
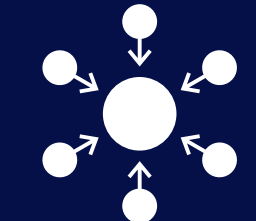




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3** THE YEAR IN NUMBERS



MAJOR ACHIEVEMENTS



MEMBER ENGAGEMENT



PARTNERSHIPS




OBJECTIVES



INNOVATION IN OCEAN OBSERVING



CAPACITY DEVELOPMENT



OUTREACH AND ADVOCACY

FOREWORD

Welcome to the Partnership for the Observation of the Global Ocean – POGO – annual report for 2021 – 2022. For those of you who know POGO, either as a member or who have worked with us, I hope you can see that POGO goes from strength to strength in all that we do. For those of you who do not know POGO, welcome. I hope you will find much of interest across our three ‘pillars’ of activity: [Innovation in ocean observing](#); [capacity development](#); and [outreach and advocacy](#) – there is much of which all of us involved can be proud.



At a personal level this report will be the last during my tenure as Chair of POGO. I have had the pleasure of leading three organisations as a member of POGO, from its earliest days, and I am about to demit as the Chair after serving two terms. All of my involvement with POGO has been a pleasure, particularly the interactions I have had with fellow members and especially the excellent and hugely professional secretariat.

POGO is a wonderful organisation, which I hope you will see shining through this excellent Annual Report.

Professor Nicholas J P Owens
POGO Chair
Executive Director, Scottish
Association for Marine Science

Since its registration as a UK Charitable Incorporated Organisation in 2018, POGO has submitted Trustees' Annual Reports to the Charity Commission, but this is the first year we have produced a more visual and interactive version of it for our members, collaborators and the community at large.



What really stands out to me in this report, as well as the breadth and impact of our activities across the 3 pillars, is the high level of member engagement – as summarised in the ["member engagement" section](#), and demonstrated in all the reports of Working Groups, projects and other activities led and executed by our members.

I am very grateful to all the POGO members for their support and engagement across all areas of the organisation, but particularly to those who volunteer their time to serve on the [Board of Trustees and other POGO Committees](#). My special thanks go out to Nick Owens for his leadership, guidance and support over the last 4 years, and to my colleagues in the Secretariat who support the implementation of all POGO activities.

Dr. Sophie Seeyave
POGO Chief Executive Officer



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Biological Observations Working group / Ocean Biomolecular Observing Network

International Quiet Ocean Experiment

Working Group on Building Capacity in Ocean AcidificaTion MoniToring in the Gulf of GuineaA (BIOTTA)

Working Group on Acquisition of Oceanographic Data for Sustainable Resources Management in the Gulf of Guinea

Working group on Capacity building for biochemical observation of anthropogenic pollution in tropical, transitional waters (BEACON)

Open Access Marine Observation Devices (OpenMODs)

Social AGITation for Temperature Analysis (SAGITTA)

CAPACITY DEVELOPMENT29

NF-POGO Centre of Excellence in Observational Oceanography hosted by the Alfred Wegener Institute, Germany

POGO-SCOR fellowships

Shipboard training

POGO-funded member training initiatives

NANO Global Project “A global study of Deoxygenation, Ocean Acidification and Productivity at selected coastal sites” (NANO-DOAP)

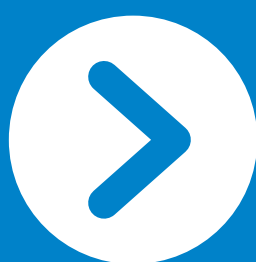
OUTREACH AND ADVOCACY39

Citizen Observations of Local Litter in Coastal ECosysTems (COLLECT) -citizen science project

South East Asia project for General Regional Awareness of Seagrass by Society (SEAGRASS)

General outreach and communications

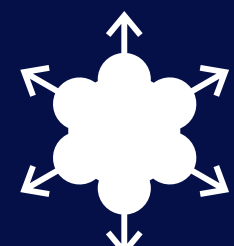
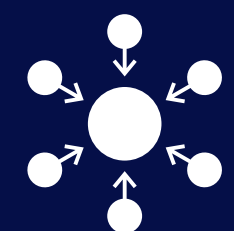
Collaborations with other organisations



Visit our website



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THE YEAR IN NUMBERS

MEMBERSHIP

55 institutions
29 countries
96% members actively engaged



TRAINING

34 Fellowships conducted
20 Countries represented
10 graduating scholars in October 2021
10 scholarships awarded to attend NF-POGO Centre of Excellence 2021-22
7 POGO-SCOR fellowships
7 Shipboard Training fellowships

Funding provided for training courses held in Mozambique, in UK and on-line

167 students attended (31 in-person + 136 on-line)
20 countries represented
1,204 Total number of trainees reached (1,068 in-person + 136 on-line)

OBSERVATIONS

Time-series measurements conducted during

349 sampling events at

35 stations in

18 countries

(NANO-DOAP project)



OUTREACH

POGO engaged with

4 UN Processes

UNFCCC COP26, UNFCCC SBSTA Ocean & Climate Dialogue, UN Ocean Conference, UN Decade of Ocean Science for Sustainable Development

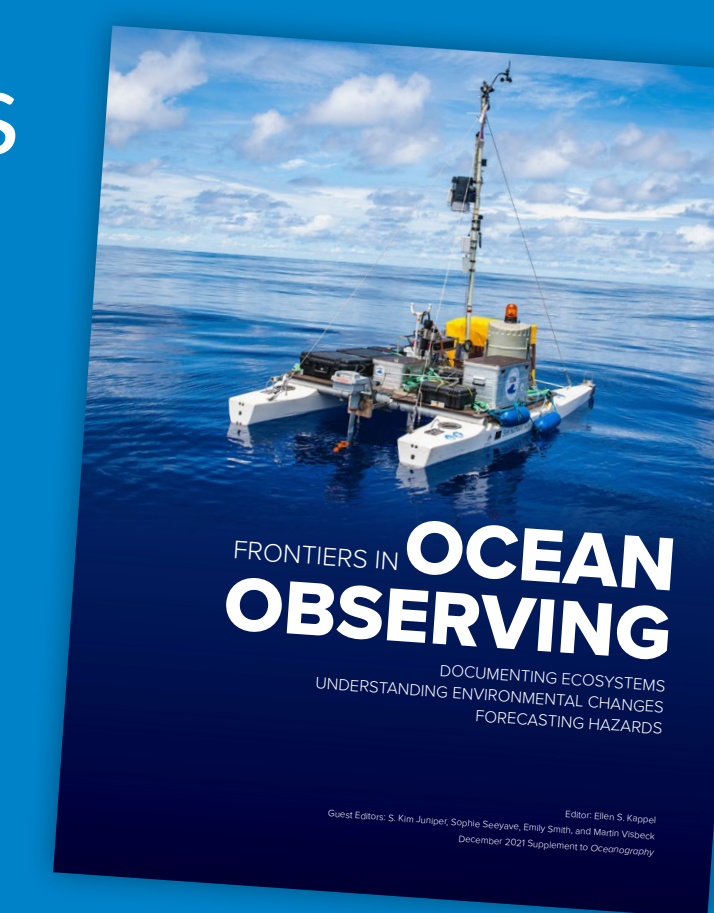
New POGO Strategy published in

5 languages

5 ocean observing case studies published



Sponsorship of Oceanography magazine special issue including 35 articles from 20 countries



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MAJOR ACHIEVEMENTS

First OBON iSAC meeting and project endorsement



First deep water test of SAGITTA probe during an Arctic research cruise

David White

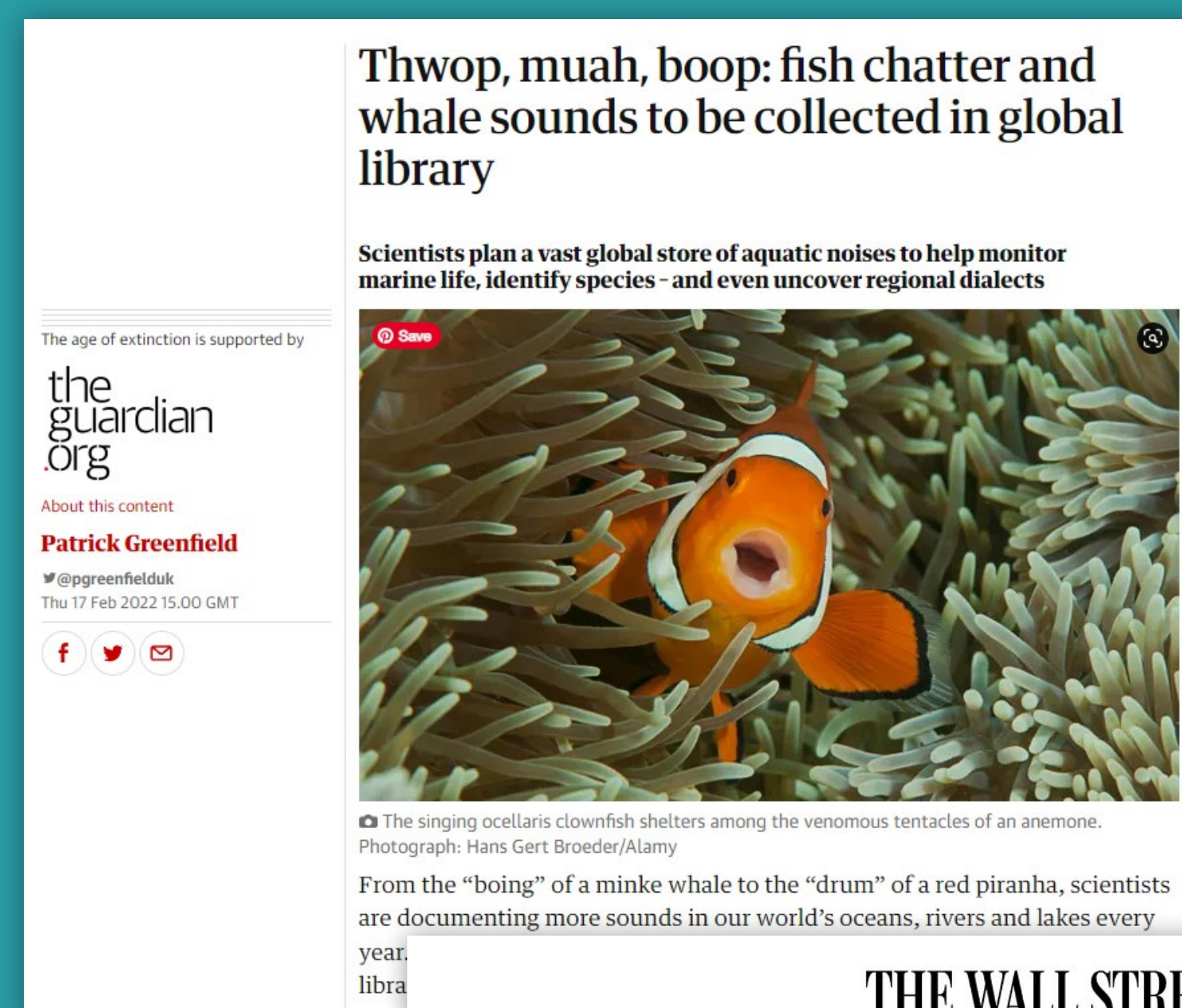
International Quiet Ocean Experiment (IQOE) Working Group published a paper promoting the idea of an Underwater Library of Underwater Biological Sounds” (GLUBS), which obtained an Altmetric “Attention Score” of 1088, i.e. in the top 5% of all research outputs ever tracked by Altmetric.

310
articles

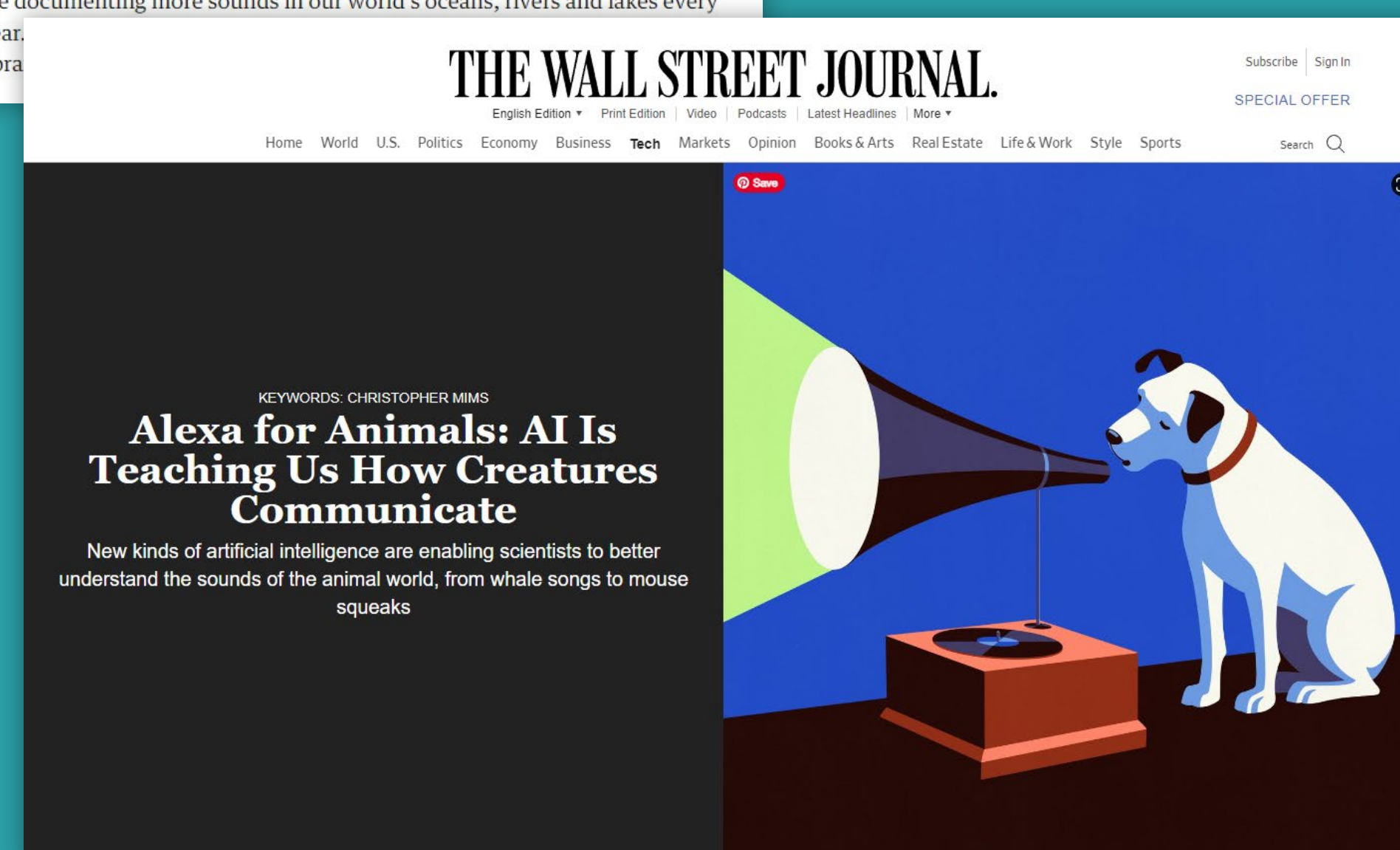
251
news sites

65
countries

15
languages



687
million
impressions
in online
media



OpenMODs assembled and tested by Centre of Excellence students, who created a video tutorial on how to assemble and deploy the drifter.



POGO-SCOR fellowships

After the disruption to international travel caused by the Covid-19 pandemic, the programme was able to resume with 8 fellowships successfully undertaken during this year. Topics included seagrass mapping, mangrove mapping, ocean acidification, wave modelling, marine megafauna, sea glider training, ocean observations for weather prediction, and coastal biodiversity observations.



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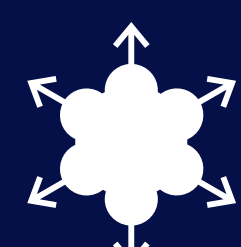
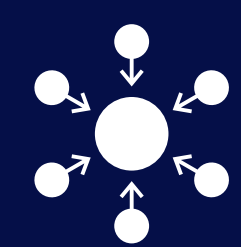
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MAJOR ACHIEVEMENTS

Ocean observing case studies published on ocean observations for water quality monitoring in China, Mexico, Nigeria, Portugal and Malaysia



Launch of new POGO Strategy

English

Français

Español

عربي

Português

COLLECT in the news

The COLLECT project was featured in local press, radio shows and on-line media in Belgium, Cabo Verde, Nigeria and Portugal.

<https://youtu.be/u-9UkTbIGHM>



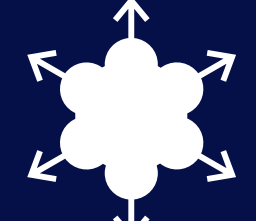
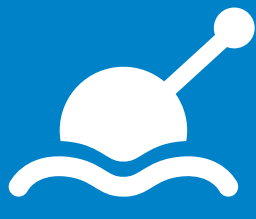
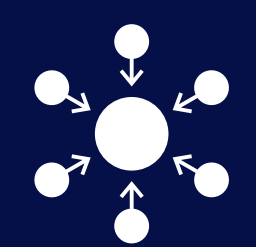
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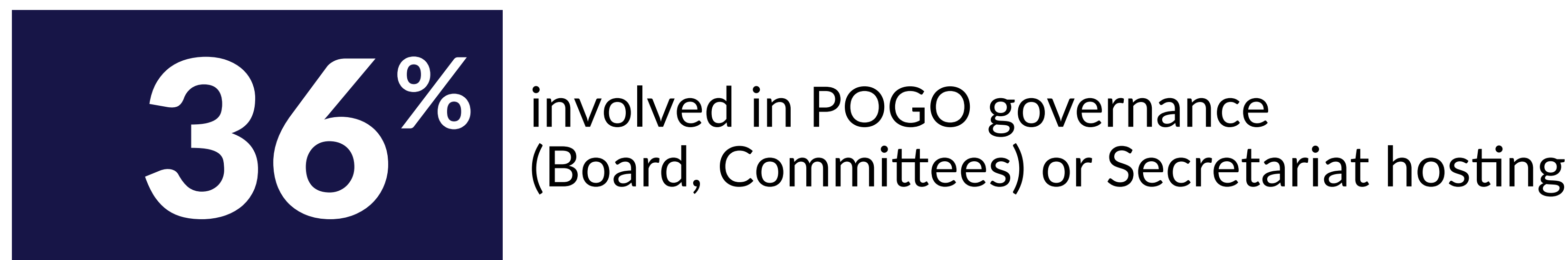
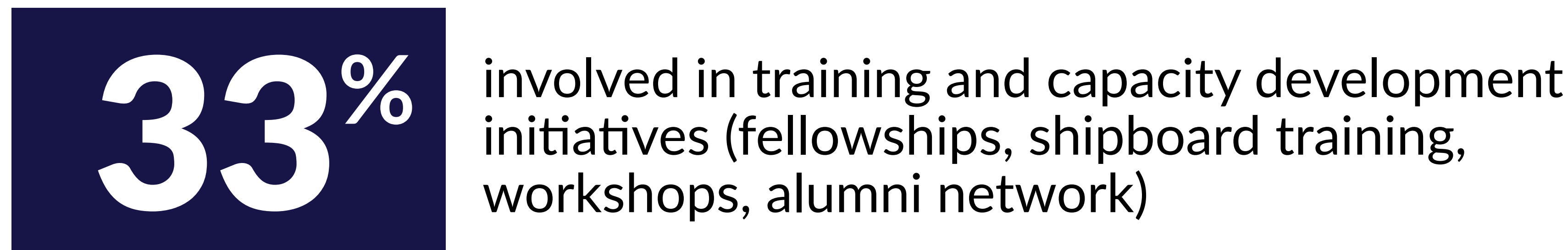
Os alunos do Liceu Ludgero Lima e da Escola Salesiana, em Mindelo, vão fazer um levantamento da poluição de plásticos nas praias de São Vicente durante o mês de Outubro e, juntamente com especialistas de universidades e institutos de investigação, contribuir para o conhecimento sobre distribuição e abundância de detritos costeiros nos países africanos.



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MEMBER ENGAGEMENT



PARTNERSHIPS

Scientific Committee on Oceanic Research (SCOR)

POGO and SCOR partnered for the 21st year running on the joint [POGO-SCOR Visiting Fellowship programme](#). POGO also participated in a side event on capacity development at the UN Ocean Conference that was led by SCOR and included the International Oceanographic Data and information Exchange (IODE) of the Intergovernmental Oceanographic Commission (IOC) and the International Science Council as partners.

➤ [see Events section](#)

POGO has also continued to co-sponsor with SCOR the International Quiet Ocean Experiment (IQOE)

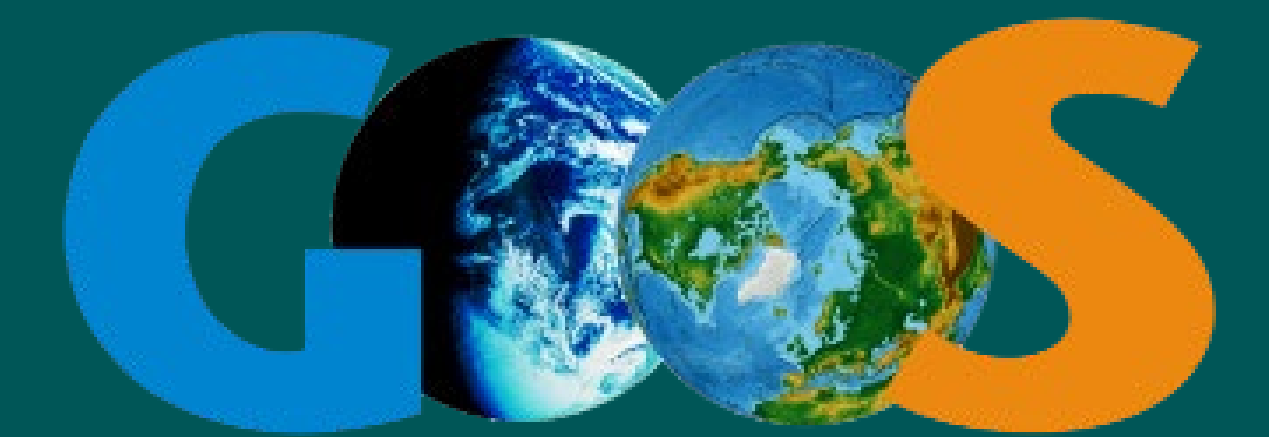
➤ [see Pillar 1 section](#)



Global Ocean Observing System (GOOS)

Session on POGO-GOOS partnership held during 23rd POGO Annual Meeting, resulting in a “Statement of Intent” and joint statements prepared for UNFCCC SBSTA Ocean & Climate Dialogue and 2nd UN Ocean Conference (June 2022)

➤ [see Outreach and Advocacy section](#)



Ocean Best Practices

POGO co-organised two sessions at the 5th Ocean Best Practices Workshop in Sept 2021, on (1) Shipboard training –towards multi-regional best practices (partnership with the All-Atlantic Floating University Network, and (2) How do we build and sustain inclusive ocean-Arctic digital ecosystems? (partnership with Arctic Data Committee and Ocean Info Hub).

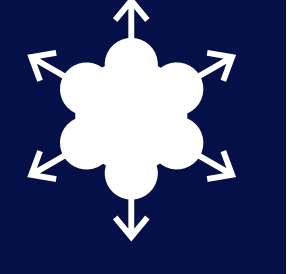
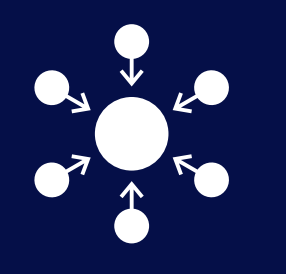


Ocean Info Hub

Sophie Seeyave, POGO CEO, continued to serve on the [Ocean Info Hub Steering Group](#). The project has progressed well over the last year, with a search interface now in place and several dozen partners having made their databases available and accessible through this interface (which will act like a Google search engine for ocean information). The POGO-led portal on ocean organisations, Oceanscape, is one of the pilot information portals being connected to OIH, and serves as a good example of a website that was not technically constructed as a database with a metadata catalogue, but which can also be accessed through OIH.



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PARTNERSHIPS

Group on Earth Observations (GEO) Blue Planet Initiative

The POGO CEO continued to serve on both the Steering Committee and Executive Committee for GEO Blue Planet, for the final year. POGO was instrumental in the creation of GEO Blue Planet in 2011, and providing administrative support as well as leadership of the initiative until a Secretariat was established at NOAA in the USA in late 2015, and a formal governance structure put in place the following year. Following the establishment of a European Secretariat Node in 2019, funded by the European Commission, an Asian Node has been established in the past year, funded by the Korean Ocean Policy Research Institute.



World Association of Marine Stations

POGO sponsored the first World Congress of Marine Stations, held online due to the Covid pandemic, in Nov 2021. Sophie Seeyave, POGO CEO, gave a presentation on POGO and also attended the inaugural meeting of the WAMS Steering Committee.



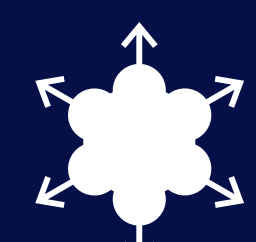
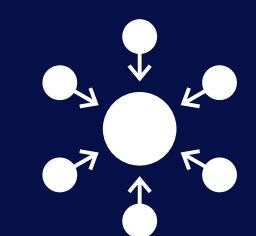
From Global to Coastal:
Cultivating New Solutions and Partnerships for an
Enhanced Ocean Observing System in a Decade of
Accelerating Change



15 - 17 August 2022
An ICTP - CLIVAR Hybrid Meeting
Trieste, Italy

Climate and Ocean Variability, Predictability and Change (CLIVAR)

POGO co-sponsored a regional training workshop organised by CLIVAR on “observing the coastal and marginal seas in the western Indian Ocean including the Arabian/Persian Gulf and the Sea of Oman” (see separate section) in June 2022. Sophie Seeyave also attended a CLIVAR workshop in August 2022 “From Global to Coastal: Cultivating New Solutions and Partnerships for an Enhanced Ocean Observing System in a Decade of Accelerating Change” in Trieste, Italy. She contributed to discussions on possible pilot projects that could be developed in partnership with CLIVAR and GOOS, thus also furthering the goals stated at the last POGO Meeting of enhanced collaboration between POGO and GOOS, particularly in the area of capacity development. The workshop opened up the possibility of partnerships for further development of POGO’s existing projects on low-cost sensors/citizen science, as well as potential new ones.

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OBJECTIVES

Our goal is to have by 2030, world-wide cooperation for a sustainable, state-of-the-art global ocean observing system that serves the needs of science and society. To achieve this, we will:

1. Lead innovation and development of the crucial components of the ocean observing system.
2. Identify and contribute to the development of the key skills, capabilities and capacities needed to achieve the vision.
3. Work with governments, foundations and industry, to articulate the benefits to society and required funding to build and sustain the system.

➤ Read and download POGO's full Strategy in several languages



Shaju S. S.

OUR VISION AND MISSION

Ocean observations available on-line to all

OBJECTIVES

WORKING FOR THE PUBLIC BENEFIT

POGO has been registered as a Charitable Incorporated Organisation (CIO) in England, UK, since 2017 (registration number 1171692). The charity brings together the world's major oceanographic institutes to plan joint actions to advance sustained ocean observations for societal benefit. POGO institutes are motivated by a common belief that advancing scientific understanding of the ocean is rooted in making systematic, high quality measurements. They believe that this understanding and its wise use are critical to, and will make a real positive difference in, enabling humanity to develop a sustainable relationship with a healthy, productive and biologically diverse ocean. POGO is further motivated by the shared belief that its vision can only be realised by working together across the world, where we can achieve together what none of us could do alone.

The ocean produces half of the world's oxygen, most of its fresh water and much of its food. It regulates climate and weather, is critical to the cycling of heat, water and carbon. It is the source of huge biodiversity. However, far too little is known about the state and functioning of the ocean. Accordingly, scientifically sound study of the ocean and support and advocacy for such study (and for the conclusions drawn from it) is of vital importance to mankind. POGO seeks to expand international support for ocean observing, through innovation of the ocean observing system, capacity development and outreach/advocacy.



David White



OBJECTIVES

STRATEGIES FOR ACHIEVING OUR OBJECTIVES

In terms of innovation, POGO members are at the forefront of oceanographic methods and technology development, often in partnership with industry, as they are the future “users” of such new technologies. Thus, POGO is in a critical position to identify the emerging methods and technologies that POGO members are developing and using, and highlighting those that can be expanded and deployed on a global scale to achieve global datasets of specific parameters measured using comparable methods. POGO also focusses on the affordability issues associated with ocean observing, particularly for developing countries, and is therefore engaged in projects to develop low-cost sensors and systems for coastal ocean observing.

POGO also recognises that the expertise for conducting ocean observations is not evenly distributed between countries, and therefore the ocean is unevenly observed, with a much higher density of observations conducted in the North Atlantic and North Pacific, than in, for example, the South Atlantic, South Pacific and Indian Oceans. POGO therefore provides professional training opportunities for early-career scientists, mainly from coastal developing countries, to expand the worldwide capacity for conducting sustained ocean observations, data collection, analysis and management, and interpreting the scientific results for the benefit of society.

POGO highlights the societal need for ocean observations, as well as the key issues facing global ocean observing, and the obstacles hampering the completion of a global ocean observing system, and brings these issues to relevant public and policy fora.



National Oceanography Centre

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OBJECTIVES

SHORT-TERM AND LONG- TERM OBJECTIVES

In the short term, POGO aims to provide training for early-career scientists, to develop the next generation of scientists and ocean observers, as well as to raise the levels of awareness and education about the importance of the ocean and ocean observing for society. Measures of success include numbers of trainees, numbers of countries having received training, numbers of website visits and downloads of outreach materials, mentions on social media and other statistics.

The longer-term vision is to develop the capacity of research institutions in developing countries to conduct ocean observations, by (1) integrating the trained scientists and their institutions into the POGO network and having them actively participate in POGO projects, (2) sharing best practices among POGO member institutions, and (3) contributing to the development and dissemination of low-cost instrumentation for coastal ocean observing. Measures of success include numbers of POGO members and numbers of new (developing) countries being added to the network, establishment of new ocean observing systems in those countries, and demonstrated long-term impacts of the training programmes (e.g. >5 years after the training, on institutional capacity and continued knowledge-transfer).

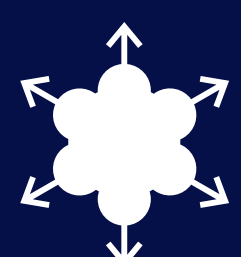
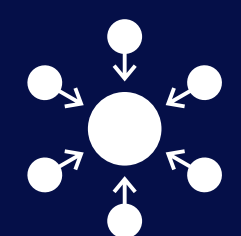


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INNOVATION IN OCEAN OBSERVING

BIOLOGICAL OBSERVATIONS WORKING GROUP / OCEAN BIOMOLECULAR OBSERVING NETWORK



In 2020 POGO used the remaining grant from the Lounsbery Foundation to fund an International Virtual Conference on eDNA: Opportunities and Challenges (led by POGO Biological Observations WG). Following on from the conference, a proposal was developed for a global programme, the Ocean Biomolecular Observing Network (OBON), that will use techniques to analyse biomolecules such as DNA, RNA, and proteins (e.g., eDNA analysis, metabarcoding, 'omics) to enhance coastal and open ocean biodiversity observations. The proposal was endorsed by the UN Ocean Decade in June 2021, with POGO as the lead organisation.

OBON will exploit the fact that every lifeform in the ocean, from viruses to the largest marine mammals, contains or leaves behind a biomolecular trace (e.g., nucleic acids) that can be analysed directly from a tissue, seawater or sediment sample. The programme will utilise biomolecular technologies to monitor, research and understand life in the sea at every trophic level and scale, how life varies in response to climate and anthropogenic impacts, including fisheries, and how these changes impact society.

This high-level objective is broken down into the following four more detailed objectives:

- To build a coastal-to-open ocean multi-omics biodiversity observing system over the Ocean Decade.
- To develop and transfer capacity so as to initiate additional marine biomolecular observation activities through training programmes combined with funded equipment programmes supported by development/aid agencies and philanthropy.
- To enhance marine ecosystem models (including new modelling based on machine learning) by adding biomolecular components so the models can utilize data collected from the coordinated molecular observations and generate 4D multi-omic biodiversity seascapes.
- To address pressing scientific, management, and policy questions linked to the state and dynamics of life in the ocean, including exploited resources and those affected by other pressures.

This year POGO has supported the initial development of OBON, through the provision of salary for a part-time Programme Officer and financial support for a hybrid meeting of the newly established OBON interim Science Advisory Council (iSAC) in Nov 2021.

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INNOVATION IN OCEAN OBSERVING

BIOLOGICAL OBSERVATIONS WORKING GROUP /
OCEAN BIOMOLECULAR OBSERVING NETWORK

- Expansion of iSAC to include representation of new regions (SE Asia, Southern Africa)
- Endorsement of 12 UN Decade Projects



2021 United Nations Decade
2030 of Ocean Science
for Sustainable Development

- Establishment of Working Groups on Data, Technology and Capacity Building
- Virtual side events at COP26 and UN Ocean Conference 2022
- Publications: OBON Fact Sheet; article in Marine Technology Society Journal;
- Initial website, social media channels (Twitter, Instagram and YouTube), pitch video, mailing list and newsletter created.



OBON
OCEAN BIOMOLECULAR
OBSERVING NETWORK

> OBON Website



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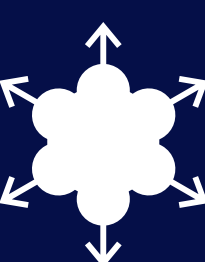
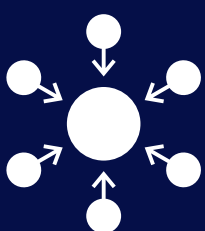
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INNOVATION IN OCEAN OBSERVING

INTERNATIONAL QUIET OCEAN EXPERIMENT



POGO and SCOR have been co-sponsoring the International Quiet Ocean Experiment (IQOE) since its inception in 2011. This is an international scientific programme to promote research, observations, and modelling to improve understanding of ocean soundscapes and effects of sound on marine organisms. The Sloan Foundation was instrumental in starting up this initiative, and in providing seed funding for coordination. In recent years, IQOE has benefitted greatly from grants awarded by the Richard Lounsbery Foundation to advance specific IQOE activities. IQOE is past the mid-point in implementation of its [Science Plan](#) and has successfully coordinated a variety of activities in ocean acoustics and bioacoustics through IQOE [working groups](#) on the use of acoustics to [assess biodiversity](#), the importance of acoustic observations in the [Arctic Ocean](#), standards for reporting [ocean acoustic](#) and [bioacoustic](#) data for IQOE, [software](#) for making acoustic observations comparable worldwide, and recommendations for implementation of an [Ocean Sound Essential Ocean Variable](#) for the Global Ocean Observing System. IQOE progress has been documented since June 2018 through IQOE Newsletters and since the beginning of the project through other [products](#). IQOE identified 2020 as the Year of the Quiet Ocean because of evidence that [ocean sound decreased](#) because of decreases in human activities in the ocean due to the COVID-19 pandemic.

Specific POGO contributions

- POGO encouraged its members to consider hosting an International Project Office (IPO) for the programme, which led to the Alfred Wegener Institute recruiting 2 data managers to support IQOE and its Data Working Group.
- An IQOE panel supported by POGO proposed that the Global Ocean Observing System (GOOS) adopt Ocean Sound as an Essential Ocean Variable (EOV), and submitted an EOV Specification Sheet that was subsequently accepted by GOOS. IQOE was given the responsibility to work on implementation of this EOV, and formed a [committee](#) in 2020 to write an Implementation Plan for the Ocean Sound EOV. POGO has been supporting the development of the Implementation Plan, which (as of Aug 2022) is in the final stages of internal review before going out for community review.
- POGO has led IQOE-sponsored discussions of low-cost hydrophone systems. An [IQOE Workshop on Low-Cost, Self-contained Underwater Acoustic Recording Systems](#) (in three two-hour sessions to make global participation possible) was held on 13-14 December in virtual mode to bring together ocean acousticians and bioacousticians, engineers, and some NGO representatives to discuss how to develop and deploy lower cost hydrophone systems worldwide. More than 150 individuals registered for the sessions and several interesting ideas were put forward, related both to hydrophones for citizen science/education (not necessarily calibratable) and hydrophones that could be calibrated and deployed by countries seeking to contribute data to related to the Ocean Sound EOV. The workshop will probably result in several spin-off efforts that will benefit POGO, IQOE, and implementation of the Ocean Sound EOV. IQOE will continue to help groups self-organise around topics identified during the workshop.

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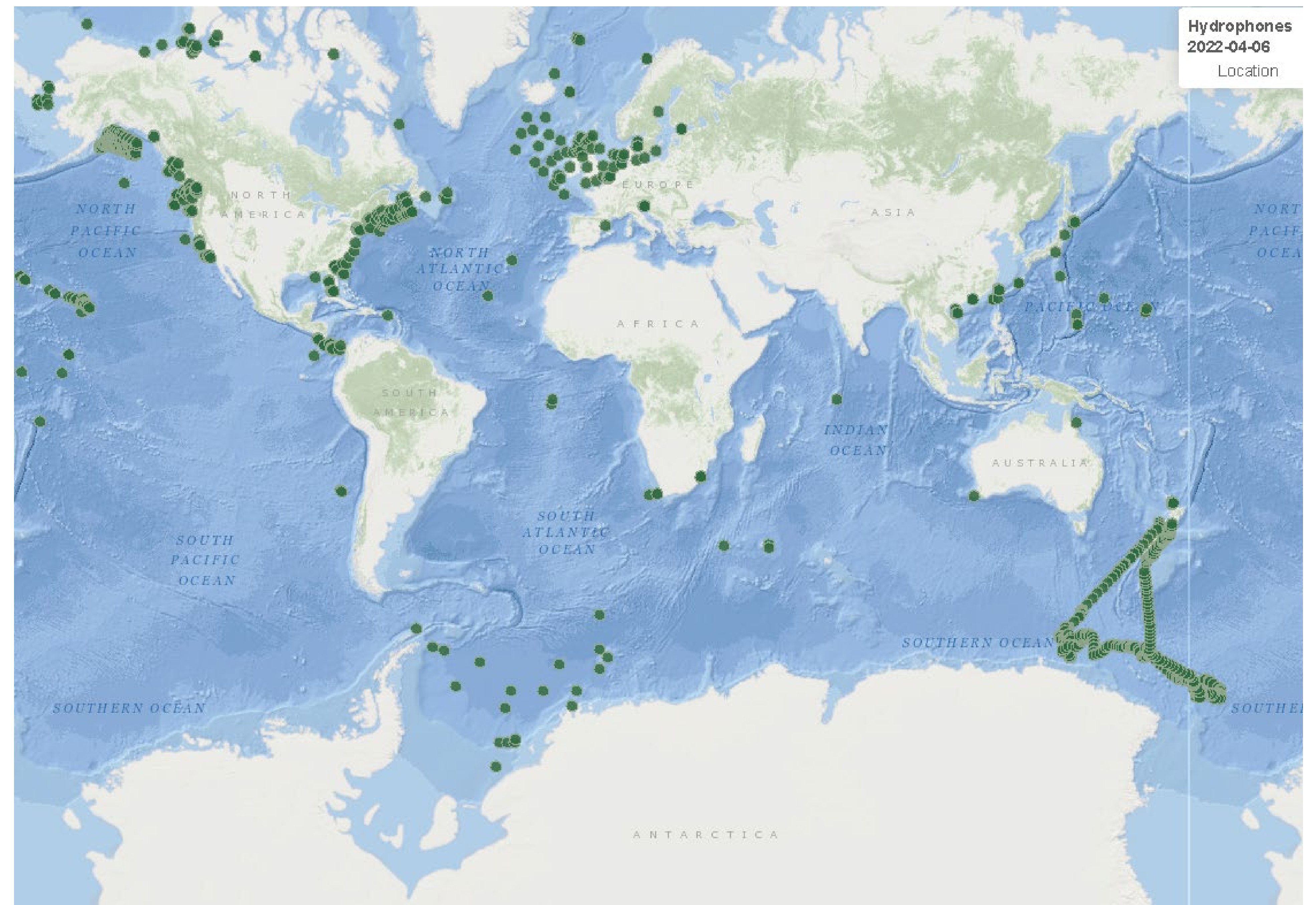
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INNOVATION IN OCEAN OBSERVING

INTERNATIONAL QUIET OCEAN EXPERIMENT

Other highlights

- COVID-19 Pandemic Noise Observations and Publications: The list of papers on the IQOE website related to COVID-19 impacts on ocean sound has been updated with [two 2022 publications](#). Observations of the changes in ocean sound that resulted from the COVID-19 pandemic will help managers understand the extent to which different changes in human activities— such as decreased shipping and slowing of ships—will impact ocean sound. IQOE is considering developing an analysis and publication synthesizing the published information on the effects of the pandemic on ocean sound. As a first step, a conference call is being planned to bring together the authors of published work on this topic to discuss what would be required to conduct such an analysis.
- Global Hydrophone Network: The set of hydrophones for which metadata is maintained by IQOE continues to grow. Most recently, sonobuoy deployments by Australian and U.S. agencies have been added. The most up-to-date locations of deployments (1999–2022) are shown in the figure.



Locations of civilian hydrophone deployments from 1999 to present, as of 24 October 2022

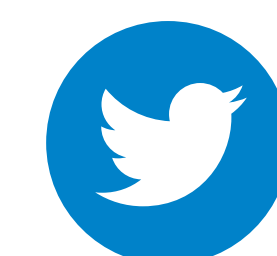
INNOVATION IN OCEAN OBSERVING

INTERNATIONAL QUIET OCEAN EXPERIMENT

- Global Library of Underwater Biological Sounds (GLUBS): GLUBS is a project of the IQOE WG on Acoustic Measurement of Ocean Biodiversity Hotspots, led by Miles Parsons (AIMS, Australia). The WG published a [paper in *Frontiers in Ecology and Evolution: Population, Community, and Ecosystem Dynamics*](#). The article, “Sounding the call for a global library of biological underwater sounds”, made the case for the cooperation of institutional and national databases of underwater biological sounds to create an international system that could advance abilities for scientists and the public to input unknown sounds and have them classified, a capability that has been developed for birds. The publication attracted huge media attention and was in the top 5% of all research outputs ever tracked by [Altmetric](#). The WG obtained a grant from the Richard Lounsbery Foundation (\$140,300) for GLUBS work. The grant will support an early-career scientist to work on the follow-up from a GLUBS workshop in Berlin, Germany on 16 July 2022 and leading the organization of a two-day hybrid workshop (in the United States) to develop the GLUBS conceptual platform design, among other tasks.
- Making Ambient Noise Trends Accessible (MANTA): A [new version of MANTA has been released](#), for processing ocean acoustic data according to ISO standards and making it possible to compare observations made by different equipment at different locations.
- Open Portal to Underwater Soundscapes (OPUS): OPUS is intended to be an expeditious discovery tool of archived, quality-controlled, passive acoustic monitoring data to promote public recognition of underwater sound and to further our understanding of its ecological function, by making underwater soundscapes experienceable by anybody, from artist to researcher. [OPUS](#) is being developed at the Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI) and is available with login credentials received upon request. A test version of OPUS currently features 6 passive acoustic monitoring, however the internal database comprises 79 passive acoustic datasets, which will be featured publicly on OPUS after their data quality has been reviewed. Over the past few months, a steadily increasing number of users from the scientific community worldwide have accessed the test version of OPUS and provided feedback. Overall, OPUS has been well received and its functionality seems to serve most users well.



[IQOE Website](#)



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INNOVATION IN OCEAN OBSERVING

WORKING GROUP ON BUILDING CAPACITY IN OCEAN ACIDIFICATION MONITORING IN THE GULF OF GUINEA (BIOTTA)

Grant awarded to University of Ghana

The BIOTTA working group was set up to equip graduate students, early career ocean scientists and other marine science professionals in the Gulf of Guinea (GoG) region with skills on sustainable ocean acidification (OA) data acquisition to expand our understanding of the threats, risks and impacts to marine ecosystems and chart pathways for sustainable management of marine resources at risk to OA in the GoG region. This working group hopes to also bridge national, regional and international data gaps in ocean acidification.

BIOTTA aims to complement global efforts such as the Global Ocean Acidification Observing Network (GOA-ON) and the International Ocean Carbon Coordination Project (IOCCP) by convening a series of virtual regional workshops and webinars to train young and professional scientists in setting up and maintaining OA observation systems in the GoG and other African coastal waters.

The BIOTTA working group objectives are to:

- Develop a coordinated network for observing OA in the GoG
- Develop capabilities to undertake analysis of seawater OA parameters using low-cost, readily available and easy-to-use equipment.
- Map OA hotspots in BIOTTA member countries for long-term OA monitoring.
- Initiate OA monitoring activities in BIOTTA member countries after successful mapping of hotspots in these countries, making use of OA observation kits developed by GOA-ON and the International Atomic Energy Agency (IAEA).
- Integrate into global OA observing networks, such as GOA-ON, with the goal to share and make data available to the global ocean observing community.



Members Involved





INNOVATION IN OCEAN OBSERVING

WORKING GROUP ON BUILDING CAPACITY IN OCEAN ACIDIFICATION MONITORING IN THE GULF OF GUINEA (BIOTTA)

Highlights

- The network has been formed, with partners from new countries (Benin, Cote d'Ivoire and Cameroon) added to the original group of country representatives from Ghana and Nigeria.
- 100K USD obtained from The Ocean Foundation (TOF) to purchase equipment to set up the monitoring stations.
- 2nd Focal Point Meeting held in Oct 2021 and 3rd Focal Point Meeting in Feb 2022
- Stakeholder and knowledge identification surveys conducted in participating countries
- BIOTTA presentation given at virtual Ocean Science Meeting in Feb 2022
- Partnership with IOC NORAD programme, which is also planning OA training activities in the same region
- On-line training course developed by TOF and IOC-UNESCO and trialled in the Pacific Islands. This is due to be implemented in the BIOTTA countries in 2022/23, in conjunction with an in-person training course.



Alex Mustard / Ocean Image Bank

[Read more about BIOTTA](#)

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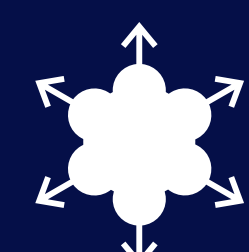
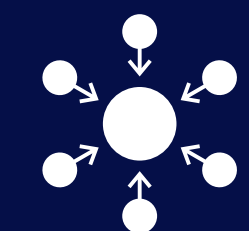
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INNOVATION IN OCEAN OBSERVING

WORKING GROUP ON ACQUISITION OF OCEANOGRAPHIC DATA FOR SUSTAINABLE RESOURCES MANAGEMENT IN THE GULF OF GUINEA

Grant awarded to Nigerian Institute of Oceanography and Marine Research (NIOMR)

The initiation of an oceanographic network and a regional databank is a very important project to be embraced by all countries within the West African sub region. Sea surface temperature in the Gulf of Guinea (GoG) varies at seasonal and inter-annual time scales, and thus may have a strong impact on climate (West African monsoon onset and intensity), precipitation (water resources), and fisheries. The WG aims to obtain data on seawater characteristics up to the 500m isobath within the GoG region. This will provide salient information for physical, chemical, biological and geological description of the water column and sediment characteristics within this region. The main objectives are to collect oceanographic data to complement the completed and ongoing international programmes within the region, establish and maintain a long-term network of measurements within GoG, and also incorporate training and local capacity building.

To fulfil one of the goals of POGO in building a community of ocean scientists, this WG brings together marine scientists from five African countries within the region (Nigeria, Benin, Togo, Ghana and Côte d'Ivoire), in partnership with oceanographers from GEOMAR, Germany (5 out of these 6 institutions are POGO members). The main goals are:

- To establish a regional oceanographic databank needed for studies on the analysis and monitoring of ocean and climate conditions within the Gulf of Guinea, their influence on the regional climate, and sustainable management of living and non-living resources (e.g. identification of potential fishing zones).
- To promote regional capacity building through academic/research institutions and shipboard trainings.
- To develop and maintain a long-term ocean monitoring network within the Gulf of Guinea region.
- To assist governments through research and development in implementing sustainable economic policies on living and non-living resources, which are geared towards sustainable societal livelihood.

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INNOVATION IN OCEAN OBSERVING

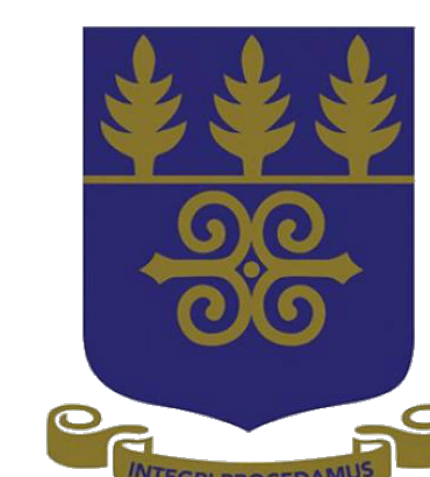
WORKING GROUP ON ACQUISITION OF OCEANOGRAPHIC DATA FOR SUSTAINABLE RESOURCES MANAGEMENT IN THE GULF OF GUINEA

Highlights

- Following the completion of the first leg of the cruise, which included 6 shipboard training fellows (January 2021), the WG worked on the analysis and compilation of the comprehensive dataset that was collected.
- The complete data report has been submitted to POGO.
- In spite of delays and problems caused by COVID, security issues in Nigeria, and the rise in fuel costs, the WG has continued to make progress by planning for a data analysis workshop instead of conducting the second leg of the cruise.



Members Involved



➤ [Read more about Acquisition of Oceanographic Data for Sustainable Resources Management in the Gulf of Guinea](#)

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INNOVATION IN OCEAN OBSERVING

WORKING GROUP ON CAPACITY BUILDING FOR BIOCHEMICAL OBSERVATION OF ANTHROPOGENIC POLLUTION IN TROPICAL, TRANSITIONAL WATERS (BEACON)

Grant awarded to University of Ghana

There is a need to build capacity to monitor human activities (e.g., pollution) on benthic communities and chemical tracers within the biota and sediment in the coastal waters of the Gulf of Guinea (GoG). The capacity building will increase access to state-of-the-art sampling methodologies, laboratory processes, and instrumentation useful for expanding the knowledge of benthic biodiversity and chemical tracers in biota coupled with the sediment in West Africa, a poorly documented field. Coastal ecosystems, such as lagoons and estuaries, serve as economic, social, and educational resources. As the aquatic environment is a source of food, its pollution is a global health concern. Mercury (Hg) is a toxic element occurring in low concentrations, but its by-product, methylmercury, is highly toxic, and can accumulate in the sediment and biota (e.g., bivalves and fish). This can lead to human health concerns, such as increased risk of circulatory system disorders and cancers, through consumption of contaminated food.

Benthic organisms are good bioindicators for investigating anthropogenic environmental disturbances such as pollution, as species

composition can reflect the ecological conditions of an aquatic environment. Transitional waters (e.g., estuaries) are complex systems that are regional in scale. There is limited information on transitional tropical waters and their biota in the spatial inventory of benthic fauna from West Africa. Increasing human population coupled with growing demand for resources and generation of waste put coastal lagoons and estuaries at risk of collapse. Continuous monitoring of these systems is necessary for understanding changes in their ecosystem structure and functioning. Yet, there is inadequate information on well-documented biological data and biota as chemical tracers of contaminants from the tropical West Africa coast. Information on species occurrence, habitat, and spatial-temporal distribution will allow local and regional distribution of indicator species to understand pollution and environmental change.

The BEACON working group objectives are:

- To organise a workshop for interdisciplinary scientists on benthos sampling with bottom grab and Multi-Parameter Probe to observe the conditions of the coastal waters and use of a Direct Mercury Analyzer to measure chemical tracers such as analysis of total Hg in sediment and biota.
- To contribute spatial knowledge on benthos and contaminant of Hg in biota and sediment from coastal waters in the Gulf of Guinea.
- The preliminary findings can support decision-making, policy development for biodiversity conservation, future coastal benthic research, and understanding of pollution in tropical transitional coastal waters.

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INNOVATION IN OCEAN OBSERVING

WORKING GROUP ON CAPACITY BUILDING FOR BIOCHEMICAL OBSERVATION OF ANTHROPOGENIC POLLUTION IN TROPICAL, TRANSITIONAL WATERS (BEACON)

Highlights

- The biochemical observation network (BON) has been established for pollution monitoring. BEACON has pioneered collaboration among scientists in the West Africa region and Europe and America, who are willing to work together to exchange scientific resources and knowledge.
- BEACON presentation was given at virtual Ocean Sciences Meeting in Feb 22
- There has been a series of online seminars and planning meetings ahead of the hybrid workshop (4 seminars in Oct 21, planning meetings in Apr and May 22).
- The preliminary database on physicochemical parameters of transitional waters within the participating countries is in progress. However, harmonisation of methods, analysis of species and mercury concentration in sediment is yet to be carried out during the hybrid workshop.
- BEACON members participated in capacity building Coastal Ocean Environment Summer School in Nigeria 2022 (COESSIN).
- An Eckman grab has been procured and shipped to Ghana.



Members Involved



ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR-
UND MEERESFORSCHUNG



WOODS HOLE
OCEANOGRAPHIC
INSTITUTION



[Read more about BEACON](#)

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INNOVATION IN OCEAN OBSERVING

OPEN ACCESS MARINE OBSERVATION DEVICES (OPENMODS)

Project grant awarded to National Institute of Oceanography and Applied Geophysics (OGS), Italy, Alfred Wegener Institute (AWI), Germany, and Instituto do Mar (IMar), Cabo Verde

This project has the overarching goal “to devise ocean sensors and monitoring devices, globally available to all and not just to a privileged few”. The objective of the current phase was to realize a prototype of a versatile low-cost ocean observing platform ready to be tested and equipped with a variety of sensors, to consolidate and enlarge the potential user community and to narrow the data and knowledge gaps between “advanced” and “developing” countries. Its potential is not limited to developing countries, but it can be advantageous in all those applications that require a high temporal and spatial coverage of observations. The implementation of the prototype has followed three main lines: the platform, the sensors, and the communication systems.

During the first phase of the project, the participants agreed that the platform would:

- operate with minimum modifications as moored system, drifting buoy or manually deployed equipment;
- include essential sensors and operate in dual mode as a self-recording system or real-time autonomous system;
- include a low-cost low-power embedded system to acquire, control, process, store and (in case) transmit data;
- employ low-cost materials (e.g. plastic pipes for domestic use for the instrument housing);
- be assembled on-site by trained non-professional operators or for educational purposes.

Furthermore, the communication system would:

- use the most popular low-cost/no transmission cost communication systems;
- enable the timely communication of the relevant data and control flags and its delivery on the web;
- be ready to exploit the present and future opportunities and facilities offered by the Internet of Things technologies.

It was agreed that the resulting platform would then be tested and used as educational equipment in a conceptual framework of science, technology and practice transfer and dissemination to local user communities.

Members Involved



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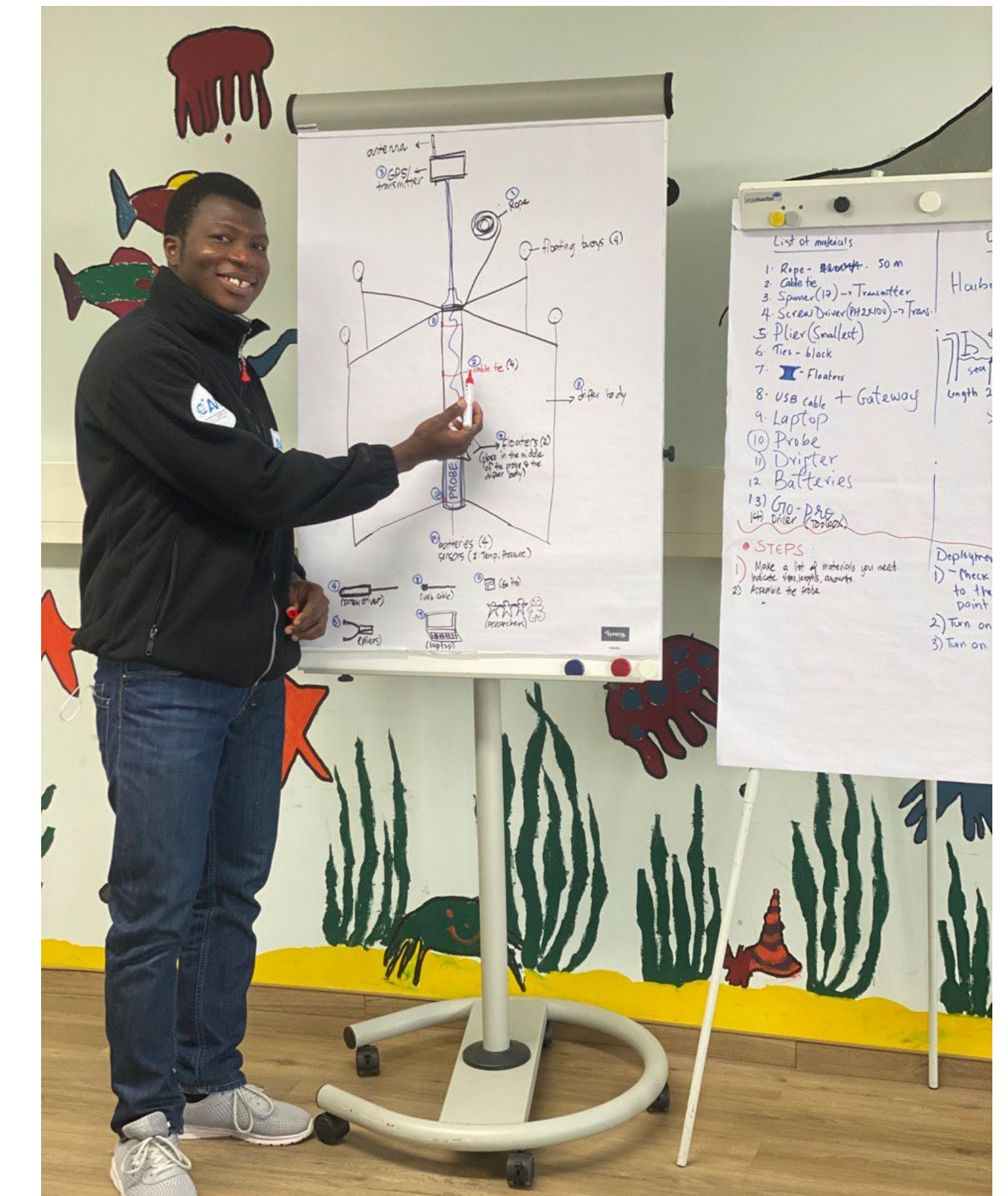
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INNOVATION IN OCEAN OBSERVING

OPEN ACCESS MARINE OBSERVATION DEVICES (OPENMODS)

Highlights

- An improved platform was designed, assembled and tested in the OGS test tank for watertightness and strength of its structure.
- Several tests were performed on the instrument's pressure module for temperature and depth (TD) measurements. The final predicted accuracy was 20 cm with an operating range of 0 to 140 m depth. The housing for the TD was manufactured on a lathe and was tested at the OGS naval tank at a depth of 2 m to test its watertightness.
- Several TD probes were produced, and two platforms equipped with LoRa data transmission and temperature depth (TD) probe for temperature and pressure (depth) measurement and a gateway for data reception were shipped to the AWI in March 22 for training the NF-POGO Centre of Excellence scholars in the assembly, deployment and use of the instrument.
- The training unit was very successful in terms of increased knowledge on the maintenance and improvements to the system. The scholars gained hands on knowledge on low-cost devices and developed a deep understanding of the underlying processes and possible pitfalls. The main deliverables were a manual and a video on the maintenance and launching of the devices, produced by the scholars. These products will be formatted and proofread within the duration of this NF-POGO CofE cohort.



<https://youtu.be/JK9OgTZWI7Y>



➤ Read more about Open MODs

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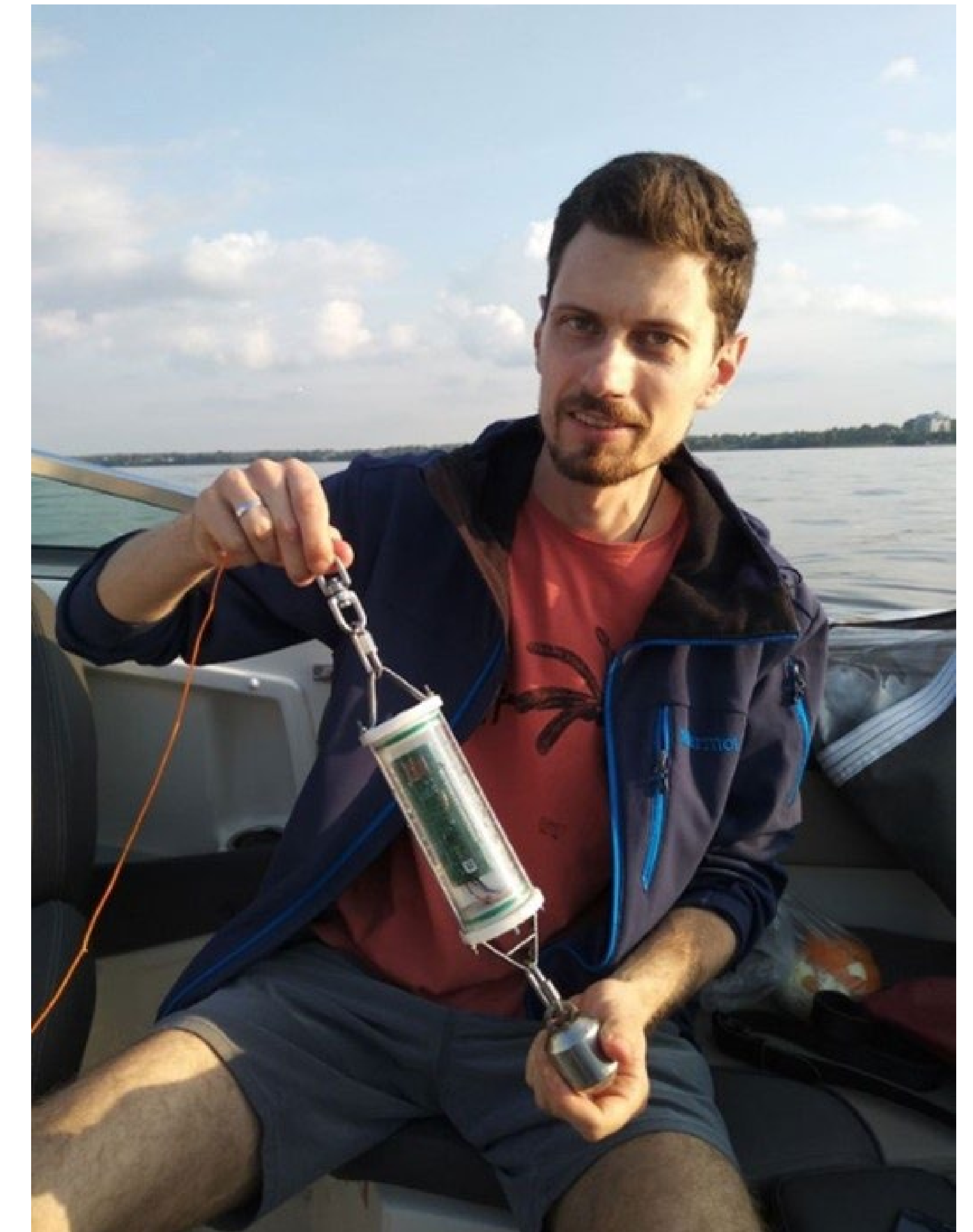
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INNOVATION IN OCEAN OBSERVING

SOCIAL AGITATION FOR TEMPERATURE ANALYSIS (SAGITTA)

Project funded by the Nippon Foundation as part of the NF-POGO Alumni Network for the Ocean (NANO) activities

The project aims to implement a citizen science approach for consistent and regular temperature profile data collection in the coastal ocean. This requires distribution of cheap and simple temperature-depth (TD) probes among the general public. Though suitable equipment is present on the market, it is quite expensive (5,000-9,000 USD per probe) and relatively complex for users without specialised training. Therefore the project aims to create a cheap TD probe, simple smartphone application and web portal to make this idea possible. The probe should be cheap (about 100 USD) yet scientifically reliable. The smartphone app will be used for probe control, instant data visualization and data transmission to the web. The web portal is necessary for data storage, access and dissemination; it will also be useful for training and outreach. The main achievements this year have been (1) finalising and production of the probe prototype, (2) development of the smartphone application, and (3) testing the prototype in the field.



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INNOVATION IN OCEAN OBSERVING

SOCIAL AGITATION FOR TEMPERATURE ANALYSIS (SAGITTA)

Highlights

- A smartphone application was developed by a US-based company and tested by the project PI, with several rounds of feedback and improvements made to the app over a period of several months.
- Several prototypes of the housing were produced and tested, as well as several versions of the Printed Circuit Board (PCB).
- One fully assembled unit of the probe (housing and the final version of the electronics) was tested twice in the Ivan'kovskoye reservoir (river Volga basin, Russia), in Sep 2021. Two options of deployment were tested: from a Stand-Up Paddleboard in a shallower area and from a boat, in deeper water. The idea was to test the feasibility of using a small water-borne platforms (e.g. wind surfing, dinghy boats) to deploy the sensor. Both deployments were successful, although they highlighted the need for calibration of both the temperature and pressure sensors.
- A prototype of the instrument was shipped to Plymouth for testing by the POGO Secretariat at the L4 time series station, about 16 km southwest of Plymouth in the western English Channel. Although the instrument was successfully connected to a smartphone via the app, some issues were detected with the data transmission so the in situ testing was put on hold while the issue was being investigated by the PI.
- The project PI was able to test the probe in the North Pacific during a scientific cruise. He was able to attach the sensor to the CTD and deploy it to 100-110 meters and two successful profiles were obtained. The housing had a slight leak (one or two drops of water inside the housing were observed each time after deep deployment) so further tests are needed with other units to determine the cause of the leak. Nonetheless, it was an important achievement for the project that the sensor was finally tested in deep water and that professional CTD data were obtained in parallel to compare results and assess the sensor performance.

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CAPACITY DEVELOPMENT

NF-POGO CENTRE OF EXCELLENCE IN OBSERVATIONAL OCEANOGRAPHY HOSTED BY THE ALFRED WEGENER INSTITUTE, GERMANY

The ten-month postgraduate-level training consists of 1- to 2-week modules on all aspects of observational oceanography (e.g. physical, chemical, biological oceanography, marine geology, remote sensing, modelling, data management, statistics) as well as key skills (scientific writing, presentation skills, scientific communication, research ethics) and a 3-month individual research project.

Eight of the 10 scholars of the 2020-21 cohort (postponed to Dec 20 – Oct 21) successfully graduated; unfortunately, 2 of the scholars were only able to attend the programme remotely and therefore could not complete the individual research projects and therefore graduate. The 2021-22 course was also postponed to Feb-Nov 2022 due to Covid. Although the scholars' arrivals were somewhat staggered, all scholars were able to physically join the programme by Feb 22 and the course has been able to return to its usual in-person teaching format.

For the first time a module on low-cost open access marine observation devices took place, in collaboration with the [POGO OpenMODs](#) project. During the OpenMODs project, the AWI and a team of scientists at the National Institute of Oceanography and Applied Geophysics (OGS) in Trieste, Italy, worked on the development of a low-cost probe with several sensors, which was then tested under real conditions on Helgoland Roads. The scholars had to assemble and connect the device to the communications gateway, conduct deployment and data retrieval experiments and discuss their observations and results with the team of developers in Italy via videoconferencing. The accompanying lectures were also attended by

scientists from Senegal (among them an alumnus of the NF-POGO Centre of Excellence) and Tunisia who are planning to work with this system in the future. One team of the CofE was tasked with creating a handbook, the second team with creating a video explaining the handling of the probe. All outcomes were presented at the end of the course and very well received by the project scientists and POGO. It was decided to implement workshops in the scholars' home countries where the scholars should act as trainers for the handling of the OpenMODs instrument.



CENTRE OF EXCELLENCE IN
OBSERVATIONAL OCEANOGRAPHY



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CAPACITY DEVELOPMENT

POGO-SCOR FELLOWSHIPS

Seven Visiting Fellowships have been awarded to, and completed by, early-career scientists from developing countries to spend up to 3 months at another research institute receiving individual training and supervision on a research topic of their choice. In addition, another fellowship was underway by the end of Aug 22. All fellowships awarded in 2020 had had to be postponed to 2021 due to restrictions on both travel and on institutions being able to welcome visiting scientists due to Covid health and safety protocols. Of these, the final two were either completed or underway by the end of this reporting period. The fellowships awarded in 2021 were subjected to fewer disruptions, and 5 of the 6 awarded were completed (and 1 underway) by the end of the reporting period.



"As a result of this internship, we intend to produce one of the first high-resolution wave hindcasts with data assimilation for the SE Brazilian coast [...]. This effort is essential to building up an open access operational wave product that focuses on the increase in the synergy between observation and modelling."

Ana Carolina Peralta Brichtova

Parent institution: Universidad Simón Bolívar, Venezuela

Host Institution: Institute for Marine Remote Sensing, University of South Florida, USA

Training topic: Seagrass Assessment using optical satellite images: a case study at the Ocumare Cienaga.

Duration: 3 months (Sep-Dec 2021)



Country of origin



Host country



Carolina Gramcianinov

Parent Institution: University of São Paulo, Brazil.

Host Institution: Institute of Coastal Systems Analysis and Modeling - Helmholtz Centre Hereon, Germany.

Training topic: Integrated wave modelling and observation system in the South Atlantic Ocean.

Duration: 3 months (Sep – Nov 2021)



Country of origin



Host country



Stella Patricia Betancur Turizo

Parent Institution: Center for Oceanographic and Hydrographic Research of the Caribbean (CIOH), Colombia

Host Institution: Instituto de Investigaciones Oceanológicas, Mexico.

Training topic: Biogeochemical parameters analysis at Antares Cartagena station and its climatic variability in the Colombian Caribe region.

Duration: 2 months (Oct – Dec 2021)



Country of origin



Host country



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CAPACITY DEVELOPMENT

POGO-SCOR FELLOWSHIPS

Cristhian Asto

Parent Institution: Instituto del Mar del Peru

Host Institution: Mediterranean Institute of Oceanography, France.

Training topic: Glider training for coastal monitoring in the Peruvian upwelling system.

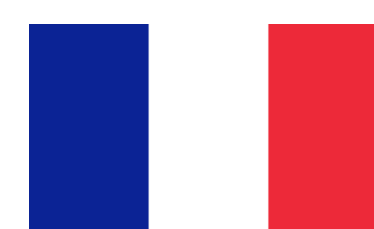
Duration: 1 month (Jan – Feb 2022)



Country of origin



Host country



“The Peruvian Marine Research Institute (IMARPE) is trying to establish an operational monitoring network using state of the art instruments such as gliders. [...] This training will help to better operate and automatize the data transfer sent in real time by those instruments. [...] This will make our activity visible and our data open, as well as available for assimilation in operational forecasting models and reanalysis.” -Christian Asto

Dava Amrina

Parent Institution: Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG), Indonesia.

Host Institution: Scripps Institution of Oceanography, USA.

Training topic: Karimata Strait Variability in relation to Northeasterly Cold Surges and their Impact on Regional Rainfall.

Duration: 2 months (June - July 2022)



Country of origin



Host country



“The POGO/SCOR fellowship programme provides an excellent and important opportunity to support visits to host laboratories and research institutions to foster the exchange of ideas and encourage the advance of scientific interests.” -Janet Sprintall, Scripps Institution of Oceanography

Pranav Pulukkayi

Parent Institution: Central Marine Fisheries Research Institute, India

Host Institution: Plymouth Marine Laboratory (PML), UK

Training topic: Use of sentinel satellite data for mangrove mapping and conservation.

Duration: 3 months funded by POGO-SCOR + 1 month extension funded by host supervisor (Feb – June 2022).



Country of origin



Host country



María Mendez

Parent Institution: Gregorio Bigtti, Instituto de Biología de Organismos Marinos (IBIOMAR), Argentina.

Host Institution: Celia Olabarria, Universidade de Vigo, Spain.

Training topic: Effects of increased environmental stress on coastal biodiversity.

Duration: 3 months (June - Aug 2022)



Country of origin



Host country



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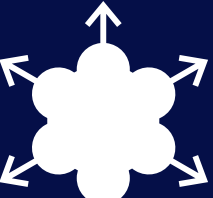
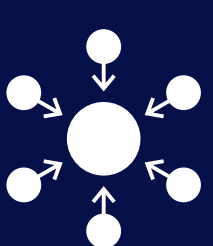
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CAPACITY DEVELOPMENT

SHIPBOARD TRAINING

Seven fellowships were awarded for training on-board research ships to receive hands-on training in sampling and analysis techniques, a one-month stay at the host research institute prior to the cruise and a further month after the cruise to analyse the data and interpret the results. Fellows were from Argentina, Brazil, Cabo Verde, India, Morocco, and Nigeria and the host institutes were in Denmark, Portugal and Spain.



Joseph Sebastian

Parent Institution: Hafencity University, Germany

Fellowship: Nippon Foundation-POGO-Eurofleets+ on-board the Danish DANA BITS cruise (2 – 17 November 2021).



Country of origin



Host country



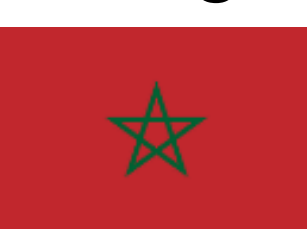
Ghoufrane Derhy

Parent Institution: Essaouira School of Technology, Morocco

Fellowship: Nippon Foundation-POGO-IEO on-board the RADMED cruise with pre and post cruise training periods at the Instituto Español de Oceanografía (IEO) in Malaga, Spain (6 Dec 2021 – 28 Feb 2022).



Country of origin



Host country



Carola Ferronato

Parent Institution: Instituto Argentino de Oceanografía, CONICET, Argentina

Fellowship: Nippon Foundation-POGO-IEO on-board the RADIALES cruise, with pre and post cruise training periods at the Instituto Español de Oceanografía (IEO), Centro Oceanográfico de A Coruña, Spain (14 Feb - 15 May 2022).



Country of origin



Host country





CAPACITY DEVELOPMENT

SHIPBOARD TRAINING

Zuleica Almeida Duarte

Parent Institution: Atlantic Technical University, Cabo Verde

Fellowship: Nippon Foundation-POGO-IH on-board NRP D. Carlos I, with a post cruise training periods at the Instituto Hidrográfico (IH), Lisbon, Portugal (30 Jan - 2 May 2022).



Country of origin



Host country



Julieta Rodriguez

Parent Institution: National Institute for Fisheries Research and Development, Argentina

Fellowship: Nippon Foundation-POGO-Eurofleets+ on-board the Danish DANA IBTS cruise (Aug – 2 Sept 2022).



Country of origin



Host country



“The fellowship programme provides great opportunity to experience first-hand and receive training in the practical use of advanced ship based marine science equipment and techniques. It provides not only training in specific skills, but also inspiration for projects and new approaches to tackle challenges in home institutes and countries. The exchanges through the fellowship programme are also a great way to promote greater international understanding and tolerance through developing personal relationships across sometimes very different cultures.” -Susan Maersk Lusseau, host supervisor, DTU Aqua

Luiza Reis de Souza

Parent Institution: Universidade Federal Fluminense, Brazil

Fellowship: Nippon Foundation-POGO-Eurofleets+ on-board the Danish DANA IESNS cruise (22 April – 6 May 2022).



Country of origin



Toyosi Igejongbo

Parent Institution: Federal University of Technology Akure, Nigeria

Fellowship: Nippon Foundation-POGO-Eurofleets+ on-board the Danish DANA HERAS cruise (25 June – 8 July 2022).



Country of origin



Host country



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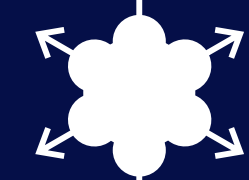
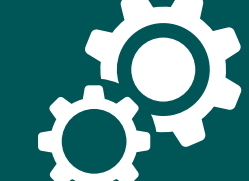
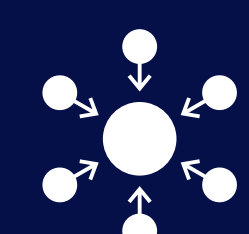
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CAPACITY DEVELOPMENT

POGO-FUNDED MEMBER TRAINING INITIATIVES

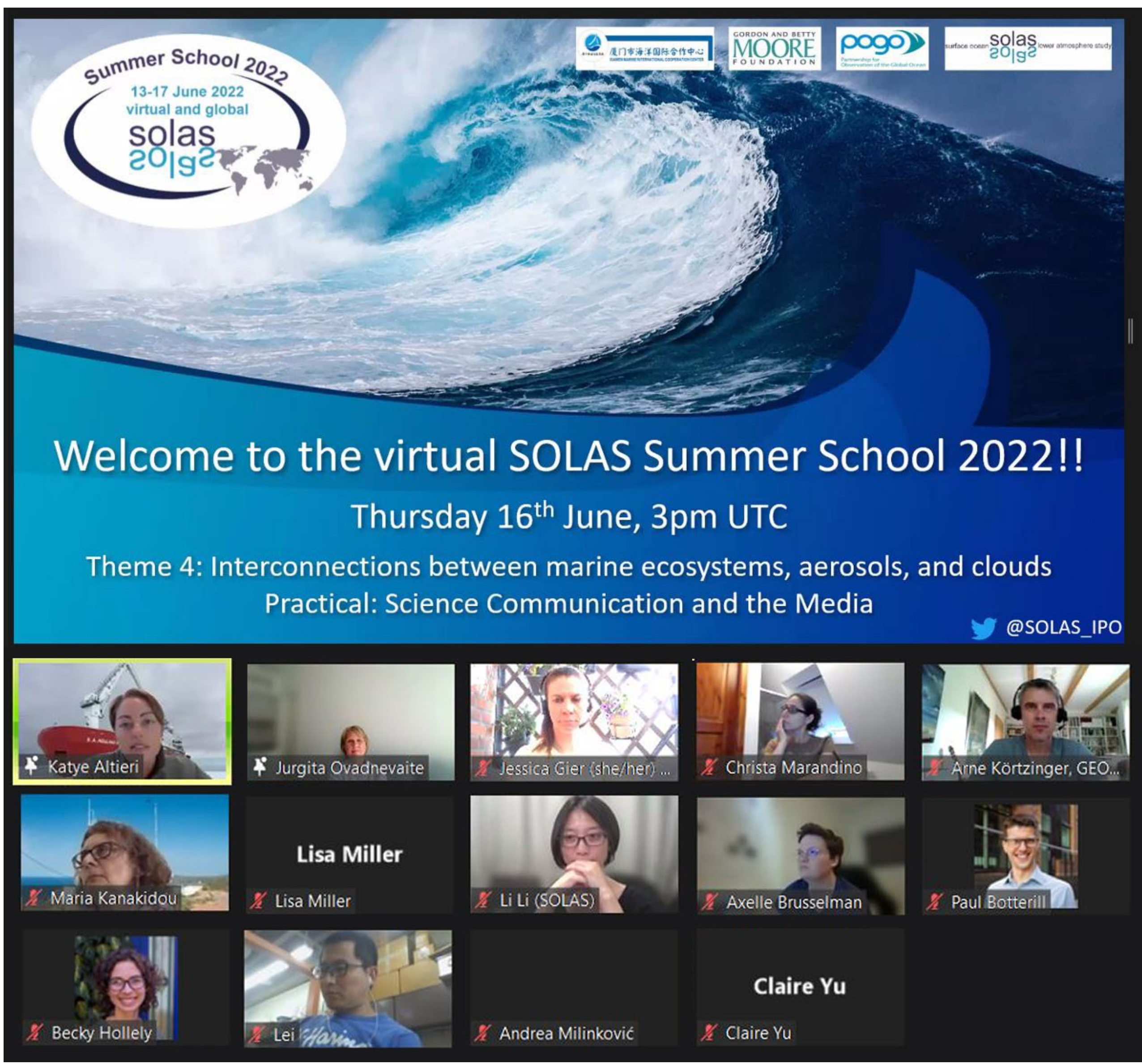
Grants were awarded to 3 member institutions to support the following training programmes:

2022 Surface Ocean Lower Atmosphere Study (SOLAS) Summer School, June 2022

Grant awarded to GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany

The first virtual SOLAS Summer School took place from 13-17 June, 2022. A total of 62 students from 24 countries were accepted and the content was delivered by 29 international and interdisciplinary experts. The virtual event was performed via the online platforms Whova and Zoom, supported by the great communications expert team of [Mindfully Wired Communications](#).

The students were offered a carefully selected mix of lectures, discussions and workshops over five days ([see the full programme](#)). As in previous SOLAS Summer Schools, one focus of this virtual summer school was on communication and networking. As we now know after more than two years of the pandemic, virtual events pose a very special challenge when it comes to communication and networking. Thanks to the great students, lecturers and the team of Mindfully Wired, the hurdles of virtual events were skilfully overcome and transformed into a lively experience that will be remembered by the participants. We hope that fruitful collaborations will emerge in the future, and we saw, through the Whova platform interactions, that the students mobilized to meet even after the school finished. The virtual summer school concluded with the awarding of work-related travel and publication monetary prizes to selected students. This year the best posters, the most liked uploaded photo, and the most creative/engaged social media post were awarded. A total of 12 prizes found happy recipients. The contents of the first virtual SOLAS Summer School will be made available to the interested public.



CAPACITY DEVELOPMENT

POGO-FUNDED MEMBER TRAINING INITIATIVES

Training course on best practices for biogeochemical ocean observations, June 2022

Grant awarded to Scottish Association for Marine Science (SAMS), UK

Biogeochemical measurements in ocean observing systems allow for assessment and sustainable management of oceanic ecosystems, yet they are underrepresented and underutilized. The POGO observational training course was designed to increase utilization of biogeochemical data sets and share experiences with moored and float biogeochemical sensors made by different projects to grow the biogeochemical observing system.

The workshop took place as hybrid event. It was streamed live and online from Wednesday, 15 June to Friday, 17 June, and attended by a total of 35 participants (of which 9 were in-person).

Program Highlights

1. Mini-Conference (5-minute presentation of participants)
2. Training Groups: 1) BGC-Argo, 2) Moored observations, 3) Ship-board and glider observations
3. Discussion - Do we need to standardize calibration and quality control of biogeochemical sensors? What do you want from the international community? What is a good approach to test new BGC sensors (Ship-board, Mooring, Argo)?



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CAPACITY DEVELOPMENT

POGO-FUNDED MEMBER TRAINING INITIATIVES

IORP-CLIVAR training course on “Regional training workshop on observing the coastal and marginal seas in the Western Indian Ocean”, June 2022 (grant awarded to INCOIS)**Grant awarded to Indian National Centre for Ocean Information Services (INCOIS), India**

The Regional Training Workshop on Observing the Coastal and Marginal Seas in the Western Indian Ocean (WIO) was successfully organised from 7 to 9 June 2022, in a hybrid format with physical venues in Maputo, Mozambique as hosted by the Instituto Oceanográfico de Moçambique (InOM). The overall goal of the training workshop was to encourage the countries in the WIO to engage in ocean (where ocean here refers to ocean, coastal and marginal seas) observing and marine research. Additionally, the training gave insight into the existing tools for ocean observing and accessing data through open platforms. [Visit the workshop webpage.](#)

During this 3-day workshop, over 235 participants (22 in-person) representing the WIO rim countries (Kenya, Tanzania, South Africa, Madagascar, Comoros and Mozambique) and beyond listened to the voices from world experts (12 in-person and 12 on-line) on ocean observing. It was also an opportunity for the WIO experts to raise what they are doing and where the observational needs and gaps are. In addition, there was training and discussions on best practices on the fit-to-purpose and easy-to-use observation instruments and innovative platforms; how to access data and make quality assurance; data archive, distribution and use to solve the societal needs; as well as how to leverage support from national and international opportunities were emphasised.

[Download full report.](#)



CAPACITY DEVELOPMENT

NANO GLOBAL PROJECT “A GLOBAL STUDY OF DEOXYGENATION, OCEAN ACIDIFICATION AND PRODUCTIVITY AT SELECTED COASTAL SITES” (NANO-DOAP)

Project funded by the Nippon Foundation as part of the NF-POGO Alumni Network for the Ocean (NANO) activities; Research grants awarded to 17 participating institutions in the following countries: Argentina, Bangladesh, Brazil, Colombia, Ghana, India, Indonesia, Kenya, Lebanon, Mexico, Nigeria, Senegal, Thailand, Togo and Tunisia, with additional voluntary participating institutions in Ecuador, Pakistan and Peru.

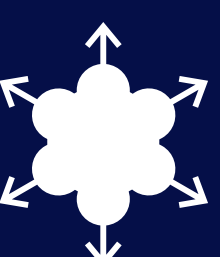
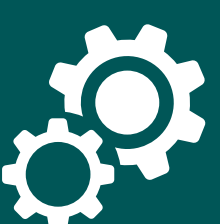
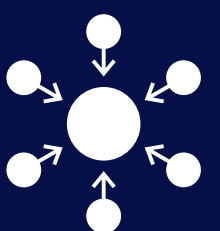
The NANO global project has three major components:

1. Promote in situ and remotely sensed observations of the ocean at selected coastal sites in order to contribute to the global effort of monitoring the levels of ocean acidification and deoxygenation;
2. Provide opportunities to the project participants for: i) capacity building to strengthen their efforts to monitor levels of acidification and oxygenation; ii) join larger observation networks of ocean acidification and deoxygenation;
3. Organize workshops and webinars dedicated to share experiences in i) monitoring levels of productivity, acidification and oxygenation; ii) training on marine data management; iii) compare results from fieldwork and produce a biogeographic distribution of the stations.

Field work was conducted in 2021-22 in all countries, for a set of variables (e.g., temperature, chlorophyll-a, pigments, bio-optical variables, conductivity,

nutrients, total alkalinity, pH, dissolved oxygen, phytoplankton) varying from station to station. The budget was allocated depending on the local sampling costs, so as to enable each country to sample on a bimonthly basis. In general, sampling was able to resume at or close to pre-COVID frequencies. In addition, the project has been running a [webinar series](#), publishing regular updates in the [NANO Newsletters](#), and several stations have been conducting outreach activities in their local communities.

The project participants published an article on the project in the POGO-sponsored supplemental issue of Oceanography magazine, “Frontiers in Ocean Observing” (see next section and reference list below) and are currently working on a second manuscript. Throughout the year, several presentations were given at various international conferences and high-level events.



CAPACITY DEVELOPMENT

NANO GLOBAL PROJECT “A GLOBAL STUDY OF DEOXYGENATION, OCEAN ACIDIFICATION AND PRODUCTIVITY AT SELECTED COASTAL SITES” (NANO-DOAP)

Krug, L.A., Sarker, S.; Huda, A.N.M.S., Gonzalez-Silvera, A.; Edward, A.; et al. 2021. Putting training into practice: An alumni network global monitoring program. pp. 18–19 in *Frontiers in Ocean Observing: Documenting Ecosystems, Understanding Environmental Changes, Forecasting Hazards*. E.S. Kappel, S.K. Juniper, S. Seeyave, E. Smith, and M. Visbeck, eds, *A Supplement to Oceanography* 34(4), DOI 10.5670/oceanog.2021.supplement.02-08.

Krug, L.A., Kivva, K., Sarker, S., Beckman, F. & Seeyave, S. (2022). Beyond the training: The NF-POGO Alumni Network Projects. Oral presentation at the Ocean Sciences Meeting session on Global capacity development in ocean science for sustainable development. 2nd March 2022. (virtual)

Krug, L.A. (2022). Maximising benefits and extending opportunities beyond the NF-POGO trainings. International Indian Ocean Science Conference (IIOSC) Early Career Network workshop. 16 March 2022 (virtual)

Krug, L.A. (2022). NANO Network. 4th Ocean Decade Laboratory “A Healthy and Resilient Ocean” Core event. 9 March 2022 (virtual)

Krug, L.A. (2022). Developing capacity in ocean observations - Opportunities. Presented at UN Ocean Conference virtual side event Developing the capacity we need for the ocean we want (29 Jun 2022)



OUTREACH AND ADVOCACY

CITIZEN OBSERVATIONS OF LOCAL LITTER IN COASTAL ECOSYSTEMS (COLLECT) -CITIZEN SCIENCE PROJECT

The project, initiated in Jan 2021, with funding from the Richard Lounsbery Foundation, is led by Dr. Ana Catarino from the Flanders Marine Institute (Belgium) and Dr. Edem Mahu from the University of Ghana.

COLLECT aims to acquire data on marine plastic debris distribution and abundance on the coasts of six African countries, through training citizen scientists (secondary school students) and promoting knowledge transfer between local communities, researchers, and POGO members.

This project targets ten secondary schools from six African countries (Ghana, Nigeria, Benin, Ivory Coast, Cape Verde and Morocco) and an external collaboration with Malaysia. Each POGO collaborator (except for Malaysia) received funds to purchase locally any required materials to organise the field activities, engage with the media, to cover for transport to the field, provision of meals/snacks for the students and staff, and to cover modest fees for technicians' and teachers' support. Expenses also covered the purchase of small gifts for the students, namely [foldscoptes](#) and POGO/COLLECT-branded face masks. The collaborator in Malaysia shared the protocols but conducted the field work at their own cost.

The main scientific tasks focused on developing a sampling protocol for macro, meso and microplastics in sandy beaches, for the citizen scientists (school students), using systematic sampling techniques along a 50 m transect. The protocol included a technical extended version for partners and teachers,

RICHARD LOUNSBERY FOUNDATION
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OUTREACH AND ADVOCACY

CITIZEN OBSERVATIONS OF LOCAL LITTER IN COASTAL ECOSYSTEMS (COLLECT) -CITIZEN SCIENCE PROJECT

and an illustrated (2-pager/video) simplified version for students. Protocols included datasheets based on the OSPAR classification of macroplastic and on the vocabularies used by EMODnet Chemistry. All materials were produced in the three working languages (English, French and Portuguese). The project includes a data management plan (DMP), submitted to the VLIZ Data Centre and stored at the DMPonline platform (dmponline.be).

The first sampling season took place in October 2021, and the data analysis began in January 2022. The second sampling season took place in March 2022, and a calibration exercise for plastics identification will take place in the next reporting period.

The social sciences component of the project aimed at evaluating the impact on the wellbeing and environmental awareness of the students before and after participating in the sampling activities. This component is led by Marine Severin (VLIZ), who developed a DMP for data collection, a submission for the ethics committee of Ghent University, and surveys that were given to students prior and post-intervention, prepared in the three working languages. This component of COLLECT has been pre-registered in the [platform OSF](#) and the data analysis is underway.

Activities related to the communications component of the project included the creation and update of social media handles (Facebook, Instagram and Twitter), publication of news pieces in the POGO newsletter, production of a banner, and media engagement via a press release (in the three working languages) as well as via direct contact by the local POGO partners (TV, radio and newspapers).

Highlights

- COLLECT has been submitted by POGO as a “voluntary commitment” to the UN Partnerships for Sustainable Development Goals online platform.
- COLLECT was presented in several scientific events (SETAC Africa (Sep 21), 5th Community Workshop of the IOC-UNESCO Ocean Best Practices System (Sep 21), VLIZ Marine Science Day (Mar 22) and SETAC Europe (May 22)) and local media from participating countries (see examples [here](#) and [here](#)).



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OUTREACH AND ADVOCACY

SOUTH EAST ASIA PROJECT FOR GENERAL REGIONAL AWARENESS OF SEAGRASS BY SOCIETY (SEAGRASS)

Grant awarded to the Centre for Marine and Coastal Studies (CEMACS) of Universiti Sains Malaysia (USM)

For the past 20 years, CEMACS has been conducting scientific training on seagrass ecology and environmental monitoring on the Middle Bank seagrass bed in Penang. The location of the Middle Bank in the Straits of Malacca, the second busiest ocean maritime trade route in the world, provides a unique opportunity to understand the impact of climatic and anthropogenic influences on the seagrass ecosystem.

The Middle Bank provides an exemplary and educational hands-on site for academic exercises, stakeholders training for capacity development, and promotion of environmental sustainability awareness in the community. It is a long-term monitoring site for seagrass ecosystem and its evolution, with the potential to advance our understanding of the effect of global environmental change and its consequences on the seagrass ecosystem.

Findings from the scientific studies conducted at the Middle Bank can be shared with the relevant stakeholders, policymakers, and local government agencies to assess adaptation actions, manage risks and apply scientific knowledge to issues of sustainable development in this area.

The SEAGRASS project is providing the institutional mechanism for mobilizing and integrating the University's expertise and resources in marine science, scientific training, and capacity development in partnership with the relevant government agencies and academic institutions, as well as conducting public engagement activities to raise environmental sustainability awareness.



Members Involved



OUTREACH AND ADVOCACY

SOUTH EAST ASIA PROJECT FOR GENERAL REGIONAL AWARENESS OF SEAGRASS BY SOCIETY (SEAGRASS)

The state government aspires to establish a marine sanctuary at the seagrass bed of Middle Bank – in the vicinity of a heavily built-up and populated area in Penang. The establishment will serve important goals including the advancement of conservation, food security, nature tourism, climate change resilience, and coastal protection. A multidisciplinary approach to key issues involving multiple-use and varied stakeholder profiles is essential in providing insights for the successful development of marine conservation areas on the Middle Bank

The SEAGRASS project is engaging with relevant authoritative bodies in the formation of marine sanctuary to improve the resilience of the protected ecosystem towards climate change, and providing scientific inputs to the stakeholders and policymakers to advance their understanding of global environmental change and its impact on the seagrass ecosystem in the marine sanctuary.



Highlights

- Clean-up activity conducted in partnership with State Government and private organisations (watch video)
- Article published in This Week in Asia and 3 articles in Penang Monthly (all subscription-based): “The Unique Wonders of Penang’s Marine Garden”, “The Middle Bank Can Anchor a Green Future for Penang”, and “Middle Bank: A Marine Sanctuary to Enrich the Future”.
- Stakeholder consultation workshops conducted, co-organised with the Department of Fisheries.

OUTREACH AND ADVOCACY

GENERAL OUTREACH AND COMMUNICATIONS

This year continued to see a significant move away from printed (paper) materials. This change was already beginning to take place in 2019 – e.g. displaying laminated ‘hard copies’ of leaflets on our booths, together with an array of QR codes to allow mobile device users to access digital copies quickly and easily, or handing out branded USB Flash Drives, pre-loaded with digital materials. However, the 2020 shift to virtual meetings has made paper products almost obsolete.

All of POGO’s brochures, leaflets and other written products are available as [digital versions online](#).



As human population is predicted to reach 9 billion by 2050, people are turning with growing urgency to the ocean for answers to the greatest challenges of our age, such as feeding the world's growing population; providing clean energy to power vibrant economies; increasing resilience to dangers from the sea; and mitigating and adapting to climate change. But people are also looking to the ocean for more – for hope and inspiration. The ocean is the last unexplored frontier on Earth and holds so much promise and opportunity for the future – provided we manage it wisely.

Human activities are having widespread impacts on the ocean such as overfishing and biodiversity loss, the acidification of the ocean as it takes up excess carbon dioxide from fossil fuel burning, or the spread of disintegrating waste plastics throughout the ocean with as yet unknown consequences. This ocean state cannot continue and humanity needs to find ways to manage more effectively our relationship with the ocean, coastal seas and estuaries so future generations can benefit from it as we do.

Therefore, we need to be more continuously aware of how and why the ocean is changing – and maybe better predict the impacts of the ocean on people and of people on the ocean. To this end, making continuous ocean



New interactive POGO Strategy

In 2021, the POGO Strategy was updated to take into account changes in the international context and advances in technology since 2016, and to lay out a more specific focus for POGO activities over the next 5 years. POGO Members were invited to contribute to an interactive publication by recording short video clips of themselves making statements from the strategy text. Members were also invited to contribute images to illustrate sections of the text. The Secretariat commissioned a designer and video producer to bring all the components together, with a formal launch on 22 October. [View the announcement](#), and the [full interactive document](#). In December, the Secretariat sent postcards to Members and other contacts (178 in total) to raise awareness of the launch. In March 2022, the Strategy was professionally translated into Arabic, French, Portuguese and Spanish.



English

Français

Español

عربي

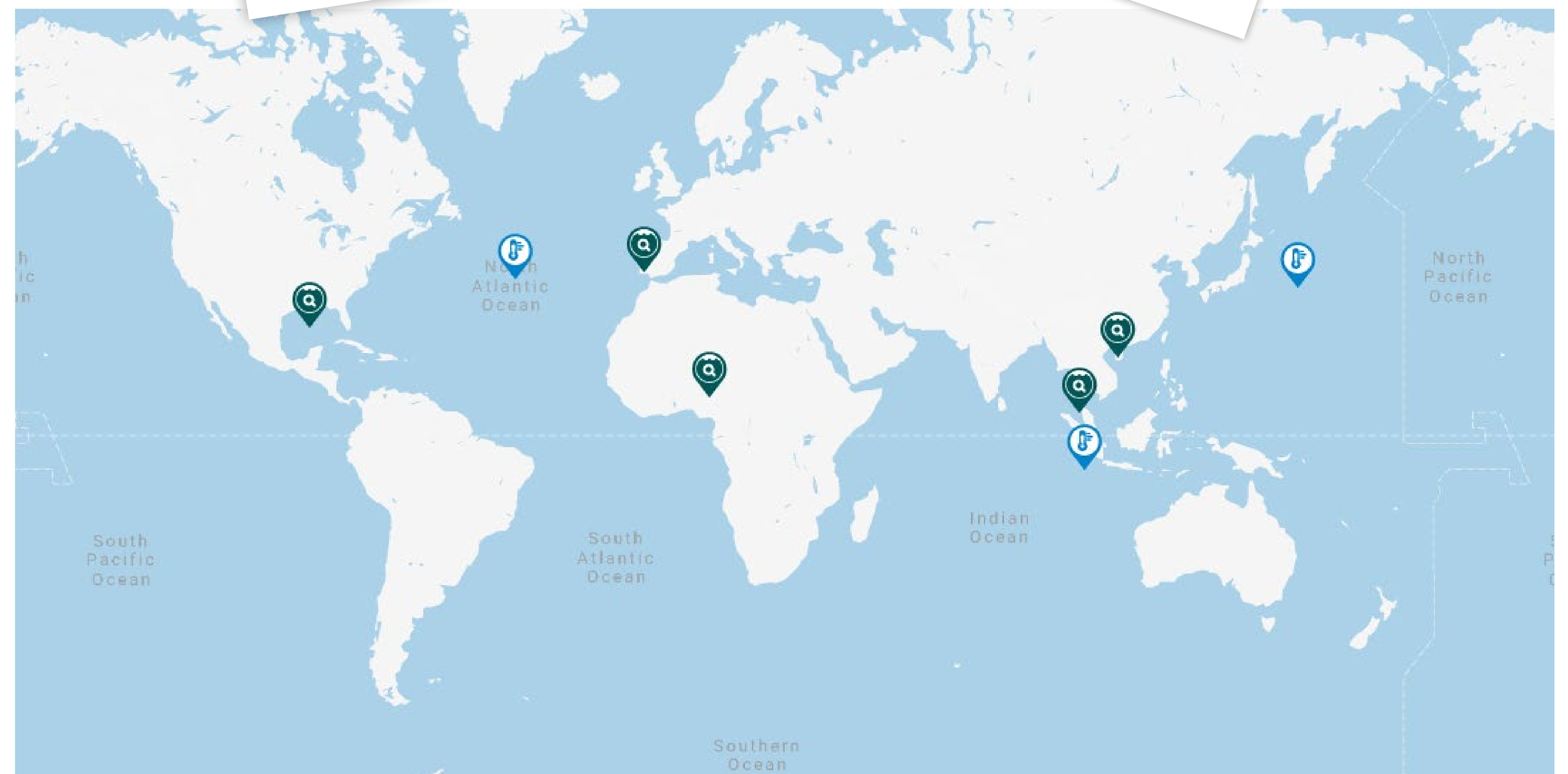
Português

OUTREACH AND ADVOCACY

GENERAL OUTREACH AND COMMUNICATIONS

Ocean Observing Case Studies

Following on from discussions at the POGO Annual Meeting in January 2020, a set of Case Studies has been developed to illustrate various socio-economic benefits of ocean observing. A freelance science writer was contracted to work on the project and to interact directly with researchers at POGO institutions. A call for story ideas went out to all POGO members in May 2021, resulting in 30 proposals from 16 members. Once reviewed, it became clear that the majority fitted into one of four main 'themes'- (1) Coastal water quality monitoring, (2) Climate-critical observing, (3) Fisheries/food security and (4) Geohazards. We decided to group similar stories together, starting with coastal water quality monitoring (five examples from Malaysia, Nigeria, Portugal, China and Mexico) for the first phase of the project. The case studies are designed for use in a variety of settings – website, social media, print, etc – to help those outside the ocean observing community to understand the value of such observations in the wider societal context, and the critical need for GOOS. We have created an [Interactive Map](#) on the POGO website, with links to each example, and printable PDFs.



OUTREACH AND ADVOCACY

GENERAL OUTREACH AND COMMUNICATIONS

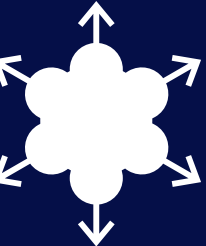
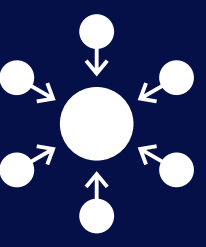
Events

- **UNFCCC Climate Conference COP26 (Nov 2021):** POGO had a virtual exhibit and was a partner in the organisation of a side event on “Ocean solutions: Coordination and collaboration for ocean-based mitigation and adaptation”.
- **UN Ocean Conference (June 2022)** –POGO-sponsored side events on (1) “Developing the capacity we need for the ocean we want” (led by SCOR), and (2) “Biomolecular observations in support of conservation and sustainable development”; and POGO participation in a side events on “Marine Africa: The role in excellence in capacity building to increase globally ocean health and quality of life” (led by University of Algarve) and “Evaluation Science, Valuing the Ocean” (led by Leiden University & European Marine Board).
- **Other international (virtual) meetings:** POGO’s global outreach was supported by presentations given to international audiences at the SCOR Annual Meeting (Oct 2021), the World Congress of Marine Stations (Nov 2021), the UN Ocean Decade Laboratory “A Healthy and Resilient Ocean” (March 2022).
- **Other regional (virtual) meetings:** outreach to countries in Africa and Asia was supported by presentations given on-line at the African “Tropical Atlantic Climate and Coastal Variability” (TACCOVAR) Conference (Sept 2021) and at the “First International Seminar on Earth Sciences and Technology in Indonesia (Dec 2021).

Website and social media

- The **POGO website** has continued to be developed and updated with more information on how our **members contribute to GOOS**, new additions to the **interactive timeline** of POGO’s history, the launch of our **ocean observing case studies** page, and of our new **interactive Strategy**.
- POGO maintains an active social media presence on Twitter (**@POGO_Ocean**), Facebook (**/POGO.Ocean**), Instagram (**/pogo_ocean**) and LinkedIn (**/pogo_ocean**), as well as a minor presence on **YouTube**. Social media continues to be an excellent means to share news and information with an interested and interactive audience. In addition, the secretariat runs or shares responsibility for the **Ocean Training Partnership** and **NANO Network** Twitter accounts.



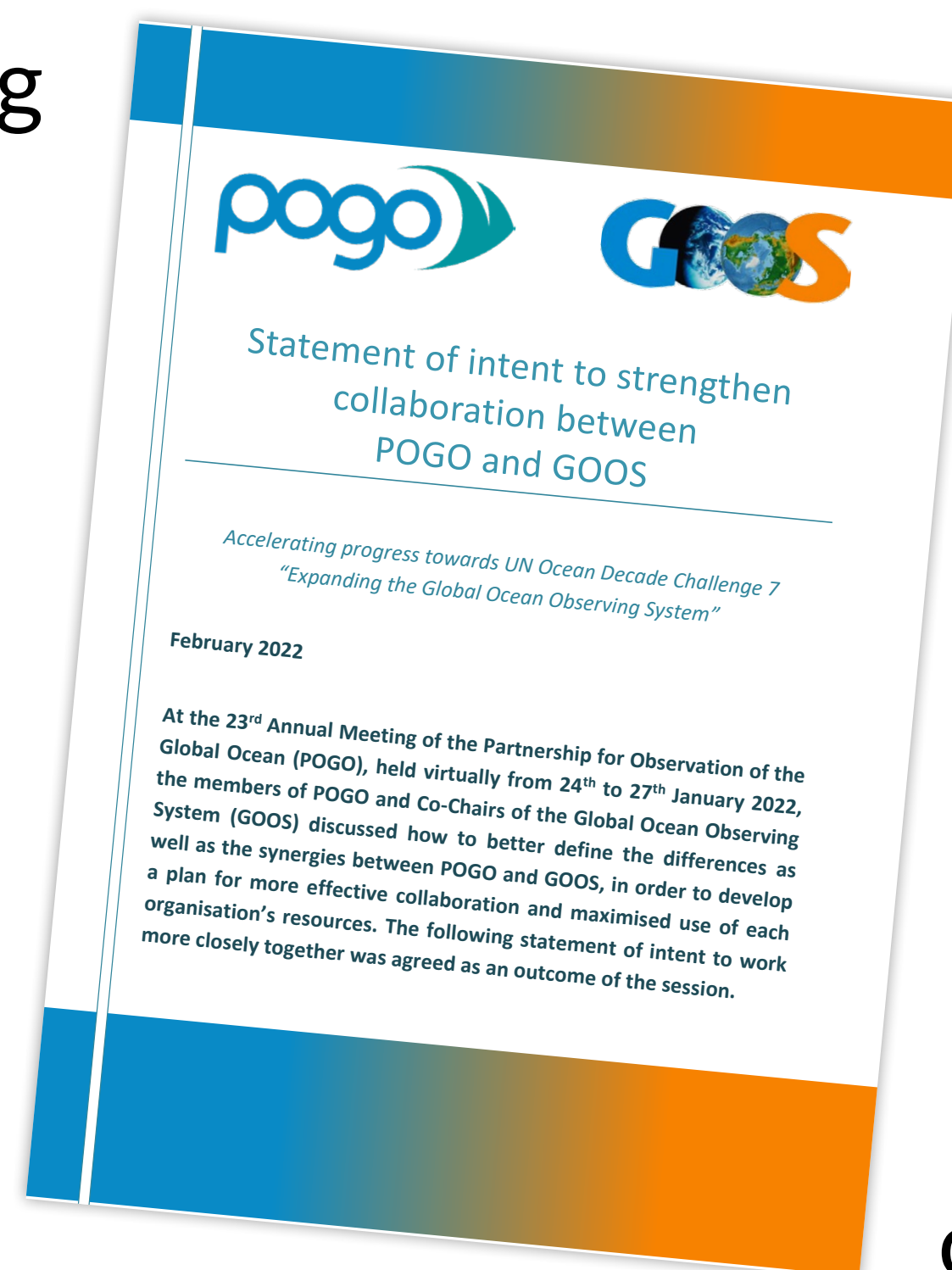
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OUTREACH AND ADVOCACY

COLLABORATIONS WITH OTHER ORGANISATIONS

Following the 23rd POGO Annual Meeting in January 2022, a [joint statement](#) was issued with GOOS, on our mutual intent to work closer together, to accelerate progress towards UN Ocean Decade Challenge 7 “Expanding the Global Ocean Observing System”. POGO and GOOS also [submitted a contribution](#) to the UNFCCC Subsidiary Body on Science and Technology (SBSTA) “Ocean and Climate Change Conference” on possible topics to be discussed during the meeting. Our statement outlined the importance of ocean observations in the context of climate change monitoring, prediction, and mitigation/adaptation.

POGO also submitted comments for the UN Ocean Conference Global On-line Stakeholder Consultation for the Concept Papers of Interactive Dialogues, some of which were included in the final Summary Report. Throughout the year, the POGO Communications Officer has been an active member of the UN Decade Communications Advisory Group, participating in regular virtual meetings as well as in the organisation and running of an in-person science communication workshop aimed at 18-30 year olds at the 2nd UN Ocean Conference in Lisbon (June 2022).



POGO partnered with the US National Oceanic and Atmospheric Administration (NOAA), Ocean Networks Canada and the US Arctic Research Commission to sponsor an annual supplement of *Oceanography* magazine on “Frontiers in Ocean Observing”. The purpose of the supplement was to widely disseminate information about the many different ways in which scientists observe the ocean to improve our understanding and support the sustainable management of the ocean and its resources. One of the aims of the supplement is to help explain the scientific and societal importance of ocean observing to funders, policymakers, and the general public.

The themes were selected in line with the UN Decade of Ocean Science for Sustainable Development:

- Ocean-Climate Nexus
- Ecosystems and Their Diversity
- Ocean Resources and the Economy Under Changing Environmental Conditions
- Pollutants and Contaminants and Their Potential Impacts on Human Health
- Multi-hazard Warning Systems

In addition to these, there was a section featuring new technologies. Each section features 5-7 articles, generally starting with a longer overview article.

The supplement was published in January 2022 and is available as an [open-access publication](#).

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