United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea

Twenty-second meeting

6 to 10 June 2022
(United Nations Headquarters)

Discussion panel
"Ocean observing"

Biographies and abstracts of panellists

Segment 1: Tools, contributions to science-based decision making, and challenges relating to gaps in observational data

Monday, 6 June 2022

3:00pm – 6:00pm

Ms. Anya Waite
Co-Chair of IOC GOOS Steering Committee; Scientific Director and CEO, Ocean Frontier Institute; Professor, Dalhousie University

Bio
Anya M. Waite is CEO and Scientific Director of the Ocean Frontier Institute, and Associate Vice-President Research (Ocean), Dalhousie University. Prior to this she was Section Head of Polar Biological Oceanography at the Alfred Wegener Institute (AWI) in Bremerhaven, and Professor of Oceanography in the Department of Biology at the University of Bremen.

She chaired AWI´s Scientific Council, championing interdisciplinary scientific discussions, and gender equity. Prof. Waite's research career spans thirty-five years of education, service and international scholarship, with scientific research publications in areas as diverse as aquaculture, rock lobster fisheries, conservation genetics, physical oceanography, and the impacts of climate change. Her most recent work includes innovations in oceanographic technologies and sensors.

After completing a BSc Hons. in 1985 at Dalhousie University, she obtained her PhD in 1992 in oceanography at the University of British Columbia. She was appointed Postdoctoral Scholar at Woods Hole Oceanographic Institution (USA) in 1992. In 1997 she took a professorship at University of Western Australia (UWA) in Perth, and was there for 17 years as an oceanography research group leader while teaching in the undergraduate and graduate Environmental Engineering programs at UWA. She won teaching excellence awards both in Australia and Germany.

Prof. Waite's international service includes membership on numerous Boards and committees, and a wide range of technical, scientific and policy advisory panels, in the USA, the UK, Australia, Germany, Norway, Sweden and Canada.

Abstract
"***Overview of global ocean observing activities: frameworks, status and challenges"***
The Global Ocean Observing System (GOOS) convenes global networks to coordinate a sustained ocean observing system serving societal needs for climate information, operational services and ocean health. GOOS links the ambitions and activities of the observation community to a wide range of stakeholders including national governments, intergovernmental bodies, communities, and industries. In 2022, the ocean remains critically under-observed. Support for many observation programs has effectively flatlined, particularly during the COVID-19 pandemic.

GOOS and the observation community are thus at a crossroads where the critical need for observation systems must be matched by international investment, or these systems will face terminal decline. Requiring urgent support are systems including biodiversity observation for ocean health, conservation, and food security. The achievement of global net-zero carbon ambitions by 2050 could conceivably be derailed by our inability to observe potentially large deviations in the Earth's largest carbon sink, the ocean. Ocean data are also critical for the Blue Economy, estimated to reach $3Trn globally by 2030. Forming the heart of the UN Decade of Ocean Science for Sustainable Development, GOOS proposes to become the Ocean Observation Co-ordination Center for the Decade, and has three major programs to transform ocean

observations through co-design, capacity-building and coastal community engagement. We propose a simple framework for nations to invest massively in ocean observations where urgently needed. Recent work suggests that if investment in ocean observations and conservation shifts from millions to billions we can realize our climate targets and achieve a sustainable ocean.

Mr. Brian King
Member of the International Argo Steering Team; Oceanographer, National Oceanography Centre, United Kingdom

Bio
Brian King is an oceanographer at the National Oceanography Centre, Southampton. His background is in Applied Mathematics and Physics. He has been a member of the International Argo Steering Team since its first meeting in 1999, which marked the start of the Core Argo program the following year. He has been centrally involved in the evolution of the Argo data system, which ensures that Quality-Controlled data are freely available in Real-Time to all users, with further quality control provided in Delayed-Mode for climate studies. As Argo expanded from the Core Mission, delivering physics measurements in the upper 2000 dbar, he became co-Chair of the international Deep Argo Mission Team, and lead the UK effort to deploy floats capable of 6000-dbar operation. In March 2022 he deployed the first three UK floats to measure all 6 parameters in the BioGeoChemical Argo Mission.

His research interests are in budgets, inventories, transports and variability of physical and biogeochecmical properties of the oceans at basin scale, especially heat, freshwater and carbon, and their importance for understanding climate change. Away from Argo he has participated in more than 25 research cruises on the UK's deep-water research vessels, many as a contribution to the Global-Ocean Ship-Based Hydrographic Investigations Program (GO-SHIP), and CLIVAR and WOCE before that. Around half of my cruises have been as Chief or co-Chief Scientist. He is a passionate advocate of the free and timely distribution of ocean data to ensure its widest possible use.

Abstract
"*The Argo array: operation, contributions to science-based decision-making and challenges*"
The One Argo program is a global partnership of more than 30 countries, providing a sustained global observing network. Argo delivers data in Real-Time, freely available for science researchers and for use by prediction services for any and all nations. Unattended platforms known as floats cycle between the ocean surface and a preset depth, often 2000 metres but which can be down to full ocean depth of 6000 metres. While cycling, floats measure ocean properties related to global warming, the changing global water cycle, ocean removal of CO_2 from the atmosphere, ocean acidification, deoxygenation and many other questions about global change. Data from Argo have been central to the headline conclusion by the 2021 IPCC 6th assessment report that "It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred". Many prediction agencies now routinely use Real-Time Argo data in operational weather forecasting. When fully implemented the BioGeoChemical Argo Mission will transform our ability to describe, with confidence, the absorption and impact of anthropogenic CO_2 in the oceans, providing the science base for policy making in the Blue Economy. The greatest single challenge for Argo is securing funding to ensure the maintenance of the Core Mission and the implementation of the BioGeoChemical and Deep extension missions. The cooperation of coastal States in providing access to 200 mile zones for Argo measurements has been a vital contribution to enabling the benefits that come from a truly global program, and will continue to be needed into the future. Argo is continually striving for technology advances to reduce environmental

impact, and to ensure that data are freely available to meet the user needs and access methods of the widest possible range of users, from individuals to agencies.

Mr. Richard Edwing
Director, NOAA NOS Center for Operational Oceanographic Products and Services (CO-OPS)

Bio
Richard Edwing has served as the director of NOAA's Center for Operational Oceanographic Products and Services, the United States' authoritative source for timely, accurate, and reliable water-level and current information since January 2010. In this role, Mr. Edwing oversees and continues to improve this 24-hour a day operation to provide mariners, coastal managers, and many other users with historic, real time and forecast data on ocean conditions along the United States' 95,000-mile coastline.

Mr. Edwing's career with NOAA spans over 45 years with much of that time spent advancing NOAA's navigation services and coastal resilience missions to provide the nation with the products and services needed to support safe and efficient maritime commerce as well as mitigating the impacts of short to long term coastal hazards for the protection of life and property. He is an expert in designing, deploying, and operating oceanographic observing systems as well as in the data management processes used to quality control and generate a broad spectrum of products from those systems. He has traveled internationally to transfer NOAA ocean observing technology to other countries.

Graduating in 1976 from George Washington University, Mr. Edwing earned a Bachelor of Science degree in oceanography, and later completed graduate level work in civil engineering at the University of Maryland.

Abstract
"The National Water Level Observation Network: evolution, operation and societal applications"
The panelist will provide an overview of the role and evolution of the National Water Level Observation Network (NWLON), the nation's oldest coastal oceanographic observing system, in supporting science-based decision making and tools for a wide range of societal applications. The NWLON is a high impact, high benefit observing system through its products and services providing the nation's legal water level reference system as well as supporting multiple safety of life and property applications, from near real time to long term. Methodologies to understanding observing system network gaps as well as using technology to mitigate observation data gap challenges will be covered. The importance of leveraging the same observing system and data for many different societal needs, and providing tailored products that are easily accessible and effectively communicate key information to the end users, will be discussed.

Mr. Niels Andersen
Head of Department of Innovation and Authorities, DTU Space, Technical University of Denmark

Bio
Niels Andersen, M.Sc. (Physics and Mathematics), Ph.D. (Geodesy) is cofounder and Executive Board Member of the Danish National Space Institute (DTU Space). In this capacity, he has been part of ensuring the Institute's strong Earth and Ocean Observing capabilities. He has a background as geodesy researcher and in management in public mapping agencies, where he has been responsible for digitalizing the topographical map production of the Kingdom of Denmark using the newest satellite systems, including transforming the national geodetic reference systems into modern Space born World Geodetic datum systems. Furthermore, Niels Andersen

was part of the establishment of the Danish UNCLOS Continental Shelf Project on Extended Continental Shelf (ECS).

Niels Andersen holds several international positions. He is a bureau member at the International Union of Geodesy and Geophysics (IUGG) and national representative at the International Association of Geodesy (IAG). Furthermore, Niels Andersen is a senior adviser to the Danish Ministry of Foreign Affairs on matters of delimitation and a member of the Danish ECS delegation to the United Nations. He is also a member of and has chaired the Advisory Board on the Law of the Sea (ABLOS) and is member of the International Law Association (ILA) as a technical expert.

Abstract

"Satellite infrastructure and ocean observation: contributions to science-based decision-making and remaining gaps"

Over the last decade, the space sector has shifted from being state driven to becoming an emerging private sector business with cheaper and commercialized solutions.

This development opens up for new opportunities, e.g. in merging the in situ and space ocean observations into seamless information infrastructures, including with real time observations where relevant.

In the future, States and private companies could cooperate in developing and securing a global joint backbone satellite system in order to achieve a worldwide warning and ocean information capacity to meet sustainable requirements. All States, including island States could be central and operational stakeholders in this endeavour.

Ms. Michelle Heupel

Director of Australia's Integrated Marine Observing System (IMOS)

Bio

Michelle Heupel is the Director of Australia's Integrated Marine Observing System (IMOS). In this role she leads Australia's core ocean observing efforts, including over 60 national-scale sub-Facilities ranging from shelf moorings, Argo floats, and ocean gliders to animal tagging and more. IMOS was established in 2006 as a consortium of Australia's premier marine research institutions and is funded by the Australian Government. Michelle is the third Director of IMOS and is currently the Vice-Chair of the Regional Alliance committee for the Global Ocean Observing System.

Prior to being the IMOS Director Michelle was a successful research scientist with over 25 years' experience working on ecology, conservation and management of marine predators, predominantly sharks and fish. She completed her undergraduate degree in Zoology at Colorado State University (USA) and PhD at the University of Queensland (Australia). She has previously worked as a Senior Researcher at Mote Marine Laboratory, as Research Director of the AIMS @JCU joint venture at James Cook University, and as a Research Scientist and Team Leader at the Australian Institute of Marine Science. She has published over 200 peer-reviewed scientific publications.

Abstract

"Application of ocean observations for decision-making: delivering benefit at multiple scales"

Global populations are heavily reliant on our ocean systems for a range of goods and services, and this dependence will increase as the blue economy continues to grow. In addition, climate change is altering our ocean ecosystems at rates not previously experienced. To sustainably manage,

understand and protect the incredible resources provided by our oceans, we need observations that underpin decision-making.

Ocean observations support operational decision making in a wide range of fields, including fishing, aquaculture, shipping, oil and gas, offshore energy, maritime safety, defence and natural resource management. For example, shipping companies use data on ocean currents to predict fuel requirements and route vessels to minimise fuel use. Long-term sustained observing also underpins decision-making by natural resource managers, such as understanding how climate change is affecting critical ecosystems and species. The influence that the ocean has on weather and climate mean that ocean observations also make significant contributions to land-based decisions. Changes to our coastal systems also need to be understood. In Australia, for example, coastal infrastructure at potential risk of erosion and inundation due to climate change is valued at c. A$226b. Here ocean observation is helping inform government agencies, insurers, indigenous communities, homeowners and industry about mitigation and adaptation strategies.

Strong engagement amongst scientific and stakeholder communities is needed to identify new and evolving observation needs, and develop products that translate raw observation data into useable information. Strong user-focused ocean observation systems are delivering significant benefits to decision-makers through understanding the state of, and changes to, our oceans. Ongoing development, international collaboration and the deployment of new technology, will allow ocean observing systems to continue to provide decision-makers with relevant and timely information.

Mr. E. Pattabhi Rama Rao
Group Director, Modelling and Ocean Observations Group, Indian National Centre for Ocean Information Services (INCOIS), Ministry of Earth Sciences of India

Bio
E. Pattabhi Rama Rao is currently the Group Director at the Indian National Centre for Ocean Information Services (INCOIS), Hyderabad. He is responsible for establishment of Ocean Observing Network in the Indian Ocean for long term monitoring of marine meteorological and oceanographic parameters to support operational ocean information and advisory services and aid research. Another major responsibility includes implementation of unified framework for ocean and coastal modeling, data assimilation and model enhancement through process specific studies.

He joined INCOIS in 2001 and held different positions in the field of Ocean Observing System, Ocean Data Management, Tsunami and Storm Early Warning Services and Project Management. Prior to joining INCOIS, he worked at the National Institute of Ocean Technology (NIOT), Chennai and National Institute of Oceanography (NIO), Goa as Project Engineer and Research Fellow respectively and dealt with Ocean Observing System projects.

He is serving several international committees in different capacities viz., Vice-Chair of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG-IOTWMS) of the IOC of UNESCO, Member of the Task Team on Tsunami Watch Operations (TTTWO) of the IOC of UNESCO, Executive Member of the Argo Steering Team, Member of the Expert Team on Met Ocean Requirement (ET-MOR) of WMO etc.

E. Pattabhi Rama Rao hold a master's degree in Meteorology and his research interests include ocean observations, air-sea interactions, ocean data management, geospatial technologies and tsunami and storm surge early warnings. He is the author of more than 45 scientific publications in international peer reviewed journals.

Abstract

"The role of ocean data acquisition, processing and management in contributing to sustainable development"

Technological advances in the last two decades in oceanographic sensors; communication and computing systems facilitated the ocean scientists to acquire data in real-time from a variety of ocean observing platforms. Efficient management of heterogeneous and voluminous oceanographic data is imperative to ensure high-quality data operational oceanographic services and for research. Ocean data management is becoming an integral part of ocean observation programmes with emerging technologies to serve the data with analytical and visualization features on the fly. Further, preservation of the long-term data of different parameters and its availability would facilitate in understanding the oceans in a multi-disciplinary approach, decision making and sustainable development.

The panellist will provide an overview of the ocean observing systems implemented by India in the Indian Ocean, ocean information and advisory services provided to different stakeholders in the context of UN Decade of Ocean Sciences for Sustainable Development. He will also present the development of an end-to-end ocean data management system at the Indian National Center for Ocean Information Services (INCOIS).

Tuesday, 7 June 2022

10:00 am – 1:00 pm

Mr. Gilles Lericolais

Senior Scientific Officer, French Prime Minister General Secretariat for the Sea; Chair of the European Marine Board

Bio

Gilles Lericolais is presently acting as Senior Scientific Officer for the French Prime Minister General Secretariat for the Sea. From 2011 to 2020, he has been the European and International Director of Ifremer. He received his PhD (1997) and Professorship Habilitation (2009) in marine geology. He has been chief scientist of more than 10 scientific cruises and author and co-author of more than a 100 publications and communications. From 2007 to 2013, he was nominated Vice-Chair and then Chair of the Site Survey Panel for IODP and Chair (2016 to 2018) and Vice-Chair (2018-2020) of the ECORD Facility Board for IODP. He also was the Vice-Chair (2019-2020) of the French Committee for the IOC of UNESCO. He is member of the Internal Advisory Committee of the JPI Oceans and is member of the Board of Trustees of POGO since January 2019. In June 2019, he has been elected Chair of the European Marine Board for a 3-year mandate, mandate renewed for another 2 years in April 2022.

Abstract

"A regional perspective on ocean observation and monitoring of the marine and coastal environment"

As predictions show that the human population is expected to reach 9 billion by 2050, the world is increasingly looking to the ocean for answers to humanity's greatest challenges. Such as feeding the world's growing population; providing clean energy to power vibrant economies; increasing resilience to the dangers of the sea; and coping with climate change by seeking to mitigate it and finding ways to adapt. But the world is now looking to the ocean for more hope and inspiration. The ocean is the last unexplored frontier of our Earth and holds so much promise and opportunity for the future - if we manage it wisely.

Beyond science, leaders at the highest political levels understand the importance of better understanding how our ocean works and new attentions are given to actions and solutions to reverse the cycle of degradation of the Ocean's health and productive capacity. But: "you cannot manage what you cannot measure". To better understand climate change and variability, and improve our forecasting of climate, weather, ocean status and environmental hazards and their impacts, long-term ocean observations are necessary and timely Ocean information rooted in systematic sustained in situ Ocean observations have to be integral to the design and evaluation of the necessary actions and solutions to be set.

Indeed, the advancement of scientific understanding of the ocean depends on systematic and high-quality measurements. This understanding and its wise use is critical to enabling humanity to develop a sustainable relationship with a healthy, productive and biologically diverse ocean. The information obtained by the observation of the Ocean provides an evidence base for real-time decision-making, tracking the effectiveness of management actions, and guiding adaptive responses on the pathway to sustainable development, leading to the establishment of good policies and practices for a better future.

In situ Ocean observations are all Ocean, seas or coastal observations, and complement remote sensing observations (e.g. from satellites). This short presentation proposes to show that in situ ocean observations must become sustained financed infrastructures dedicated to the acquisition

of public good data, providing information suitable for Sustainable Development Goals and for a sustainable blue economy. This presentation also urges that processes to be established to examine the costs and performance of the systems to be put in place compared to what exists today for atmospheric studies. It is proposed to highlight the economic and environmental benefits of such observations by recommending to build on global coordination efforts, while creating partnerships with the private sector and civil society, with the need to integrate them with satellite observations and models.

By helping to secure long-term financial investment from multiple stakeholders to create such sustainable ocean management infrastructures, this will maximise the value and benefit of the Global Ocean observations. This means making ocean observing data more widely available and usable by multiple sectors that include research, industry, and national authorities responsible for the marine environment and maritime activities. With an important message that is, that ocean observing is to be recognised as essential service. Unlocking the full potential of ocean science using in situ ocean observations within the existing framework of UNCLOS will be a major step forward to make the ocean more accessible and sustainably managed, and of course contributing to the vision of the Ocean Decade: "the Ocean we need for the future we want".

Mr. Henry Ruhl
Director, Central and Northern California Ocean Observing System; Member of the GOOS Biology and Ecosystem Panel

Bio
Working in the field of ocean biogeochemistry and ecosystems research since 1994, Henry Ruhl has published more than 100 peer-reviewed papers on marine ecological research and ocean observing. He joined the Central and Northern California Ocean Observing System (CeNCOOS) as Director in January 2018. Ruhl received a PhD in Marine Biology from the Scripps Institution of Oceanography in 2006. From 2010-2017, he served as Associate Head of the Ocean Biogeochemistry and Ecosystems group of the National Oceanography Centre of the United Kingdom. Work has included investigating connections between climate, variations in conditions over daily to decadal scales, and changes in seafloor biogeochemical and ecological conditions, frequently developing and/or applying imaging methods. He has also conducted landscape scale ecological surveys in estuaries, in and around shelf sites in soft bottom and rocky reef habitats, and deep-sea locations. Work with the Global Ocean Observing system (GOOS) and contributors focuses on building capability and impact for biogeochemistry, biology and ecosystem observing. Dr. Ruhl contributes to several initiatives including the GOOS Biology and Ecosystems Panel, the Marine Biodiversity Observation Network, the Deep Ocean Observing Strategy, the Ocean Networks Canada – International Science Advisory Board (Chair) and the Monterey Bay National Marne Sanctuary – Research Advisory Panel.

Abstract
"Contributions of ocean observation to understanding and conserving biological diversity"
Species and habitats are the subjects of national and international polcies that mandate reporting of information on ecosystem conditions. Improvements in sensors, sampling platforms, information systems, and collaborations among experts and information users now enables more effective and up-to-date information to meet regional and national needs. Specifically, advances in environmental DNA (eDNA)-based assessments of biodiversity, community science data, various underwater imaging devices, and environmental, behavioral, and physiology observations from animal telemetry provide new opportunities to address multiple requirements for reporting status and trends, including insights into life in the deep ocean. Passive and active acoustic sensors help monitor marine life, boat traffic, and noise pollution. Satellites provide repeated, frequent, and long-term records of many relevant variables from global to local scales and, when combined with numerical computer simulations, allow planning for future scenarios.

Metadata standards facilitate the transfer of data from machine to machine, thus streamlining assessments and forecasting and providing knowledge directly to the public. The Global Ocean Observing System (GOOS) Biology and Ecosystem Pane, the Marine Biodiversity Observation Network (MBON) and other efforts facilitate advancing this exchange of information on life in the sea. The collaborative efforts of regional associations such as the Central and Northern California Ocean Observing System (CeNCOOS), through to GOOS, provide an example of a regional to global process for information delivery. This includes linking policy and management needs, prioritizing observing data from various platforms and methods, streamlining data handling practices, and delivering information for management.

Mr. Bayram Öztürk
Professor, Faculty of Aquatic Sciences, Istanbul University; Head, Turkish Marine Research Foundation

Bio
Bayram ÖZTÜRK, born in 1960, on the Black Sea coast of Turkey. After he got his Ph.D. on Marine Biology from the Institute of Marine Sciences, Istanbul University, in 1990, he has been studying on fishery science and biological oceanography in various seas and oceans in the world. He is the Founder and Director of Turkish Marine Research Foundation (TUDAV), and currently Editor for the Journal of Black Sea and Mediterranean Environment (www.blackmeditjournal.org). He is also a board member of CIESM (Mediterranean Science Commission).

Since 1999 to date, he has been working as a Professor on Marine Biology, Faculty of Aquatic Science, Istanbul University. He has been involved in several EU-funded and international projects under SPA/RAC, GFCM and Black Sea Commission. He is also an expert for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) on global assessment of biodiversity and ecosystem services. His latest book was published in 2021 by FAO/GFCM, titled "Non-indigenous species in the Mediterranean and the Black Sea".

He worked in Antarctica in 2014, 2015 and 2016. He was also the leader of the first Turkish Antarctica Expedition. He was awarded the Japanese Antarctic medal in 2015. A newly discovered endemic Antarctic species *Sagediopsis bayozturkii* was named in his honor. His main interest is Mediterranean and global marine biodiversity, ocean conservation and fisheries governance issues. He was a visiting professor to Tokyo University of Marine Science and Technology in 2020. In 2022, he was elected as a member of Romanian Academy of Sciences.

Abstract
"Contributions of ocean observation to fishery science and marine conservation"
World oceans are under threats mainly by pollution, overfishing, climate change, non- indigenous species and habitat destruction. Ocean observation is one of the crucial tools to improve marine conservation and sustainable use of marine living resources, mainly fishery stocks. While traditional methods, such as diving and ship surveys, are still being used widely, recent technological development, such as satellite imaging and biologgers, has made it possible to monitor various issues of the oceans at a wider scale as well as at a fine level. Both approaches should be taken to monitor ocean health and to enhance fisheries management.

The Global Ocean Observation System (GOOS) is an important network of observing system and coordinated by Intergovernmental Oceanographic Commission (IOC) but needs to extend worldwide. United Nations Agenda 2030 and Sustainable Development Goal 14 to "conserve and sustainably use the oceans, seas and marine resources for sustainable development," and many of the other 17 Sustainable Development Goals require sustained ocean data and cooperation.

Regional and international cooperation is essential for ocean conservation and sustainable governance of marine living resources. In this regard, research effort and capacity building in all relevant countries should be increased for better management of the ocean resources. Besides, public participation to data collection, namely citizen science, should be encouraged through the effort to increase ocean literacy of the coastal communities.

Ms. Amy Baco-Taylor
Associate Professor, Department of Earth, Ocean and Atmospheric Science, Florida State University College of Arts and Sciences

Bio
Amy Baco-Taylor is a Professor of Oceanography in the Department of Earth, Ocean and Atmospheric Sciences at Florida State University. She completed her undergraduate degrees at Florida Institute of Technology and her PhD at the University of Hawaii, followed by a postdoc at Woods Hole Oceanographic Institution. Her general research interests are in the ecology, evolution, and connectivity of benthic marine organisms. Her research uses traditional ecological tools alongside advanced genetic/genomic tools to answer basic questions about the ecology of marine benthic invertebrates, with a goal of informing management and conservation of these species. Her work currently focuses largely on deep-sea corals and seamounts. Most of this research has been exploratory in nature and has included descriptions of the distributions of species on seamounts, descriptions of new species, coral phylogenetics, population genetics of deep-sea precious corals, invertebrate associations with deep-sea corals, habitat suitability modeling for deep-sea species, and the effects of anthropogenic impacts on seamount megafauna. She has participated in >40 oceanographic cruises off Florida, Hawaii, the Emperor Seamounts, Alaska, California, the Gulf of Mexico, the Bahamas, New Zealand, and Antarctica. She has led 134 dives on the Pisces IV and V submersibles as PI or lead PI, and Alvin dives as Co-PI, with additional dives with the Turtle and Johnson-Sealink II submersibles. She has also led or participated in numerous ROV dives with the Jason II, Lu`u`kai, ATV, Scorpio, SuBastian, Tiburon, Global Explorer, and RCV-150, along with the AUV Sentry, to depths reaching 5200m.

Abstract
"***Contributions of Ocean Observing to Understanding the Deep Ocean"***
There are a variety of tools that are used by deep-sea biologists to explore and understand the deep oceans, including submersibles, ROVs, and AUVs. Observations made using these tools can provide the basic data needed for science-based decision making for management of high seas deep-sea areas for fisheries, mining and other anthropogenic activities. An example is given of a study on observations from heavily trawled seamounts on the Emperor Seamount Chain and northwestern Hawaiian Ridge in the North Pacific, where imaging surveys from four of the high seas seamounts provide evidence of vulnerable marine ecosystems (VMEs) on all surveyed features. VMEs included dense patches of octocorals, scleractinian reefs, and sponges. Evidence for significant adverse impacts (SAIs) from bottom contact fisheries were also observed on all surveyed seamounts and included large areas of barren hard substrate with scars from bottom contact gear, stumps from arborescent corals, and rubble from reef-forming corals. Evidence of SAIs is further supplied by many observations of coral rubble associated with lost fishing gear. Finally coralliid octocorals, once sufficiently abundant on the targeted seamounts to support the world's largest precious coral fishery, were extremely rare on all features despite the large survey area. These observations could inform science-based fisheries management decisions. VMEs were more widespread on these seamounts than expected based on their trawling history. There was also ample evidence of SAIs to these VMEs. Based on management guidance, these observations support a closure of these seamounts to further bottom contact fisheries. Challenges with bringing this science to management decisions will be

addressed. General challenges to understanding the deep sea due to data gaps will also be discussed.

Ms. Sabrina Speich
Professor, Ecole normale supérieure (ENS) – PSL ; Laboratoire de Météorologie Dynamique – IPSL ; CLIVAR Atlantic (ex-officio) and OOPC Co-Chair

Bio
Sabrina Speich is full professor of Oceanography and Climate Sciences at the Ecole Normale Supérieure of Paris (France) and she is member of the Laboratoire de Météorologie Dynamique as well as the French climate Institute Pierre-Simon Laplace.

She is the co-chair of the Ocean Observations Panel for Climate (OOPC which is a panel under GOOS, GCOS and WCRP programs). She was a member of the Scientific Committee on Antarctic Research (SCAR) and the co-chair of the Atlantic CLIVAR (Climate Variability and Predictability) Regional Panel, which facilitates global climate research in the atmosphere and ocean with a focus on the Atlantic and pan-European regions.

She is also a member of the National Committee for Marine, Maritime and Coastal Research (COMER) of the French National Council for the Sea and Coasts and leading the framing of the French Open Ocean observing infrastructure.

Sabrina Speich has two decades of experience in conceiving large international observing and modelling projects to better assess ocean and climate processes and monitor changes. She is working together with the international community (within projects and organizations) to improve the ocean observing strategy and capacity. Indeed, the ocean is key to the future of humanity challenged by a rapidly changing climate. We need to build robust ocean information to feed in adaptation strategies and to help develop solutions to the various risks arising from the intense anthropogenic stresses exerted on our environment.

In 2019 she was awarded the Albert Defant Medal by the German Meteorological Society.

Abstract
"*Contributions of ocean observation to understanding, adapting and mitigating the effects of climate change*"
The ocean, weather and climate are inextricably linked. The global ocean covers ~70% of Earth's surface and provides many services to human society from shaping weather, mitigating climate change by storing the excess heat (90% of the total) and carbon (about 25%) produced by anthropogenic activities to providing food access to the largest fraction of humanity. However, the ocean is warming, losing oxygen, and it is being acidified by the increasing anthropogenic carbon emissions. Moreover, changes in ocean energy (heat, currents) impact deeply weather extremes. With ocean warming, acidification, and deoxygenation projected to increase, extreme events, including marine heatwaves within the ocean, are likely to intensify, occur more often, persist for longer, and extend over larger regions greatly affecting communities and leaving beings? everywhere in the world.

There are still excellent opportunities to both reduce future warming and make our societies less vulnerable to changes when they occur. This needs informed decisions and it inevitably requires the understanding and monitoring the ocean and the overlaying atmosphere. Quantitative and fit-for-purpose ocean information are fundamental to guide science-based adaptation strategies, which minimize the economical and societal costs associated with ongoing and future changes and extremes, empower communities to self-adapt, and guide sustainable economic development for the long term.

Whereas it is straightforward that improved ocean information will benefit nations bordering the ocean, they will also benefit all nations via more precise assessments and predictions.

The effort set forth by the science community under the Global Ocean Observing System (GOOS, https://goosocean.org) and the Global Climate Observing System (GCOS, https://gcos.wmo.int) is developing a global, integrated monitoring system of the ocean that respond to such needs. This has been recognized by the United Nations and the scientific community by supporting the UN Decade of ocean science for sustainable development (Ryabinin et al., 2019, https://www.oceandecade.org/) with Challenge 7 dedicated to an integrated ocean observing system. GOOS has three programmes dedicated to the transformational development of an integrated and sustainable observing system (Ocean Observing Co-Design, CoastPredict and Observing together).

Mr. Peter Haugan
Program Director, Institute of Marine Research; Professor, Geophysical Institute at the University of Bergen

Bio
Peter Mosby Haugan is Programme Director at Institute of Marine Research in Norway and professor of oceanography at the Geophysical Institute, University of Bergen. He currently serves as chair of the Expert Group of the High Level Panel for a Sustainable Ocean Economy and with the Norwegian Ministry of Foreign Affairs. He is past chair of the Intergovernmental Oceanographic Commission of UNESCO. His research interests span a wide range of ocean, climate and energy issues.

Abstract
"Contributions of ocean observation to sustainable ocean-based economy"
A sustainable ocean-based economy can be critical for global sustainability notably by providing increased food security, more renewable energy, transportation and leisure. However, expansion of ocean economy sectors can potentially also stress ocean ecosystem functions including carbon uptake and coastal protection. Environmental Impact Assessments (EIA) taking into account all stressors should therefore be performed whenever new developments like offshore wind farms, aquaculture or increased ship traffic is planned. EIAs in turn require physical, chemical and biological observations of the ocean environment. Baseline studies as well as time series are needed to make provisions for corrective actions and for considering impacts of climate change. The concept of Sustainable Ocean Planning (SOP) is gaining traction as a politically endorsed, inclusive and iterative process for not only allocating ocean space to different industries but also making sure that all human activities in the area covered by the plan contribute positively to sustainability. The talk will address the contributions from observations to Sustainable Ocean Planning processes.

Segment 2: International cooperation and coordination in advancing ocean science and addressing related challenges

Tuesday, 7 June 2022

3:00pm – 6:00pm

Mr. Toste Tanhua
Co-Chair, IOC GOOS Steering Committee; Senior Scientist, GEOMAR

Bio
I am a chemical oceanographer working with marine biogeochemistry and ventilation of the ocean. I make observations of transient tracers and conduct deliberate tracer release experiments to understand ventilation and mixing in the ocean. I work on understanding the dynamics of ocean carbon, nutrients and oxygen in the context of water masses and the distribution of other chemicals.

I am also co-chairing the steering committee of the Global Ocean Observing System (GOOS) and coordinating the EU funded project EuroSea, that aims at improving the ocean observing and forecasting system.

Abstract
"How to optimize the ocean observing value chain: Insights from EuroSea"
Ocean observing and forecasting systems should be designed to deliver the essential information needed for human wellbeing and safety, sustainable development and blue economy in a changing world. The EU funded Horizon 2020 project "EuroSea" use a co-design approach to significantly improve European ocean observing and forecasting services and products by building the community needed for a system that delivers services and products on the ocean, ocean climate, marine ecosystems and their vulnerability to human impacts.

In addition to build capacity and increasing the TRL level of the system, an integrated system approach requires effective collaboration between areas of expertise in order to improve coordination at each step of the ocean observing value chain, from the design and deployment of multiplatform observations to their analysis and the delivery of products. We have articulated a few key steps towards improved integration.

EuroSea partners are also considering how the practices of the UNCLOS MSR clearance process is incompatible with the operational reality of a sustained ocean observing system, and is making suggestions for a way forward.

Mr. Pierre Bahurel
Director-General, Mercator Ocean International, Data Hub for GEMS Ocean

Bio
Pierre BAHUREL is the Director General of Mercator Ocean International. Graduated from Ecole Polytechnique engineering and HEC management schools (France), he has worked on space altimetry, modelling and data assimilation applied to operational oceanography and was among the founders of Mercator Ocean in 1995, which he has been leading and developing since then. For twenty-five years, Pierre's main activities have been related to operational oceanography at National, European and International level. He has federated in Europe a large community of marine organisations to build and run for the European Union the Copernicus marine service which successfully serve today thousands of users worldwide and supports the European

Commission in its blue diplomacy. Under its leadership, Mercator Ocean, which adopted in 2017 a multi-national governance, started early 2022 its transformation into an intergovernmental organisation, to create a unique centre in Europe devoted to digital oceanography and ocean prediction. Pierre has been involved since the early days in the international OceanPredict scientific group which has been instrumental in the worldwide development of operational oceanography. He is the chair of the GOOS expert team on operational ocean forecasting systems at the Intergovernmental Oceanographic Commission of UNESCO, contributes to the UNEP GEMS Ocean initiative and prepares Mercator Ocean to support the UN Decade of Ocean Science for Sustainable Development by developing and running a Decade Collaborative Centre devoted to Ocean Prediction.

Abstract

"Digital oceanography to bridge observations and society: Lessons from Copernicus"

Ocean Prediction services are the first users of ocean observing systems: these digital oceanography infrastructures are critically dependent on satellite and in situ observations. They are also the most powerful tools to build a responsive and inclusive value chain bridging observations and users, and propose on this basis evidence-based advocacy for an enhanced, global and sustained observing system.

The Copernicus Marine service implemented for the European Union by Mercator Ocean International has successfully gathered scientists, data producers and users within the same framework to deliver a state-of-the-art monitoring and forecasting service, reaching out to users and citizens worldwide. It enables the development of up-to-date service requirements for satellite and in situ observation taking into account actual societal, economic and environmental needs. The G7 Future of the Seas and Ocean Initiative and the GEO Blue Planet programs are two international frameworks used to develop further these actions.

Within the UN framework, the IOC of UNESCO and UNEP took structuring initiatives to integrate digital oceanography and ocean prediction services in their actions and plans. The GOOS expert team on operational ocean forecasting systems (ETOOFS) develops actions in this direction and, within the UN Decade for Ocean Science, the Decade Collaborative Centre for Ocean Prediction proposed by Mercator Ocean International to the IOC of UNESCO could foster ocean prediction capacities worldwide. The UNEP GEMS Ocean initiative has integrated ocean prediction data and tools from Copernicus marine and beyond to propose actionable data & information to Member States and provides us with an exemplary illustration of a practical and promising science-policy interface.

Ms. Tenanoia Simona

Chief Executive Officer, Tuvalu Telecommunications Corporation

Bio

Tenanoia Veronica Simona is the Chief Executive Officer (CEO) for the Tuvalu Telecommunications Corporation (TTC). Prior to her new role, she was working for the Government of Tuvalu as the ICT Programme Manager in the Ministry of Justice, Communication and Foreign Affairs. She has more than 17 years of experience in the ICT and Telecommunication sector. Tenanoia holds a Master in Information Technology Management from the University of Sydney, Australia, and a Master in Commerce majoring in Information Systems from the Victoria University of Wellington, New Zealand, and a Bachelor of Arts Degree in Economics and Information Systems from the University of the South Pacific (USP) Suva, Fiji.

She is passionate about the use of emerging technologies for the development of small island developing states like Tuvalu. Tenanoia is a multi-talented ICT and Telecommunication

professional who is now a member of the IGF Multi-stakeholder Advisory Group (MAG), the Government Representative to the Asia Pacific Top Level Domain (APTLD) Association, an Ambassador for the Get Safe Online Organization, a former Board member of the Pacific Islands Chapter of the Internet Society - PICISOC, a Director in the Board of the National Bank of Tuvalu, an Executive Member of the Tuvalu Women for Change Association, and a member of her island communities. During her spare time, she loves to spend time with children learning simple coding for fun. Her public service career has been in Telecommunication and ICT Project Implementations and Deployments, Internet Governance, Project Management, Data Management, Cyber Security, and Policy and Strategy Development.

Abstract

"*Ocean data management for addressing effects of climate change: a case study from Tuvalu*"

The presentation focuses on ocean data management for addressing effects of climate change using a case study from Tuvalu. The existence of our island nation depends on how our ocean tells us, whether by using the combination of ocean observing scientific approaches or by using traditional knowledge using local content to predict, forecast and addressing effects of climate change. Tuvalu through the Government Meteorological Department contributes enormously to the populating of regional dataset, and therefore grant access to ocean monitoring dataset and information provided by the South Pacific Commission (SPC). The Australian Government under the Bureau of Meteorology also provides the department with access to Climate Change Data Portal.

The documentation of in situ observation data collected from diverse ocean-related communities and records of traditional knowledge remain as an on-going challenge. The absence of ocean data management system in the islands make it difficult for local communities to access and use ocean data fairly and free. Therefore, the need to develop a better regional or international collaborative framework that is consistent and work well in a national context.

Our approach under Initiative 2 of the Tuvalu Future Now Project focuses on the creation of a digital nation with the goal of harnessing emerging technologies such as the use of blockchain technology. The aim of the project is to digitize all government administrative services, records from across all sectors, establish digital archives of Tuvalu history, cultural practices including local knowledge from ocean-related communities, and the integration of exiting ocean observing datasets. The project supports the sustaining of ocean observations at the national, regional and international level, and most importantly supporting the ambition of the United Nations Decade of Ocean Science for Sustainable Development (2021-2030).

Mr. Fabiano Lopes Thompson
Professor, Universidade Federal do Rio de Janeiro

Bio

Oceanographer (1996; University of Rio Grande, FURG) and PhD in Biochemistry (2003; Ghent Univ.). Professor at Federal University of Rio de Janeiro (UFRJ) since 2006. Coordinator of the Brazilian Marine Biotechnology Network

Abstract

"Ocean data analysis and modeling in interdisciplinary research: Lessons from RABICÓ"

The future of the ocean heath is uncertain in a hundred-year time. Marine life is threatened by climate change and local impacts (such as pollution). Biodiversity monitoring is in urgent need. This presentation proposes means of portable, reproducible, and online monitoring systems using biosensors. Biosensors may be applied in the monitoring of conservation programs and in industrial processes in the context of the blue economy.

Mr. Mathias Jonas
Secretary-General of the International Hydrographic Organization

Bio
Mr. Mathias Jonas is the Secretary-General of the International Hydrographic Organization (IHO) since 2017. Prior to this appointment he held the posts of Vice President of the Federal Maritime and Hydrographic Agency and National Hydrographer of Germany with responsibility for sea survey and sea cartography. Being a mariner, Dr Jonas has been is involved in integrated navigation matters since the beginning of the nineties. In addition he has completed the world's first technical certification of an Electronic Chart Display and Information System in1999 and has continuously contributed to IMO and IHO standardisation activities for navigation equipment, survey and cartography since. As one of the responsibilities of his current post he holds the Chair of the Hydrographic Commission on Antarctica.

Abstract
Mapping the Ocean to deliver base line information for all specific observations and Interoperable ocean data in support of the digital twin
The shape of the seabed influences a variety of ocean processes: the movement of pollutants, ocean circulation and climate, and provides habitats for marine species. Yet we still know very little about the ocean floor. The first part of the presentation will focus on actions how the global situation can be improved and why UNCLOS is affected.

The second part will present a way forward towards the digital twin of the ocean through IHO´s S-100 standardization framework for customized data products addressing a wide range of marine geospatial data across domains.

Mr. Terje Thorsnes
Senior Geologist, Geological Survey of Norway, Mareano Programme Group

Bio
Terje Thorsnes is a senior geologist at the Geological Survey of Norway (NGU). He was the key initiator of the Norwegian Mareano programme, which is one the world's largest integrated seabed mapping efforts. He has been a pioneer in using multibeam bathymetry and backscatter for mapping the landscapes, geology, habitats and coral reefs of the Norwegian shelf. He was also one of the first to use multibeam echosounder water column data to map natural methane seepages in Norwegian waters. Since 2011, using autonomous underwater vehicles (AUVs) for a variety of applications has been one of the primary interests, and particularly using synthetic aperture sonar (SAS) to reveal the secrets of the seabed. He is author or co-author on papers dealing with geomorphology, gas seepages, quaternary geology, geochemistry, modelling of organic carbon deposition, use of AUVs and SAS, and coral reef classification. He represents NGU in the Mareano steering group, and the steering group for the national Marine Basemaps pilot project.

Abstract
"Towards autonomous sensor platforms and use of AI to advance seabed observations contributing to science-based decision-making"
Mareano is a government-funded mapping programme dedicated to providing knowledge for ecosystem-based ocean management, by mapping seafloor of Norwegian waters, primarily in offshore areas. The programme has been running since 2005. It has a multi-disciplinary approach, and focuses on seabed ecosystems, based on mapping of bathymetry, geology, biology and chemistry.

To date Mareano has mapped about 260 000 km2 (about 12 %) of the seafloor in Norwegian waters at a total cost of 158 million USD. MAREANOs standard product portfolio includes several map products: bathymetry terrain models, backscatter, water column data, marine landscape, sediment maps (grain size, sedimentary environment, sediment genesis), seabed geomorphology, organic and inorganic chemistry (several elements & compounds), biotopes, vulnerable habitats, and human impact (trawl marks and waste).

So far, the mapping has been done using traditional methods, such as ship-based multibeam bathymetry (including backscatter, water column data and sub-bottom profiler data), footage using towed video platforms, and physical sampling using grabs, trawls, sledge and coring equipment.

Norway is now facing new industrial challenges such as deep-sea mining, offshore wind, and offshore aquaculture, with stakeholders requesting relevant information delivered in short time. We are therefore developing Mareano 2.0, where autonomous platforms such as AUVs (autonomous underwater vehicles) and USVs (unmanned surface vessels) play an increasingly important role.

AUVs can collect large amounts of detailed acoustic and visual in relatively short time and opens up totally new possibilities for mapping and understanding seabed features and ecosystems. USVs can multiply the ability to collect acoustic data such as multibeam bathymetry, lowering the cost radically. This is particularly important in shallow shelf areas such as the North Sea, where offshore wind and aquaculture are rapidly developing industries, and where the ocean management institutions need information over large areas.

The increasing ability to collect huge amounts of data, and the expectation from both industry and management institutions to have relevant data delivered within a relevant timeframe makes it necessary to speed up the interpretation and reporting. We are therefore in a transition from manual expert-based interpretation towards using different types of artificial intelligence (AI) to achieve this. This includes semi-automatic classification of cold-water coral reefs (more than 200 000 so far), automated image classification for geological and biological purposes, and recognition of waste from both visual and acoustic data.

Mareano is an important contributor to ecosystem-based ocean management in Norway, providing knowledge on benthic ecosystems, vulnerable habitats such as coral reefs, human disturbance and pollution, including microplastic. The transition towards extensive use of autonomous platforms and AI will place us in an even better position to support further development of a Blue Economy in Norway.

Mr. Jérôme Aucan
Head, Pacific Community Centre for Ocean Science, the Pacific Community

Bio
Jerome is currently the head of the Pacific Community Center for Ocean Science. He is a physical oceanographer and an engineer by training.

Before joining SPC, he worked as a research scientist for IRD between 2010 and 2020, and has been based in New Caledonia since 2012. Before working for IRD, Jerome worked for 10 years within the University of Hawaii Sea Level Center, in Honolulu, Hawaii. Jerome established a new network of wave monitoring buoys, that later formed the backbone of the Pacific Islands Ocean Observing System (www.pacioos.org/wavebuoy).

He has worked on multiple research projects focusing on coastal vulnerability to sea-level variations, swell or wind waves, and tsunamis.

He is currently the chair of the science committee of the Joint Task Force to investigate the use of submarine telecommunications cables for ocean and climate monitoring and disaster warning

He possesses a Doctorate in Physical Oceanography from the University of Hawaii, a Postgraduate diploma in Applied Maths and Physics from James Cook University in Townsville Australia, and a Master of Engineering in Marine Environment from the Ecole Nationale Supérieure des Techniques Avancées (ENSTA Paris, France).

Abstract

"Technological innovations for ocean observation: SMART cables"

SMART Subsea Cables will integrate environmental sensors into commercial submarine telecommunications cables supporting global scale observations for climate, ocean circulation, sea level monitoring, structure of the Earth, and tsunami and earthquake early warning and disaster risk reduction. SMART cables will be one of the transformative technologies deployed for the 2021-2030 UN Decade for Ocean Science for Sustainable Development. We provide an overview of SMART Cables, describe projects at various stages spanning the Arctic to the Antarctic, and address challenges of international coordination, funding, legal, permitting, and security issues. (SMART = Science Monitoring And Reliable Telecommunications).

Wednesday, 8 June 2022

3:00pm – 6:00pm

Ms. Simone Borg
Ambassador for Malta on Climate Change; Professor, University of Malta

Bio
Simone Borg LL.D, LL.M. (Int law), Ph.D (IMLI) is Malta's Ambassador for Climate Action and chairs the National Climate Action Board. Prof Borg is a resident academic at the University of Malta, a visiting lecturer at the IMO International Maritime Law Institute and has lectured at various Universities abroad. She is specialized in Climate law and policy and the Law of the Sea and Ocean Governance, particularly in relation to the conservation of living marine resources.

Prof Simone Borg recently chaired the Steering Committee for Malta's National Post COVID Strategy. She also occupied various other senior roles at governmental level.

Prof Borg started her career as a diplomat with the Ministry of Foreign Affairs and later headed the Legal and Multilateral Affairs department from 1992 to 2004 within the Ministry responsible for the Environment. During this time, she also drafted national environmental law and policy and was Malta's negotiator in various Environmental Multilateral Agreements, particularly in the climate change negotiations, where she is still very active as Malta's climate ambassador. She was also responsible for the transposition of the environmental acquis communautaire when Malta joined the European Union in 2004. In 2017, during Malta's tenure of the Presidency of the Council of the European Union, she chaired the EU working party on climate negotiations.

Prof Borg is a member of the IUCN Commission on Environmental Law, a member of its sub-committee on the oceans. She has authored various publications on both ocean governance and climate change.

In 2017 she received the French National Order of Merit for her work as a diplomat on climate action in Malta and within the International community. She was recently awarded the Inspirational Leadership Award by the British High Commission in Malta for her work on climate action.

Abstract
"Engaging with policymakers in advancing ocean observing and addressing related challenges"
Ocean observing is instrumental in identifying change, the extent of harm and the various risks impinging upon ocean health. In this respect it serves as a vital, evidence-based source of information for the formulation of law and policy. Ocean observing enables policy makers to further develop their knowledge base in order to take informed decisions. The process becomes a two-way street when policy makers use ocean observation results to identify how to obtain further information in order to go granular and focus on specific impacts and preparedness options from the global, to the regional, up to the local level.

This presentation explores how scientists and policy makers can best work together by ensuring they share the same objectives, namely ocean observation that is equitable, fair and inclusive. Building the essential knowledge base and capacity requires both scientists and policy makers to frame the right questions to pursue the right type of qualitative and quantitative research. Also necessary is the need to streamline data/ complex scientific information to identify

effective legal and policy obligations and compliance measures and to render the same information from ocean observation accessible to end users and all stakeholders.

The presentation also explores lessons learnt over time and how ocean observing which has been informing and guiding policy and law making for more than 50 years can be further strengthened by addressing challenges such as fragmentation, independence and objectivity, synergy and prioritizing action.

Mr. João Vitorino
Physical Oceanographer, Instituto Hidrografico (IH, the Portuguese Hydrographic Institute)

Bio
João Vitorino is a physical oceanographer at Instituto Hidrografico (IH, the Portuguese Hydrographic Institute) with more than 25 years of experience. The activity he develops is centered in the study of the physical oceanography of the Portuguese coastal ocean areas (combining observations and the use of numerical models with data assimilation) and in the development of the capacities of IH real-time monitoring infrastructure MONIZEE. He was the scientific and technical responsible in 15 multidisciplinary cruises conducted by Instituto Hidrografico, was the coordinator of the national funded projects MOCASSIM and MONICAN and was the responsible scientist for Instituto Hidrografico participation in the EU projects EUROSTRATAFORM, HERMES, HERMIONE and JERICO-NEXT. He is presently the responsible scientist for Instituto Hidrografico participation in the EU projects JERICO-S3 and JERICO-Design which gather a broad community of European research institutions in the design and implementation of a European research infrastructure for the coastal ocean. He is also actively contributing to the joint action AA-MARINET conducted in the framework of the All-Atlantic Ocean Research Alliance - AANChOR coordination and support action. Joao Vitorino is the Portuguese Contact Point for the Global Ocean Observing System (GOOS).

Abstract
"Citizen science and the engagement of non-scientific communities"
A large variety of observations is nowadays collected in the world's ocean, forming the backbone of our understanding of the functioning of the marine environment and marine ecosystems and of our capacity to predict their evolution in the short and long term. This huge effort in observation mobilizes many different entities and a broad panoply of observing systems. The vast majority of the marine areas remain however poorly sampled, with available observations being frequently limited to sea surface measurements collected by satellites.

Citizen Science - the engagement of member of the general public in the scientific work, often in collaboration with or under supervision of professional scientists - gained an increasingly importance during the last years as a way to increase observations in many different areas of knowledge. In marine sciences, Citizen Science is assuming a particularly important role in areas such as marine conservation with a large mobilization of public during regular actions for the monitoring of species, habitat conditions, contaminants and litter, among other aspects. The engagement of non-scientific communities is also well established in programs such as the Voluntary Observing Ship Program (VOS) or the Ships of Opportunity Program (SOOP) which use commercial ships to collect meteorological and oceanographic data using ongoing systems such as vessel mounted acoustic current profilers or ferry-box systems.

A particularly important area that can strongly benefit from Citizen Science initiatives is the coastal ocean. This is the geographical area that extends from the coast to the transition to deep ocean waters offshore, covering the continental shelf and upper slope. This area concentrates the large majority of human activities related to the sea, host extremely dynamical and biologically

diverse environments and play the role of battlegrounds between the ocean and the human society.

Characterized by processes operating at diverse spatial and temporal scales the coastal ocean areas challenge our present capacity for observation, asking for an articulated effort involving many different actors and a multiplatform approach. The engagement of the local nautical communities (fishing communities, surfers, sailors, divers and others) in this observation effort could assure a permanent presence "in the field" and the regular coverage of large areas. This potential is presently being explored all around the world using different approaches and technologies. In Europe, the potential of Citizen Science initiatives to strength the capacity of coastal ocean observatories is being discussed, for example, by the Joint European Research Infrastructure of Coastal Observatories (JERICO), which brings together a large community of research centers engaged in coastal ocean observation from several European nations. In another front, as part of the All-Atlantic Cooperation for Ocean Research and Innovation Coordination and Support Action (AANChOR) a web portal is being implemented to boost the articulation between the different actors involved in marine observation. This portal can optimize the articulation between scientific and citizen science initiatives expanding the possible synergies between the different communities.

The consolidation of a citizen science pillar for costal ocean observatories will require the development of specific systems based on miniaturized, low cost sensors, the definition of strategies that could effectively lead to the engagement of the different communities in this effort and the coordination to bring these observations to the level of quality and robustness required. This is a certainly a challenge for the next decades.

Ms. Molly Powers-Tora
Team Leader, Ocean Management and Literacy, Geoscience, Energy, and Maritime (GEM) Division, the Pacific Community

Bio
Molly Powers-Tora is committed to facilitating ocean literacy and capacity development, integrated ocean management, and sustainable livelihoods in Small Island Developing States vulnerable to climate change. She leads the Pacific Community (SPC)'s efforts to improve ocean management and ocean literacy across 22 Pacific Island member states.

In Molly's current role, she coordinates the activities of a multi-disciplinary team in maintaining a regional sea level observation network, developing ocean knowledge products, progressing regional maritime boundaries submissions, and building capacity of Pacific partners in ocean science, law of the sea, and earth and marine observations applications.

SPC is the Pacific region's principal science and technical development organisation, with more than 600 staff working in eight technical divisions. Prior to joining SPC in 2013, Molly was a US Peace Corps Volunteer in Fiji, an Ocean Classroom onboard educator, a Global Islands Partnership (GLISPA) fellow, manager of a corporate foundation, and field manager of a coral reef conservation NGO.

Molly also serves as a Global Ocean Observing System (GOOS) Steering Committee member, expert adviser to the Pacific SIDS on Biodiversity in Areas Beyond National Jurisdiction (BBNJ) treaty negotiations, co-chair of the GOOS Observing Together Program under the UN Ocean Decade, and the coordinator for SPC's OceanTeacher Global Academy Regional Training Centre. She holds a degree in anthropology and religious studies and a master's in public administration/ development practice from the School of International and Public Affairs at Columbia University. She is an avid sailor, diver, and lifelong ocean and island lover.

Abstract

"Strengthening Pacific Island Ocean observation capacity through community engagement"

The Pacific Island region's 12 million inhabitants are custodians of 20% of global ocean exclusive economic zones. Accordingly, Pacific lives and livelihoods are inextricably connected to the ocean. They are also among the most vulnerable to ocean changes and extreme events. When it comes to the ocean observations that can help communities prepare for these changes and events, however, the Pacific islands face numerous challenges in developing accurate local predictions. While global models and satellite observations provide us with a good understanding of the open ocean, our understanding of the dynamics at the coast is patchy at best—and this is the area of greatest interest to Pacific islanders, 90% of whom live in the coastal zone.

This presentation explores the challenges and recent progress in Pacific island ocean observing. It focuses on brightspot examples from the region where capacity building and community engagement have helped to strengthen predictions, communicate important messages, and improve awareness of ocean changes and extreme events. Finally, it highlights opportunities for future development through partnerships and collaboration.

Mr. David Millar

Government Accounts Director, Fugro (a multinational corporation headquartered in the Netherlands active in Seabed 2030 and the UN Ocean Decade)

Bio

Based in the Washington, DC area, David Millar is Fugro's Government Accounts Director for the Americas region. He serves as Fugro's key account manager for national governments within the Americas, the United Nations, the World Bank, and other Multilateral Development Banks. Mr. Millar is responsible for overseeing the development and execution of Fugro's partnerships with public sector clients and overseeing Fugro's collaborative science activities within the Americas Region. Mr. Millar also leads Fugro's global support of and participation in Seabed 2030 and the United Nations Decade of Ocean Science for Sustainable Development.

Abstract

"Role of the private sector in contributing to advancing ocean observation"

Ocean Observations are required to build scientific capacity and generate data that will contribute to the 2030 Agenda for Sustainable Development and other relevant global legal and policy frameworks. The integration of science and policy in a mutually reinforcing manner will be critical to balancing sustainable development and environmental stewardship of the ocean and its resources. Unfortunately, the availability of ocean science data is currently insufficient to inform sustainable ocean governance and policies.

This presents an opportunity for the private sector, who are actively involved in the sustainable development of the world's oceans. The private sector is already collecting ocean science data in support of resource and infrastructure development projects around the globe. These data are generally not shared or made publicly accessible, however. As a result, there is a wonderful opportunity to leverage ongoing private sector activities to improve our collective understanding of the world's oceans.

Companies now understand that employees, shareholders, customers, and society expect them to contribute to a sustainable future. Businesses must balance short- and long-term stakeholder interests while integrating economic, social, and environmental considerations into decision-making. Given the private sector's increasing awareness of and focus on ocean stewardship, they represent an important partner in expanding the pool of ocean science data generators and users.

This presentation will discuss the role of the private sector in contributing to advancing ocean observation, focusing on how public private partnerships and equitable frameworks can provide public access to private ocean science data.

Ms. Juliet Hermes
Oceanographer, South African Environmental Observation Network; Professor, University of Cape Town

Bio
Juliet has significant experience with developing, coordinating and managing national, regional and international long-term, multidisciplinary, ocean observations and numerical modelling programs. She leads a team focussed on the marine offshore environment around southern Africa as part of the Government funded South African Environmental Observation Network. Juliet commits a lot of her time to standards and best practices through her role as a vice chair of the GOOS Observation Coordination Group, as well as through the IOC/GOOS Ocean Best Practices Group. Her involvement in the CLIVAR Indian Ocean Regional Panel as well as the GEO Blue Planet, the Indian Ocean Rim Association, GCOS and working with the African Group Negotiators Experts Support have allowed her to gain a greater understanding of policy and the users of ocean observing systems.

Juliet is also a Professor, at the University of Cape Town and the Nelson Mandela University, where she has supervised over 40 students and co-authored more than 50 papers. However, her passion is in fostering regional and international collaborations as well as developing capabilities across regions, cultures and varying skillsets. Juliet focuses attention on development through ensuring knowledge generation and sharing and providing an enabling environment to grow a diverse, inclusive cohort of ocean scientists.

Abstract
"Challenges and successes in international partnering for regional ocean observation"
There is no doubt about the role the ocean plays in our climate, nor the impact climate change has on the ocean and marine ecosystems. Healthy oceans are critical for our wellbeing. However, our ability to understand and communicate this role is suboptimal. Like much science we are constrained by funding and capacity, but also by collaboration, communication and our own inherent bias. The ocean connects each one of us and no scientist or scientific organization in the world can work alone without collaboration. This presentation highlights the successes and challenges of regional ocean observations and international partnerships and highlights how we can break the mold of traditional approaches whilst building on the strong foundations that have been laid.

Ms. Emma Heslop
Acting Director of the Global Ocean Observing System in IOC-UNESCO

Bio
Emma is a physical oceanographer with significant strategic & business development expertise.
An initial career in the technology industry developed skills in new market development and communications. Sailing made her profoundly aware of the importance of the oceans and of the human impacts on them. She completed a PhD in physical oceanography and is passionate about the need for sustained monitoring of the oceans and the utility of ocean data for science, government, and industry applications, now and into the future.

Her experience encompasses circulation variability, new technology such as gliders, model validation, multi-platform ocean observing systems, the economics of ocean data and ocean data products. She has proven leadership of research, international collaboration and in applying business practice to bridge the gap between ocean science and societal applications.

In 2018 she joined the IOC of UNESCO to support the development of the Global Ocean Observing System (GOOS), in particular developing and now implementing its ambitious 2030 Strategy. The ocean has a key role to play in our sustainable future and ocean observations are the foundation to achieving this.

Abstract

"Building a fit-for-purpose global ocean observing system through multi-stakeholder partnerships"

The ocean plays a huge role in our climate and the livelihoods of billions of people, many of them in parts of the world that are currently ill equipped to cope with climate change. Ocean observations are key to facing these challenges, however this vital information also opens the door to clear opportunities for economic growth and blue sustainable development. The Global Ocean Observing System today coordinates across ocean observing networks, and regional and national systems, that gather data from the open ocean and more coastal areas. However, society will need more observations and a more operational ocean observing system if we are to manage these threats and enable nations and communities to capitalize on the opportunities. The Global Ocean Observing System 2030 Strategy was an ambitious call to deliver a 'fit for purpose, responsive and fully integrated ocean observing system that delivers the essential information needed', this vision cannot be achieved without strong partnership with stakeholders. This presentation briefly outlines key challenges, where strong stakeholder partnership is vital, and the actions, including within the Ocean Decade, that are advancing these partnerships in 3 key areas; 1) across the value chain through co-design with users, observers, information services, and the modeling community to develop fit for purpose system design, 2) through greater partnership with the private sector, and 3) through working with partners across the UN, including DOALOS, WMO, and UNEP. We need to advance strongly in the next years to deliver on the concept of a fit for purpose system, this provides recommendations for concerted action.

Thursday, 9 June 2022

10:00 am – 1:00 pm

Mr. Ariel Hernan Troisi
Chair of IOC-UNESCO

Bio
Captain Ariel Troisi has a degree in Oceanography from the Technological Institute of Buenos Aires and a Master's degree in Policy and Management of Science and Technology from the University of Buenos Aires. He currently serves as Technical Secretary in the Naval Hydrographic Service, coordinating oceanographic, hydrographic and cartographic activities.

He has extensive professional experience across the whole value chain of ocean sciences, including planning, execution and management of scientific and technical activities.

His experience in the international arena covers various activities related to the Intergovernmental Oceanographic Commission (IOC) of UNESCO, having chaired multiple programs and activities. He currently holds the position of Chairperson of the IOC, actively participating in the design, preparation and implementation of the United Nations Decade of Ocean Sciences for Sustainable Development 2021-2030, as well as in other processes.

Cap. Troisi has been deeply involved in the preparation of the Argentine Submission on the outer limit of the continental shelf and has also actively participated in the analysis process of the Argentine Submission by the Commission on the Limits of the Continental Shelf.

Abstract
"Advancing ocean observation through international cooperation in the United Nations Decade of Ocean Science for Sustainable Development"
The ocean is changing, and observations are the underpinning of informed decisions about its present state and the future. Attaining a sustainable ocean management requires an integrated, responsive and sustained observing system, with a focus on supporting the frameworks and infrastructure coordinating ocean observing activities, including design, partnerships, evaluation, standards and data flow to key applications.

While significant improvements have been made in the last decades in our ability to observe and understand the ocean, several challenges and unknowns remain in place. The UN Decade of Ocean Science for Sustainable Development (the Ocean Decade) has the potential to play a major role in fulfilling the transformative ambitions towards 2030. There is a need to implement a strategy to provide the framework and the impetus to meet the combined challenges of climate change, biodiversity loss, expanding populations and coastal mega-cities, extreme weather events, and ocean and coastal resource management. We cannot create different systems to meet all of these challenges. We need to invest in an integrated and responsive ocean observing system to serve multiple users.

Ms. Joana Akrofi
Programme Management Officer, Team Leader, Global Environment Monitoring System on Ocean and Coasts (GEMS Ocean), Science Division, UNEP

Bio
Joana Akrofi is a Programme Management Officer at the United Nations Environment Programme (UNEP), Science Division, Big Data Branch. She is currently leading the co-design of the Global

Environment Monitoring System Ocean (GEMS ocean) with partners to makes available relevant data, analysis, and information guiding action to conserve and sustainably use the ocean and coasts. This includes the coordinating the building and convening of a global Community of Practice across experts and society at large to provide capacity, analysis, innovation and synthesized information to decision and policy makers, civil society, international organizations worldwide in an integrated approach to keep the global ocean and coasts healthy and productive. GEMS Ocean promotes and convenes a transdisciplinary partnership approach including UN and civil society partners, data providers, observing systems and knowledge asset holders to translate the collective ocean and coastal knowledge and expertise into sustained, targeted information for decision-makers, and to trigger transformative action at scale focused on sustainable coastal and ocean use and ecosystem health as well as informing sustainable blue economy developments. Since joining UNEP in 2005 her focus has been on marine and coastal scientific assessments including work on the Global Environment Outlook (GEO) and the GEF Transboundary Waters Assessment Programme (GEF-TWAP) and indicator based integrated assessment of five transboundary water systems including Large Marine Ecosystems, Open Ocean, Lakes and Reservoirs, River Basins, and Groundwater Aquifers. She is also the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP)Technical Secretary for UNEP and the Focal Point for the World Ocean Assessment (WOA).

Abstract

"Building a global ocean monitoring system for sustainable development through transdisciplinary partnership: The GEMS Ocean co-design experience"

Our ocean and coasts are being degraded by direct human activities, climate pressure and pollution from land, air and water sources that harm marine life, undermine coastal communities, and negatively affect human and ecosystem health. Data and information related to the ocean is important to understanding ocean processes and ecosystem functioning, and to making informed decisions about human activities considering the present and estimated future state of the ocean. Currently data is collected through an extensive network of in situ, remote observational and modelling systems. This is being coordinated by assets such as the Global Ocean Observing System (GOOS), Mercator Ocean International and strongly mandated in the Intergovernmental Oceanographic Commission of UNESCO. Considerable advancement has been made by these programmes and, Essential Ocean Variables (EOVs), follow rigorous science; these standards are promoted for monitoring globally; the UN Decade for Ocean Science has a strong accelerator effect.

Challenges remain, however, in meeting the increasing societal demands for ocean observation data to be put to action. Even more so in a time where we will encounter accelerated and cumulative use of sea space e.g., for renewable energy. Information across sectors needs to evolve and to address gaps in socio-economic data. In general, there are difficulties in/lack of capacity to access, share and use information on transformational scale down to community level.

UNEP seeks partnership, recognizing the challenge lies in assistance to process available data to information, to address gaps collectively and address regional, national specific drivers and pressures. It requires a bottom-up science-policy and social engagement process at scale to have knowledge and services at hand that can be operationalised and help prioritize targeted actions.

The Global Environment Monitoring System (GEMS Ocean) co-design process invites Communities of Practice across experts and civil society at large and by drawing mostly on existing data it aims to foster capacity, analysis, innovation and scaled action. Key is to protect, maintain or build ocean and coastal natural capital, assets and flows based on healthy and productive ecosystems. GEMS Ocean by working with observation and expert communities and local/regional stakeholders shall incubate downstream action and transformation.

GEMS Ocean is leveraging UNEP's World Environment Situation Room (WESR) and relevant expert portals to display data and analytics. Compelling use-cases shall be demonstrated including those illustrating nature-based solutions, together with relevant sectoral stakeholders.

GEMS isn't classical monitoring; it rather aims to translate and contextualize existing data for information. Duplication with existing monitoring initiatives shall be avoided, while downstream collaboration for data uptake shall be collaboratively promoted. This involves embracing bottom-up data and knowledge, to set priorities for action and co-design local solutions to global pressures; in essence to assist in setting up a user driven end-to-end value chain. A focus is to link land-ocean interaction, Source to Seas (S2S), data and information and to engage in/learn from the newly adopted System of Environmental Economic Accounting (SEEA) standards in Ocean context.

Mr. David Legler
Director, Global Ocean Monitoring and Observation program at NOAA; Chair, Ocean Observation Coordination Group

Bio
David M. Legler currently serves as the Director, Global Ocean Monitoring and Observing program (GOMO), within NOAA's Oceanic and Atmospheric Research. GOMO is leading NOAA's efforts to develop and sustain a global in-situ ocean observing system and related products for researchers, forecasters, and other beneficiaries of ocean knowledge. He is currently co-chair of the GOOS Observation Coordination Group (formerly part of the WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM - http://www.jcomm.info/) and co-chairs the US Inter-agency Ocean Observation Committee (IOOC - http://www.iooc.us/).

Before coming to NOAA, he directed the US Climate Variability and Predictability (CLIVAR – a program of the World Climate Research Program) Office in Washington, DC where he coordinated scientific and programmatic activities addressing a wide range of topics including the Atlantic Meridional Overturning Circulation (AMOC). He has also served on numerous national and international committees addressing global ocean observations, ocean data assimilation, ocean data management, and climate research. He has published on a range of topics such as ocean remote sensing, air-sea interaction, and the impacts of El Niño on North American climate and subsequent effects on US agriculture and water resources.

Abstract
"Ocean observing co-design through international cooperation and coordination"
Oceans are a major driver of weather, regional climate variability (e.g. El Nino, monsoons), and extreme events such as drought/floods. The oceans also act as enormous reservoirs of heat and carbon, governing the long-term future climate of the earth. As a result, the oceans are warming, marine heat waves are now leading to disruptions in marine ecosystems, sea level rise threatens many coastal communities, and ocean acidification and changing ocean chemistry are having a deleterious impact on the ocean's health and ability to support marine life. Moreover, the global ocean economy is expected to double by 2030, increasing pressures on our global oceans.

Routinely available observations and information on our oceans must be a cornerstone of our strategy to track the current state of the ocean, enable skillful environmental predictions and warnings, manage ocean resources, empower society to adapt to change, and meet our growing needs for a sustainable ocean, sustainable communities, and a vibrant ocean economy.

The Ocean Observing Co-Design Programme, endorsed as part of the UN Decade of Ocean Science for Sustainable Development, aims to transform the current ocean observing system development processes, into an integrated process whereby existing and new observing networks, closely coupled with the modeling community, work collectively to support the development of an integrated and agile ocean observing system; with linked prediction capabilities. Co-development of the system will better enable us to take full advantage of new observing technologies, and reflect the rapid capabilities of digital knowledge delivery (e.g. digital

oceans). This fit-for-purpose observing and forecasting system will provide readily available ocean information as a foundational element in achieving the ocean we want by 2030 and address user needs on a local and global basis.

The Ocean Observing Co-Design Programme will initially work to harness community and stakeholder interest around multiple "Exemplars" (end user need areas), to inform the co-design of a fit-for-purpose system and drive the development of requirements, diagnostic tools, as well as observing-modeling integration necessary to demonstrate value to ocean observing system investors.

By 2030, this programme will advance the maturity and robustness of the global ocean observing and forecasting enterprise, moving towards an integrated system that will increase permanent support, and provide the greatest possible impact for investment.

Ms. Olga Sato
Professor, Instituto Oceanográfico, University of São Paulo

Bio
Olga Sato is a professor in Physical Oceanography at the Oceanographic Institute of the University of São Paulo, in Brazil. She got her Ph.D. in Physical Oceanography at the Graduate School of Oceanography, University of Rhode Island, USA. Her research interests involve the study of large-scale oceanic circulation focused on the South Atlantic Ocean. She currently studies aspects of Meridional Overturning Circulation (MOC), an indicator for changes in climate, under the perspective of oceanic fluxes and water mass formation.

She collaborates with activities to maintain an observational effort carried out by the initiative known as the South Atlantic MOC (SAMOC) which she is part its Executive Committee. Her involvement with data distribution started as part of the GOOS-Brazil, the Brazilian branch of the Global Ocean Observing System (GOOS). She is also a member of the Atlantic Regional Panel of the Climate and Ocean - Variability, Predictability and Change (CLIVAR). Since 2019, she participates in the All-Atlantic Cooperation for Ocean Research and innovation (AANChOR) in the Common Standard for Information and Data Sharing group as the leader of the Joint Action "All Atlantic Data Enterprise 2030".

Abstract
"Building common standards for ocean data sharing: experience from a cross-regional initiative"
According to the IPCC, climate change continues to have a far-reaching impact on the oceans and their coasts. The consequences are profound impact on marine ecosystems. At the same time, the oceans play a key role in the development of national and regional economies, in achieving the Sustainable Development Goals and in addressing climate change. Globally, the livelihoods of many coastal places and the people who live there are under threat. Policymakers should be able to make global decisions based on the best possible knowledge. An essential basis for this is the availability of scientific data. Natural science figures as well as social science facts form the basis for a balanced picture of today's knowledge about the current situation for future decisions. The agreement signed as the Belém Statement between the signatories Brazil, the European Commission, and South Africa creates the political framework for transatlantic cooperation. One goal of the Coordination & Support Action AANChOR (https://allatlanticocean.org/), which is financially supported by the European Commission, is the formation of an All-Atlantic Ocean Data Space. As a representative of its five core activities, we present the Joint Action "All Atlantic Ocean Data Enterprise 2030 - Common Standards for Information and Data Sharing". Behind this title is the task: Create a common All-Atlantic Ocean Data Space, in which all interested countries

of the South and North Atlantic jointly undertake the effort to collect, archive, and share historical and current data transparently, free of charge. This initiative is guided by the principles for data management known as Findable, Accessible, Interoperable, Re-usable data (FAIR) and Collective Benefit, Authority to Control, Responsibility, and Ethics (CARE). We have promoted a series of meetings, webinars, workshops to congregate scientists, data experts, stakeholders, organizations from several countries to identify the existing data collections and infrastructures but also to assess the gaps and needs in the Atlantic Ocean.

Mr. Karim Hilmi
Research Director at Institut National de Recherche Halieutique (Morocco)
National Focal Point and Vice Chair at IOC-UNESCO

Bio
Karim Hilmi is a Research Director at the National Institute of Fisheries Research in Morocco. He also serves as a Vice Chair of Group V (Africa and Arab states), the Chair of the Intersessional Financial Advisory Group (IFAG) at the Intergovernmental Oceanographic Commission for UNESCO (the IOC of UNESCO) and as a focal person for the IOC of UNESCO in Morocco at the National Commission of Education, Sciences and Culture. He holds a PhD in physical oceanography with emphasis on hydrodynamic modeling.

His field's expertise is also on interaction between climate change, the functioning of marine ecosystems, the impacts of marine environment on fisheries and aquaculture, upwellings, renewable energies (winds, tides, currents, swells…). He is involved as a contributing author/lead author/reviewer expert into IPCC Assessment Reports since 1998, mainly for Ocean & Africa chapters and involved also in many national and international IOC and IOCAFRICA programs. He has published widely and served as reviewer for journals and MSc and PhD thesis for universities in Morocco (and outside Morocco).

Abstract
"Building an integrated national ocean observing system: A case study from Morocco"
The Kingdom of Morocco has two large marine coasts stretching over the Atlantic Ocean (3000 km) and the Mediterranean Sea (500 km), including the Strait of Gibraltar connecting the Atlantic Ocean to the Mediterranean Sea. The Moroccan Atlantic coast is part of the Large Marine Ecosystem of the Canary Current (CCLME) and the Moroccan Mediterranean coast of the Alboran Sea. Recent scientific studies, carried out on these three ecosystems, strongly indicate a change in their marine environments and the impact of climate change on their ecosystems. Regarding the challenges and in a context of climate change, ocean observation is fundamental for a regular and operational monitoring of these ecosystems. This monitoring is provided by our national institutions for the implementation of the operationalization of an "integrated" national oceanographic observation system. A case study will be presented in connection with the thematic for this conference on the "international cooperation and coordination in advancing ocean observing and addressing related challenges" and the "UN decade of ocean science for sustainable development (2021-2030)".

Ms. Joana Beja
Senior Scientific Officer, Flanders Marine Institute (VLIZ); EMODnet Biology coordinator, EurOBIS node co-manager

Bio
I work at Flanders Marine Institute (VLIZ) Data Centre and accumulate roles as the EMODnet Biology coordinator, the EurOBIS node co-manager and also as the VLIZ data coordinator for the EMODnet Central Portal, EMODnet Physics and EMODnet Ingestion.

I am also involved with Southern Ocean Observing System (SOOS) through its Data Management Sub-Committee and the Equity, Diversity and Inclusion (EDI) working group and am a member of the Ocean Biodiversity Information System Vocabulary Infrastructure Project Team (OBIS-VIPT).

My academic trajectory diverted her from the initial undergraduate studies in environmental engineering to marine science, upon completing my Masters. My main expertise is in physical oceanography data management, an activity that I have done for roughly two decades and since 2019, I have moved sideways to marine biological data management.

Abstract

"Strengthening ocean observation value chain through regional cooperation: lessons from EMODnet Biology"

The European Marine Observation and Data network (EMODnet) is the EU service for marine in situ data. The main principle guiding the work developed within this initiative is "collect once, use many times", which is implemented through a series of actions that foster and encourage collaboration across multiple sectors of activity, from research to policy making, industry to individual citizens and NGOs.

EMODnet Biology is hosted and coordinated by the Flanders Marine Institute (VLIZ) and builds on the knowledge acquired and developments implemented by previous initiatives, some of which also hosted and/or coordinated by VLIZ.

EMODnet Biology focuses its activities in providing free and open access to historical and recent data, on temporal and spatial distribution of marine species and species traits from all European regional seas, and creating gridded maps of species abundance in space and through time. Through the widespread partnership, we promote engagement and collaboration with various other national and international initiatives, such as the European Regional Sea Commissions, EU Thematic Groups, UN endorsed initiatives, to name but a few.

There are various examples of the added value chain through regional cooperation, within EMODnet Biology one of the most important to mention is our close collaboration with the Ocean Biodiversity Information System (OBIS). All the data managed and published by EMODnet Biology are also available via OBIS, which makes it one of the main data contributors to this aggregator.