ACTIVITY REPORT

Linking Earth Observation Data and Sustainable Development across the Atlantic

03-05 December 2019
Estoril, Portugal

Activity Number: 545-510: 508

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Workshop Objectives

The workshop "Linking Earth Observation Data and Sustainable Development Across the Atlantic" took place in Centro de Congressos do Estoril, on days 3, 4 and 5 of December 2019.

This activity aimed at fostering the incorporation of Earth Observation (EO) and related in situ data products in the work carried out by researchers and stakeholders of ocean related activities, with emphasis in the Central and Southern Atlantic. Interested participants, with limited or no experience of EO data and products, were invited to join the Marine Technology Workshop 2019 (Marinetech19), organized by Instituto Hidrográfico biannually since 2015, where they had the opportunity to share their work with more experienced users, including experts from ESA and Copernicus. Newcomers and experienced users were able to discuss how the existing EO data and products, including the ESA's CCI datasets, can be used to address the specific issues concerning a diversity of topics related with the Environment, Ocean, Coast and Sustainable Development.

Expected Outcomes

The intended long-term outcome of this proposal is the setup of new collaborations and partnerships envisioning Research and Development activities in a Blue Economy, within members of different scientific disciplines and economic activities across the Atlantic basin, which will routinely use ESA's products and services while promoting the philosophy underlying Sustainable Development Goals, which is central to Future Earth.

This activity can be linked indirectly to all Sustainable Development Goals (SGDs) of the UN 2030 Agenda, but the outcome of this proposal is aligned directly with six of the SDGs:

Participants

Benefiting from the joint organization of Marinetech19 the workshop was well attended with close to 100 participants per day, 42 of which were specific attendees of the "Linking Earth Observation data and Sustainable Development across the Atlantic".

The participants were directly invited from academic and technical institutions but this workshop was also disseminated at certain related events: Atlantic from Space Workshop, Southampton, January 2019; World Ocean Circulation User Consultation Meeting, Frascati, February 2019, Living Planet Symposium, May 2019. The event was also disseminated through social media of the different organizing institutions and through the Future Earth community.

Sponsorship was available to attend the workshop and before the deadline was reached, 50 applications were submitted in the platform. The activity funds together with the contribution from Deimos and GMV allowed full coverage of travel, meals and accommodation expenses for nine participants. The full participants list can be checked on Annex 1.

Methodology

A webpage was created: https://eo4sd-atlantic-workshop.weebly.com/ with the information about the workshop. In the webpage, there was also information about the application for sponsorship that was open until July 31, 2019. The webpage and flyer (annex 3) were disseminated through institutional and social contacts and through the Future Earth open network forum.

This workshop included four thematic sessions: Earth Observation for Sustainable Development, Earth Observation for Fisheries and Aquaculture, Earth Observation for Coastal Resilience, Earth Observation Data, Tools and Services. Each session had 3 to 5 keynote presentations from experts that presented case studies and shared their expertise with the audience. Each session ended with a roundtable discussion, where the sponsored participants were invited to briefly present their line of work and participate in the discussion.

Sponsorship and Support

This workshop was funded by ESA – Future Earth Joint Initiative 2018 Activity Number: 545-510: 508 and organized by Instituto Hidrográfico, Portugal and AIR Centre, Portugal.

The workshop also received funds from Deimos Engenharia, Portugal and GMV, Portugal and the support of Future Earth Coasts.

Final Remarks

Throughout this workshop, a number of real case studies, EO based tools and services were presented in a broad range of topics related with the ocean. Not only ESA's initiatives in bringing consistent EO data to the users but also the development of new services based on EO data has proven to be a powerful tool for the democratization of information and the sustainable development across the Atlantic. It was explained how EO data can be directly and indirectly linked with all the SDGs from the UN 2030 Agenda. It was clear that the linkage between data and the final users was of the utmost importance and there is still much room for improvement. This issue must be considered as a top priority for the UN decade for the Ocean.

This workshop enabled an open and synergetic discussion between professionals from different countries, scientific backgrounds and areas of expertise. New projects, initiatives and collaborations that will work towards the sustainability of the Atlantic are certain outcomes of this workshop.

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ANNEX 1

Participation Description

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Participation List

First Name	Last Name	Country	Institution	Email
Abiodun	Sulen	Nigeria	NIOMR - Institute for Oceanography and Marine Research	adeadegbie@yahoo.com
Adekunle	Oresegun	Nigeria	NIOMR - Institute for Oceanography and Marine Research	koresegun@yahoo.com
Akaawase	Bernard	Nigeria	Centre for Maritime and Offshore Studies, FUPR	akaawasebernard@gmail.com
Amaya	Atencia Yépez	Spain	GMV	aatencia@gmv.com
Ana	Nobre Silva	Portugal	Instituto Português do Mar e Atmosfera	amasilva@ipma.pt
António	Araujo	Portugal	GMV	antonio.araujo@gmv.com
António	Geraldo Ferreira	Brazil	Labomar	antonio.ferreira@ufc.br
António	Jorge da Silva	Portugal	Instituto Hidrográfico	jorge.silva@hidrografico.pt
Artur	Rocha	Portugal	INESC TEC	artur.rocha@inesctec.pt
Bruno	Ramos	Portugal	EMEPC	bramos@emepc-portugal.org
Carlos	Doménech	Espanha	GMV	cdomenech@gmv.com
Catarina	Duarte	Portugal	AIR Centre	catarina.duarte@aircentre.org
David	Barnabé Fernandes	Portugal	Make it Special	David.fernandes@makeitspecial.pt
Edward	Senkondo	Tanzania	Tanzania Fisheries Research Institute	eddoseny@gmail.com
Elsa	Alexandrino	Portugal	Deimos Engenharia	elsa.alexandrino@deimos.com.pt
Ffion	Atkins	South Africa	University of Cape Town	ffion.atkins@uct.ac.za
Foster	Mensah	Ghana	CERGIS	fmensah@ug.edu.gh
Hayley	Evers King	Germany	EUMETSAT	Hayley.EversKing@eumetsat.int
Hilkka	Ndjaula	Namibia	University of Namibia	hndjaula@unam.na
Isa	Elegbede	Nigeria	University of Lagos	isaelegbede@gmail.com
Joaquin	Brito	Portugal	AIR Centre	joaquin.brito@aircentre.org
Jorge	Del Rio	Austria	UNOOSA	jorge.delriovera@un.org
José	Moutinho	Portugal	AIR Centre	jose.moutinho@aircentre.orf
Julliet	Correa da Costa	Brazil	Federal University of Santa Catarina (UFSC)	jullietcorrea@hotmail.com

Koushik	Panda	Portugal	Deimos Engenharia	koushik.panda@deimos.com.pt
Luísa	Lamas	Portugal	Instituto Hidrográfico	luisa.lamas@hidrografico.pt
Mahmoud	Ibrahim Mahmoud	Nigeria	National Oil Spill Detection and Response Agency (NOSDRA)	salammahmoudiii@gmail.com
Milton	Kampel	Brazil	Instituto Nacional de Pesquisas Espaciais (INPE)	milton.kampel@inpe.br
Nathalie	Ngalya	Democratic Republic of Congo	Institut Facultaire des Sciences Agronomiques (IFA) de Yangambi	nathngalya@gmail.com
Nuno	Grosso	Portugal	Deimos Engenharia	nuno.grosso@deimos.com.pt
Nuno	Catarino	Portugal	Deimos Engenharia	nuno.catarino@deimos.com.pt
Paulo	Oliveira	Portugal	Instituto Português do Mar e Atmosfera	pboliveira@ipma.pt
Robert	Weiss	USA	Virginia Tech / Future Earth Coasts	weiszr@vt.edu
Ruben	Santos	Portugal	Instituto Hidrográfico	rubenchages@gmail.com
Samuel	Mafwila	Namibia	University of Namibia	smafwila@gmail.com
Samy	Djavidnia	Portugal	Geo Blue Planet	samy.djavidnia@gmail.com
Sara	Aparício	Italy	ESA - ESRIN	Sara.Aparicio@esa.int
Sónia	Pedro	Portugal	Instituto Português do Mar e Atmosfera	spedro@ipma.pt
Stefano	Ferreti	Italy	ESA - ESRIN	Stefano.Ferretti@esa.int
Stewart	Bernard	Africa do Sul	CSIR	sbernard@csir.co.za
Susana	Barbosa	Portugal	INESC TEC	susana.a.barbosa@inesctec.pt

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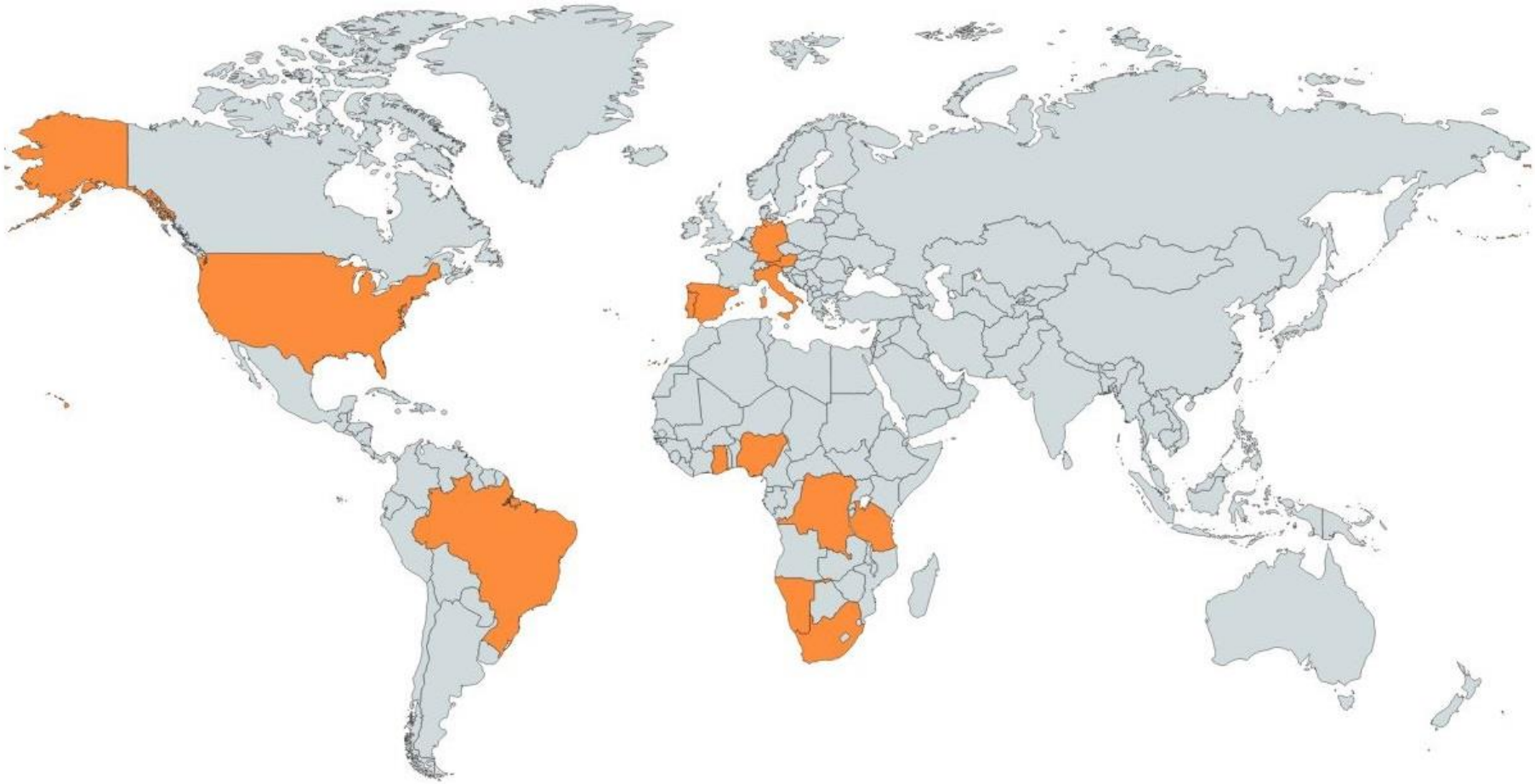
Participation by Country



Participation details:

Nine participants were fully funded by this Activity:

- Foster Mensah (CERGIS, Ghana)
- Edward Senkondo (Tanzania Fisheries Research Institute, Tanzania)
- Nathalie Ngalya* (IFA, Democratic Republic of Congo)
- Isa Elegbede (BTU, Germany)
- Julliet Correa da Costa (UFSC, Brazil)
- Ffion Atkins (University of Cape Town, South Africa)
- Akaawase Bernard* (Federal University of Petroleum Resources, Nigeria)
- Mahmoud Ibrahim Mahmoud (NOSDRA, Nigeria)
- António Ferreira (Labomar, Brazil)
- Sonigitu Ekpe* (Nigeria)

* Unfortunately due to visa restrictions these participations were unable to travel to Portugal.

Moderators and Keynote speakers short bio:

Samy Djavidnia is a voluntary member of the Group of Earth Observations Blue Planet (GEO Blue Planet) Initiative Steering and Management Committees. His expertise includes Earth observation, oceanography from space and international operation. Within Blue Planet, Samy is looks at the application of Earth Observation for the implementation of the Sustainable Development Goals targets and indicators. He is the lead editor if the "Oceans and Society: Blue Planet" book. Samy holds a Bachelor's degree in Physics and Astrophysics and Master's degree in Space Science. He is currently working for a European Union Agency in Lisbon, and before that he worked for the European Space Agency in Germany & Spain, for Imperial College in the UK and for the European Commission Joint Research Centre in Italy. Samy is a qualified rugby coach engaged with grass roots level development programmes, but deep down he wished he could have been a professional rugby player.

Foster Mensah is a GIS and remote Sensing Specialist and currently works with the Centre for Remote Sensing and Geographic Information Services, located in the University of Ghana. He has worked on a number of GIS and remote sensing related projects in Ghana and the West Africa Sub-region including assignments on the application of earth observation technologies to land and forest degradation. He is presently involved in a West Africa Programme aimed at using available satellite imagery and GIS to develop user-tailored environmental information services and decision support systems for spatial planning and evidence-based decision making. He holds a BSc (Hons) degree in Geodetic Engineering, Post Graduate Diploma in Integrated Map and Geo-information Production and an MPhil in Geography and Resource Development.

Stefano Ferretti works in the Science, Applications and Climate Department of the Earth Observation Programmes Directorate of the European Space Agency, where he manages the EO Atlantic Regional Initiative. He co-authored and edited the book "Space Capacity Building in the XXI century" as Resident Fellow of the European Space Policy Institute (ESPI) in Vienna, Austria, the leading European think tank for space policy, while working as an ESA Space Policy officer seconded from ESA/HQ in Paris, France, from 2015 until 2018. His main research interests are governance, innovation and future space-based

services, and at ESPI he has initiated and managed the "Space for Sustainable Development" programme of activities, which included the 10th ESPI Autumn Conference in 2016 and the "Yearbook on Space Policy 2016: Space for Sustainable Development" published by ESPI at Springer Wien New York; The ESPI contributions to the UNISPACE+50, which included the ESPI-UNOOSA-ESA Conference "Space Capacity Building in the XXI century" in 2018; and various high-level Space policy researches, dialogue platforms, seminars and conferences in the European and global context, addressing sectors such as health, telecommunications and transport, which included the ESPI-EU-ESA Conference "Space and SATCOM for 5G: European Transport and Connected Mobility" in Bruxelles in 2017 and the participation to the UN COPUOS Expert Focus Group for Space and Global Health (EFG-SGH) based on the UNISPACE-III Recommendation 6. Previously he covered various positions at the European Space Agency, working as energy manager and infrastructure technical officer at ESA/ESRIN, and as International Space Station payloads project manager at ESA/ESTEC, coordinating the development of scientific experiments in microgravity, with international space agencies (NASA, JAXA and ROSCOSMOS), research institutions and industries. Before joining the Agency, he worked at Thales Alenia Space, where he managed development activities of the International Space Station Node3 module, covering the various engineering and manufacturing phases of the flight hardware. For this work he received an award from the NASA International Space Station vehicle office in 2006. Prior to that, he carried out academic and industrial research activities at NASA, and during ESA parabolic flight campaigns, for which he received the International Astronautical Federation Napolitano Award in 2002. He holds a PhD, with a dissertation on Innovative Technologies for Space Habitats, a Master in Mechanical Engineering from the University of Bologna and a Master of Space Studies from the International Space University. He attended executive programmes in Space policy and law, innovation and entrepreneurship and leadership, at George Washington University and MIT. He has authored several articles, reports and papers in the fields of space policy and law as well as science, engineering and technology. He is a member of the Professional Engineers Association (*Ordine degli Ingegneri*) of Italy since 2005, of the International Astronautical Federation Committee on Space Applications and he represented ESPI for three years at the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS)

Jorge del Rio is a telecommunication Engineer and have PhD in earth observation. He started his career in the Group of Physical Oceanography of the University of Malaga where he used remote sensing to study the Mediterranean Sea, during this period he had research stays in the Colorado State University, the University of British Columbia and the NASA Goddard Space Flight Centre which gave him better insights on how satellites were used and the techniques needed to process their data. After that, he joined the European Space Agency, working on Envisat, the largest earth observation satellite ever built, and Copernicus, the biggest European earth observation programme. He has also worked for the NATO Underwater Research Centre applying space knowledge to underwater systems and the European Maritime Safety Agency using satellites to catch polluters red-handed. After that, he moved to the European Global Navigation Satellite Systems Agency, the agency in charge of the exploitation of Galileo, the European global navigation satellite system, where he worked setting up the operations of the Galileo Security Monitoring Centre until he joined the Office for Outer Space Affairs in the United Nations, as a scientific affairs officer, promoting international cooperation in the peaceful uses of outer space.

Carlos Doménech is Project Manager at GMV with more than 9 years of experience in management and coordination of Earth Observation projects. His main scientific expertise is on the fields of atmospheric physics, climate, analysis of remote sensing data and development of atmospheric products. At GMV he is in the Payload Data Processing and Applications division, where he currently coordinates the ESA's project CLARA on development of radiative products for the EarthCARE Mission, is the technical lead of the ESA's activity HAPSVIEW for identification of a High-Altitude Pseudo Satellites (HAPS) mission for air quality and greenhouse gases, and leads the ESA's Climate Resilience cluster of the Earth Observation for Sustainable Development initiative.

Milton Kampel holds a degree in Oceanography from the State University of Rio de Janeiro (1988), a master's degree in Remote Sensing from the National Institute for Space Research (1993), a doctorate in Oceanography (Biological Oceanography) from the University of São Paulo (2003) and a Postdoct at the Bedford Institute of Oceanography, Canada (2005). He is currently a Senior Researcher at the INPE, acting on the Earth Observation Coordination. He is the leader of the Monitoring Oceans from Space Group (MOceanS). He is a lecturer in the Graduate Program in Remote Sensing at INPE (CAPES 7), responsible for the disciplines of Introduction to Remote Sensing and Remote Sensing of Climate and advisor to master's and doctoral students. He was Head of the Remote Sensing Division and Earth Observation Director Deputy (2008-2013). Former Member of the Municipal Council of Environment of São José dos Campos (2004-2010) and of the Municipal Council of Preservation of the Historical, Artistic, Landscape and Cultural Heritage of São José dos Campos (2004-2008), Director of the Sao Paulo Regional Section of the Brazilian Association of Oceanography (2009-2016). Awarded the Honor of Cartographic Merit in the degree of Officer by the Brazilian Society of Cartography (2010). His research focusses on developing applications of remote sensing and geotechnologies in Oceanography and Environment, mainly in the following subjects: Water / Ocean Color, Marine Ecosystems Monitoring, Inland, Coastal and Oceanic Aquatic Systems Monitoring, Phytoplankton Biomass and Primary Productivity, Surface Field Analysis of sea surface temperature and winds, Study of mangroves and coral reefs, mapping of offshore wind power generation potential, and marine spatial mapping.

Hayley Evers-King is a marine applications expert at EUMETSAT in the User support and Climate Services division. She provides user support and training on ocean applications of satellite data, and manages feedback between user(s) and operational satellite agencies, mostly in support of the European Commission Copernicus Programme. Her research background covers the use of optics to derive information about the oceans. She has worked throughout the satellite data value chain from the validation of satellite sensor measurements, to algorithm development and data use for various applications including harmful algal blooms, ocean heat flux, carbon pools, climate model validation and marine spatial planning. She is a keen programmer, focusing exclusively on open source tools, and a passionate science communicator seeking novel ways to use new media to share science with new satellite data users and the public. Prior to her current role, Hayley worked for 5 years as a Marine Earth Observation Scientist at Plymouth Marine Laboratory. She obtained a PhD in ocean remote sensing from the University of Cape Town, South Africa in 2014.

Samuel Mafwila has combined total of more than 20 years working experience in both public and private sector where he served in various capacities. He is currently the Director of the Sam Nujoma

Marine and Coastal Resources Research Centre (SANUMARC), University of Namibia, Henties Bay, Namibia, and he is a Senior Lecturer in the Department of Fisheries and Aquatic Sciences, University of Namibia. He has served as a Course Director for the Regional Graduate Network in Oceanography in Namibia; former Manager for the I&J and NAMDEB Mariculture Venture. A certified project management professional, and manages project portfolios including various EU-funded Projects, UK Research Funded, National Commission for Research, Science and Technology. Serves on Boards of Corporate Companies and Advisor on various scientific bodies. Chairperson of the Namibian SCOR National Committee. He has published more than 20 scientific papers and specialized reports. He is a Marine Scientist by profession and an entrepreneur in his own right.

Paulo B. Oliveira is a researcher at IPMA in the Oceanography and Marine Environment Division, his main research topic is coastal oceanography using in situ, satellite and numerical model solutions, with emphasis on the linkage between the physical processes and marine biology, from phytoplankton dynamics, especially the conditions associated to the transport and proliferation of harmful algae (HABs), to small pelagic fish population dynamics, particularly the identification of the environmental factors affecting the early life stages and recruitment. Prior to his current role, P. Oliveira worked at the Faculty of Sciences of the University of Lisbon where he obtained a PhD in Physical Oceanography in 2000.

Stewart Bernard is a researcher at the Council for Scientific & Industrial Research (CSIR) in South Africa. Oceanographer, specialising in remote sensing of the ocean, Dr Bernard's particular interests include multi-scale and -sensor marine observation, ocean colour, bio-optics and harmful algal bloom research. He is active in capacity building in Southern Africa, for example through participation in ChloroGIN, NF-POGO Alumni Network for Oceans (NANO), EAMNet and other programmes.

Nuno Grosso, is a Project Engineer and Business Developer in the Aerospace & Defense Portugal Business Unit at DEIMOS Engenharia. Nuno Grosso obtained the B.A. (5 years degree) and a PhD, both in Environmental Engineering, from Universidade Nova de Lisboa (PT). His PhD research focused in the application and development of atmospheric pollution remote sensing algorithms. His other research work covered different areas, from the development of GIS web applications for Land Use/Land Cover to Remote Sensing and GIS applied to Water Resources and Flood Risk Assessment, where he developed skills in hydrological modelling in a climate change context, working in several national projects (e.g., ADAPTACLIMA-EPAL and CIRAC). In recent years, his work interest has widen to include the development of marine applications related to fisheries and environmental monitoring of protected areas, Furthermore, he has been involved in international research projects where he developed visualization and analysis applications dealing with large volumes of satellite and model data (e.g., AirCast, PM#GRID, VA-4D, Co-ReSyF, SIMOcean). He has several conference articles dealing with remote sensing, water resources, GIS and air quality.

António Araújo, Biophysics Engineer - UÉvora and MSc in Geographic Information Systems - IST. Has 15 years experience in Remote Sensing and GIS, and is currently working as Section Head at GMV Payload Data Processing and Applications Unit, leading a team of more than 15 persons working in the EO applications domain. Started at GMV in 2009 and, till today, has been involved at technical and

managerial level in several R&D and operational EC and ESA projects, standing out the consortium coordination of the FP7 MyWater project. Since 2015 he is leading and growing the GMV participation in the Copernicus security/emergency services for European borders monitoring, support to the European Union external action and rapid mapping for emergencies management. Currently is also managing GMV services for infrastructures and environmental monitoring for the Energy sector. One of his past carrier achievements at GMV was the coordination of the satellite based forest inventory and habitat mapping across the whole Abu-Dhabi Emirate. Antonio started his carrier in 2004 working 5 years in the Remote Sensing Lab. of the former Portuguese Geographic Institute under prof. Mario Caetano guidance. In this great learning environment he was involved in several EO related projects, highlighting the CORINE Land Cover and COS production. When not working Antonio loves good food, good wine and the rural outdoors. Although a soccer fan, his heart is with tennis.

António Jorge da Silva graduated as a Chemical Engineer by Instituto Superior Técnico, Lisboa, in 1975. After teaching Biochemistry at Instituto Superior de Educação Física, in 1976-77, he joined the Fisheries Research Institute, in Maputo, Mozambique, where he stayed until 1984, organizing a small Physical Oceanography unit and carrying out research on the dynamics of the Mozambique Channel, effect of freshwater contribution to the circulation over the continental shelf and the conditions for tuna vulnerability to the fishing gears. In 1984 he joined the Portuguese Hydrographic Institute, dedicating to the study of shelf and slope processes. After undergoing higher oceanographic studies at the Geophysical Institute of the University of Bergen, Norway, he was involved in fresh and saltwater interaction studies along the Iberian coast for quite a number of years. From 2010 his main commitment was with operational oceanography, first through the implementation of coastal observatories and, since 2014, also in the promotion of an approach to the continuous update of the littoral bathymetry aiming at an operational service. Presently he is heading the recently implemented Project's Office.

Susana Barbosa is a senior researcher at INESC TEC (Porto, Portugal) working at the interface of data science, earth observation, and robotics. Her research is highly interdisciplinary, with a strong emphasis on climate and earth system science. She holds a PhD in Surveying Engineering (University of Porto, 2006) with a thesis on "Sea level change in the North Atlantic from tide gauges and satellite altimetry". She edited a book on "Nonlinear Time Series Analysis in the Geosciences - Applications in Climatology, Geodynamics and Solar-Terrestrial Physics", and 3 topical volumes. She is also the author of 3 book chapters and +50 papers in international peer-reviewed journals. Her current research interests include the application of autonomous systems and robotic platforms for monitoring extreme environments, and the study of space-atmosphere-ocean-surface interactions

Artur Jorge Rocha, is a senior researcher at INESC TEC since 1998. Current research interests are e-Science infrastructures, large-scale information systems, geospatial semantic Web and semantic sensor Web (IoT). From October 1996 to December 1997 he was an associate member of CERN - European Laboratory for High Energy Physics, IT Division/Web Office. He has participated, mainly as technical coordinator or responsible for the infrastructure implementation, in several European projects, namely GISEDI, MEDSI, CAALYX, ICT4Depression, E-COMPARED, RECAP Preterm, EUCAN-connect and iReceptor

Plus. In the scope of Earth and Ocean Observation, he participates in the implementation of the RAIA Observatory, currently focused on MarRISK, C4G which is the Portuguese node of EPOS, in the EEA Grant SeaBioData and H2020 Project MELOA.

Robert Weiss is an Earth scientist whose research is in the intersect of Geoscience, Engineering, and Applied Mathematics to study the impact of coastal hazards. He has more than 15 years of experience in and published more than 50 peer-reviewed journal articles about developing and coupling numerical tools to quantitatively study the tsunami-wave propagation and impact, tsunami sediment transport, and how sea-level rise alters the future tsunami hazards. Robert is a Professor of Natural Hazard in the Department of Geoscience at Virginia Tech, the director of Virginia Tech's Center for Coastal Studies, the directionor of the graduate education program in disaster resilience and risk management ($DRRM^{VT}$), and the lead of the Virginia Tech's International Program Office of the Future Earth Coasts program.

Koushik Panda is the Technology and Business Innovation expert at DEIMOS. He is involved in the coordination and management of H2020 Projects like NextGEOSS and Co-ReSyF and several business development activities at DEIMOS. Koushik possesses 9+ years of professional experience in the area of Data warehousing, Data Analytics, Data Management and Data Anonymization. He has experience in handling large international projects, namely in requirement analysis, conceptualization of functional and technical specifications for large and complex systems with end-to-end delivery of solutions. He has also worked on building services related to Data Governance areas. Koushik Holds an International MBA Degree from Nova School of Business and Economics , Catolica Lisbon and MIT Sloan and bachelor degree in Information Technology.

Sara Aparício is an Earth Observation data scientist at the European Space Agency (ESA) in ESRIN/Italy. Recently she has been giving engineer support to the newly created department Phi-Lab in ESRIN. Sara also supports Artificial Intelligence-related activities and has also been involved in several networking and outreach actions for the Agency. Sara holds a master in Environmental Engineer degree having been awarded with Merit recognition from the University. Prior to her current duties in Italy, she has conducted research, co-founded a start-up and headed an Association of Polar Scientists in Portugal.

Sponsored participant's short bio:

Edward Senkondo is a fisheries research scientist working with Tanzania Fisheries Research Institute (TAFIRI) from 2009 to present. He did his BSc in aquatic environmental sciences and conservation from University of Dar es Salaam in Tanzania and MSc in marine resources management and ecology from Wageningen University and research centre in the Netherlands. He has been successfully working with TAFIRI on different fisheries research projects such as fish stock assessment and fish cage monitoring in Lake Victoria as well as assessment of prawn fisheries in Indian Ocean part of Tanzania. Also Mr Senkondo has been conducting researches on *remotely sensing the seasonal variability of chlorophyll-a in Tanzania coastal waters* and *Spatio-temporal variability of chlorophylla off the coast of Tanzania, Mozambique and Comoros Island*. Currently, Mr. Senkondo is pursuing a PhD at the National Institute of oceanography in Goa, India where his area of research based on Application of GIS and Satellite remote sensing for

operational oceanography with a special focus on management of coastal and marine fisheries resources.

Isa Elegbede is affiliated with the Brandenburg University of Technology (BTU), Germany as a doctoral candidate. While awaiting his doctoral defence he engages as a Diaspora expert with the Deutsche Gesellschaft für Internationale Zusammenarbeit/ Center for Integration and Migration(GIZ/CIM) to engage in knowledge dissemination as a visiting lecturer at the Department of Marine Sciences, University of Lagos, Nigeria. He his recognised as a lecturer of the International Ocean Institute (IOI) annual training programme. He was a visiting scholar at the School for Resources and Environmental Studies (SRES) at Dalhousie University, Halifax, Canada Simultaneously, a fellow of the Ocean Frontier Institute (OFI) and the Robin Rigby Trust (RRT). He was an alumni member of the São Paulo School of Advanced Science on Ocean Interdisciplinary Research and Governance (SPSAS-Ocean), Brazil. Also an Alumni of the International Summer School on "Data Management in Environmental and Earth Science Infrastructures: theory and practice", organised by the H2020 ENVRIplus and LifeWatch Service Centre in Italy. His research, academic and developmental capacities and interests within interdisciplinary context include : Ocean and coastal resource management; data lifecycle and management; environmental and sustainability studies; food security. He brings a wealth of interdisciplinary skills, technical expertise, and enthusiasm for this programme.

Julliet Corrêa da Costa, BSc in Oceanography and Master in Coastal Management at Universidade Federal do Rio Grande (FURG). Currently, Phd student in Geography at the Federal University of Santa Catarina (UFSC) and Researcher at the Integrated Coastal Management Lab (LAGECI) at UFSC. Expertise in coastal management projects and social participation; development of several studies in ecosystem services and its benefits for human well-being. CV: http://lattes.cnpq.br/5132928252709799

Ffion Atkins is currently a postdoctoral research fellow in Urban Ecology at the University of Cape Town focusing on the role of urban wetlands in improving water quality in African cities. She did her PhD in marine science and biogeochemistry, looking at nitrogen cycles in the Benguela Upwelling System off the west coast of South Africa. Stepping out of academia for a few years, Ffion worked for hydrogeologists during the worst drought experienced by the city of Cape Town. She became increasingly interested in coastal urban systems and exploring ways to integrate knowledge of both surface and groundwater systems into holistic urban water management. Ffion has a strong focus on urban water quality and its impact on coastal ecosystems, her work speaks directly to SDG6, SDG11 and SDG14.

Mahmoud Ibrahim Mahmoud is a Senior Environmental Scientist (remote sensing and Geographic Information Systems-GIS applications specialist) with the National Oil Spill Detection and Response Agency (NOSDRA), Abuja since 2008. Over the years he developed skills and competencies in conceptualizing and implementing operational geoinformation processes for oil spill response and management in Nigeria. His concepts have been used to develop platforms such as the oil spill monitor in Nigeria (https://oilspillmonitor.ng). With hands-on skills in geoinformation sciences, he has participated in and managed GIS and remote sensing products such as Environmental Sensitivity Index (ESI) maps; oil spill trajectory modelling and underground storage tankfarms databases as a tool for oil spill management. I recently completed my first postdoctoral research fellowship position as a geospatial information modelling scientist with the Centre for Tropical Environmental and Sustainability Science (TESS) James Cook University, Cairns, Australia (2016-2018). As a researcher at JCU-Cairns, his research focused on assessing the impacts human driven land-cover change and

infrastructure development pose to African tropical forests, biodiversity and wildlife using geospatial information technologies (with published works). His interests are in spatial land-use planning, urban ecology, coastal environmental changes in the Atlantic, the conservation of natural ecosystems for sustainable development, oil spill sciences, using geodata/technologies (remote sensing) in establishing and monitoring the linkages between Earth Observation Data and Sustainable Development Goals as well as to learn how to professionally Translate Remote Sensing data into Sustainable Development Indicators (TRISDI) for monitoring development near real time and reliably.

Antonio Geraldo Ferreira got his Ph.D. in 2011 in the Department of Physics of the Earth and Thermodynamics, of the University of Valencia – Spain, with the Climatology from Satellites Group (CSG), where he applied remote sensing techniques and neural networks to land-surface process studies. From August 1996 to September 2005 he was the Head of the Department of Meteorology of FUNCEME–Meteorology and Water Resources Ceara's Foundation, a nonprofit regional Institute, linked to the local government, located in Fortaleza City. FUNCEME develops activities in three areas, namely Meteorology, Environmental Resources and Water Resources (http://www.funceme.br). During this period, he was responsible, in 2001, for the acquisition and installation of the FUNCEME's Polar Orbit Satellite Reception and Processing System for the NOAA and Orbview-2 (NASA) satellites series, and in 2004 for the acquisition and installation of the FUNCEME's Geostationary Satellite Reception and Processing System for the MSG (Meteosat Second Generation) satellites series. In 1998, he started a series of Meetings called 'International Climate Outlook Forum for Northeast Brazil Region (NEB)'on regional climate monitoring, assessment and seasonal climate forecast for the semi arid region in Brazil, that have been held on an annual basis, every January, since then, in Fortaleza, Brazil. The goal of this forum is to analyze the oceanic and atmospheric patterns like Sea Surface Temperature (El Niño, La Niña, and Atlantic Ocean Dipole), Sea Level Pressure, Wind Velocity and Direction etc, that have influences in the quality of the NEB rainy season. He was the representative and Principal Investigator of the Remote Sensing Area-Sub-Committee for Northeast Brazilian Region in the REVIZEE PROGRAM, the Brazilian Program established by the Environmental Brazilian Ministry (MMA) in order to evaluate the sustainable potential of living resources in the exclusive economic zone of Brazil. He is FUNCEME's representative both to the Brazilian Science and Technology Ministry (MCT) and to the Brazilian part of the PIRATA (Prediction Research moored Array in the Tropical Atlantic) Project, a cooperative project between Brazil, France and USA. Geraldo has collaborated with the activities developed by the CSG, coordinated by Dr. Ernesto Lopez Baeza, addressed to the application of remote sensing techniques to climate process studies. In 2008 and 2009 Geraldo Ferreira actively participated in the preparatory validation fields campaigns performed in the Valencia Anchor Station (VAS) area for SMOS (Soil Moisture and Ocean Salinity) mission. It is worth to mention that the VAS site has been selected as one of the primary validation sites for level 2 land products (soil moisture, vegetation optical depth, etc.). The European Space Agency (ESA) successfully launched the SMOS satellite in November 02, 2010.

ANNEX 2

Workshop Programme

Agenda

3 December

08:45-09:30 Registration

09:30-10:15 Opening Session

10:15-10:30 Film and talk by Hipólito Monteiro on “Geological oceanography: The ocean floor closely observed”

10:30-11:00 Coffee break + Exhibition

11:00-12:30 Session 1: Earth Observation for Sustainable Development

Moderator: Samy Djavidnia (GEO Blue Planet); Foster Mensah (CERGIS, Ghana)

11:00 **The ESA Earth Observation Atlantic Regional Initiative**.
Stefano Ferretti (ESA, Italy)

11:20 **EO and Sustainable Development Goals in the Atlantic Region**.
Jorge del Rio (UNOOSA, Austria)

11:35 **Earth Observation: the new frontier in climate resilience**.
Carlos Doménech (GMV, Spain)

11:50 **R&D and Application Activities of Remote Sensing in SW-S Atlantic.**
Milton Kampel (INPE, Brazil)

Discussion

12:30-14:00 Lunch + Exhibition

14:00-15:30 Session 2: Observatories and Fixed Platforms

Moderator: *Vânia Lima (Instituto Hidrográfico, Portugal); Cristobal Molina (NORTEK AS, Norway)*

14:00 **Surface drifter for coastal environment: preliminary results – MELOA.**
Paulo Pinto (Instituto Hidrográfico, Portugal)

14:15 **Present experiences from wave and current measurements from buoy**.
Inger Graves (Aanderaa, a Xylem brand, Norway)

14:30 **OceanMet: a new perspective on wave monitoring networks**.
Miguel Duran Lopez (OceanMET, Spain)

14:45 **TURTLE – Hybrid Robotic Landers – Sea bottom permanence with autonomous repositioning capabilities.**
Hugo Ferreira (INESC TEC, Portugal)

15:00 **The next Seawatch generation**
Inés Martin Grandes (Fugro, Norway)

Discussion

15:30-16:00 Coffee break + Exhibition

16:00-17:30 Session 3: Earth Observation for Fisheries and Aquaculture

Moderator: Hayley Evers-King (EUMETSAT, Germany); Samuel Mafwila (University of Namibia)

16:00 **EO for Aquaculture and Fisheries - Facts and Gaps**.
Paulo Oliveira (IPMA, Portugal)

16:15 **Earth observation for sustainable fisheries and marine aquaculture: a Southern African example**.
Stewart Bernard (CSIR, South Africa)

16:30 **Building Services for Sustainable Fishery and Aquaculture**.
Nuno Grosso (DEIMOS, Portugal)

Roundtable Participants
Edward Senkondo (Tanzania Fisheries Research Institute, Tanzania)
Nathalie Ngalya (IFA, Democratic Republic of Congo)
Isa Elegbede (BTU, Germany)

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4 December

08:45-09:00 Registration

09:00-10:15 Session 4: Underwater Acoustics

Moderators: 1TEN Luís Quaresma (Instituto Hidrográfico, Portugal); e Josh Kohut (Rutgers University, USA)

09:00 **Implementation of the acoustic surveillance system - SUBECO.**
Ilmer Golde (Instituto Hidrográfico, Portugal)

09:15 **An underwater acoustic monitoring system with real-time telemetry**.
Cristiano Soares (MARSENSING LDA, Portugal)

09:30 **An update on the state of the technology for underwater acoustic measurements.**
Cristobal Molina (NORTEK AS, Norway)

09:45 **A permanent underwater sound monitoring station in Belgian North Sea. The Westhinder measurement pile experience.**
Alain Norro (Royal Belgian Institute of Natural Sciences, Belgium)

Discussion

10:15-10:45 Coffee break + Exhibition

10:45-12:15 Session 5: Gliders and Other Autonomous Vehicles

Moderator: Inês Martins (Instituto Hidrográfico, Portugal); CFR Bessa Pacheco (Instituto Hidrográfico, Portugal);

10:45 **Improving ocean-observations in the Macaronesia region with autonomous mobile platforms**.
Carlos Barrera (PLOCAN, Spain)

11:00 **A robots view of our ocean planet: Promoting partnerships for research, education, and service to society.**
Josh Kohut (Rutgers University, USA)

11:15 **Slocum G3**.
Oswaldo Monzón (INNOVA, Spain)

11:30 **AUV Systems in Mine Warfare.**
1TEN Violante da Luz (Mergulhadores da Armada, Portugal)

11:45 **Multirobot System for Marine Environments.**
José Barata (UNINOVA, Portugal)

Discussion

12:15-13:45 Lunch + Exhibition

13:45-14:45 Session 5: Gliders and Other Autonomous Vehicles

Moderator: António Jorge da Silva (Instituto Hidrográfico); Inés Martin Grandes (Fugro, Norway);

13:45 **Maritime Broadband Radio.**
Miguel Ángel Lleches Sempere (Kongsberg Maritime, Spain)

14:00 **Exploring Fronts with Multiple Robots.**
Pedro Gonçalves (LSTS/OceanScan, Portugal)

14:15 **Cooperative Marine Robotics for Scientific and Commercial Applications.**

António Pascoal (LARSyS, Portugal)

Discussion

14:45-16:45 **Field demonstrations in the Marina de Cascais**

14:45 *Transportation to Marina de Cascais*
16:45 *Transportation back to Centro de Congressos do Estoril*

18:30 GeraJazz Concert & Icebreaker

20:30 Social Dinner

5 December

08:45-09:00 Registration

09:00-10:30 Session 6: Earth Observation for Coastal Resilience

Moderator: António Araújo (GMV, Portugal) e António Jorge da Silva (Instituto Hidrográfico, Portugal)

09:00 **Challenges in data-driven assessment of coastal change.**
Susana Barbosa (INESC TEC, Portugal)

09:15 **Software Ecosystem for the Acquisition, Analysis, Processing and Publishing of Marine Observation Data.**
Artur Rocha (INESC TEC, Portugal)

09:30 **Our Coastal Future - A pathway for a sustainable coastal zone from a theoretician's perspective**.
Robert Weiss (Virginia Tech, USA & Future Earth Coasts)

Roundtable Participants:
Julliet Correa da Costa (UFSC, Brazil)
Ffion Atkins (University of Cape Town, South Africa)
Akaawase Bernard (Federal University of Petroleum Resources, Nigeria)

10:30-11:00 Coffee break + Exhibition

11:00-12:15 Session 7: HF radars

Moderators: João Vitorino (Instituto Hidrográfico, Portugal); Gil Gonçalves (INESC Coimbra, Portugal)

11:00 **Latest developments around SeaSonde HF radar technology for ocean observing.**
Jorge Sanchez / Andrés Alonso-Martirena (Qualitas Instruments, Spain)

11:15 **WAVES BY SEASONDE - Preliminary conclusions on the analysis and improvements on wave outputs**.
Maria Fernandes (Qualitas Instruments, Portugal)

11:30 **High frequency coastal ocean radars: Promoting partnerships for research, education, and service to society.**
Josh Kohut (Rutgers University, USA).

11:45 **Tsunami Arrival Detection with High Frequency (HF) Radar Technology.**
Vânia Lima (Instituto Hidrográfico, Portugal)

Discussion

12:15-13:45 Lunch + Exhibition

13:45-15:15 Session 8: Earth Observation Data, Tools and Services

Moderator: Stefano Ferretti (ESA, Italy); Milton Kampel (INPE, Brazil)

13:45 **From satellites to services: Data access, tools, and user support for the EUMETSAT Copernicus Marine Data Stream.**
Hayley Evers-King (EUMETSAT, Germany)

14:00 **Service4EO: supporting smart development of marine applications.**
Koushik Panda (DEIMOS, Portugal)

14:15 **GMV – Showcase of Tools and Services.**
António Araújo (GMV, Portugal)

14:30 **Earth Observation open data and platforms.**
Sara Aparício (ESA, Italy)

Roundtable Participants:
Foster Mensah (CERGIS, Ghana)
Mahmoud Ibrahim Mahmoud (NOSDRA, Nigeria)
António Ferreira (Labomar, Brazil)

15:15-15:45 Coffee break + Exhibition

15:45-17:15 Session 9: Marine Litter Solutions

Moderators: Sandra Moreira (Instituto Hidrográfico, Portugal); António Pascoal (IST, Portugal)

15:45 **Detecting marine litter on sandy beaches with low-cost UASs and machine learning methods.**
Gil Gonçalves (INESC Coimbra, Portugal)

16:00 **(Bio)plastics sea: How can the marine bacteria save the day?**
Rúben Silva (iBB IST, Portugal)

16:15 **Microplastics: what are we missing?**
Paula Sobral (FCT UNL, Portugal)

16:30 **Presence of Microplastics in Potential Portuguese Areas for Aquaculture – AQUIMAR Project Data**.
Luís Gonçalo Gomes / Vanessa Morgado (Instituto Hidrográfico, Portugal)

Discussion

17:15-18:00 Closing Session

ANNEX 3

Workshop Dissemination

Dissemination Flyer

futurearth
research for global sustainability

esa

Workshop Newsletter

We successfully conducted the international workshop on *Linking Earth Observation Data and Sustainable Development Across the Atlantic,* funded by ESA - Future Earth, on the 3rd, 4th and 5th of December 2019. This workshop was incorporated on the *MarineTech2019* enabling professionals dealing with a broad range of ocean related activities the opportunity to share their work in a diversity of topics related with the Environment, Ocean, Coast and Sustainable Development.

3 roundtable discussions	13 countries
4 thematic sessions	14 keynote presentations
9 sponsored participants	30+ participants

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