



Ocean Observation and Prediction for Coastal Sustainability in Africa

In-person workshop

4-7 March 2024

United Nations Office of Nairobi (UNON), Kenya

Hosted and sponsored by:



Event Report

The workshop held in Nairobi 4-7 March 2024 convened experts and stakeholders to address pressing challenges facing Africa's oceans and coastal areas, recognizing the critical importance of sustainable ocean governance. Dr. Richard Munang set the stage by highlighting the urgency of addressing ocean-related challenges in Africa. With a focus on fostering a comprehensive strategy, the workshop aimed to leverage innovative technologies and enhance community engagement to catalyse cooperation for coastal sustainability in Africa.

Key aspects of the workshop included discussions on the value-chain approach to addressing marine pollution, leveraging innovative technologies like digital twinning for comprehensive ocean and coastal monitoring, and enhancing community engagement through accessible tools and knowledge. During 2 days of plenaries and 2 days of parallel working session, participants explored strategies to bridge the gap between data and societal needs, emphasizing stakeholder engagement, cooperation, and capacity development.

Presentations and panels showcased ongoing efforts to support sustainable ocean governance, including capacity building, policy development, and the integration of Earth Observation data.

Policy discussions addressed the regional context for coastal management, disaster risk management, and the importance of ocean data for informed decision-making in countries like Kenya, Mozambique, Cote d'Ivoire, and Nigeria.

The workshop also included an overview of the role of the Ocean on Climate, coastal hazards, opportunities, and observation capacities, especially focused on Africa. Flash-talks on ocean products and services, were given highlighting solution-oriented initiatives with a strong impact in Africa.

Interactive working sessions focused on four key areas shoreline changes, coastal flooding, ecosystem mapping, and water quality, highlighting the need for collaborative approaches and community involvement in addressing these challenges. The interactions during the working sessions emphasized the importance of community engagement, sustainability of actions, and multi-stakeholder collaboration in developing effective solutions.

Overall, the workshop provided a platform for experts and stakeholders to exchange knowledge, share best practices, and develop strategies to address coastal challenges in Africa, with a focus on building resilient and sustainable ocean economies for future generations.

Session 1 – Opening Session

Co-Chairs: **Audrey Hasson** (GEO Blue Planet / Mercator Ocean International) and **Joana Akrofi** (UNEP)

Welcome notes from UNEP

Richard Munang (UNEP)

Dr. Richard Munang opened the workshop welcoming participants to Nairobi and providing an overview of ocean and coastal monitoring and prediction for the African context. In Africa, the blue economy generates approximately \$300 billion annually and supports 49 million jobs, and the urgency to address ocean-related challenges is paramount. Despite the continent's minimal contribution to global plastic production, it suffers significantly from plastic pollution, #biodiversityloss, and the impacts of climate change. With over 80% of the global ocean unexplored and only about 7% adequately protected, the workshop's mission is to foster a comprehensive strategy encompassing UNEP's Early Warning for the Environment (EWE) approach, innovative monitoring solutions, and enhanced community engagement.

Key aspects include the value-chain approach to addressing marine pollution, leveraging innovative technologies like digital twinning for comprehensive ocean and coastal monitoring, simulation of risk and impact of management decisions, and enhancing community engagement through accessible digital tools. These efforts aim to catalyze investments and actions necessary for sustainable ocean governance and the conservation of marine environments.

Welcome notes from GEO Blue Planet

Audrey Hasson (GEO Blue Planet / Mercator Ocean International)

Audrey Hasson welcomed participants to this joint UNEP GEO Blue Planet event. She provided an overall introduction of the mission of GEO Blue Planet that seeks to bridge the gap between data and societal needs to deliver actionable information to decision makers. She presented the 3 action areas of GEO Blue Planet: stakeholder engagement – to know what the needs are -; Cooperation and co-design – to help experts meet these needs – and Capacity development – to ensure the exchange of knowledge and developments. She went on providing some

background information on the meeting (based on the outcomes of the 5th GEO Blue Planet Symposium in Ghana) and objectives for the 4 following days.

The UN Ocean Conference 2025

Ashok Adicéam (Ministry of Europe and Foreign Affairs, France)

Ashok Adicéam introduced the UN Ocean Conference (UNOC25) that will take place in Nice in June 2025. He provided participants with an overview of the associated events: The One Ocean Science Congress, The Ocean Rise and Resilience Summit and the Blue Economy and Finance Forum. He highlighted that the One Ocean Science Congress will be instrumental in linking data and knowledge of experts in the room with decision makers on the topics at hand during this workshop. He went on explaining that these special events will accelerate the development of solutions and projects for a sustainable blue economy. UNOC25 will be a milestone for sustainable coastal development in Africa and powerful platform to share and discuss outcomes of the workshop.

The UN Ocean Decade and the Africa Roadmap

Jacqueline Uku (KMFRI & Chair, African Ocean Decade Taskforce)

Dr. Jacqueline Uku introduced the Africa Roadmap for the UN Ocean Decade. At the Africa level, a task force was formed to decide how this decade will be implemented. There are 20 endorsed projects but only 1 from Africa. The number of actions spearheaded by non-African partners significantly surpasses those led by African partners. The Ocean Decade Africa Roadmap was launched in May 2022 and was developed through a highly consultative process. This document provides a vision and plan for diverse stakeholders to convene around a common set of priorities for the implementation of the Ocean Decade in Africa.

The Ocean and "Agenda 2063: The Africa We Want"

Bachir Saley (African Union Commission)

Africa has a vast coastline with 38 coastal nations, making the Blue Economy a key area of opportunity. Bachir Saley presented how the African Union Commission

(AUC) has developed two key documents, Agenda 2063 and Africa's Integrated Maritime Strategy (AIMS 2050), to guide the development of the Blue Economy. Saley explained that Agenda 2063 sets a target of protecting at least 10% of marine and coastal areas, while both documents promote sustainable development, job creation, and poverty reduction for a prosperous future in Africa.

Responding to needs of impacted coastal communities

Titus Letaapo (GEO Indigenous Alliance)

Titus Letaapo co-founder of the GEO Indigenous alliance provided the potential role of Earth observations for indigenous peoples covering resource management, disaster preparedness and sustainable development. Among the challenges raised includes lack of funding support and infrastructure, language and cultural barriers and issues relating to data ownership. He also provided some examples of initiatives, events and publications on the topic of inclusion of indigenous peoples in developing Earth observation-based solutions.

Mercator Ocean international's actions with Africa

Muriel Lux (Mercator Ocean International)

Muriel presented how Mercator Ocean International (MOi)'s missions are in line with GMES and Africa and the Agenda 2063. MOi is strongly interested in developing collaborations as the leader of Copernicus Marine Service and the European Digital Twin of the ocean (EDITO), as well as Ocean Prediction DCC and Geo Blue Planet. Moreover, as a partner of UNEP for the GEMS Ocean programme, MOi will also be able to lead capacity building activities.

Session 2 – Policy, Economy, and Ocean Observations

Co-Chairs: **Lillian Diarra** (GEO Blue Planet / Mercator Ocean International) and **Stewart Bernard** (University of Cape Town)

The regional context of the West coast of Africa for coastal management decision making informed by ocean observation

Abdoulaye Diagana
(Abidjan Regional Seas Convention)

Abdoulaye Diagana from the Abidjan Regional Seas Convention talked about the vulnerability of coastal communities to climate change effects on the West coast of Africa and the importance of ocean observations in providing the data needed for decision-making to protect these communities. He gave examples, such as how sediment transport data can support coastal management in addressing coastal erosion and habitat loss. Other transboundary issues (fisheries management and pollution control) were also mentioned which require collaboration and coordination among neighbouring countries.

The regional context of the East coast of Africa for coastal management decision making informed by ocean observation

Theuri Mwangi (Nairobi Regional Seas Convention)

Theuri Mwangi reminded the Nairobi Convention was constituted of 10 contracting parties hosted by UNEP and about to expand. It provides many protocols in several domains of interest such as marine pollution and preserving MPA that need information about Seagrass, underwater habitats, and chlorophyll-a. Theuri also mentioned there is a need for knowledge and data management system as well as for an information management strategy. An interactive knowledge platform is under development for the access to data such as seagrasses and mangroves. They are involved in projects such as SAPPHIRE (Fisheries Management) and NoCaMo (coastal resources in the Northern Mozambique). They also have a dashboard for Marine Protected Area and early warning data for cyclones and floods, ocean acidification and temperature changes during el nino and la nina episodes.

Science and Knowledge for a Resilient and Sustainable Ocean Economy in Africa- SEAWARD Africa

Edwin Mwashinga
(UNESCO / IOCAfrica)

SEAWARD-Africa was presented by Edwin Mwashinga. This programme was developed in September 2023, and it will be launched during the Ocean Decade Conference in April 2024 in Barcelona. He also mentioned that there is a decreasing trend in endorsed projects in Africa with each call but that it has been significantly reversed with Call for Decade Actions No. 06/2023 with 24 submissions for co-design ideas. SEAWARD has 4 components that align with the nine priorities of the Africa Roadmap.

Ocean observations in support of the National Adaptation Plans (NAPs) development

Louis Celliers (HEREON)

Louis Celliers presented on the National Adaptation Plans (NAPs), which are a strategic process for countries to prepare for climate change. Last year, 32 out of 48 submitted NAPs were from coastal countries. While some countries included dedicated sections for their coasts (6), many completely neglected or only slightly considered oceans and coasts. Louis Celliers pointed that a deeper integration of coasts in NAPs requires moving beyond generic language to capture regionally specific vulnerabilities and opportunities, incorporating local knowledge and earth observations to create targeted plans, and not only identifying local weakness, but existing local capabilities to build upon. The sustainability NAPs seek to create requires marine spatial planning and large-scale collaboration to manage marine protected areas.

Maritime Spatial Planning / A transformative ocean governance to enable sustainability

James Mbugua (Cordio East Africa)

James Mbugua discussed how there are multiple approaches to marine spatial planning, primarily economic and ecosystem-based approaches. The West Indian Ocean Marine Spatial Planning (WIO MSP) Strategy exemplifies an ecosystem-based approach, aiming for comprehensive, sustainable management of the West Indian Ocean's marine environment and its coastal ecosystems. Mbugua explained how the WIO MSP Strategy benefits from the support of Agenda 2063 and other regional programs. However, environmental, political, and socioeconomic challenges persist. Mbugua pointed that these challenges emphasize the need for international efforts like the Ocean Decade to bolster these regional frameworks.

IUCN perspective on information needs for coastal resilience

Thomas Sberna
(International Union for Conservation of Nature, IUCN)

Thomas Sberna presented the Great Blue Wall initiative, a major Africa-born multipartner effort aiming to create interconnected protected and conserved marine areas “seascapes” to counteract the effects of climate change and global warming in the Western Indian Ocean region. These seascapes will also aim to unlock the potential of the blue economy to become to driver of nature conservation and sustainable development outcomes. The IUCN acts as the initiative’s secretariat with UNECA as co-facilitator.

Policy needs for ocean data and information in Kenya

Emma Akware (Senior State Council, Kenya)

Emma Akware presented how the blue economy is still underdeveloped in Kenya, despite its huge potential for wealth and food security. The main sectors that need to be addressed by earth observations include marine transportation, fisheries, tourism, and offshore mining. Akware explained that there are some data policies currently in place (e.g., National Fisheries Policy, IMO-Maritime Single Window), and existing institutional and legal frameworks to support these data policies. However, there needs to be harmonization, coordinated development, clarification of mandates, enforcement, and enhancement of data research and collection methods. Akware highlighted the importance of collecting local knowledge, capacity building, and the need for community programs that support citizen scientists.

Disaster Risk Management and Reduction efforts needs for ocean data and information – showcasing Mozambique’s Emergency Centre

Armando Alberto National Institute of Disaster Management (INGD), MZ

Provincial Delegate for Mozambique National Emergency Operations Center – CENOE, Armando Alberto, presented how observations and prediction services can support policy in his country. MZ experiences several threats such as flooding and inundation, coastal erosion, and extreme weather conditions (tropical cyclones, storms, and floods). To predict and monitor these natural hazards, myDEWETRA web platform provides real-time monitoring and forecasting. Ocean data, incl sea level rise trend, and saline intrusion, along with access to real-time data, human resource capacity, and funding for disaster intervention and emergency response are needed to provide reliable forecasts and support risk disaster management.

Policy and blue economy needs for ocean data and information – showcasing Cote d'Ivoire Government

Abou Bamba (Office of the Prime Minister, Cote d'Ivoire)

Abou outlined the significance of coastal and ocean information at the political level, highlighting both challenges and opportunities. He emphasized the value of water resources and the importance of a healthy ocean for the economy. Various threats such as coastal erosion, pollution, and climate change were discussed, along with potential solutions including improving sectors like transportation and fisheries. Abou stressed Africa's role in the blue economy revolution and the need for regional cooperation and prioritization of actions.

Policy and blue economy needs for ocean data and information – showcasing Nigeria's Ministry of Marine and Blue Economy

Linda Etta (Ministry of Marine and Blue Economy of Nigeria)

Mrs Etta provided an overview on Nigeria's ocean/blue economy, providing jobs to 30 million Nigerians. The ministry of Marine and Blue Economy was created in July 2023. Challenges are common with other African countries: IUU, Marine Safety, Coastal vulnerability and Pollution, Climate Change and Habitat Loss. Funding is an important part of the blue economy. Strategic areas where need for information is key: marine security, environmental management.

Panel Discussion on Earth observation to inform policy design and decision making with Stewart Bernard (moderator), Emma Akware, Armando Alberto, Abou Bamba and Linda Etta.

The panel discussion underscored the crucial role of Earth observation (EO) in addressing sustainable development and economic impacts on coastal communities. Speakers emphasized the practicality of EO intelligence and its socio-economic relevance, stressing the need for effective implementation. Financing options included public-private collaborations and leveraging carbon credits. Capacity building and knowledge sharing were highlighted for long-term project success. International cooperation and partnerships with local companies were deemed essential. Discussion also touched on addressing specific challenges like rice farming and oil/gas activities, while considering the needs of startups and assessing user requirements for EO data effectively.

Session 3 - Ocean Observations for Decision-making

Co-Chairs: **Delphine Lobelle** (Fugro) and **Edwin Mwashinga** (IOCAfrica)

Early Career Professionals (ECOPs) in Africa

Pauline Mwangi
(KMFRI)

Pauline presented the ECOP programme of the UN Ocean Decade and the importance of youth in addressing challenges of the ocean. She also presented the regional node of Africa and the various achievements since set up. She demonstrated that ECOPs will be at the heart of the future of Ocean Sciences in Africa and of the sustainable development of coastal areas.

The role of the ocean in climate, with a focus on the African Seas

Corrine Almeida (West African Science Centre on Climate Change and Adaptation Land Use (WASCAL), Cabo Verde)

Corinne Almeida from WASCAL, Cabo Verde talked about the issues that West African coastal communities are facing. Coastal communities need resources for conserving their habitats, but not enough resources are allocated. FUTURO (The Future of Tropical Upwelling Regions in the Atlantic Ocean) project aims to co-design with West Africa and stakeholders to investigate how the upwelling region in this area can be protected and managed sustainably. Strategic ecosystems management may enhance climate change mitigation and adaptation and understand the threats of climate change that are required by observational, experimental, and modelling studies and capacity building coupled with reinforcement of research and governance institutions and fair mutual benefits from resource use.

Ocean observations and prediction, with a focus on African capabilities and recommendations for sustainability

Stewart Bernard
(University of Cape Town), South Africa

Stewart presented the framework of risk that are informed by observation and prediction. Using this framework, informed decision can be made. He then introduced the value chain from EO to policy implementation and the scales of ocean drivers, target systems and intelligence needed. He also commented on

the key for sustainability of intelligence systems: needs to be used by the community, co-design / co-development, needs to contribute to economic growth (beyond science).

Coastal hazards in Africa

Donatus Angnuureng
(University of Cape
Coast), Ghana

Donatus explained that in Africa with 40% of the population living near the coast. He described the different coastal hazards (tsunamis, storm tides, storm surges and coastal flooding and coastal erosion as rapid onsets), their effects (damages in terms of loss of natural ecosystem, buildings...). He explained how sea level rise and climate change are the major phenomena since they increase all other hazards. He concluded that developing adaptation strategies for cyclones and flooding is needed as an early warning system, to monitor and reduce saline intrusion.

Blue Carbon as Natural Climate Solution

Derrick Njiru (UNEP)

Derrick Njiru spoke about the connection between Blue Carbon and Nature-Based Solutions (NBS). While there are many existing definitions for NBS, Derrick pointed that it is generally accepted that NBS are solutions to societal challenges, including climate change, poverty, biodiversity loss, and pollution. Their ability to be both adaptive and resilient strategies make NBS desirable. However, Derrick pointed that despite their ability to address multiple concerns, NBS still face many challenges including overheating, local awareness, pollution and degradation, climate change, land use changes, and governance gaps. Blue carbon in particular faces additional challenges, such as the difficulty to accurately measure and track the amount of carbon stored in coastal ecosystems. Still, Derrick pointed that there are opportunities to make these NBS and Blue Carbon programs sustainable, including the use of remotely sensed data, citizen science, and creating tourism opportunities.

Session 4 - Ocean Products and Services Flash-talks

Co-Chairs: **Louis Celliers** (HEREON) and **Hayley Evers-King** (EUMETSAT)

OceanPrediction Decade Collaborative Centre – **Jennifer Veitch** (SAEON)
Africa Regional Team

Jennifer presented the Ocean Prediction DCC main objective to bring together all forecasting capabilities and develop globally. She also presented the website forum (for networking and discussion purposes), Atlas (open information forecasts), News and guides. She introduced the African Regional Hub, in the process of recruiting experts as members. She also advocated for the integration of the OP DCC into existing platforms such as Marcosio/GMES and Africa.

GMES & Africa

Kwame Adu Agyekum
(GMES and Africa)

Kwame reminded GMES and Africa and agenda 2063 objectives to adapt Copernicus programme to Africa concerns. Kwame presented the project Marcnowa and associated EO services such as coastal mapping services to support fishermen, simple mobile app and SMS communication are available and used in many countries. He reminded that a document on targeted services based on EO developed for the Abidjan convention exists. Key stakeholders have been identified. They develop services and trainings to use them. Many applications to support decision makers, in particular for oil spill detection and illegal fishing monitoring by detecting pairwise vessels during transshipment.

Global Environment Monitoring Services for the Ocean and Coasts (GEMS Ocean and Coasts) **Joana Akrofi** (UNEP)

GEMS (Global Environment Monitoring Services) Ocean programme is an endorsed UN Ocean Decade programme and it was presented by Joana Akrofi (UNEP). This programme brings ocean experts and stakeholders together to provide valuable information for policymaking, focusing on Marine Spatial Planning, ocean forecasting, and the sustainable blue economy. The delivery model used brings data together, creates data uptake, and then scales up with the definite goal of informing, enabling, and inspiring to use of ocean data and translating it into action.

CORDIO East Africa

James Mbugua (CORDIO East Africa)

James Mbugua presented on coral bleaching in the Western Indian Ocean (WIO). Mbugua explained that while efforts to collect observations exist, it is still lagging. Coral observations are a parameter of climate change. For example, the transition from healthy to bleached to coral death is correlated with an increase in ocean temperature. The WIO region created a dashboard for collating ocean data for monitoring coral health. However, Mbugua highlighted that even with this dashboard and the ocean data collected, citizen scientists are still necessary for monitoring coral bleaching.

South African Oceans and Coastal Information Management System (OCIMS)

Marie Smith (CSIR)

Mary explained there is a need for an information system to support several coastal applications (MSP, fisheries and aquaculture, coastal flooding, coastal operations at sea integrated vessel tracking (national security) and EO for water quality). As part of Phakisa to support ocean governance of the south African ocean economy, OCIMS project has been launched in 2015 to provide information and services. It consists of a Co development approach with stakeholders as part of the technical advisory group. Data is accessible through user-friendly platform and communication and alert also use social media such as Whatsapp. As an example, Fisheries and aquaculture decision service DeST, with present and historical maps of EO and phytoplankton blooms analytics.

EUMETSAT

Hayley Evers-King
(EUMETSAT)



Hayley presented EUMETSAT products, tools and services targeting users in Africa, providing an overview of satellite missions providing data on marine environments, with focus on Sentinel missions 3 and 6. Today the EUMETSAT data store allows access to long time-series of most up to date products via a single point. The EUMETSAT user support provides numerous resources, case studies, training courses, jupyter notebooks and more to make best use of available and planned satellite services targeting the marine African community.

Digital Twin of the Ocean and the Copernicus Marine Service at Mercator Ocean International **Muriel Lux** (Mercator Ocean International)

Muriel has presented both the Copernicus Marine Service and the European digital Twin of the Ocean, both implemented by Mercator Ocean. She highlighted the single access point for all Copernicus Marine Services: Data (in situ, satellites and model), Essential Ocean Variables, User support including capacity development actions and Ocean State Reports. Muriel also presented the EDITO project that will provide an innovative set of user-driven, interactive and decision making tools backed by data and knowledge.

CLS Tools for Integrated Coastal Zone Management **Gildenhuys Sanette** (CLS South Africa)

Gildenhuys Sanette from CLS South Africa talked about the tools developed by this French company for integrated coastal zone management. They utilize High-Frequency radar data to collect met ocean information, such as current, wind, and waves along with wind data coming from lidar facilities. These data and services are used by many research agencies to study and tackle many coastal issues like floods, by computing flood risk maps, mangrove management, and coastal urbanism using satellite images to support decision-making.

Digital Earth Africa tools, data and learning resources for marine and coastal monitoring and reporting **Kenneth Mubea** (Digital Earth Africa)

Kenneth Mubea presented on Digital Earth Africa (DEA). Modeled after the Digital Earth Australia Coastlines program, DEA has brought together over 17 African-

based organizations and over 34 technical partnerships to deliver 6 digital products. Mubea described DEA as a free access sandbox that can identify hotspots and rates of change. For example, coastal erosion can be evaluated over time while decision makers and technical experts can evaluate the performance of infrastructure and implementation plans. Mubea concluded that DEA is an inclusive tool that empowers communities through free access to data and training opportunities.

Fugro digital solutions supporting coastal resilience efforts and decision-making

Delphine Lobelle (Fugro)

Delphine presented a private sector perspective on leveraging Earth observation for coastal sustainability, highlighting Fugro's work to co-design and deliver geo-data driven solutions that add value for decision making, with a focus on Africa. Solutions presented included modelling and monitoring coastal hazard risk, seabed and ecosystem mapping.

Session 5 - Needs and Limitations for EWE in Africa

Co-Chairs: **Muriel Lux** (Mercator Ocean International) and **Joana Akrofi** (UNEP)

UNEP's Early Warning for Environment (EWE) vision – **Panel discussion** with Richard Munang (moderator), Hayley Evers-King, Liu Ning, Ignatius Williams, Kenneth Mubea and Louis Celliers.

The discussion driven by Richard highlighted various strategies and considerations for addressing coastal and ocean challenges. The importance of mitigating upstream issues was emphasized such as sediment blockage from dams. The need for collaboration with stakeholders and leveraging technology was also stressed, while integrating early warning systems with ecosystem mapping for effective adaptation was also emphasized. Panellists highlighted the significance of engaging communities along the value chain, as well as bridging the gap between science, decision-makers, and the private sector. The importance of youth innovation, market innovation, and scalability were also discussed, along with the necessity of understanding local perspectives and ensuring sustainability.

Parallel Working Sessions

Working Session #1	Working Session #2	Working Session #3	Working Session #4
Shoreline changes incl. erosion and seabed mapping	Coastal flooding and inundation	Coastal ecosystem mapping	Coastal waters quality
Ignatius Williams (GMES and Africa) & Donatus Angnuureng (University of Cape Coast)	Delphine Lobelle (Fugro) & Kenneth Mubea (DEA)	Louis Celliers (Hereon) and James Mbugua (Cordio East Africa)	Hayley Evers-King (EUMETSAT) and Liu Ning (UNEP)

Working Sessions Introduction

Co-Chairs: **Audrey Hasson** (GEO Blue Planet / Mercator Ocean International) and **Stewart Bernard** (University of Cape Town)

Case study / Intro to WS #1

Ignatius Williams (GMES and Africa) & **Donatus Angnuureng** (University of Cape Coast)

Ignatius Williams began his presentation on shoreline vulnerabilities by pointing out the challenges including availability of data, human and institutional capacities, and the utilization of information by decision and policy makers. Williams provided three examples of extreme coastal erosion along Ghana's coast, and the impacts of this erosion on buildings and roads. Williams concluded that their needs to be remotely and locally collected data and that collaboration with Digital Earth Africa (DEA) is necessary for harmonizing methodologies and developing online tools and dashboards.

Case study / Intro to
WS #2

Delphine Lobelle (Fugro) & **Kenneth Mubea** (DEA)

Delphine explained the general context of early warnings for all. Over the last 20 years 1.6 billions of people were affected by flooding. She reminded that Fugro is in several programmes of the un ocean decade (DITTO, coast predict (aquarius project), Ocean decade Africa roadmap and UNESCO) and involved in a co design process to define digital solutions for decision through a 3-step approach: Understanding and mapping the needs, exploring solutions and testing ideas (prototype to collect feedback) and delivering the tailored solution. She provided a high-level description of Aquarius as an EU/AU collaboration and of the Dewetra project (multi-hazards assessment) which is characterized by a rapid aggregation of information, applied for the Mozambique emergency Centre.

Case study / Intro to
WS #3

Louis Celliers (HEREON) and **James Mbugua**
(Cordio East Africa)

The working session focused on coastal ecosystem mapping, bringing stakeholders from research and academia, legal sector, private sector and UN bodies. Participants worked together to unpack coastal ecosystem mapping and monitoring, outlined challenges and the development of EO driven solutions to address needs for information by decision makers particularly critical for establishing nationally determined contributions, providing evidence for nature-based solutions, ecosystem conservation and climate mitigation and adaptation actions.

Case study / Intro to
WS #4

Hayley Evers-King (EUMETSAT) and **Liu Ning**
(UNEP)

This case study, led by Hayley Evers-King (EUMETSAT) and Liu Ning (UNEP), aims to tackle water quality issues by understanding how Earth Observation can support decision and policymaking by providing data in the form of predictions, and risks, but also quantifying services, and planning restoration for topics like aquaculture, human health, eutrophication, pollution, oil spills, and more. UNEP has been working on global targets to prevent and reduce significant marine pollution of all kinds by 2025 and understanding how ocean data can support reaching this goal is a key factor.

Closing Session

Co-Chairs: **Audrey Hasson** (GEO Blue Planet / Mercator Ocean) and **Joana Akrofi** (UNEP)

WS #1 restitution **Ignatius Williams** (GMES and Africa) & **Donatus Angnuureng** (University of Cape Coast)

This group developed a pilot solution to leverage Earth Observations (EO) and citizen science collected data to assist decision makers on where/when to act and direct resources for protecting coastlines and coastal communities. The app would first be launched locally but can be scaled across theme and space. The app will be fed EO data from in-situ and satellite sources but allows community users to upload photos of erosion and its impacts to their community (difficulty fishermen face towing their boats onshore). Partnering with industry service providers could provide the financial support to create the app and reward community contributors or frequent users. The benefits of this app include monitoring of erosion, empowerment of youth and community members, improved awareness, and more tools and data to support calls for action.

WS #2 restitution **Delphine Lobelle** (Fugro) & **Kenneth Mubea** (DEA)

This working session was dedicated to coastal flooding. It gathered both technical experts and stakeholders involved in decision-making process. The WS revealed that in Mozambique, a disaster management organisation was already in place for 3 of the 11 provinces but could be improved and generalized to the 11 provinces to become an Early Warning System including a forecasting platform to communicate and a multi-year assessment to refine the National Adaptation plans. One of the keys for success was the Community Engagement and the sustainability of funding. A solution has been built as the scaling-up of the existing services into a local system with a multi-source data collection, multi-criteria analysis and stronger communication activities at national and transnational level.

WS #3 restitution **Louis Celliers** (Hereon) and **James Mbugua** (Cordio East Africa)

WS3 developed a pilot solution to leverage EO intelligence for national blue carbon and biodiversity reporting to respond to the need for regionally consistent and accurate information on blue carbon stocks. Starting with a pilot covering

African countries in the West Indian Ocean region, the goal is to produce a continental monitoring service providing data and information over time on carbon stocks from blue carbon ecosystems (BCE) covering mangroves, estuaries and seagrasses. This information is crucial to inform nationally determined contributions and mitigation actions, set 30 by 30 targets, determine the blue carbon trade component of payment of ecosystem services and support conservation efforts and nature-based solutions based on BCE.

WS #4 restitution **Hayley Evers-King** (EUMETSAT) and **Liu Ning** (UNEP)

The water quality group presented a tool for Eutrophication Monitoring and Response (towards compliance). The main ingredients needed for a successful solution are community/stakeholder involvement (taking ownership of the problem), improving access to data information along a strong co-design process. This eutrophication tool can have a database and management in the background, and a dashboard with analytics and warnings for short-term and long-term. The data provided through this tool will help a wide range of end users from coastal communities to decision-makers.

Final notes from organisers **Audrey Hasson** (GEO Blue Planet / Mercator Ocean International)

The final session took the form of general discussion, moderated by Audrey Hasson. It was agreed that once the report is out, working session co-chairs will elaborate each an annex to provide more content on their discussions. These annexes may take the form of briefs for the Regional Seas Conventions and/or the African Union Commission (AUC). The workshop organisers will provide templates in accordance with the stakeholders. It was acknowledged as well that for these briefs to be discussed by member states, one state needs to push it forward. These briefs shall include beyond the proposed solution, networks to be involved, directions for indicators for action, Earth Observations needs and requirements, demonstration of alignment with existing literature and groups, etc. It was also raised that the endorsement by locally impacted communities is important. It was also proposed to support the creation of a non-technical version of the briefs to circulate to funding agencies and policy groups (regional and national). GMES and Africa (AUC) was identified together with the Regional Seas convention as instrumental in the scaling up of local solution to regional. Participants will be asked after the conference if they wish to be part of the elaboration of such briefs and continuing actions.

Programme committee:

Prof. Kouadio Affian (IOC Africa – GOOS Africa)

Joana Akrofi (UNEP – GEMS Ocean and Coast Programme)

Dr. Muriel Lux (Mercator Ocean International)

Dr. Louis Celliers (Hereon)

Dr. Steward Bernard (University of Cape Town)

Dr. Bachir Saley (African Union)

Dr. Hayley Evers-King (EUMETSAT)

Dr. Delphine Lobelle (FUGRO)

Dr. Bennet Foli (University of Ghana - GMES and Africa – GEO Blue Planet co-chair)

Jose Moutinho (Atlantic International Research (AIR) Centre - GEO Blue Planet co-chair)

Dr. Audrey Hasson (GEO Blue Planet / Mercator Ocean International)

Lillian Diarra (Mercator Ocean International)

Event webpage:

<https://geoblueplanet.org/ocean-observation-and-prediction-for-coastal-sustainability-in-africa/>

Social Media handles:

LinkedIn - @GEO Blue Planet

X/Twitter - @GEOBluePlanet



Title	Last Name	First Name	Groups	Working session
Dr.	Agyekum	Kwame Adu	GMES & Africa Project, University of Ghana	4
Prof.	Almeida	Corrine	Atlantic Technical University, WASCAL Cabo Verde	3
Prof	Amougou	Joseph	National Observatory on Climate Change (ONACC) Cameroon	2
Dr.	Angnuureng	Bapentire Donatus	ACECoR, University of Cape Coast	1
Dr.	Bernard	Stewart	University of Cape Town	2
Dr.	Celliers	Louis	Hereon	3
Ms.	Diarra	Lillian	Mercator Ocean International	3
Dr.	Du Plessis	Nicole	National Research Foundation - South African Environmental Observation Network (NRF-SAEON)	3
Dr.	Evers-King	Hayley	EUMETSAT	4
Ms.	Gildenhuis	Sanette	CLS Southern Africa	4
Dr.	Giunta	Valentina	Mercator Ocean International	3
Dr.	Hasson	Audrey	Mercator Ocean International	1
Mr	Hawkins	Robert	Fugro	1
Ms.	Innes	Lorien	ESRI Eastern Africa	2
Dr.	Kairo	James Gitundu	Kenya Marine and Fisheries Research Institute	3
Ms.	Lerma	Natalie	NOAA / GEO Blue Planet	2
Dr.	Lobelle	Delphine	Fugro	2
Dr.	Lux	Muriel	Mercator Ocean International	2
Mr.	Mbugua	James	CORDIO East Africa	1
Dr.	Mubea	Kenneth	Digital Earth Africa	2
Ms.	Mwangi	Pauline	KMFRI/ECOPs	1
Dr.	Smith	Marie	Council for Scientific and Industrial Research	4

Dr.	Veitch	Jennifer	The South African Environmental Observation Network	2
Mr.	Williams	Ignatius	GMES and Africa Project, University of Ghana	1
Mr.	Adicéam	Ashok	Ministry of Europe and Foreign Affairs, France	
Mrs.	Akrofi	Joana	UNEP / GEMS Ocean and Coast	1
Ms.	Akware	Emmah	Gouvernement of Kenya	3
Mr.	Armando	Alberto	National Emergency Operations Center (CENOE) - Mozambique	2
Dr.	Awolala	David	The African Group of Negotiators Experts Support (AGNES) Nairobi	3
Mr.	Bamba	Abou	Abidjan Legacy Program - Office of the Prime Minister, Cote d'Ivoire	4
Dr.	Bosire	Jared	UNEP / GO-Blue Project	3
Dr.	Diagana	Abdoulaye	Abidjan Convention/UN Environment	1
Ms.	Etta	Linda	Advisor at Ministry of Marine and Blue economy	4
Mr.	Kirugara	David	ENSAFO Group Ltd	4
Mr.	Letaapo	Titus	GEO Indigenous Alliance	1
Dr.	Liu	Ning	UNEP	4
Mr.	Maritim	Zachary	The Nature Conservancy (TNC)	1
Dr.	Munang	Richard	UNEP	2
Mr.	Mwashinga	Edwin	IOC UNESCO / IOCAFRICA	4
Mr.	Ndarathi	John Ngatia	IOC UNESCO / IOCAFRICA	2
Dr.	Saley	Mahaman Bachir	African Union Commission	2
Mr.	Theuri	Mwangi	UNEP - Nairobi Convention Secretariat	1
Ms.	Traore	Marie Suzanna	Réseau régional d'Aires Marines Protégées en Afrique de l'Ouest (RAMPAO)	3
Dr.	Wamukoya	George	African Group of Negotiators Experts Support	2