Overview of GEO Blue Planet Activities 2022

GEO Blue Planet is an initiative of the Group on Earth Observations (GEO) that focuses on the use of ocean and coastal observations to inform policy and decision making. GEO Blue Planet conducts activities in three Core Action Areas:

i) Stakeholder Engagement

Outreach materials

Stakeholders who are not experts in Earth observations or ocean science are often interested in what Earth observations are, how they are applied in the ocean and coastal domains and the limitations to their use. To this end, GEO Blue Planet produces informational materials including

booklets on ocean and coastal observations, examples of indicators and decision support tools that utilize ocean and coastal observations, infographics, videos and other outreach materials as needed.

Workshops, Symposia and Consultations

Understanding the decisions that stakeholders are required to make and what information is required to support those decisions is a key focus of GEO Blue Planet. GEO Blue Planet works to plan regional and thematic workshops that bring together representatives of government, research institutions, industry and NGOs. This provides an avenue to assess information needs in terms of ocean and coastal observation-based products and service and capacity development. GEO Blue Planet also makes understanding information needs and stakeholder priorities a focus of international GEO Blue Planet symposia. GEO Blue Planet Secretariat, Committee and Working Group members also welcome invitations to participate in UN expert meetings on topics that require input on ocean and coastal observation topics and to provide informal consultations on relevant topics.

White papers on Earth observation applications

In order to understand the state of science, limitations and future directions of ocean and coastal observations for a specific application (e.g., management of tuna fisheries, monitoring of marine litter, etc.) or provision of policy-relevant information, GEO Blue Planet produces white papers on Earth observation applications based on requests from stakeholders. Teams of experts collaborate to produce the publications which are published either by the requesting organization (such as the UN) or in a relevant journal.

ii) Cooperation and Co-design

Building expert networks

Once a stakeholder information requirement is identified, GEO Blue Planet works to bring together an expert network that can advise on the development of indicators or decision-making support tools. This may be met through internal expertise or through linking existing groups/task teams (e.g., SCOR, GESAMP, GOOS, CEOS teams) and/or identifying additional experts with other skills required to meet the stakeholder's needs (such as statisticians, policy experts, etc.).

Developing indicators and decision support tools

Distilled ocean and coastal information in the form of indicators and decision-making support tools are needed for sustainable management of the ocean and coasts. GEO Blue Planet works in an iterative process to co-design and co-develop indicators and decision-making support tools based on stakeholder needs. These include indicators for specific global policies, such as the UN Sustainable Development Goals, Sendai Framework for Disaster Risk Reduction or Paris Climate Agreement.

Co-creating information hubs

Earth observation information alone is often not enough for non-expert users to understand issues and make informed decisions. Often Earth observation processes and resulting outputs must be simplified to ensure its relevance for a larger community. To facilitate cooperation with other communities, GEO Blue Planet supports the development of information hubs (e.g., https://sargassumhub.org/) that provide background information on Earth observation-based co-designed indicators and decision-making support tools, information about the topic and other information. The information hubs are co-designed and developed with end users and a variety of partners and are intended to be maintained long term by a partner organization.

iii) Capacity Development

Training Courses

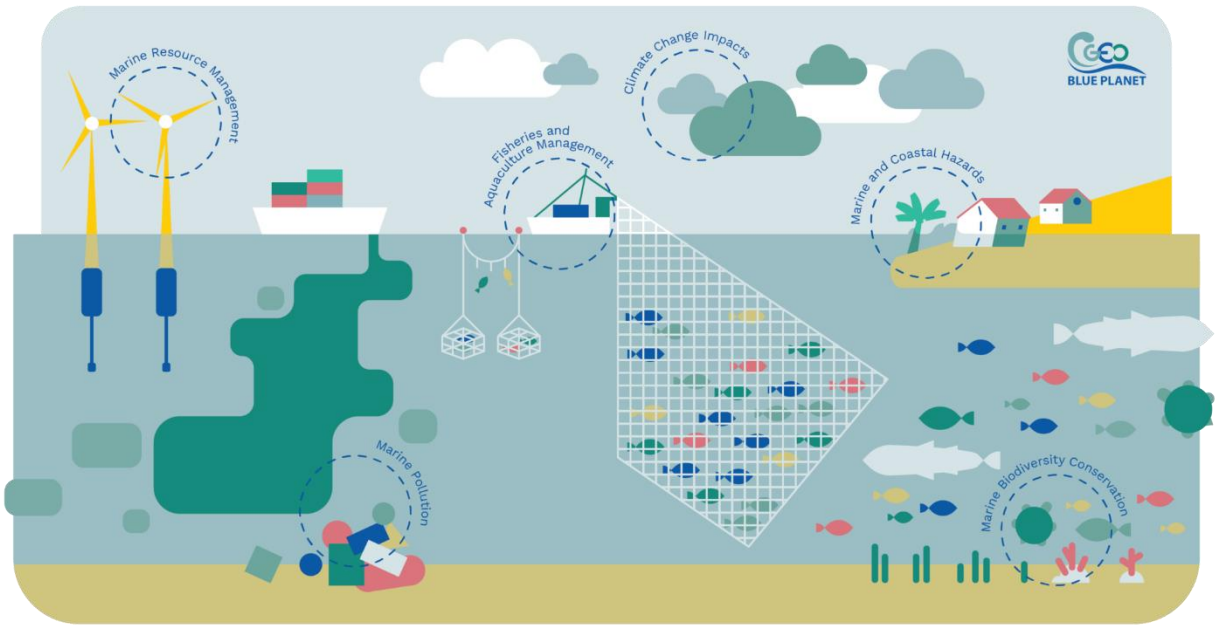
GEO Blue Planet targets training courses at government and other stakeholder organizations that will be able to implement and maintain the skills learned on a regular and sustained basis. GEO Blue Planet does not arrange training for students or for informational purposes. Training is focused on building long term capacity for an Earth observation provider to deliver a decision support tool to a specified end user on a sustained basis. Training material and learning tools are carefully chosen to provide long-term solutions using resources that can be sustained by the end user.

Information Exchange

Capacity development involves the transfer of information between experts in different regions and fields. GEO Blue Planet works to support information transfer related to ocean and coastal observations. Core actions for information transfer include activities such as ambassador programs and exchanges, best practices documentation and sharing of data, tools and protocols.

Transfer of applications to operational agencies

One of the major challenges in the sustainability of Earth observation applications is maintenance due to the current funding and development structure. In the ocean and coastal observations arena, there are many useful applications that are developed with temporary grant funding that become nonfunctional at the end of the funding cycle. For applications where stakeholders have a clear need for continued use and maintenance of the applications, GEO Blue Planet works with operational agencies that support and operationalize these applications. GEO Blue Planet also works to identify operational agencies or other partners that applications that are developed in collaboration with GEO Blue Planet's working groups.



High Level Summary of GEO Blue Planet Activities 2022

Organizational Updates

- GEO Blue Planet has successfully established the Asian GEO Blue Planet Secretariat office which will be housed within the Korean Maritime Institute (KMI) in the Republic of South Korea. Dr Sung-Jin Cho, senior researcher at the Korean Maritime Institute has been appointed as the director of the Asian Secretariat office.
- Representatives from KMI (Dr. Jung-Ho Nam, Dr. Sung-Jin Cho and Dr. Taehee Lee) met with representatives from the US and European offices to discuss prospective projects, collaborative activities and the 2023 GEO Blue Planet Symposium.

- The GEO Blue Planet Secretariat also welcomed Nikelene Mclean and Fifi Adodo to support the US and EU offices respectively.
- The GEO Blue Planet website was successfully updated and launched. This effort was led by the EU office in partnership with Portuguese company *The Science Crunchers*. The website (https://geoblueplanet.org/) was updated to include new vibrant imagery and reflect information related to GEO Blue Planet's mission, structure, activities, events and resources.
- At the One Ocean Summit in Brest, it was announced that Mercator Ocean International, which hosts the GEO Blue Planet EU coordination office, will become an intergovernmental organization.
- The GEO Blue Planet Secretariat has worked with the UN Decade coordination office to register GEO Blue Planet as a "Decade Implementing Partner" in order to get the stakeholder and user engagement activities recognized by the United Nations decade.

GEO Blue Planet Activities 2022

2022 GEO Blue Planet Symposium

For the first time, the GEO Blue Planet Symposium took place in Africa, in Accra, Ghana. With the theme *"Local Action in Support of Global Traction"*, the 5th Symposium was specifically geared towards improving GEO Blue Planet's engagement with African nations in an effort to expand the Earth Observation community of practice, strengthen local capacity and provide access to resources, tools and services.

The Symposium featured Plenary Sessions centered around the themes of Fisheries, Ecosystem Conservation and Coastal Hazards. It also featured ocean and coastal observations training sessions, thematic workshops and an interactive poster forum. A symposium report is in preparation and follow up actions will take place over the next year.

A few highlights include:

- Highly engaged unique participants from 16 different countries.
- High local impact- representation from 128 Ghanaian participants out of a total of 181.
- Diverse representation from academia, industry, regional governing agencies, EO experts, NGOs.
- Near equal balance in gender participation.
- High attendance from early career stakeholders.
- Symposium highlighted in national broadcast media.

Some of the proposed actions that were highlighted based on stakeholder engagement include:

- Developing an information hub for fisher folk and other stakeholders to expand the reach and efficiency of the GMES and Africa marine weather early warning service.
- Developing a charter for Blue Schools and Blue Careers to help promote aquaculture to support development of aquaculture in Ghana.
- Organizing teams to work on guidance for coastal National Adaptation Plans and Fisheries and Aquaculture NAPs.
- Developing plan to support integrated land-to-sea-litter monitoring using Earth Observations and citizen science
- Engage local stakeholders and policy makers to build inclusive and integrated regional solutions to coastal hazards.

Marine Litter Working Group

- The marine litter group co-organised the "Marine Litter: Solutions for Mitigation" session at the SeaTech Week in Brest (September 2022). The conference proposed a refined road map and recommendations to major institutions and funding agencies for future technologies initiatives. Four sub-sessions throughout the day covered: Knowing where and how much; where it comes from; preventing and recycling; and communication and decision support.

- The group also organized the "Marine Litter: Solutions for a Cleaner Ocean" workshop (September 28-29). The objective of this third workshop was to assess potential solutions for the prevention of marine litter entering the ocean and the reduction of marine litter — in particular plastics — in the ocean.

- The group put together a proposal for an official side event to the UN Ocean Conference in Lisbon in June 2022. This led to the organisation of an in-person meeting in Cascais (Portugal), on 29 June, which included (upon selection) the official side event to the UN Ocean Conference, under the accredited organisation AIR Centre. The main outcome of the meeting was the announced partnership between GOOS / IOC-UNESCO, GEO Blue Planet and UNEP GPML on establishing an Integrated Marine Debris Observing System (IMDOS) as a join project, with specific partnership agreements currently being drafted. Furthermore, the meeting identified synergies between IMDOS and the relevant Communities of Practices of UNEP GPML to better streamline the harmonization and delivery of marine debris data to stakeholders. Details of how IMDOS and the Communities of Practice will work side by side were subsequently presented during the 7th International Marine Debris Conference in September 2022 in Busan, Korea. The UN Ocean Conference Side Event on IMDOS also gathered overwhelming support from the various stakeholders who attended the meeting, and this resulted in marked interest from new actors to collaborate or contribute to the IMDOS project. To this end, initial meetings were held to discuss the nature of new collaborations. Currently, the Interim Steering Committee of IMDOS is in the process of developing regular communication and coordination of future IMDOS activities in line with the Terms of Reference initially presented and approved by the community during the meeting. To facilitate the process, there is ongoing recruitment for a dedicated IMDOS Project Coordinator.

Group photo from GEO Blue Planet side event at the UN Ocean Conference 2022

- The marine litter working group discussed resource mobilization ideas for the Integrated Marine Debris Observing System (IMDOS) and a wider GEO effort on litter observing (to include waste site leakage, riverine inputs, etc.).

Eutrophication Working Group

- The Eutrophication working group has been working to process the satellite-derived level 1 data for indicator SDG 14.1.1a (chlorophyll-a deviations and anomalies). The group will be submitting the data along with a story line for the 2021 SDG report.
- The group contributed to a publication on a level 2 eutrophication indicator for SDG 14.1.1a for Europe that is in review.
- A peer reviewed publication on the level 1 satellite-derived SDG 14.1.1a (coastal eutrophication) indicator in collaboration with member pilot countries is underway. The publication was planned to be submitted by the end of July.
- The group was expanded to become a cross-initiative GEO working group on eutrophication for coastal and inland waters.
- Engagement with case study countries for the global SDG eutrophication indicators took place.
- Some of the working group's members attended a workshop on Water Quality Validation of Satellite-derived Optical and Water Quality Parameters for Coastal and Inland Waters. Follow ups will include potential collaborations on validation data collection and integration with the REMARCO network in support of SDG indicator 14.1.1a (coastal eutrophication).
- In November, working group partners from Uruguay, Mexico and Argentina completed an in-situ validation campaign to validate the global chlorophyll indicators developed for SDG 14 and to support the development of regionally tuned products.

- The working group has fully transitioned to a cross-GEO activity that includes eutrophication activities for inland waters.

Oil Spill Working Group

- After a successful meeting training in Trinidad and Tobago, the group was interested in looking for additional partners for oil spill monitoring in the Caribbean.

- The group provided some connections to support the oil spill in Peru.
- Working group participants participated in side event submissions for the UN Decade Satellite event sessions on oil spills.
- The group worked with AmeriGEO to create a federated oil spill monitoring program for the Caribbean and Gulf of Mexico. Trainings of additional countries/organizations to cover the region were discussed.
- The working group planned to revise the terms of reference to broaden the working group to include global sharing of best practices for oil spill monitoring and forecasting.
- Through the training facilitated by the working group, Trinadad and Tobago was able to supply satellite oil spill surveillance for a recent oil spill in Jamaica.
- **Collaboration for Oil Spill Tracking in the Americas (COSTA)**
    - Trinidad and Tobago (in coordination with UNEP) are finalizing the expansion of their coverage area to include much of the eastern Caribbean. They hope to be fully operational in that larger area starting in January.
    - Mexican universities and Peru's CONIDA (Peru's National Commission for Aerospace Research and Development) are in the final "coaching" or "dual ops" phase of the COSTA transitioning to ops process and we're hoping both will be operational in early 2023.

- DIMAR (the General Maritime Directorate) from Colombia and SICA (the Central American Integration System) representing Central American nations are making internal arrangements to start the first phase of the COSTA standing up ops process. We'll be meeting with them intermittently until March when things will ramp up with more serious technical exchanges followed by training starting in May.

- **Global Working Group Development**

  - In the New Year, the global oil spill working group will be kicked off. The working group will work to share best practices in oil spill monitoring, data collection and trajectory forecasting.

Sargassum Working Group

- Blue Shell (Barbados)was contracted to determine end-user needs and subsequently update the Sargassum Information Hub.

- Science Crunchers have proceeded in creating new pages for the Hub, they will be online once reviewed by Blue Shell. The next steps of the project involve translating the Hub to Spanish and French.
- Version 2.0 of the Sargassum Information Hub was launched: https://sargassumhub.org/
  - New features include regional pages and media
  - The next round of updates will include translation into Spanish and French and an updated directory in collaboration with OceanExpert.
- The group co-chairs are Joaquin Trinanes (NOAA CoastWatch/AOML) and Edwin Cruz-Rivera (Morgan State University).
- The leads of the Sargassum working group met to discuss next steps for the development of the working group and Sargassum Information Hub.

- Further development will include feedback from African stakeholders from the GEO Blue Planet Symposium's Sargassum workshop.
- Experts from the WG also contributed to the EU4OceanObs case study on using Earth Observation for the detection, monitoring and forecasting of Sargassum in the Tropical Atlantic, providing data and information needed to understand the Sargassum basin-wide spread, its impacts and inform mitigation and adaptation strategies. Developed in the framework of the EU4OceanObs project, which facilitates the GEO Blue Planet EU Office, this case study highlights the European Union's contribution along the EO value chain, providing concrete examples of pan-European and European led initiatives, projects and services to address challenges and problems related to each theme. The case study also identifies gaps in observation, monitoring and forecasting, and data access, the case studies also put forward recommendations to address these gaps. To access the case study, click here: https://geoblueplanet.org/wp-content/uploads/2022/12/Use_case_Sargassum_Dec2022.pdf

Fisheries Working Group

- The Terms of References have been updated. The new workplan includes 6 actions:
  - Action 1. SMS Fisheries Alerts for Bangladesh
  - Action 2. EO data to support modelling
  - Action 3. EO data for onshore and offshore culture fisheries
  - Action 4. Develop a road map for the utilization of short and medium-term EO-based forecast products and fishing vessel traffic data relevant to fisheries management.
  - Action 5. Identify gaps in EO data to establish the impact of Marine Litter on Fisheries.
  - Action 6. Whitepaper from the Tuna workshop
- Bennet Atsu Foli from the University of Ghana successfully organized a satellite event to the "Safe Ocean" UN Decade lab on April 5th, entitled "Safety for Fishers". More here.
- There were several activities at the GEO Blue Planet Symposium dedicated to EO applications of fisheries including plenary discussions, workshops and a symposium booth. Fisheries stakeholders from Ghana and other countries along the West Coast of Africa provided useful feedback on some of the EO user needs. Working group members are eager to use feedback from symposium to inform working group activities and build collaborations with African stakeholders.
- SMS Fisheries Alerts for Bangladesh: Working group members have compiled documents related to the GMES and Africa service in Ghana. Representatives from Bangladesh will then work to provide information on the local user needs in Bangladesh to fine tune the service to fit the local/regional context.
- EO and Ocean data to support fisheries and climate change modelling**:** Working group members have successfully compiled a draft document which highlights information related to Earth Observation and ocean data which can be used to support fisheries with

respect to climate change modelling. Members foresee completing the publication by early 2023.

- EO data for onshore and offshore culture fisheries: A presentation on the use of EO in support of aquaculture site-selection was given during the EO in support of fisheries and aquaculture site selection workshop at the GEO Blue Planet Symposium and there was positive feedback from attendees. Mercator Ocean International is interested in providing support related to potential stakeholders and technical institutions which can help move this project forward.
- Develop a roadmap for the utilization of short and medium-term EO based forecast products and fishing vessel traffic data relevant to fisheries management: A draft document has been created, working group members have agreed to work together to adjust and edit the existing document.

Climate Adaptation Working Group

- GEO Blue Planet hosted a meeting to discuss kicking off a climate adaptation working group to develop activities, likely around supporting guidance documents for National Adaptation Plans and Blue Carbon mapping.
- A draft of the Climate Adaptation Working Group's Terms of Reference was developed to steer working group activities. The draft can be found here.
- One of the main undertakings of the working group will be to evaluate how ocean and coastal observations can be positioned to better serve adaptation planning- primarily through National Adaptation Plans.
- The GEO Blue Planet Climate Adaptation core group hosted a meeting with representatives from the GEO Secretariat and GEO GLAM on May 12th to discuss NAP formulation.
- GEO is currently working on formulating a document which details how Earth Observations can be used in NAP formulation. The activities are currently being spearheaded by GEO GLAM, however, GEO Blue Planet was asked to contribute to the portion of the document related to oceans and coasts.
- The working group secretariat leads will be hosting a follow up meeting with the GEO Sec/GEO GLAM NAP group on June 21st to co-ordinate our next steps and discuss GEO's potential contribution to upcoming NAP related events.
- There were many discussions surrounding climate adaptation at the GEO Blue Planet Symposium, including a workshop on the use of Earth Observations for the development of National Adaptation Plans.
- Dr. Louis Celliers led a workshop on the NAP process and allowed stakeholders to discuss their potential role in the NAP process.
- Workshop attendees also provided excellent insight into some of the gaps which exist which hinder the successful development NAPs as it relates to data access, access to published information related to EO and NAPs and resource mobilization to support these activities.

- Follow up activities related to the formulation of NAPs with specific focus on coastal zones, fisheries and aquaculture have been proposed.
- Nikelene Mclean participated in the session on collective action on oceans, biodiversity and climate at the 18th plenary at GEO Week in Ghana.
- Secretary of the UNFCCC, Paul Desanker is interested in collaborating with GEO Blue Planet to host discussions surrounding NAP formulation and the role of EO in supporting coastal adaptive resilience.

Coastline Changes Working Group

- GEO Blue Planet began discussions about kicking off a coastline changes working group to develop activities around sharing, learning emerging and best practices to increase the resilience of coastal ecosystems for sustainable development.
- The working group is expected to support the WaveForce project and collaborate with Digital Earth Africa and other partners on coastal erosion.

Global Working Group Development

- Thematic workshops on coastline changes were organised during the 5th GEO Blue Planet symposium held in Accra, GHANA from 24 to 28 October 2022. It helped exploring the region-specific user needs and provided insightful and relevant information to shape this group actions tasks.

WaveForce Activity (Wave-driven Flood-forecasting on Reef-line Coasts Early warning system)

- Development of BEWARE (Bayesian Estimator for Wave Attack in Reef Environments), upon which WaveFoRCE is built, continues. So far, BEWARE accuracy has been tested at 36 different reef-lined coastal sites over 8 regions that span 198 degrees of longitude. Results show that BEWARE and therefore WaveFoRCE, has an 8% error in predicting wave run-up when compared to X-Beach (a high resolution, fully implemented wave model).
- A live WaveFoRCE demonstration is currently under development. Currently historic flood events are used for the WaveFoRCE demonstration site (waveforce.online).
- A WaveFoRCE poster was presented during Earth Information Day at COP27.
- The WaveFoRCE team is now actively looking for funding opportunities for the global roll-out of WaveFoRCE.

Collaboration and Engagement with Coastal and Marine Community in Africa

- We have implemented a new regional network of ocean professionals in Africa. A mailing distribution list was developed to disseminate and share information on events and opportunities for researchers related to coastal and marine environmental sciences.

- To date the mailing list (handled on MailChimp), comprises approximately 75 subscribers from different countries and research areas related to the coastal and marine environment. The link to the mailing list can be found here: **Oceano_Africa_Mailing_List.**
- The network subscriber is constantly growing through our communication and ocean science knowledge spreading activities (training, webinars, workshops and symposiums). The mailing list comprises almost 200 subscribers.
- Several conferences, training and workshop events and opportunities that may be of interest to the community have been shared through this network.
- Information and news have been shared to encourage the community to be aware of opportunities, share potential for participation and broaden their knowledge and network of contacts and collaborations.