



GDA



Global Development Assistance

Marine Environment &
Blue Economy

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List of abbreviations

ADB	Asian Development Bank
CMS	Copernicus marine services
EO	Earth observation
GDA	Global Development Assistance
HSI	Habitat suitability index
IFI	International Financial Institution
IUU	Illegal, unreported, and unregulated
LAT	Lowest astronomical tide
MENA	Middle East and North Africa
NPP	Net primary productivity
SAR	Synthetic aperture radar
STP	São Tomé e Príncipe
VHR	Very high resolution
WACA	Western Africa Coastal Area
WB	World Bank



What does ESA's Global Development Assistance (GDA) Activity on Marine Environment & Blue Economy do?

Marine Environment & Blue Economy are essential for the well-being of all the populations not only those living in coastal areas, since they provide food security and climate resilience for billions of people worldwide, support biodiversity, and foster sustainable socio-economic growth. Therefore, the Action Plans of International Financial Institutions (IFIs), on one hand, focus on ensuring the economic growth of developing countries, through the promotion of inclusive livelihood opportunities and the sustainable development of key oceanic sectors such as tourism, maritime transport, and renewable energy. On the other hand, they are interested in preserving the health of coastal and marine ecosystems, through the management of marine litter and pollution, and the improvement of sustainable fisheries governance. The GDA AID Marine Environment & Blue Economy activity aims to deliver value-adding products and services to assist the IFIs teams involved in the framework of their current operation and their strategic goals over the coming years on the marine environment and Blue Economy.

The objective of the GDA AID Marine Environment & Blue Economy activities is to support IFI initiatives; to do that, the project team employs a comprehensive multidisciplinary approach to develop cutting-edge products and services. The strategy involves seamlessly integrating geospatial data with a wide range of information sources to facilitate customised analysis, ultimately enhancing decision-making processes.

For further context please see: <https://gda.esa.int/thematic-areas/>

The Blue Economy refers to the sustainable use and conservation of marine and freshwater resources to support economic growth, improve livelihoods, and promote overall well-being. It encompasses various activities such as fishing, aquaculture, shipping, tourism, renewable energy generation (such as offshore wind farms and tidal energy), and marine biotechnology.

The concept emphasises the importance of responsible and environmentally friendly practices in industries that rely on the world's oceans, seas, and water bodies. It also considers the need to protect and preserve marine ecosystems and biodiversity while utilising these resources for economic benefit. The Blue Economy aims to balance economic development with environmental sustainability in coastal and maritime regions.



What topics of Marine Environment & Blue Economy are in focus?

Improved fisheries governance

There is an urgent demand for fisheries sustainability while ensuring social protection through more efficient use of scarce public resources. Targeted social protection systems are needed to address the unique characteristics and requirements of the fisheries sector. Sustainable fisheries management is crucial, and EO plays a vital role in identifying areas of ecosystem stress by assessing the health of marine ecosystems, such as monitoring changes in sea surface temperatures, ocean currents, and chlorophyll.

Marine Litter and Pollution Management

To reach a Blue Economy, marine litter and pollution need to be reduced and prevented. Additionally, it will, in turn, contribute to restoring the coastal and marine ecosystem health. There is, therefore, a need to identify, prepare and implement bankable operations in marine litter and pollution reduction/prevention while strengthening stakeholder's capacity in the implementation phase. Earth Observation (EO) technology assists in enabling the identification of pollution sources and hotspots. This data helps authorities take targeted actions to mitigate and manage marine pollution effectively. EO also supports tracking changes in litter distribution and its impact on marine ecosystems.

Blueing oceanic sector

A sustainable Blue Economy requires the development of knowledge and capacity building around ocean health. This transition to a sustainable ocean economy calls for investments (public and private) and policy reforms that, together with coordination strategies, are built on the principle of coastal and marine assets protection. EO data and tools can be incorporated into educational programmes and training initiatives. This allows students, researchers, and professionals to gain hands-on experience in using EO data for various applications, from monitoring marine ecosystem health.

Integrated seascape management

Focusing not only on environmental concerns but also on socioeconomic considerations, such as enhancing coastal resilience and establishing protected marine areas, a sustainable Blue Economy framework offers a valuable framework for organising the data and knowledge necessary for informed policy development and strengthening institutional capacity to regulate diverse marine sectors. This, in turn, can attract investments that drive equitable and climate-smart economic growth while safeguarding the health of our oceans. EO technology plays a crucial role in supporting fisheries and aquaculture management, which are pivotal for livelihoods and food security, aiding in the assessment of fish stocks, monitoring fishing activities, and preventing overfishing.

For further context please see: <https://gda.esa.int/thematic-area/marine/>



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Who runs the GDA Marine Environment & Blue Economy?

The GDA Marine Environment & Blue Economy project is run by a team consortium of seven European companies and research institutions. They are leaders in Earth Observation, Remote Sensing, and Marine Environment domains. This consortium is led by **Planetek Italia**.

The members are:

Planetek Italia	(IT)		
Geoville	(AT)		
EOMAP	(DE)		
Terrasigna	(RO)		
Climate Impact	(IT)		
AIRCENTRE	(PT)		
University of Palermo	(IT)		



Priorities of GDA Marine Environment & Blue Economy

1. Supporting the **International Financial Institutions** (IFIs) initiatives in augmenting global development efforts.
2. **Geo-information reliability**: extraction of information at high-quality levels is required. The adoption and/or adaptation of state-of-the-art EO-based methods, as well as the exploitation of all available information from independent and/or overlapping data sources, is the key to doing so.
3. Providing adaptive and flexible Earth Observation initiatives, leveraging **agile methodologies** to address emerging needs and situational shifts effectively.
4. **Preparation and presentation in different aggregation levels and actors**: decision-makers and technical staff need appropriate information.
5. **Exploitation and integration of pre-existing data and information**: data and information collected in former and ongoing international initiatives and projects are a significant advantage.



Use case example

Ecosystem Protection and Management EO-based biomass carbon, seagrass, and salt marshes maps

Users: World Bank MENA Blue Programme team

Geographic Region: Middle East and North Africa

Country: Tunisia

Description: Ecosystems are complex environments, and their delicate balances are increasingly under stress, with human interference and/or climate change as the most notable drivers of performance degradation. EO data can play an important role in assessing the status of ecosystems, on all scales, from local to global, particularly elucidating the spatial extent and inter-relationships between ecosystems and their relationship to the areas of human habitation and activities dependent upon them.

Product sample:

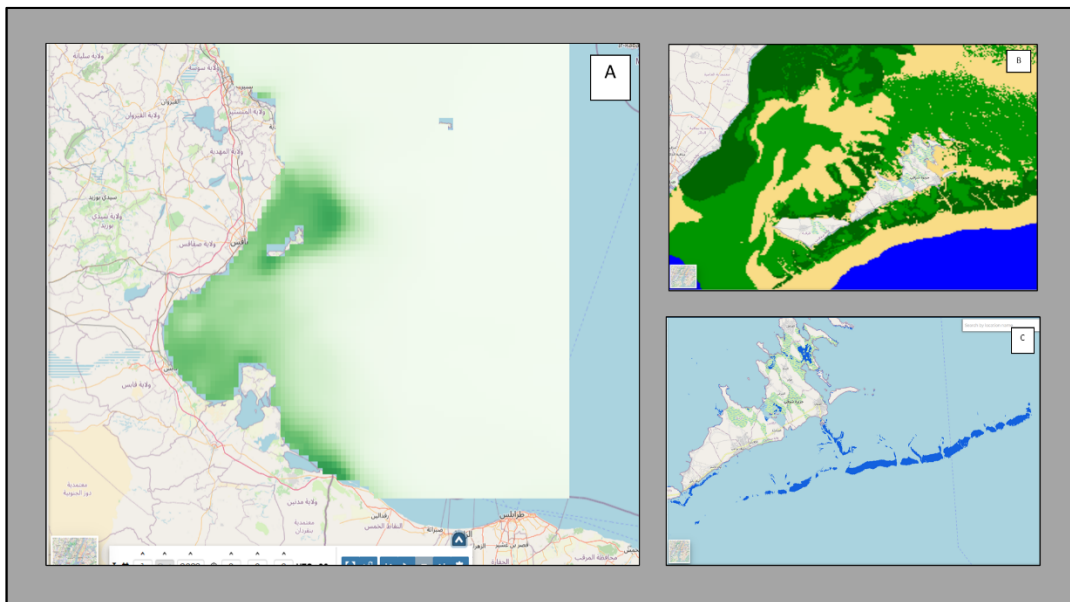


Figure 1: A - Biomass carbon map (Gulf of Gabes), B - Seagrass presence map (Gulf of Gabes), C - Saltmarsh potential map (Kerkennah and Djerba islands).



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Use case example

Water Quality

Unleashing the Blue Economy of the Caribbean

Users: World Bank Caribbean team

Geographic Region: Latin America and the Caribbean

Country: The Caribbean region

Description: Coastal environments are susceptible to anthropogenic pressure, pollution, and climate change. EO methodologies allow retrieving water quality parameters, such as chlorophyll concentration, water turbidity, water transparency, sea surface temperature, etc., which are crucial for evaluating the eutrophic status of coastal waters, which is the most important and long-lasting water quality problem for densely populated and industrialised countries.

Product sample:

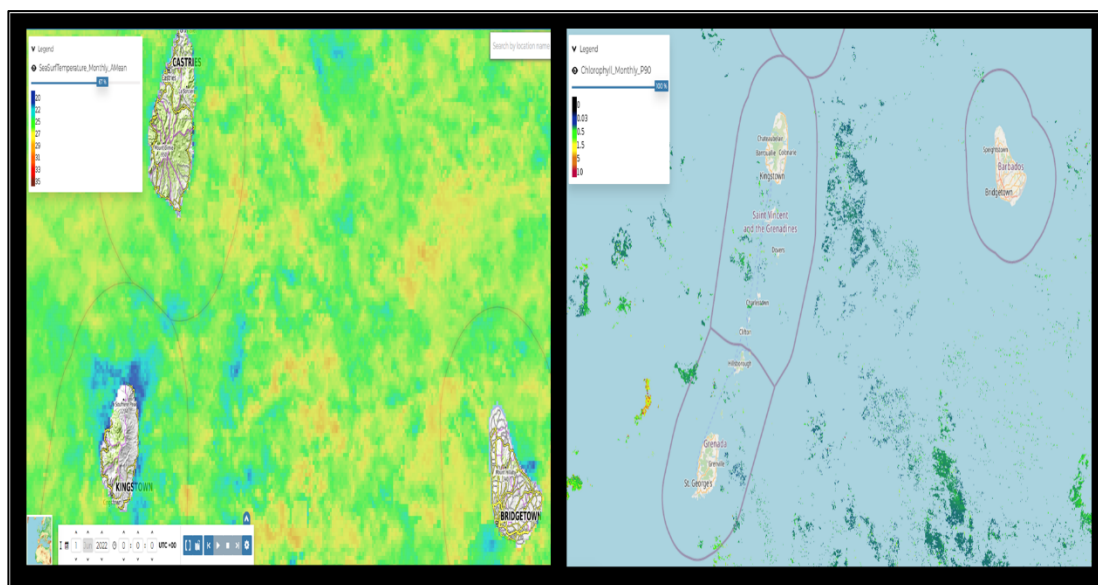


Figure 2: Left - Mean Sea Surface Temperature in June 2022 (C°); Right - Mean chlorophyll content in July 2022 (micrograms / litre).



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Use case example

Shoreline and riverbank erosion mapping EO-based coastal vulnerability index

Users: World Bank Maldives team

Geographic Region: South Asia

Country: Maldives

Description: The use case focuses on supporting stakeholders to quantify and manage their 'sediment capital' along coasts and rivers. The EO-based information about coastal erosion/accretion and scenario forecast will be provided in high spatial and required temporal resolution to manage coastlines and riverine systems better.

Product sample:

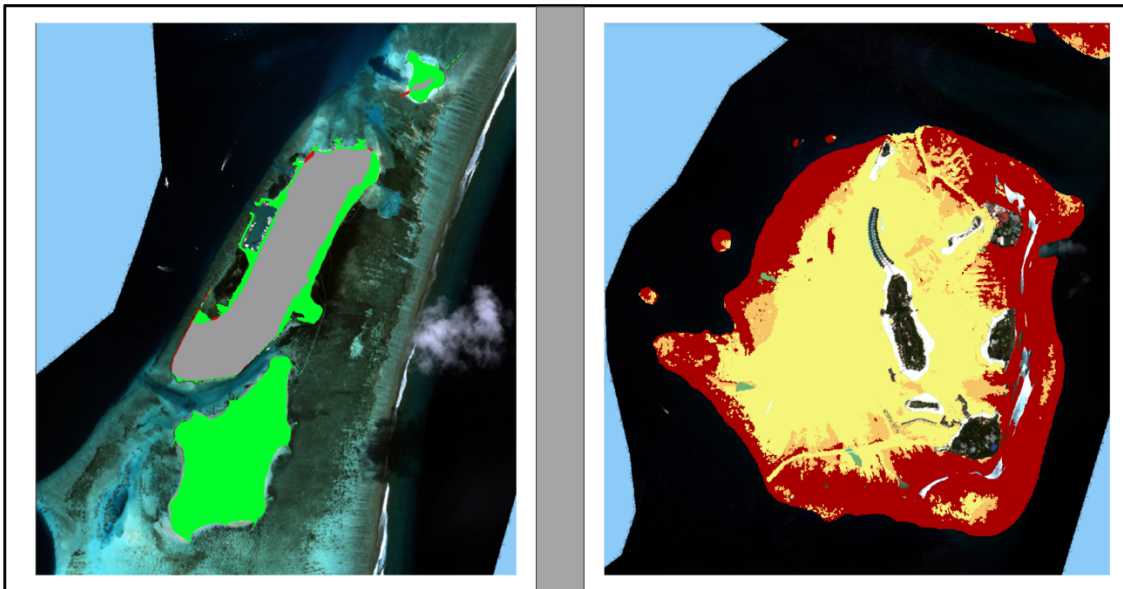


Figure 3: Left - Shoreline change (between 2003-2022); Right - Seafloor classification.

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Use case example

Shoreline and riverbank erosion mapping Coastal resilience and adaptation

Users: World Bank São Tomé e Príncipe team
Geographic Region: Western and Central Africa
Country: São Tomé e Príncipe

Description: The use case focuses on supporting stakeholders to quantify and manage their 'sediment capital' along coasts and rivers. The EO-based information about coastal erosion/accretion and scenario forecast will be provided in high spatial and required temporal resolution to manage coastlines and riverine systems better.

Product sample:

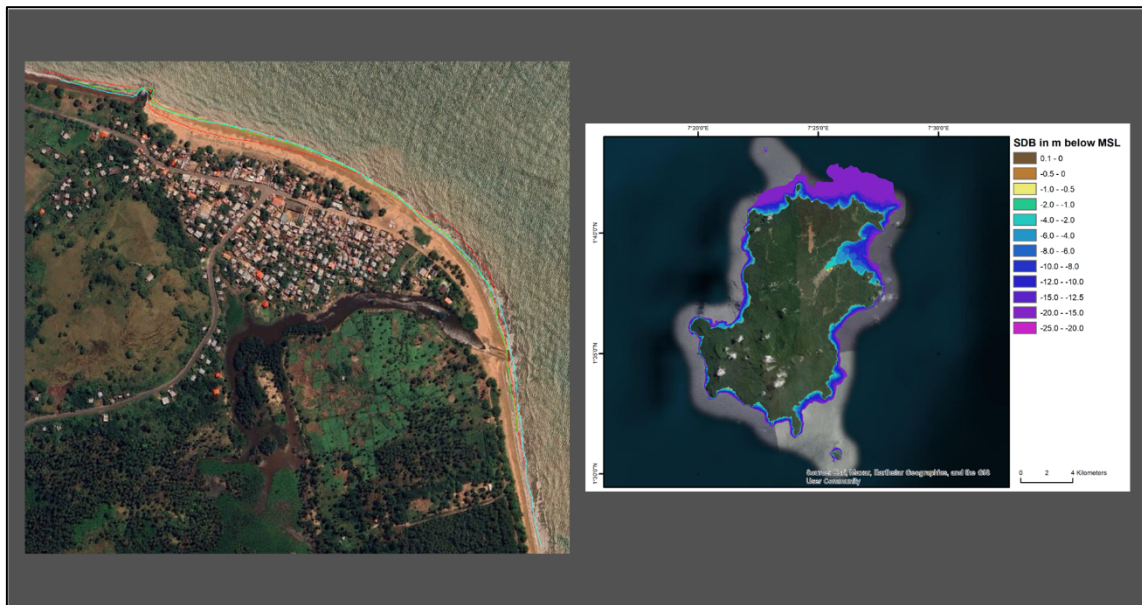


Figure 4: Left - Shoreline change (for different dates); Right - Seafloor depth.



Use case example

Water Pollution Assessment and Monitoring Plastic drift modelling and accumulation

Users: Liberia World Bank team

Geographic Region: Western and Central Africa

Country: Liberia

Description: The inefficient management and disposal of wastewater, the overuse of fertilisers, the steadily increased use of plastic items entering the marine water, and the increasingly frequent oil discharges from tankers lead to adverse consequences on the coastal and marine environment, wildlife, and human health. Satellite sensors can detect the anomalous trends of biophysical parameters correlated to water pollution, enabling the assessment, and monitoring of impacts over extensive areas more efficiently than traditional in situ monitoring and, simultaneously, providing surveillance to fight illegal discharges.

Product sample:

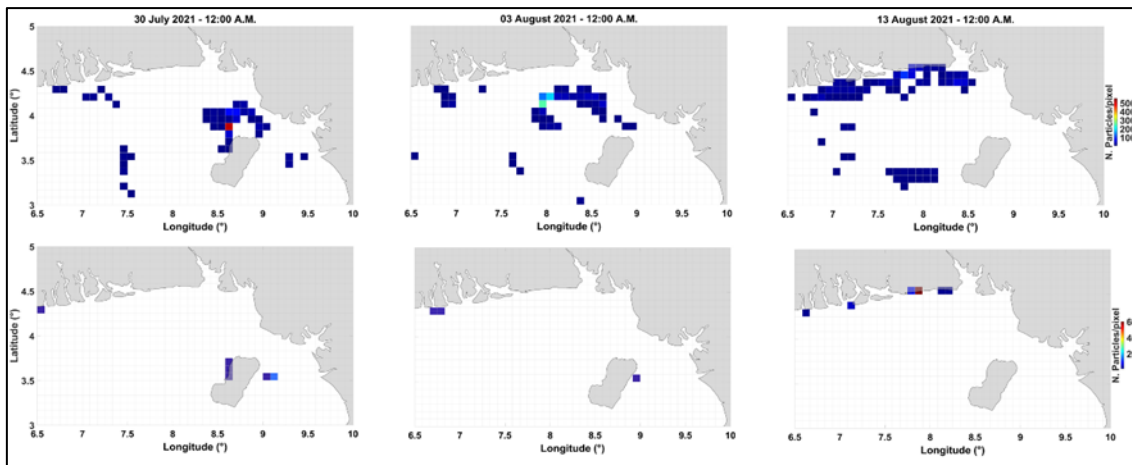


Figure 5: Density (upper panels) and beaching maps (lower panels) for three representative days



Use case example

Detection and assessment capabilities for fishery resources Optimising Fishing Campaigns: A Regulatory and By-Catch Solution

Users: Liberia World Bank team

Geographic Region: Western and Central Africa

Country: Liberia

Description: Identification of the most favourable areas for fishing and fish stock protection activities, based on modern techniques, is essential for the sustainable development and implementation of the Blue Growth strategy. Earth Observation data can be successfully used to raise the environmentally sound efficiency of fishing. Satellite tracking is also fundamental in fighting regional illegal, unreported and unregulated (IUU) fishing.

Product sample:

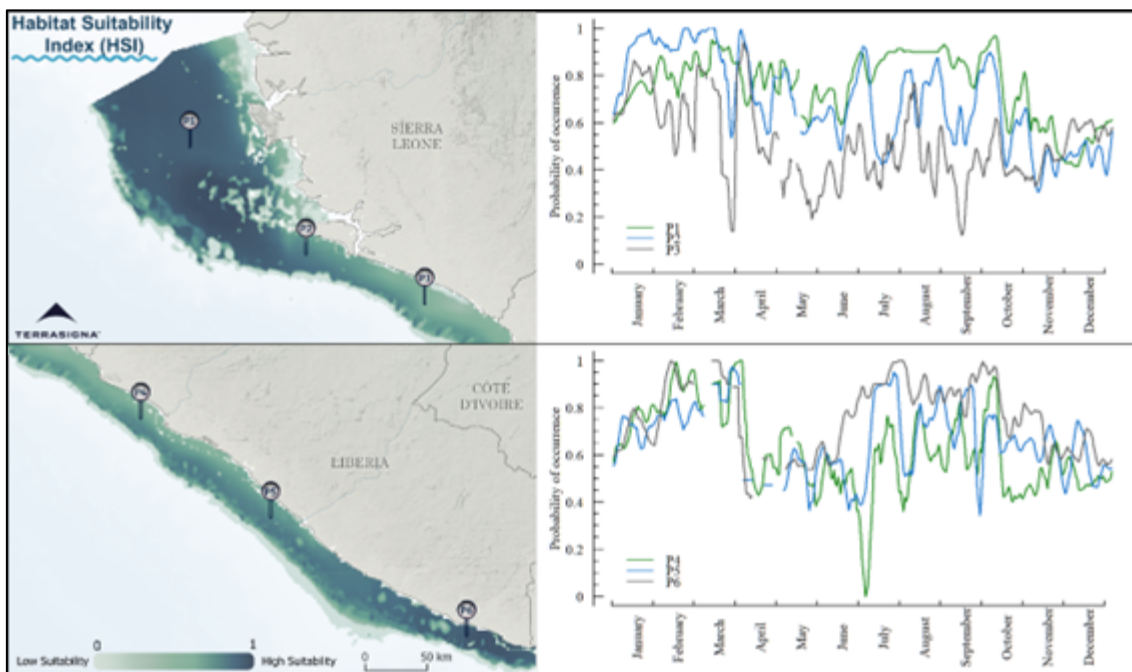


Figure 6: Temporal dynamics of the HSI (Habitat Suitability Index) for specific coordinates/locations



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