# **Context**

Reliable, accessible, and well-managed ocean data is critical for informed decision-making, sustainable resource management, marine spatial planning, and emergency response across Africa. The African region faces a major challenge in terms of data fragmentation, limited sharing frameworks, lack of interoperability between platforms, and inadequate investments in digital infrastructure. While global systems such as the International Oceanographic Data and Information Exchange (IODE) and the Ocean Biodiversity Information System (OBIS) provide opportunities for African contributions and access, many African countries still lack the capacity to collect, curate, and disseminate high-quality marine data at scale.

Africa is not starting from zero. Several data centers, academic institutions, and government agencies have built expertise and operational data services within the ODINAFRICA network and beyond. Among these, National Oceanographic Data Centres (NODCs) are pivotal. Strengthening NODCs is essential not only for managing and curating national marine data assets but also for ensuring that African countries can actively participate in global data exchange networks and contribute to regional ocean science priorities. These centers hold valuable datasets and knowledge, but face systemic challenges in terms of funding, staff retention, and technological upgrades. Supporting and connecting these existing capacities into a more integrated and collaborative regional data ecosystem will be key to building Africa’s ocean data infrastructure.

# **Purpose**

To guide the sessional working group in identifying strategic priorities and actionable solutions for enhancing Africa’s marine data and information management ecosystem through open access, interoperability, innovation, and institutional strengthening.

# **1. Theme Overview**

Ocean data and information management is a foundational pillar for advancing ocean science, environmental governance, disaster preparedness, sustainable development, and blue economy innovation. This theme encompasses the entire value chain of ocean information — from data acquisition through sensors and satellite systems, to quality control, storage, analysis, dissemination, and informed application. Reliable and accessible marine data enables evidence-based decision-making for fisheries management, coastal planning, marine biodiversity protection, and emergency forecasting.

As digital technologies rapidly evolve, the integration of artificial intelligence (AI), machine learning, big data analytics, and blockchain presents enormous opportunities for transforming how Africa collects, processes, and utilizes marine data. AI can support anomaly detection in monitoring systems, automate species identification, and enhance predictive modeling. Blockchain can help secure data provenance, ownership, and traceability—crucial for sensitive datasets such as those related to environmental impact assessments or marine spatial planning.

The theme also supports Africa’s participation in the Global Ocean Observing System (GOOS), the UN Decade of Ocean Science, and data-driven achievement of the Sustainable Development Goals (SDGs). It strengthens the continent’s engagement in the blue economy, disaster risk reduction, maritime security, and climate adaptation, while enhancing transparency and inclusiveness in how ocean knowledge is shared and governed.

# **2. Sub-Themes to Cover**

* Implementation of FAIR principles (Findable, Accessible, Interoperable, Reusable) in data systems
* Strengthening and connecting National Oceanographic Data Centres (NODCs)
* Regional marine data portals and integration with global platforms
* Data standards, ethics, and governance (including sovereignty and intellectual property)
* Disaster Risk Reduction (DRR) and early warning systems through integrated data services
* Promoting digital innovation and use of emerging technologies (e.g., AI, digital twins)

# **3. Guiding Questions**

* + What are the key gaps in national and regional ocean data collection, management, and sharing?
	+ How can Ocean Data and Information Networks be leveraged to enhance data services and visibility?
	+ What institutional and policy frameworks are needed for ethical and equitable data governance?
	+ How can Africa better participate in and benefit from global marine data initiatives?
	+ Which innovations and partnerships can support data-driven decision-making?

# **4. Coordination with Other WGs**

* + Coordinate with WG 5.2.1 on integration of observational data.
	+ Support WG 5.2.2 with biodiversity and ecosystem data services.
	+ Align with WG 5.2.4 on training delivery and institutional support.

# **5. Monitoring & Evaluation Considerations**

* + Number of countries with operational and connected NODCs.
	+ Number of datasets shared through regional or global platforms.
	+ Number of people trained in marine data curation and FAIR principles.
	+ Number of partnerships established to support innovation and data use.
	+ Number of AI, machine learning, or blockchain-based pilot initiatives launched and scaled.
	+ Percentage of data workflows integrating automated analytics tools for real-time insights.

# **6. Expected Outputs from the WG**

* Priority list of actions to strengthen Africa’s ocean data infrastructure.
* Recommendations on data governance, ethics, and interoperability.
* Strategy to promote ocean literacy through data accessibility.
* Pipeline of projects for resource mobilization and innovation support.
* Inclusion of AI, big data, and blockchain approaches in proposed digital transformation initiatives.
* Identified pathways for scaling emerging technologies in ocean data systems across African regions.

# **7. Proposed Activities for 2026–2027**

These activities should explicitly integrate the use of emerging technologies such as artificial intelligence (AI), big data analytics, machine learning, and blockchain to drive innovation, data transparency, and efficient management of ocean information systems.

## Infrastructure & Systems

* + Upgrade and connect NODCs with regional and global platforms (e.g., ODIS, OBIS).
	+ Establish and maintain national ODIS and OBIS nodes.
	+ Deploy cloud-based regional data storage and access systems.

## Capacity Building & Training

* + Organize regional training on FAIR data principles, metadata, and digital archiving.
	+ Establish a mentorship programme for ocean data scientists and information managers.
	+ Conduct workshops on ethical data sharing, sovereignty, and open science.

## Tools & Digital Innovation

* + Establish a regional AI lab or innovation hub focused on ocean data solutions for marine resource management, pollution tracking, and predictive modeling.
	+ Develop blockchain-based data traceability and validation systems to secure the integrity and provenance of critical marine datasets.
	+ Build big data analytics pipelines to process high-resolution oceanographic data for real-time and long-term applications.
	+ Develop a regional marine data dashboard for decision-makers and researchers.
	+ Pilot digital ocean twin applications in selected coastal areas.
	+ Explore AI-based tools for marine data processing and visualization.

## Policy & Governance

* + Draft a model regional policy framework on marine data governance, standards, and interoperability.
	+ Promote inclusion of ocean data in national strategies for climate resilience and disaster preparedness.

## Outreach & Communication

* + Design school and public outreach content using real-time ocean data (e.g., visualizations, infographics).
	+ Promote ocean literacy through partnerships with media and digital platforms.