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# COASTAL GEOMORPHOLOGY MAPPING AND SHORELINE CHANGE ANALYSIS TRAINING

7<sup>th</sup> to 9<sup>th</sup> February, 2024 TIME: 1400 Hours to 1630 Hours EAT (GMT + 3)



**Case Study of South West Indian Ocean Island Countries; Comoros,  
Mauritius, Madagascar, and Seychelles using EO Data, Innovative  
Techniques, and End-User Knowledge**

## CONCEPT NOTE

PRESENTATION BY:



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## Introduction

This training workshop is a result of the environmental monitoring tools for coastal erosion mapping that was developed in 2023. The project was implemented by LocateIT Limited through a contract with the Regional Centre for Mapping of Resources for Development (RCMRD) under the GMES & Africa Programme, a joint initiative co-financed by the European Commission and the African Union Commission. This training is part of the project's goal on Conducting online training to GMES staff, partners and end users.

This training workshop aims to further increase awareness, uptake and build capacity of stakeholders with the relevant earth observation-based tools and approaches necessary to support resource management by informing policy intervention processes at regional and national levels towards coastal erosion monitoring and mitigation

## Background

The Global Monitoring for Environment and Security (GMES) & Africa Programme is a joint initiative co-financed by the European Commission and the African Union Commission. The objective of the GMES & Africa Programme is to address the growing needs of African countries to access and use Earth Observation (EO) data for the implementation of sustainable development policies across the continent. The Program was explicitly designed to respond to African needs in water, natural resources, marine and coastal areas, as well as address global needs to manage the environment, mitigate climate change, and ensure civil security. It was additionally designed to enable the implementation of the African Space Policy, and Strategy formulated to harness the continent's capabilities in utilizing space science and technology for economic growth and sustainable development.

As part of the global objectives highlighted in the mission and vision of the GMES & Africa project, the Regional Centre for Mapping of Resource and Development (RCMRD), through its partnership with the private sector, is developing environmental monitoring tools for Coastal Erosion mapping in Comoros, Mauritius, Madagascar, and Seychelles using EO data, innovative techniques, and end-user knowledge. This involves the development of an

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interactive dashboard that allows the user to interactively explore areas susceptible to coastal change, a QGIS plugin to model shoreline changes, and Mapographics to provide insights and inform policies.

To further empower stakeholders and end-users with the skills needed for effective utilization of these tools, a three-day online training session has been organized. The training aligns with the GMES & Africa mission, fostering the capacity of individuals to contribute to sustainable development through informed decision-making in coastal management.

## **Environmental Monitoring Tools for Coastal Erosion Mapping**

Environmental monitoring tools play a pivotal role in comprehending and addressing the challenges posed by coastal erosion, a dynamic phenomenon affecting the Earth's coastal regions. Coastal geomorphological mapping, a study of the physical features and their evolution, provides valuable insights into these intricate ecosystems. Earth observation, utilizing remote sensing technologies, has gained prominence for coastal geomorphological mapping, offering a comprehensive understanding of the coastal landscape's dynamics.

Time series shoreline change analysis, facilitated by remote sensing technologies, adds another layer of significance. This method allows for continuous monitoring of coastline alterations over time, providing critical data for the development of strategies to manage and conserve coastal ecosystems. Furthermore, it aids in predicting the potential impacts of climate change on these vulnerable regions.

In the context of the South West Indian Ocean, specifically Madagascar, Comoros, Mauritius, and Seychelles, advanced environmental monitoring tools have been developed as part of the GMES & Africa Programme. These tools include a geoportal, providing a centralized platform for accessing a range of geospatial information, along with geomorphology maps and shoreline products detailing accretion and erosion patterns. Additionally, a QGIS plugin has been designed for efficient shoreline extraction within open-source software, and a Mapographics tha is a comprehensive compilation of maps and statistical data aimed at facilitating decision-

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making processes. . These tools collectively empower stakeholders to make informed decisions regarding coastal management, aligning with the broader objectives of sustainable development in the region.

## **Rationale of the Training**

The three-day training workshop is driven by the GMES & Africa Programme's commitment to addressing African countries' specific needs in utilizing Earth Observation (EO) data for sustainable development, particularly in the South West Indian Ocean region.

Focused on the products developed for Comoros, Mauritius, Madagascar, and Seychelles, the training, conducted by the Regional Centre for Mapping of Resource and Development (RCMRD) with LocateIT Ltd, aims to empower stakeholders in coastal erosion monitoring.

Through sessions on GIS and remote sensing, participants will gain skills in utilizing advanced environmental monitoring tools, including a QGIS plugin and Dashboards. The practical training includes interpreting shoreline change maps, using the web-based dashboard for interactive exploration, and developing hands-on skills in automated geomorphological mapping. The ultimate goal is to enhance participants' expertise in Earth Observation applications for informed decision-making in coastal management, aligning with the broader GMES & Africa mission.

## **Training Objectives:**

The main aim of the training workshop is to meet the GMES & Africa objective of building capacity for the uptake, use and development of Earth Observation application products for Coastal Erosion monitoring in the South West Indian Ocean Island Countries

## **Specific Objectives**

The training aims to empower regional participants/stakeholders in project partner countries on how to assess and estimate wind erosion using earth observation-based tools. It will focus on the following.



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1. To empower the participants on the introductory geographical information systems and remote sensing concepts and data usability
2. Train and introduce the participants on the Environmental monitoring tools for coastal erosion

## **Learning Outcomes**

At the end of the training, the trainees are expected to:

1. Explain the introductory concepts, fundamentals and application of GIS and remote sensing
2. Access and effectively utilize coastal geomorphology and shoreline trends maps for Comoros, Madagascar, Mauritius, and Seychelles, serving as valuable visual aids for coastal assessments and planning.
3. Interpret shoreline change maps for erosion and accretion identification, crucial for understanding coastal dynamics and conducting vulnerability assessments.
4. Acquire proficiency in using the newly developed QGIS plugin for automatic shoreline extraction within open-source software.
5. Learn to utilize the web-based dashboard for interactive exploration of coastal areas susceptible to change, enabling data-driven decision-making.
6. Develop the capability to build geomorphology maps using automated techniques. Acquire hands-on skills in utilizing Python for efficient and systematic geomorphological mapping processes.
7. Understand Mapographics functionalities for products and tools display, enhancing the ability to present and analyze geospatial information effectively.



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## Training Schedule

The workshop is scheduled daily from February **7th to 9th February , 2024** with each session lasting **2 hours and 30 minutes** from from **1400 hours to 1630 hours EAT**. Participants will be redirected to an e-learning platform, where the course content, including pre recorded videos, will be accessible.





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Day/Date	Time	Topic/ Subject	Facilitator	Material	Online Link
<b>Day 1</b> <b>Wed</b> <b>7<sup>th</sup> Feb</b> <b>2024</b>	13:45 -14:00 hrs	Participant Login			Day 1 Session Link: To be provided
	14:00 - 14:05 hrs	Introduction remarks	LOCATEIT	•PPT	
	14:05-14:10 hrs	Opening address, Regional Centre for Mapping of Resources for Development [GMES and Africa]	RCMRD	•PPT	
	14:10 hrs	Welcome address	LOCATEIT	•PPT	
	14.10 – 14.15 hrs	Introduction on Geomorphological Mapping Component	LOCATEIT	•PPT	
	14:15 – 15:15 hrs	Technical Analysis on Coastal Geomorphology	LOCATEIT	•PPT •Data •Manual	
	15:15 – 15.30 hrs	Feedbacks and Engagements		•Online Form • Speech	
	15:30 – 16.30 hrs	Self-learning exercises and Online Assessment		•Online Form	
<b>Day 2</b> <b>Thu</b> <b>8<sup>th</sup> Feb</b> <b>2024</b>	13:45 -14:00 hrs	Participant Login			Day 2 Session Link: To be provided
	14:00 - 14:10 hrs	Welcome address & Recap Session	LOCATEIT	•PPT	
	14.10 – 14.15 hrs	Technical Analysis on Coastal Shoreline Change	LOCATEIT	•PPT •Data •Manual	
	15:15 – 15.30	Feedbacks and Engagements	LOCATEIT	•Online	







	hrs			Form • Speech	
	15:30 – 16.30 hrs	Self-learning exercises and Online Assessment	LOCATEIT	•Online Form	
<b>Day 3</b>  <b>Fri</b>  <b>9<sup>th</sup> Feb</b>  <b>2024</b>	13:45 -14:00 hrs	Participant Login			Day 3 Session Link: To be provided
	14:00 - 14:10 hrs	Welcome address & Recap Session	LOCATEIT	•PPT	
	14:15 – 15:00 hrs	Development and demonstration of Dashboard, Plugin, & Mapographics	LOCATEIT	•Geoportal •PPT •Data •Manual	
	15:00 - 15:15 hrs	Wrap-up and Final remarks	RCMRD/LO CATEIT	•Speech	

### Pre-requisites

Participants will be expected to have working knowledge of Remote Sensing and GIS. Working knowledge of QGIS will be an added advantage.

### Mode of Delivery

The training will be conducted using the following.

- PowerPoint Presentation
- Practical Demonstration Sessions
- Software Demonstrations





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- Individual Assignments

NB: The course will be virtual and delivered using zoom. All the participants are expected to have a computer with good internet access for the entire duration of the training.

### **Mode of Evaluation and Assessment:**

Participants will be assessed through.

- Practical Exercises
- Active Participation in Training Sessions
- Participation in Individual Assignments
- Tasks/Exercises

To ensure a thorough understanding of participants' progress, we've implemented a robust evaluation system.

#### Daily Assessment Forms:

At the conclusion of each online session during the three-day workshop, participants will be required to complete a brief Daily Assessment Form. These forms are designed to assess the immediate impact of the session, ensuring that participants grasp key concepts and are on track with the learning objectives. This real-time feedback will be valuable in tailoring subsequent sessions to address specific needs and concerns.

#### Certificate of Completion:

Participants who actively engage in all daily online sessions and successfully complete the test within the e-learning platform for self-paced learning will be awarded a Certificate of Completion. This certificate not only serves as formal recognition of their commitment to the workshop but also signifies the attainment of essential knowledge and skills covered throughout the program.



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### Course Feedback Survey:

To continuously improve our training programs, we value the feedback of our participants. Upon completion of the workshop, a comprehensive survey will be distributed for participants to share their insights and opinions regarding the course content, delivery, and overall experience. This feedback will be instrumental in refining our future workshops and ensuring that they remain relevant and beneficial to our audience.

## **Target Audience**

The training is suitable for all professionals dealing in the environment, natural resources management and conservation. These include but not limited to:

- a. Land and Management Authorities
- b. Marine Environment Management Authorities
- c. Environment and environment impact assessment, Energy, Agriculture institutions, Infrastructure development and management
- d. Academia and Research institutions
- e. Private Sector NGOs, CBOs and other conservation groups
- f. Natural Resource Management
- g. Local community representatives
- h. ALL users interested in environmental protection, Earth Observation, and marine ecosystem studies

## **Logistics**

The training workshop is free of charge to all participants who are selected to attend. Due to the necessity not to significantly disrupt the participants normal schedules, the training will be conducted for 2 hours per day beginning, **14:00 hours to 16:30 hours** EAT time



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## Registrations

This is thus a call to all participants who have the interest and have been selected for the training workshop to register for the training workshop before the deadline of **5th February 2024**. Successful participants will then be able to receive the course materials and course data ahead of time to facilitate easy following of the training.

## Venue

The training will take place **virtually**, allowing participants to join from the comfort of their own locations. Access details and any additional information for the online sessions will be provided to registered participants.

For the self-learning component, participants must use a laptop or computer to access tools and resources on the e-learning platform, optimized for desktop use.

Additionally, for online sessions, a device with a large screen is recommended to enhance the interactive experience, allowing for better visibility of presentations and materials. These recommendations aim to optimize the overall learning experience and encourage active participant engagement.

## Registration Link

<https://us06web.zoom.us/meeting/register/tZUtd-msqzMuEtVjqEpBfiqIKfTU2i0kO1A>

## Dates and Deadlines

The training will take place from the **7<sup>th</sup> – 9<sup>th</sup> February 2024** starting from **14:00 hours to 16:30 hours** East African Time (**GMT + 3**) every day.

## Informational Contacts

For more information and in case of any inquiries, please contact:

1. RCMRD GMES & Africa Project Manager, Joseph Murage – [jmurage@rcmrd.org](mailto:jmurage@rcmrd.org)

or

2. LocateIT Limited, Vivianne Meta - [vivianne.meta@locateit.co.ke](mailto:vivianne.meta@locateit.co.ke)