

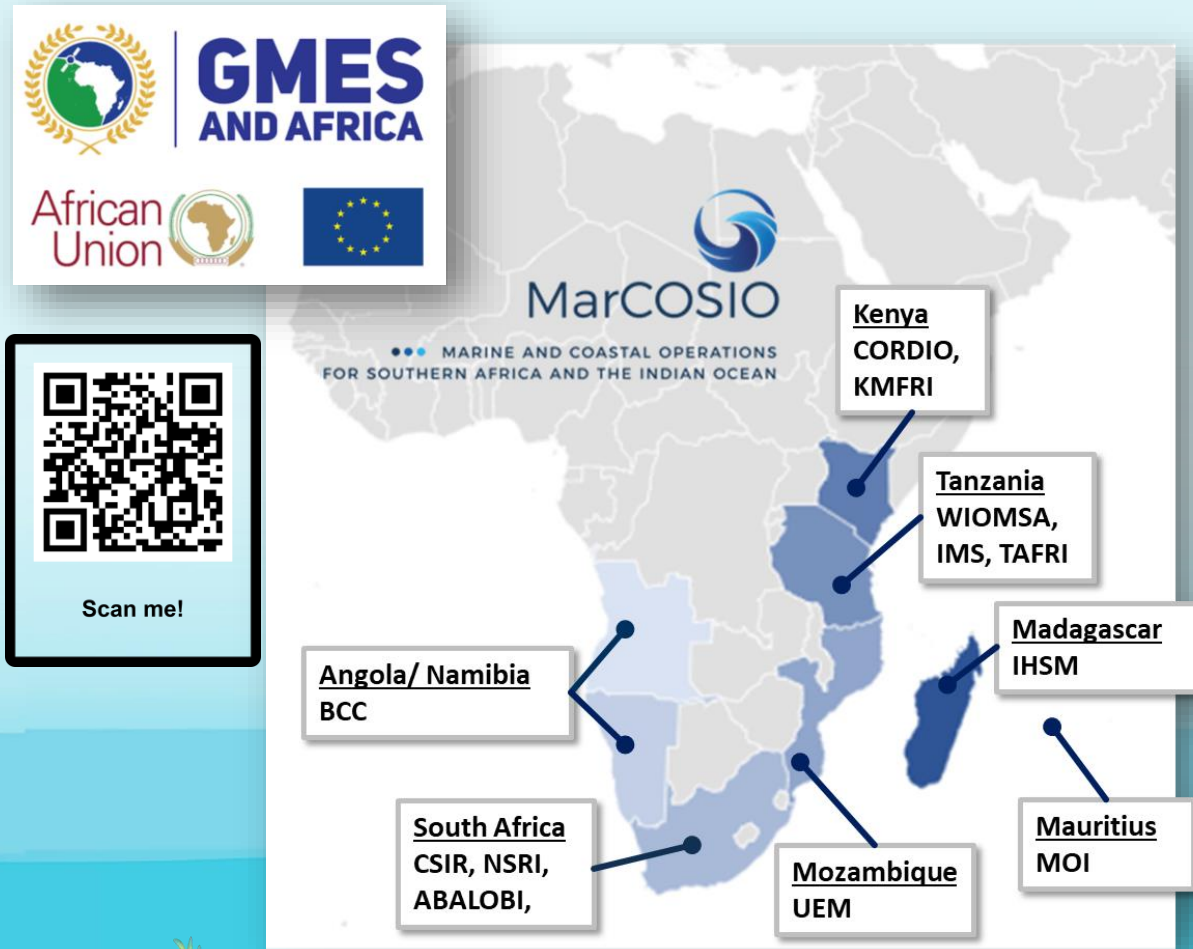
The **M**arine and **C**oastal **O**perations for **S**outhern Africa and **I**ndian **O**cean **W**estern Indian Ocean **C**oral Bleaching Monitoring Service

Marié Smith (CSIR), James Mbugua (CORDIO)



12 October 2022

The Marine and Coastal Operations for Southern Africa and the Indian Ocean (MarCOSIO)



- Previously known as MarCOSouth
- One of 2 marine consortia within the GMES&Africa programme
- The MarCOSIO project is lead by the CSIR (South Africa)
- The project represents 12 partners in 8 countries in Southern Africa and the Western Indian Ocean (WIO) region



MarCOSIO Project and Services



●●● MARINE AND COASTAL OPERATIONS
FOR SOUTHERN AFRICA AND THE INDIAN OCEAN

Policy and institutional Frameworks

Data Access

Services

Knowledge Management and Cross Fertilization

Capacity Building

Outreach, Uptake and Dissemination

Fisheries and
Aquaculture
Service



Fisheries



Aquaculture

Coastal
Service



Coral Bleaching
Monitoring



Coastal
Ecosystems

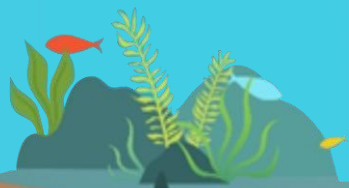
Marine and
Maritime
Service



Ship Traffic
Monitoring



Sea Rescue



MarCOSIO Coral Bleaching Service

Fisheries and Aquaculture Service



Fisheries



Aquaculture

Coastal Service



Coral Bleaching Monitoring



Coastal Ecosystems

Marine and Maritime Service



Ship Traffic Monitoring



Sea Rescue

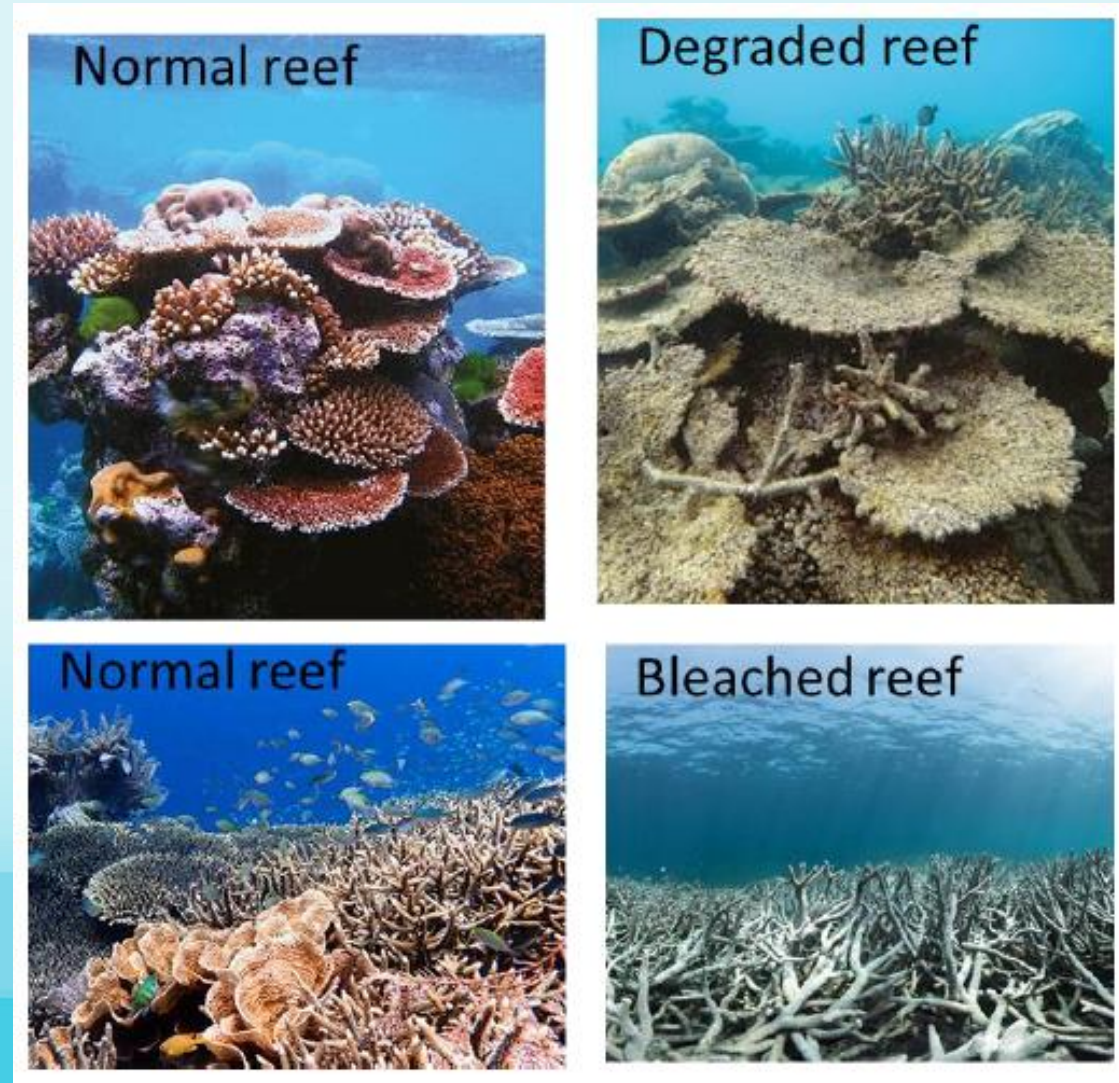


CORDIO
East Africa



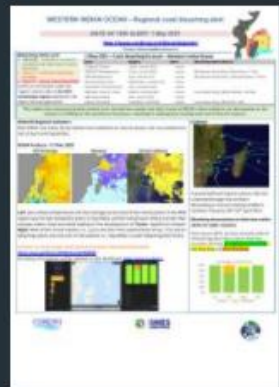
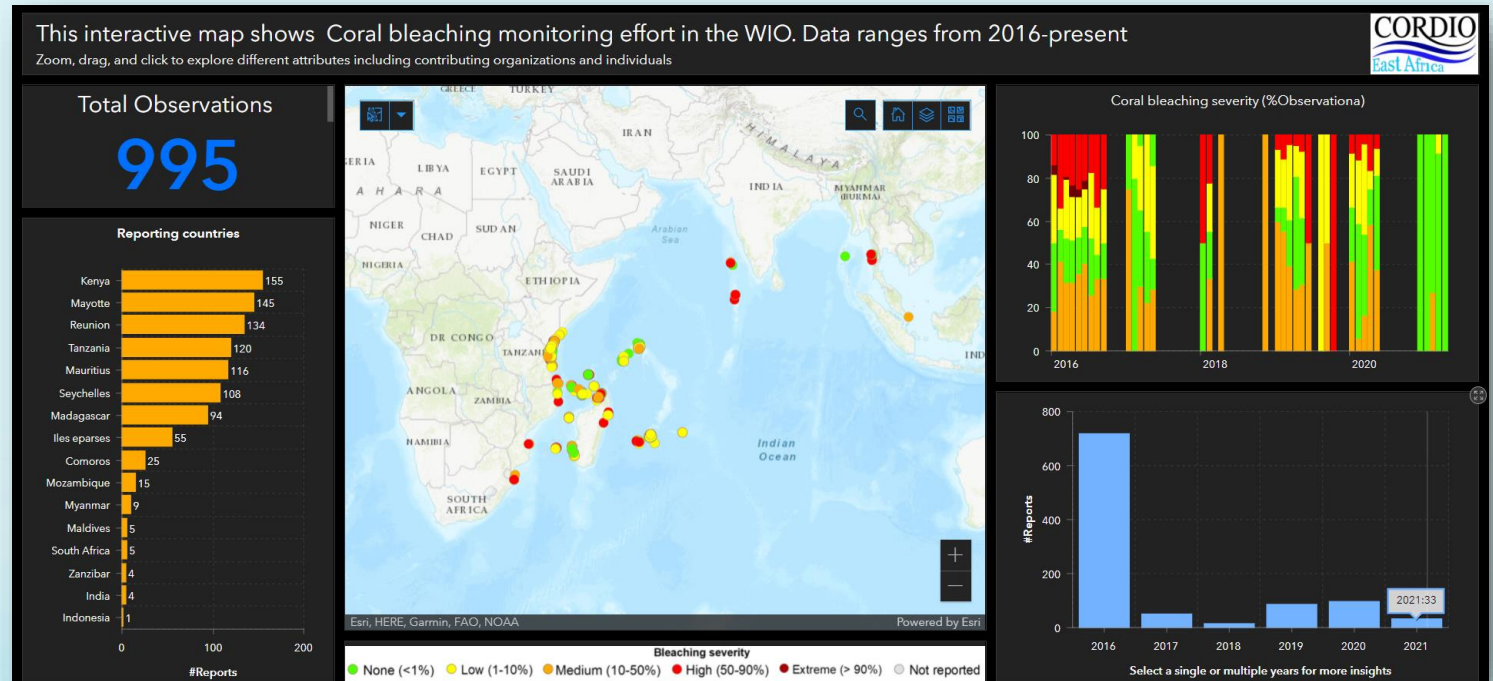
What is coral bleaching?

- Bleaching occurs when corals are **stressed** by changes in the environment, making them expel the symbiotic algae (zooanthellae) living in their tissue, causing them to lose their vibrant colour
- Factors that might cause bleaching include changes (increase) in **temperatures**, nutrient load and light
- Bleaching is the most pervasive **threat** to coral reefs, and can have cascading **impacts** on food security and ecosystem services accrued from coral reefs



CORDIO coral bleaching alert service

- Service provided by CORDIO since 2009 features:
 - In situ bleaching observations displayed on an interactive ESRI Dashboard from 2016 to present
 - Regionalised bleaching outlook pdf provided biweekly between January and June



Heritage satellite-based coral bleaching monitoring

- Products are derived from Sea Surface Temperature information using established methodologies*
- Global satellite-derived coral bleaching monitoring
 - Climatologies generally too cool for Western Indian Ocean (WIO) region, leading to over-estimations of thermal stress products and alerts

NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)

DOC > NOAA > NESDIS > STAR > CRW

Coral Reef Watch
USCRTF | CRCP | NCRMP | CoRIS

Coral Reef Watch Satellite Monitoring and Modeled Outlooks

Hover over buttons below image to change product; then click on button or image to navigate to product's page.

NOAA Coral Reef Watch Daily 5km Bleaching Alert Area 7-day Maximum (v3.1) 22 Nov 2021

5km data
5km composite products
Outlook

Alerts DHW HotSpot SST (CoralTemp) Anomaly SST Trend Virtual Stations

Complete Products List

Current ENSO Conditions and Forecasts

Report Field Data & Observations of Coral Bleaching/No Bleaching

* Liu, G, Skirving WJ, Geiger EF, De La Cour JL, Marsh BL, Heron SF, Tirak KV, Strong AE, Eakin CM (2017) NOAA Coral Reef Watch's 5km Satellite Coral Bleaching Heat Stress Monitoring Product Suite Version 3 and Four-Month Outlook Version 4. Reef Encounter 45 32(1): 39-45

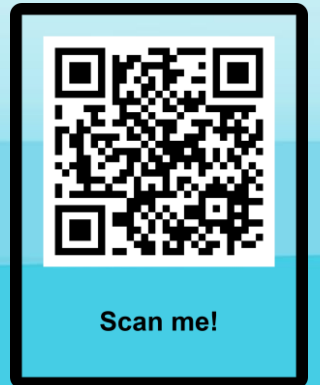
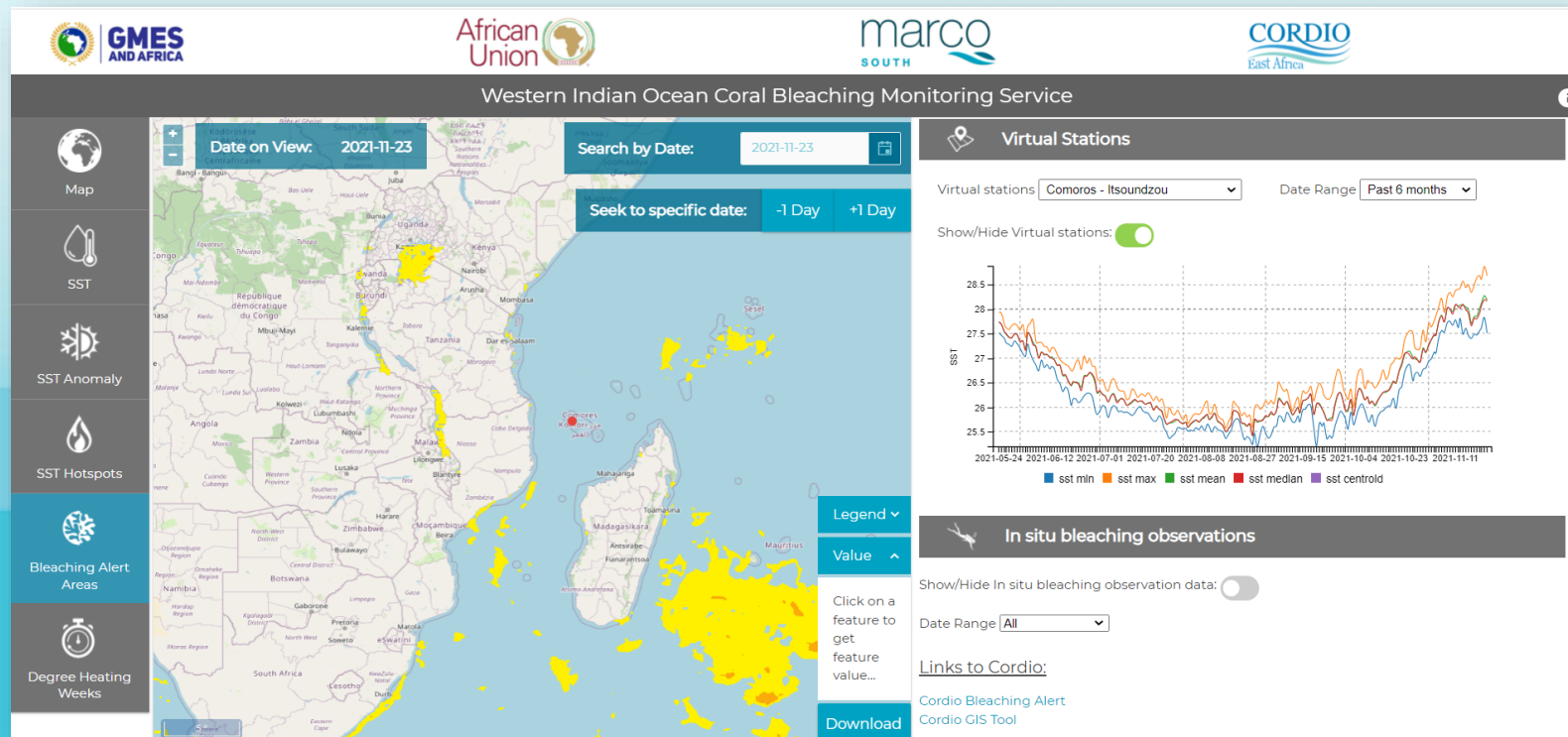
The WIO Coral Bleaching Monitoring Service

- Key features

- All climatologies and products are derived using Copernicus data:

Global Ocean OSTIA Sea Surface Temperature and Sea Ice Analysis






- Specifically designed for the WIO region using more recent, warmer data to avoid over-estimating alerts

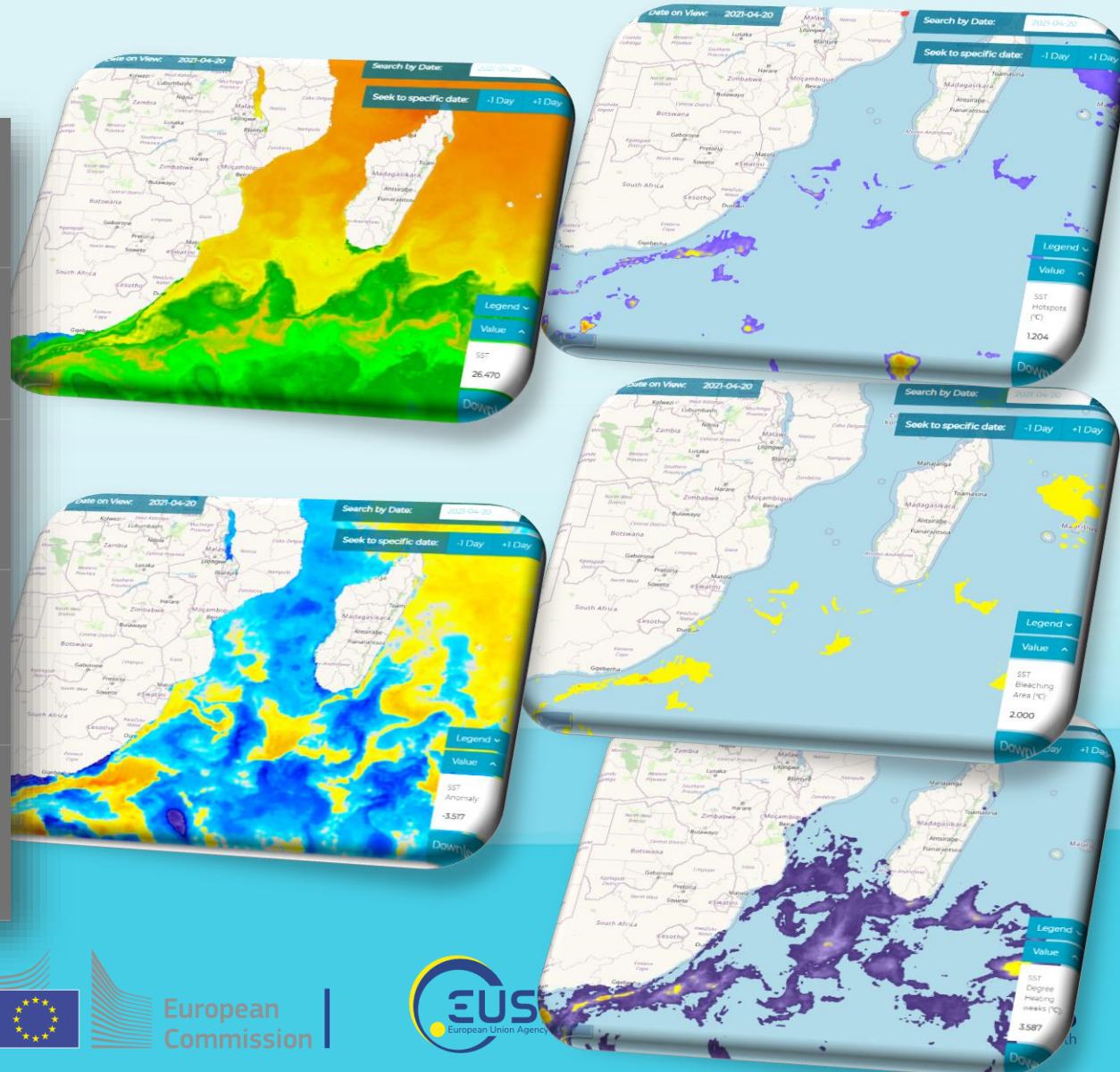


The WIO Coral Bleaching Monitoring Service

- Product viewer

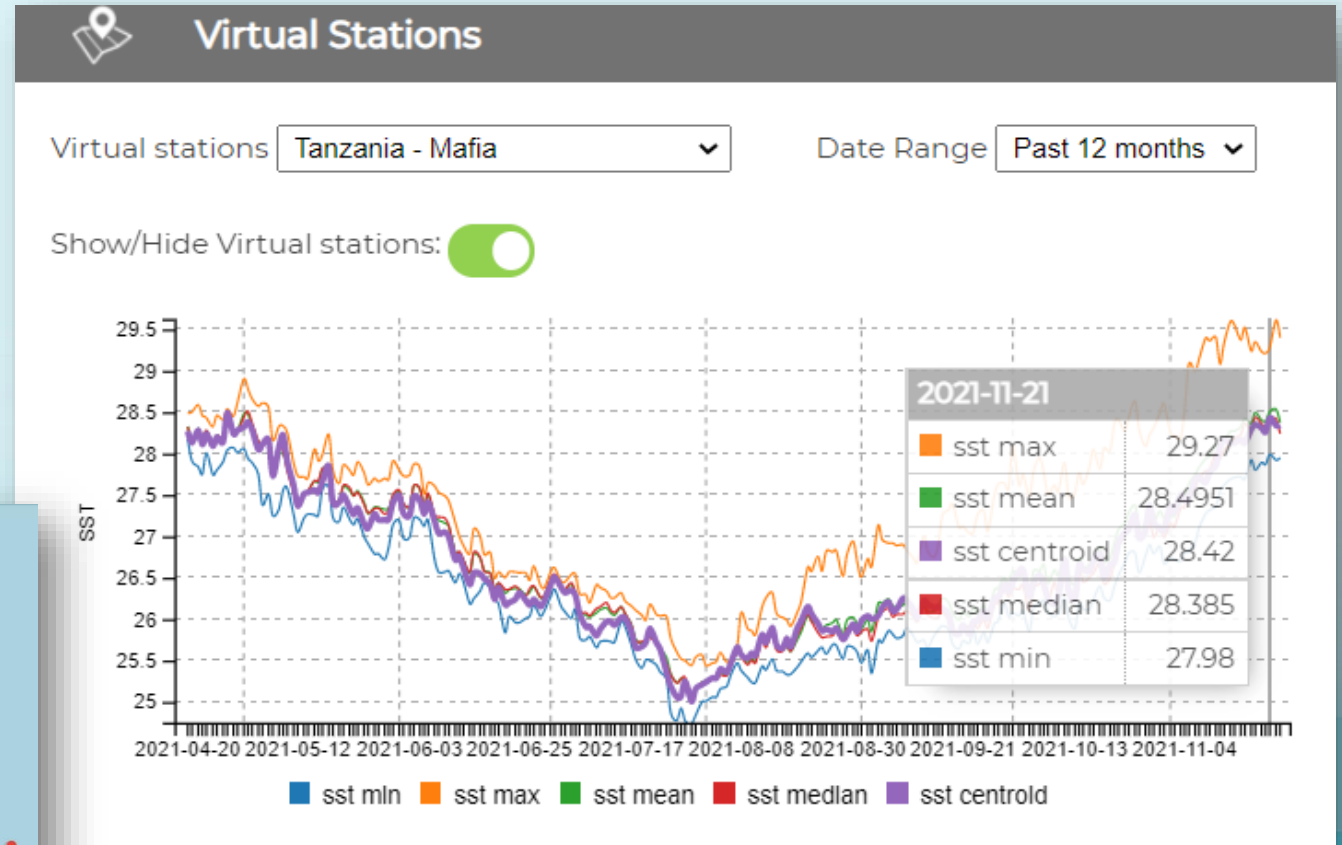
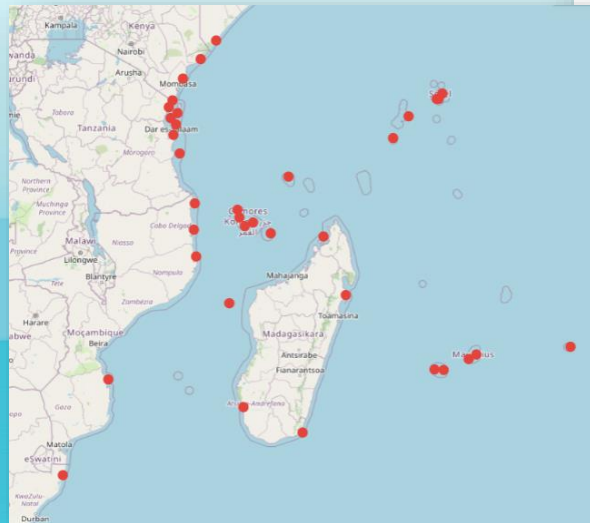
- Interactive web-based user interface
- Clickable pixel information
- Five SST-derived products at 5km spatial resolution
- Date selector with scrolling functionality
- Daily image archive from 1 January 2007 to present
- All products are updated daily at 1 day latency

-  SST
-  SST Anomaly
-  SST Hotspots
-  Bleaching Alert Areas
-  Degree Heating Weeks

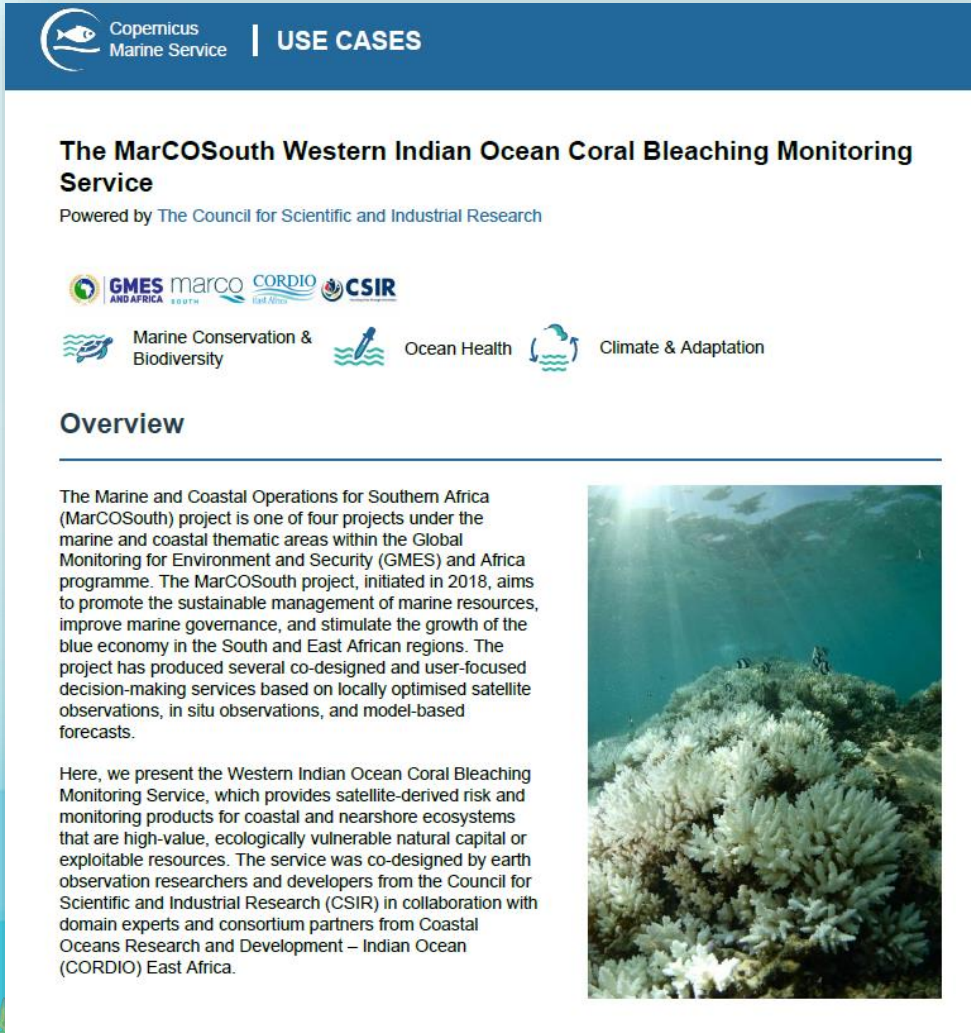


The WIO Coral Bleaching Monitoring Service

- Virtual Stations
 - Interactive graphical presentations of key monitoring sites showing historical information on SST within the past 12 months



Further information and resources



Copernicus Marine Service | USE CASES

The MarCOSouth Western Indian Ocean Coral Bleaching Monitoring Service

Powered by The Council for Scientific and Industrial Research


GMES AND AFRICA **marco** **CORDIO** **CSIR**

Marine Conservation & Biodiversity | Ocean Health | Climate & Adaptation

Overview

The Marine and Coastal Operations for Southern Africa (MarCOSouth) project is one of four projects under the marine and coastal thematic areas within the Global Monitoring for Environment and Security (GMES) and Africa programme. The MarCOSouth project, initiated in 2018, aims to promote the sustainable management of marine resources, improve marine governance, and stimulate the growth of the blue economy in the South and East African regions. The project has produced several co-designed and user-focused decision-making services based on locally optimised satellite observations, in situ observations, and model-based forecasts.

Here, we present the Western Indian Ocean Coral Bleaching Monitoring Service, which provides satellite-derived risk and monitoring products for coastal and nearshore ecosystems that are high-value, ecologically vulnerable natural capital or exploitable resources. The service was co-designed by earth observation researchers and developers from the Council for Scientific and Industrial Research (CSIR) in collaboration with domain experts and consortium partners from Coastal Oceans Research and Development – Indian Ocean (CORDIO) East Africa.



The MarCOSIO Coral Bleaching Webtool:

<https://marcosouth.org/coralbleaching/#>

CORDIO East Africa:

<https://cordioea.net/>

GMES&Africa Programme:

<https://au.int/en/GMESAfrica>

Webinar: Predicting and Responding to Coral Bleaching in the WIO:

<https://reefresilience.org/predicting-and-responding-to-coral-bleachng-in-the-wio-webinar/>



Thank you 😊

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For *in situ* bleaching monitoring & support:

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Follow MarCOSIO  [@AfricaGmes](https://twitter.com/AfricaGmes)

