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5th Symposium | Accra, Ghana | 24 – 28 October 2022



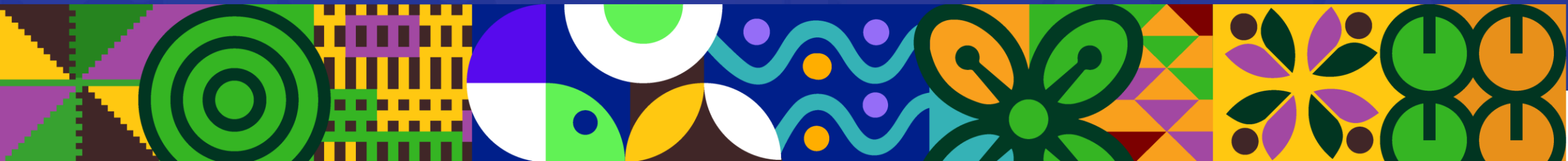
5th Symposium | Accra, Ghana | 24 – 28 October 2022



Fisheries Support through OCIMS and MarCOSIO projects

Dr Marié Smith

*Coastal Systems and Earth Observation Research Group,
Council for Scientific and Industrial Research*



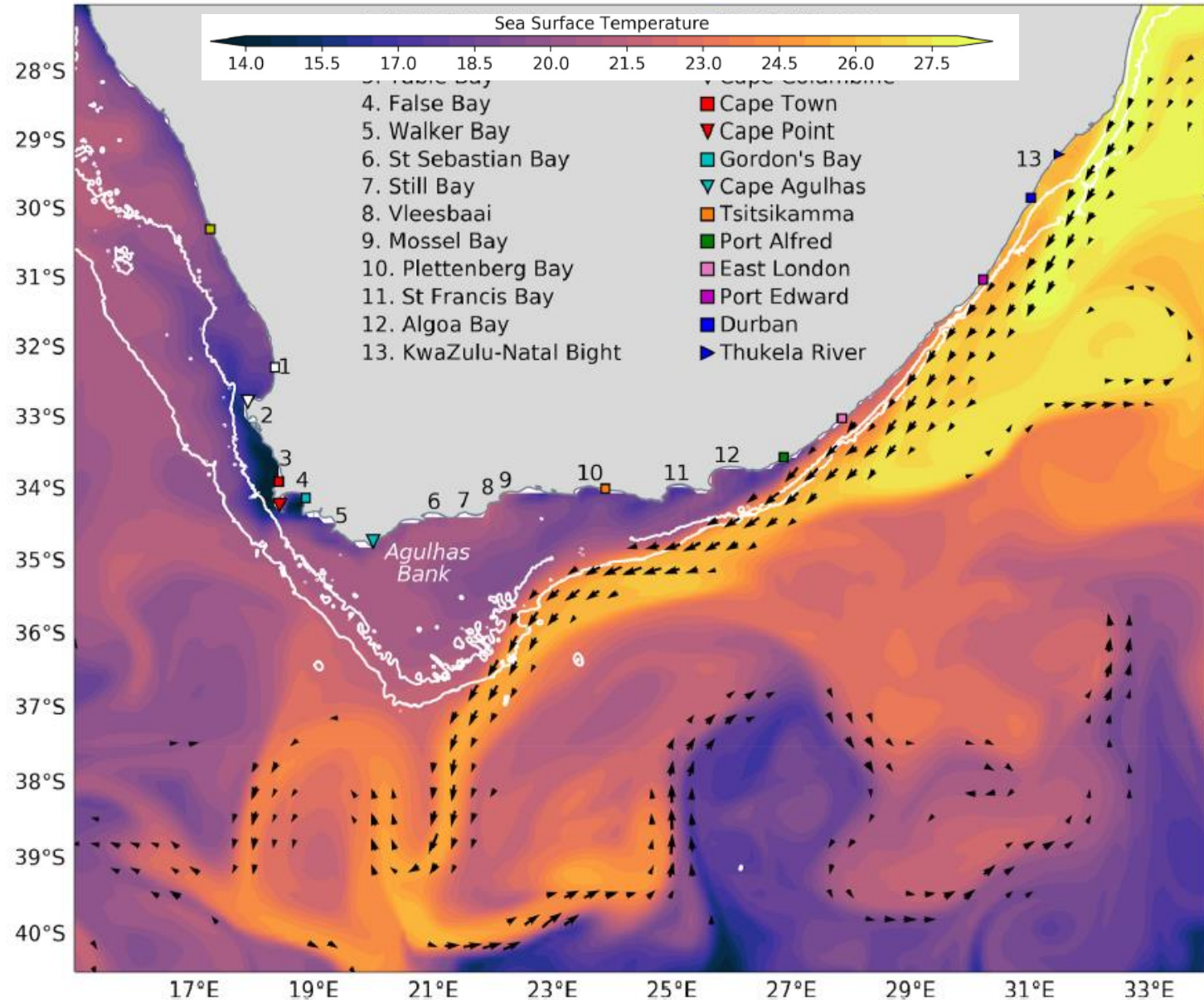
Content

1. Environmental overview
2. Earth Observation Product Development
3. National and regional initiatives supporting fisheries
 - National Oceans and Coastal Information Management System (OCIMS)
 - Marine and Coastal Operations for Southern Africa and the Indian Ocean (MarCOSIO)

Environmental overview

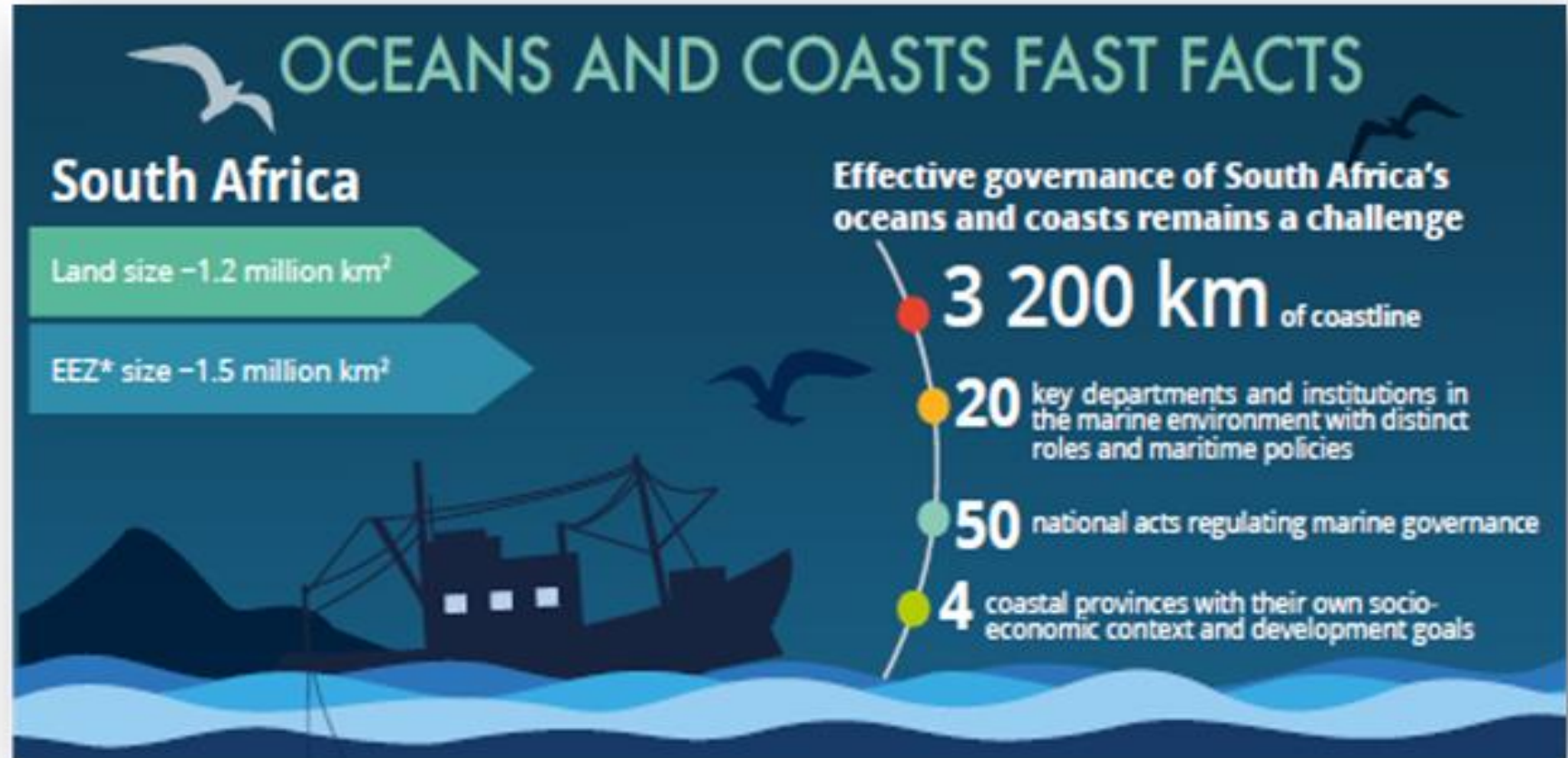
Southern African Coastal Environment

- Dynamic environment with great variability in physical and biological characteristics
 - Productive upwelling on the west
 - Warm Agulhas current, subtropical environment on the east



Southern African Marine Environment

- SA marine environment covers vast spatial scales
- Earth Observation-based information helps with
 - ✓ Monitoring
 - ✓ Protection
 - ✓ Management
 - ✓ Policing



Environmental threats : Harmful algal blooms

- Some phytoplankton can be harmful to the marine ecosystems through:
 - Toxins
 - Mechanical damage
 - Low oxygen water
- These blooms can change the colour of the water, and are often referred to as “red tides”



Devastating farmed abalone mortalities attributed to yessotoxin-producing dinoflagellates

Grant C. Pitcher^{a,b,*}, Charles J. Foord^a, Brett M. Macey^{a,b}, Lisa Mansfield^a, Anna Mouton^c, Marie E. Smith^d, Steven J. Osmond^e, Lynndal van der Molen^f

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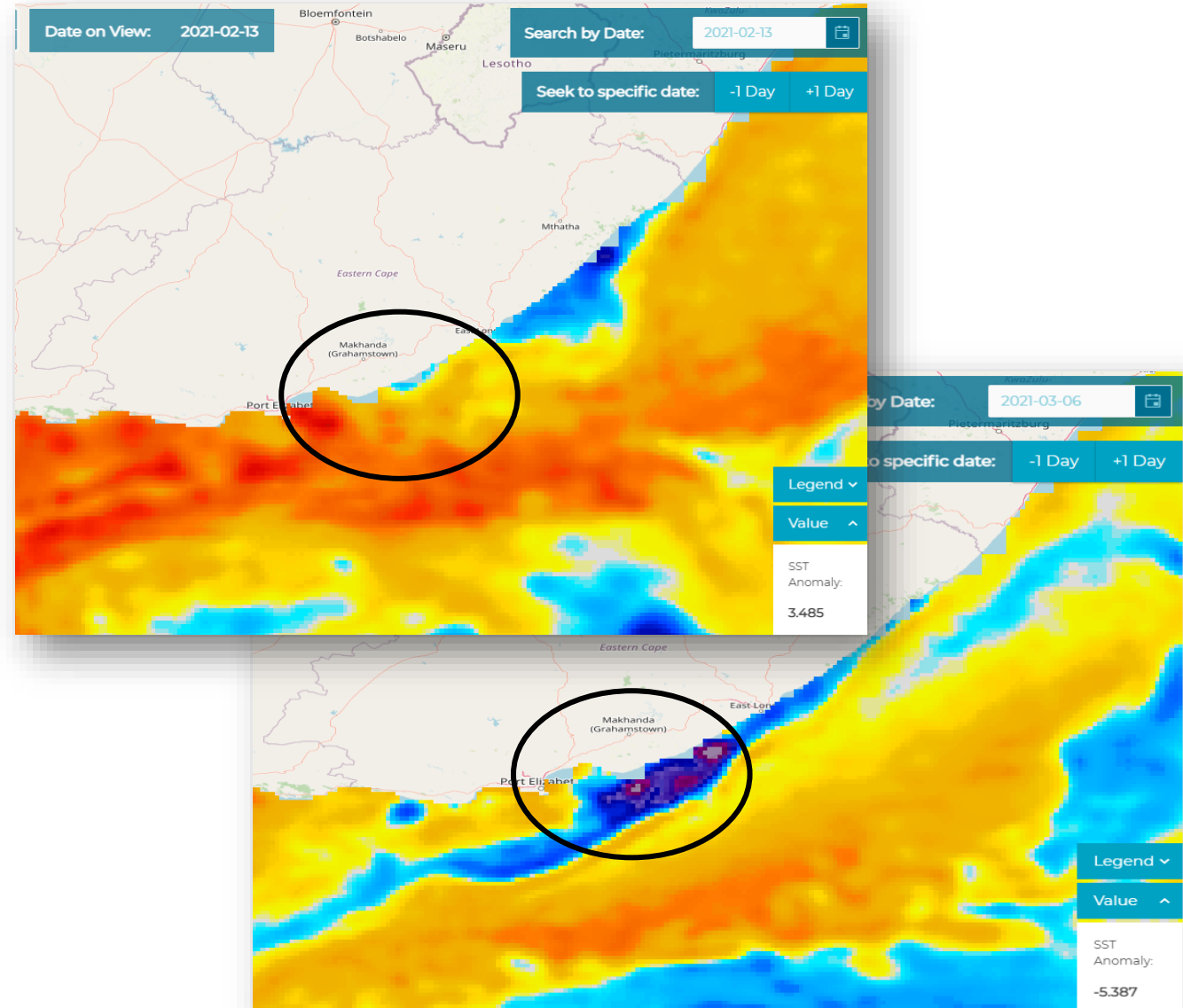
^e Amanzi Biosecurity, Sandbaai, South Africa

^f Food and Beverage Laboratory, Aspirata, Cape Town, South Africa



Environmental threats : marine heatwaves

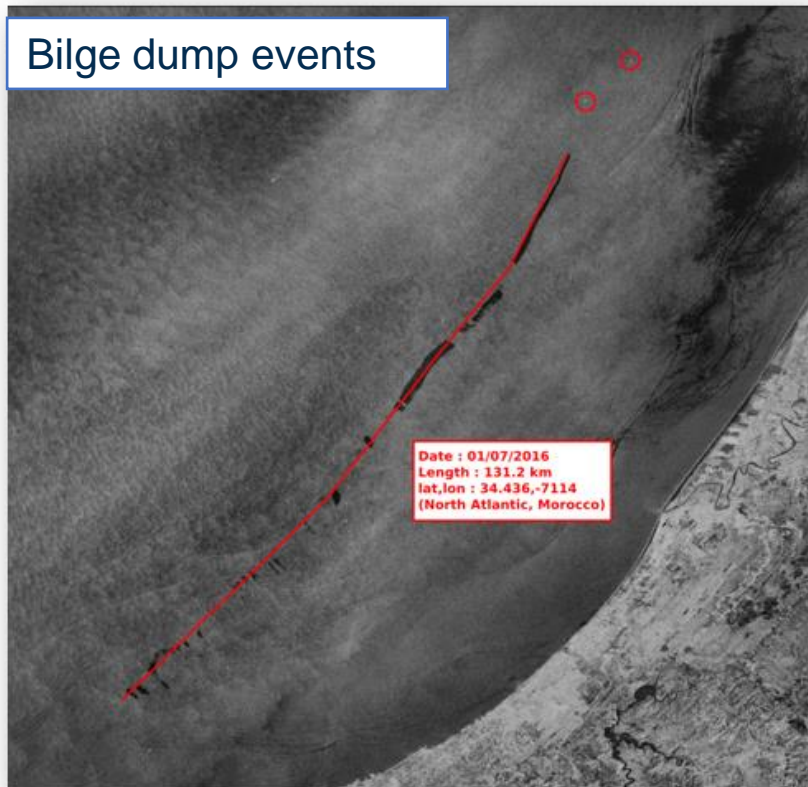
- Some dynamic coastal areas may experience sudden extreme changes in water temperature
 - Thermal shock
 - Bleaching of seaweeds
- Persistent marine temperature increases can lead to **coral bleaching**, with cascading impacts for reef ecosystems



Anthropogenic threats : Maritime Pollution

- Some ships bypass costly pollution prevention equipment by simply flushing the bilge water directly into the sea.
- Oil spill events have drastic impacts to the marine environments

Bilge dump events



Brazil Oil Spill incident (2019).



Anthropogenic threats : Illegal, Unreported and Unregulated (IUU) Fishing

NATURE | NEWS

South Africa tackles crime at sea with ship-spotting satellites

Automated vessel-tracking system aims to spy poachers and smugglers.

Linda Nordling

10 November 2017

Rights & Permissions



Maritime Security

Navy plays major role in impounding 600 tons of squid and other fish as well as foreign trawlers

defenceWeb - 26th May 2016



The three foreign fishing vessels, escorted into East London harbour earlier this week by the SA Navy replenishment vessel and the DAFF vessel, Sarah Baartman, were carrying 600 tons of squid as well as other fish caught illegally.

The vessels have been inspected and searched by a team comprising representatives of the SA Police Service, SARS Customs, Department of Home Affairs (Migration) and the SA Maritime Safety Authority

'Rogue' fishing vessel seized in PE harbour



3 Chinese squid jiggers in South African waters – Illegal fishing or innocent passage ?

Fu Yuan Yu fishing fleet – built in China to exploit unregulated squid and tuna stocks on the high seas In recent months, the Fu Yuan Yu fleet has come into focus for illegal tuna fishing in the southern Indian Ocean. Back in March this year i wrote about the ...

ARTICLES, IUU FISHING



KORYO Maru 811

forestry, fisheries & the environment

Department of Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Earth Observation Product Development

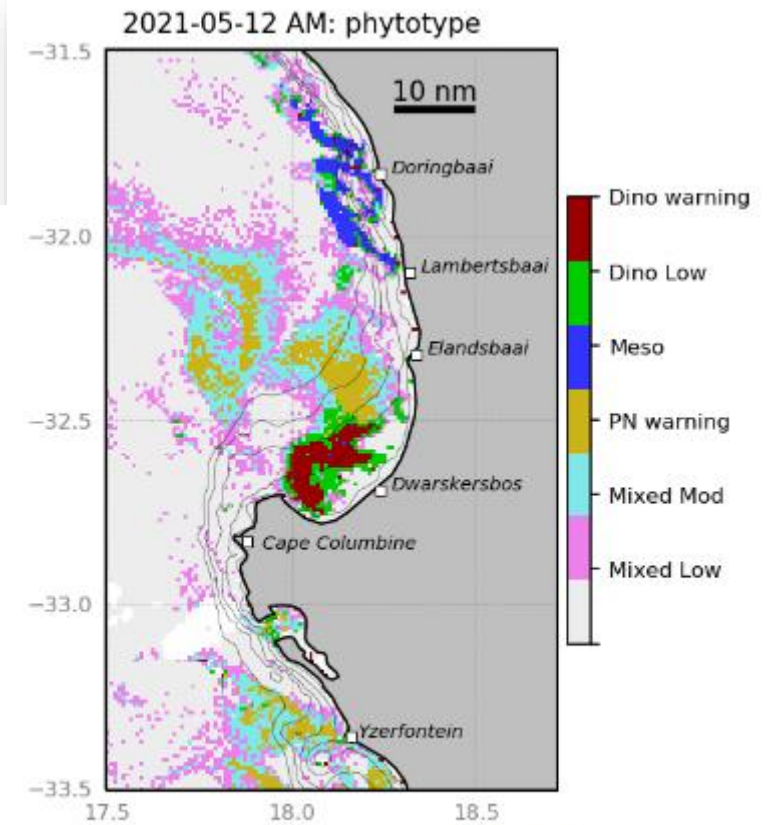
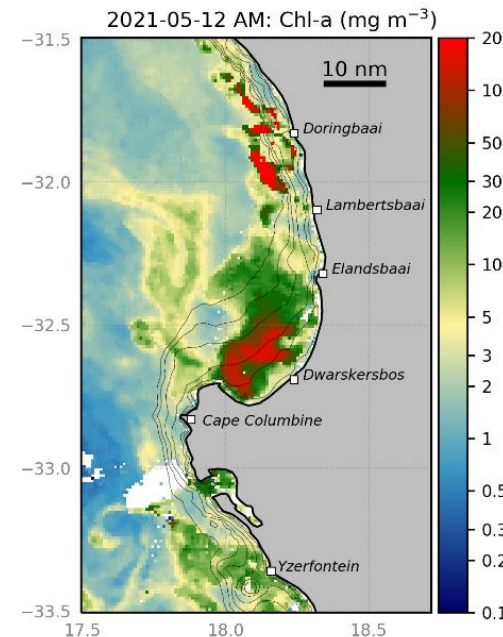
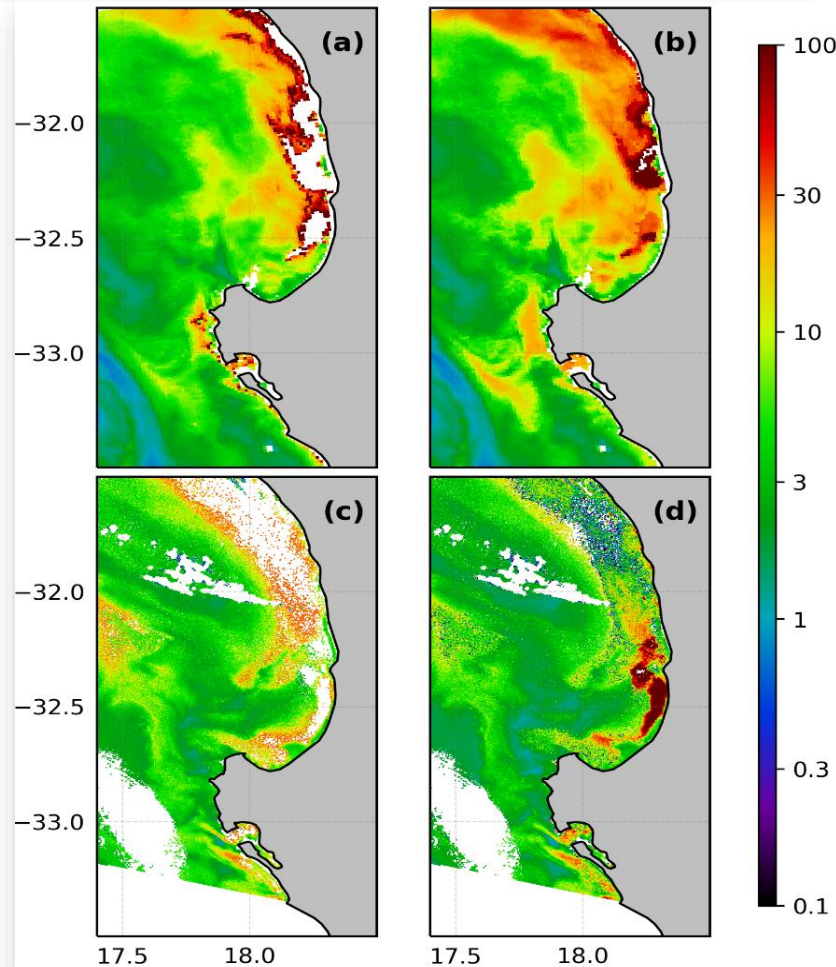
Regional ocean colour products

Standard products
flagged out

New improved
regional products

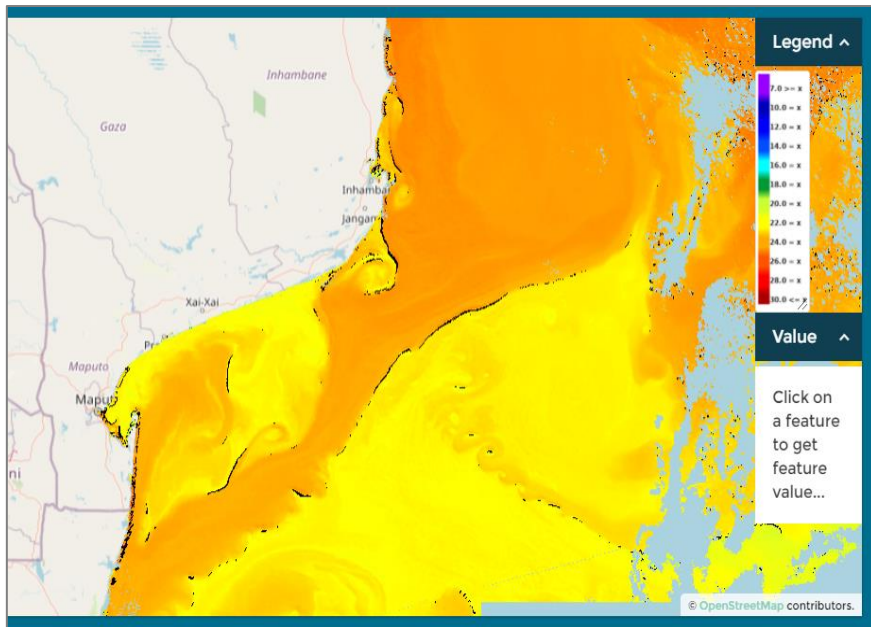
- Chl-a products optimized to cope with high biomass coastal waters

- Phytoplankton type products

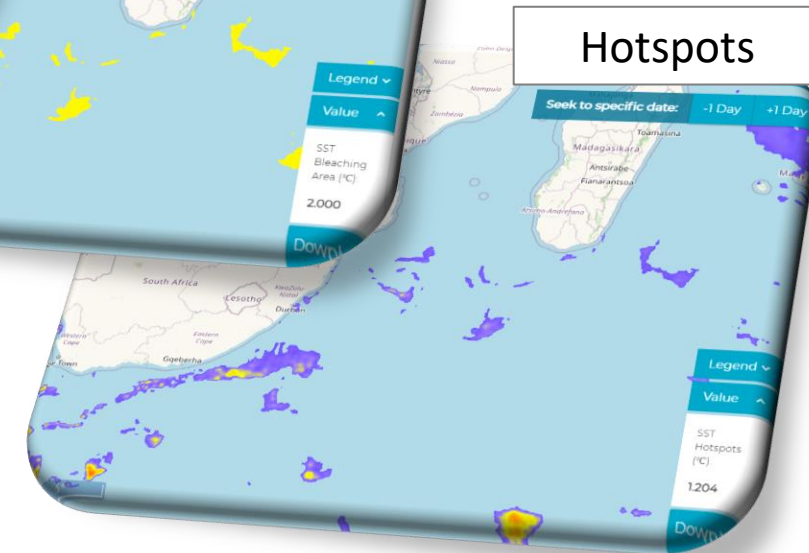
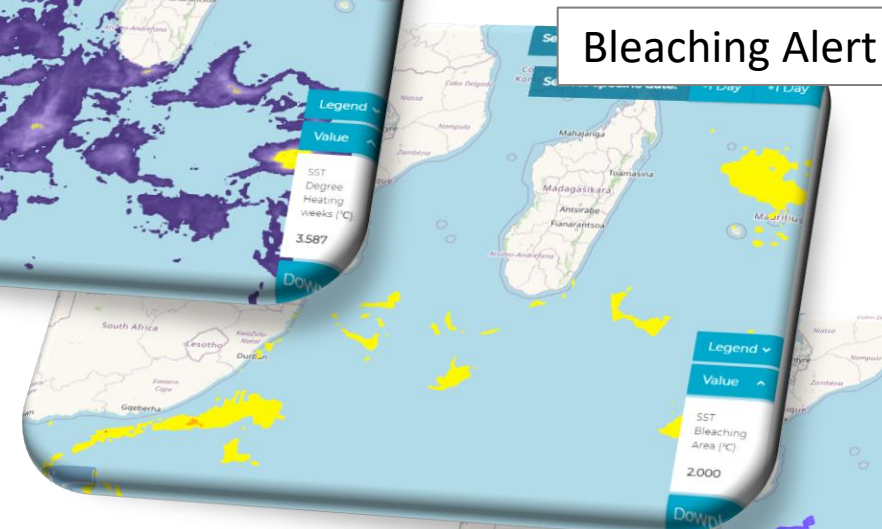
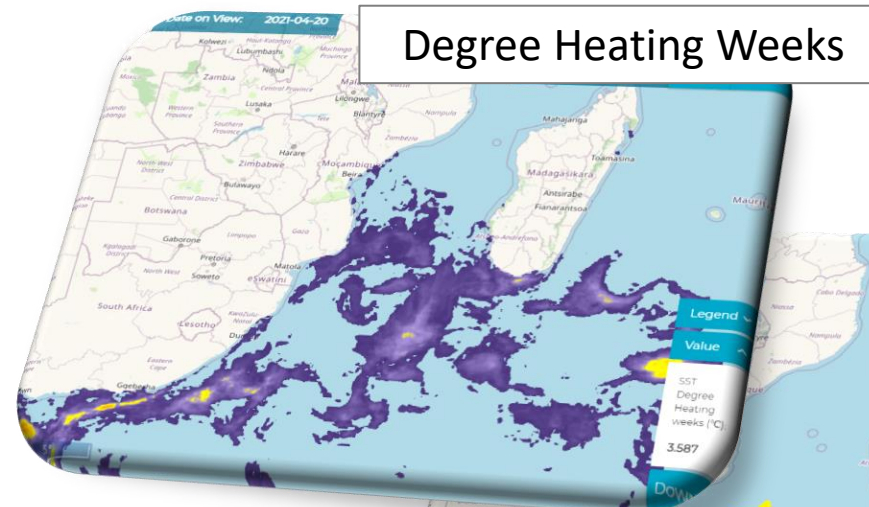


Sea surface temperature products

- Twice daily near-real time temperature with frontal gradients

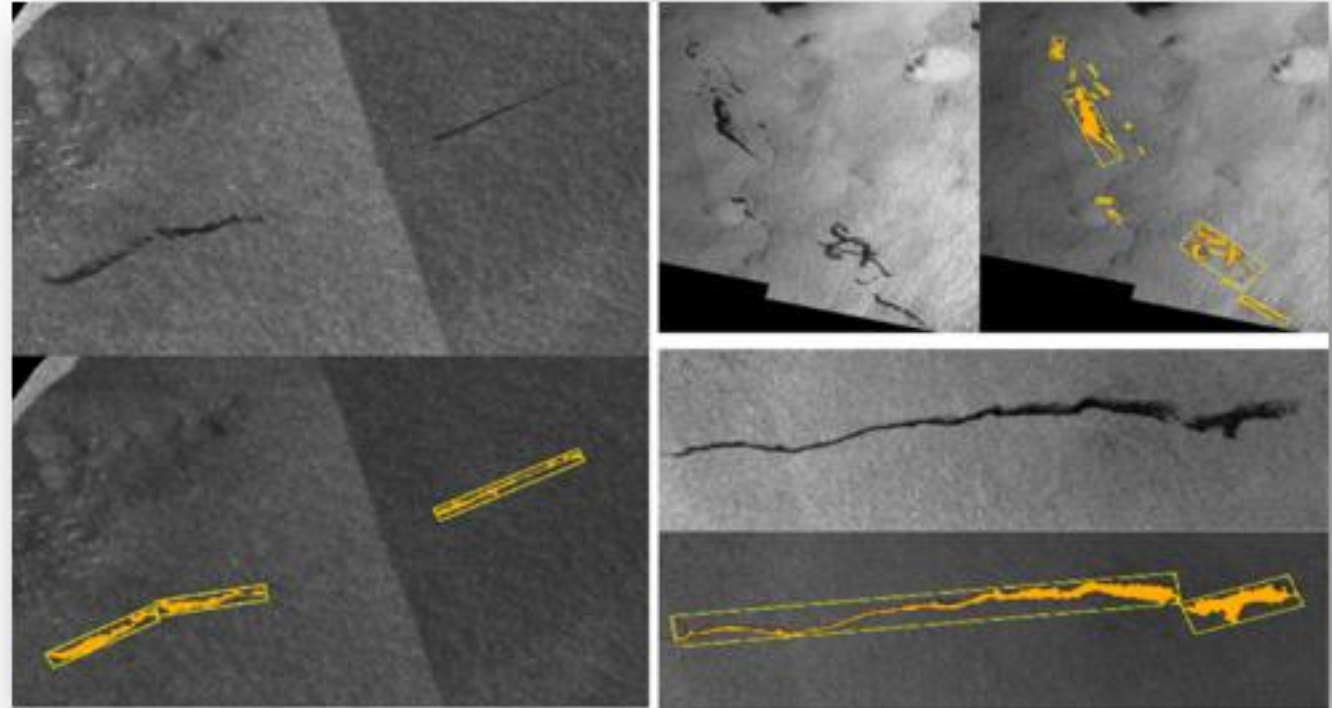
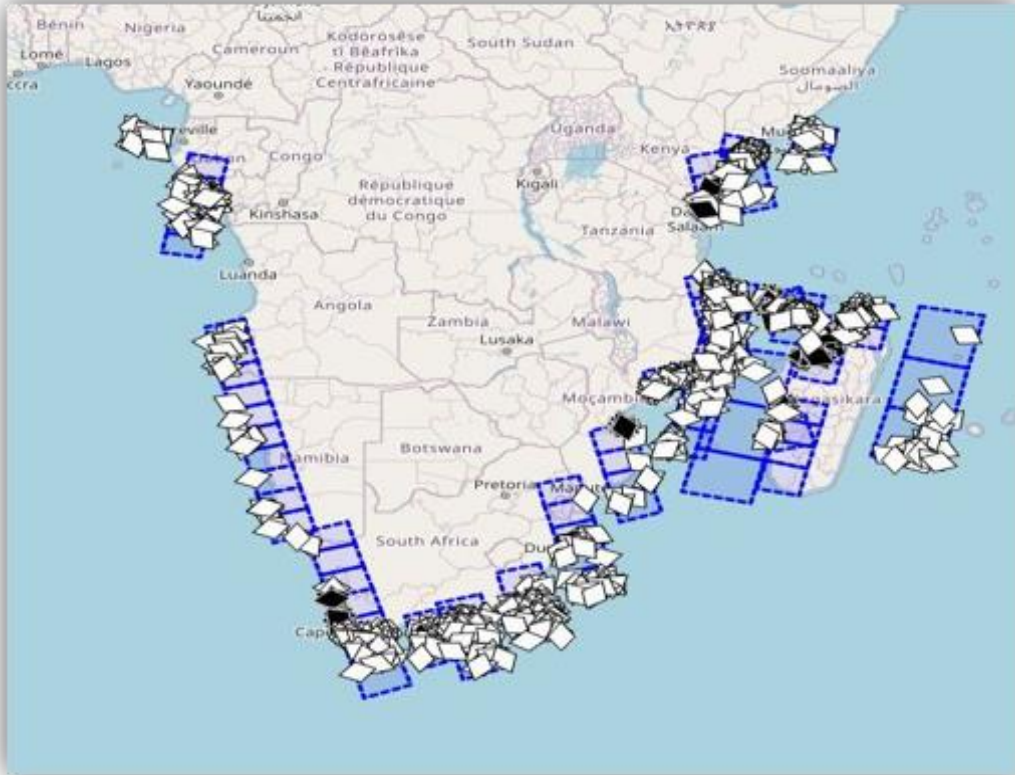


- Thermal stress products



Synthetic Aperture Radar (SAR) products

- When merged with AIS transponder data, SAR is used to detect ships known as “dark targets”
- Automatic detections of oil spill events and Bilge Dump events



National and regional initiatives
supporting fisheries

National Oceans and Coastal Information Management System

Coastal Viewer



Fisheries & Aquaculture Support



Marine Spatial Planning



Coastal Flood Hazard



Water Quality



Marine Predators



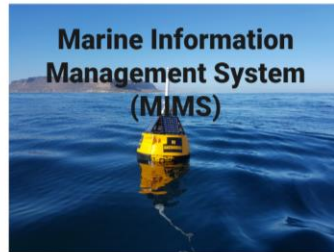
Coastal Operations at Sea



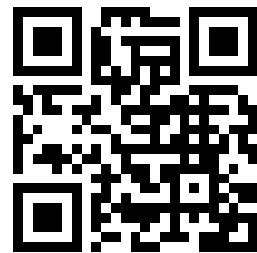
Integrated Vessel Tracking



Marine Information Management System (MIMS)



- OCIMS is a national system built on multiple partnerships in response of Operation Phakisa Initiative 6 : Ocean protection and governance
- The goal is to promote FAIR data access, information sharing & adhere to international best practices
- Decision Support Tools are developed through consultations between developers and stakeholders



National Oceans and Coastal Information Management System

Fisheries-related Information dissemination services

Government advisories

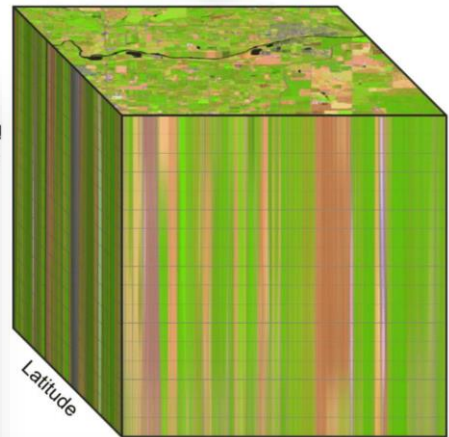
Email HAB bulletins



OCIMS Fisheries and Aquaculture Decision support tool

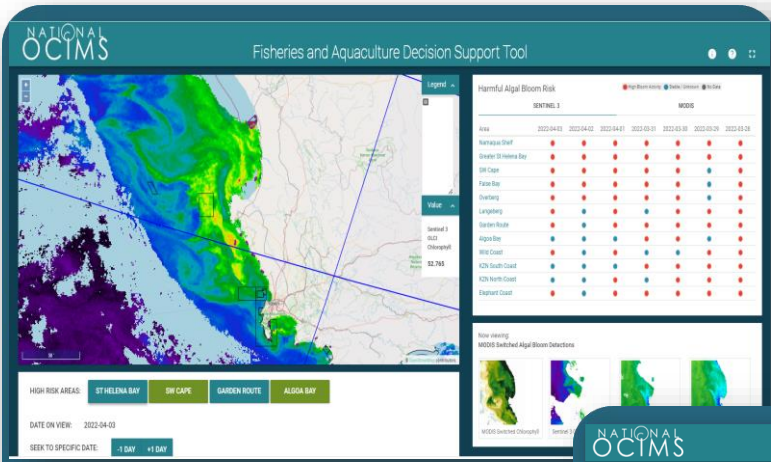
Regional WhatsApp groups

Data cubes



Kopp et al., 2019. CC BY 4.0
<https://doi.org/10.3390/data4030094>

Kopp et al., 2019. CC BY 4.0
<https://doi.org/10.3390/data4030094>



25 March 2021

Over the past week large fish and shellfish aggregations, as well as mortalities have been observed in three different parts of the coast from Elands Bay north of the Olifants River Estuary of Cape Town and to False Bay. The stressed and shrunken animals include sandling, basslets, white shrimp and octopus. Surprisingly, no lobster, sweetfish, wakanda or kibi have been reported whereas in False Bay, the (baasops) have washed up on the shore.

The phytoplankton identified at Elands Bay is not toxic and therefore unlikely responsible for the mortalities there. The washouts and mortalities are more likely a result of the current sea and anoxic near water conditions there which are probably driving fish and shellfish into the warmer, shallower and more oxygenated. Some of these stressed fish become too weak to avoid being stranded or washed up on the beach. This non-toxic confirmation is only for Elands Bay and does not preclude the red-tide to the north including toxic forms of phytoplankton. This, and the possibility that some of the fish and shellfish may be rolling for longer than thought, makes a safer choice to not feed any to family, friends, or pets.

The fish mortalities in False Bay are almost exclusively of the six-eye pufferfish (baasops) with counts of 300 to 400 dead fish per km of shore. There are no reports or side of any adverse water conditions or red-tide toxins that may have caused this.

The Pufferfish carry the deadly neurotoxin (Tetrodotoxin) and should be advised to keep their pets away from them. If one's dog does eat reduced immediately, and a veterinary surgeon consulted.

Satellite composite map, red areas showing the highest phytoplankton and extent of the red tide on the West Coast.

For media enquiries please contact:
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Cell: 082 800 6483
E-mail: enquiry@environment.gov.za

09:40 Retidie Andre, Christo, Grant, Maya, Stephen, S...

From 1km North of hotel brown water, Kreefbaai dark red 10:17

Kreefbaai smelly 10:18

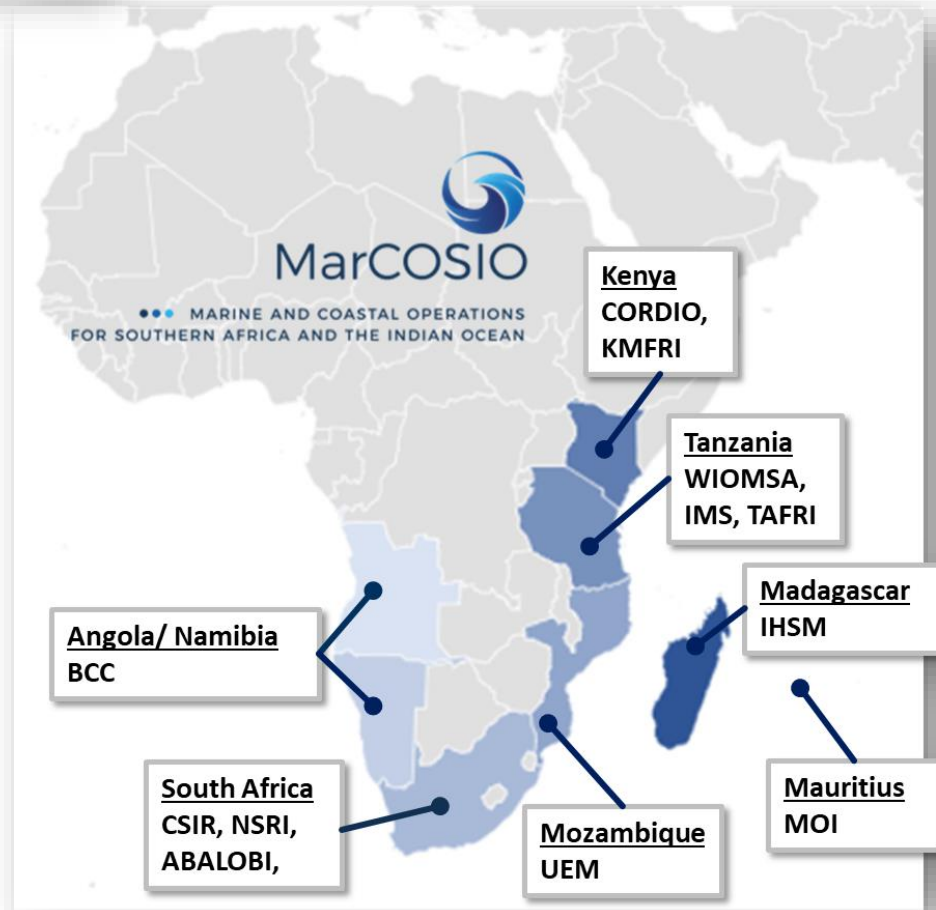
+27 82 771 8910 added +27 82 778 6889

2020-12-31 Chl-a (mg m⁻³)

Today's Chl-a image 13:19

CURRENT SHIPS	COORDINATES	SAR	CAMERA	IMAGES
35378000	YM NAVIGATOR	391CZ	Panama	
63002048	YM PIONEER	DS29D	Libria	
60187500	YOLD (GOLD SALON)	2979S	South Africa	
35134000	YONGSHENG OCEAN	3PL8	Panama	
41370200	YU JAO (TANG)	88PL	China	
41330900	YU GUAN (TANG)	88PC	China	
60139500	ZAMANI 1	2C099	South Africa	
53805042	ZH KIAN ZH KING	V7A2174	Marshall Is	
63002162	ZM PACIFIC	SL209	Libria	

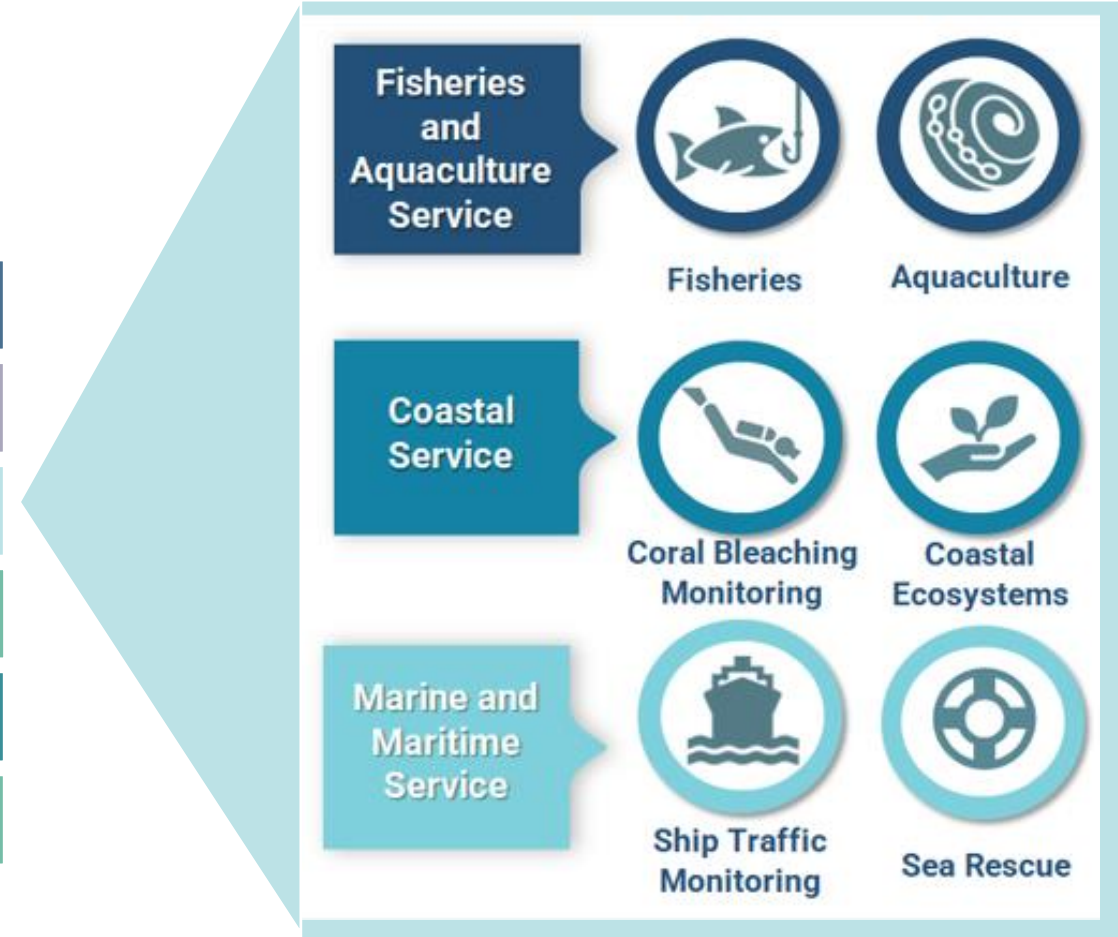
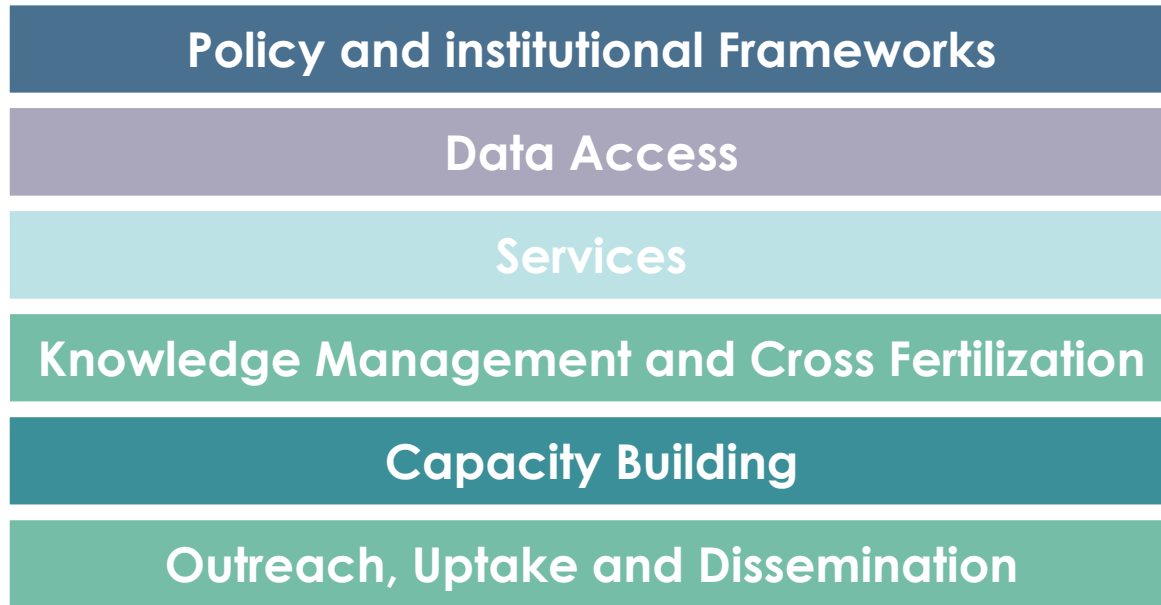
OCIMS Integrated Vessel Tracking Decision support tool



- Previously known as MarCOSouth
- Regional expansion of OCIMS services
- 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

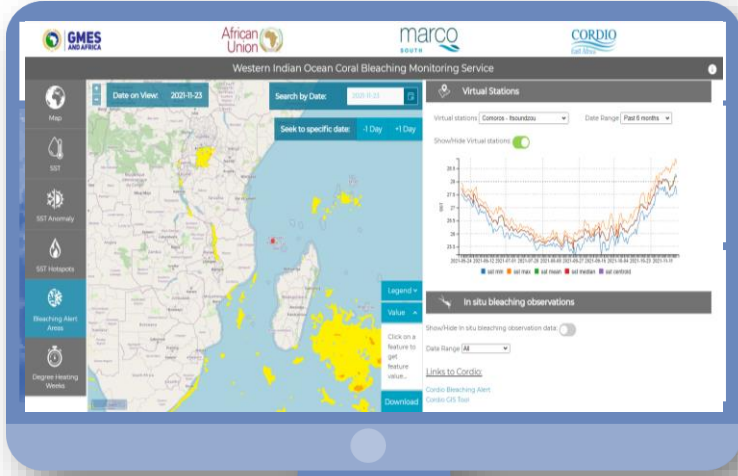


Project pillars



Fisheries-related Information dissemination services

Regional Partner applications

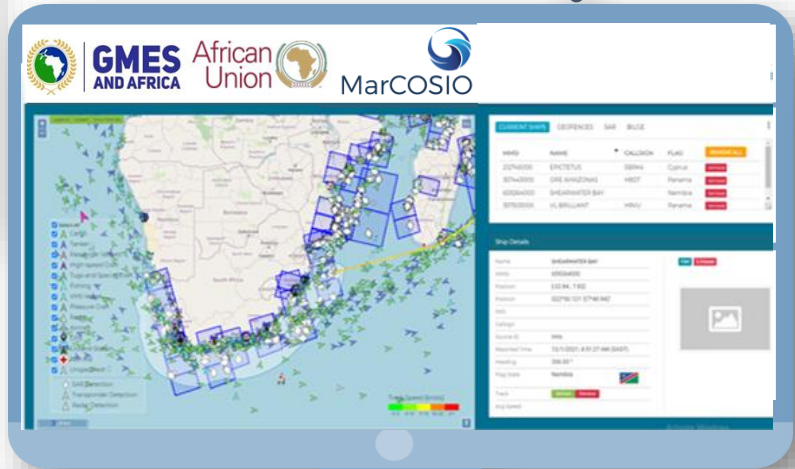


MarCOSIO WIO Coral Bleaching Monitoring Service

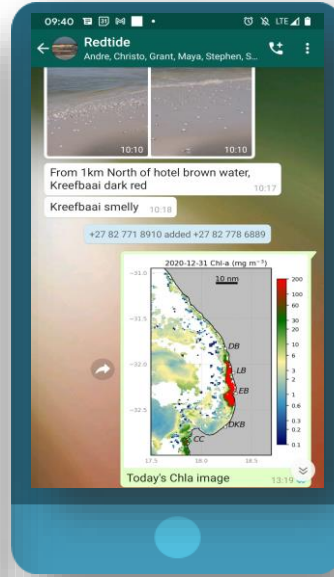
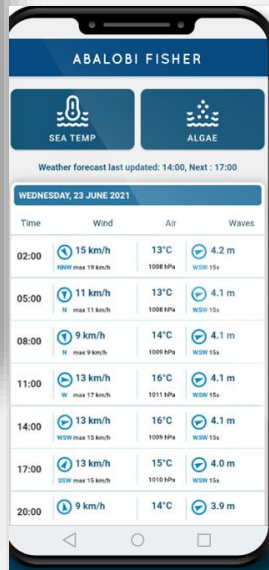
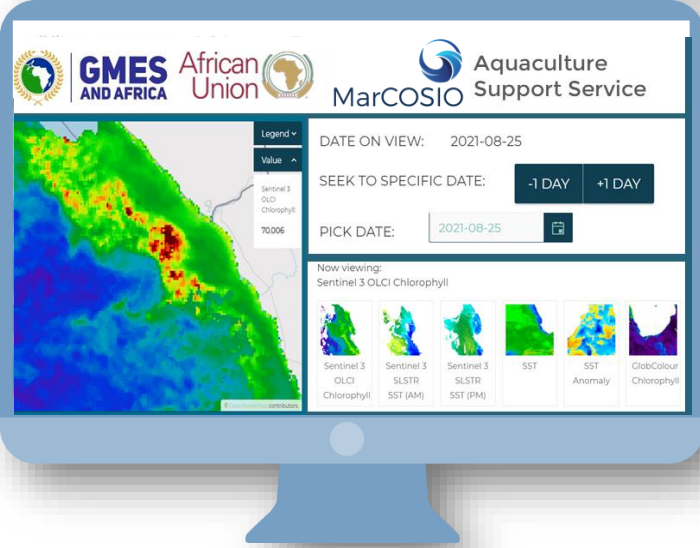
MarCOSIO Ship Traffic Monitoring service

ABALOBI Fisher application

Regional WhatsApp groups



MarCOSIO Aquaculture and Fisheries support Service





The Marine and Coastal Operations for Southern Africa and the Indian Ocean



Connect with us!

- We are in the 1st year of a 4 year implementation and support project
- We have the data and the products, so tell us how we can support YOU in fisheries and aquaculture domains
- Whether its with statistical summaries, case studies, virtual stations, api access for your regional app
- Come chat to me at the MarCOSIO poster in the fisheries booth



Thank You.
Medaase.
Oyiwaladon.

