The National Oceans and Coastal Information Management System

Dr. Marjolaine Krug (DEFF) with contributions from CSIR and SAEON teams
The National Oceans and Coastal Information Management System (OCIMS) provides decision support for the effective governance of South Africa’s oceans and coasts.

www.ocims.gov.za

Science aimed at societal issues and in support of institutional decisions
A National Project built on partnerships
A project with a long-term vision

10-yr strategy approved (2020 – 2030)

2015 – 2020: OCIMS Implementation
- Operational system providing decision support daily to stakeholders.
- 8 DEcision Support Tools (DeSTs) at different stage of maturity.
- DeST developments driven through Technical Advisory Groups (TAGs).

2020 – 2025: OCIMS -Phase 2
- Further develop existing DeSTs.
- Bring to maturity emerging DeSTs (eg. Marine Predator, Water Quality).
- Implement operational ocean models
- Migrate OCIMS from CSIR to DEFF maintained infrastructure.
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<th>Static DeSTs</th>
<th>Dynamic DeSTs</th>
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<td><strong>Marine Spatial Planning:</strong> Inform MSP and the development of Marine Area Plans (MAPs)</td>
<td><strong>Operations at Sea:</strong> Informs on Sea State and supports Search and Rescue</td>
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<td><strong>Coastal Flood Hazard:</strong> Flooding risk for coastal areas at risk of flooding and climate change adaptation</td>
<td><strong>Integrated Vessel Tracking:</strong> Surveillance and Alerts</td>
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<td><strong>Coastal Viewer:</strong> Coastal Public Property (CPP) and Coastal Protection Zone (CPZ) information.</td>
<td><strong>Fisheries and Aquaculture:</strong> Harmful Algal Bloom detection and Alerts, Temperature front highlighting fishing zones.</td>
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<td><strong>Water Quality:</strong> consolidated views of remote-sensed and in-situ data</td>
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<td><strong>Marine Predators:</strong> Track marine predators (i.e. dolphins, whales, sharks, penguins, sea turtles, seals and otters)</td>
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Both tools are GIS – Like with layer displays and basic interactivity for non-experts.

Users cannot edit/manipulate data (controlled environment)

MSP DeST challenges include data agreements and slow updates due to lengthy legal process, and many stakeholders.
Coastal Hazard DeST

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Users can “Drown their town” using a slider.

Bath-tub type model currently. Near future improvements with inclusion of roughness conditions.

**Stakeholders:**
- Coastal Municipalities
- Coastal Provinces
- Town planners
- Disaster managers
- Environmental practitioners
- Developers
High resolution EO observations used to complement in-situ observations.

DeST still in preliminary phase of development. Needs more in-situ data.
DeST still in preliminary phase of development. Currently displaying data from iNaturalist and SEAFARI.

App to capture whale logs from approved operators in development.
Operations at Sea DeST

Tool based on drift model from National Sea Rescue Institute (NSRI) provides direct estimate of search area for sea rescue efforts. Prevents human error calculation, promote rapid response and is used for volunteer training.

Developed in partnership with South African Weather Services (SAWS). Provides access to sea state forecasts of wind & waves. Currently only using GFS global forecasts.

Data agreement with SAWS to be re-instated soon for higher resolution forecast.
Landing page gives you direct access to a product and HAB persistence viewer with choices of products and date selection.

Primary data from Sentinel-3. Data available +- 3H after satellite pass. Historical data through MODIS.
Fisheries & Aquaculture DeST

- 12 coastal regions, first 25km from coast are used in the bloom analytic.
- Pixels with Chl-a > 25 mg/m³ are flagged as potential blooms and enclosed by a polygon.
- If a bloom falls within one of the 12 coastal regions, it is indicated as “present” (red) in the bloom persistence product.
- WhatsApp groups are used for fast information sharing during high risk periods...
- WhatsApp groups are also used for product development and stakeholder engagement...
Integrated Vessel Tracking DeST

- AIS messages are decoded, filtered, inserted into stored in a spatial database and indexed.
- Reliably processing 100 AIS messages per second. Tested up to several thousand messages per second.
- Approximately 3 million unique messages per day go into the database.
- Database is optimized for quick retrieval, retrieving a week of AIS data for a single vessel under 8 seconds.
SAR detection automatically matched to AIS.

Provide means to detect illegal Bilge Dumping / oil spills.

Suspicious activities (eg. Near MPA) alerts provided to Stakeholders through Telegram App.
Future developments: Ocean models

Model developments done through SOMISANA (Sustainable Ocean Modelling Initiative: a South AfricaN Approach to operational ocean and coastal forecasting in South Africa)

Ocean models to provide:

- Hindcasts assembling long term data sets which will provide data for description of past states, and time series showing trends and changes
- Nowcasts providing the most usefully accurate description of the present state of the sea, including living resources
- Forecasts providing continuous forecasts of the future condition of the sea for as far ahead as possible

History of ocean state, trends, changes, scenario testing
Integration into OCIMS DeSTs
Marine Weather tool
Future developments: Ocean models

High resolution EEZ hindcast:
Historical ocean conditions at 3 km, 1980-present.

Algoa Bay as a pilot OOFS
High resolution curvilinear grid (~500 m in Algoa Bay)

FY 20/21
High resolution EEZ hindcast

FY 21/22
Benchmarking, evaluations operational QA/QC

FY 22/23
Limited domain OOFS*

FY 23/24
Full EEZ OOFS*
Future developments

Coming out soon operationally:

• Location of the Agulhas Current's Core and Edges (LACCE) (Russo et al., in Review)
• Eddy tracking
• Volume transport monitoring
• Marine Heat Waves
THANK YOU!

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