GMES AND AFRICA

African Union

UNIVERSITY OF GHANA

Hernessing Earth Observation for Effective Oil Spill Monitoring in Egypt

BACKGROUND:

Oil spills pose significant environmental and economic risks to marine ecosystems and coastal livelihoods. The MarCNoWA Project, under the GMES and Africa Programme, developed an Oil Spill Mapping Service to support the Egyptian Environmental Affairs Agency (EEAA). This service utilizes satellite-based Earth Observation (EO) data to identify oil spills and track their spread within the Exclusive Economic Zone (EEZ) and across the broader West and North African coastal regions. This initiative is implemented by the University of Ghana in collaboration with key partners, including Chouaib Doukkali University (UCD), the Centre d'Études et de Recherche des Télécommunications (CERT), and the Centre for Environment and Development for the Arab Region and Europe (CEDARE).

MarCNoWA

جامعة شعيب الدكالي
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Curat

CEDARE

CERT

Edenway Foundation

END-USER PROFILE:

The **Egyptian Environmental Affairs Agency** (EEAA) is the main governmental body responsible for environmental protection and sustainable development in Egypt. It works to implement national policies, monitor environmental conditions, enforce regulations, and promote awareness to address issues such as pollution, biodiversity conservation, and climate change. The EEAA (http://www.eeaa.gov.eg/) collaborates with local and international organizations to ensure sustainable use of natural resources and environmental safety.

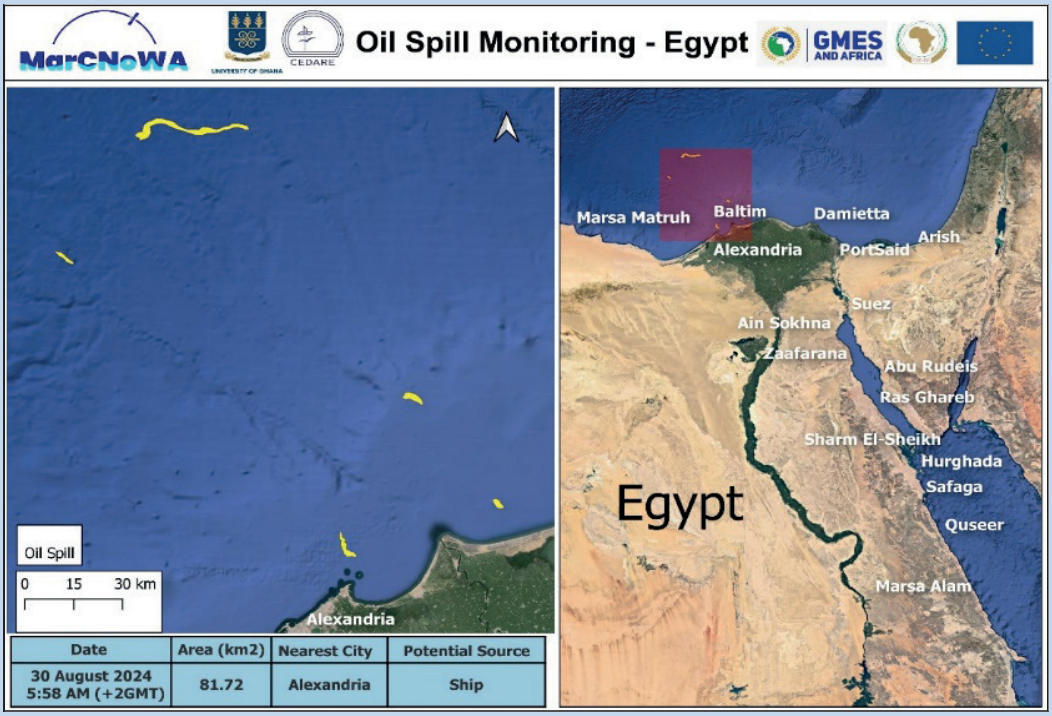
END-USER NEEDS:

CEDARE has engaged the Egyptian Environmental Affairs Agency (EEAA) through multiple stakeholder meetings and workshops. These meetings identified the need for additional information to enhance the monitoring of Egyptian waters. These stakeholder consultations led to the design of an oil spill monitoring solution tailored to EEAA's needs, offering comprehensive coverage of affected waters. The solution provides critical information, including the extent of spills, cities at risk, and potential sources of leaks, enabling more effective environmental response and management.

INFORMATION PROVIDED:

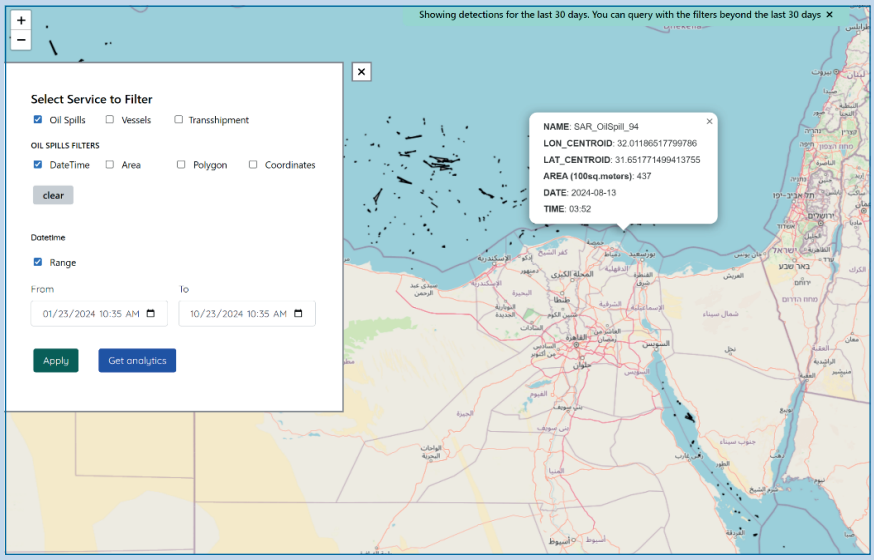
The Oil Spill Mapping Service utilizes satellite imagery from the Sentinel-1 mission of the Copernicus Programme. Processed satellite data are used to generate oil spill occurrence maps. The detections show the location, spatial extent and date of detection to help the users assess the risk posed by the potential slick. The service also provides tools for querying an oil spill detection database over a date range for different areas.

An analytical tool (https://oil-vessel-detection.vercel.app/) allows users to generate time series and other descriptive statistics of spills in a region of interest. The maps and reports are provided in both raster formats (PNG, SVG) and tabular data (CSV).



USAGE:

Demonstrations of the service portals have played a key role, enabling stakeholders to navigate the system with confidence. These demonstrations have provided practical guidance on accessing the Oil spill detection database, generating analytical outputs, and interpreting the maps and statistics produced by the service.



Special emphasis has been placed on understanding the interpretation of products, such as oil spill extent maps and time-series analyses, ensuring that users can extract actionable insights. As a result, technical staff can now use the information to assess risks, identify areas of concern, and plan appropriate responses to oil spill incidents.

To support long-term adoption and proficiency, a detailed service user manual has been made available. This manual serves as a quick reference guide, offering step-by-step instructions for using the portal and interpreting its outputs. It also acts as a refresher tool for users to revisit key concepts and workflows, ensuring sustained capacity and efficient utilization of the service over time.

IMPACT:

The introduction of the Oil Spill Mapping Service has significantly improved Egypt's capability to respond to oil spills, reducing the average response time from 72 hours to 24 hours since its launch. Stakeholder collaborations with the EEAA has resulted in more coordinated responses, minimising environmental damage and economic loss from oil pollution incidents. Between September 2022 and June 2024, the consortium generated oil spill maps covering 2,906 km² of Egypt's coastal waters. These maps provided details such as date, location, spatial coverage, nearest cities, and potential sources. This information serves as essential tools for the EEAA, supporting their daily operations in monitoring coastal waters and guiding critical decision-making. Key coastal areas at risk include Safaga, Sharm El-Sheikh, Alexandria, and Suez. Most spills detected in Egyptian waters are linked to leaks from ships and offshore oil production platforms. The detailed mapping and data supplied by GMES and Africa are vital for incident response, impact mitigation, and the development of long-term environmental strategies. The service has enabled the proactive monitoring of offshore activities, preventing illegal dumping and supporting compliance with national and international maritime regulations.

OUTREACH:

To maximise the reach and effectiveness of the Oil Spill Mapping Service, periodic webinars are organised to engage stakeholders in the use of monitoring tools and to broadcast oil spill alerts and warnings. Environmental managers and maritime stakeholders play a key role as conduits for disseminating spill information across beneficiary countries, ensuring swift and effective communication. Social media platforms, such as WhatsApp, Facebook, and Twitter, are actively utilised to distribute updates and collect real-time feedback. Public awareness campaigns, conducted in partnership with NGOs, educate coastal communities on the environmental risks of oil spills and highlight the importance of reporting suspicious slicks. Engagements with fishing cooperatives and industry stakeholders further promote the adoption of best practices, supporting sustainable marine resource management and enhancing the effectiveness of oil spill response efforts.