

Other EO data sets

EO4SD-Marine

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Overview

1. Sources of data for marine and coastal ecology studies

- Sea surface temperature
- Chlorophyll-a
- High resolution optical data
- Synthetic aperture radar (SAR)

2. ESA EO4SD*-Marine Services

- European Space Agency project to support development projects funded by the World Bank and others

*Earth Observation for Sustainable Development

Sea surface temperature

Indicator of marine climate variability and change

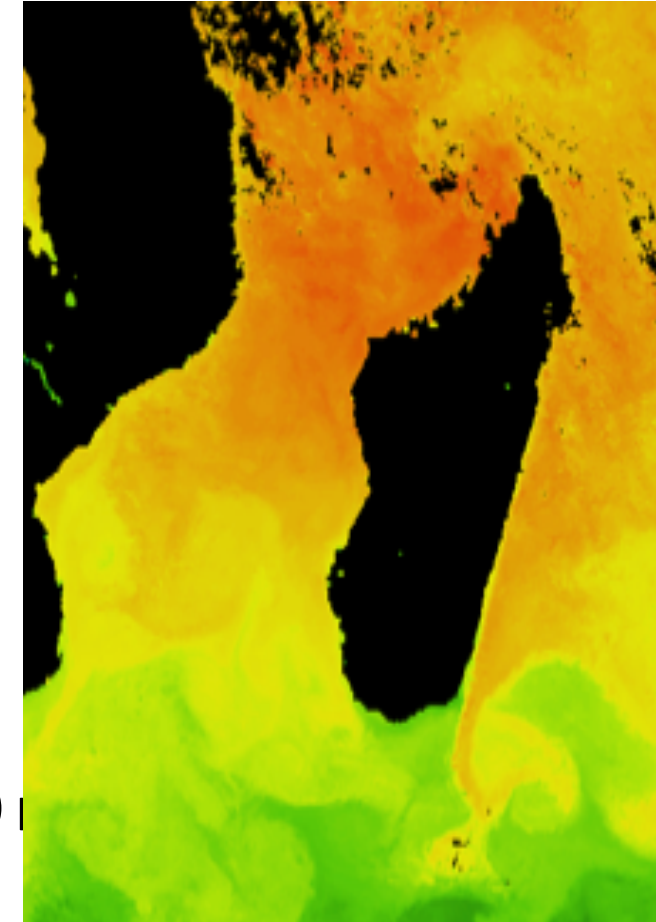
- Coral bleaching risk index based on SST

Indicator of upwelling of cooler, nutrient-rich water

- Used with sea surface height (SSH) data to study ocean dynamics
- Used with chlorophyll-a in studies of marine productivity

Data sources:

- OSTIA SST and ESA CCI (5km) data are good for climate studies:
 - <http://marine.copernicus.eu/services-portfolio/access-to-products/>
 - Registered users can search for data and subset to download their region
- For studies of fronts, upwelling or eddies chose MODIS or MUR SST:
 - <https://oceancolor.gsfc.nasa.gov/l3/> (4km resolution)
 - https://podaac.jpl.nasa.gov/Multi-scale_Ultra-high_Resolution_MUR-SST (1km)
- GMES and Africa – talk to John Bemiasa who represents Madagascar



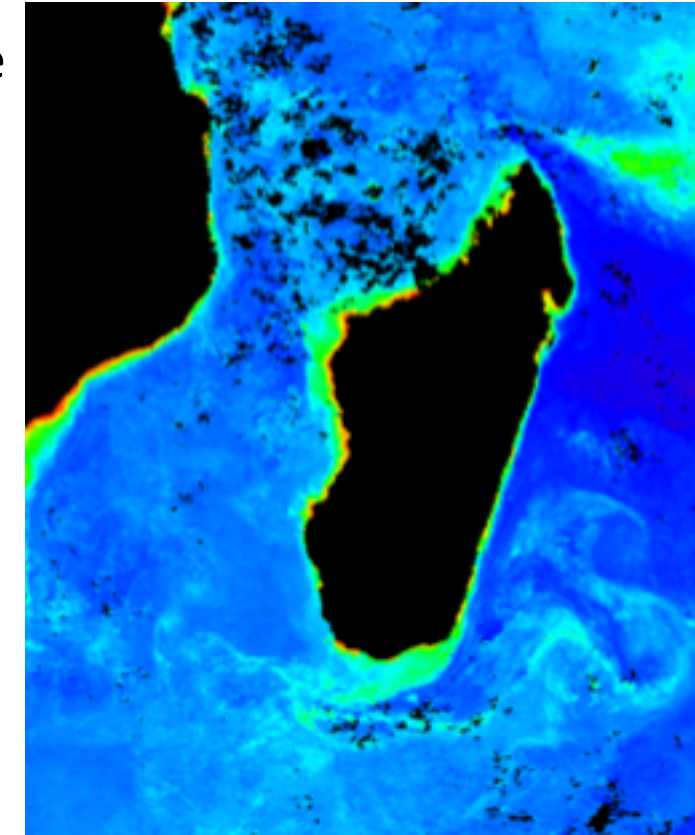
Chlorophyll-a

Indicator for primary productivity = > productivity of fisheries

- Often used with SST to identify ocean fronts or upwelling areas where fish and other marine animals gather to feed
- Interannual variability of chlorophyll may be linked to fisheries recruitment, particularly to small pelagic fishes I- sardines, anchovies

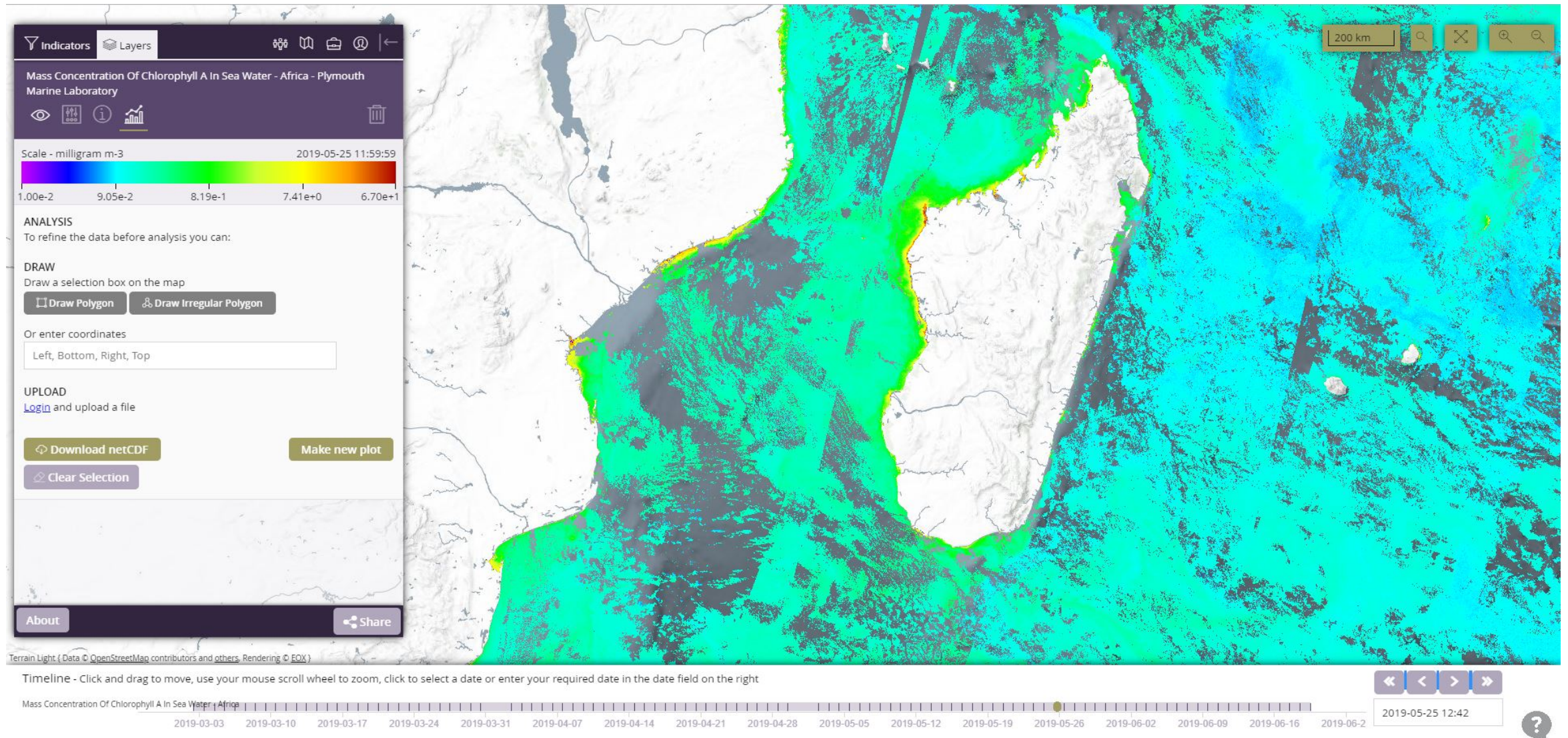
Data sources:

- ESA Ocean Colour CCI (4km) multi-sensor climate quality 1997-2019
Good for studies interannual and seasonal variability
<http://marine.copernicus.eu/services-portfolio/access-to-products/>
Registered users can search for data and subset to download their region
- MODIS-Aqua (4 km) <https://oceancolor.gsfc.nasa.gov/l3/>
- SOLSTICE data set for WIO (1km) – email me (val.byfield@noc.ac.uk)



Monthly chlorophyll Feb'19

300m Chlorophyll-a data from EO4SD-marine <https://eo4sd.eofrom.space/>



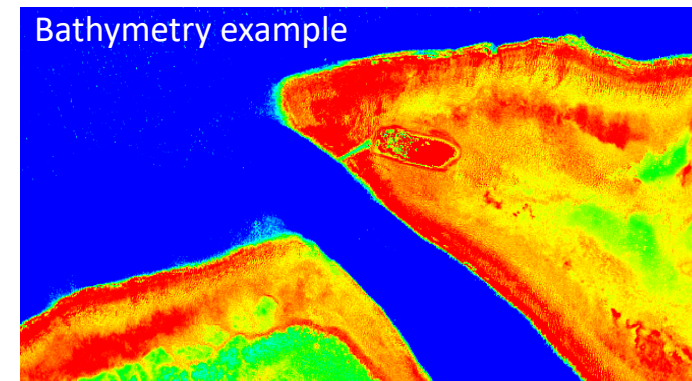
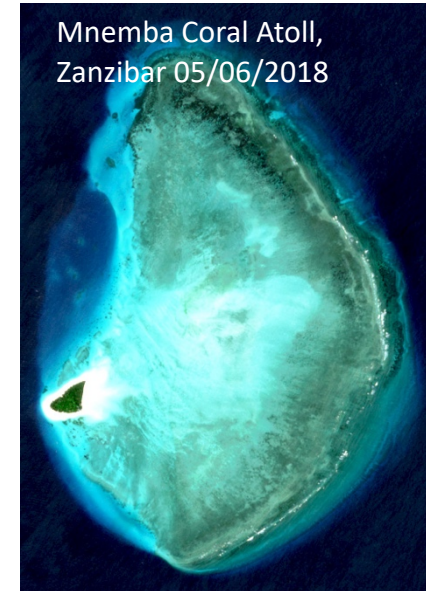
High resolution optical data

Applications:

- Vegetation indices and land use mapping
- Coastal habitat mapping
- Shoreline change
- Shallow water bathymetry
 - To about 10m in clear water
- Broad classification of benthic habitats

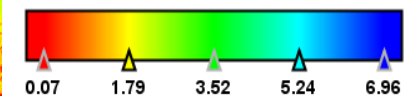
Data sources:

- Landsat (30m)
<https://earthexplorer.usgs.gov>
- Sentinel-2 (10m)
<https://scihub.copernicus.eu>



Bathymetry map of Heron and Wistari reefs, Australia, produced from Sentinel-2 imagery using Shallow Water Analytical Model (SWAM)

What is the scale of this scale? Depth in metres?



Synthetic Aperture Radar (SAR)

Penetrates cloud

Sees only the surface roughness

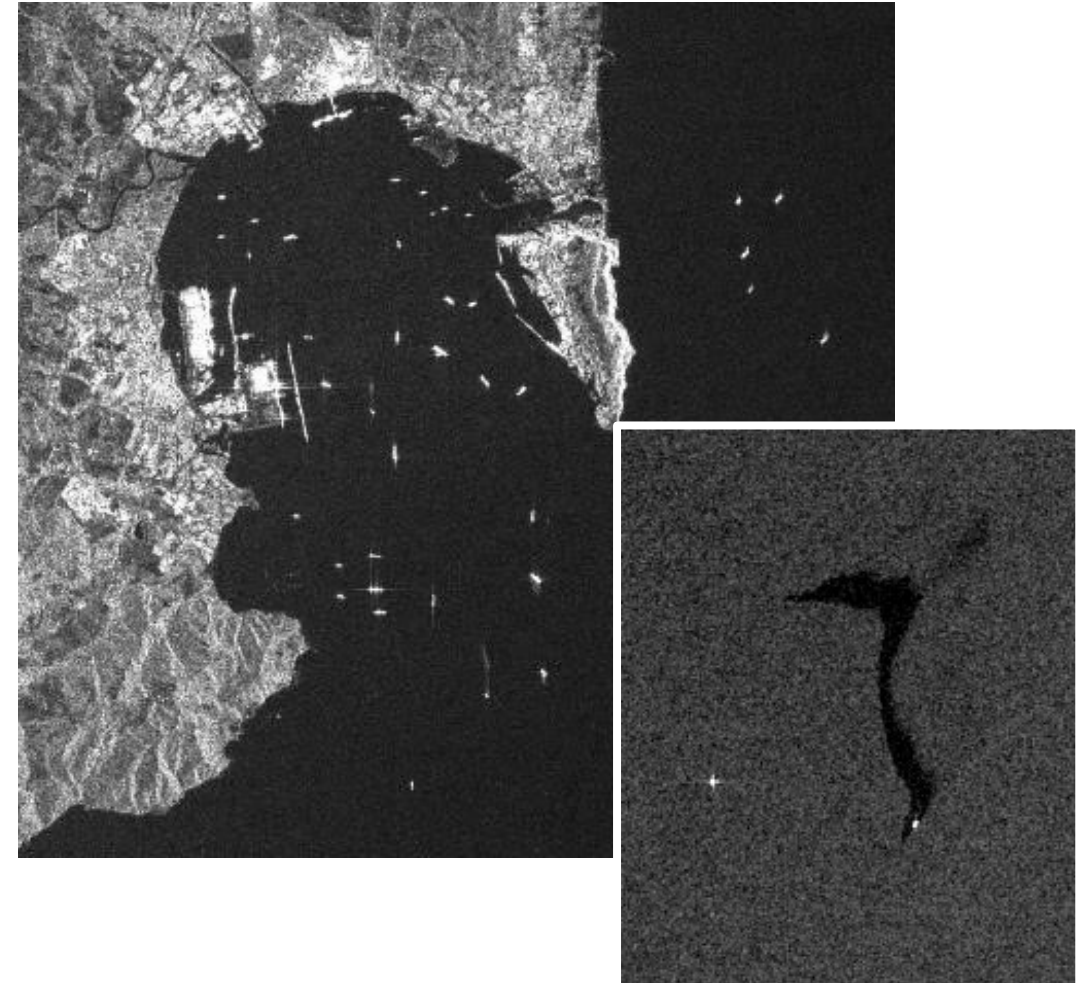
but can infer information about the water column

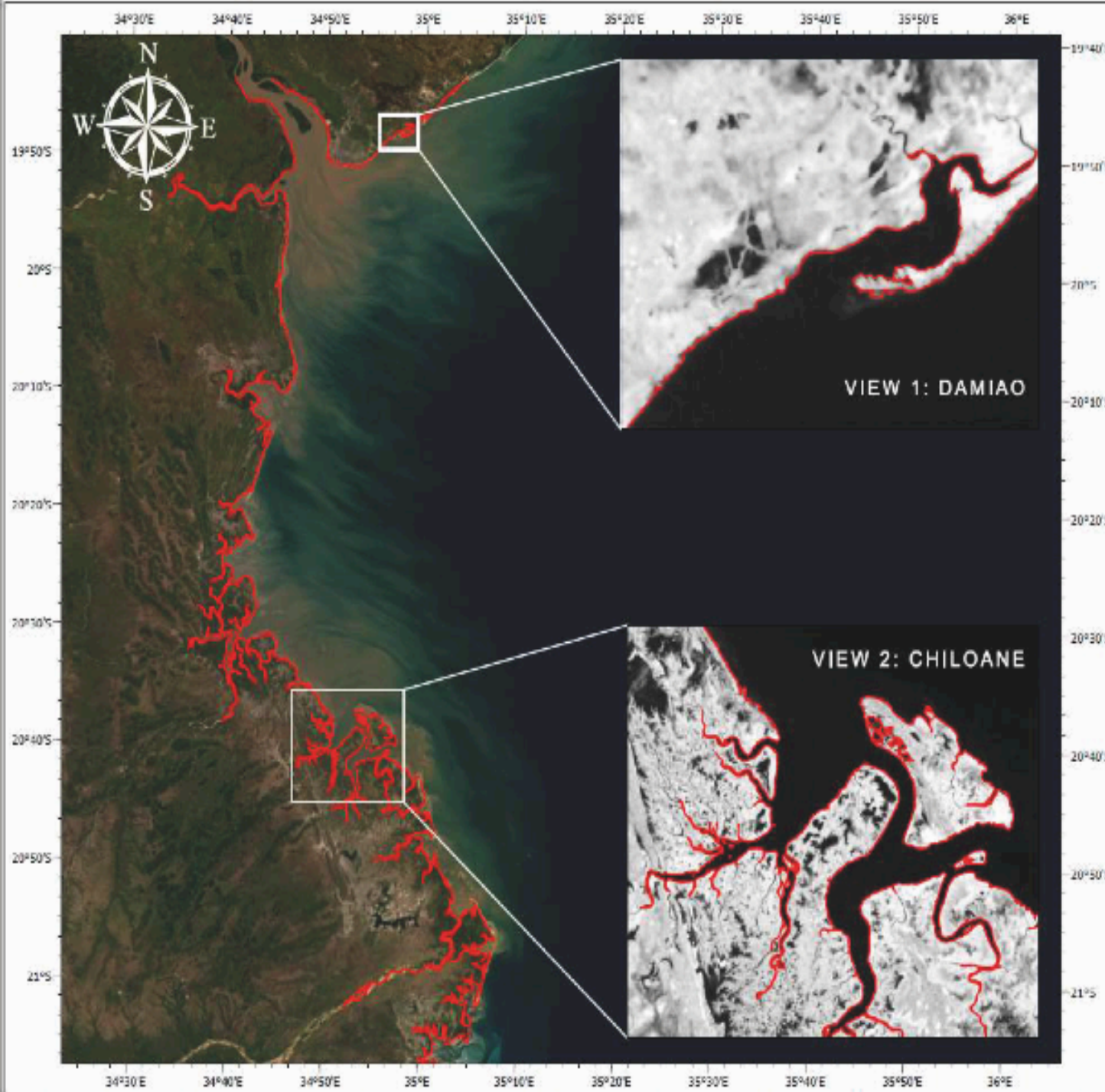
Some applications:

- Shoreline change detection
- High resolution currents near land
- Oil spill detection
- Ship detection
- Used with high resolution optical data for mapping vegetation and land use change

Data access:

- Copernicus open access hub
<https://scihub.copernicus.eu>





Shoreline Detection from
Sentinel 1 (SAR) - 2019
Beria, Mozambique



Spatial Reference
Name: Tete UTM Zone 36S

Description:
Shore detection derived from
Sentinel-1 SAR imagery for a single
tile. A median image was used,
consisting of 31 SAR images from
2019, to define the coastline.

— SAR-derived coastline

Shoreline detection with
high resolution optical and
SAR data
EO4SD-marine example
from Mozambique

→ Aim:

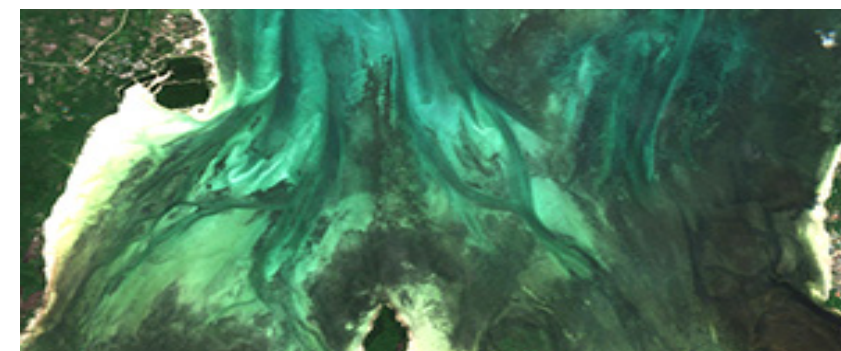
A step change in uptake of EO-derived information used for development initiatives supported by the World Bank and other International Financing Institutions (IFIs).

→ How?

- Work with stakeholders in IFIs and their Client States to define and implement a large-scale demonstration of how EO-derived information can support sustainable development

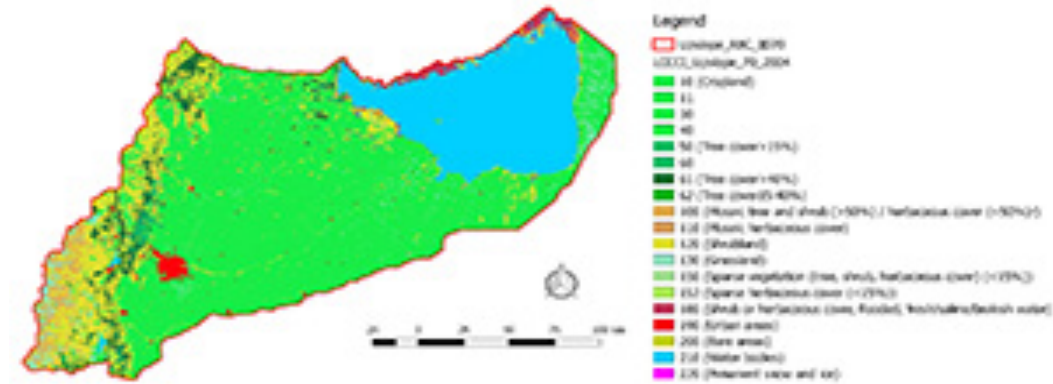
→ 8 service 'clusters' so far

- More information at <http://eo4sd.esa.int>
- Consultations on project requirements ongoing



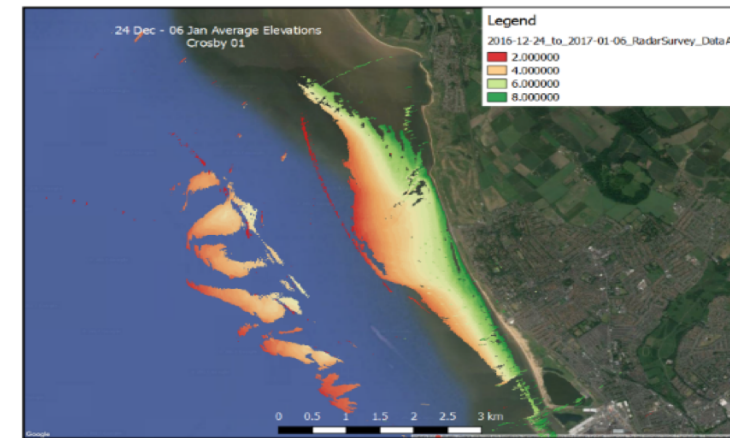
→ Cartography and mapping services

- Land use in river watersheds
- Shoreline change
- Shallow water bathymetry



→ Coastal environment services

- Water quality
- Benthic habitat status (corals, macro-algae, sea grass..)
- Coastal habitat status (mangrove, coastal forests, dunes...)
- Support for Marine Protected Area planning / management



→ Near real-time monitoring

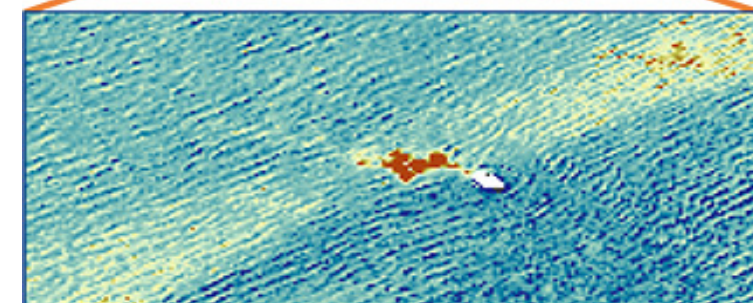
- Sargassum blooms
- Fisheries surveillance
- Oil spills
- Aggregate extraction, dredging operations



→ Support for blue economy development

Advice on selection and use of EO-derived data products

- Aquaculture site selection
- Blue Economy planning - tourism, energy, transportation
- Marine Spatial Planning
- Environmental Impact Assessment



→ Training for different user groups

- Applying the data products to decision support
- Technical upskilling for future providers of EO-derived information products and advice to users in each region



→ Building on existing regional and local initiatives

- Collaborate to draw on local expertise and skills
- Avoid duplication of effort
- Allow for hand-over to regional delivery centres after EO4SD Phase II



EO4SD-marine is planning to support SWIOFISH

Initial discussions:

- Teleconference with the World Bank lead for SWIOFISH
- Initial teleconferences with World Bank country representatives for Madagascar and Mozambique
 - Discussion with Madagascar focused on mangroves
- May also be able to support other WB projects in Madagascar (marine/coastal)

<http://eo4sd-marine.eu/>

