

OPEN DATA & OPEN KNOWLEDGE Workshop

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Digital Earth
AFRICA



Digital Earth Africa



Powered by partnerships, Digital Earth Africa provides a public infrastructure and accessible analytics to **unlock the value of Earth observations.**

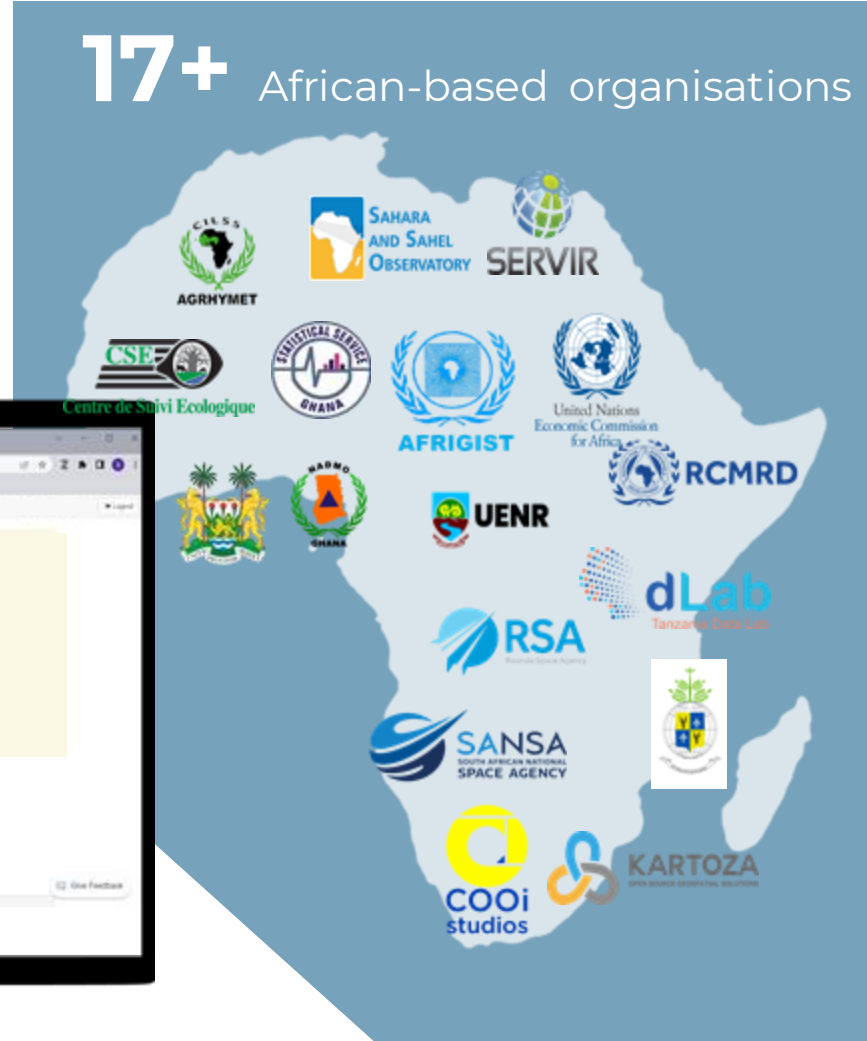
Empowering countries across Africa with Earth observation data to enable climate adaptation and mitigation, greater food security and more sustainable development.



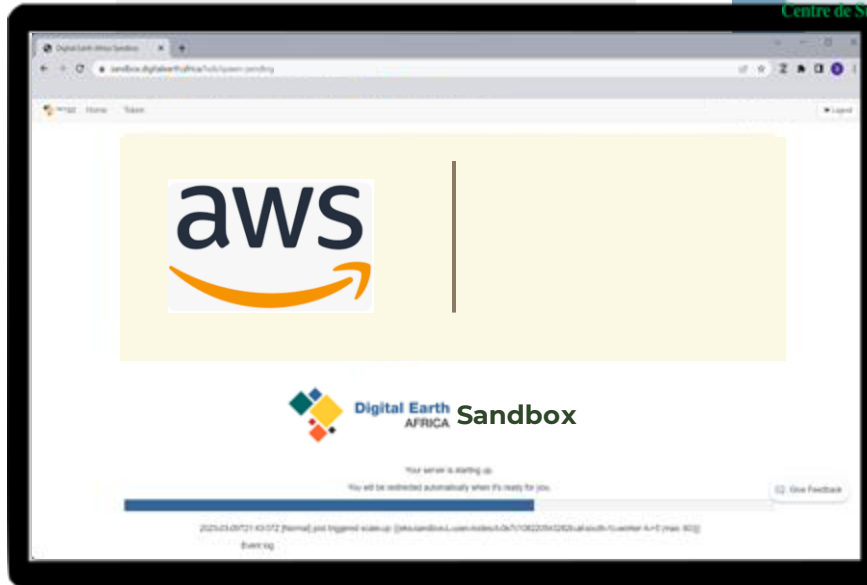
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Digital Earth Africa

17+ African-based organisations

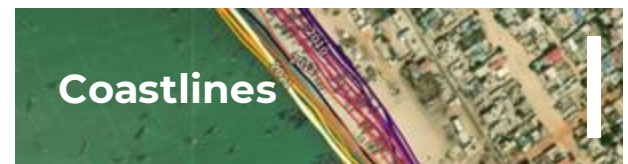
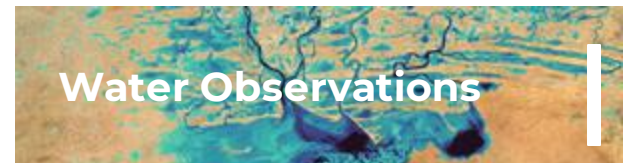


3.5PB



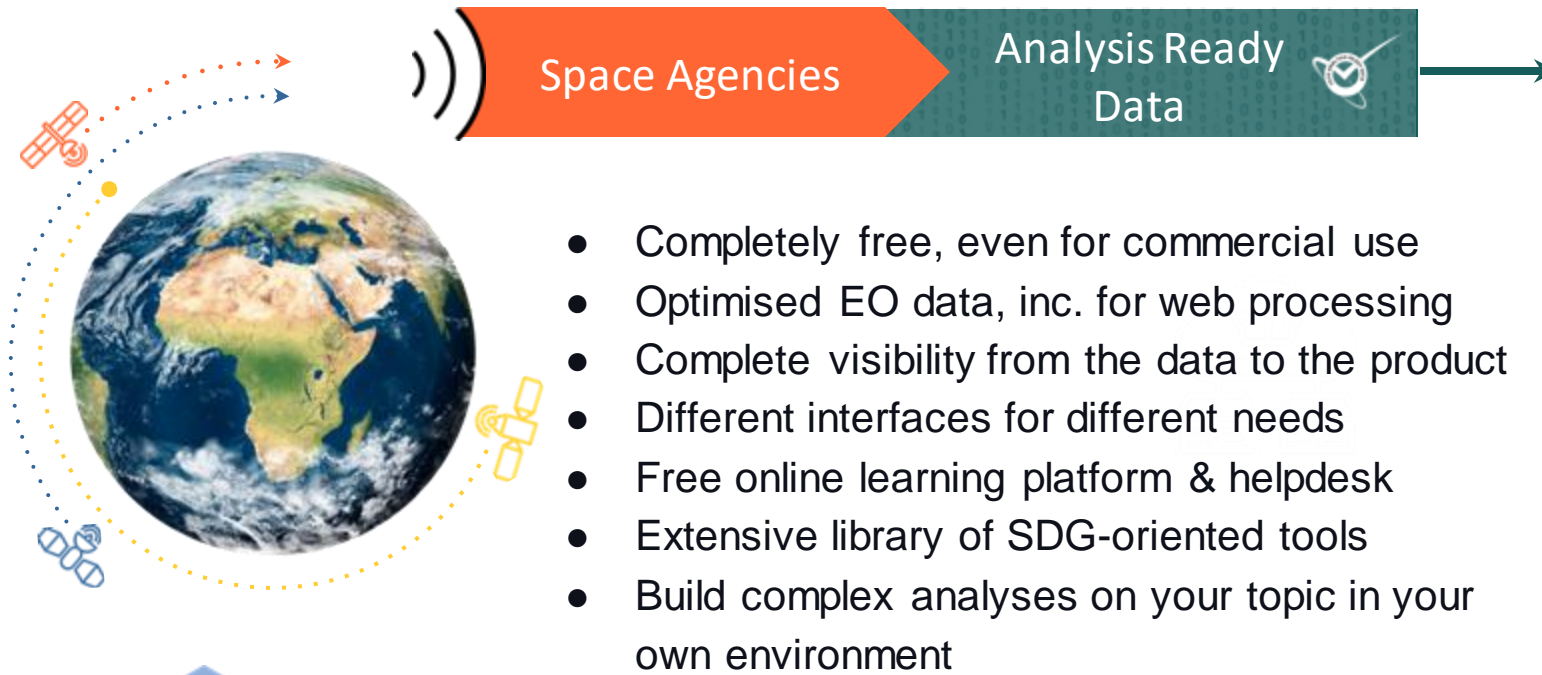
6

Continental Services



34+ technical, strategic and delivery partnerships

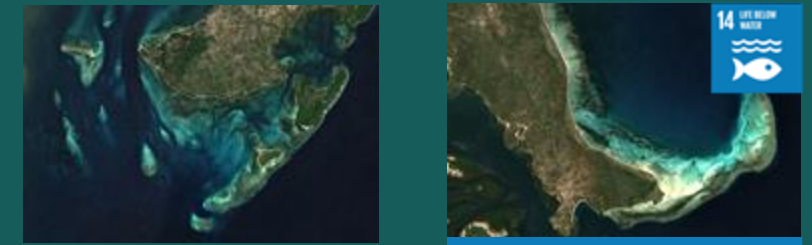
Satellite data available through Digital Earth Africa



- Completely free, even for commercial use
- Optimised EO data, inc. for web processing
- Complete visibility from the data to the product
- Different interfaces for different needs
- Free online learning platform & helpdesk
- Extensive library of SDG-oriented tools
- Build complex analyses on your topic in your own environment



Find out more technical detail in [Digital Earth Africa Docs](#)



Studying the Tanzanian Coastline with GeoMAD, 2019, RGB



Monitoring crops in Egypt 2001-2020, Landsat, RGB



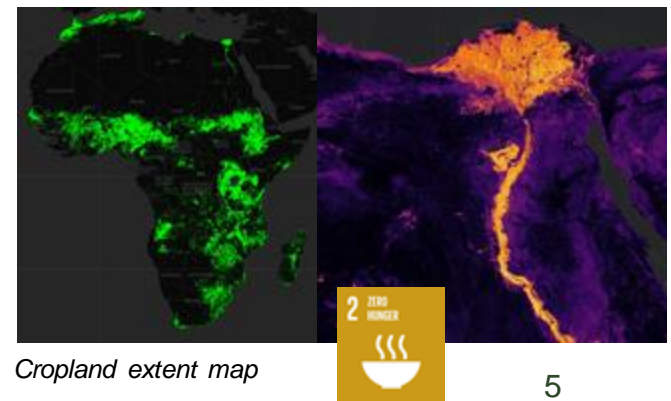
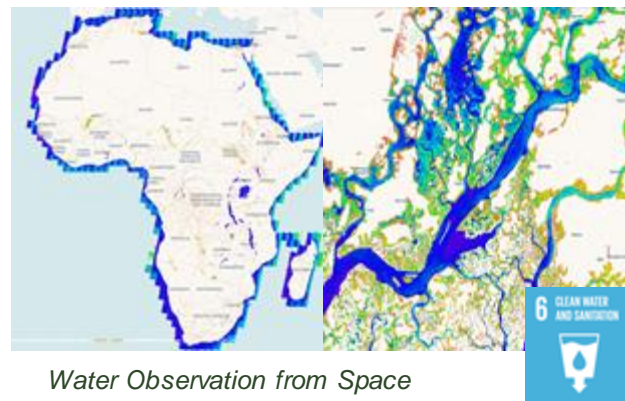
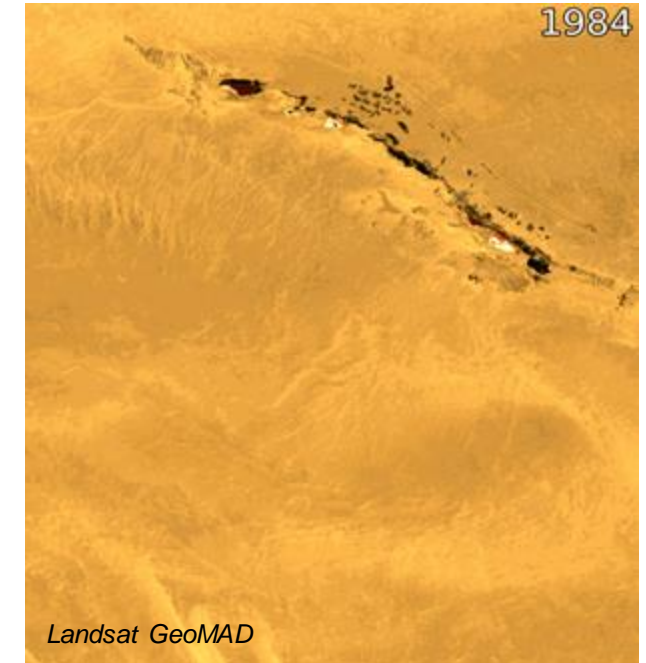
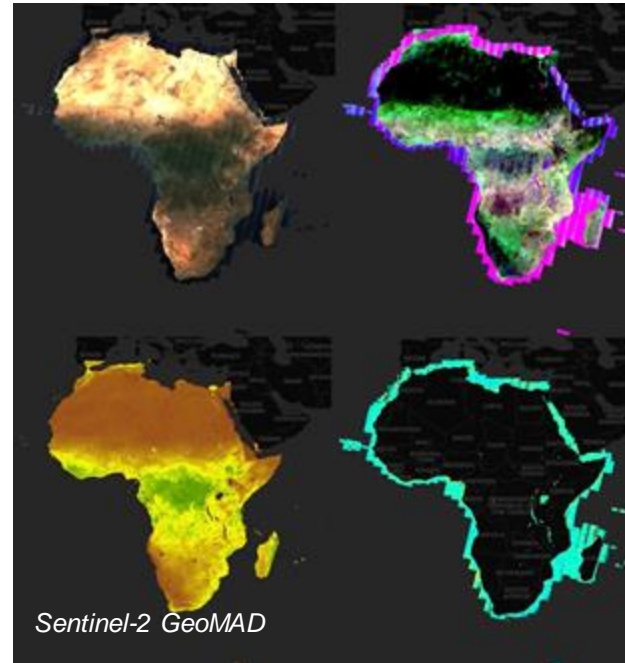
Monitoring Mount Nyiragongo, 2018 Sentinel-2 RGB and 2021 Sentinel-1



Measuring water extent on rangelands in Etosha National Park, Namibia 1992-2021, Landsat, False Colour

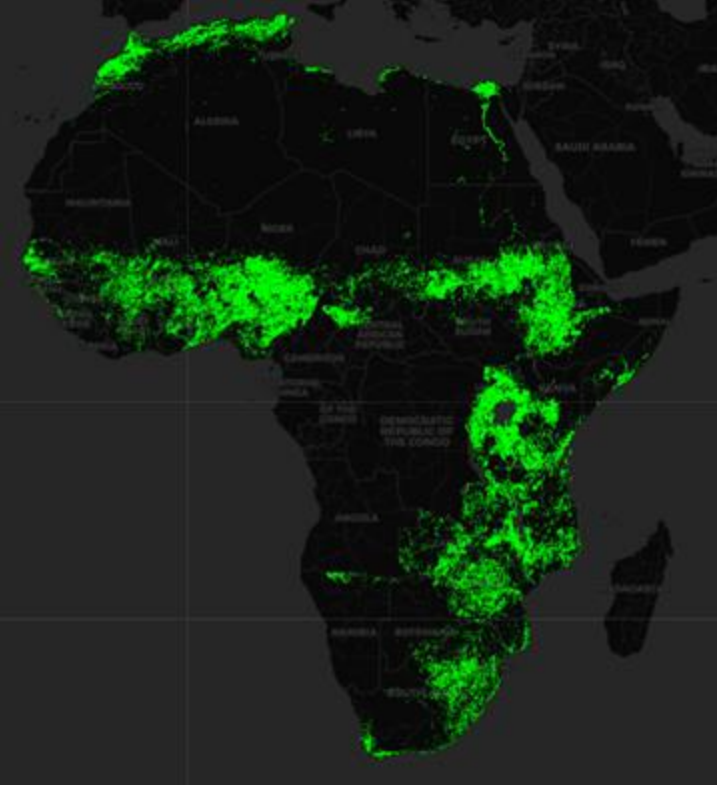
DE Africa Services and Tools

- 3.1PB data in Cape Town
- Multiple continental scale operational services
- Extensive library of SDG-oriented tools
- Product co-design with Africa partners

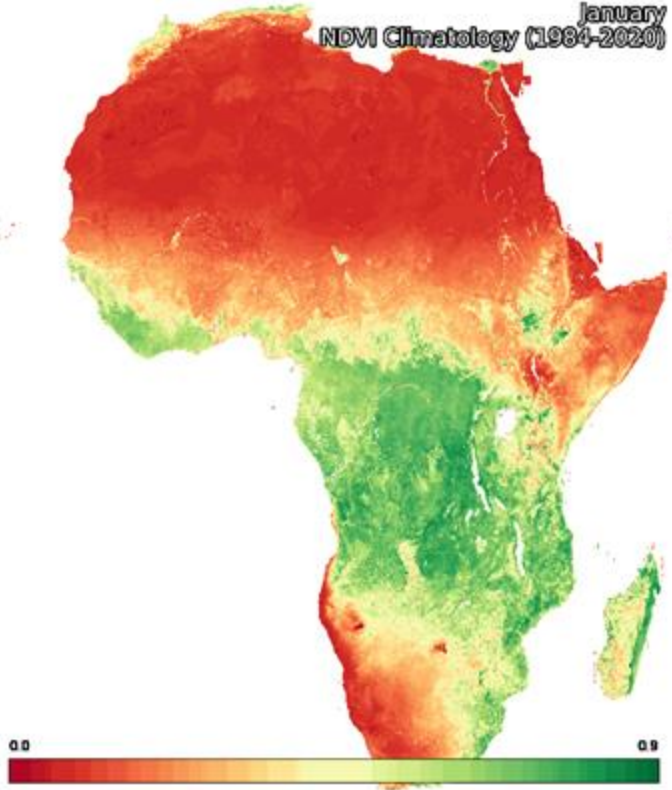


Food Security - Continental services

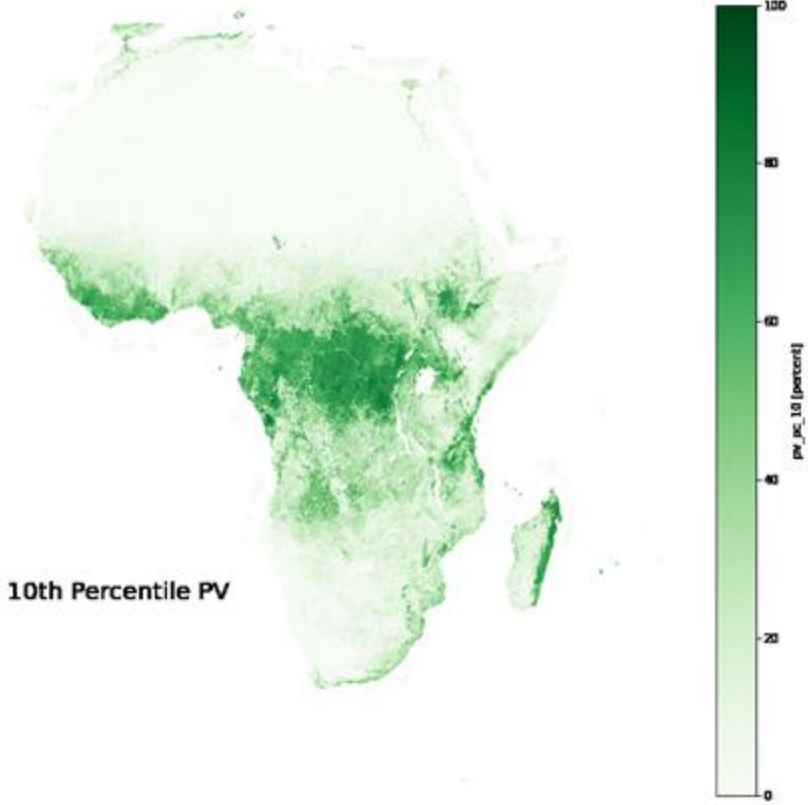
Crop Mask (continental)



Monthly NDVI Climatology at 30 m



Fractional Cover Annual Summary (Percentiles)



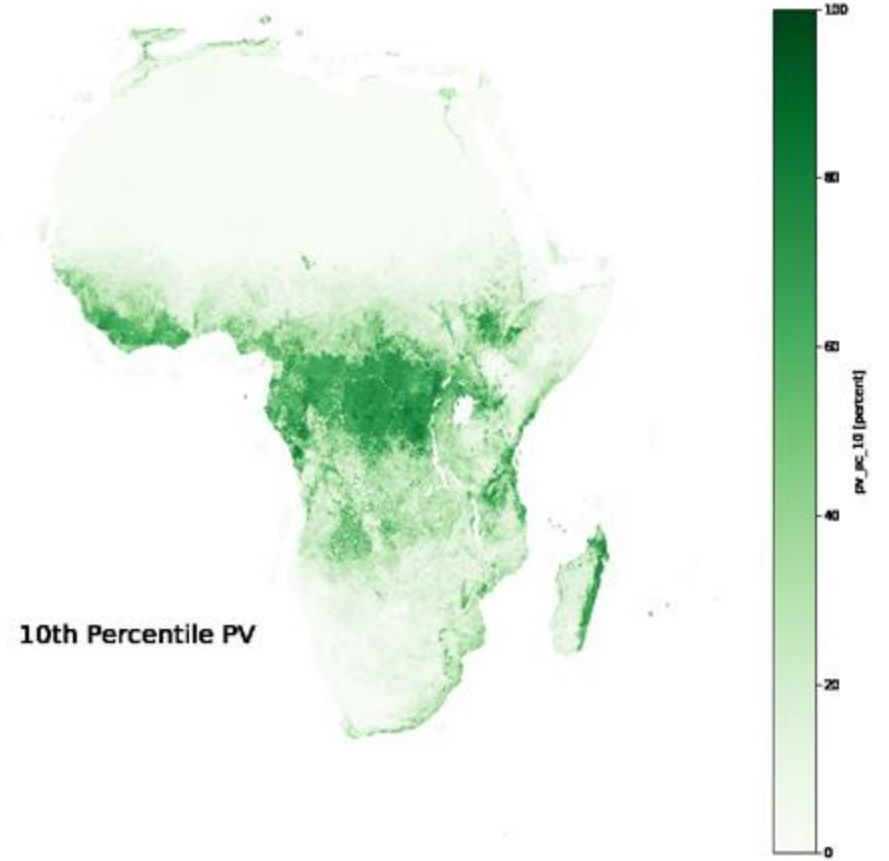
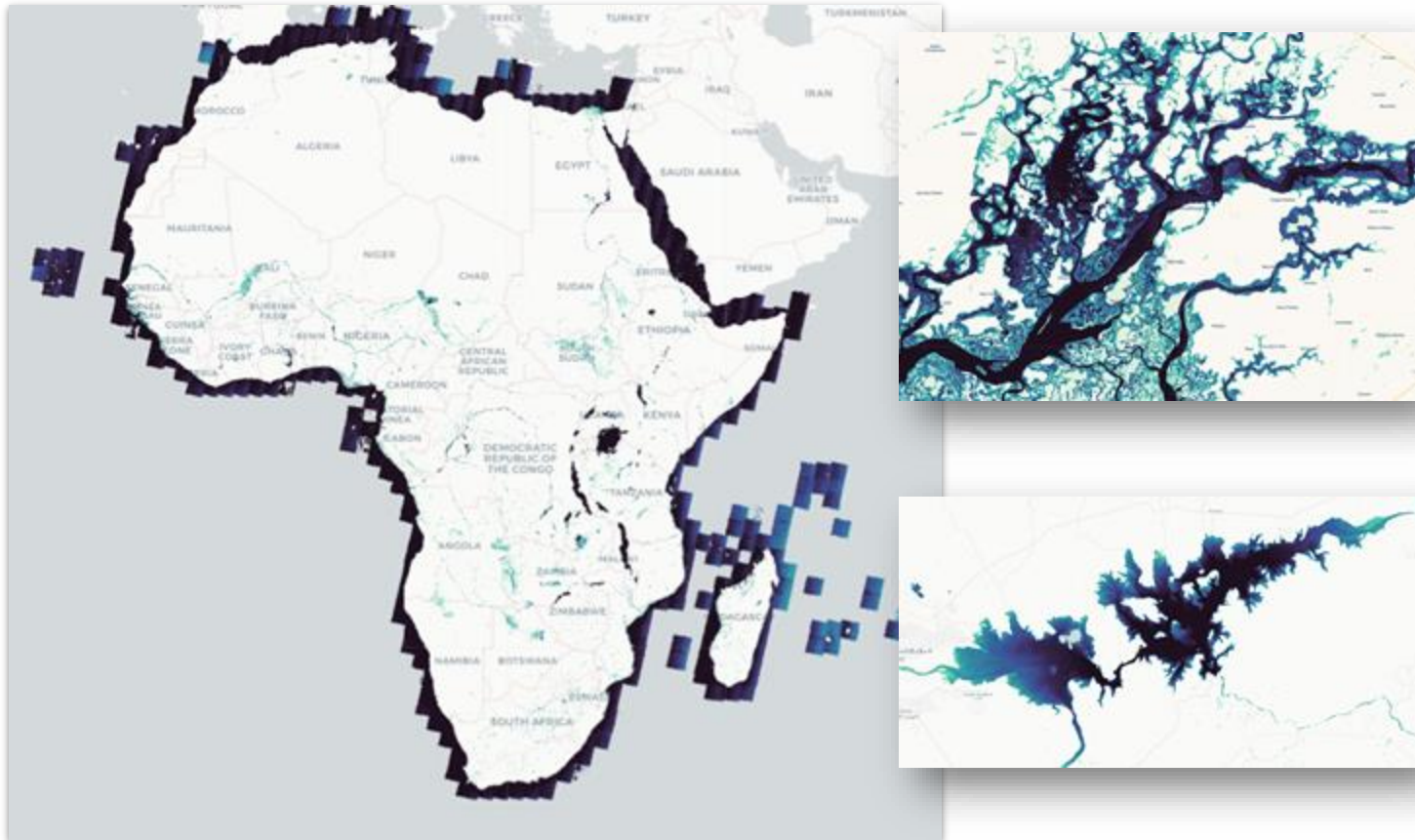
+ + WOfS, rainfall, semiannual/annual GeoMAD

Continental Services



Water Observations from Space (WOfS): a dynamic water map service for Africa, validated with partners across Africa

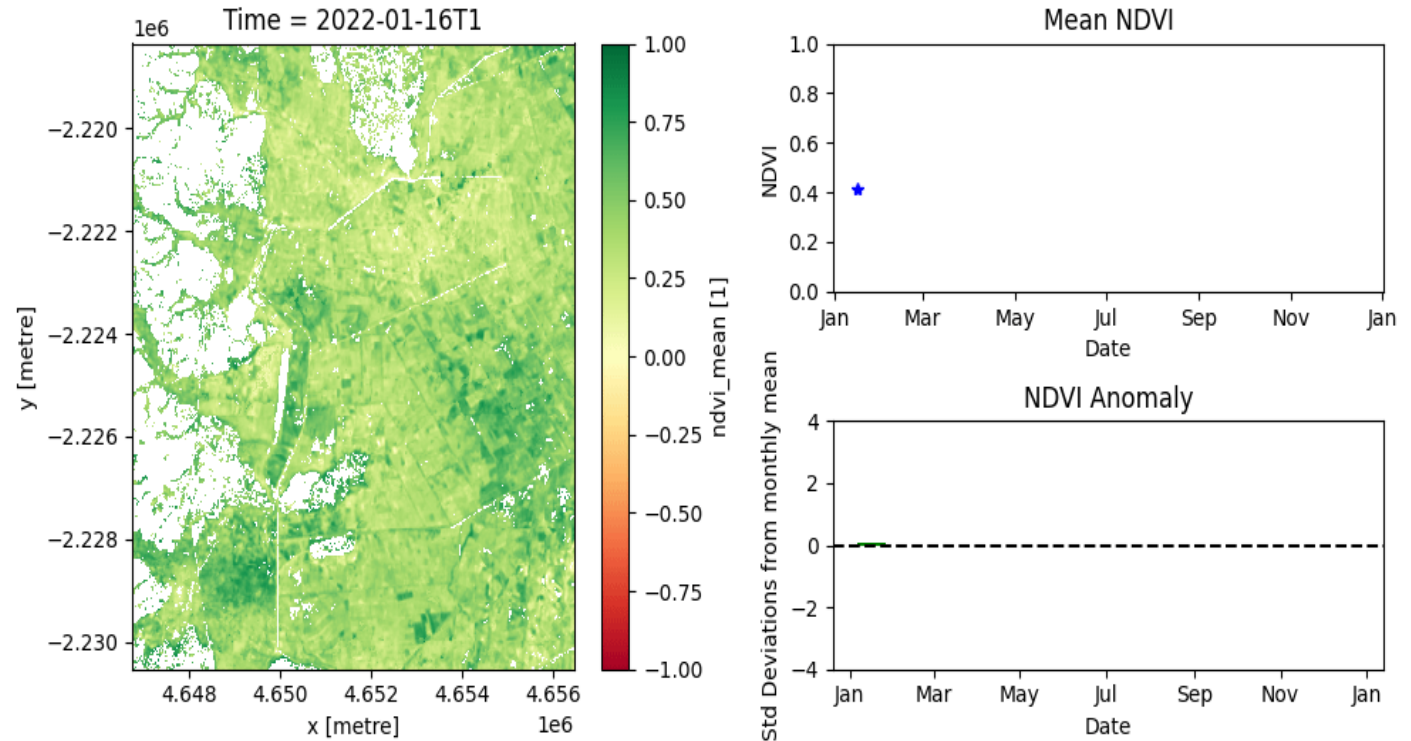
Fractional Cover: dynamic map of green, non-green and bare fractions, and annual summaries (percentiles)



NDVI Mean and Anomaly Animations

- Potential to use this product to monitor agricultural activity across the African continent, and for forecasting and early warning of food security challenges.
- The animation shows the mean NDVI in space, mean NDVI in time, and NDVI anomaly in time for an area of cropland. Non-crop land cover classes were omitted using the Digital Earth Africa crop mask

Impactful in addressing climate change



This image shows farmland in Madagascar experiencing dry conditions from June - December 2022 as NDVI anomalies indicate values below the historical baseline

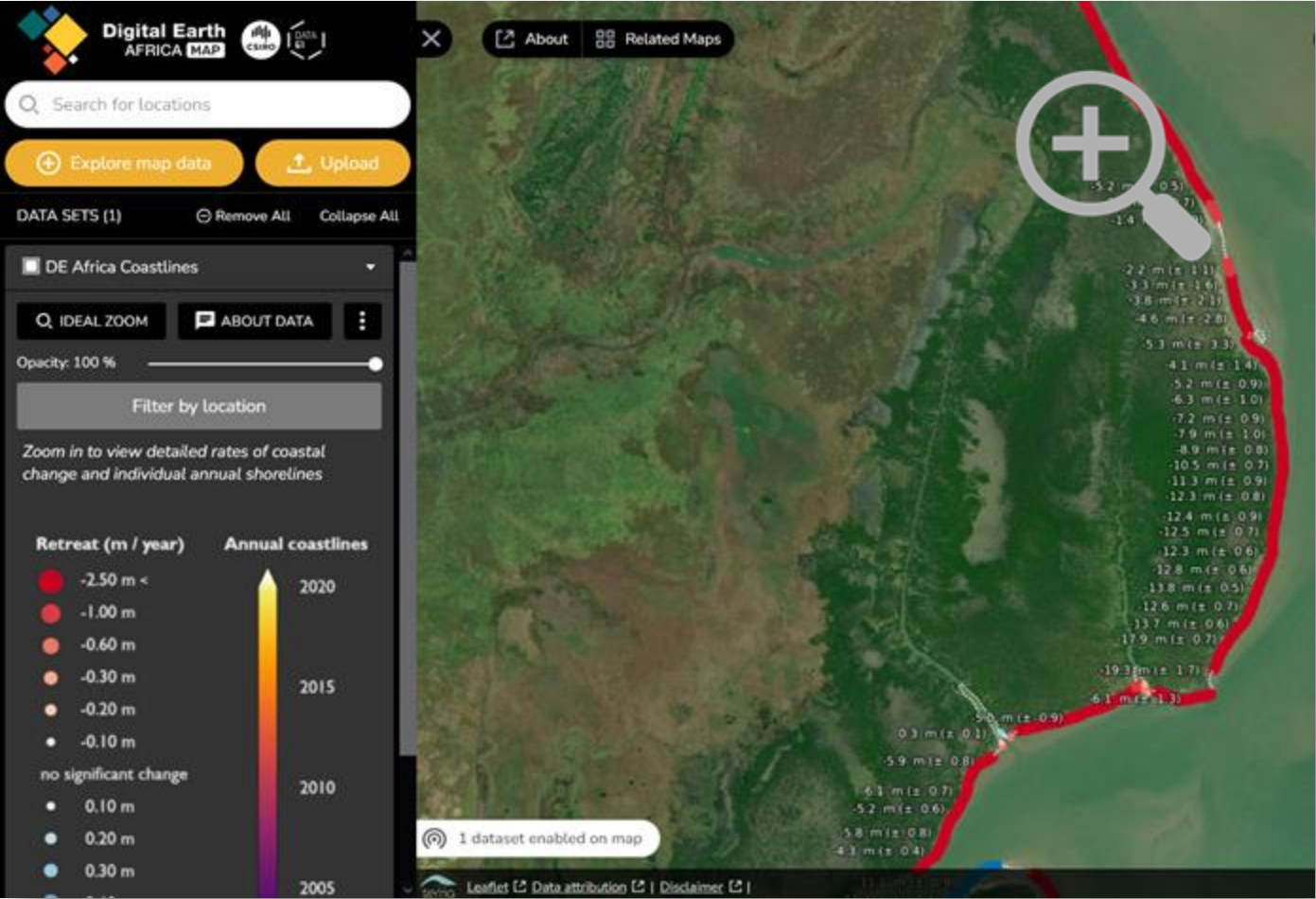
Digital Earth Africa Coastlines

- Adapted from the Australian Coastlines
- **Co-developed and validated** with implementing partners in Africa: Centre de Suivi Ecologique (CSE) – Senegal, RCMRD - Kenya
- **First Africa-wide** Coastlines monitoring service
- Tracks continental changes **from 2000 to present**
- Monitors more than **60,000 km of coast** with **30 m spatial resolution**
- Provides **free interactive access** to
 - Hotspots
 - Rates of changes
 - Average yearly shorelines

Impactful in addressing climate change



Identify hot spots and rates of change



Mangrove dynamics in Mozambique



200 meters of shoreline retreat, Madagascar



<https://maps.digitalearth.africa/>



DE Africa Data



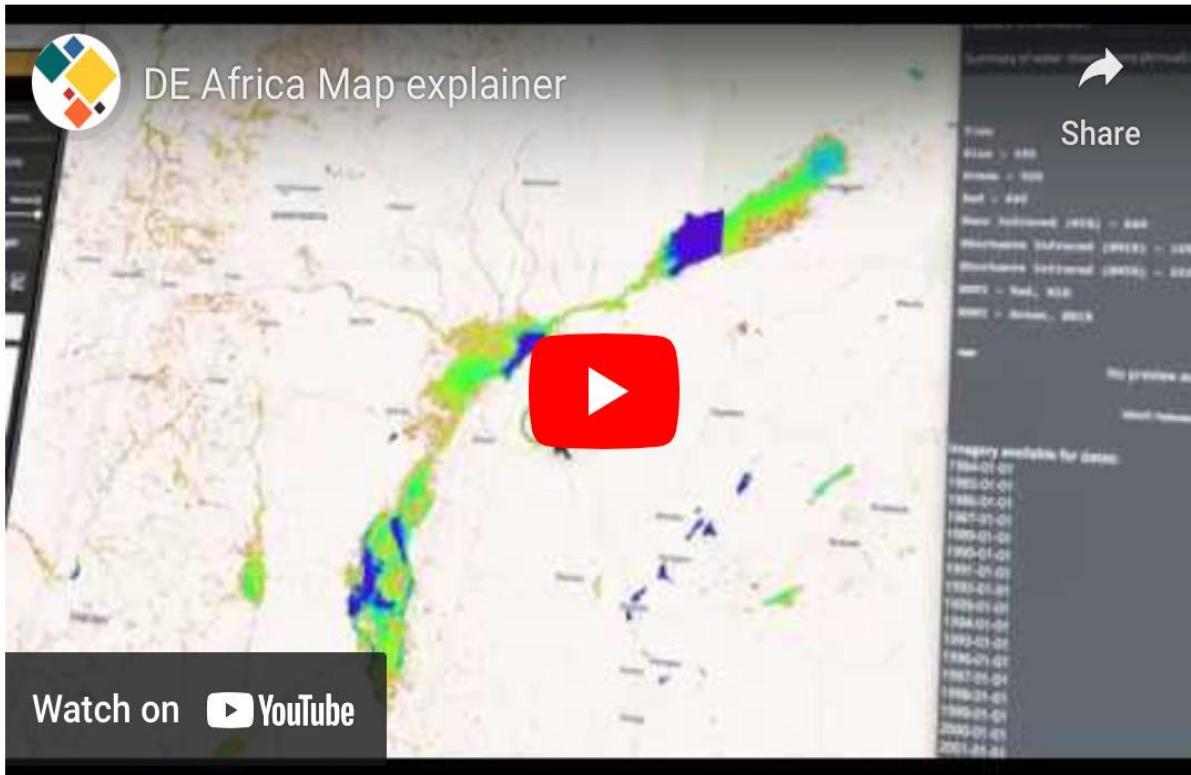
There are many ways to access DE Africa data:

View data	DE Africa Map		http://maps.digitalearth.africa/
Analyse data	DE Africa Sandbox		https://sandbox.digitalearth.africa/
<i>Other platforms include:</i>			
Access in GIS software	OWS Map Services	https://ows.digitalearth.africa/	
Learn how to access & analyse data	Digital Earth Africa Learning Platform	https://learn.digitalearthafrica.org/	

DE Africa Maps

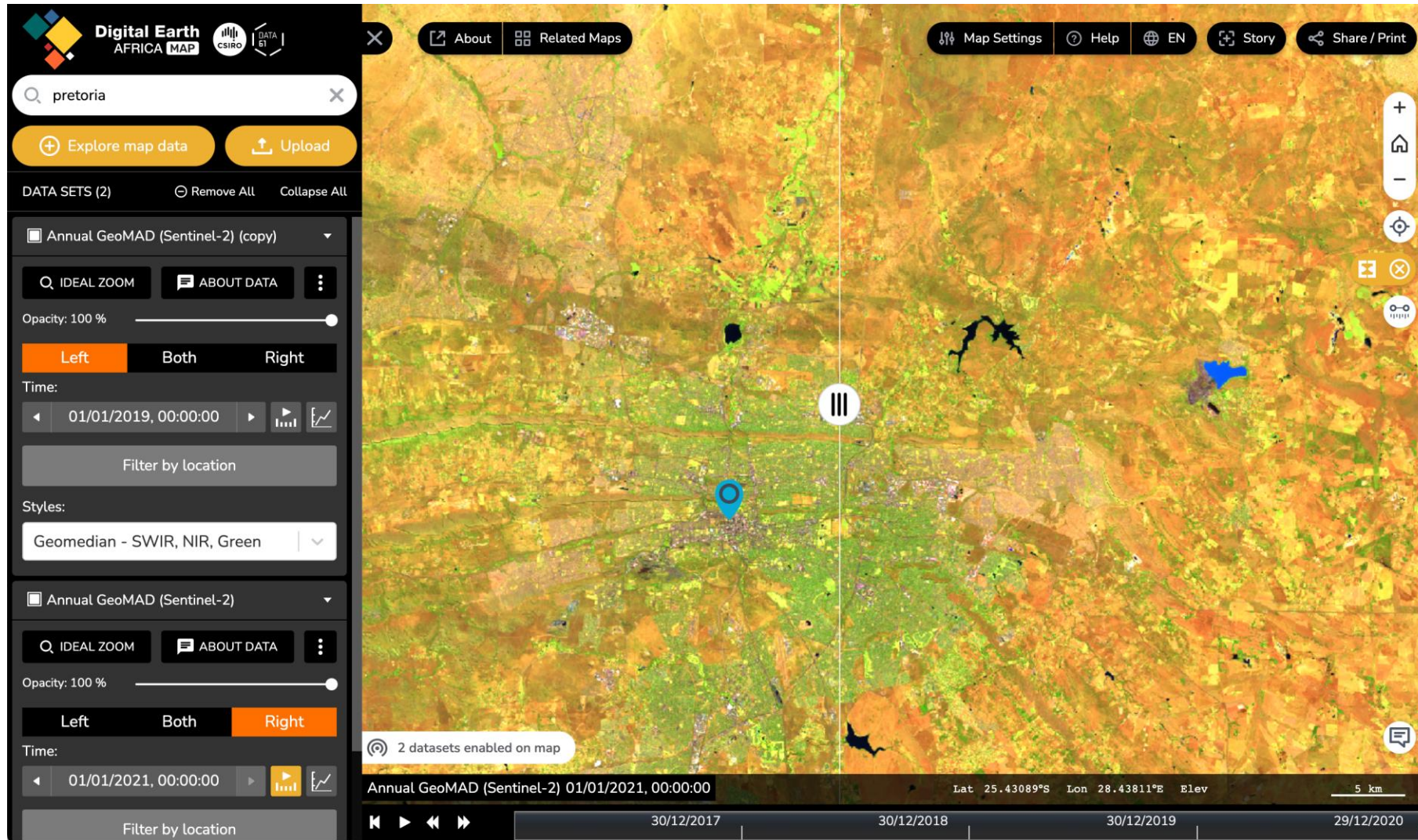


The [Digital Earth Africa \(DE Africa\) Map](https://maps.digitalearth.africa/) is a website for map-based interaction with DE Africa products and services. Through the Map we aim to provide users with the tools to explore our data and products and visualise the African continent with satellite images to understand its geographic diversity and how it changes through time.



<https://maps.digitalearth.africa/>

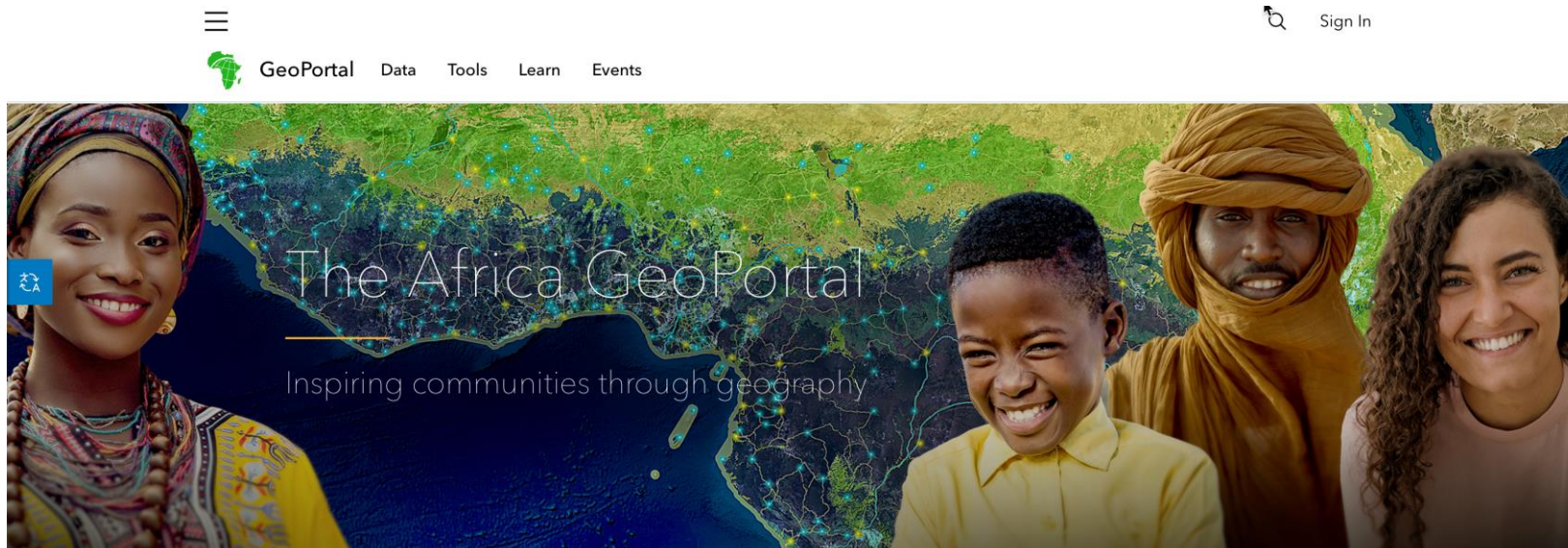
Digital Earth Africa Map allows visualising and comparing data from different times



Africa Geoportal

Africa GeoPortal (Esri)

Esri provides geographic information system software, web GIS and geodatabase management applications. They have developed the [Africa GeoPortal](#), which uses imagery from DE Africa to provide free geospatial tools, data and training for users working on Africa geospatial challenges.



English <https://youtu.be/jU5o0J37iQk>

French: <https://youtu.be/9zDYQJFvZp8>

The best location for geospatial tools, data, and training for users working on Africa's geospatial challenges!

DE Africa Sandbox

- Digital Earth Africa supports all the sectors of the economy from agriculture, water, urbanisation and management of natural resources.
- Some of the algorithms are customized to address the needs in the analysis platform: sandbox <https://sandbox.digitalearth.africa/>

Beginners_guide

Datasets

Frequently_used_code

Real_world_examples

Supplementary_data

Tools

Use_cases

Crop_health.ipynb

Phenology_optical.ipynb

Irrigated_cropping.ipynb

Chlorophyll_monitoring.ipynb

Water_extent_WOfS.ipynb

Wetlands_insight_tool.ipynb

Vegetation_anomalies_monthly.ipynb

Forecasting_vegetation_condition.ipynb

Urban_change_detection.ipynb



Measuring crop health

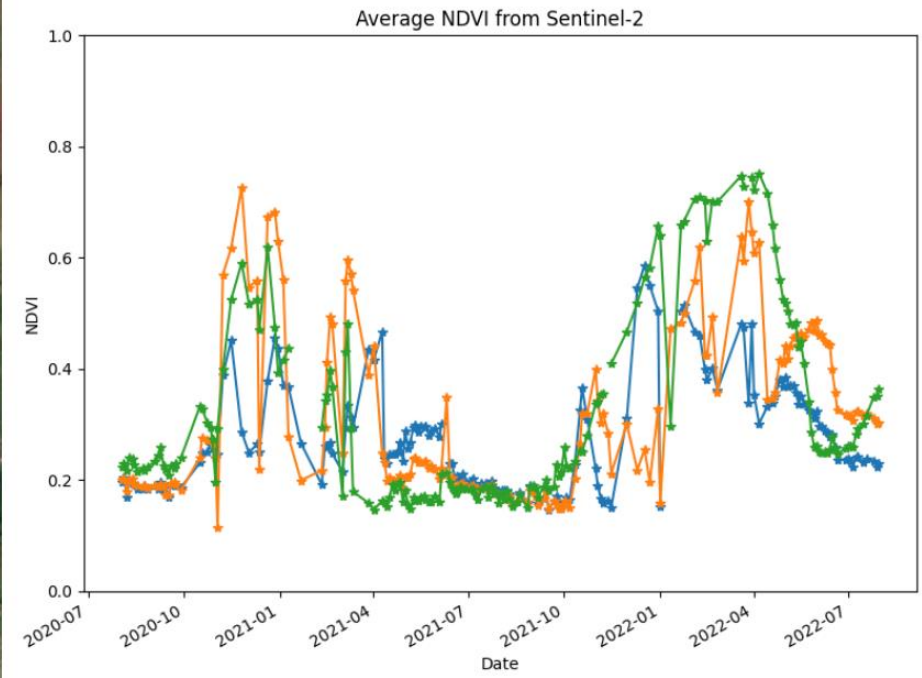
`Crop_health.ipynb`

Study area e.g.
Hartbeespoort, SA
lat, long, = -25.712780,
27.820860
= buffer = 0.005
date = '2020-08-01'

Draw a polygon within the red box to view a plot of average NDVI over time in that area.



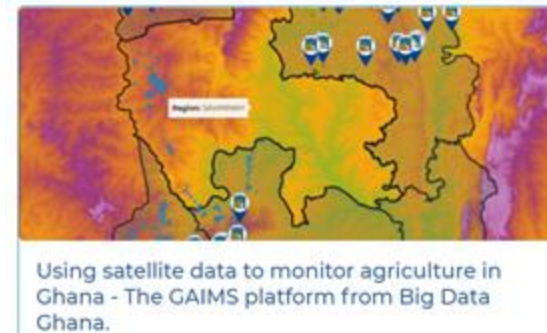
ipyleaflet | Tiles © Esri — Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, UPR-EGP, and the GIS User Community



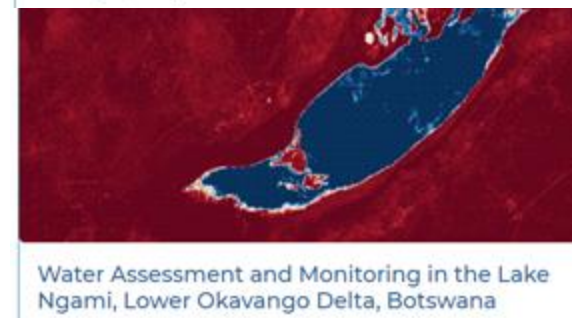
Plot status: polygon sucessfully added to plot.

Making an impact use cases

- 25 published use case studies (Kenya, Ghana, Tanzania, Botswana, Uganda), across government, industry, academic
- 7 use case studies in development (Senegal, Benin, Burkina Faso, Niger, Botswana, Kenya, Nigeria)
- 2 industry projects supported



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Coastlines in Africa



Mangroves in Zanzibar

Diversity and inclusion



Congratulations
TO THE WINNERS



Digital Earth AFRICA



youth mappers



2022 TECHNICAL CHALLENGE



Jokotola Omidiji

Winner

Monitoring mangrove forest degradation in parts of Niger Delta



Sinethemba Mtshali

First Runner - Up

Effects of the Migrant Crisis on the African Continent



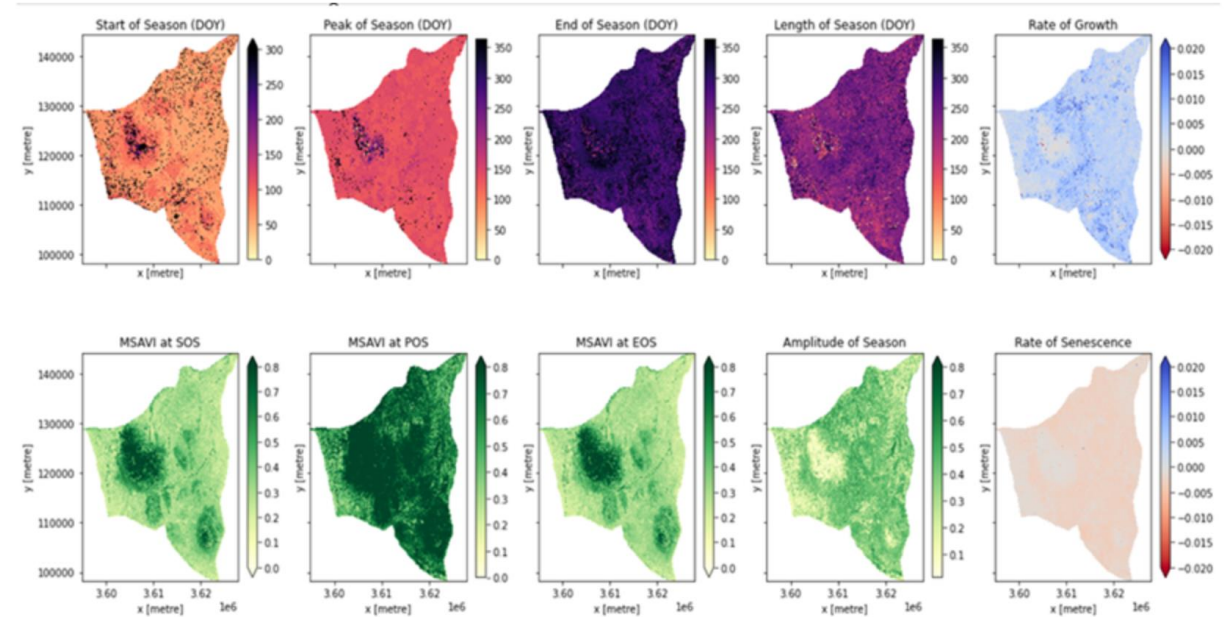
Digital Earth AFRICA

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Combining the power of Digital Earth Africa and local knowledge for planned grazing management in Northern Kenya

- The Northern Rangelands Trust (NRT) has been working with pastoralists through community conservancies to improve rangeland conditions for livestock and improve the health and diversity of wildlife in northern Kenya.
- Digital Earth Africa (DE Africa) provided assessments of rangeland health over time using fractional cover and phenology, coupled with local knowledge for validation.
- Tools: Modified Soil Adjusted Vegetation Index (MSAVI2), the Normalized Difference Vegetation Index (NDVI), and the Enhanced Vegetation Index (EVI).
- Generate phenology map, inform the management of conservancies and the peaceful coexistence of the communities.



Phenology maps of Nalowuon community conservancy in 2018. DOY- day of the year (0-365). Amplitude is an indicator of resource abundance. Rates of growth and senescence are indicative of greenness and drying dynamics, respectively. These are key pointers of the wet and dry season grazing plans.

Earth Observation for conservation

This short BBC news story shows how communities have been using DE Africa to support their effort to rehoming endangered giraffes due to raising Lake levels.

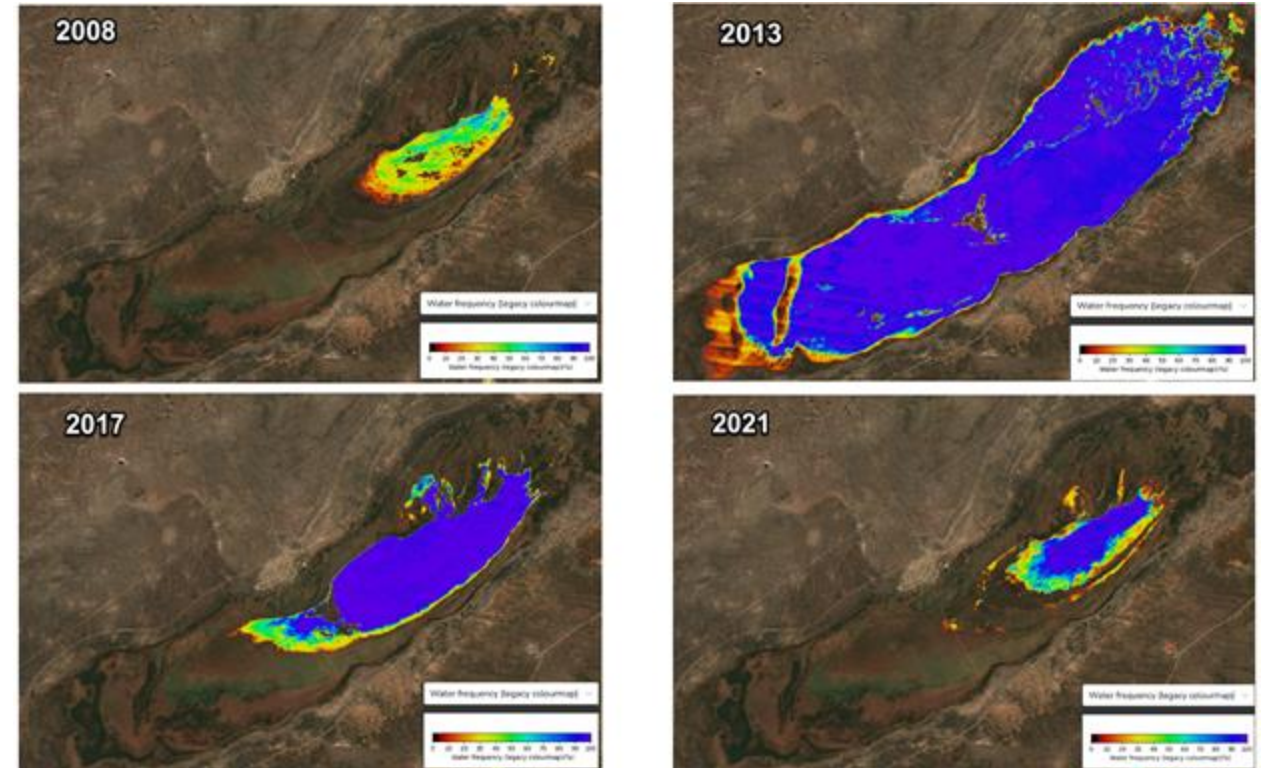
Rehoming giraffes on Lake Baringo due to rising water levels

[Story Map](#) from Data 4 SDGs



Water Assessment and Monitoring in the Lake Ngami, Lower Okavango Delta

- Lake Ngami is located at the western part of the lower Okavango Delta and an indicator for environmental change and climate variability in the Okavango Basin.
- Digital Earth Africa (DE Africa) provided the Water Observation from Space (WOfS) to evaluate water variability in Lake Ngami, Botswana from the year 2017 to 2021.
- The results for Lake Ngami indicate the need for an integrated watershed plan that encompasses the Okavango Delta.



Dr. Kelebogile B. Mfundisi is currently working as a Research Scholar in Physical Geography at the University of Botswana Maun Campus, Okavango Research Institute, Maun, Botswana. Dr. Kelebogile can be reached on email: kmfundisi@ub.ac.bw

How data and community can save Zanzibar's mangroves

Digital Earth Africa is helping Zanzibar fight the effects of climate change and protect the island's precious mangrove habitat.



The story is also part of a new documentary series, Climate Next

<https://www.aboutamazon.com/news/aws/climate-next-how-data-and-community-can-save-zanzibars-mangroves>

Digital Earth Africa and the Zanzibar researchers using the service to help fight the effects of climate change.

Khairiya Massoud,
State University of Zanzibar



Link: <https://youtu.be/FVmcEaemfmA>

DE Africa training course



- **Self-paced, free-to-access, fully online:**
 - Videos, recorded tutorials, manuals
 - Hands-on exercises
 - English and French versions
- **Certificate of Completion is awarded upon completion of exercises**



English

Digital Earth Africa
DEA101-en
Introduction to the Digital Earth Africa Sandbox

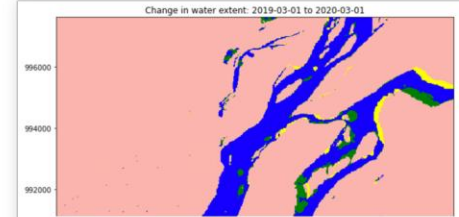
Starts: Oct 19, 2021

The cover for the English course features a satellite-style map of a river delta with the word "English" in large white letters. Below the map, the course title and start date are listed.

Français

Digital Earth Africa
DEA101-fr
Introduction à la sandbox de Digital Earth Africa

Starts: Oct 19, 2021

The cover for the French course features a satellite-style map of a river delta with the word "Français" in large white letters. Below the map, the course title and start date are listed.

Change in water extent: 2019-03-01 to 2020-03-01

Digital Earth Africa
DEA201-en
Digital Earth Africa Water Resources

Starts: Oct 16, 2022

The cover for the Water Resources course features a map showing a change in water extent over time, with a color scale from blue to red. The course title and start date are listed below.

01 Mar 2021
Seasonal MNDWI

Digital Earth Africa
DEA-202
Digital earth Afrique ressources en eau

Starts: Jan 30, 2023

The cover for the Digital Earth Africa Water Resources course features a map showing the Seasonal MNDWI for March 1, 2021. The course title and start date are listed below.

Agriculture and food security

Digital Earth Africa
DEA201-en
Digital Earth Africa Agriculture and Food Security

Starts: Feb 1, 2023

The cover for the Digital Earth Africa Agriculture and Food Security course features a map showing agricultural land use. The course title and start date are listed below.

01 Mar 2021
Seasonal MNDWI

Digital Earth Africa
DEA_202_FN
Digital Earth Afrique Agriculture et sécurité alimentaire

Starts: Mar 17, 2023

The cover for the Digital Earth Africa Agriculture et sécurité alimentaire course features a map showing the Seasonal MNDWI for March 1, 2021. The course title and start date are listed below.

<https://learn.digitalearthafrika.org/>

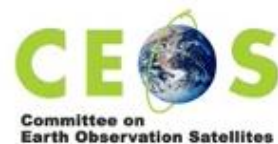
<https://learn.digitalearthafrika.org/>

Connect with DE Africa

- Website <https://www.digitalearthafrika.org>
- The opportunity to subscribe to the DE Africa community to receive quarterly newsletters and invitations to attend events
<https://helpdesk.digitalearthafrika.org> and user guide
<https://docs.digitalearthafrika.org/>
- DE Africa online learning <https://learn.digitalearthafrika.org>
- DE Africa weekly Live Learning Sessions: every Wednesday at 11am, GMT zero - ask questions and connect:
<https://forms.gle/RbFB4HZ5EgUgCnS47>
- Email address info@digitalearthafrika.org



Acknowledgements





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Thank you Merci obrigada