Introduction to the ClimSA Climate station

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September 17th 2024

Presentation overview

1. ClimSA Programme

What is the ClimSA Programme, expected results, JRC role.

2. ClimSA Station

Reasoning behind it, conceptual design.

3. ClimSA Station **walkthrough**

An explanation of the features and functionalities of Climate Station.
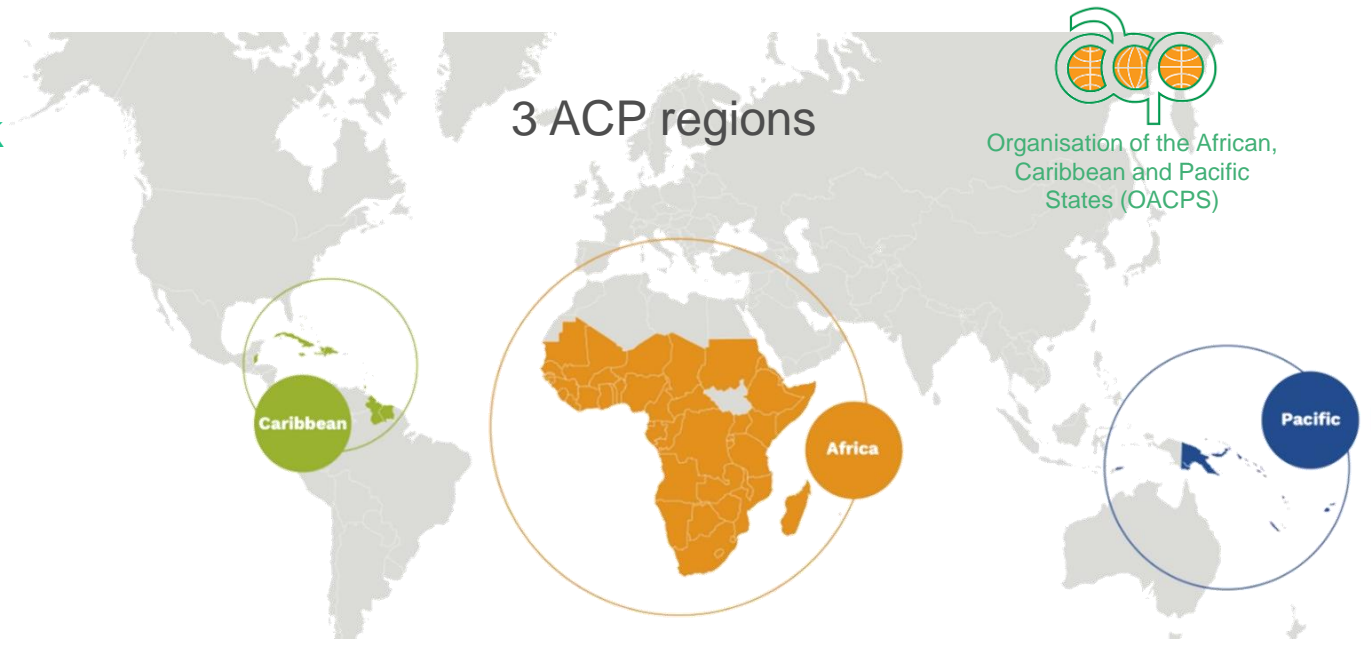
4. Take away, facts and Q&A

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What is the ClimSA programme?

INTRA-ACP CLIMATE SERVICES AND RELATED APPLICATIONS PROGRAMME

An initiative of the Organisation of African, Caribbean and Pacific States funded by the European Union

- ClimSA program supports the implementation of WMO Global Framework for Climate Services in ACP countries.

- 2019-2024 extension until 2025, 85 ME

TECHNICAL IMPLEMENTING PARTNERS

WMO
UN World Meteorological Organisation
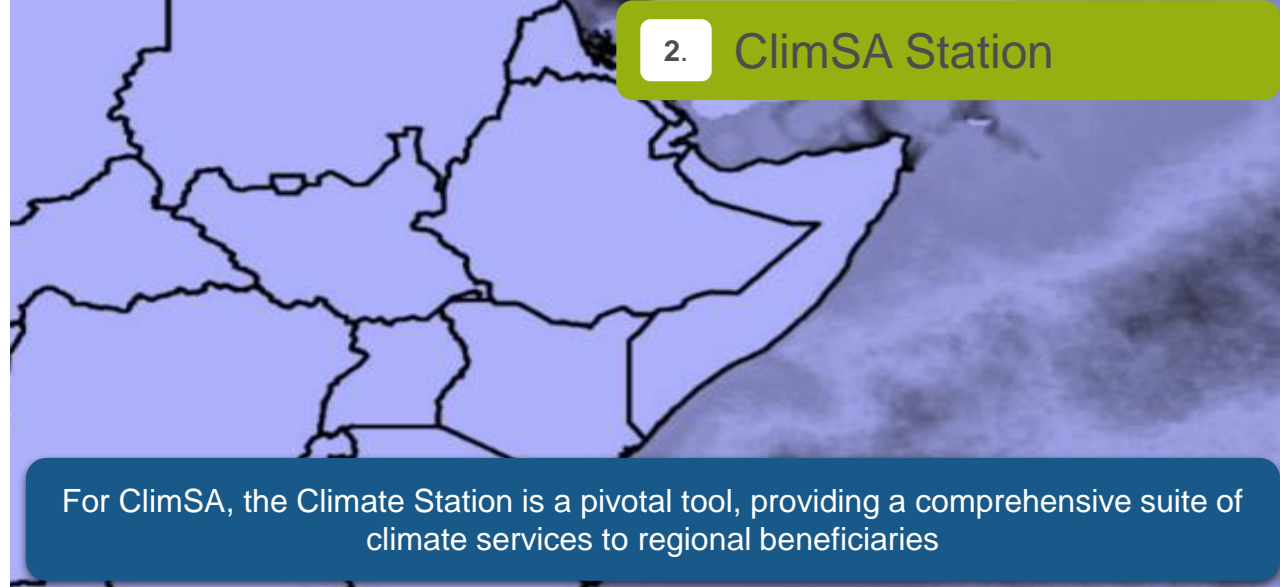
JRC
European Commission's Joint Research Centre

EUMETSAT
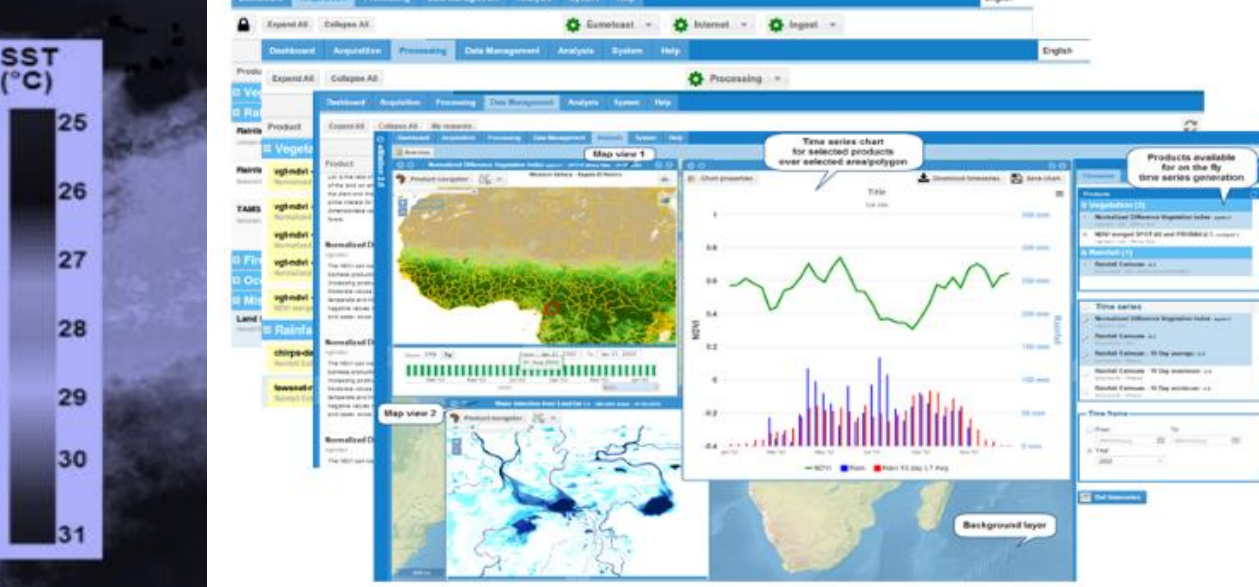European Organisation for the Exploitation of Meteorological Satellites

3 ACP regions

Organisation of the African, Caribbean and Pacific States (OACPS)

Caribbean

Africa

Pacific

Technical support, capacity building, institution strengthening and, awareness

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ClimSA Station role in ClimSA

JRC participates in intra-ACP CS through an Administrative Arrangement with DG-INTPA (2019-2024)

Tailored Products and Services

Activity 2.5

Activity 3.3

Requirements Consolidation

Quality Control and Fitness for Purpose

Activity 2.7 & 3.5

Activity 2.3

Outreach and Training

WMO – Global Framework for Climate Services

4
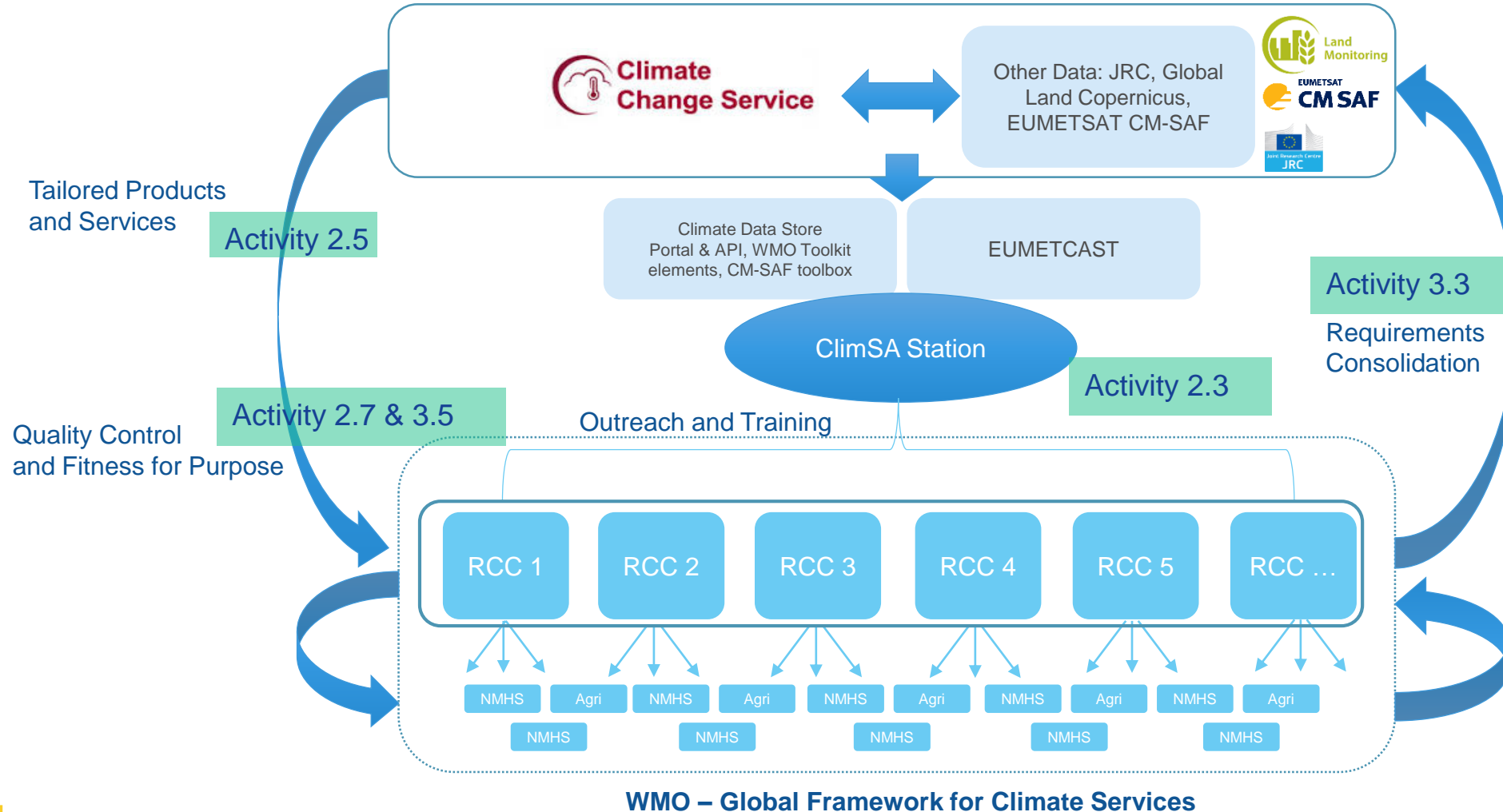
For ClimSA, the Climate Station is a pivotal tool, providing a comprehensive suite of climate services to regional beneficiaries

What is ClimSA Station?

Evolution:

- Originating from eStation 2.0, ClimSA Station since 2019.

Integration:

- Combines real-time data with forecast and projection products.

Enhanced User Experience:

- Delivers a tailored web client.
- Introduces Jupyter Notebooks.

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Key points for having a ClimSA Station

- Embed the required functionalities and applications:
  - within an operational environment

  - chain the recognised methodology steps

  - to reduce the user's tasks and improve the reliability & traceability

  - Co-develop a catalogue of high quality tailored datasets and tools

  - Integrate in a seamless way data coming from different sources
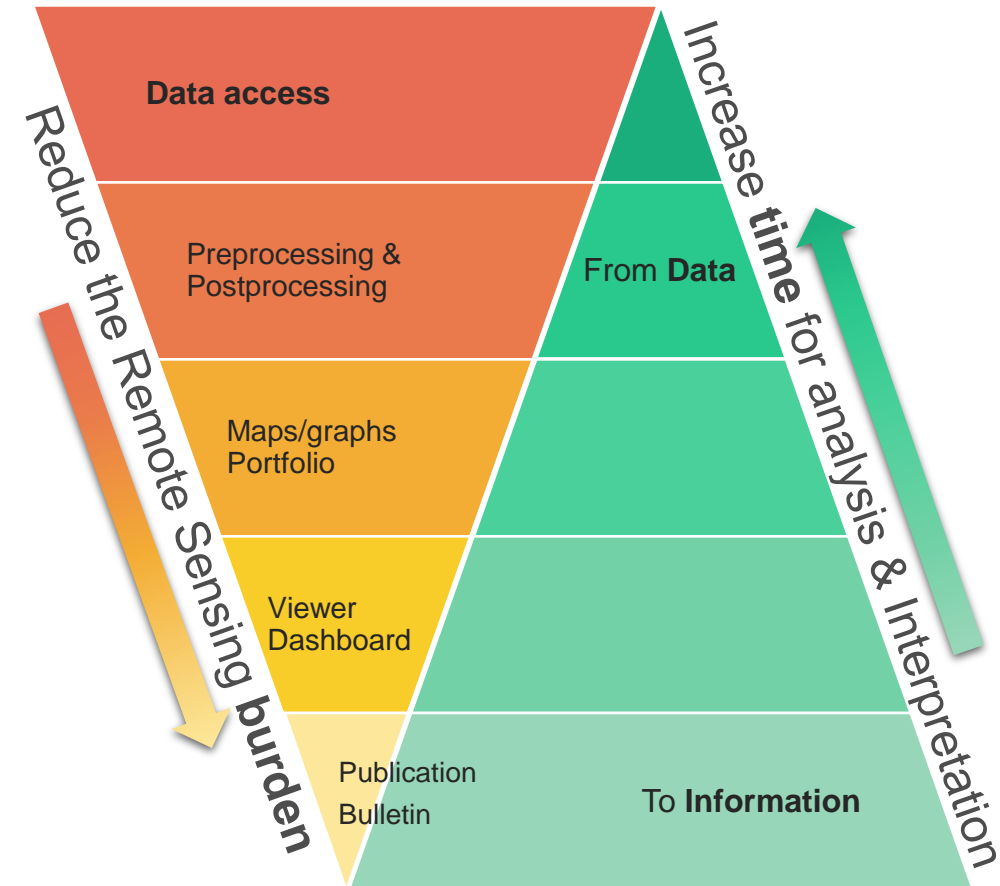
ClimSA Station - Conceptual Design

Data Acquisition

Internet source
- NOAA
- Chirps
- Tamsat
- European Climate Assessment & Dataset

DataStore
- CDS/ECMWF
- IRI Climate Data Library

EUMETCast Station

Stations data

Ingestion & processing

Climate Station Datasets

Common Data Model (**CDM**)
ISO/INSPIRE metadata

Automatic Processing

Processing Chains in python/GDAL/CDO

Jupyter Notebook

Analysis

Maps, graphs & dashboards

QA/QC, F4P

IMPACT toolbox

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ClimSA Station – Set Up

Station deployed in Nairobi, Kenya, August 2024, at the Kenyan Meteorological Department (KMD)

Online version,
with access to all
datasets, hosted by JRC

https://estation.jrc.ec.europa.eu/eStation3/
https://europa.eu/!Wvp7QJ

Physical setup,
installed at the RCCs,
then local, regional and
national partners

Dataset Distributed on ClimSA Station

Monitoring System (observations/climatology)

- Local stations (CLIMSOFT)
- Remote sensing data
- Reanalysis data
- Derived indices
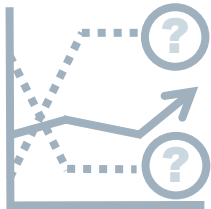
Seamless Weather Forecast

- From mid term to seasonal forecast
- Multimodel approach (C3S)

Climate Projections

- Static datasets of climate projections CMIP6

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Dataset Distributed on ClimSA Station

Product	Product code/Version	ID	Filter Expression
Evapotranspiration 30mins (1km)	lsasaf-et undefined	EO:EUM:DAT:MSG:ET-SEVIRI	S-LSA_-HDF5_LSASAF_MSG_ET_MSG-Disk_.*.bz2
Land Surface temperature 15mins (1km)	lsasaf-lst undefined	EO:EUM:DAT:MSG:LST-SEVIRI	S-LSA_-HDF5_LSASAF_MSG_LST_.Afr.*_.*.bz2
MODIS Chlorophyll a (4km)	modis-chla v2022.0	EO:EUM:DAT:AQUA:CHLORA	AQUA_MODIS.*.L3m.DAY.CHL.chlor_a.4km.NRT.nc
MODIS KD490 (4km)	modis-kd490 v2022.0	EO:EUM:DAT:MULT:MOD-KD490	AQUA_MODIS.*.L3m.DAY.KD.Kd_490.4km.NRT.nc
MODIS PAR (4km)	modis-par v2022.0	EO:EUM:DAT:MULT:MOD-PAR	AQUA_MODIS.*.L3m.DAY.PAR.par.4km.NRT.nc
MODIS SST (4km)	modis-sst v2019.0	EO:EUM:DAT:MULT:MOD-SST	AQUA_MODIS.*.L3m.DAY.SST.sst.4km.NRT.nc
S3-Chlorophyl-a (1km)	olci-wrr V02.0	EO:EUM:DAT:SENTINEL-3:OL_2_WRR___NRT	S3A_OL_2_WRR_.*SEN3.tar
S3 Sea Surface Temperature(1km)	slstr-sst V02.0	EO:EUM:DAT:SENTINEL-3:SL_2_WST___NRT	S3A_SL_2_WST_.*SEN3.tar
Global surface water– monthly occurrences (30m)	wd-gee 1.0	EO:EUM:DAT:LANDSAT:MESA-JRC-WBD-GEE	MESA_JRC_wd-gee_occurr.* _1.0.tgz
Global surface water– Long Term average occurrences (30m)	wd-gee 1.0	EO:EUM:DAT:LANDSAT:MESA-JRC-WBD-GEE-AVG	MESA_JRC_wd-gee_avg.* _1.0.tgz
NDVI from CGLS (300m)	vgt-ndvi olci-v2.0	EO:EUM:DAT:OLCI-V2.0:NDVI	c_gls_NDVI300.*AFRI_OLCI_V2.*[zip|ZIP]
DMP from CGLS (300m)	vgt-dmp olci-v1.0	EO:EUM:DAT:OLCI-V1.0:DMP	c_gls_DMP300-RT0.*_AFRI_OLCI_V1.*[zip|ZIP]
FAPAR from CGLS (300m)	vgt-fapar olci-v1.0	EO:EUM:DAT:OLCI-V1.0:FAPAR	c_gls_FAPAR300-RT0.*_AFRI_OLCI_V1.*[zip|ZIP]
FCOVER from CGLS (300m)	vgt-fcover olci-v1.0	EO:EUM:DAT:OLCI-V1.0:FCOVER	c_gls_FCOVER300-RT0.*_AFRI_OLCI_V1.*[zip|ZIP]
LAI from CGLS (300m)	vgt-lai olci-v1.0	EO:EUM:DAT:OLCI-V1.0:LAI	c_gls_LAI300-RT0.*_AFRI_OLCI_V1.*[zip|ZIP]
PML MODIS Chla	pml-modis-chla 3.0	EO:EUM:DAT:MULT:CPMAD:OC	PML_.*_MODIS_oc_3daycomp.*.nc.bz2
PML MODIS SST	pml-modis-sst 3.0	EO:EUM:DAT:MULT:CPMAD:SST	PML_.*_MODIS_sst_3daycomp.*.nc.bz2

PRODUCT REPORT
Uploaded: SEPTEMBER 13, 2022

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ClimSA Station Modules

- 🖥️ Dashboard
- 🖼️ Portfolio
- Acquisition
- ⚙️ Processing
- Data Management
- 📊 Analysis
- Fitness for Purposes
- IMPACT toolbox
- Jupiter Notebook

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ClimSA Station GUI Overview 1/6 — Dashboard
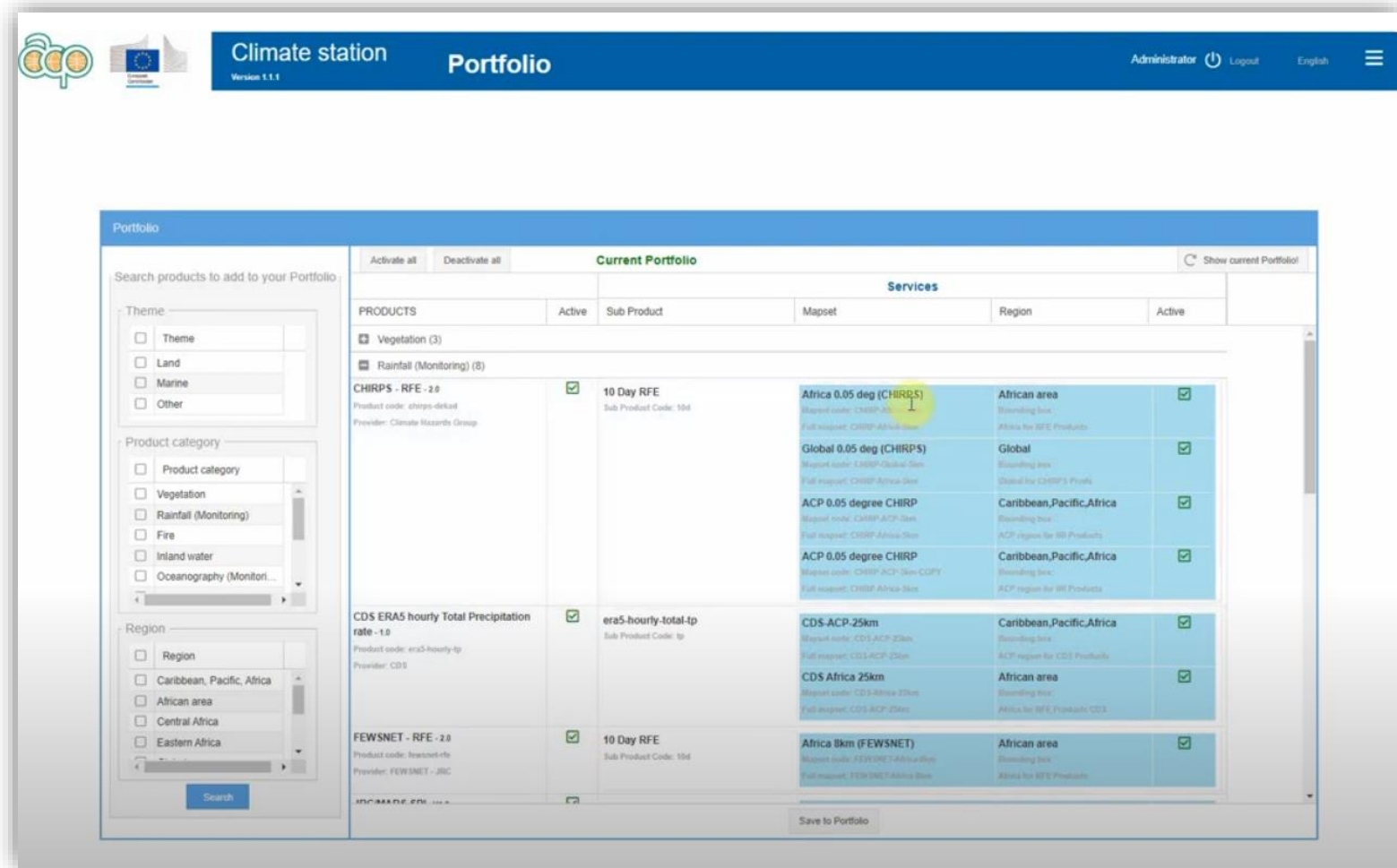
- Login
- Language Selection
- Overview of the local datasets
- Control of the Services
- Overview of products released on latest version

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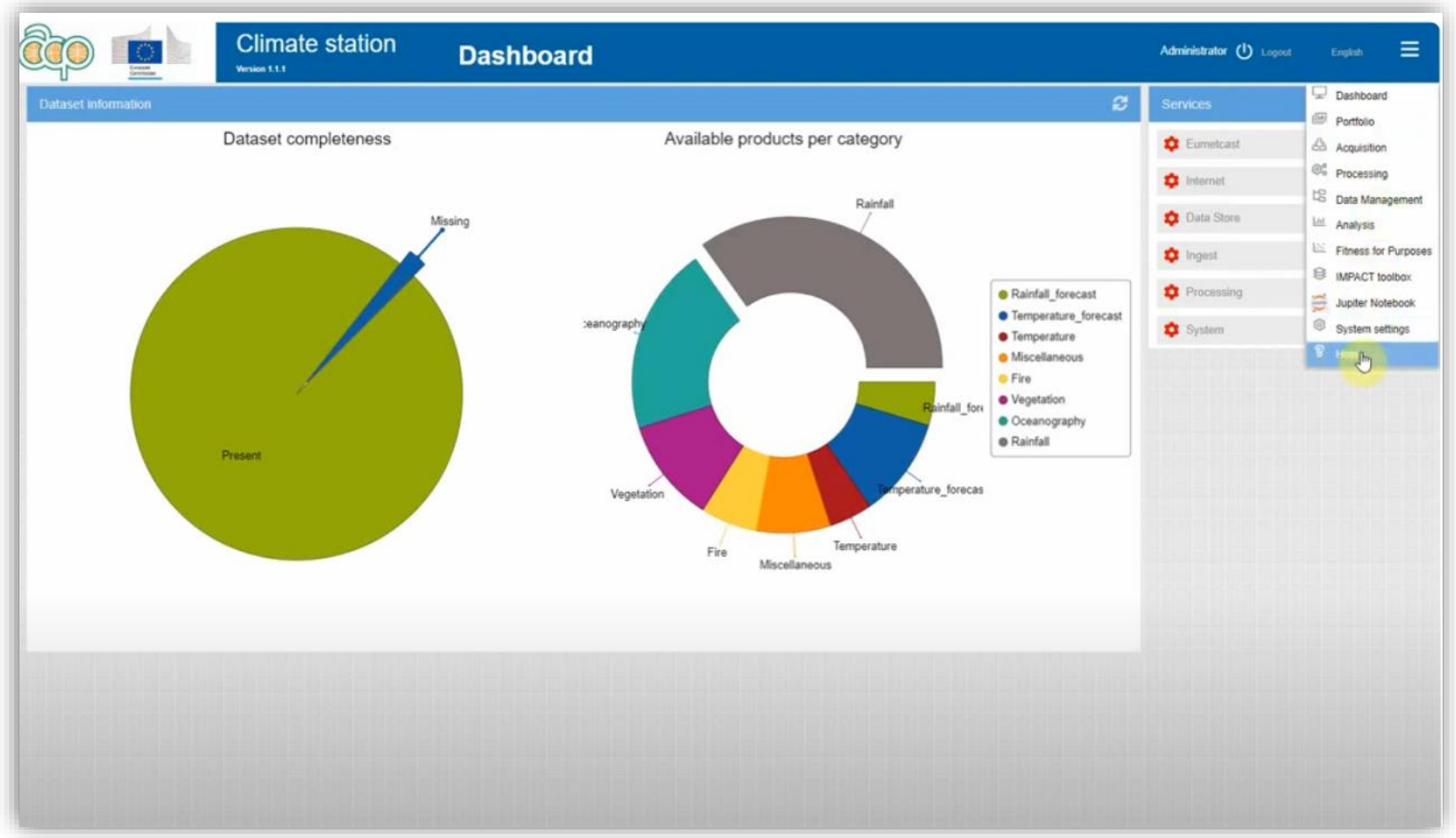
ClimSA Station GUI Overview 2/6 🖼 Portfolio

- Quick selection of the products of interest
- Option to work on the newest products only
- Overview of the active products

ClimSA Station GUI Overview 3/6 ⬇ Acquisition
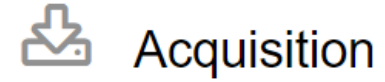
- Control of the Acquisition of incoming products
- Check the logfiles of the Services
- Check the Data completeness

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ClimSA Station GUI Overview 4/6 ⚙️ Processing

- Activate/De-activate the Processing Chains
- Check the logfiles of each Chain

ClimSA Station GUI Overview 5/6 — Data Management

- Check the completeness of each Product.
- Create 'Requests' for retrieving missing files, to be sent or executed directly if the Station is connected to the internet).

ClimSA Station GUI Overview 6/6 📊 Analysis

In the Analysis tool you can do data analysis and generate images for bulletins or reports. You can create Maps and 5 types of graphs within a workspace.

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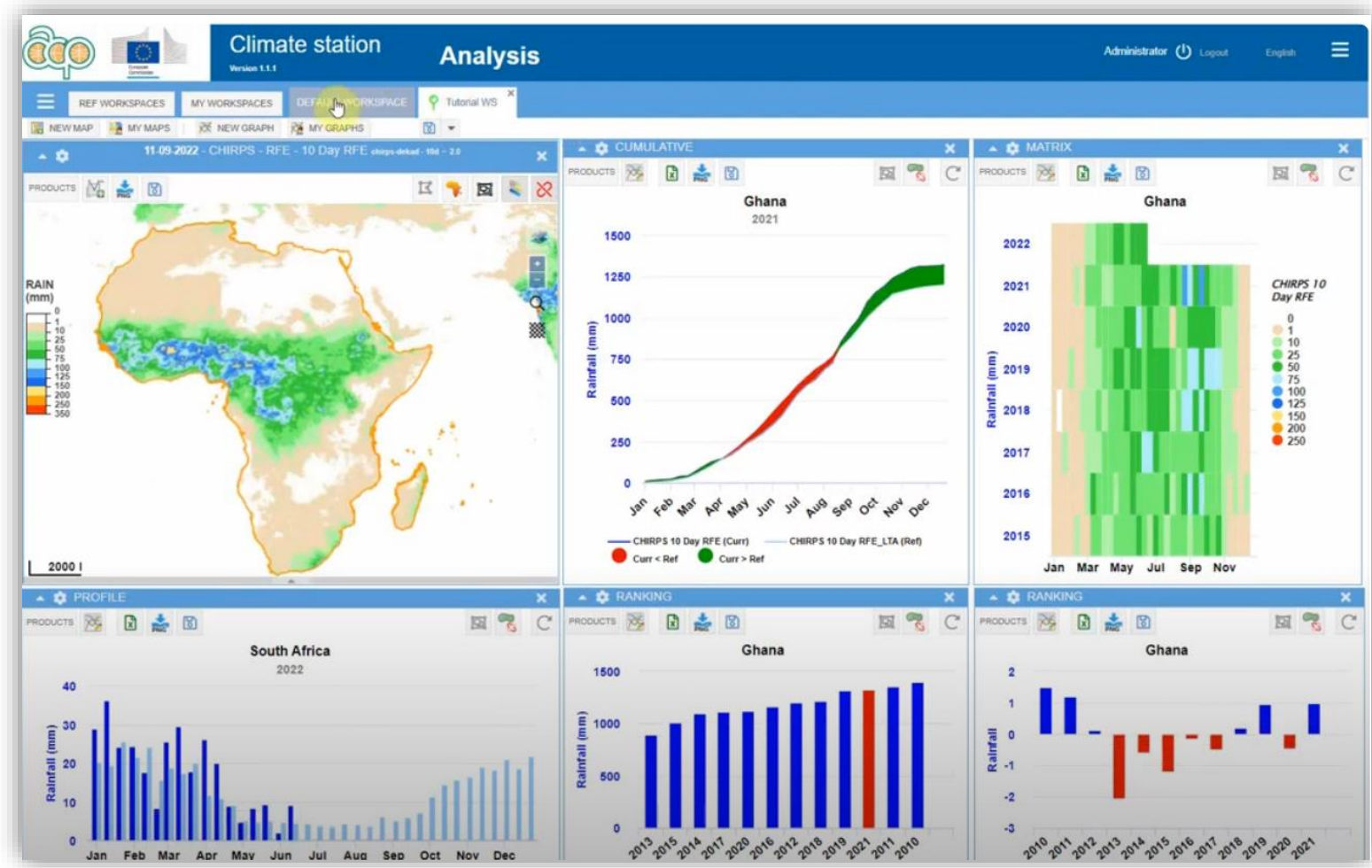
ClimSA Station GUI Overview 6/6

- In the Analysis tool you can also do the weather station data analysis by comparing with different models and Earth Observation data.
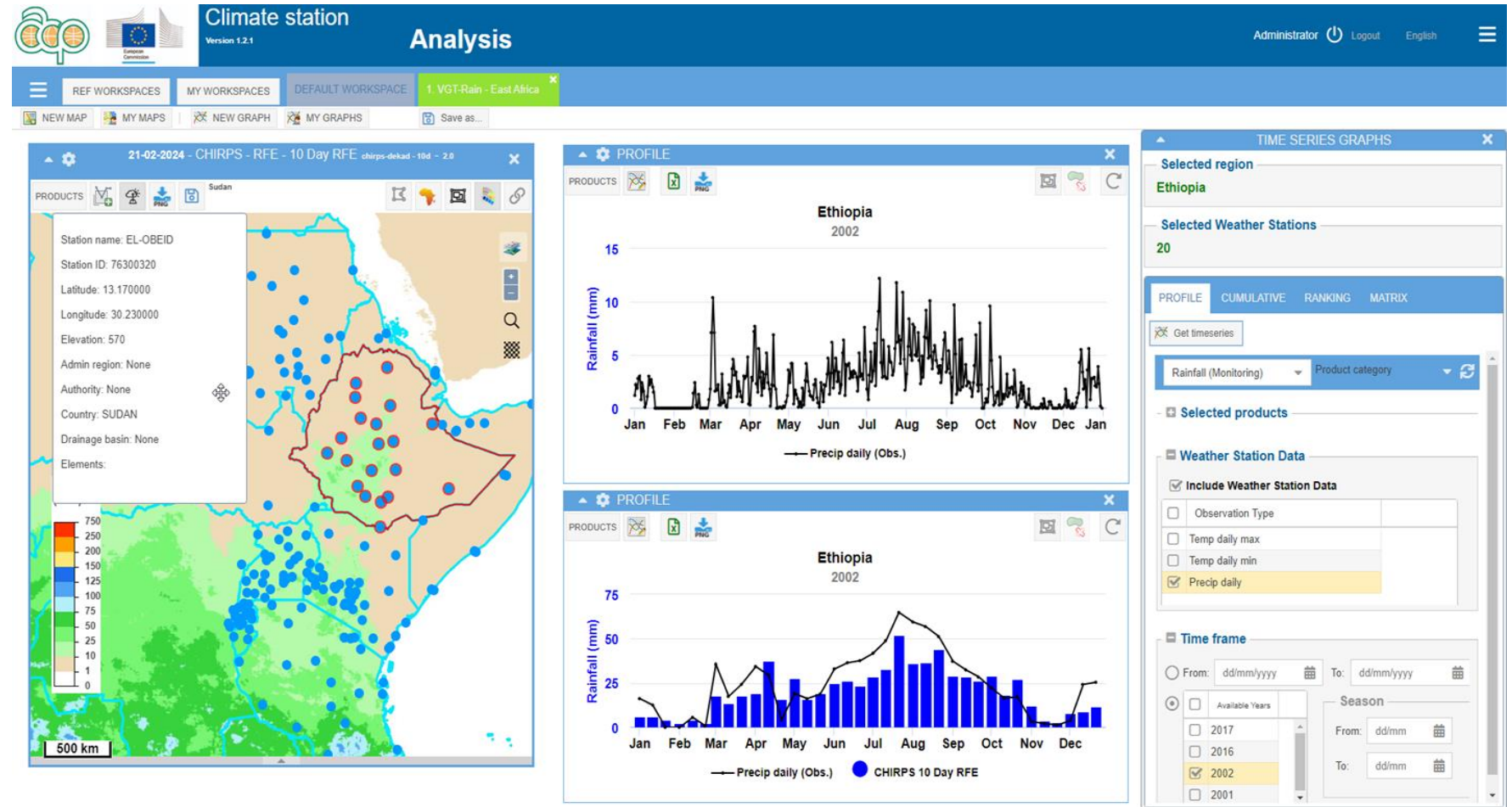
ClimSA Station F4P · Fitness for Purposes

- Hovmöller Diagram
- Scatter Density Diagram
- Trend Analysis
- Histogram and CDF
- Gamma Index
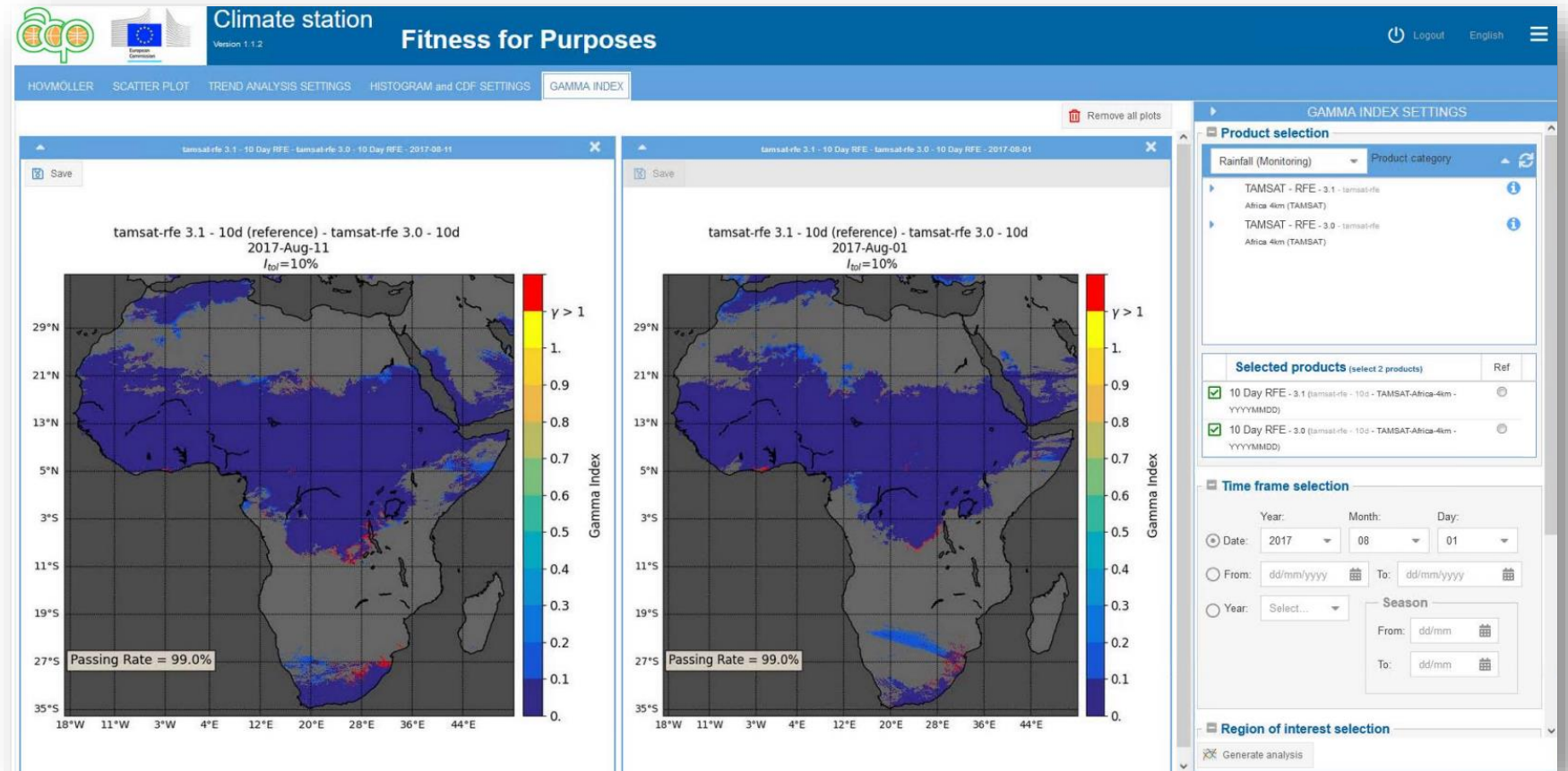
ClimSA Station IMPACT Toolbox

http://forobs.jrc.ec.europa.eu/products/software

Quick Data Visualization

- Raster and vector visualization
- Adjustable bands and stretch
- Fast rendering with tiling approach
- Data auto-load and refresh
- Processing buttons for easy access
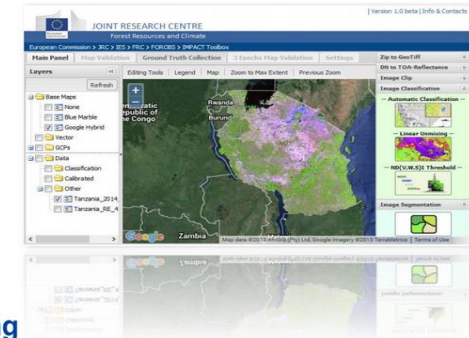
Map Visualization & Editing
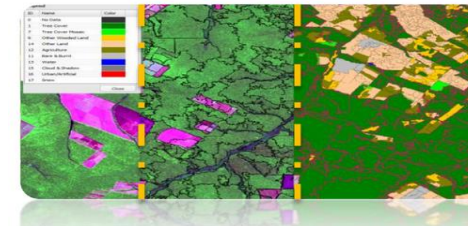
- Easy and efficient editing environment
- Selection and recoding by :
  - class or cluster
  - single or multi polygon
- 1 click edit
- Class masking / showing
- Customizable legend
- On the fly .dbf file editing

Ground Truth Collection

Collection of ground truth data at local, national or global scale is now faster with a built-it feature editor supporting either systematic samples collection or wall-to-wall feature labeling.

- Built-it degradation menu with identification of location, causes and intensity
- Customizable legend

ClimSA Station Jupyter Notebook

Jupiter Notebook

Heat Wave Analysis using ERA5

Box plot of seasonal forecast

Prototyping customized processing chains

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ClimSA Station Jupyter Notebook

- Station data from CLIMSOFT can be ingested into climate station using the Jupyter Notebook.

ClimSA Station Jupyter Notebook

Climate Bulletin Generation

Future features for the Climate Station

- Climate Station Chatbot for installation and usage assistance.
- Integration with the Africa knowledge Platform AKP

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Africa Knowledge Platform

Integrated Spatial Prioritisation Tools

The Africa Knowledge Platform is a scientifically driven **collaborative framework** focusing on devising innovative solutions leveraging **EO** and other **geospatial data** in support of global challenges within the **Green Transition** domain.

africa-knowledge-platform.ec.europa.eu

Science for the
AU-EU Partnership
Building knowledge for sustainable development

Data exploitation and Interoperability

AFRICA KNOWLEDGE PLATFORM

Science-Policy Interface

Cross fertilization

Technology Transfer

Decision-Support Systems

Beneficiaries

EU Delegations

DG INTPA DG RTD DG NEAR

African Regional Centers of Excellence

African Union Commission

Civil society & Practitioners

Observing forests, preserving uniqueness

Satellite Imagery for forest monitoring

21 March, International Day of Forests
26 giugno 2024

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Meet the Climate Station Team @JRC

Marco Clerici

Project Leader and JRC Co-ordinator for GMES&Africa and ClimSA programs

Vijay Charan Venkatachalam

Back-end and GIS

Carolina Arias Munoz

Data scientist and Thematic Applications

Baudouin Desclée

Thematic Expert

Jurriaan van't Klooster

Front-end and database

Dario Simonetti

Back-end, RS and GIS

Guido Notari

System integration

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Thank you

EU Science Hub
joint-research-centre.ec.europa.eu

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