

Climate Station: From deployed stations to operational climate services

17th EUMETSAT User Forum in Africa

Technical online session #3 – 11th June 2026

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Presentation overview

1. ClimSA Programme

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

2. Climate Station **key aspects**

Key elements and principles of the Climate Station

3. Climate Station **walkthrough**

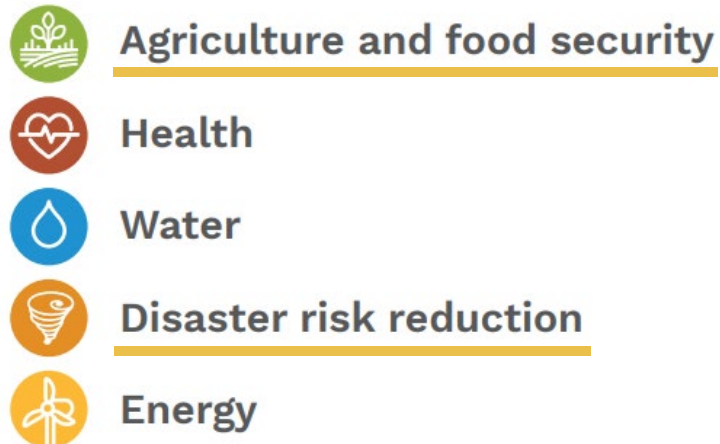
An explanation of the features and functionalities of Climate Station.

4. Conclusions



ClimSA and the JRC contribution

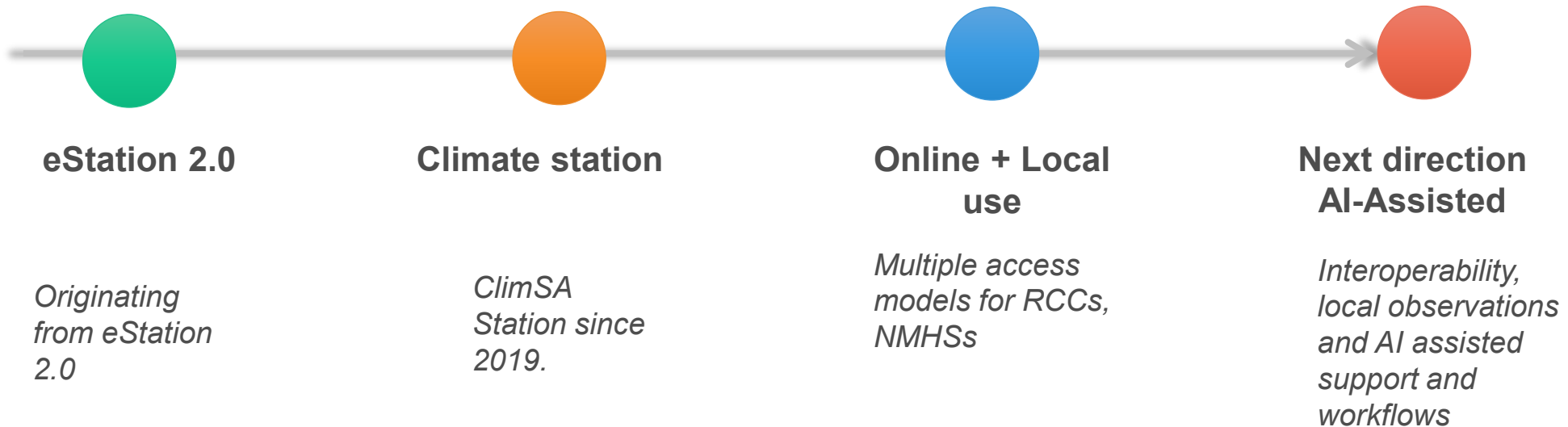
- ClimSA program supports the implementation of WMO Global Framework for Climate Services in ACP countries.
- 2019-2024 extension until 2025, 85 ME
- Supports 5 climate-sensitive sectors:



Technical support, capacity building, institution strengthening and, awareness

Climate Station Evolution

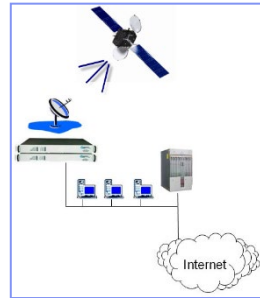
Software platform allowing users to access, process and visualized climate data automatically and in real time



Deployment and access models

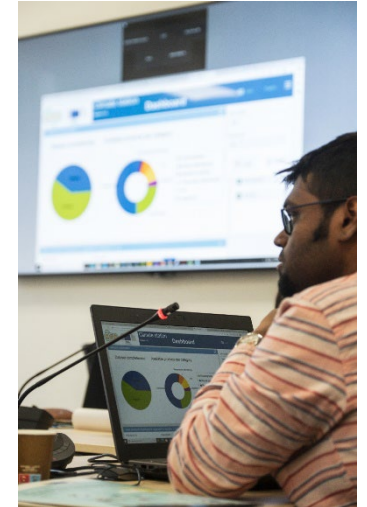


**Local
Deployment,**
Regional Level – RCCs
National Level – NHMS



**Portable/test
installation**
in a personal laptop

[GitHub -
Climate Station2/CS-Installer](#)



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

<https://estation.jrc.ec.europa.eu/estation3/>

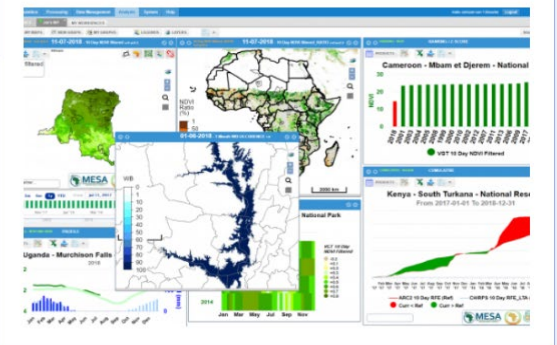
eStation online

The eStation online is a version of the eStation for Climate and Environment, giving access to visualisation and analysis components.

Languages: Available in English and French.

Restrictions: The eStation online cannot be used for commercial purposes.

[Access the eStation online >](#)



Dataset Distributed on Climate Station

Monitoring System (observations/climatology)

- EO derived datasets (precipitation, vegetation, fires, ..)
- Local observations (through CLIMSOFT or other DBMSs)
- Reanalysis (ERA5)
- Derived climate indices, like anomalies, terciles, extreme values
- JRC's products (Copernicus EMS fires, flood extent, droughts, vegetation, forest, fisheries, energy)

Seamless weather forecast

- From mid term to seasonal forecast
- Multi-model approach (C3S)
- Accurate derived products from extended ENS, SEAS5 related to Copernicus EMS (flood, low flows, extreme precipitation anomalies)

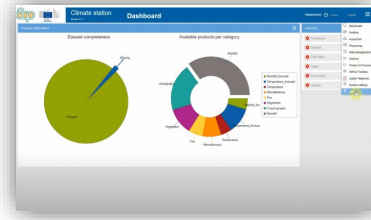
Climate projections

- Static datasets of climate projections CMIP6

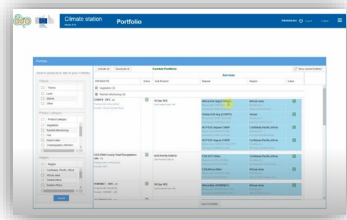


Climate Station Data Management Suite

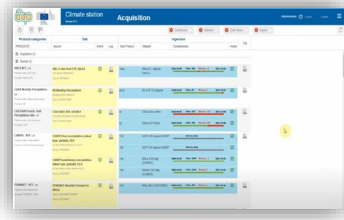
One chain: from product selection to service outputs



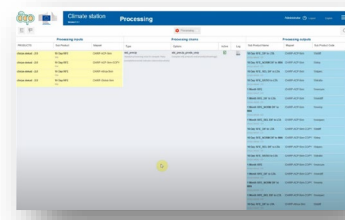
Dashboard
Overall control of services



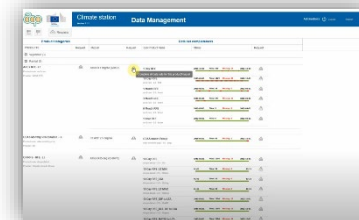
Portfolio
Activation of products



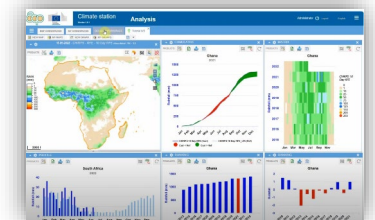
Acquisition
Automatic data download



Processing
Generate indicators and outputs



Data Management
Track completeness and recover missing data



Analysis
Track completeness and recover missing data



Advanced Modules for Specialized needs

Fitness for Purpose

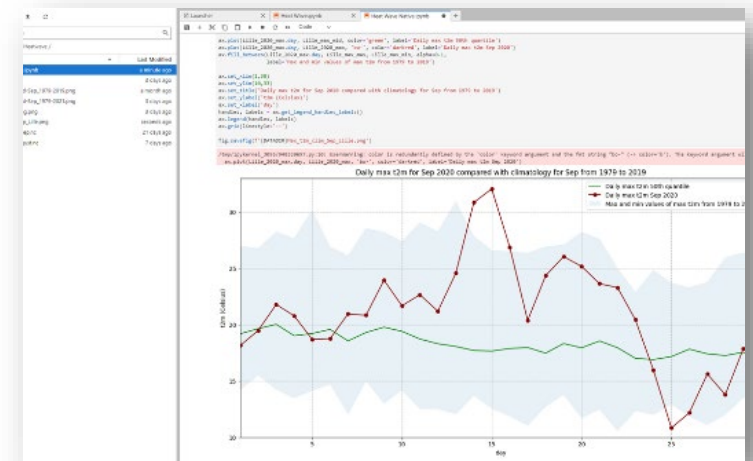
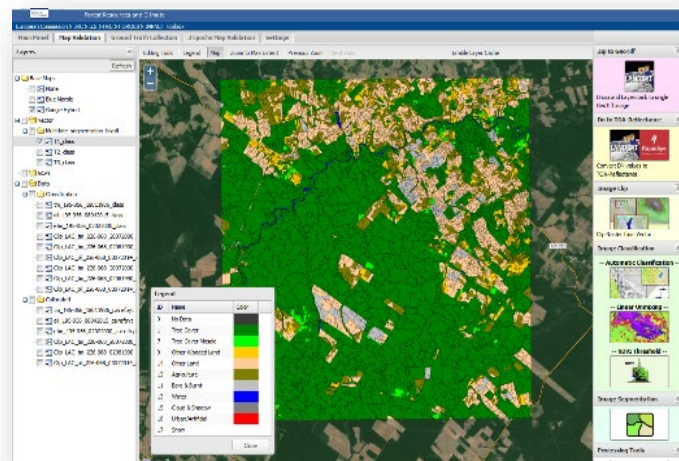
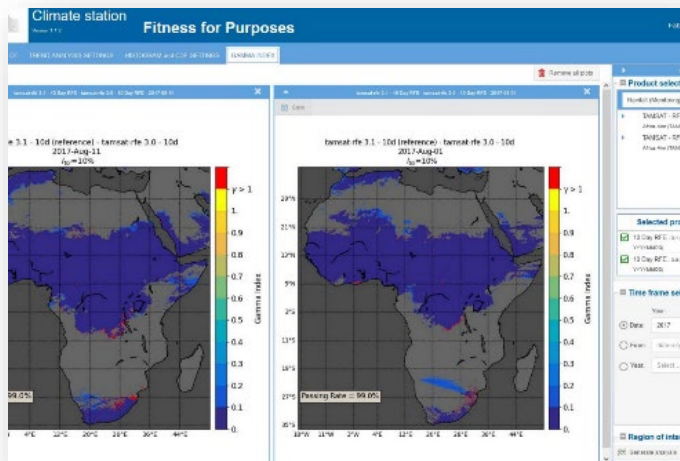
Assesses if data suits your needs

IMPACT Toolbox

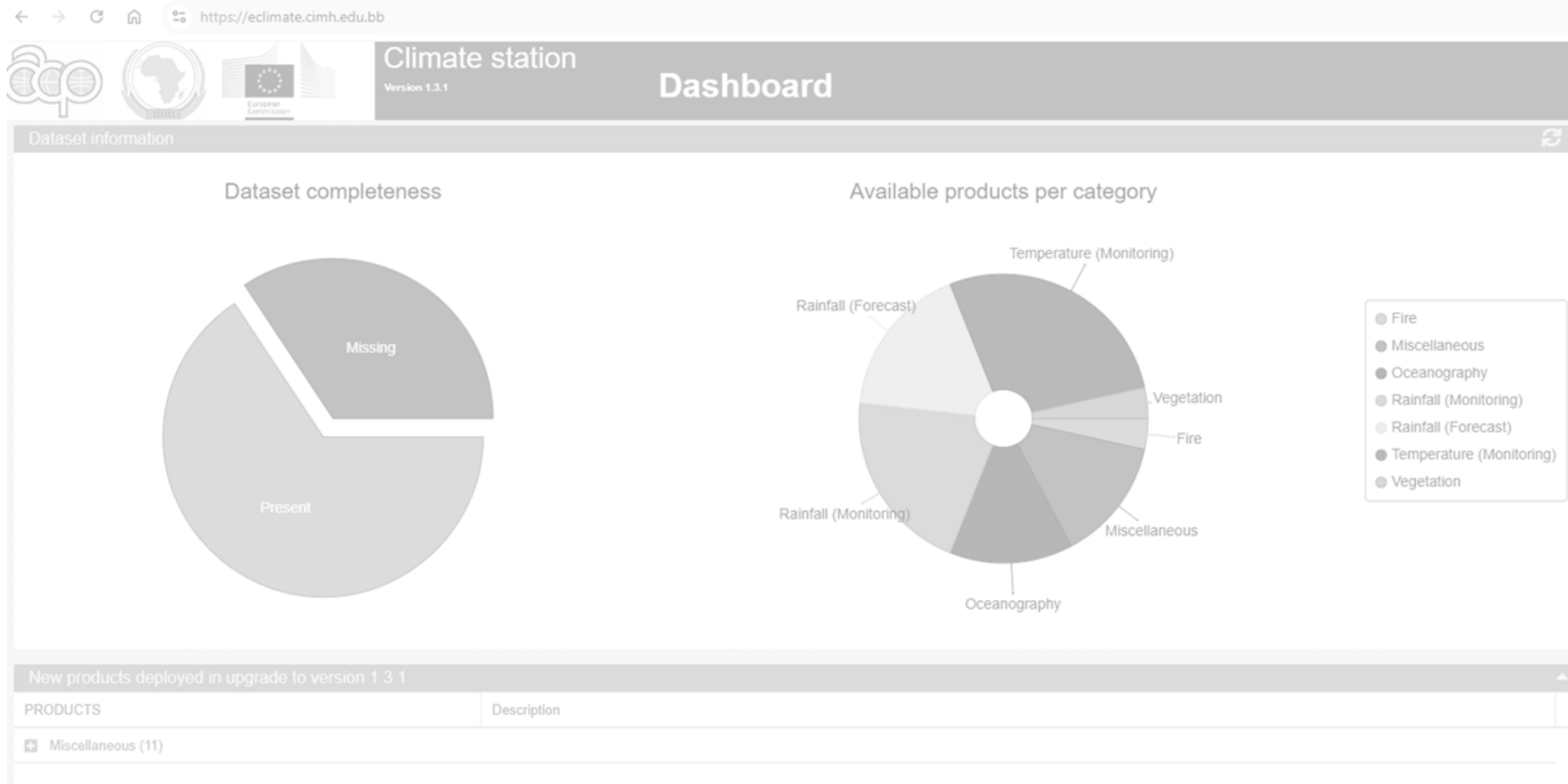
Maps land, water, and forest changes










Jupyter Notebooks

Interactive coding and data analysis



Climate Station Modules



-  Dashboard
-  Portfolio
-  Acquisition
-  Processing
-  Data Management
-  Analysis
-  Fitness for Purposes
-  IMPACT toolbox
-  Jupyter Notebook

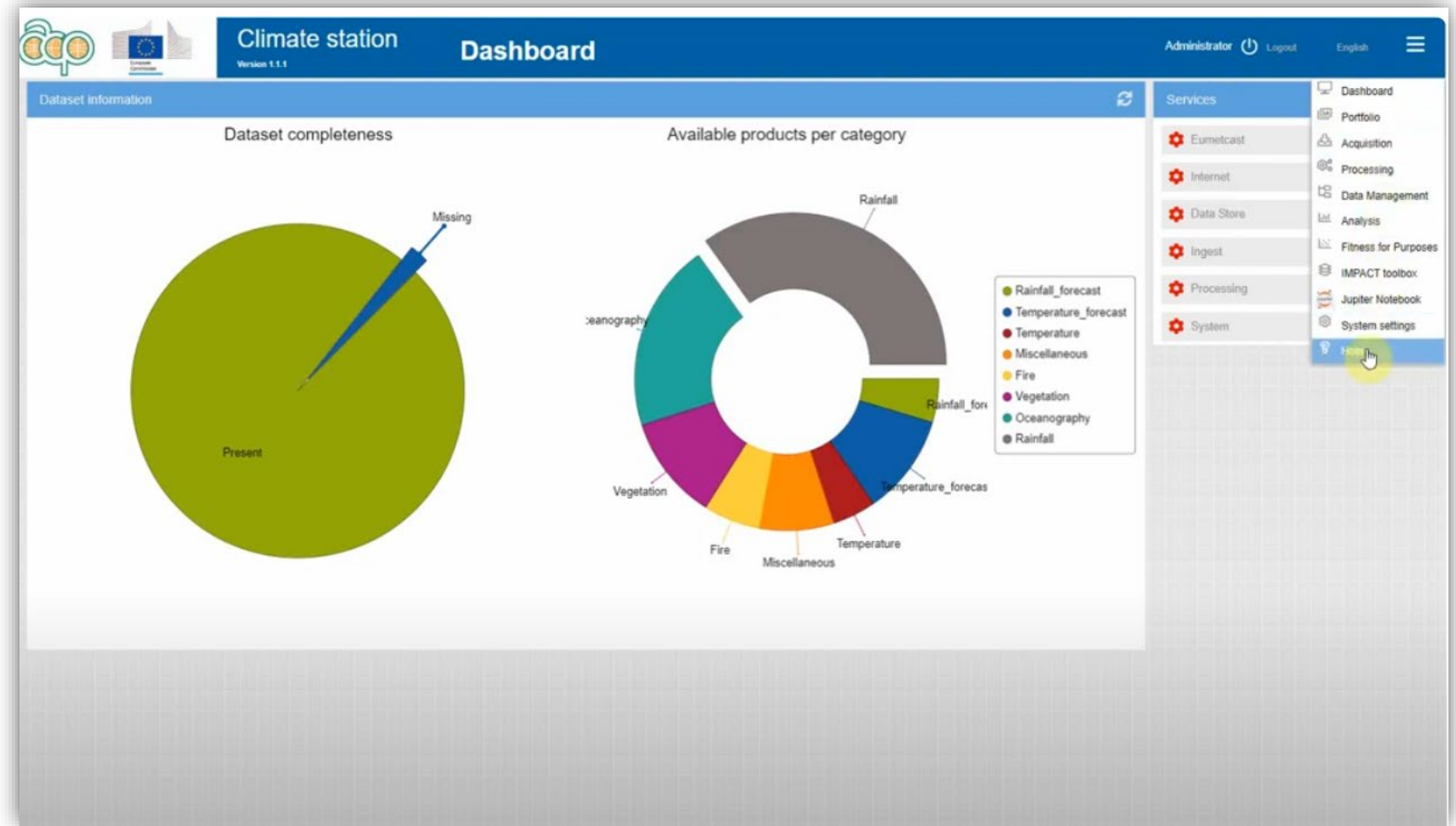


Climate Station GUI Overview 1/6



Dashboard

- Login
- Language Selection
- Overview of the local datasets
- Control of the Services
- Overview of products released on latest version



Climate Station GUI Overview 2/6



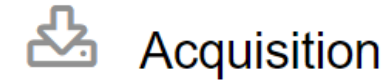
Portfolio

- Quick selection of the products of interest
- Check the list of products configured according to the user default list of products and ROI.
- Option to work on the newest products only
- Overview of the active products

The screenshot displays the 'Climate station Portfolio' interface. At the top, there's a navigation bar with 'Climate station Portfolio' and 'Version 1.1.1'. On the right, there are links for 'Administrator', 'Logout', and 'English'. The main content area is titled 'Portfolio' and includes a search bar and filters for 'Theme', 'Product category', and 'Region'. The 'Current Portfolio' section shows a table of products with columns: PRODUCTS, Active, Sub Product, Mapset, Region, and Active. The table lists several products, including CHIRPS - RFE - 2.0, CDS ERA5 hourly Total Precipitation rate - 1.0, and FEWSNET - RFE - 2.0. A yellow highlight is on the 'Africa 0.05 deg (CHIRPS)' product.

PRODUCTS	Active	Sub Product	Mapset	Region	Active
Vegetation (3)					
Rainfall (Monitoring) (8)					
CHIRPS - RFE - 2.0 Product code: chirps-rfe-2.0 Provider: Climate Hazards Group	<input checked="" type="checkbox"/>	10 Day RFE Sub Product Code: 10d	Africa 0.05 deg (CHIRPS) Mapset code: CHIRPS-Africa-10d Full mapset: CHIRPS-Africa-10d	African area Bounding box: Africa for RFE Products	<input checked="" type="checkbox"/>
			Global 0.05 deg (CHIRPS) Mapset code: CHIRPS-Global-10d Full mapset: CHIRPS-Africa-10d	Global Bounding box: Global for CHIRPS Products	<input checked="" type="checkbox"/>
			ACP 0.05 degree CHIRP Mapset code: CHIRPS-ACP-10d Full mapset: CHIRPS-Africa-10d	Caribbean,Pacific,Africa Bounding box: ACP region for RFE Products	<input checked="" type="checkbox"/>
			ACP 0.05 degree CHIRP Mapset code: CHIRPS-ACP-10d-COPY Full mapset: CHIRPS-Africa-10d	Caribbean,Pacific,Africa Bounding box: ACP region for RFE Products	<input checked="" type="checkbox"/>
CDS ERA5 hourly Total Precipitation rate - 1.0 Product code: era5-hourly-tp Provider: CDS	<input checked="" type="checkbox"/>	era5-hourly-total-tp Sub Product Code: tp	CDS-ACP-25km Mapset code: CDS-ACP-25km Full mapset: CDS-ACP-25km	Caribbean,Pacific,Africa Bounding box: ACP region for CDS Products	<input checked="" type="checkbox"/>
			CDS Africa 25km Mapset code: CDS-Africa-25km Full mapset: CDS-ACP-25km	African area Bounding box: Africa for RFE Products CDS	<input checked="" type="checkbox"/>
FEWSNET - RFE - 2.0 Product code: fewsnet-rfe Provider: FEWSNET - JRC	<input checked="" type="checkbox"/>	10 Day RFE Sub Product Code: 10d	Africa 8km (FEWSNET) Mapset code: FEWSNET-Africa-8km Full mapset: FEWSNET-Africa-8km	African area Bounding box: Africa for RFE Products	<input checked="" type="checkbox"/>

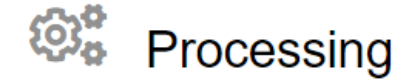
Climate Station GUI Overview 3/6



- Control of the Acquisition of incoming products
- Check the logfiles of the Services
- Check the Data completeness

PRODUCTS	Source	Active	Log	Sub Product	Mapset	Completeness	Active	Log
Vegetation (3)								
Rainfall (8)								
ARC2 RFE - 2.0 Product code: arc2-rain Provider: NASA-CPC	ARC2 rain from CPC-NASA CPC NOAA RAIN ARC2 Source: INTERNET	✓	Log	1day	Africa 0.1 degree (ARC2)	2021-10-03 Files: 346 Missing: 14 2022-10-03	✓	Log
CDAS Monthly Precipitation - 1.0 Product code: cdas-monthly-prcp Provider: IB	IRI Monthly Precipitation IB NOAA-PRCP-MONTH Source: DATASTORE	✓	Log	prcp	IRI ACP 2.5 degree	2019-01-01 Files: 44 Missing: 2 2022-10-01	✓	Log
CDS ERA5 hourly Total Precipitation rate - 1.0 Product code: era5-hourly-tp Provider: CDS	CDS ERA5 RFE HOURLY CDS ERA5 REANALYSIS RFE HOUR Source: DATASTORE	✓	Log	tp	CDS Africa 25km	2022-09-03 Files: 745 Missing: 745 2022-10-04	✓	Log
				tp	CDS-ACP-25km	2022-09-03 Files: 745 Missing: 240 2022-10-04	✓	Log
CHIRPS - RFE - 2.0 Product code: chirps-dekad Provider: Climate Hazards Group	CHIRPS final precipitation, dekad type, globally, V2.0 UC:IB:CHIRPS-DEKAD-2.0-HTTP Source: INTERNET	✓	Log	10d	ACP 0.05 degree CHIRP	Not any data	✓	Log
				10d	ACP 0.05 degree CHIRP	Not any data	✓	Log
	CHIRPS preliminary precipitation, dekad type, globally, V2.0 UC:IB:CHIRPS-PREL-DEKAD-HTTP Source: INTERNET	✓	Log	10d	Africa 0.05 deg (CHIRPS)	1981-01-01 Files: 1504 Missing: 11 2022-10-01	✓	Log
				10d	Global 0.05 deg (CHIRPS)	1981-01-01 Files: 1504 Missing: 2 2022-10-01	✓	Log
FEWSNET - RFE - 2.0 Product code: fewsnet-rfe Provider: FEWSNET - JRC	FEWSNET Rainfall Estimate for Africa USQ1:EARLWIN:FEWSNET Source: INTERNET	✓	Log	10d	Africa 8km (FEWSNET)	2001-01-01 Files: 784 Missing: 1 2022-10-01	✓	Log

Climate Station GUI Overview 4/6



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

The screenshot shows the 'Climate station Processing' interface. The top navigation bar includes the 'Climate station' logo, 'Version 1.1.1', and user information: 'Administrator', 'Logout', and 'English'. A 'Processing' status indicator is visible in the top right.

Processing inputs				Processing chains				Processing outputs		
PRODUCTS	Sub Product	Mapset	Type	Options	Active	Log	Sub Product Name	Mapset	Sub Product Code	
chirps-dekad - 2.0	10 Day RFE	CHIRP-ACP-5km	std_precip	std_precip_prods_only	<input checked="" type="checkbox"/>		10 Day RFE_DIF to LTA	CHIRP-ACP-5km	10ddiff	
chirps-dekad - 2.0	10 Day RFE	CHIRP-ACP-5km-COPY					10 Day RFE_NORM DIF to MIN	CHIRP-ACP-5km	10dnpr	
chirps-dekad - 2.0	10 Day RFE	CHIRP-Africa-5km					10 Day RFE_REL DIF to LTA	CHIRP-ACP-5km	10dperc	
chirps-dekad - 2.0	10 Day RFE	CHIRP-Global-5km					10 Day RFE_RATIO to LTA	CHIRP-ACP-5km	10drafo	
							1 Month RFE	CHIRP-ACP-5km	1moncum	
							1 Month RFE_DIF to LTA	CHIRP-ACP-5km	1mondif	
							1 Month RFE_NORM DIF to MIN	CHIRP-ACP-5km	1monnpr	
							1 Month RFE_REL DIF to LTA	CHIRP-ACP-5km	1monperc	
							10 Day RFE_DIF to LTA	CHIRP-ACP-5km-COPY	10ddiff	
							10 Day RFE_NORM DIF to MIN	CHIRP-ACP-5km-COPY	10dnpr	
							10 Day RFE_REL DIF to LTA	CHIRP-ACP-5km-COPY	10dperc	
							10 Day RFE_RATIO to LTA	CHIRP-ACP-5km-COPY	10drafo	
							1 Month RFE	CHIRP-ACP-5km-COPY	1moncum	
							1 Month RFE_DIF to LTA	CHIRP-ACP-5km-COPY	1mondif	
							1 Month RFE_NORM DIF to MIN	CHIRP-ACP-5km-COPY	1monnpr	
							1 Month RFE_REL DIF to LTA	CHIRP-ACP-5km-COPY	1monperc	
							10 Day RFE_DIF to LTA	CHIRP-Africa-5km	10ddiff	

Climate Station GUI Overview 5/6

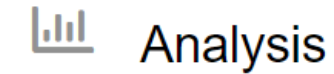
Data Management

- 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).

The screenshot displays the 'Climate station Data Management' interface. The top navigation bar includes the station logo, 'Climate station Data Management', 'Version 1.1.1', and user options like 'Administrator', 'Logout', and 'English'. Below the navigation, there are icons for 'Requests' and a refresh button. The main content area is divided into 'Product categories' and 'Data set completeness'. The 'Data set completeness' section shows a table of products with their respective data status. A tooltip is visible over the '1 Day RFE' row for the 'ARC2 RFE - 2.0' product, indicating a message to 'Complete all data sets for this product/mapset'.

PRODUCTS	Request	Mapset	Request	Sub Product Name	Status	Request
Vegetation (3)						
Rainfall (8)						
ARC2 RFE - 2.0 Product code: arc2-rain Provider: NASA-CPC		Africa 0.1 degree (ARC2)		1 Day RFE arc2-rain - 2.0 - 10d	2021-10-03 Files: 366 Missing: 14 2022-10-03	
				10 Day RFE arc2-rain - 2.0 - 10d	1983-02-01 Files: 3429 Missing: 80 2022-10-01	
				1 Month RFE arc2-rain - 2.0 - 1mon	2020-01-01 Files: 33 Missing: 5 2022-09-01	
				3 Month RFE arc2-rain - 2.0 - 3mon	1983-05-01 Files: 473 Missing: 22 2022-09-01	
				6 Month RFE arc2-rain - 2.0 - 6mon	2022-07-01 Files: 3 Missing: 0 2022-09-01	
				1 Year RFE arc2-rain - 2.0 - 1year	2022-04-01 Files: 6 Missing: 0 2022-09-01	
CDAS Monthly Precipitation - 1.0 Product code: cdas-monthly-prcp Provider: SI		IRI ACP 2.5 degree		CDAS month Precip cdas-monthly-prcp - 1.0 - prcp	2019-01-01 Files: 46 Missing: 2 2022-10-01	
CHIRPS - RFE - 2.0 Product code: chirps-dekad Provider: Climate Hazards Group		Africa 0.05 deg (CHIRPS)		10 Day RFE chirps-dekad - 2.0 - 10d	1981-01-01 Files: 1504 Missing: 11 2022-10-01	
				10 Day RFE_LT MIN chirps-dekad - 2.0 - 10dmin	01-01 Files: 36 Missing: 0 12-21	
				10 Day RFE_LTA chirps-dekad - 2.0 - 10davg	01-01 Files: 36 Missing: 0 12-21	
				10 Day RFE_LT MAX chirps-dekad - 2.0 - 10dmax	01-01 Files: 36 Missing: 0 12-21	
				10 Day RFE_DIF to LTA chirps-dekad - 2.0 - 10ddiff	1981-01-01 Files: 1504 Missing: 11 2022-10-01	
				10 Day RFE_REL DIF to LTA chirps-dekad - 2.0 - 10dperc	1981-01-01 Files: 1504 Missing: 11 2022-10-01	
				10 Day RFE_RATIO to LTA chirps-dekad - 2.0 - 10dperc	1981-01-01 Files: 1504 Missing: 11 2022-10-01	

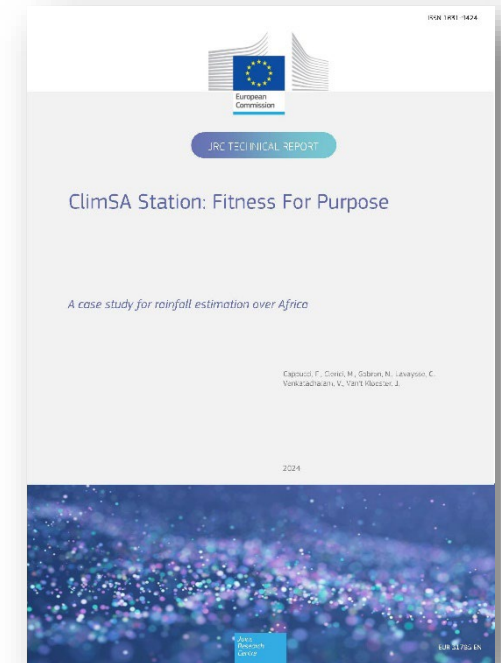
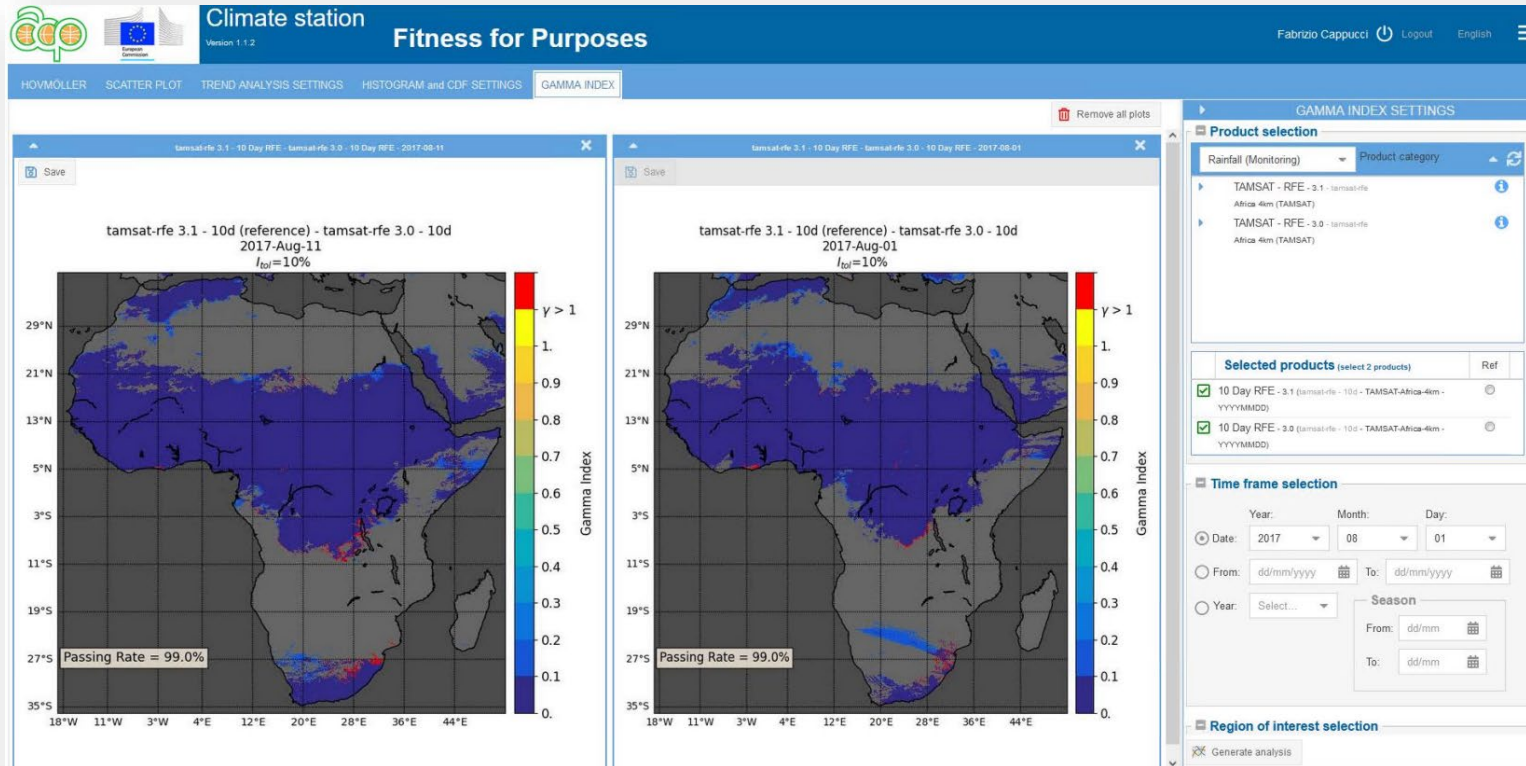
Climate Station GUI Overview 6/6



- 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.



Climate Station Fitness for Purpose



<https://publications.jrc.ec.europa.eu/repository/handle/JRC135478>

Climate Station IMPACT Toolbox

3. Climate Station walkthrough



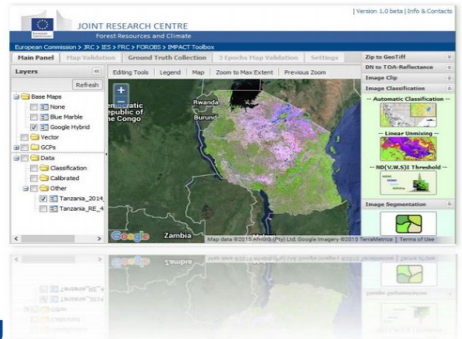
IMPACT TOOLBOX

- ✓ Portable GIS
- ✓ Free & Open Source
- ✓ Online / Offline
- ✓ Easy to Use

Runs on Windows Xp/7/8/10

Quick Data Visualization

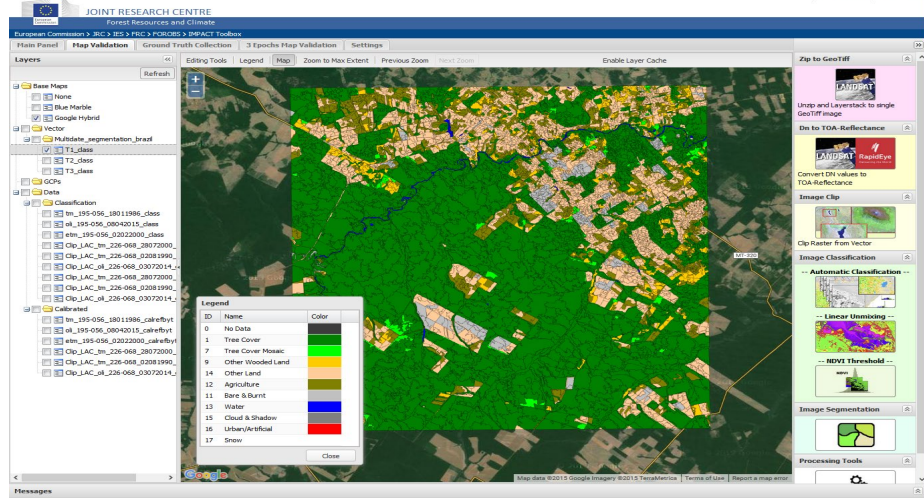
- Raster and vector visualization
- Adjustable bands and stretch
- Fast rendering with tiling approach
- Data auto-load and refresh
- Processing buttons for easy access



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-in feature editor supporting either systematic samples collection or wall-to-wall feature labeling.

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

ID	Name	Cause1	Comment
1	63	Rubino	Shifting Cultivation / Oil Palm

IMPACT Toolbox
<http://forobs.jrc.ec.europa.eu/products/software>



Climate Station Jupyter Notebook

```
[ ]: from apps.processing.proc
[ ]: from apps.productmanagement.databse
```

```
tamsat = Dataset(product_code="tamsat-rfe", sub_product_code="10d", mapset="TAMSAT-Africa-4km", version="3.1")

[ ]: tamsat.filter("20170101", "20221231")
[ ]: tamsat_proc = Processing(tamsat)
[ ]: LTS_avg_tamsat = tamsat_proc.compute_LTS_avg()
[ ]: tamsat_proc.close()
```

Name	Last Modified
0101_tamsat-rfe_10davg_T...	an hour ago
0111_tamsat-rfe_10davg_T...	an hour ago
0121_tamsat-rfe_10davg_T...	an hour ago
0201_tamsat-rfe_10davg_T...	an hour ago
0211_tamsat-rfe_10davg_T...	an hour ago
0221_tamsat-rfe_10davg_T...	an hour ago
0301_tamsat-rfe_10davg_T...	an hour ago
0311_tamsat-rfe_10davg_T...	an hour ago

Prototyping customized processing chains

Heat Wave Analysis using ERA5

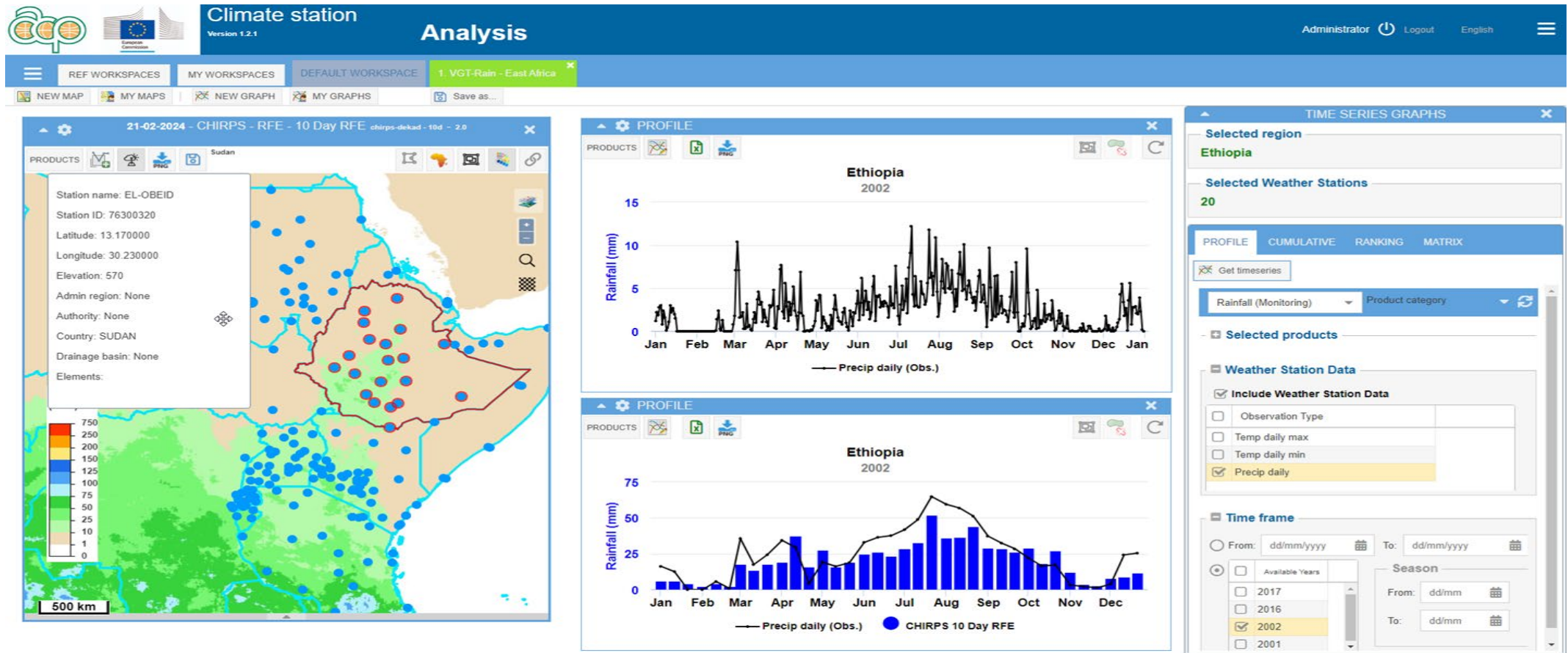
Box plot of seasonal forecast

Jupyter Notebook



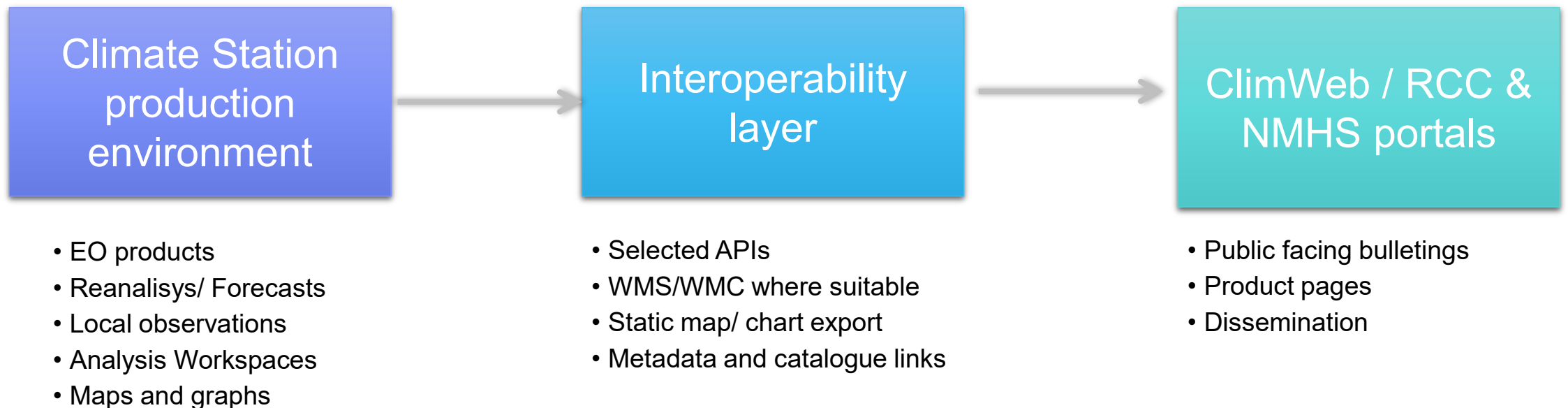


Ingestion of Weather Station Data

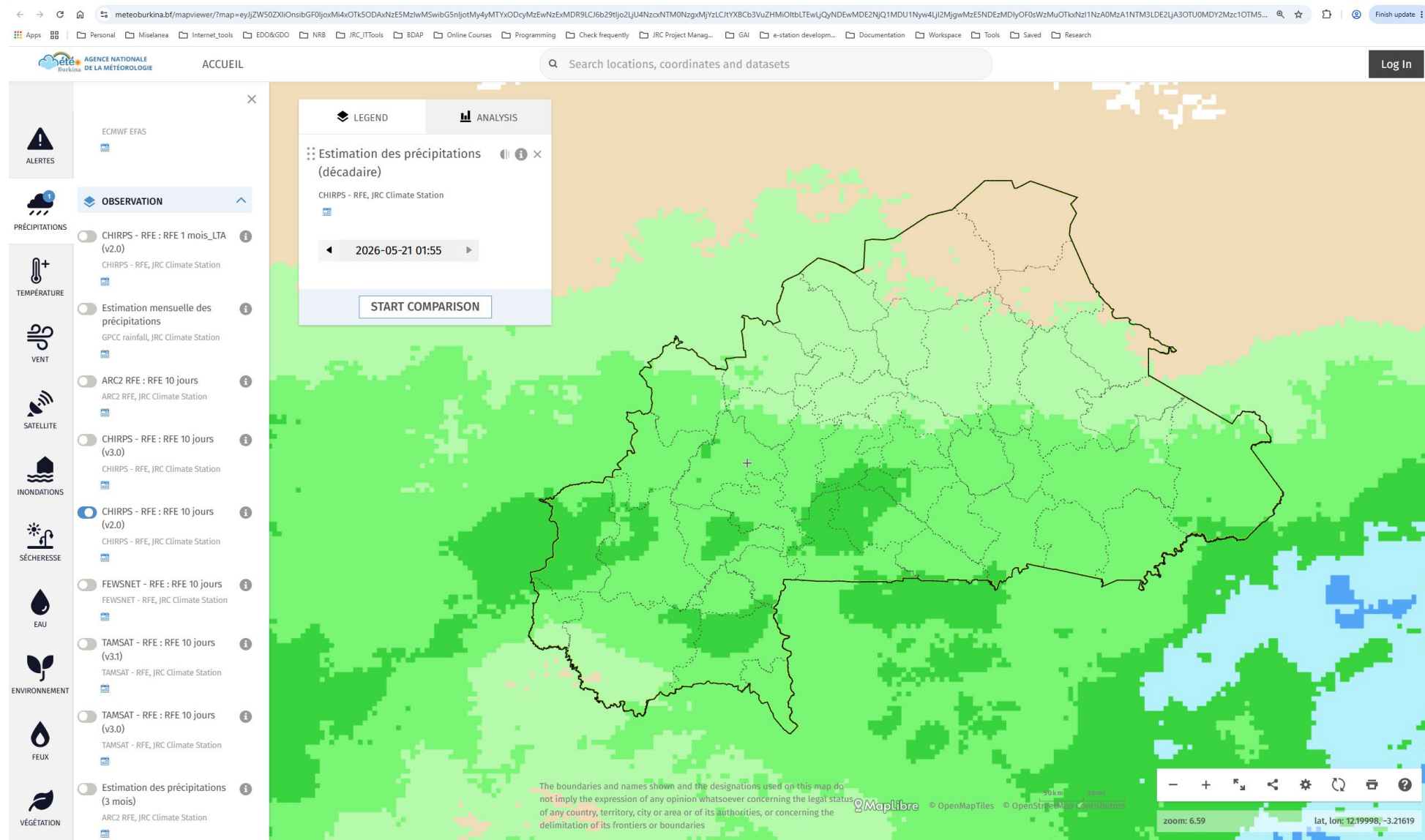


Interoperability: connecting production with dissemination

Climate station remains the processing and analysis engine; other tools can be the dissemination channels



Interoperability: connecting production with dissemination



AI-assisted Climate Station workflows

From a data and workflow platform to an environment where users can ask, understand and progressively trigger tasks.

Ask

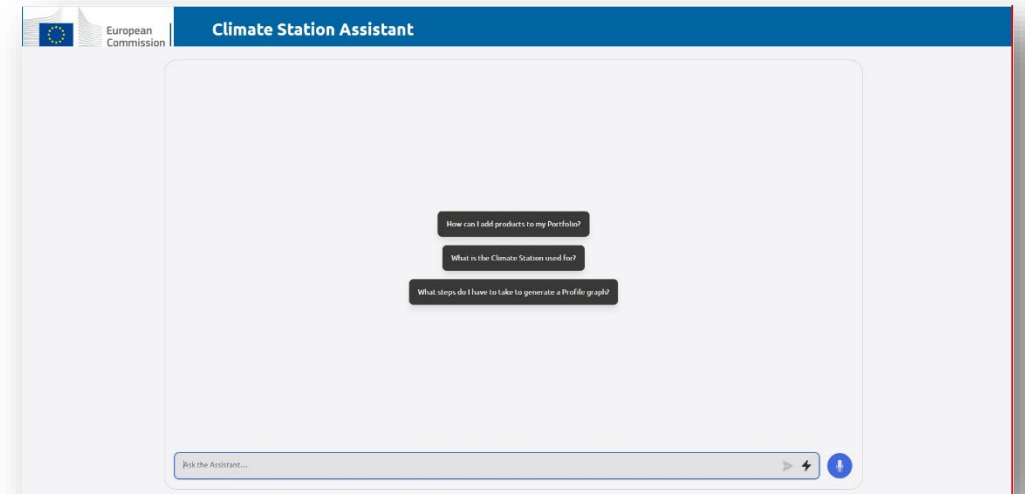
Questions about datasets, manuals, workflows and known issues

Understand

Answers grounded in documentation, training material and platform metadata

Support action

Guided steps, maps, workspace drafts or bulleting support actions



Phase 1: grounded support

Help users understand the platform, documentation, datasets and workflows.

Phase 2: agentic assistance

Expose selected eStation capabilities as safe tools through MCP servers or an equivalent pattern.



Take away

- The Climate Station **centralizes a diverse array of data sources**, streamlining the transformation of raw data into **actionable climate indices** and advanced products for various domains.
- **It extends forecasting capabilities**, moving beyond short-term predictions to provide mid-term and seasonal forecasts using a multi-model system for better uncertainty assessment.
- The Climate Station consolidates diverse data sources, **reducing the overload of raw data** and enhancing our focus on meaningful analysis and interpretation.



Questions for the working groups

Interoperability

Is there a need to connect the Climate station with other tools? (example: Climweb)

Deployment

Is the ClimSA Station installed and operational? How is the station currently used?
What blocks use?

In-situ data

Are you interested in adding local station data?

Sustainability

How can the RCC support sustainability? Helpdesk, focal points, regional clinics, training-of-trainers, product validation?

AI support

Are there other similar experiences in your institution? Is the use of AI permitted?
What are the possible use cases?

Thank you



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