

Athens

Analysis of Satellite Images for the Identification of Critical Points in Forest Fire Scenarios

Rui Pedro Tavares de Oliveira

26th July 2023



ONESOURCE



Project supported by:
ESA Network of Resources Initiative

5 km

19 July 2023

5 km

23 July 2023

Summary

01 Problem
Background

02 Purpose of the
Internship

03 Conceptual
Part

04 Evalscripts
Custom Scripts

05 Identification of
watercourses

06 Identification of
healthy vegetation

07 Identification of
dry vegetation

08 Conclusions and
Final Considerations

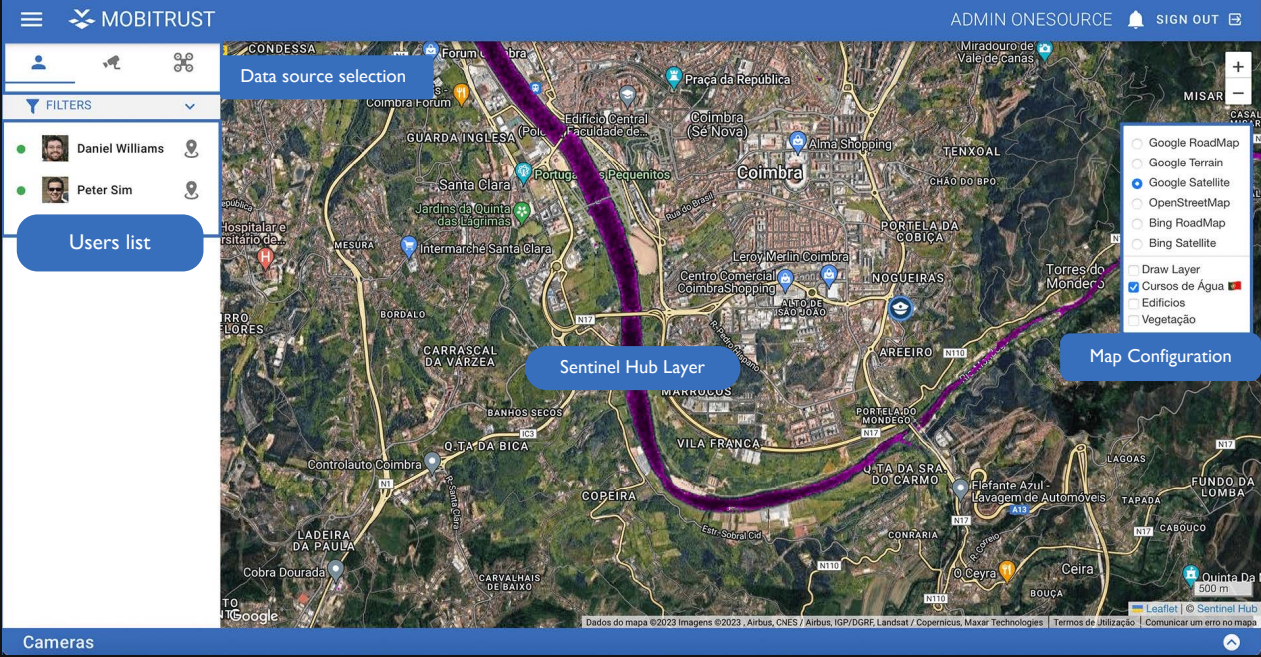
Problem Background

Wildfires

Loss of human lives and properties.



Public Protection and Disaster Relief Platform



Main objectives

- 01** Study of remote sensing satellite image analysis and processing mechanisms.
- 02** Implementation of one or multiple mechanisms for remote sensing analysis and processing.
- 03** Analysis on the accuracy and workability of the developed mechanisms.

Objetivos Específicos

01 Identification of watercourses



02 Identification of healthy vegetation



03 Identification of dry vegetation



Conceptual Part

0.1 Remote Sensing

0.2 Spectral Bands

0.3 Spacial Resolution

Understanding whether and how spatial resolution influences the detection.

0.4 Spectral signature

Understanding the behavior of the studied objects (water and vegetation).

0.5 Multispectral and multi-temporal scripts

0.6 Sentinel-Hub

Understanding the functionality of Sentinel Hub's API and establishing the connection between the API and Mobitrust's Platform.

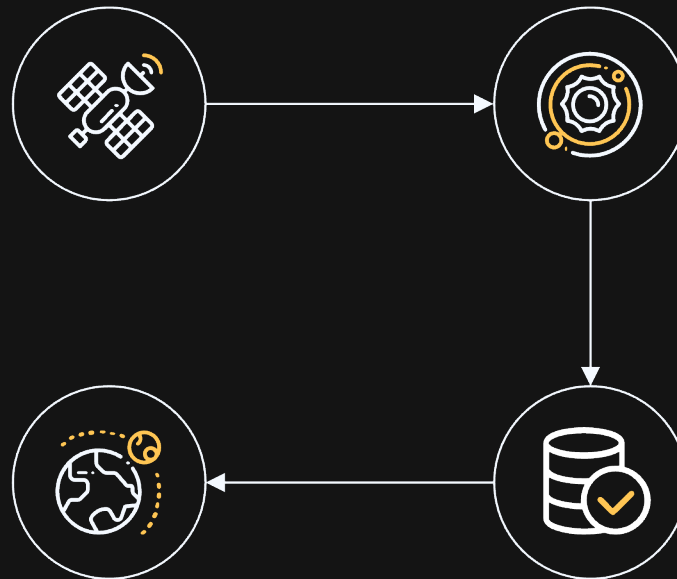
Sentinel Hub – Data Acquisition

Data Acquisition

The data are obtained through ESA Platform

Sentinel Hub

Sentinel Hub downloads the provided data from ESA's Open Hub.



Data Processing

The images are processed by ESA

Availability

After processing, the data is available on ESA's Open Hub Portal.

Evalscripts / Custom Scripts

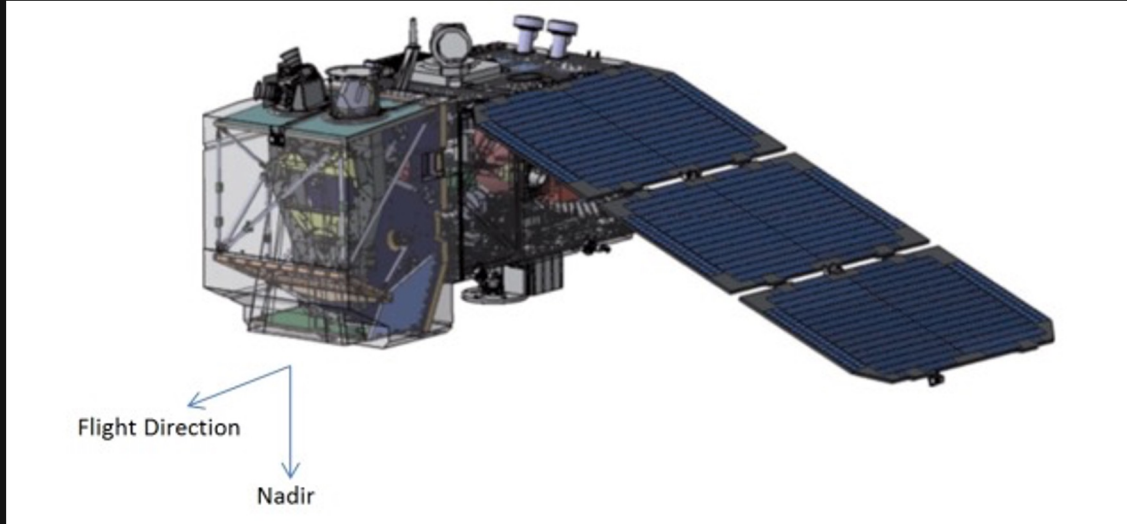
Provided Evalscripts

01 Normalized Difference
Vegetation Index (NDVI)

02 Normalized Difference
Water Index (NDWI)

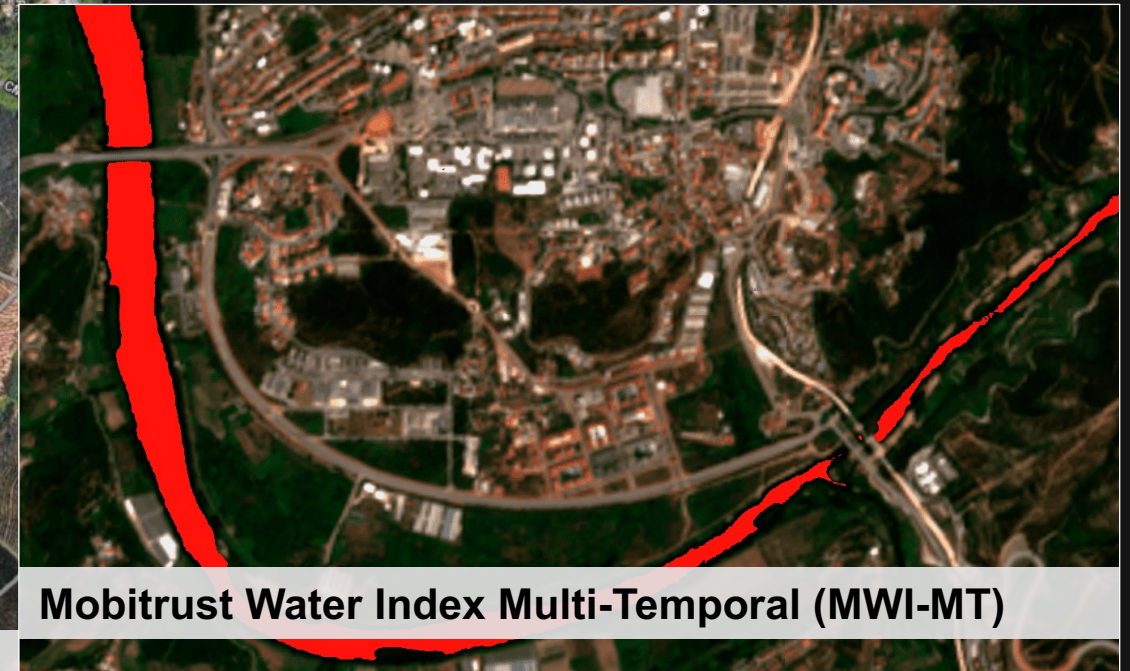
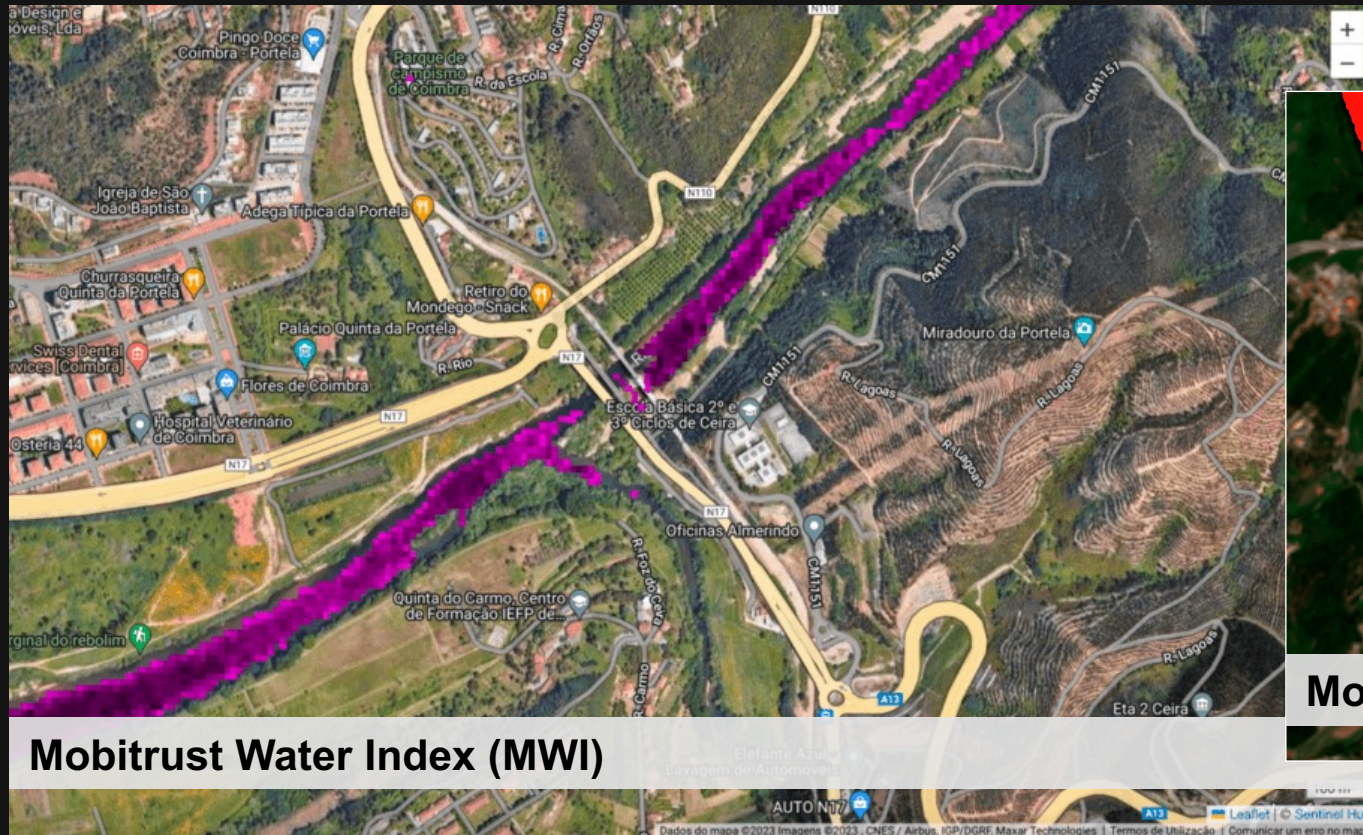
03 Normalized Difference
Moisture Index (NDMI)

Sentinel-2

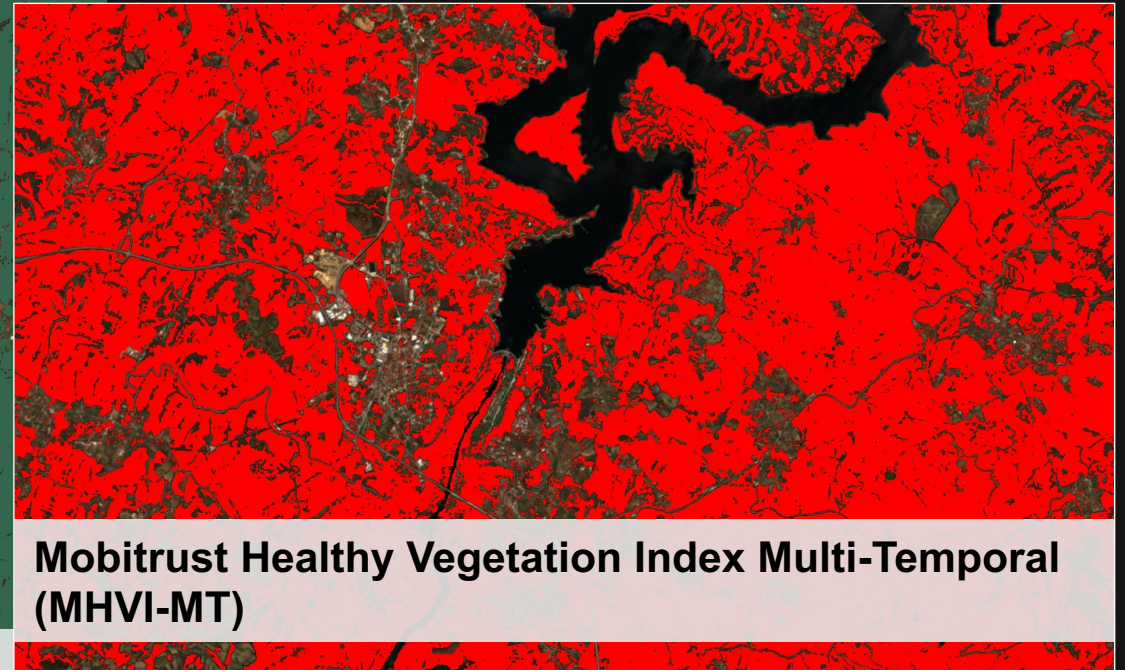
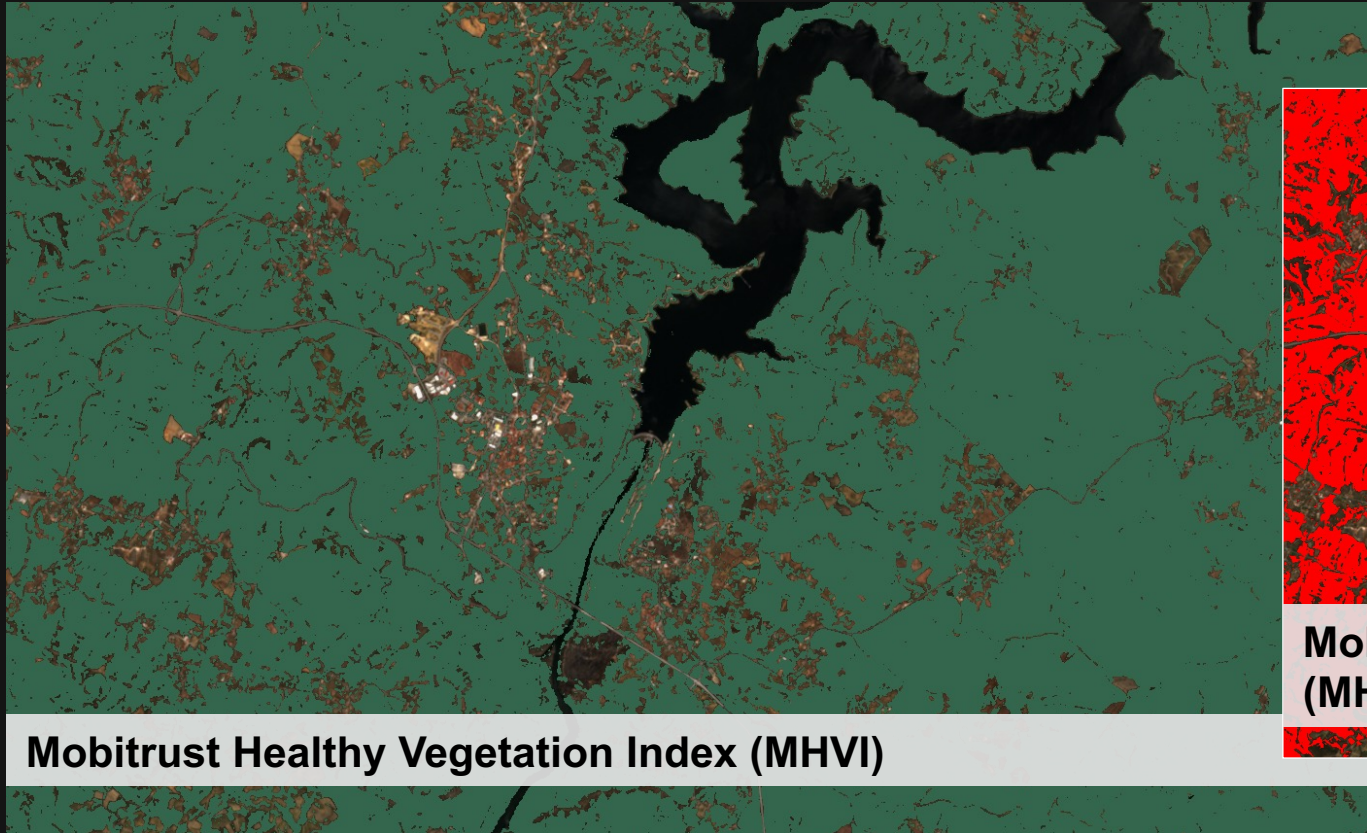


- The selected satellite for all of the mechanisms mentioned.
- Has 12 spectral bands
- Spatial Resolution [10m² , 60m²]
- Revisit time: 5 days

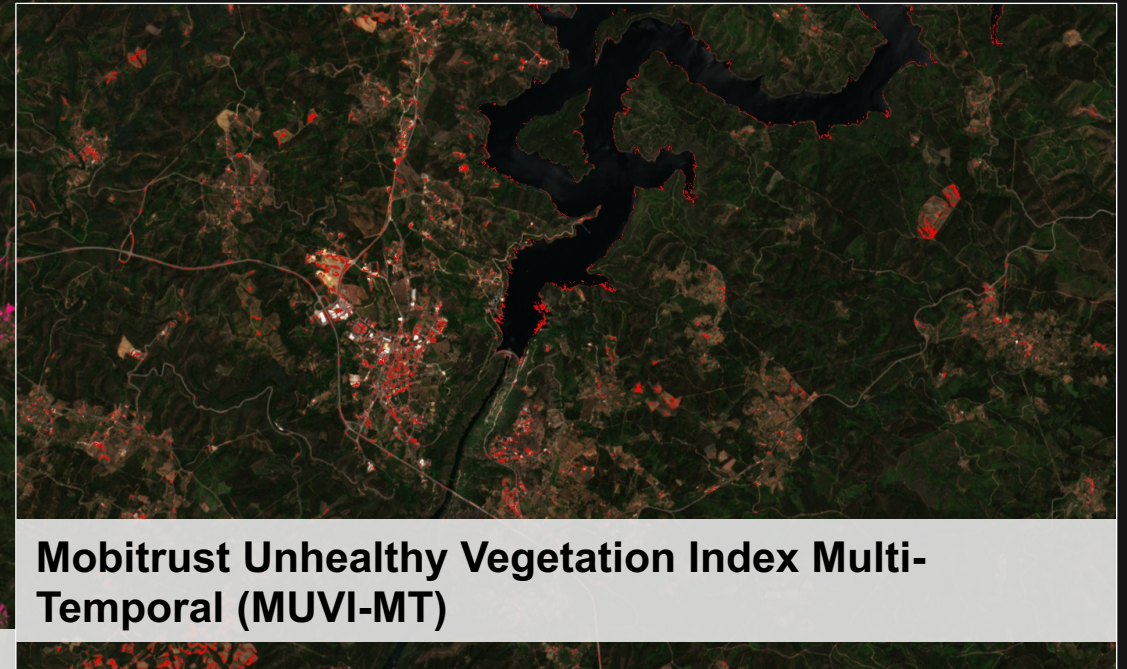
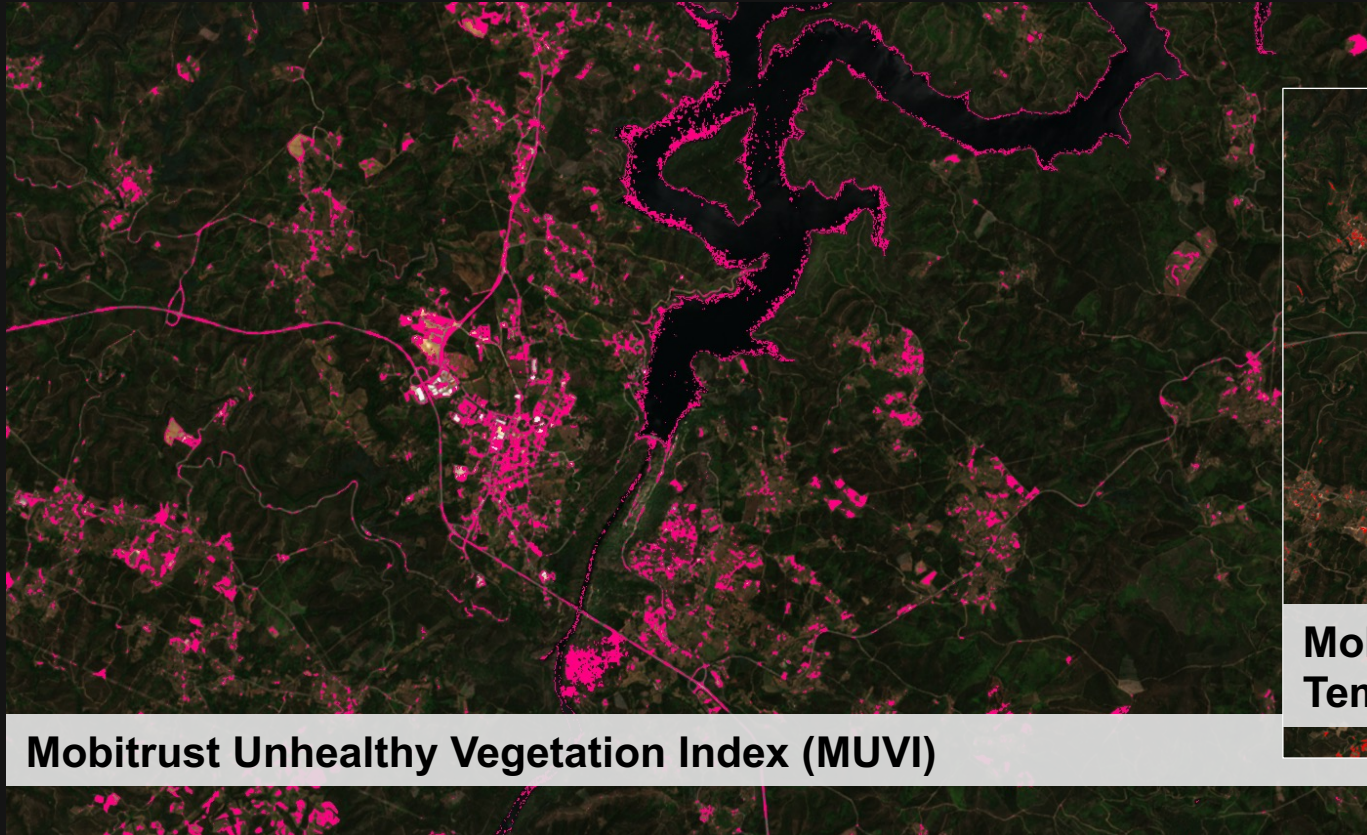
Identification of Watercourses



Identification of Healthy Vegetation



Identification of Dry Vegetation



Conclusions and Final Considerations

01 It is possible to accurately identify the delineation of large watercourses.

02 It is possible to accurately identify the delineation of healthy vegetation.

03 It is not possible to ensure an exact delineation of narrow watercourses.

Conclusions and Final Considerations

04

It is not possible to ensure an exact delineation of dry vegetation.

05

This delineations are more dependent on the surrounding environment.

06

The MHVI script is accurate but may present flaws in vegetation identification.

Conclusions and Final Considerations

07

The MUVI script can identify dry vegetation only when it presents colors that stand out from the surrounding environment.

08

The implementation of these evalscripts (MHVI and MUVI) requires a broader study regarding the seasonality and behavior of vegetation.

09

It is advisable to carry out on-site confirmation to compare real vegetation with what is obtained from satellite images.

Conclusions and Final Considerations

10

In the future, this work should follow two paths:

- Analysis of the created scripts, accompanied by on-site verification (to calibrate the scripts).
- Implementation of an Artificial Intelligence tool, based on the acquired knowledge.

ESA Sentinel-2 – Wildfires rage near Athens



ESA Sentinel-2 – Rhodes Wildfire



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