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Eco Ready

How remote sensing can support data provision of LLs (a case study of THALLA Living Lab)

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Limassol 12–15 May 2025

ECOREADY "Biodiversity, Food Security and Policy-Making" Conference

HORIZON EUROPE

ECO-READY

Achieving Ecological Resilient Dynamism for the European food system through consumer-driven policies

Project Information

ECO-READY

Grant agreement ID: 101084201

DOI

10.3030/101084201

Start date 1 December 2022

End date 30 November 2026

Funded under

Food, Bioeconomy Natural Resources, Agriculture and Environment

Total cost

€ 13 628 428,75

EU contribution

€ 13 628 428,50

Coordinated by

CESKA ZEMEDELSKA UNIVERZITA V PRAZE

Czechia

Duration:	48 months
Call identifier:	HORIZON-CL6-2022-CLIMATE-01
Topic:	HORIZON-CL6-2022-CLIMATE-01-04 - Fostering the resilience of food security: from observation of changes to the development of resilience strategies
Instrument:	Research & Innovation Action (RIA)
Partners	18

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Project overview

Aims & Objectives

ECO-READY equips the European food system with the means to obtain the necessary resilience and consolidate food security through improving policy-making capacity, by understanding the interconnections between climate change, biodiversity, and food security.

ECO-READY Vision

- ECO-READY produces knowledge-based resilience strategies and develop tools that will be embedded on the Observatory.
- The underlining principle behind the ECOREADY approach is, resilient dynamism, i.e. tackling immediate problems and long-term challenges at the same time.

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Project overview

Project Outputs

We develop and embed in the Observatory:

- 50 quantified scenarios, addressing the regional needs of the 10 Living Labs
- Policy recommendations and contingency plans based on the quantified scenarios
- Resilience strategies, resulting from the above
- An Early Warning System, and
- AI powered decision support tools

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ECO-READY OBSERVATORY APP

Data

Knowledge

Living Labs

SECO COLLAB SCANDINAVIAN LLB

Eco Ready Masuria

AIDEMEC

CONCAT LIVING LAB

PROBIO

ESAPPIN Living Lab NRW

LOFS Eco Ready

EcoVitaLL

LivOrganic

THALLA

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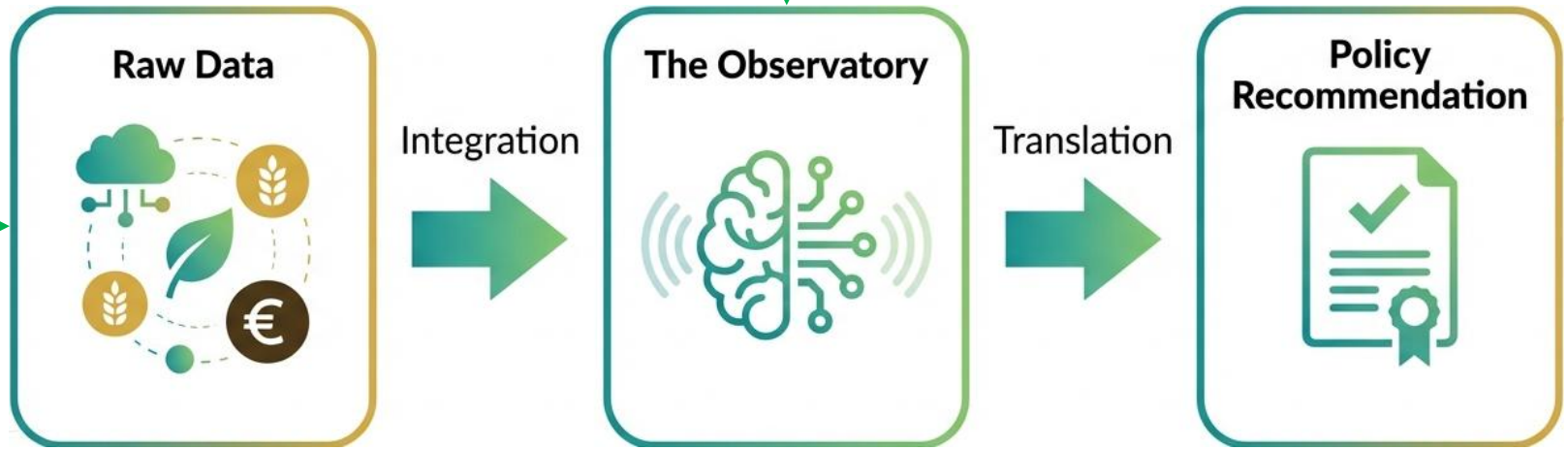
Project overview

Knowledge Infrastructure

10 LLs implement field trials, data collection and scenario development

Observatory & Mobile app being developed and tested with users.



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Introduction to Remote Sensing and Satellite Data

Remote sensing:

- ✓ RS is the process of acquiring information about an object or area from a distance, typically using aircrafts or satellites
- ✓ It involves detection and measuring radiation (such as light) that is reflected or emitted from the Earth's surface

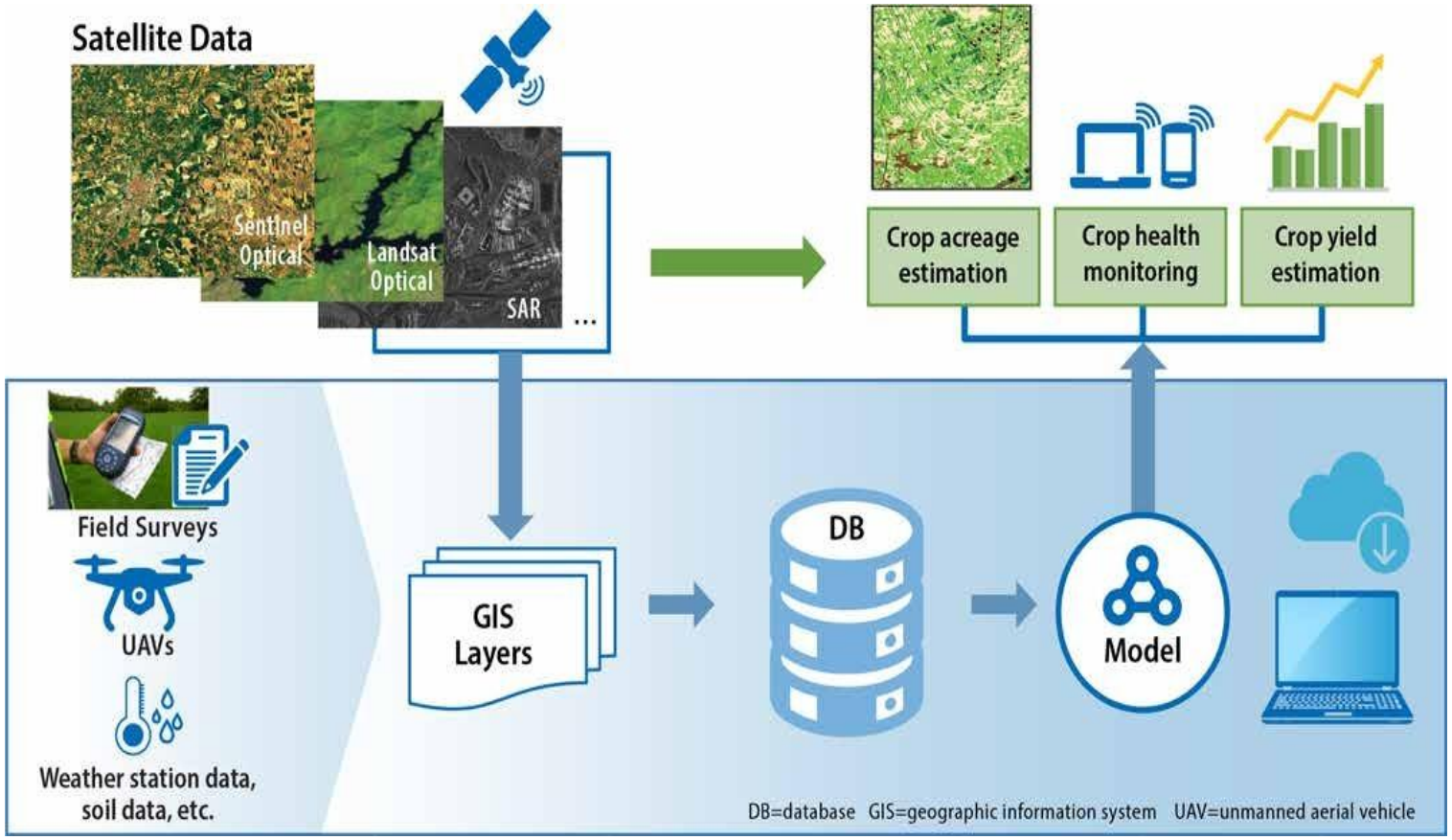
Satellite data:

Satellite data refers to the information collected by sensors on satellites orbiting the Earth.

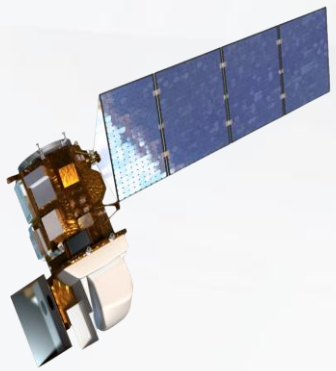
- ✓ Uses such as:
  - ➢ Environmental Monitoring: Tracking changes in land use, deforestation and natural disasters.
  - ➢ Weather Forecasting: Monitoring atmospheric conditions to predict weather patterns.
  - ➢ Urban Planning: Analyzing urban growth and infrastructure development.
  - ➢ Agriculture: Assessing crop health and managing agricultural resources.

Remote Sensing Contributions to Food Security

1. Crop Monitoring & Yield Forecasting:	Tracks crop health and predicts yields using satellite data
2. Early Warning Systems:	Identifies risks like droughts and floods to prevent disruptions in food supply
3. Soil & Water Management:	Monitors soil moisture and irrigation efficiency
4. Pest & Disease Detection:	Detects early signs of pests or diseases to minimize crop losses
5. Climate Change Adaptation:	Supports strategies for adjusting to environmental changes impacting agriculture



Satellite data for support Eco-Ready observatory



Data Sources such as:

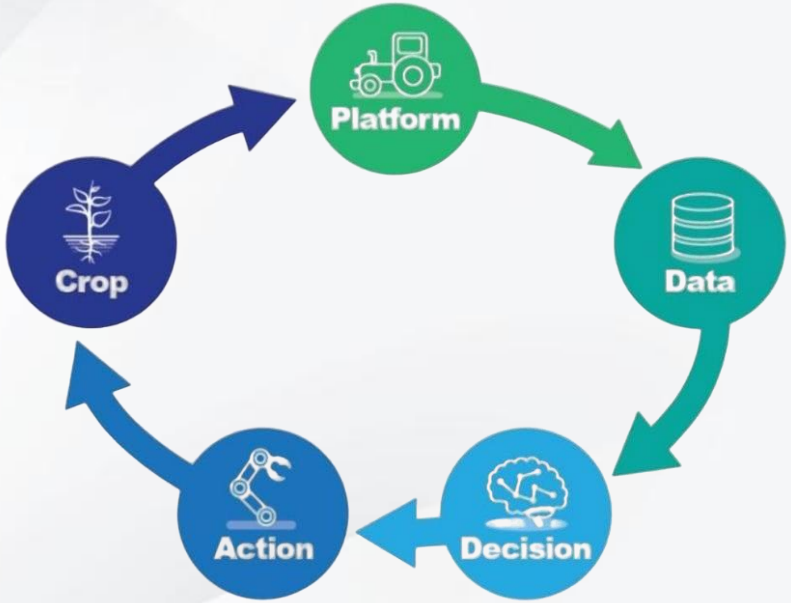
- **PlanetScope:** Daily high-resolution (3–5 m) optical imagery ideal for monitoring crop health, smallholder agriculture, and rapid land use changes.
- **Sentinel-1**: High-resolution (10m) radar imagery providing consistent data for tracking crop phenology stages under all weather conditions.
- **Sentinel-2**: High-resolution (10m) optical imagery for detailed monitoring of vegetation and land use.
- **Landsat series**: Long-term historical data for assessing land cover changes and trends with 30m spatial resolution.
- **MODIS**: Frequent updates (daily, 8-day,16-day) on large-scale environmental parameters (250m spatial resolution)

Parameters Monitored:

- Vegetation Indices: Measure of crop health and yield. Evaluate how crops respond to various stress conditions such as salinity, temperature fluctuations, or drought.
- Soil Moisture: Assessment of soil moisture levels for irrigation planning.
- Temperature: Monitoring Land Surface Temperatures (LST) to understand crop stress conditions.
- Crop Classification: Identifying and categorizing different agricultural products and crops

Crop Data Monitoring

The important roles of Living Labs in supporting the ECO-READY observatory



Some tools and technologies that we use

GIS Software:

- **ArcGIS pro**: ArcGIS is a powerful geographic information system (GIS) software developed by Esri. It's used for creating, managing, analyzing, and visualizing geographic data.

- **QGIS**: GIS (Quantum Geographic Information System) is a free, open-source GIS software that allows users to create, edit, visualize, analyze, and publish geospatial information.

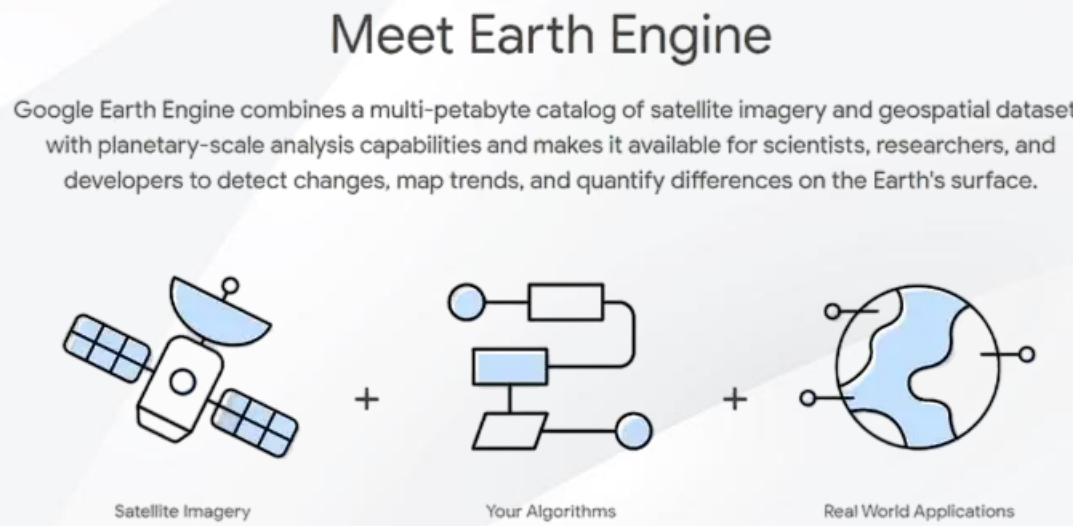
ArcGIS Pro QGIS

Both tools are effective for spatial analysis, with ArcGIS being more comprehensive and QGIS being more accessible.

Satellite Data processing:

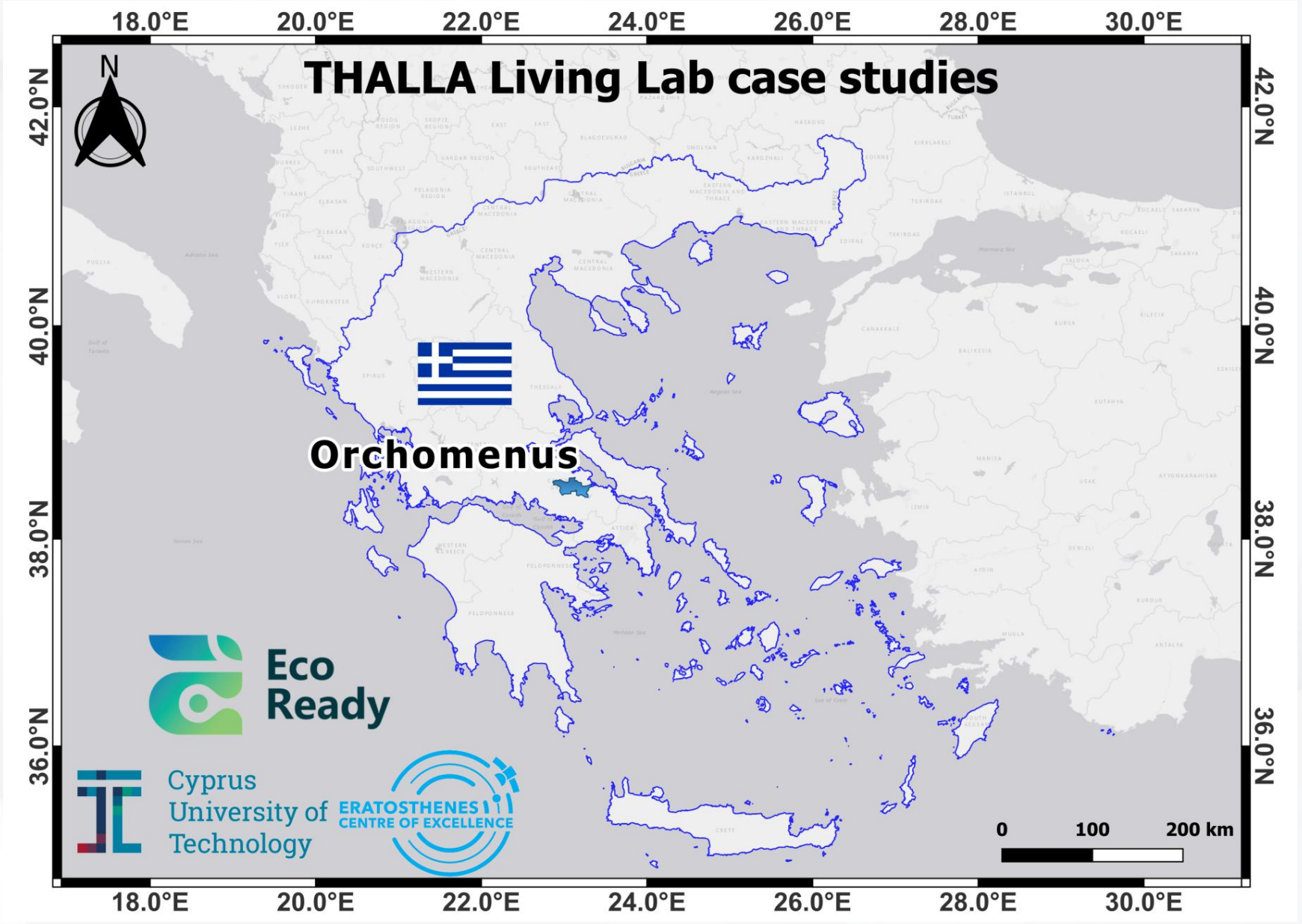
- **Google Earth Engine**:

I. A cloud – based geospatial analysis platform
II. Developed by Google for processing and analyzing large amounts of satellite imagery and geospatial data



Why in-Situ Data from Living Labs are important for us?

- **Improve Accuracy:** Enhances the accuracy of remote sensing calculations.
- **Train Algorithms for Crop Classification**: In-situ data from Living Labs assess to train remote sensing algorithms more accurately classify different crops, improving agricultural monitoring.
- **Validation:** In-situ data serves as a truth to validate remote sensing outputs such as classification algorithms. Moreover, it ensures the reliability of crop health, soil moisture, and other satellite-derived products.
- **Dynamic Environment Monitoring:** Enables continuous and Real-Time data collection in changing environments for adaptive remote sensing analysis.
- **Biodiversity Tracking:** Living Labs can provide crucial data that enhances satellite tools for monitoring biodiversity, habitat changes, and ecosystem health in agricultural and natural areas.


THALLA Living Lab case studies
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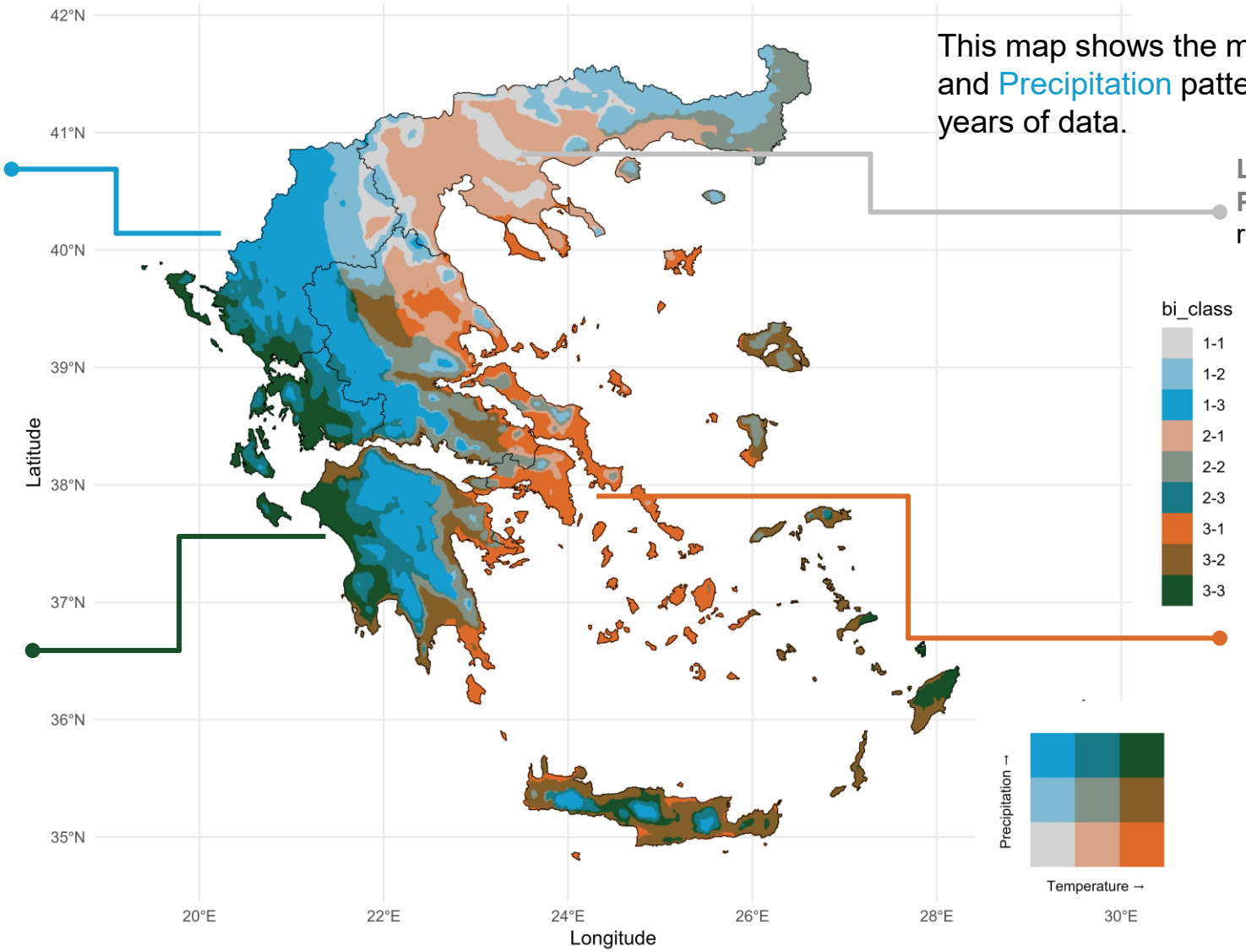
Orchomenus
Eco Ready
Cyprus University of Technology
ERATOSTHENES CENTRE OF EXCELLENCE
0
100
200 km

Eco Ready

Cyprus University of Technology

Bivariate Map of Temperature and Precipitation in Greece

Mean Annual Temperature and Precipitation (1958-2023)



This map shows the mean Temperature and Precipitation patterns based on 65 years of data.

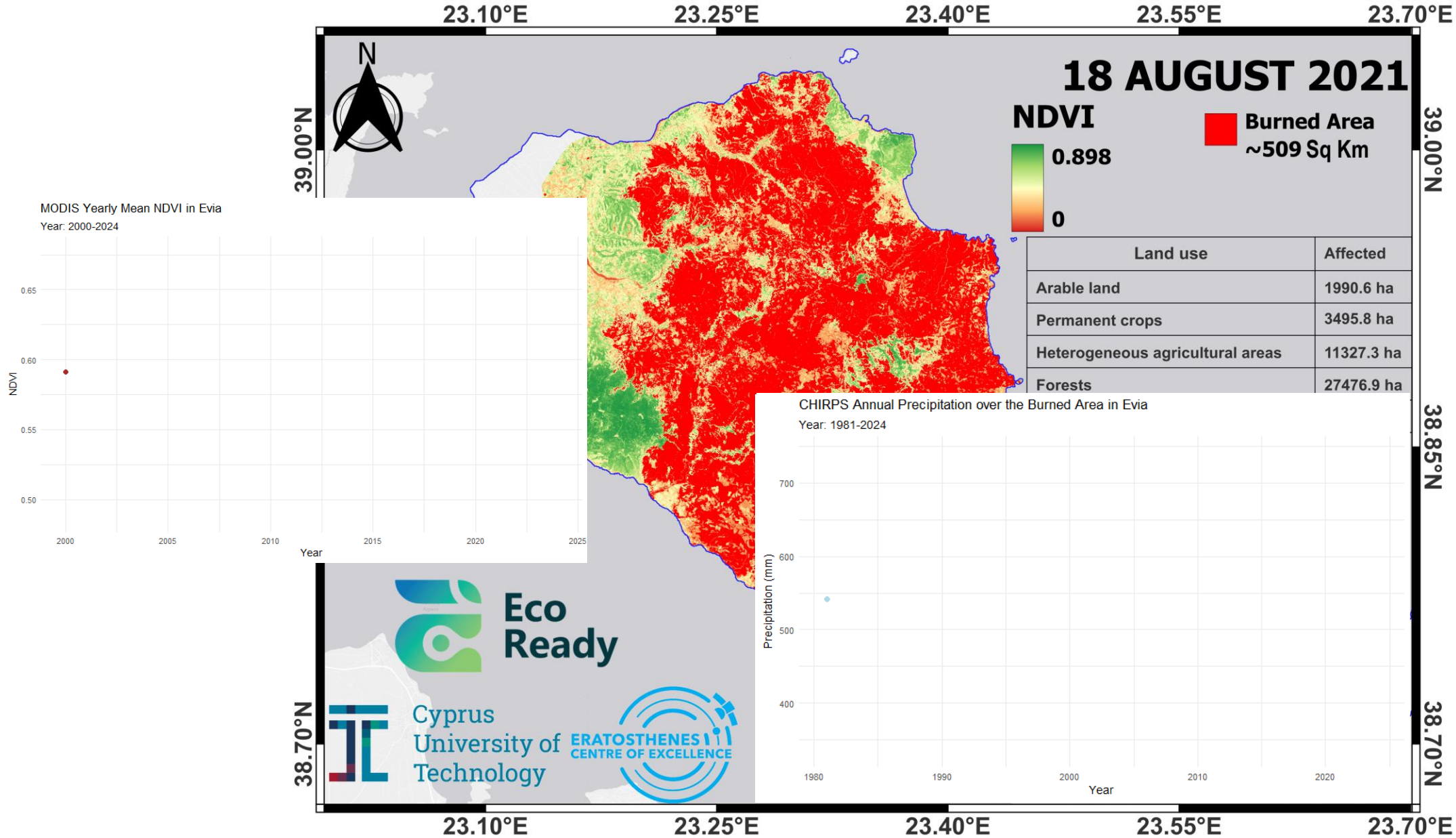
Low Temperature and high Precipitation: Cooler and wetter climate in the west part of Greece

Low Temperature and low Precipitation: Dry and cold north regions.

High Temperature and high Precipitation: Warm and wet climate supporting rich agriculture.

High Temperature and low Precipitation: Warmer and drier climate in the Southeast, prone to droughts.

Case study: Evia wildfire 2021



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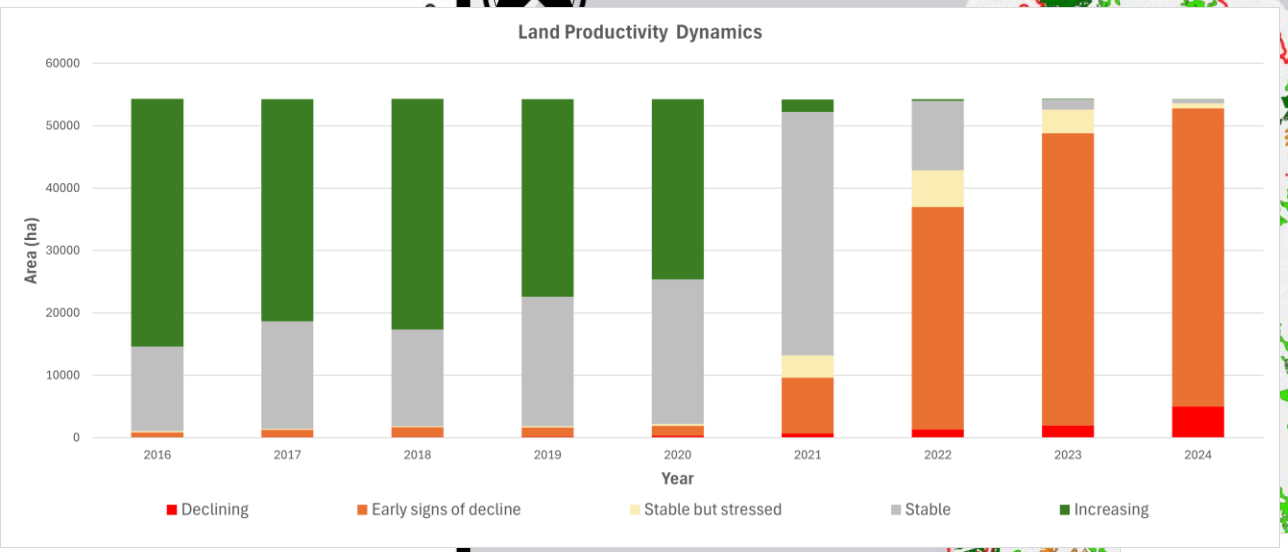

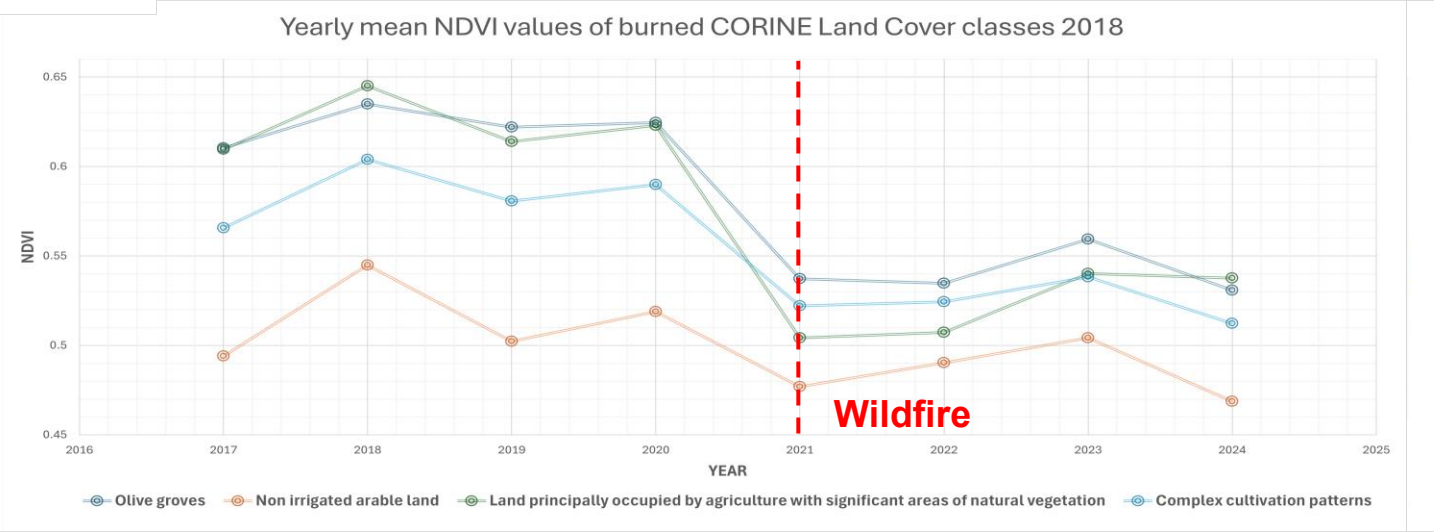

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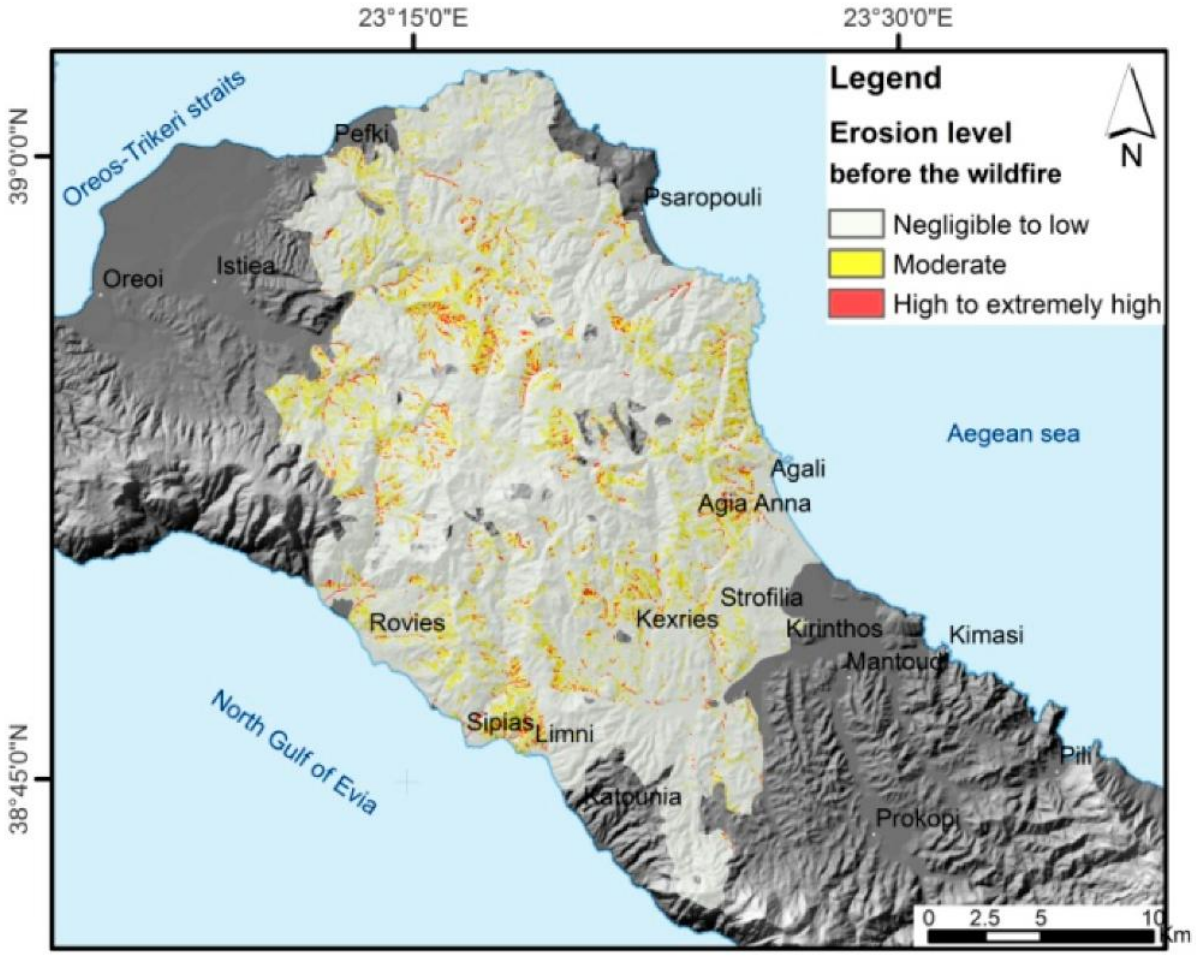
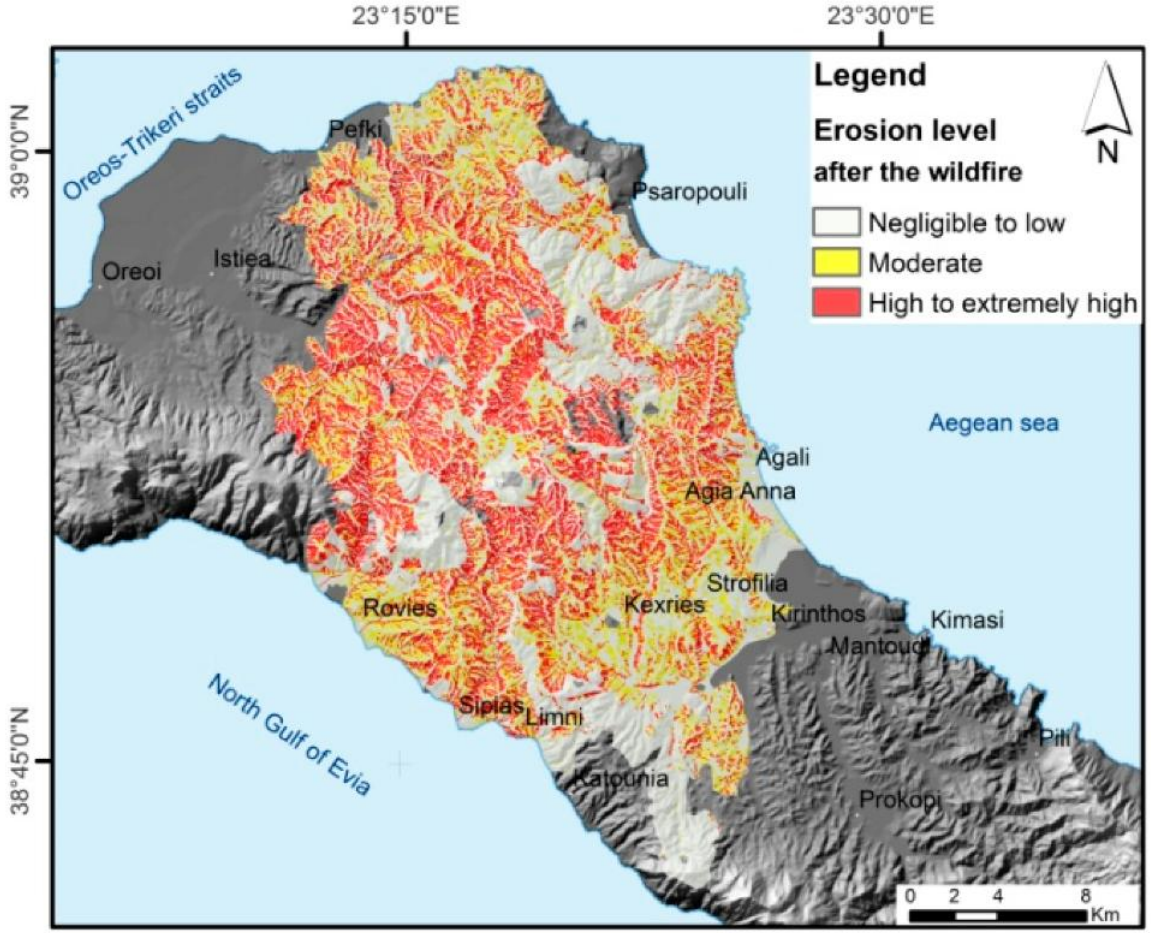
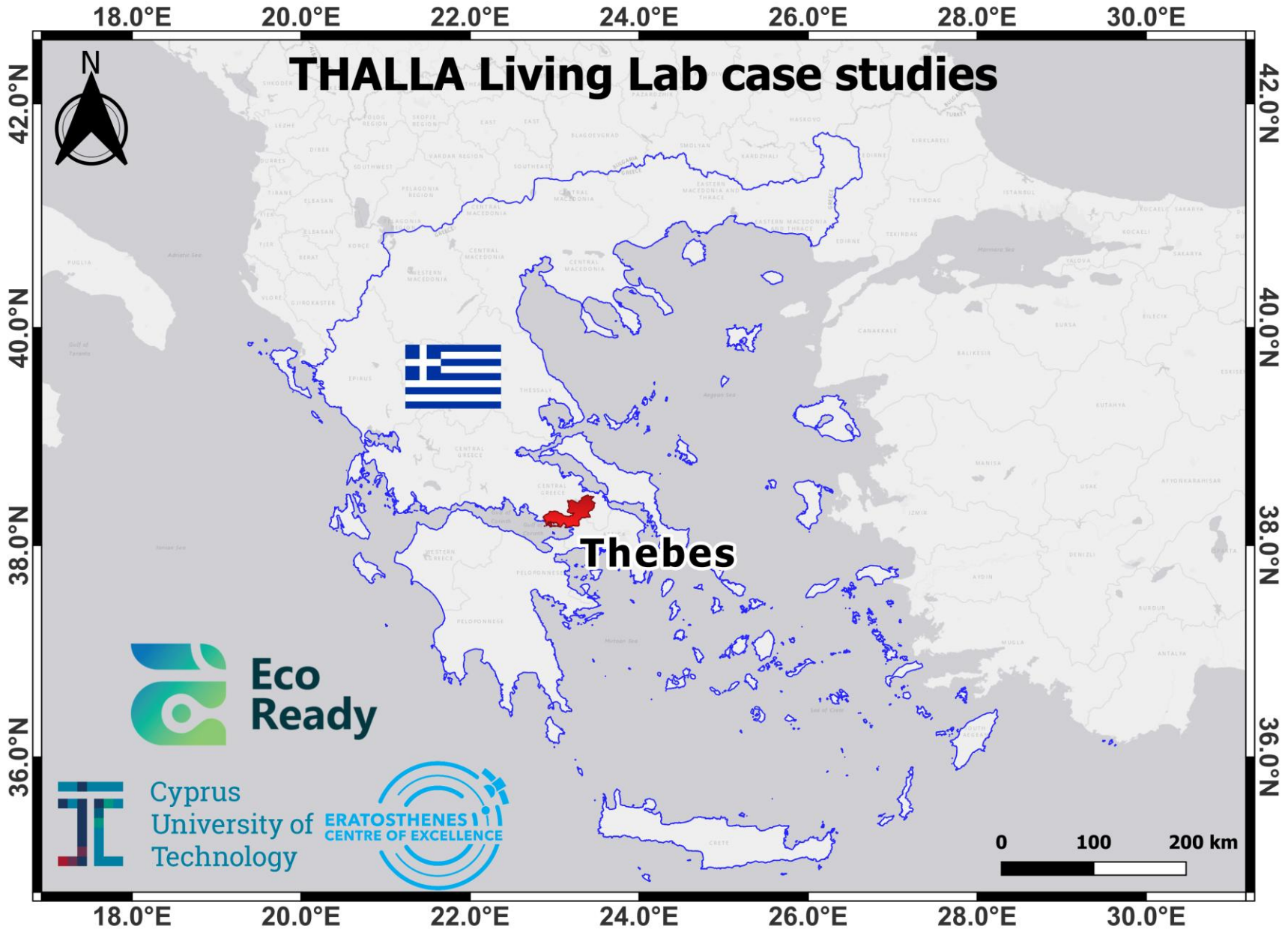




Case study: Thebes crops monitoring



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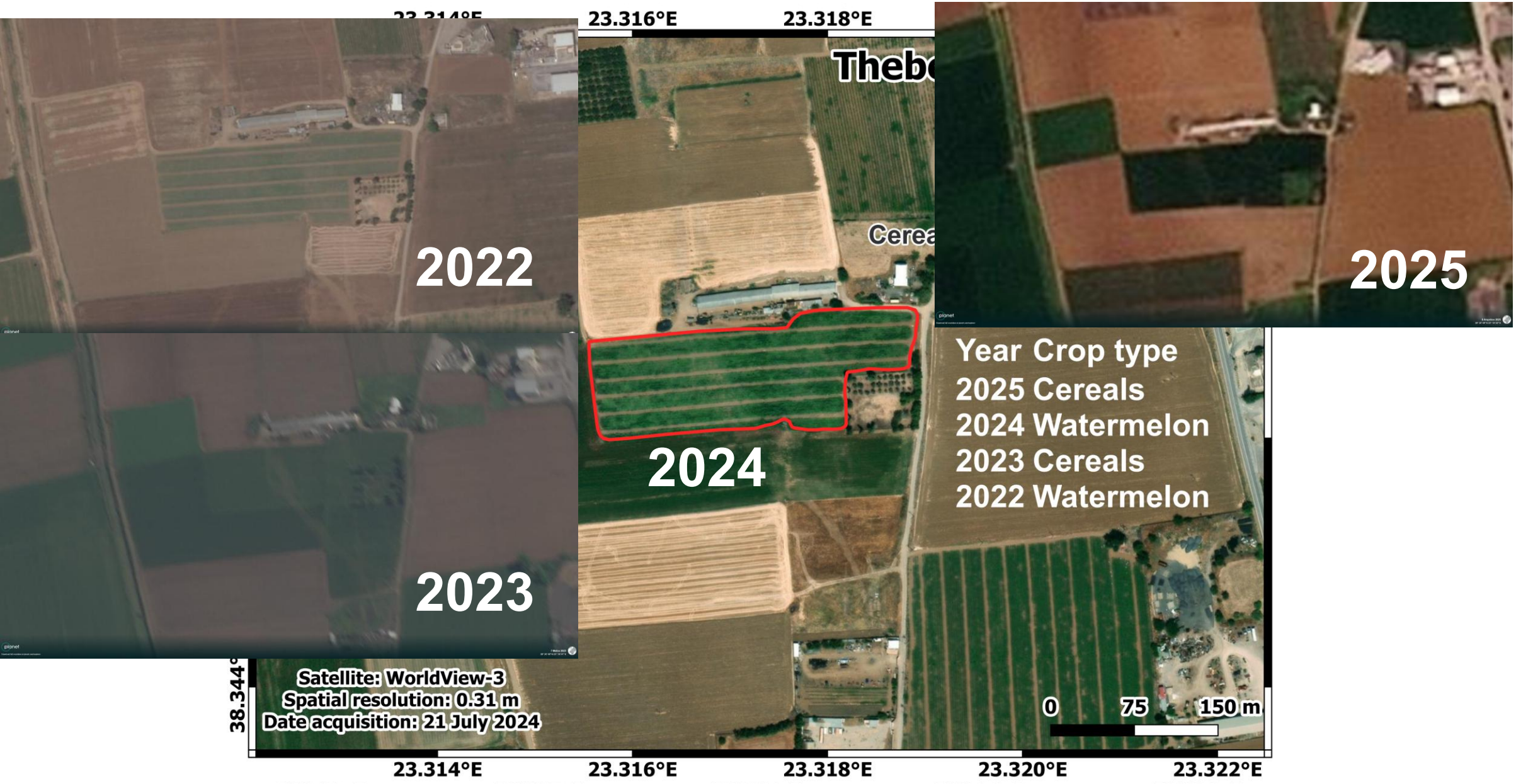

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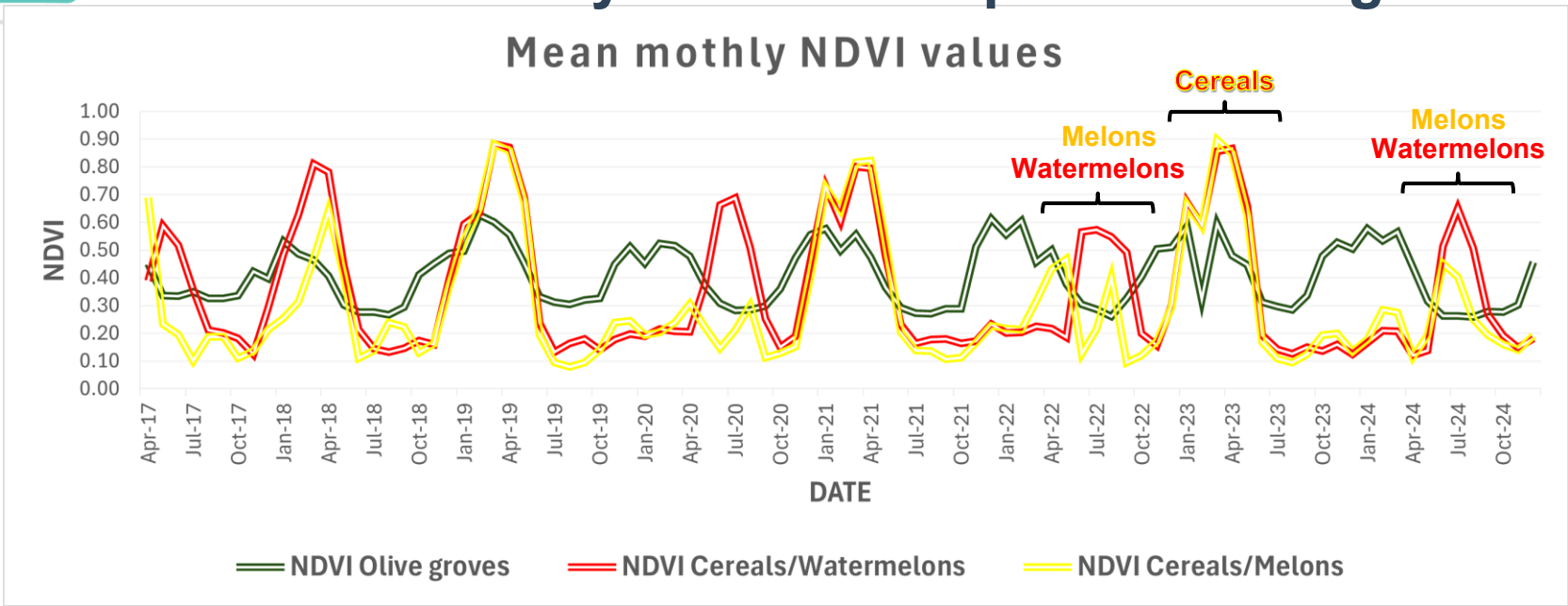

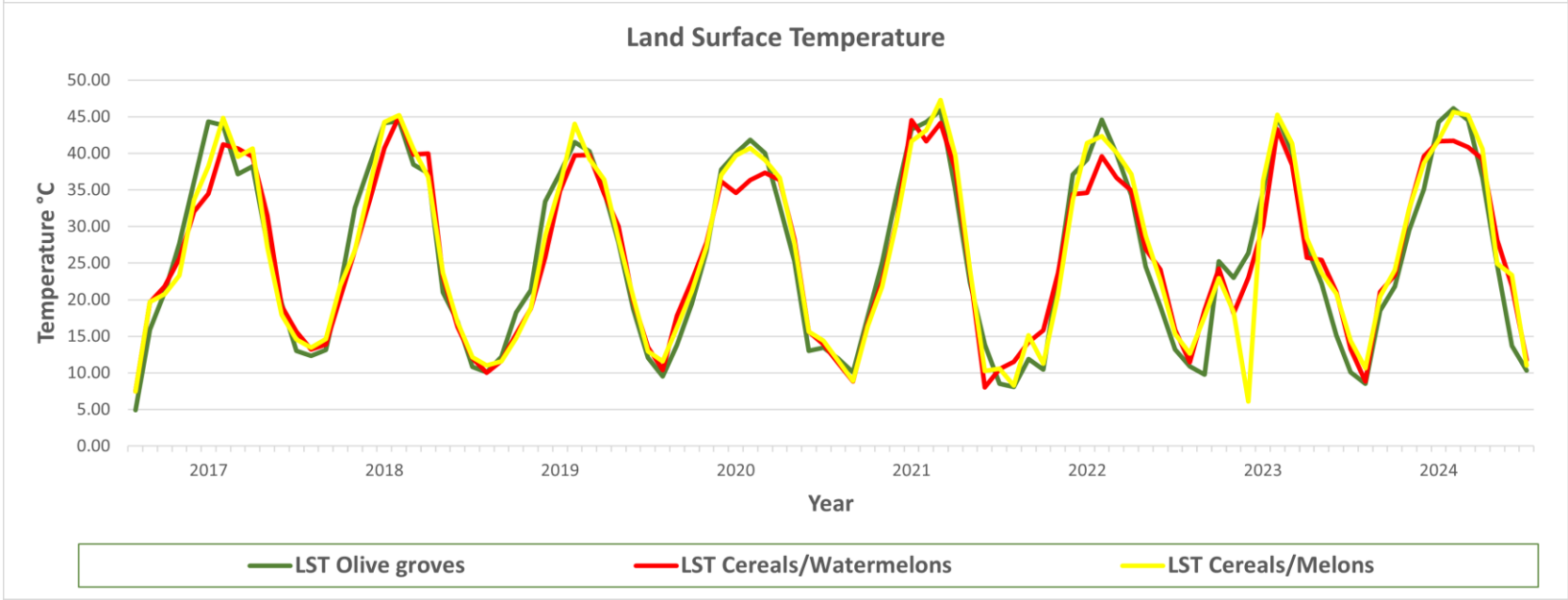

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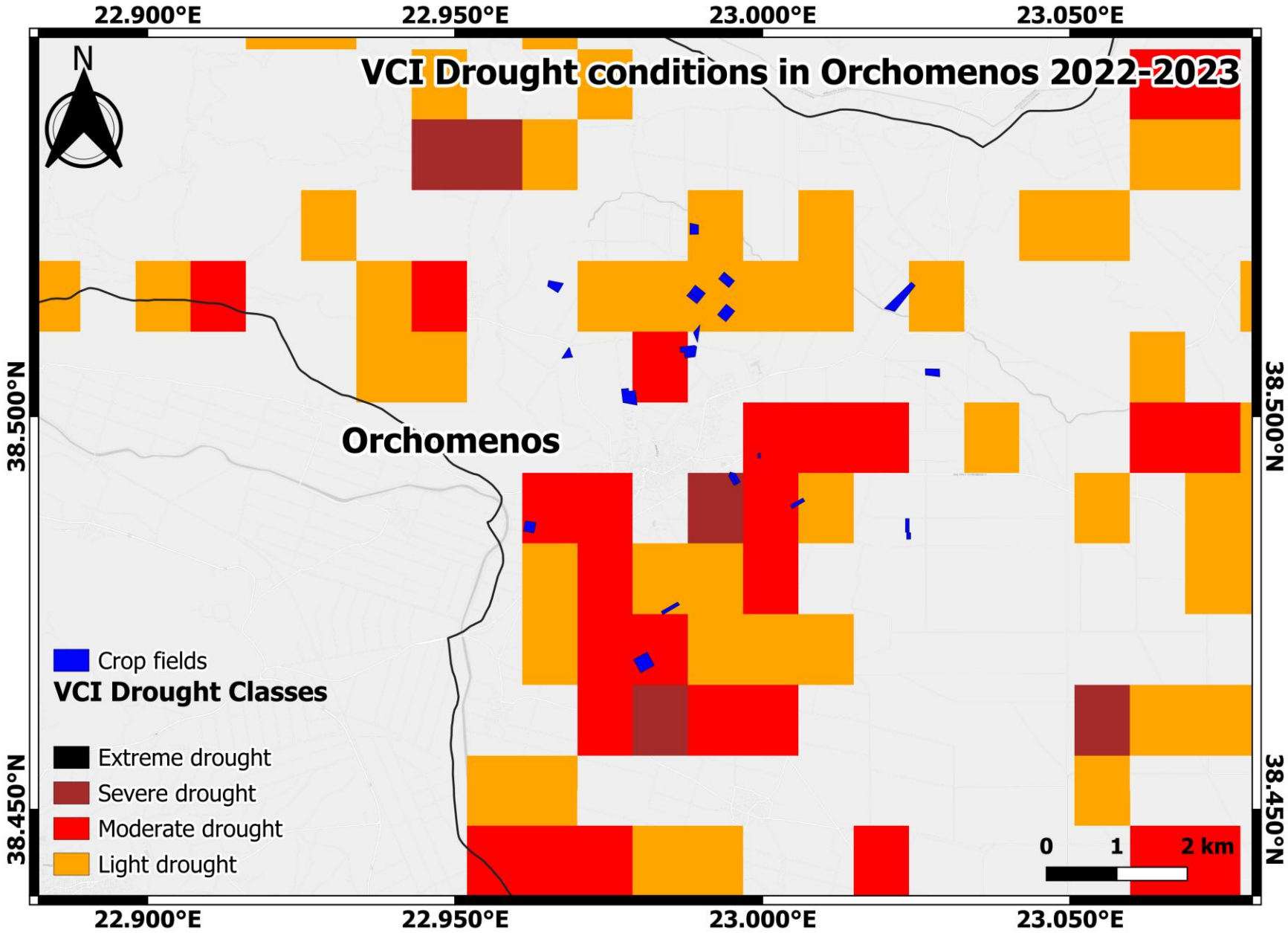
Case study: Orchomenus droughts 2022



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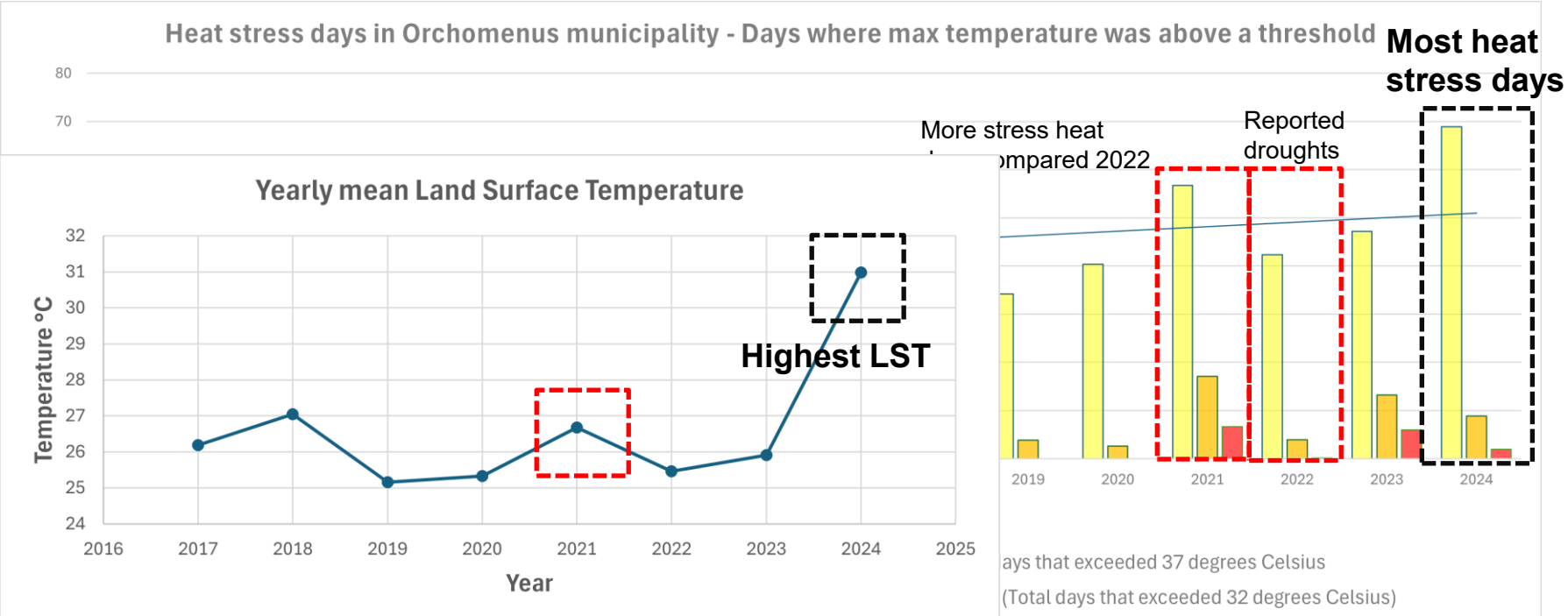
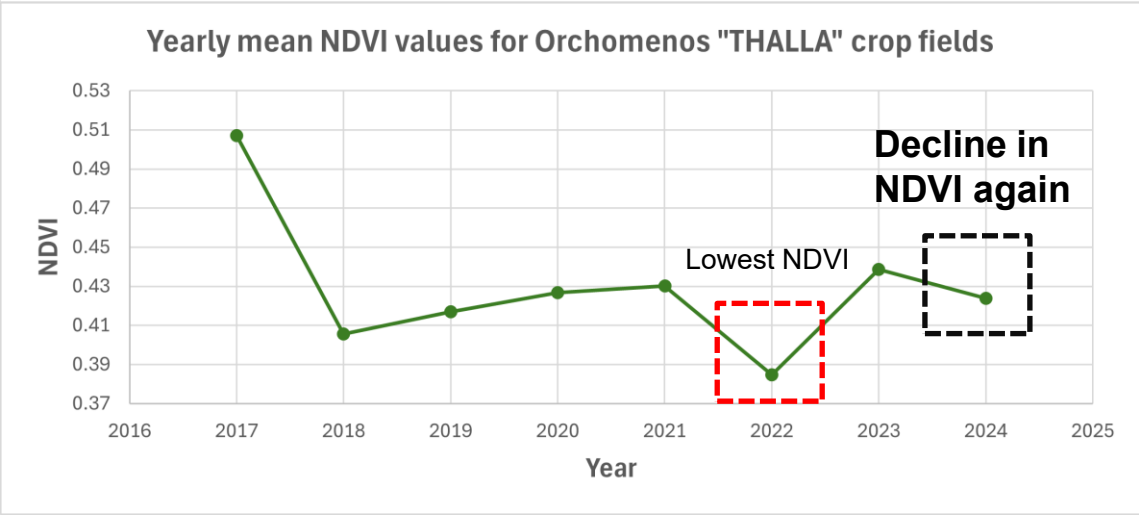


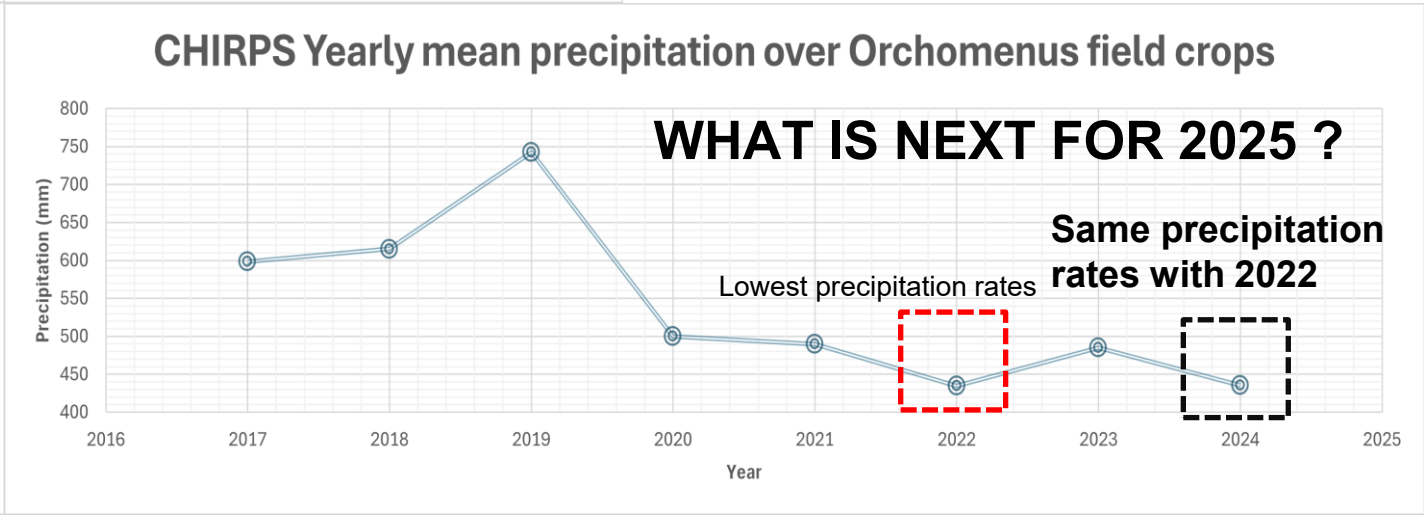
Main Reasons for the 2022 NDVI Drop

Residual stress from 2021 heatwave: The extreme heat in 2021 weakened crops and reduced resilience for the next growing season.

2022 had the lowest rainfall: Precipitation dropped sharply, leading to serious water stress and poor vegetation growth.

Vegetation decline driven by moisture deficit: Despite average temperatures, the lack of rainfall alone in 2022 was enough to reduce crop vigor and biomass, leading to a clear NDVI decline.





Thank you for your attention!