The Greek Observatory of Forest Fires (gOFFi)

New developments and outlook

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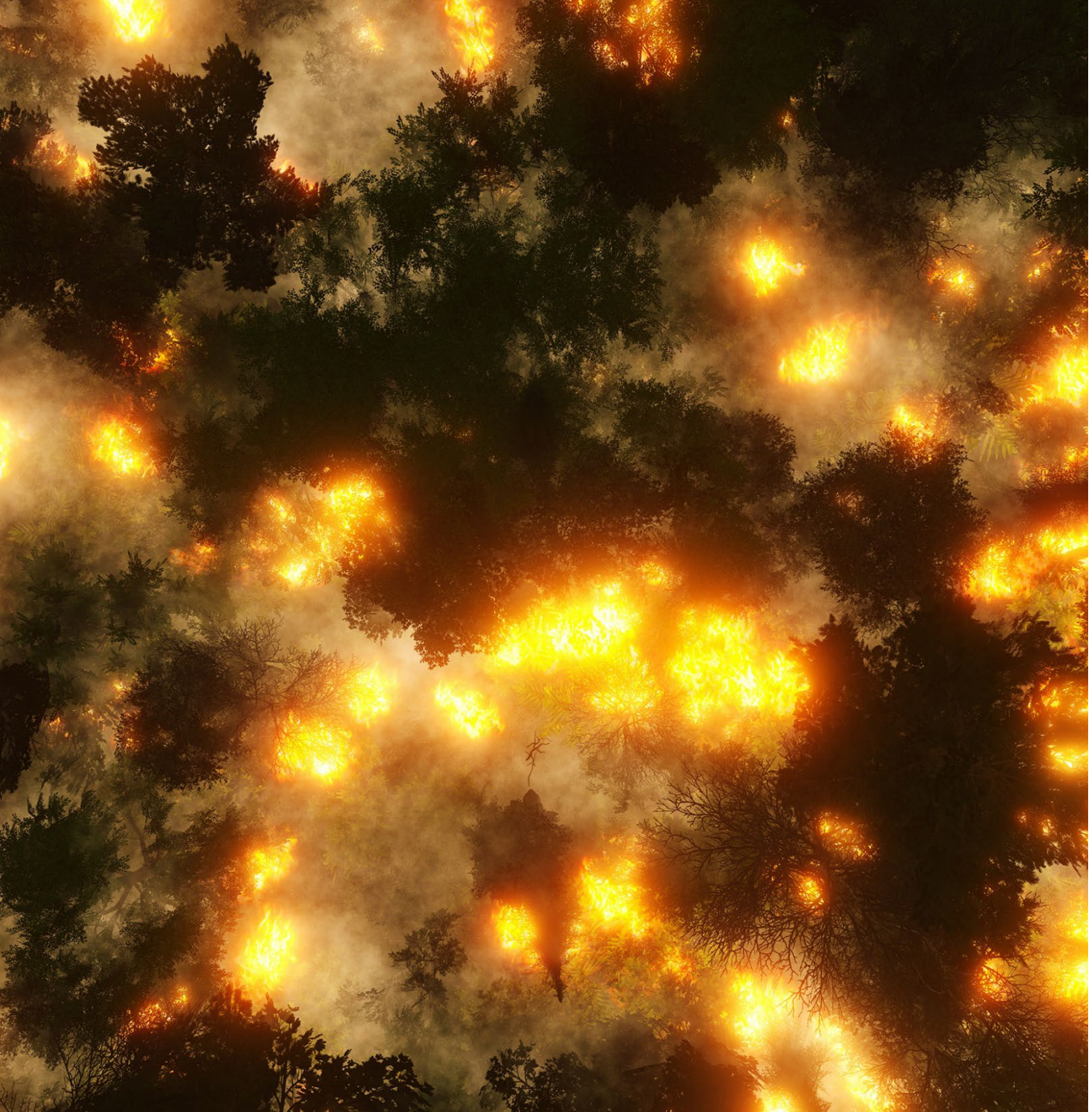
History

- Long-term collaboration with the Hellenic Central Forest Service (officially, General Secretariat for Forests and Forest Environment of the Hellenic Ministry of Environment & Energy)
- (Usually) funded via Greece's 'Green Fund'

2013–2016	NOF: National Observatory of Forests
2014–2018	NOFFi: National Observatory of Forest Fires
2020–2024	gOFFi: Greek Observatory of Forest Fires
Under negotiation	Operational burned area mapping service

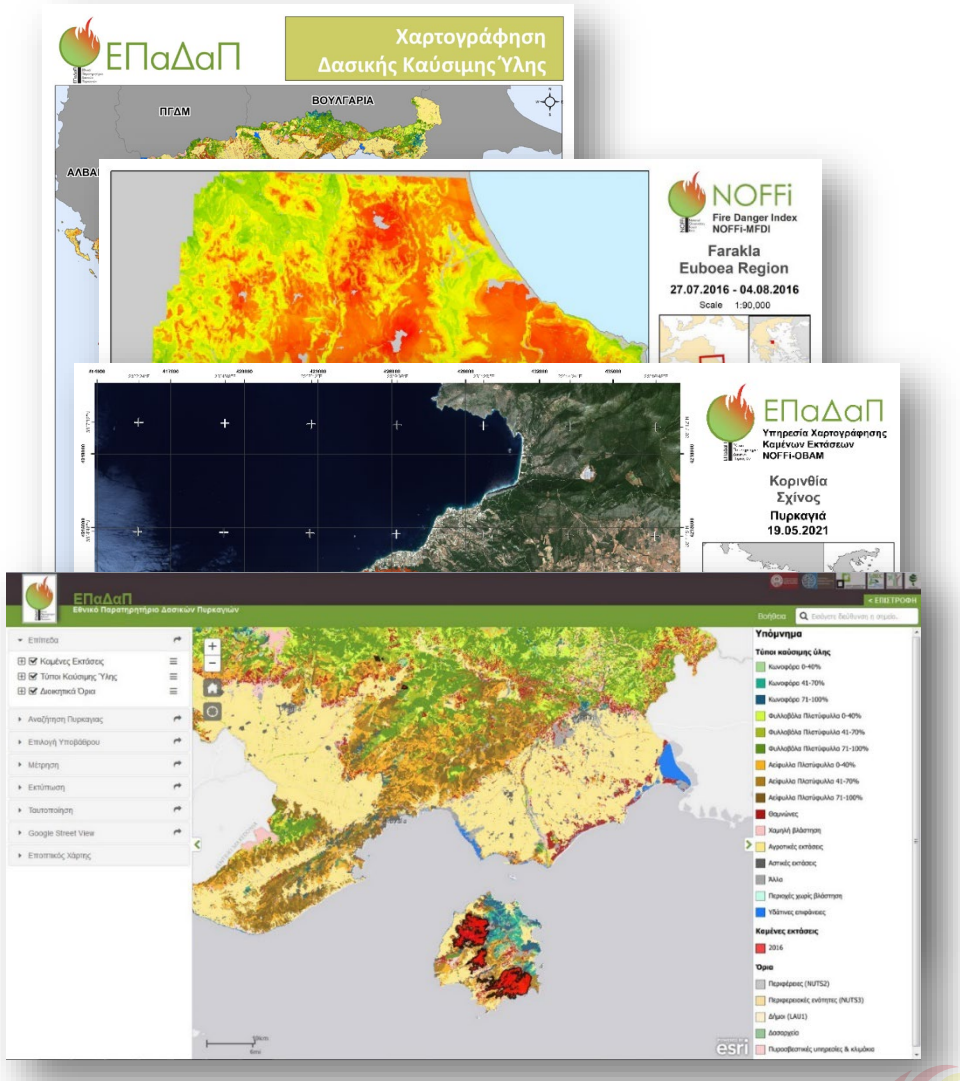


Objectives

- Develop **products** and **services** useful for increasing **preparedness** against wildfires and assessing their environmental **impact**
- Continuously **improve** the services and develop new **validated science-based** solutions for pre- and post-fire planning
- Disseminate the results and transfer knowledge to neighboring countries

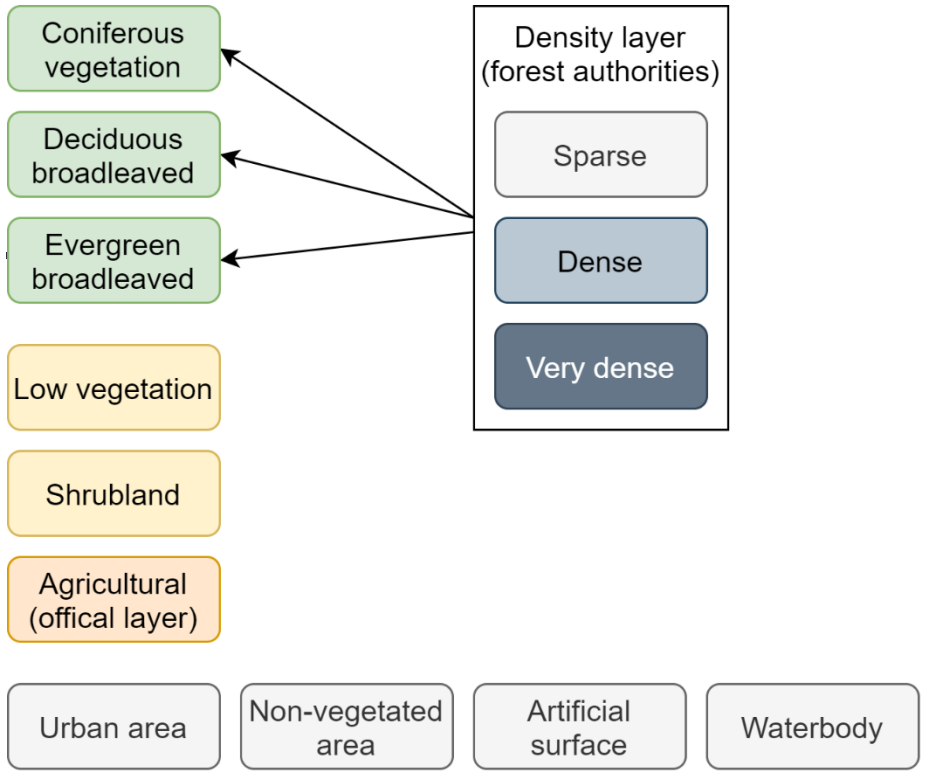
NOFFi's services

- Fuel type mapping (**NOFFi-FTM**)
- Midterm fire danger index (**NOFFi-MFDI**)
- Burned area mapping service (**NOFFi-OBAM**)
- WebGIS platform (**NOFFi-WebGIS**)



Fuel type mapping (FTM)

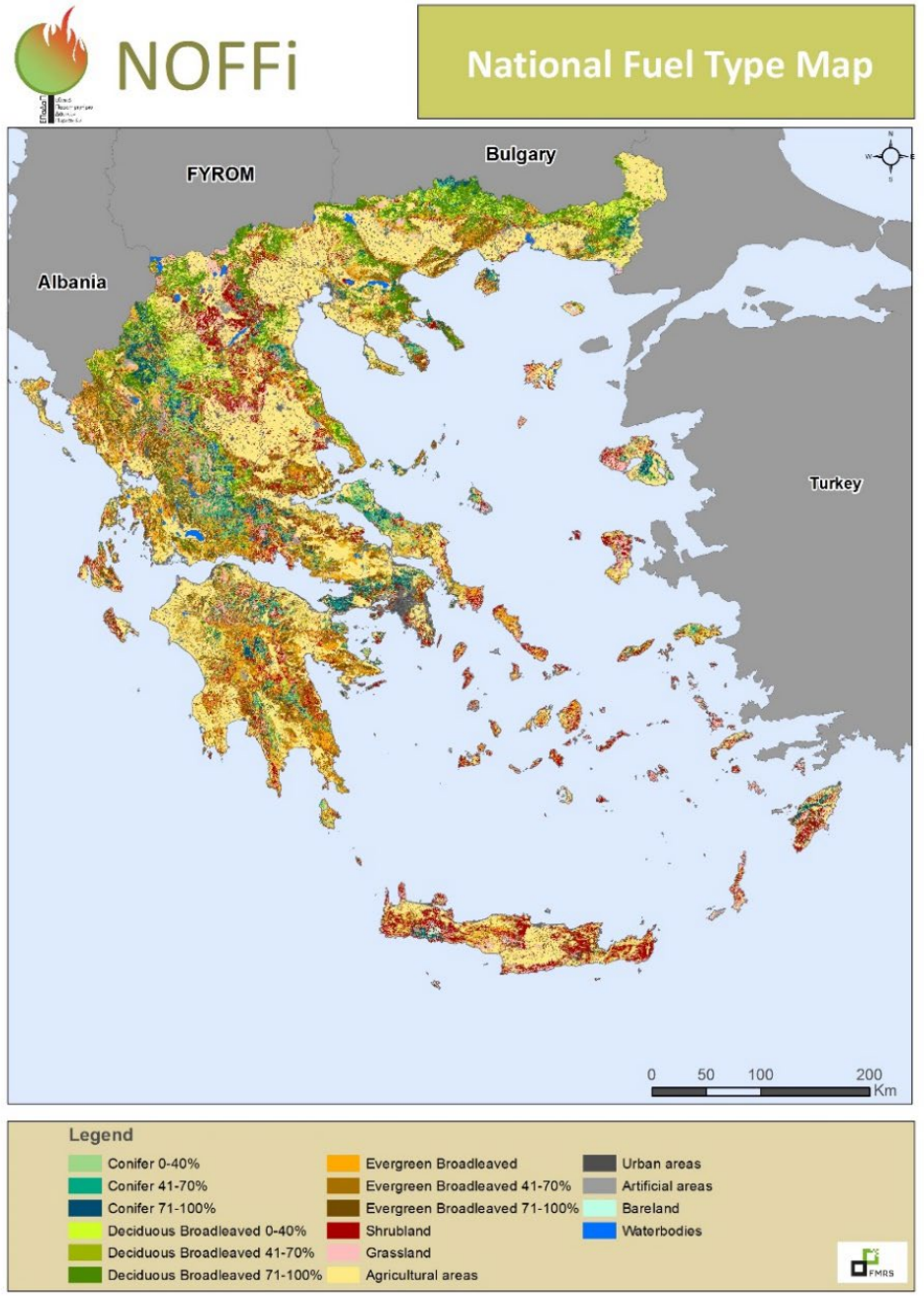
- Initial product (2015) based on winter/summer pairs of Landsat 8 images
- Land cover classification in broad vegetation categories, combined with vegetation density layer (obtained from central forest service, i.e. compiled from management plans)
- Expert-based hierarchical classification rules
- LPIS/SILOTS for agricultural & urban areas characterization



Fuel type mapping (FTM)

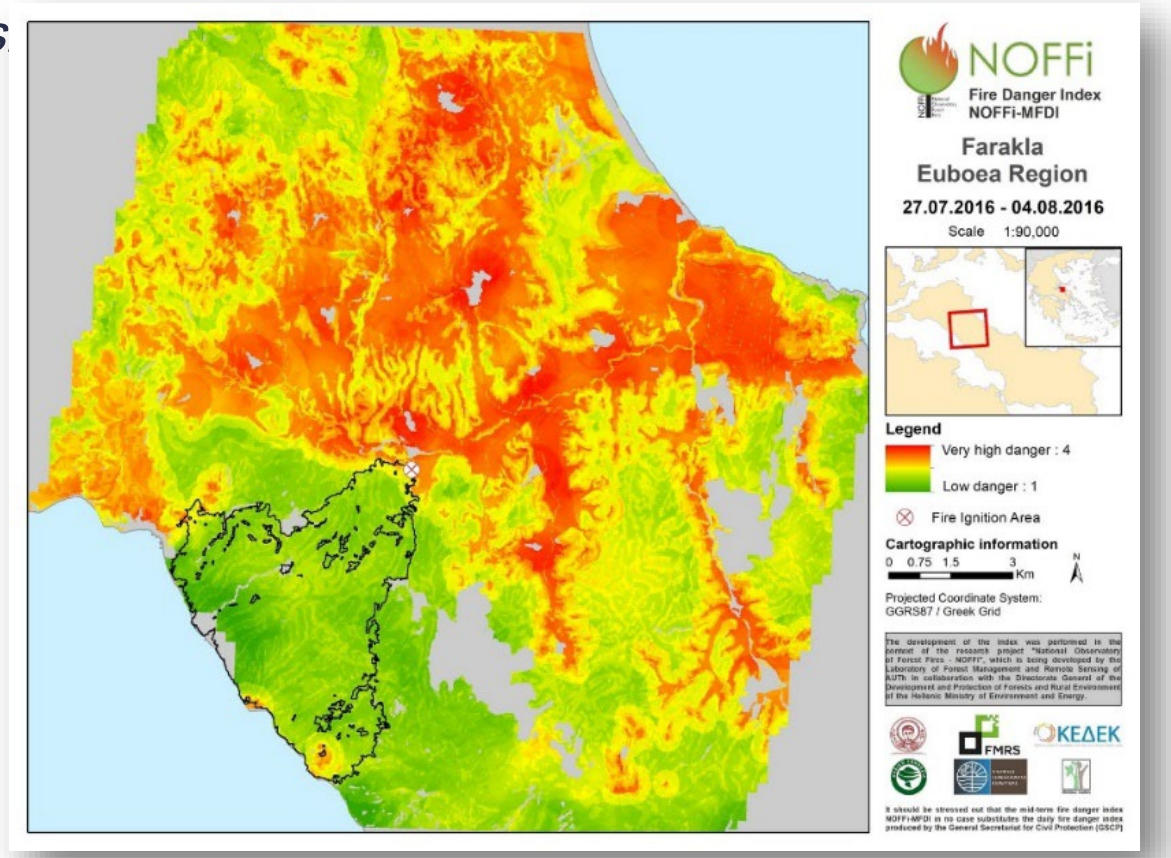
- National FTM product
- Accuracy: 92.59% for final map, 87.80% excludi ILOTS (based on LUCAS 2013 dataset)

- gOFFi updates (ongoing):
  - Transition to Sentinel-2
  - Machine learning classification instead of expert system
  - Density estimation from Sentinel-2 data
  - Yearly updates on burned areas



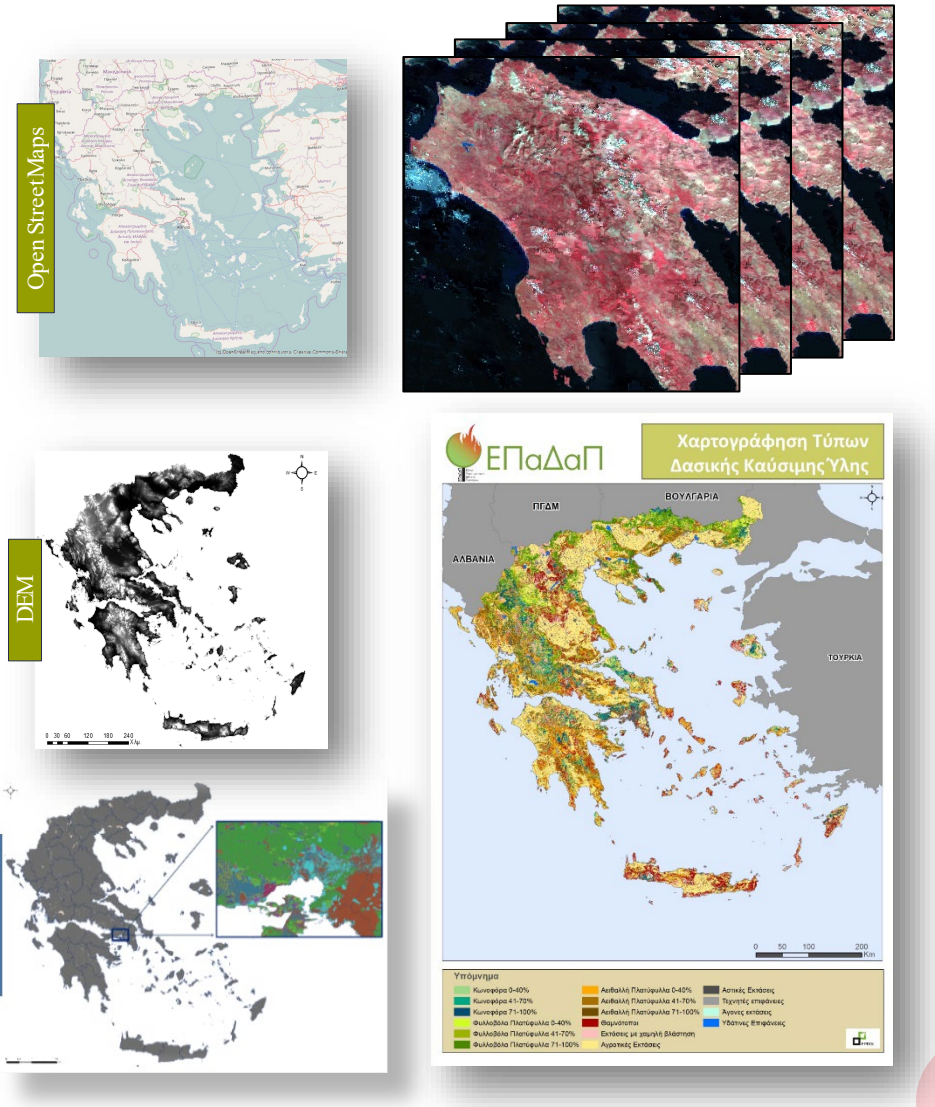
Midterm fire danger index (MFDI)

- Dynamically updated **midterm** fire danger estimations (8 days ahead); focus on *fire ignition risk forecast*
- Approach based on **optical satellite observations** and auxiliary thematic layers (no meteorological predictions)
- Use of satellite imagery for estimating **vegetation dryness anomalies** and, subsequently, dry fuel connectivity (neighborhood-adjusted anomalies from historical expected value at the current 8-day period)
- Auxiliary layers related to other fire ignition factors → all factors combined through **multi-criteria analysis**



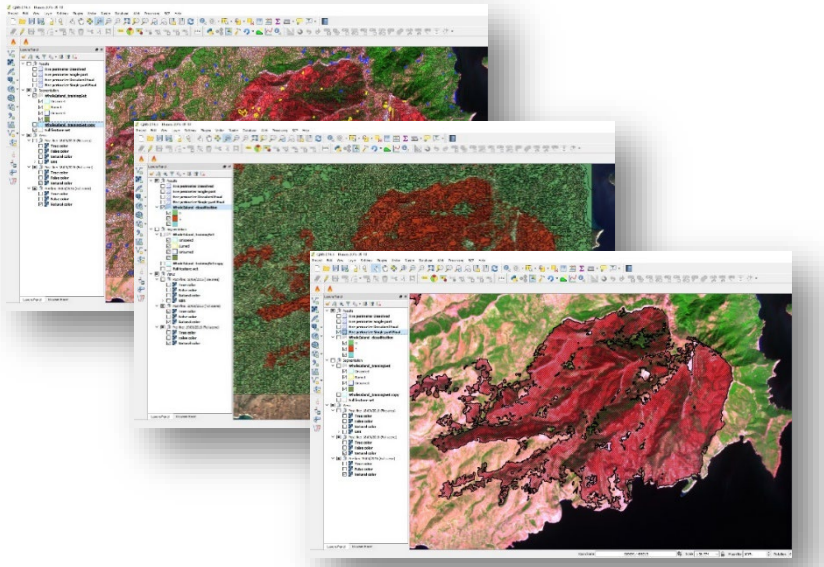
Midterm fire danger index (MFDI)

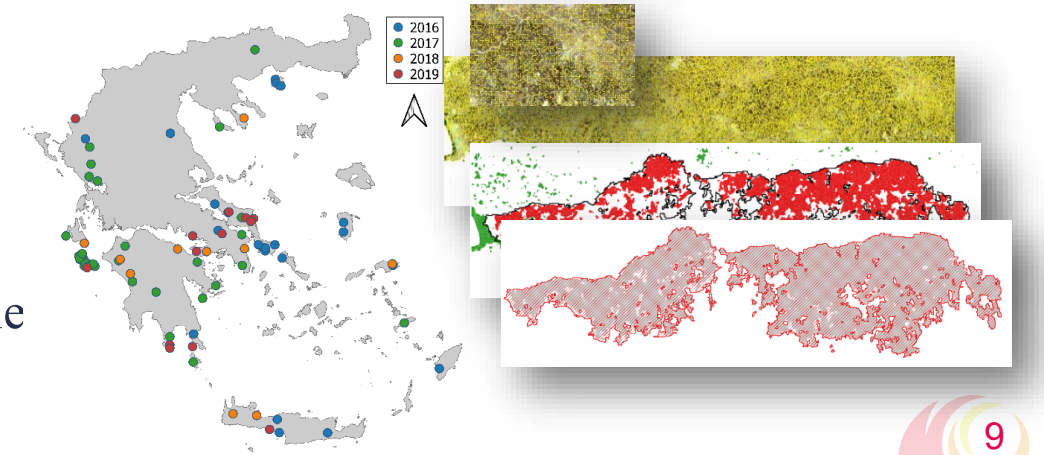
- Data used:
  - Time-series of MODIS imagery (8-days composites **MOD09A1/ MOD09A1N**) 10 years history [Estimation of dry fuel connectivity]
  - Fuel type map (**FTM**)
  - **LPIS** (ILOTS) [distance from croplands & urban areas]
  - Digital elevation model (**ASTER GDEM**) [for altitude, slope, exposure]
  - **Road network** (OpenStreetMap – OSM) [distance from roads]
- *Future* transition to Sentinel-3



Burned area mapping service (NOFFi-OBAM)

- Algorithm evolution:
  - Sentinel-2 based methodology
  - Initially a Python / QGIS plugin methodology, employing object-based supervised learning approaches
  - Later moved to pairs of Sentinel-2 images and newer machine learning approaches
  - Currently trying to transition to Google Earth Engine for fully automated processing; accept increased commission error for fewer omissions → interpretation by human
- Fully operational service, with direct communication with the local forest offices
  - E.g., in 2021 we handled more than 50 direct requests for small or very small mappings (up to 0.4 ha), in addition to the systematic mappings performed





NOFFi

HOME PROJECT SERVICES NEWS CONTACT

Viewing service accessible via:

- http://fmrsvm.for.auth.gr
- http://epadap.web.auth.gr/?lang=en
- (soon) https://goffi.web.auth.gr

National Observatory of Forest Fires NOFFi

The main goal of this research project is the establishment and pilot operation of an Observatory of Forest Fires, aiming to develop a series of modern products and services for supporting the efficient forest fire prevention management in Greece and the Balkan region, as well as to stimulate the development of transnational fire prevention and impacts mitigation policies.

Read more »

Our Vision

The National Observatory of Forest Fires (NOFFi) aims to develop a series of modern products and services for supporting the efficient forest fire prevention management in Greece and the Balkan region, as well as to stimulate the development of transnational fire prevention and impacts mitigation policies.

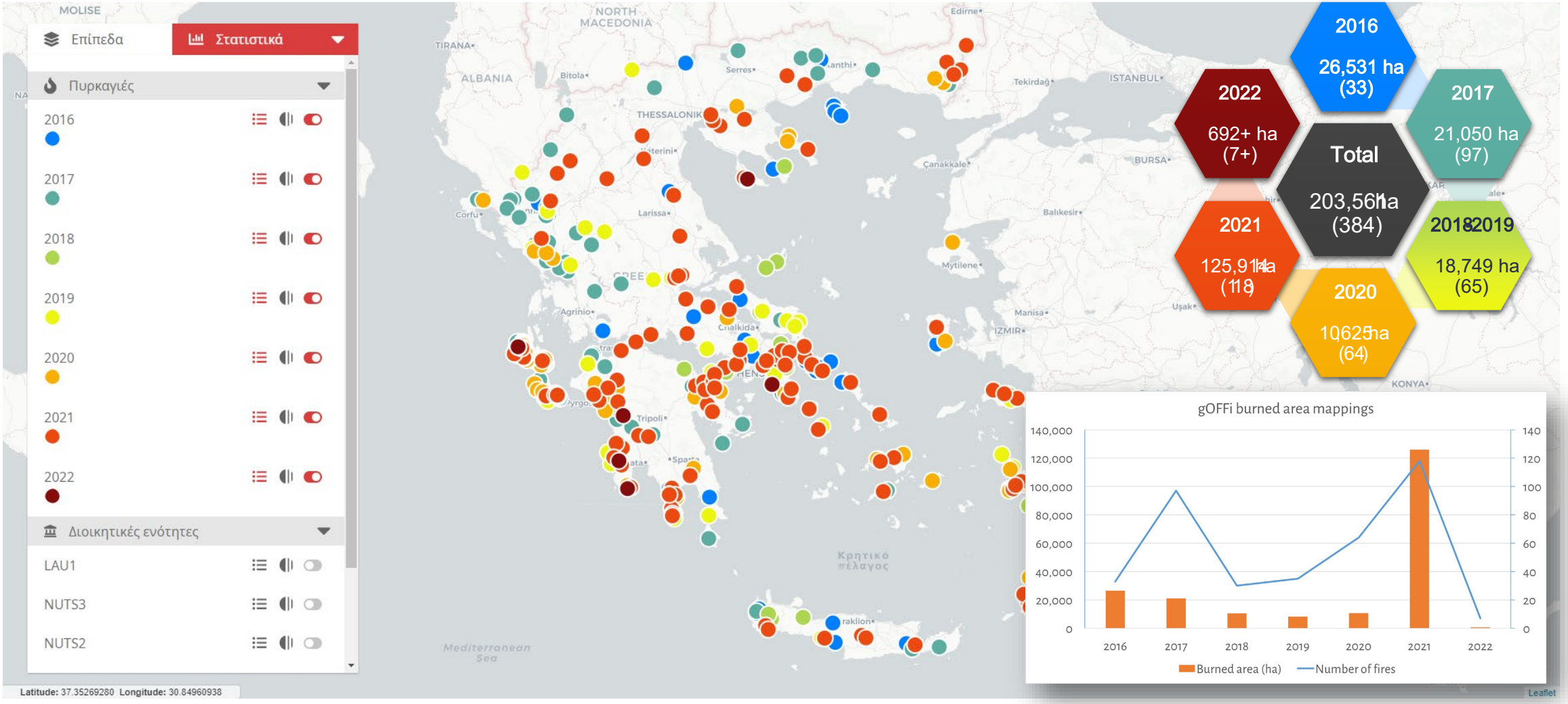
More specifically, NOFFi provides three main fire-related products and services:

1. a remote sensing-based fuel type mapping (NOFFi-FTM) methodology
2. a semi-automatic burned area mapping (NOFFi-OBAM) service
3. a dynamically updatable fire danger index (NOFFi-MFDI) providing mid-term predictions.

Burned Areas Viewing Service

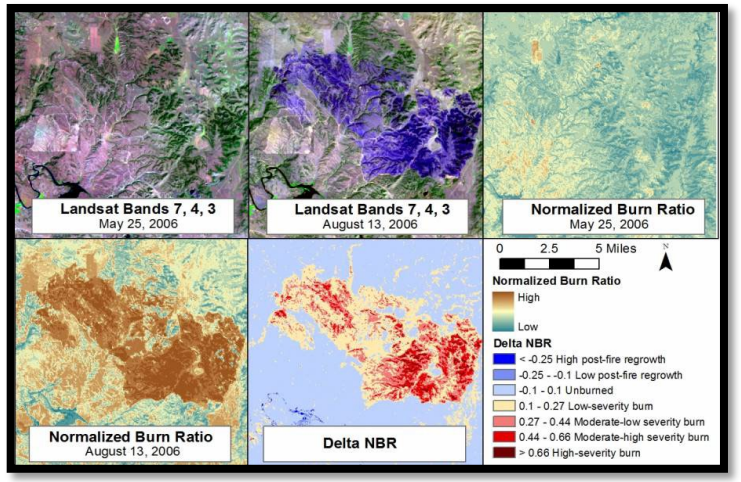
WEB GIS

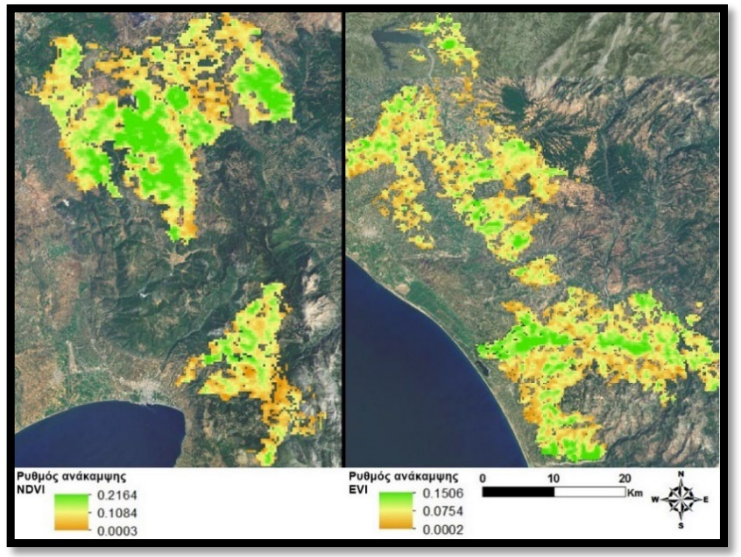
Burned area mappings



Future gOFFi services

- Additional products targeting post-fire management (future work):
  - **Fire severity indices** along with burned area mapping
  - Potentially **damaged infrastructure**/houses
  - **Post-fire regrowth monitoring** for selected sites using Sentinel-2 (rate of regeneration, identification of areas requiring intervention)





Postscript

- Ecosystem station (flux tower) in Pantouli University forest (Trikala, Greece)
- Installed in 2021 by the University Forest Administration and Management Fund and Region of Thessaly
- Measurements of:
  - CO_2 & CH_4
  - Net & photosynthetic active radiation
  - SmartFlux unit
- Currently under negotiation to become a member of ICOS

Thank you!

22/06/2022 | 5th GWIS & GOFC-GOLD Fire IT meeting, Stresa, Italy

The research project gOFFi is funded by Greece Green Fund, with the beneficiary being the Hellenic Ministry of Environment and Energy