

ForestPaths: The European Forest Disturbance Atlas

— **Alba Viana-Soto, Cornelius Senf**

23rd May 2024

LULUCF workshop



Our approach

CHALLENGE

Meet climate targets and protect biodiversity



WHAT IS NEEDED?

Forest-based policy pathways for a climate-neutral and resilient society



OUR PROJECT

Co-designing, quantifying and evaluating forest-based policy pathways to optimise climate change mitigation, adapt forests to climate change, and conserve biodiversity and ecosystem services



RESULTS

- CBS forest management options
- Policy pathways
- Policy support platform CANOPY
- High-resolution maps
- Next generation simulation models
- Improved data, tools and methods

2

Developing high-resolution monitoring methods of climate change related risks from forest disturbances (WPs 2 & 3)

4

Providing quantified and evaluated holistic forest-based policy pathways (WPs 5 & 6)

OUR APPROACH

1

Understanding the barriers and enablers to the uptake of climate and biodiversity-smart forest management (WPs 1 & 3)

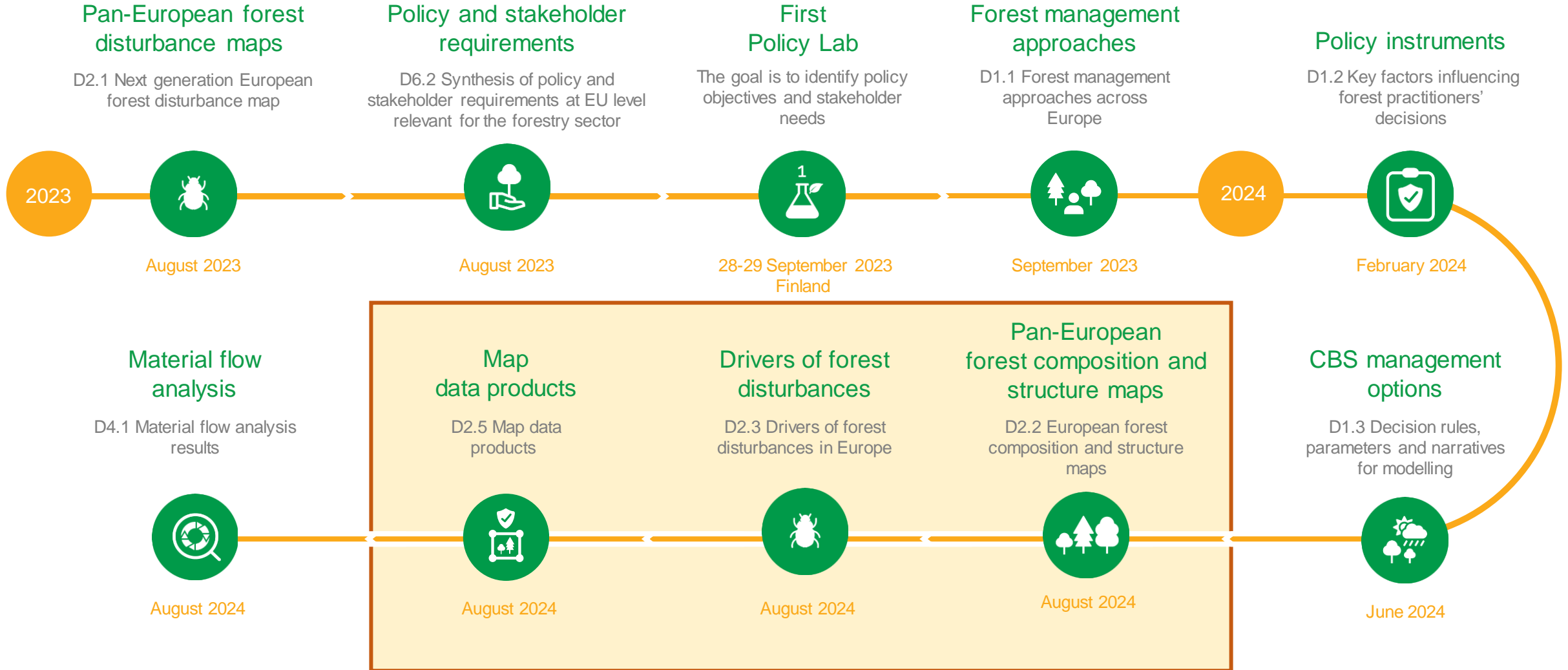
3

Assembling a next generation integrated assessment framework (WPs 3-5)

5

Maximising ForestPaths' impacts through collaboration and knowledge exchange (WP 7)

Timeline

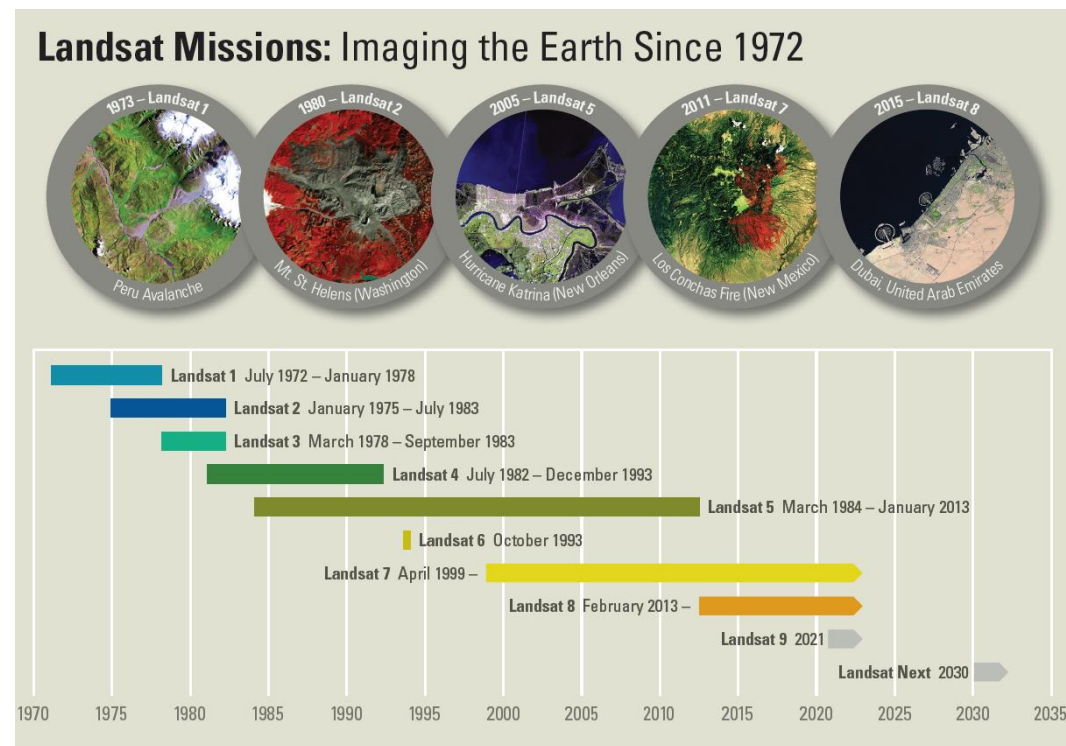


Earth observation for forest monitoring: our goals

Extending the time frame of existing pan-European forest disturbance assessments

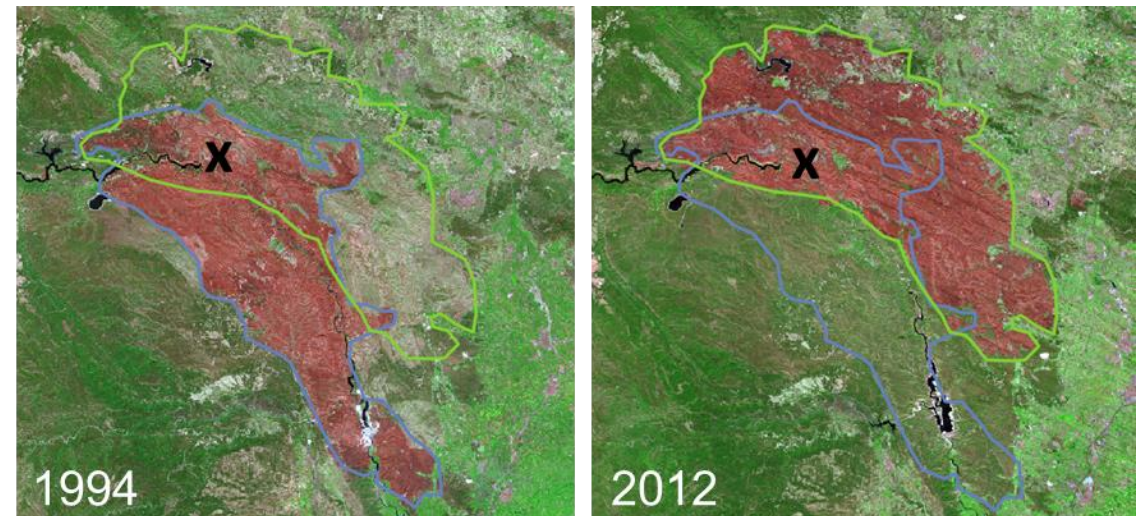
Senf and Seidl (2021)

Hansen et al. (2013)

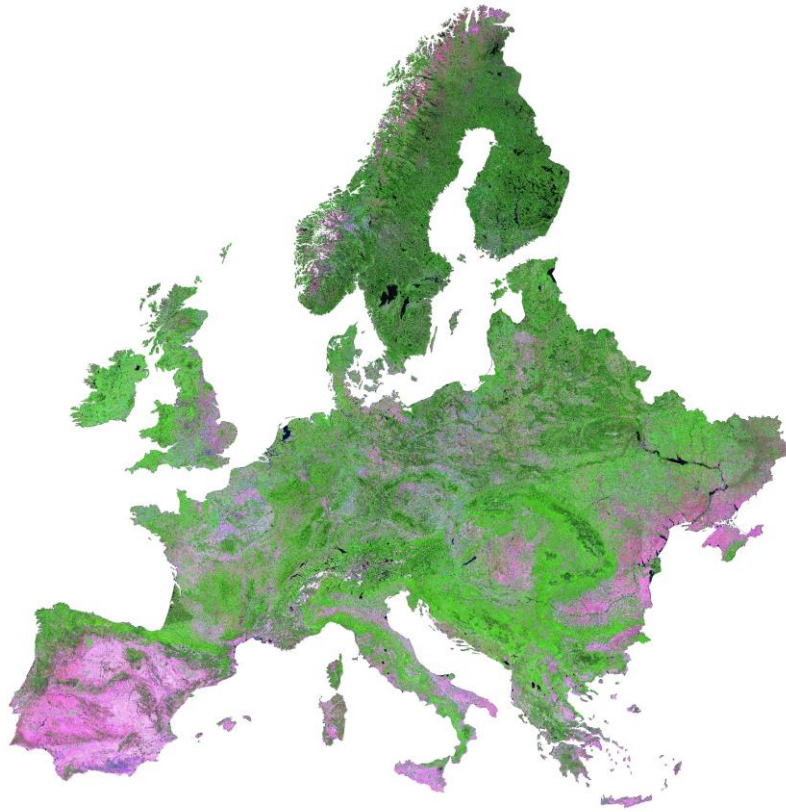


New approach:

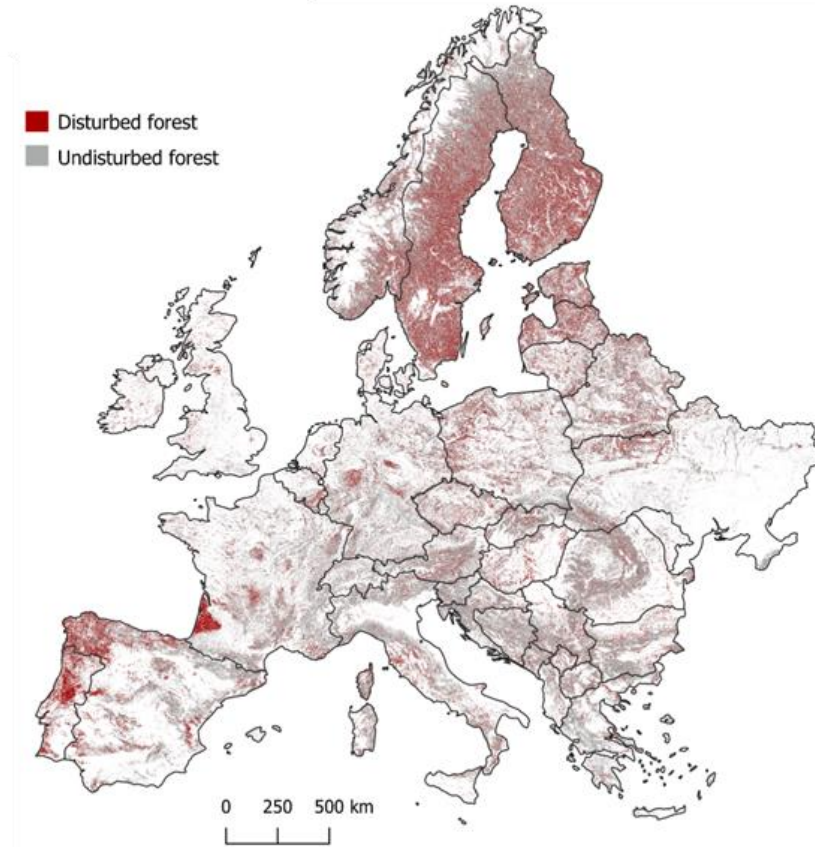
- Allow for the detection of **multiple disturbance** events per time series
- Develop a **cause-attribution** workflow
- Operational and open-source for annual update



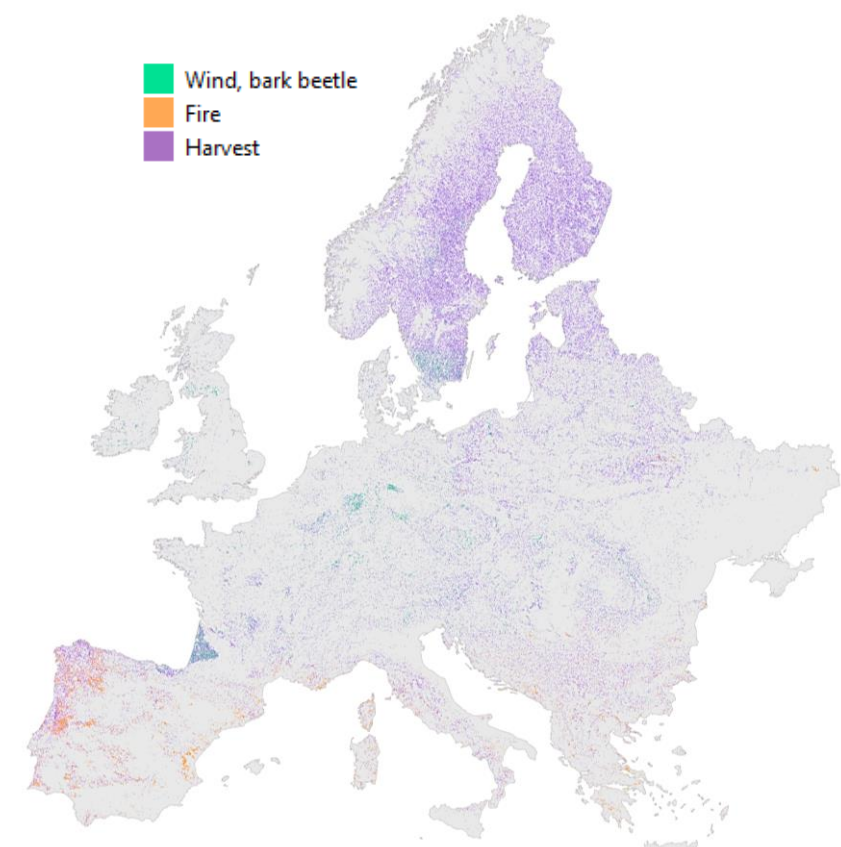
Our approach



European DataCube of
Landsat data

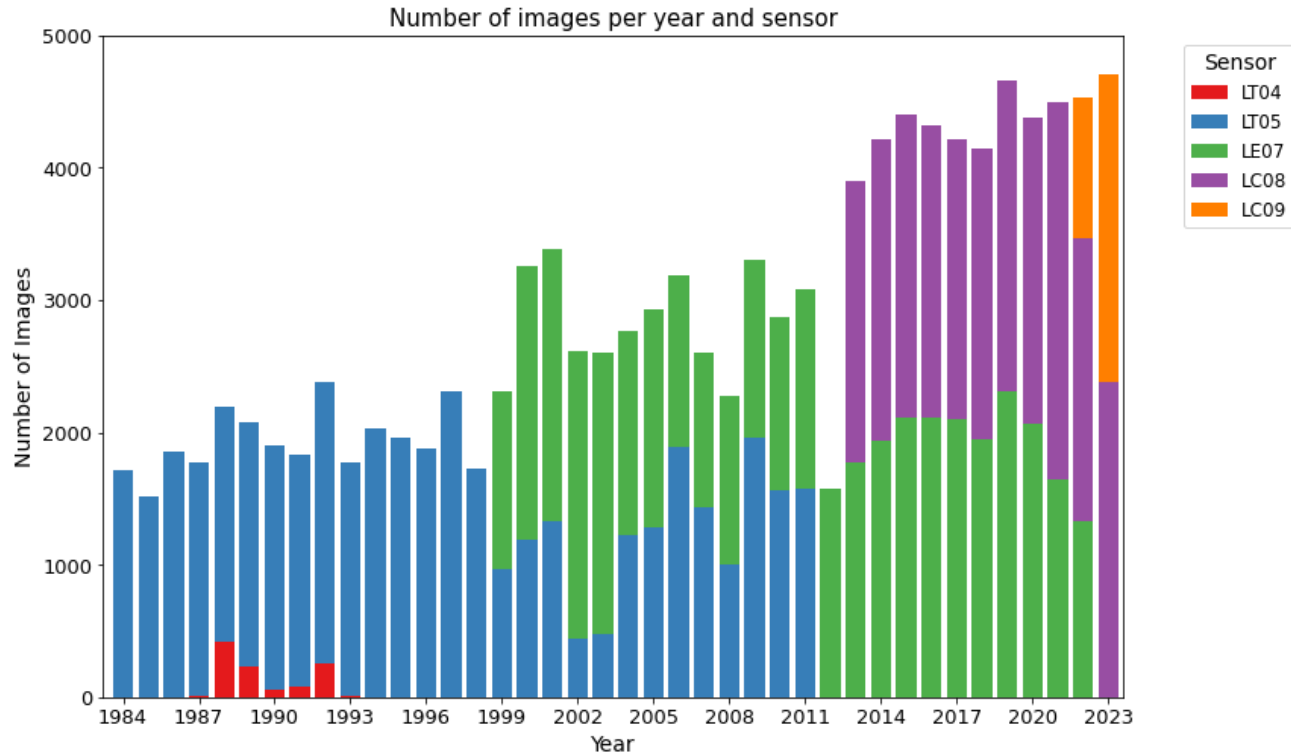


Tree canopy change
detection

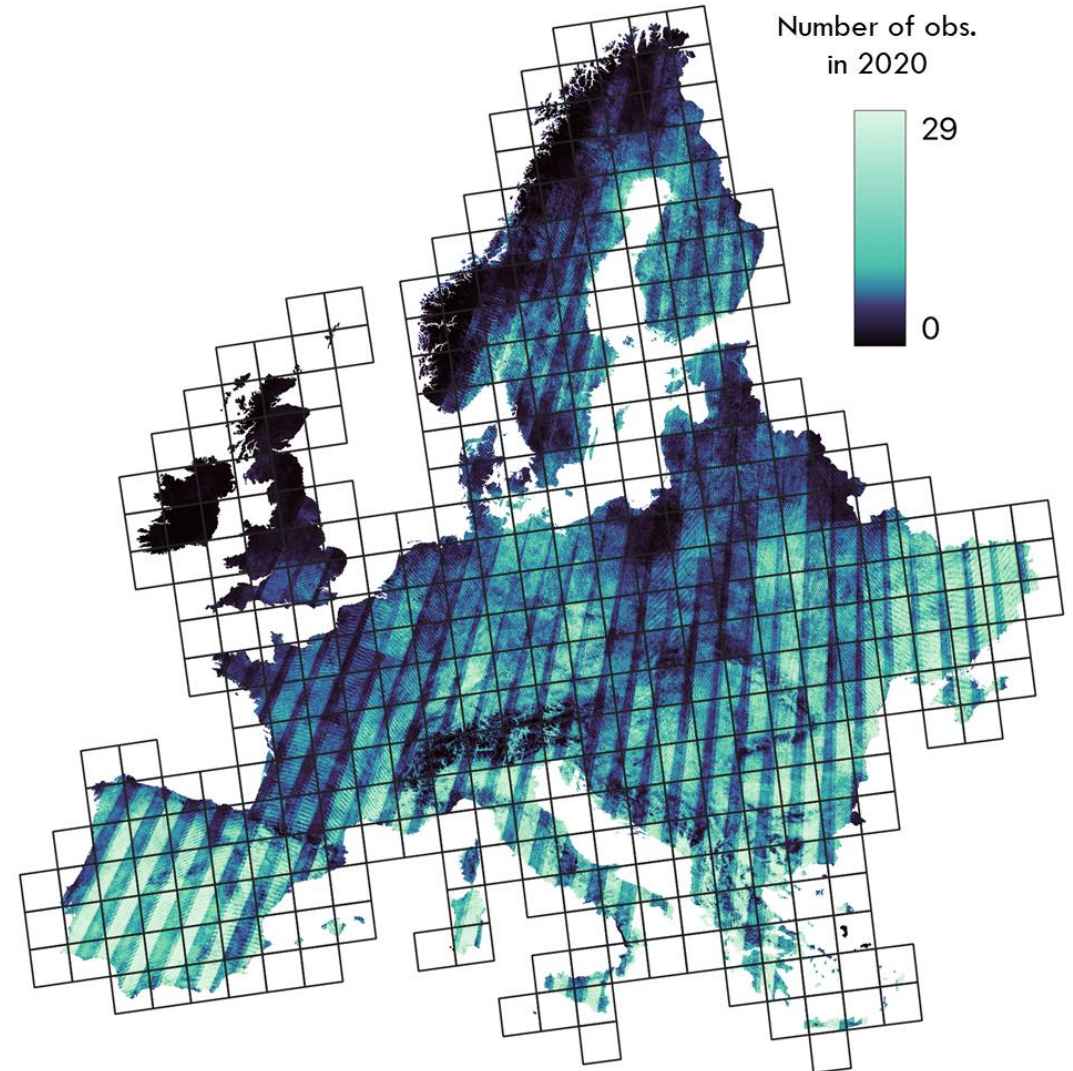


Change attribution

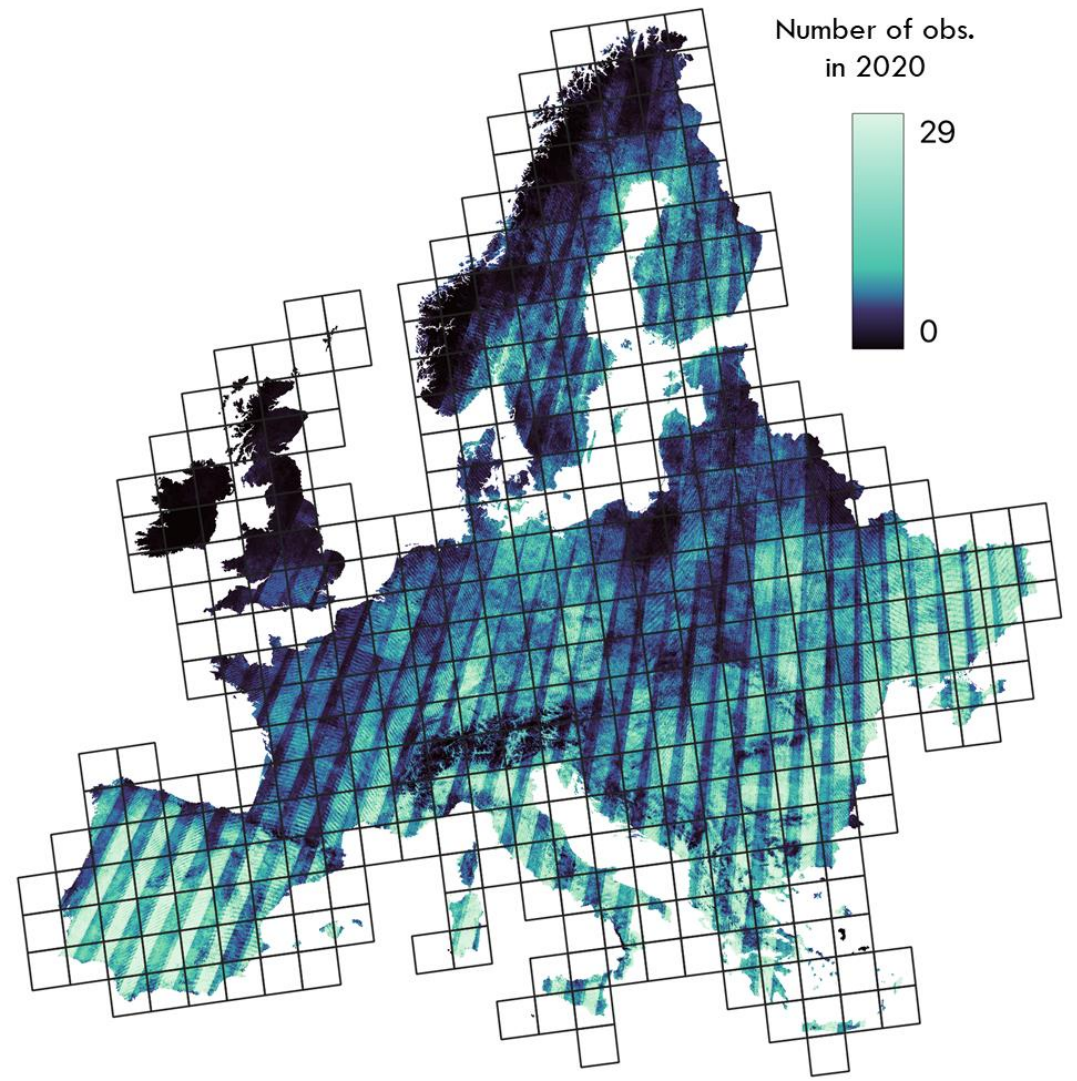
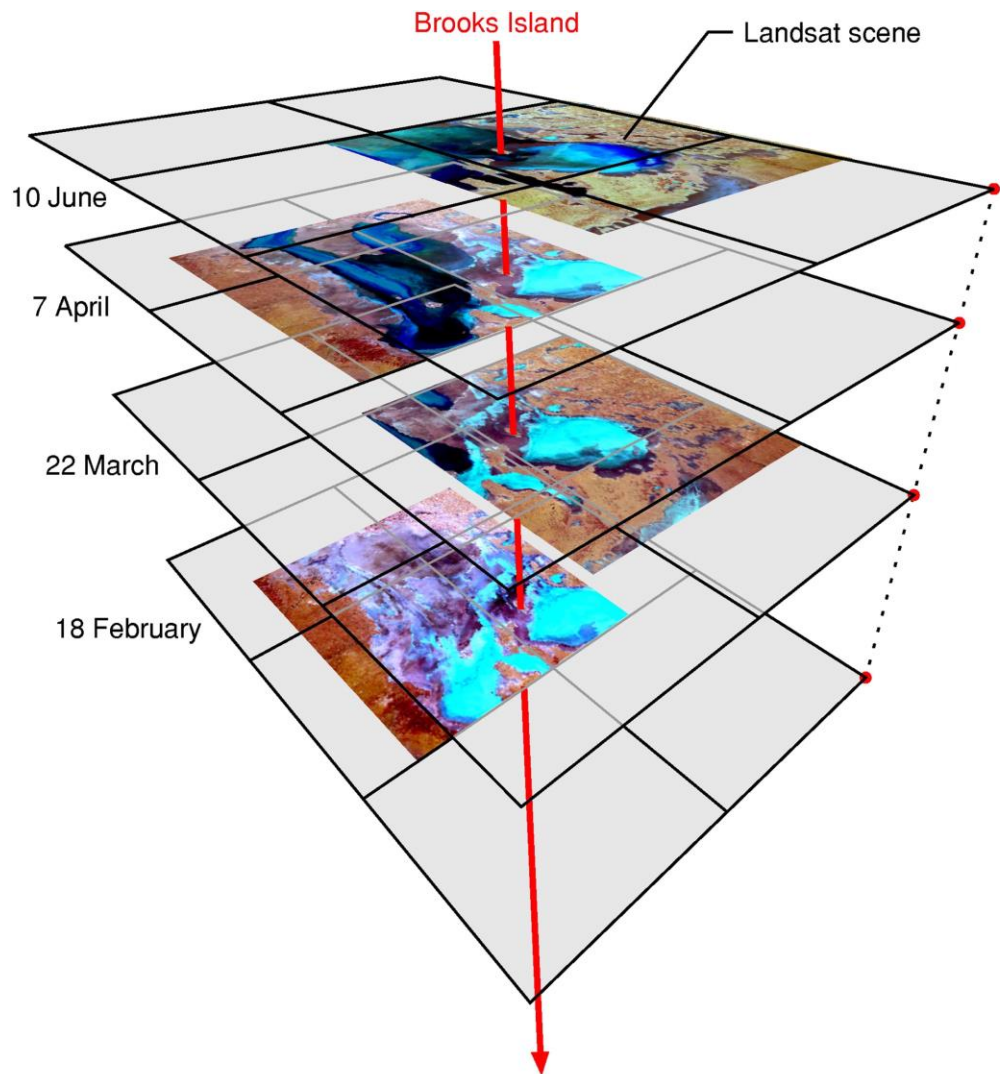
European DataCube of Landsat data



Landsat images processed: **115,663** (>50 TBs)
1984-2023 from June-September



European DataCube of Landsat data



European DataCube of Landsat data

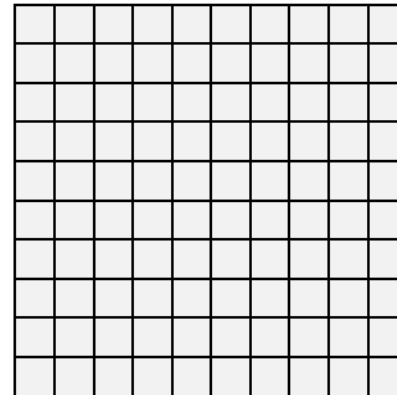
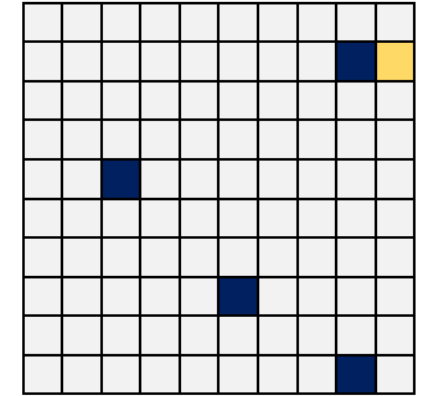
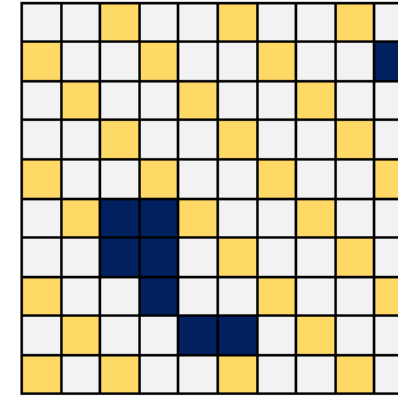
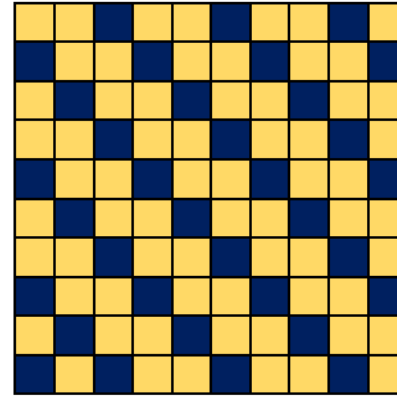
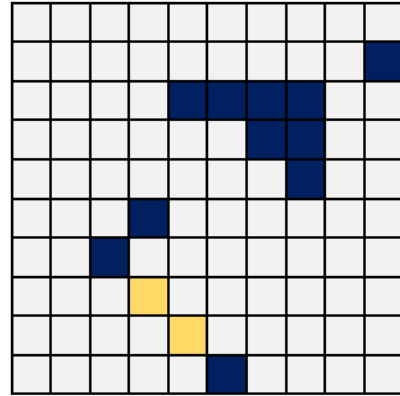
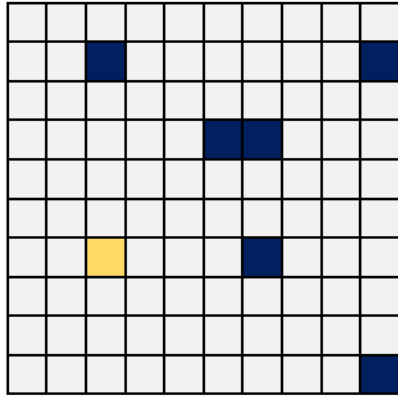
17 June 2020

10 July 2020

1 August 2020

12 August 2020

10 September 2020



Best Available Pixel Composite (BAP)

Tree canopy change detection: reference data



Forest

10.5281/zenodo.4682960

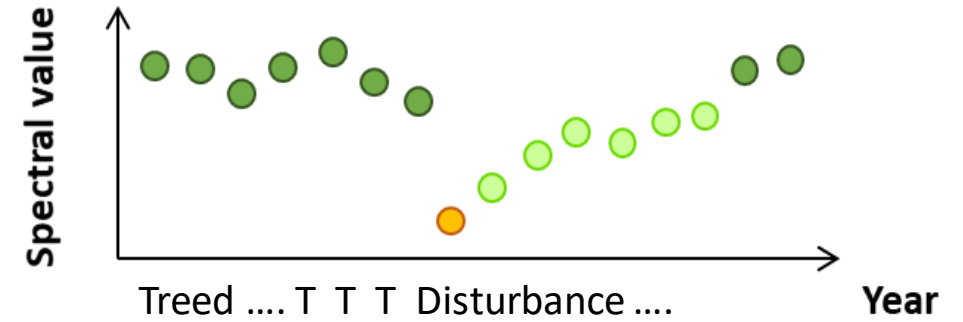
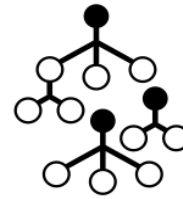
Senf. (2021)

~20,000 points for Europe
randomly sampled

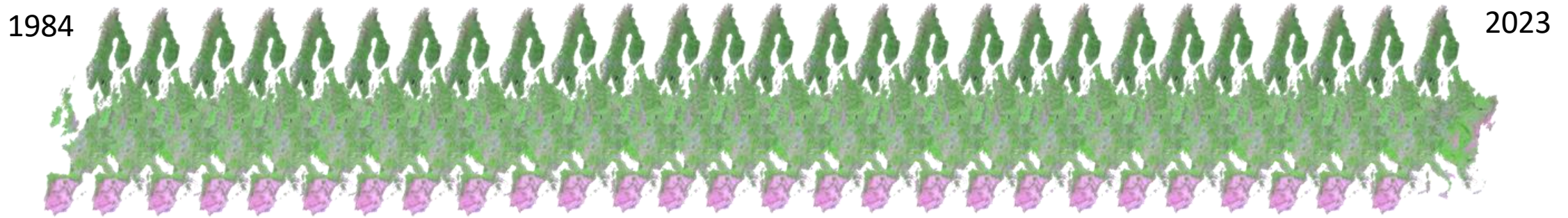
+

Non forest LUCAS
database (Eurostat)

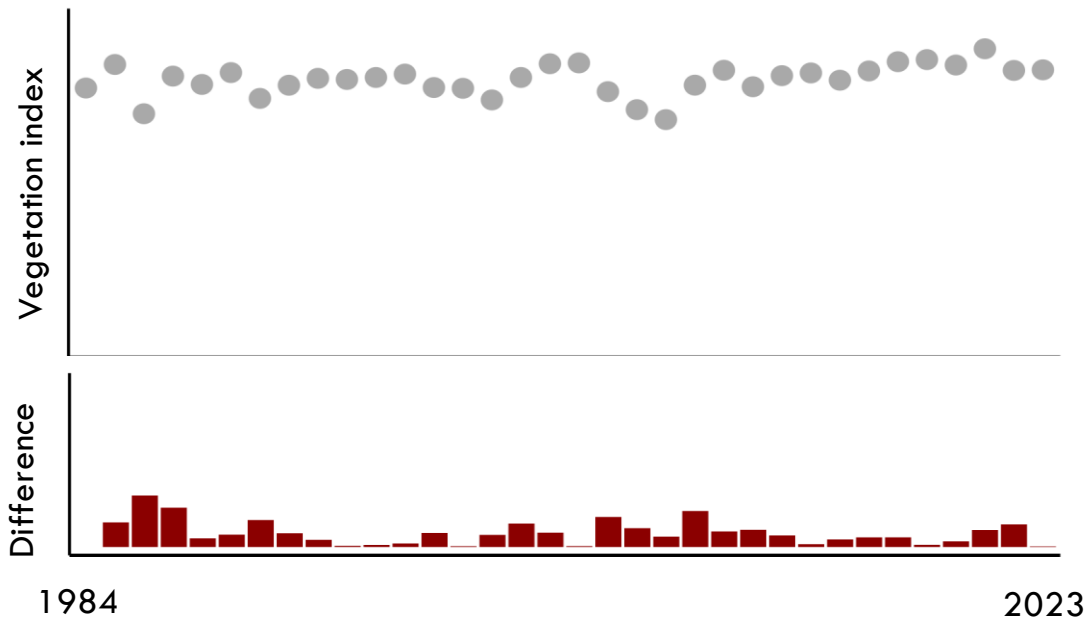
Random forest
classification



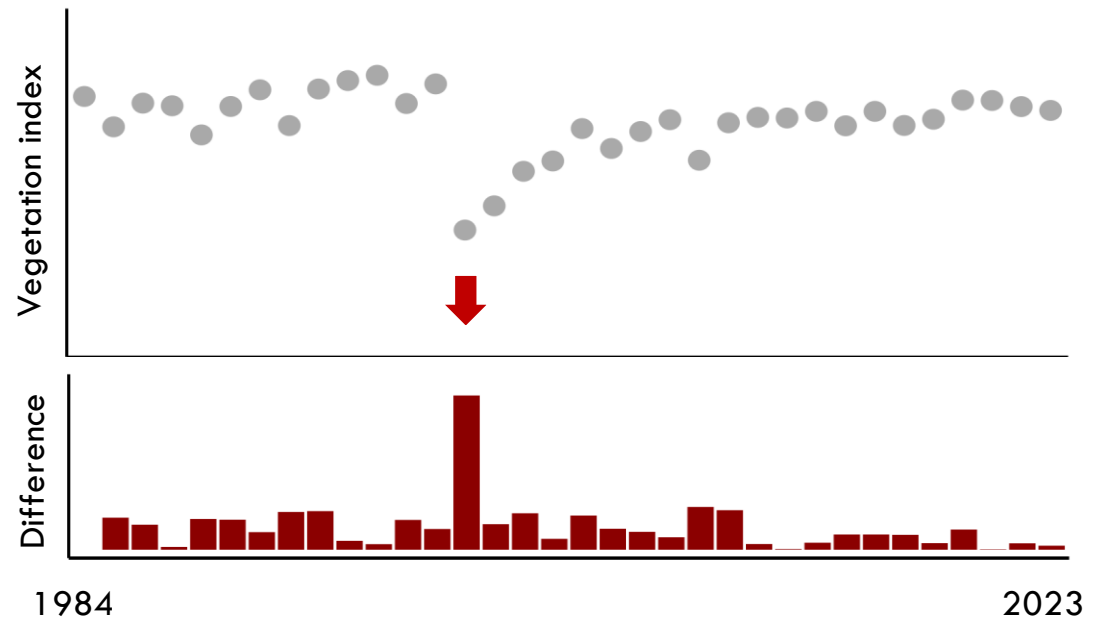
Tree canopy change detection



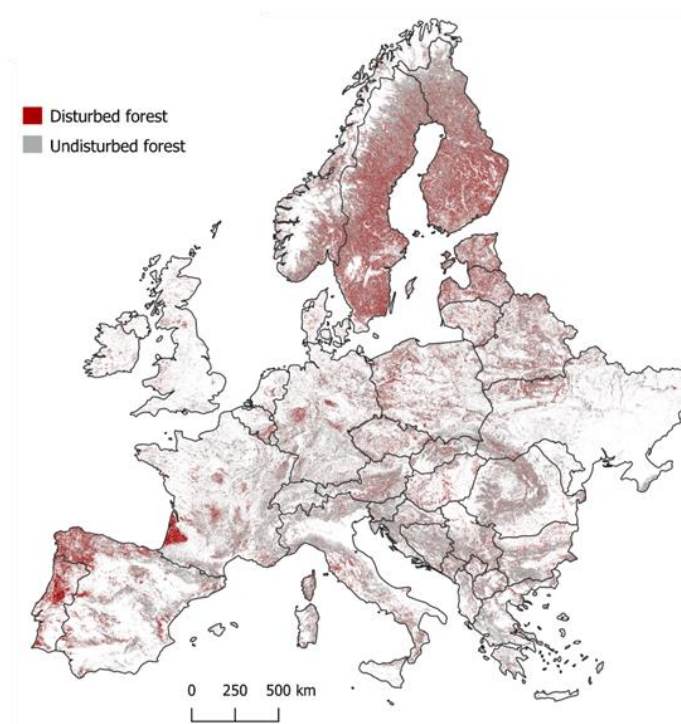
Stable forest



Forest disturbed



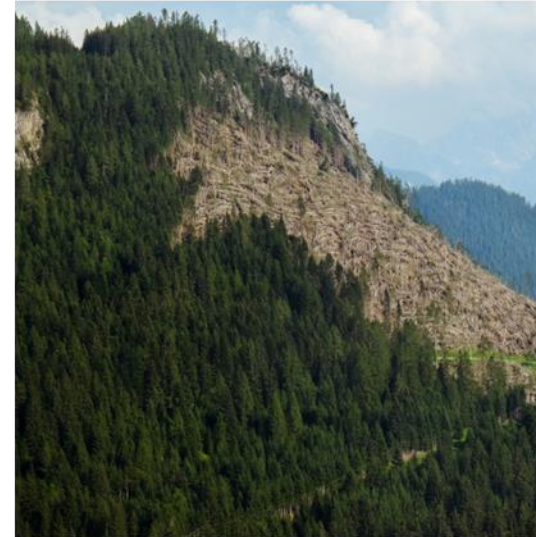
Change attribution



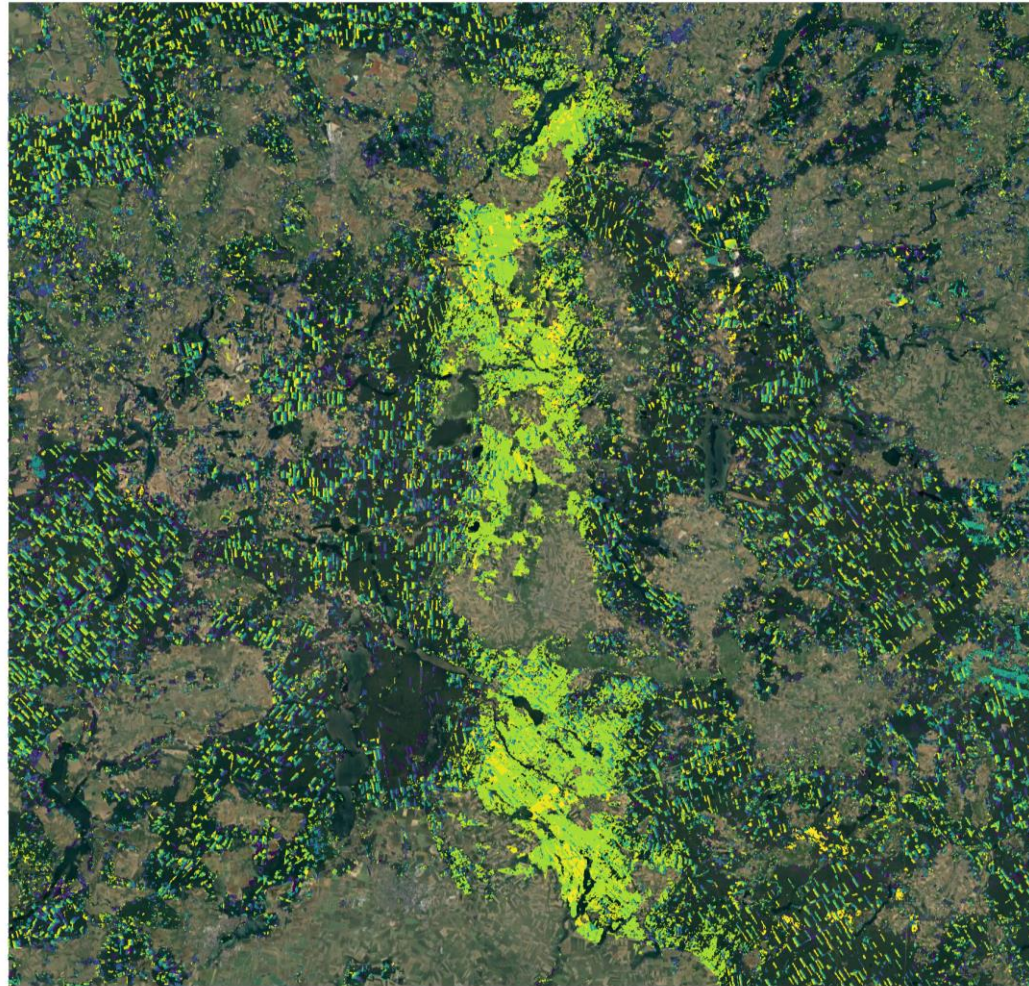
Agent attribution follows methods described in Sebold et al. 2021 and Senf and Seidl 2021

Planned: harvest

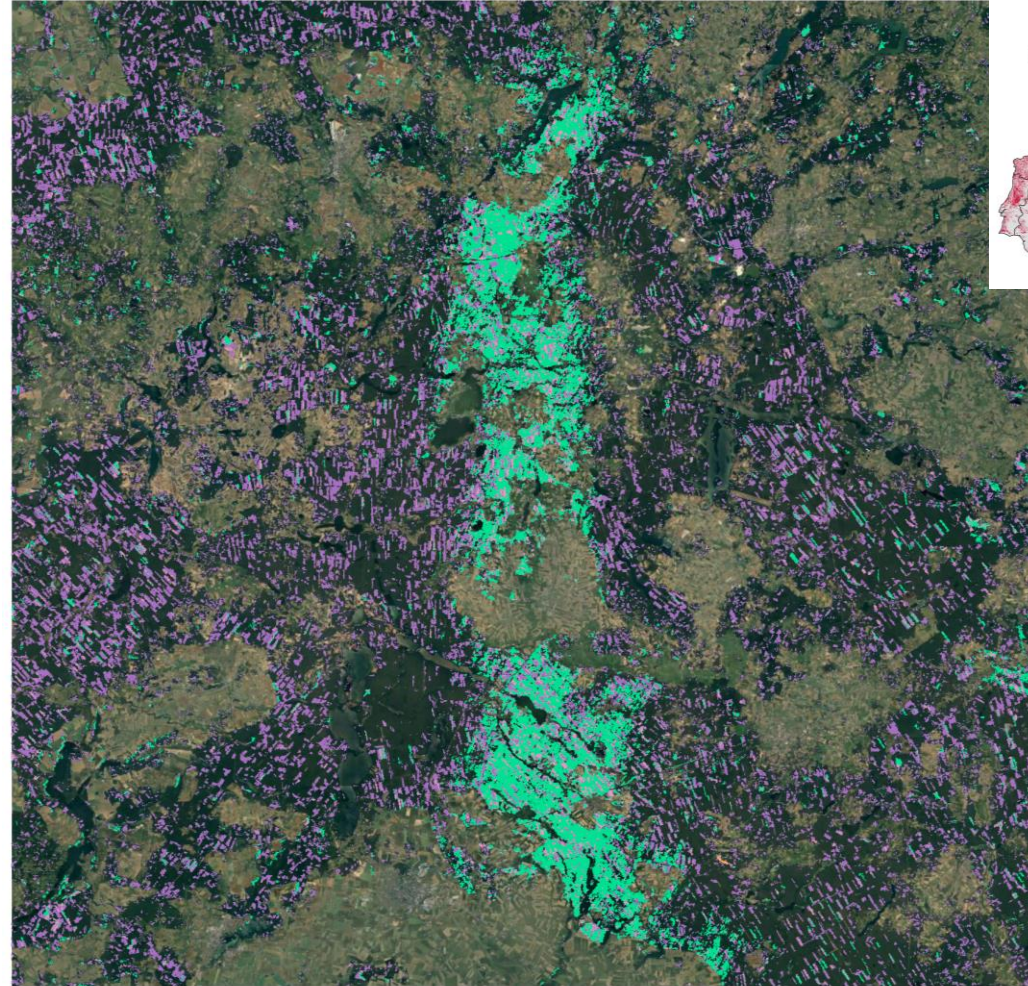
Unplanned: fire, wind, bark beetle



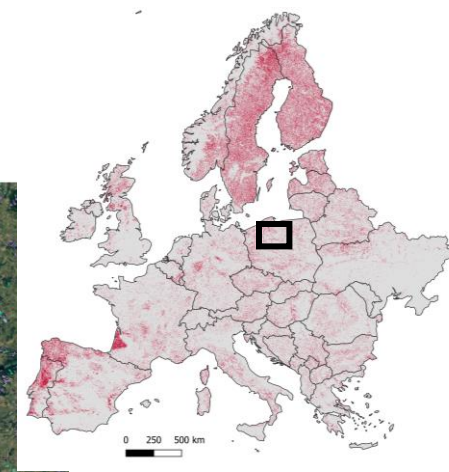
Harvesting and recent windstorm in Poland



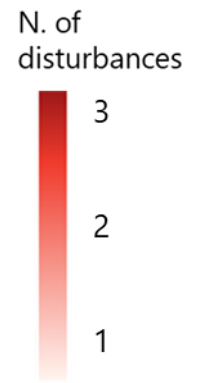
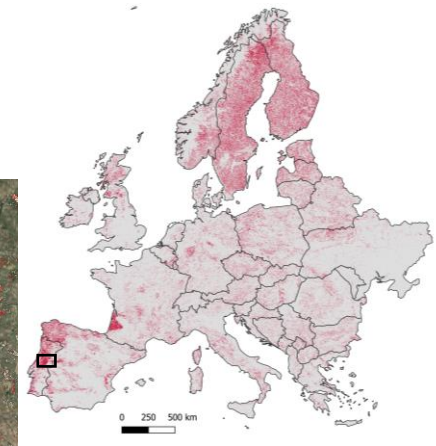
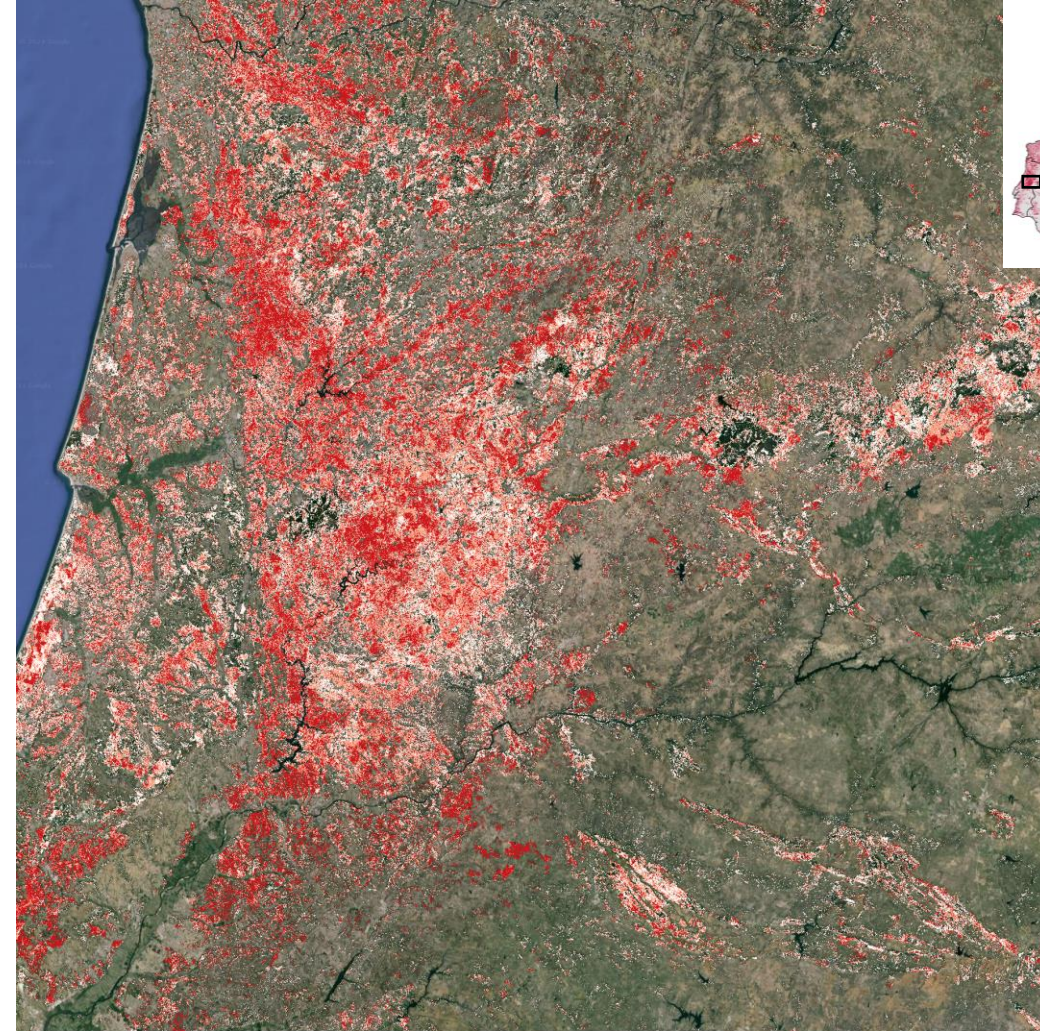
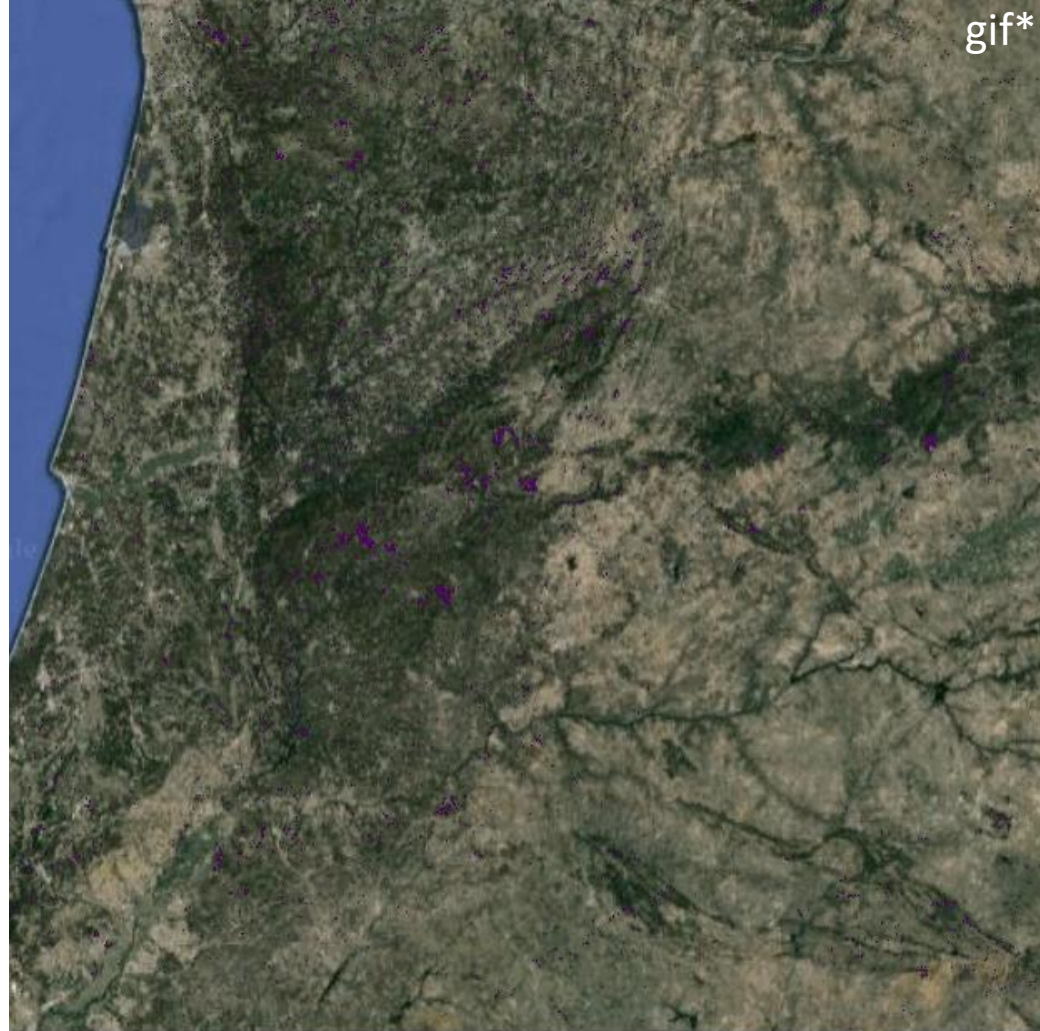
0 5 10 km
1985 2005 2023
Year of disturbance



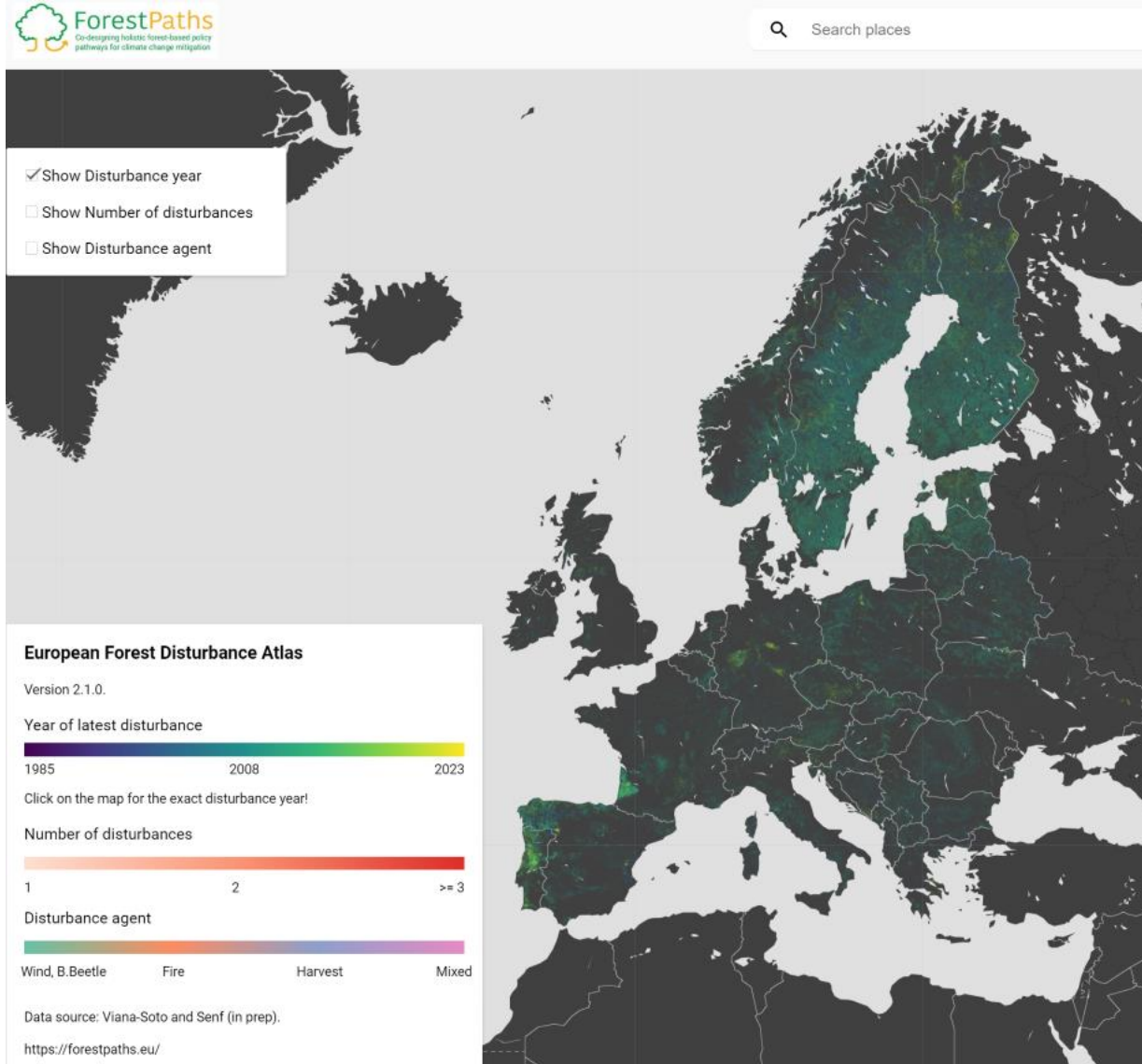
0 5 10 km
Disturbance agent
Cyan Wind, bark beetle
Orange Fire
Purple Harvest



Forest fires in Central Portugal



European Forest Disturbance Atlas v2.1.0



Outlook

Results coming in summer of direct relevance to the LULUCF community:

- Data paper to be submitted and report (June-August)
- Trainings on how to use the maps
- Next version v2.1.1 (June)



Products per country for 1985-2023 at 30 m.

[European Forest Disturbance Atlas Zenodo data repository](#) 

Thank you!

Alba Viana-Soto

alba.viana-soto@tum.de