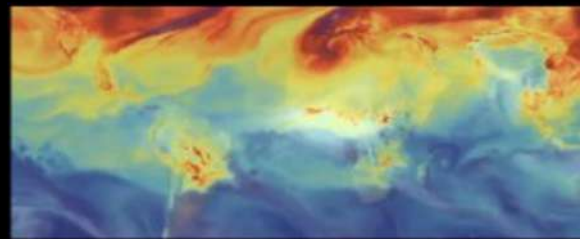


Lobelia.

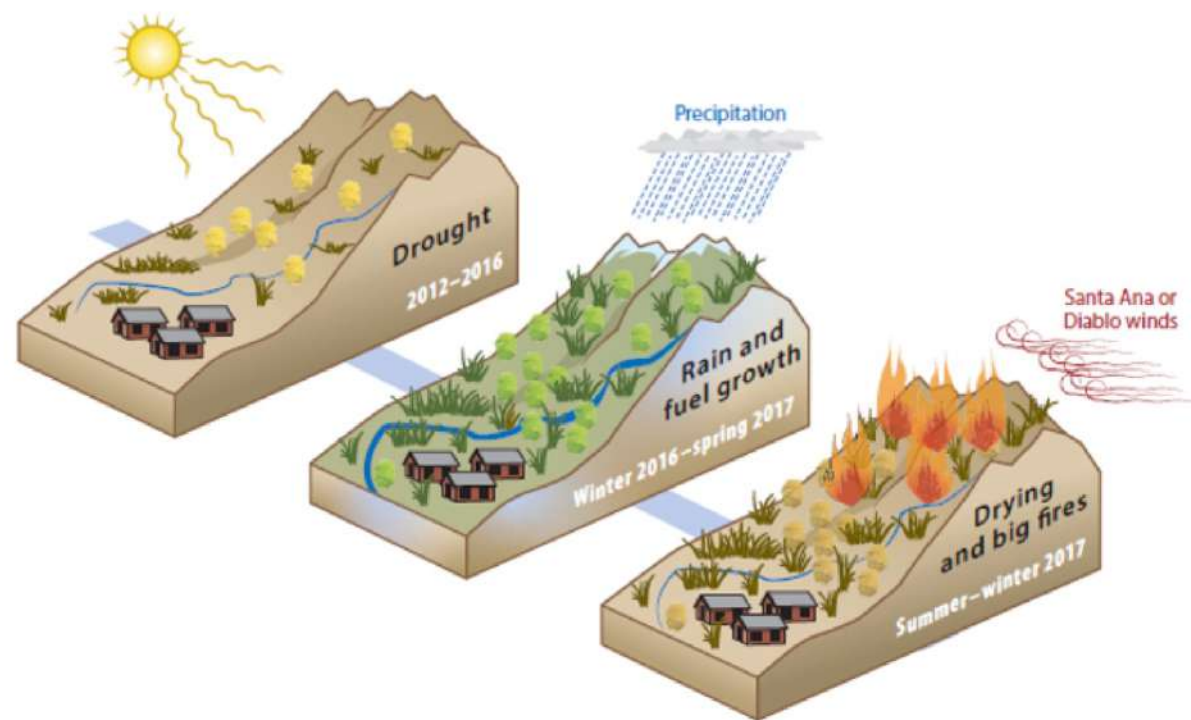
EARTH OBSERVATION • MACHINE LEARNING • WILDFIRE RESILIENCE

SAPIC: Advanced Wildfire Prevention Service in Catalonia

High-resolution AI modeling and satellite intelligence for proactive forest management and critical power grid protection.

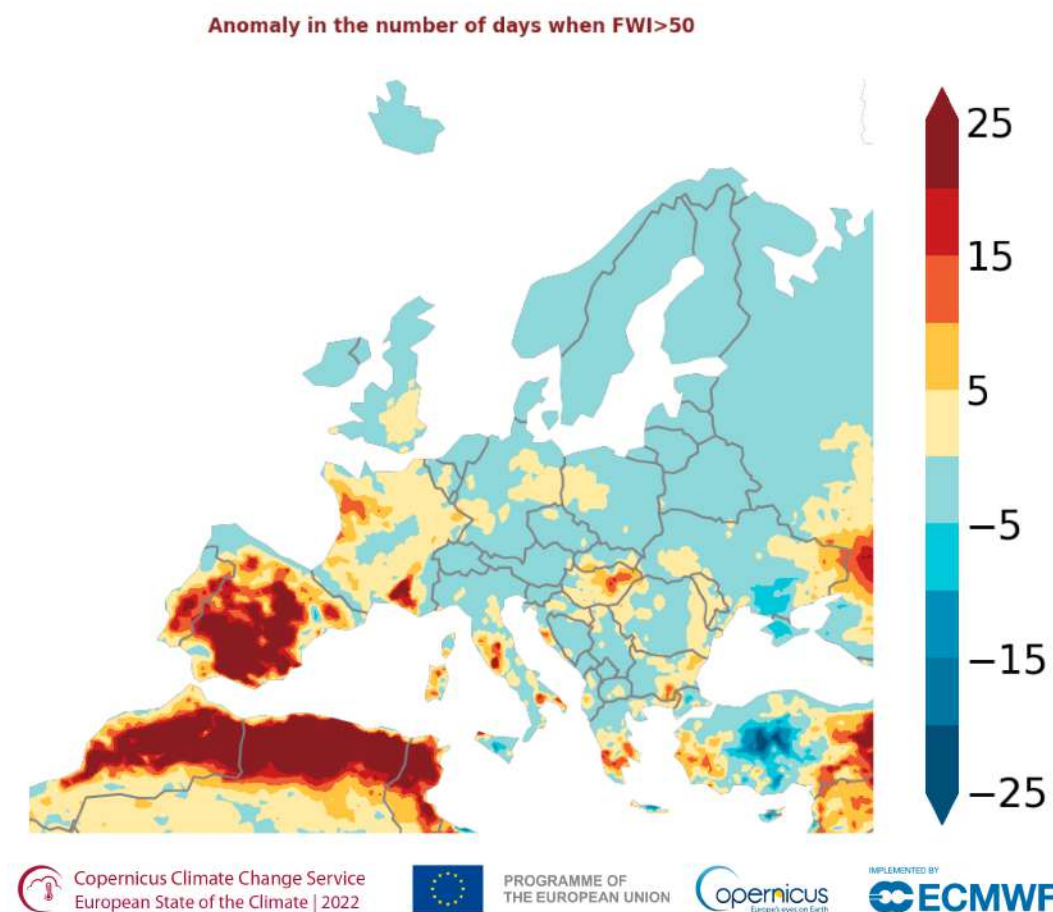


The Need for an Advanced Wildfire Prevention Service



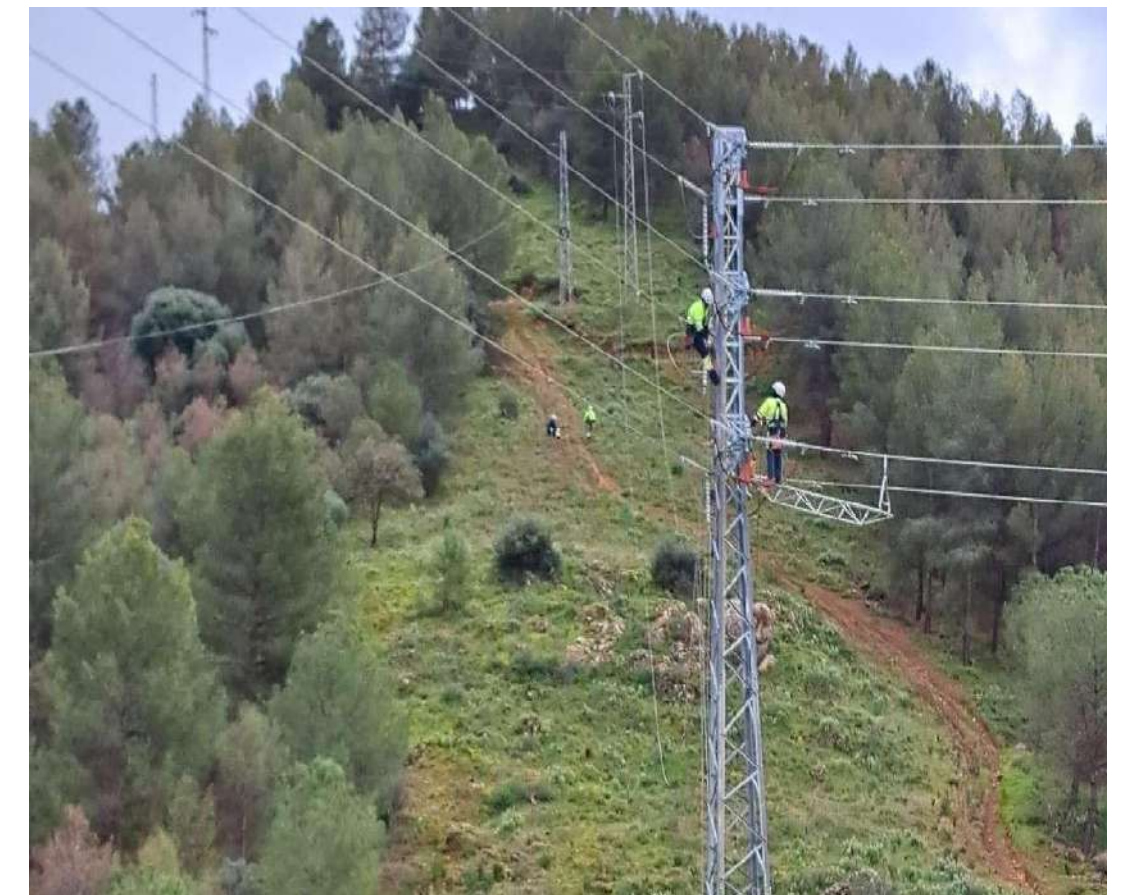
Compound Extreme Hazards

Severe heatwaves and prolonged droughts multiply forest vulnerability.



Coarse Existing Metrics

Conventional indices like FWI operate at multi-kilometer resolution.

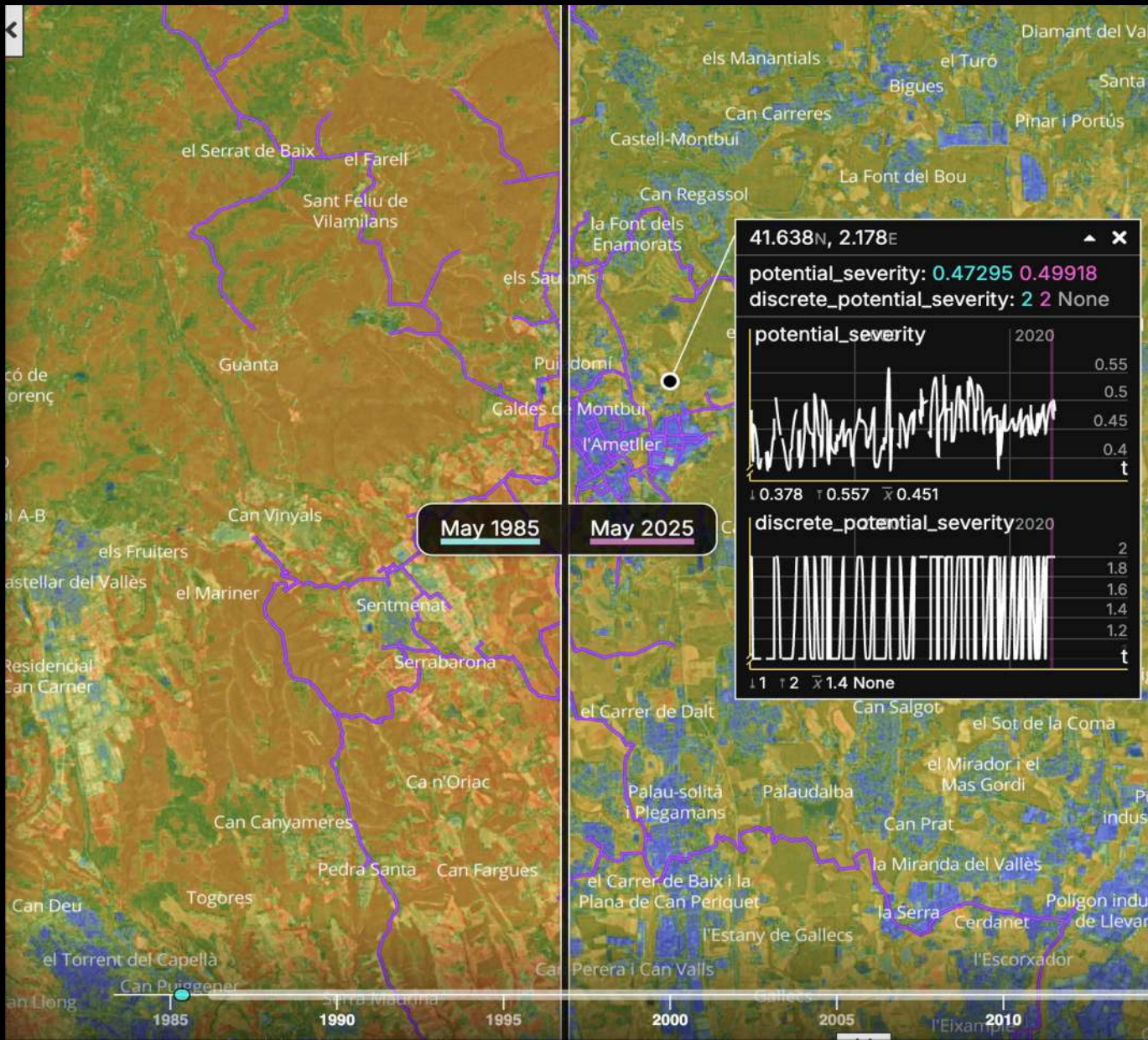


Operational Decision Bottleneck

Inability to prioritize local interventions without costly in-situ visits.

Objectives of SAPIC

Develop a continuous, high-resolution wildfire risk monitoring system by combining satellite technology, artificial intelligence, and climate data.



Output: High resolution wildfire severity map to locate and prioritize preventive interventions.

HIGH-RESOLUTION WILDFIRE SEVERITY MAP

Predictive Risk Analytics for Preventive Intervention Prioritization

PRIORITY 1: High Fuel Dryness
(Critical Corridor)



Preventive Actions

Actionable field insights

01

Locate High Risk

Identify 10-30m hotspots

02

Prioritize Corridors

Rank grid maintenance zones

03

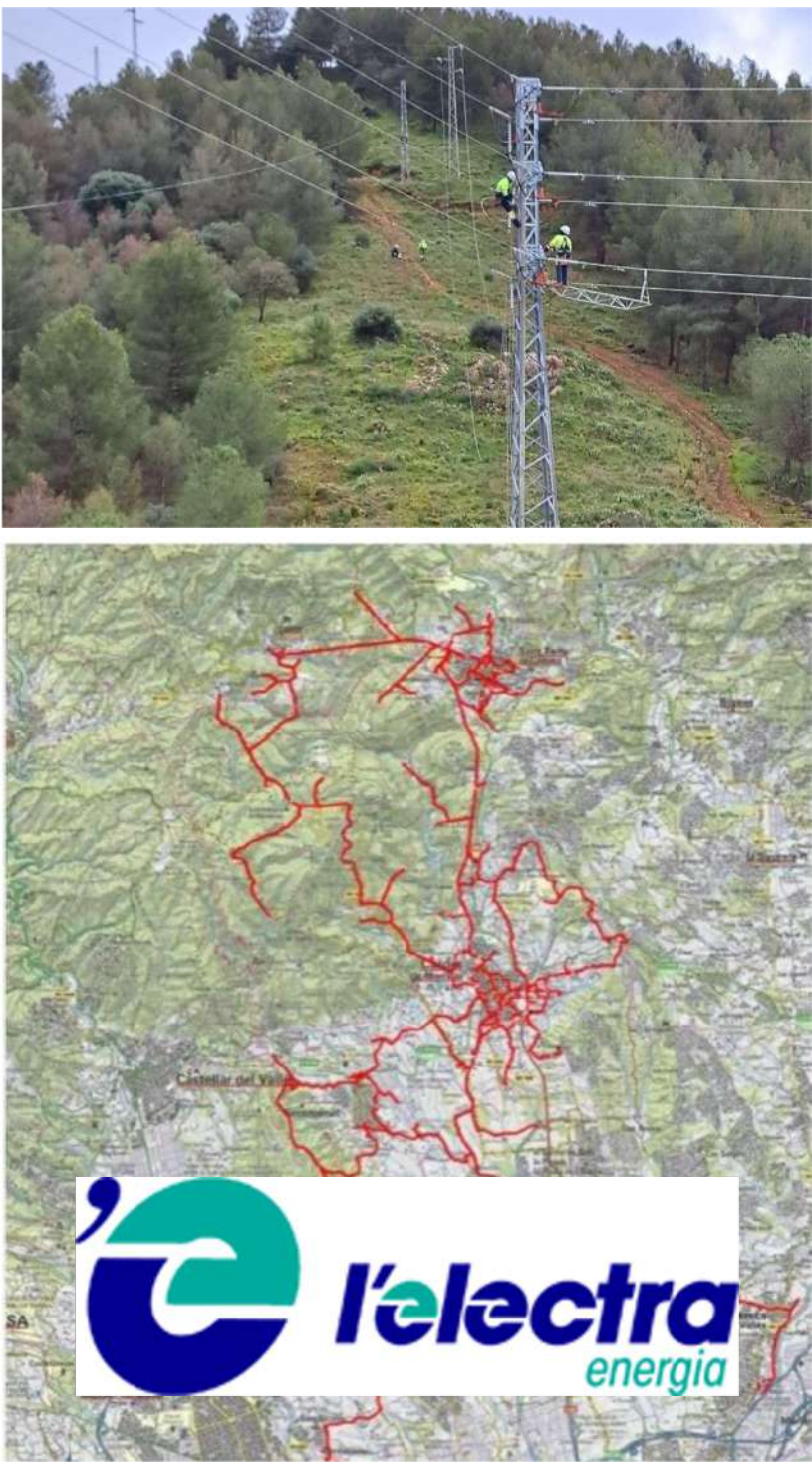
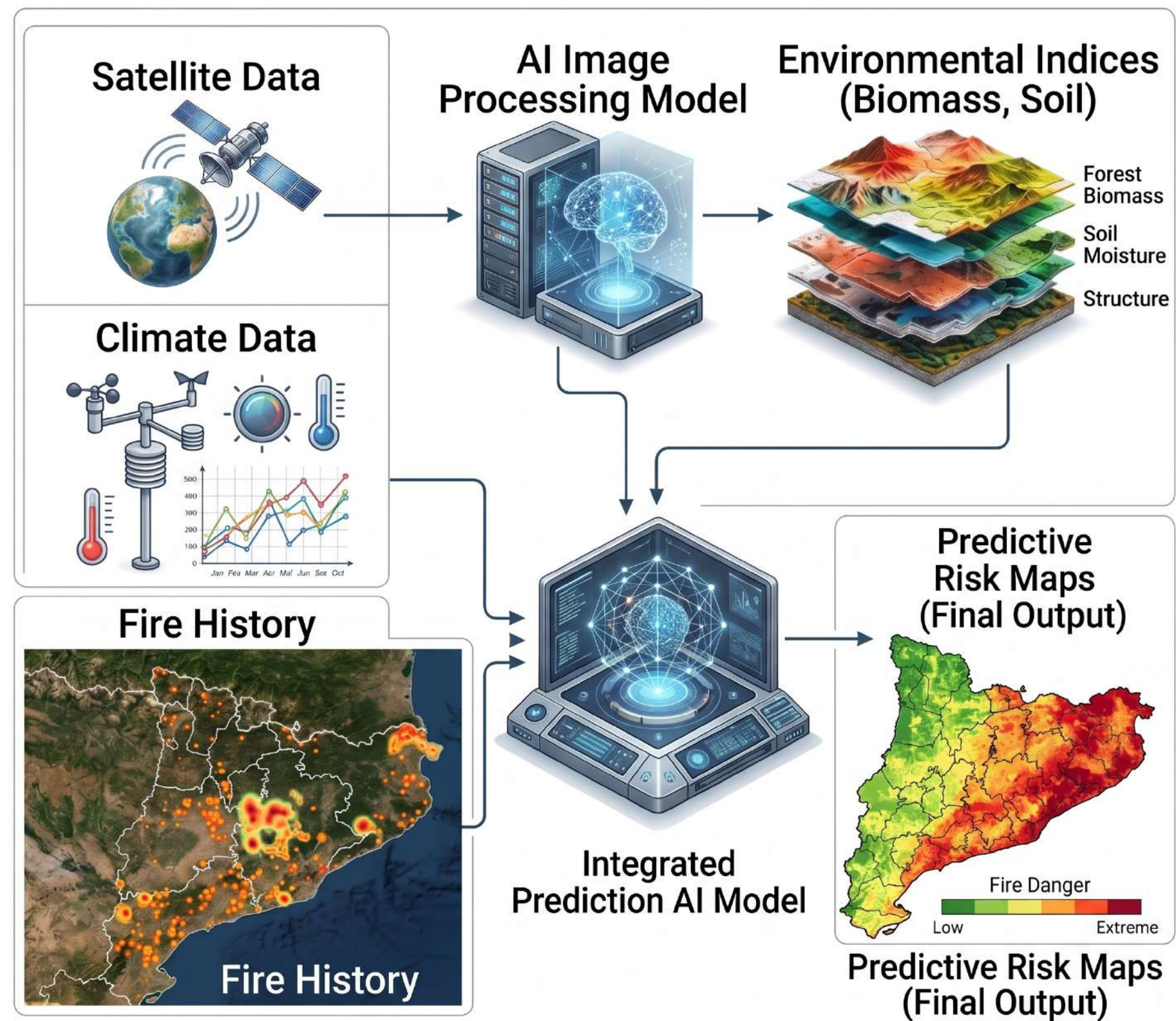
Preventive Field Action

Deploy biomass thinning teams

Severity Scale



How SAPIC Works and who uses it



Electricity grid operators



Forest managers

Model training

Trained on 210 historical wildfires (pre-2010 events for training, post-2010 for validation)

TARGET PARAMETER: EVI-Corrected Wildfire Severity Index

Conceptual Input Categories (Predictors)

Vegetation & Canopy Structure

Tree cover density, land usage classification, and pre-fire vegetation health status derived from satellite observation.

Water Stress & Drought Dynamics

Canopy moisture deficit, soil dryness, and multi-month accumulated drought indicators.

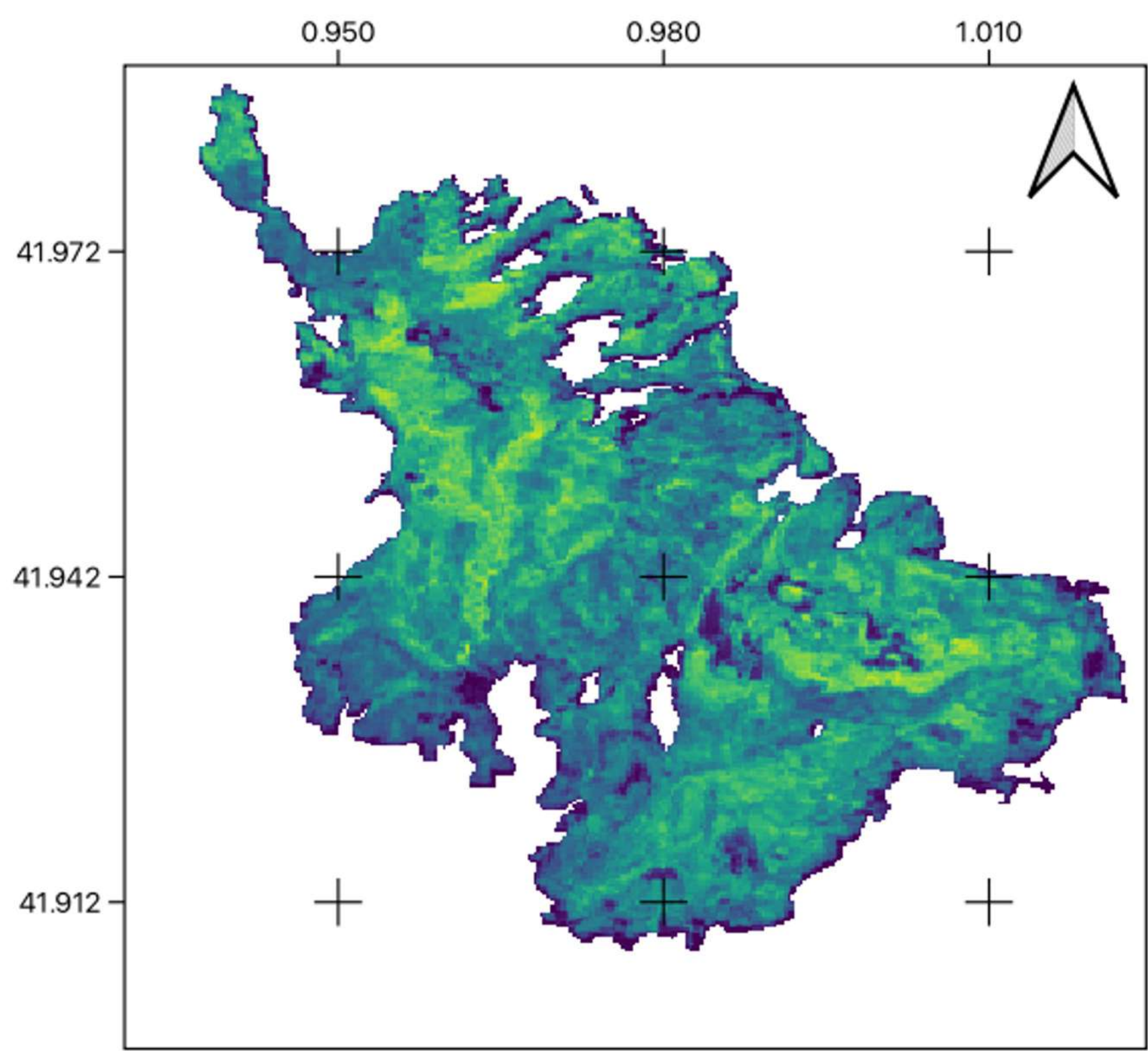
Topography & Terrain Elevation

Digital elevation models capturing terrain slope, aspect, and morphological complexity across regions.

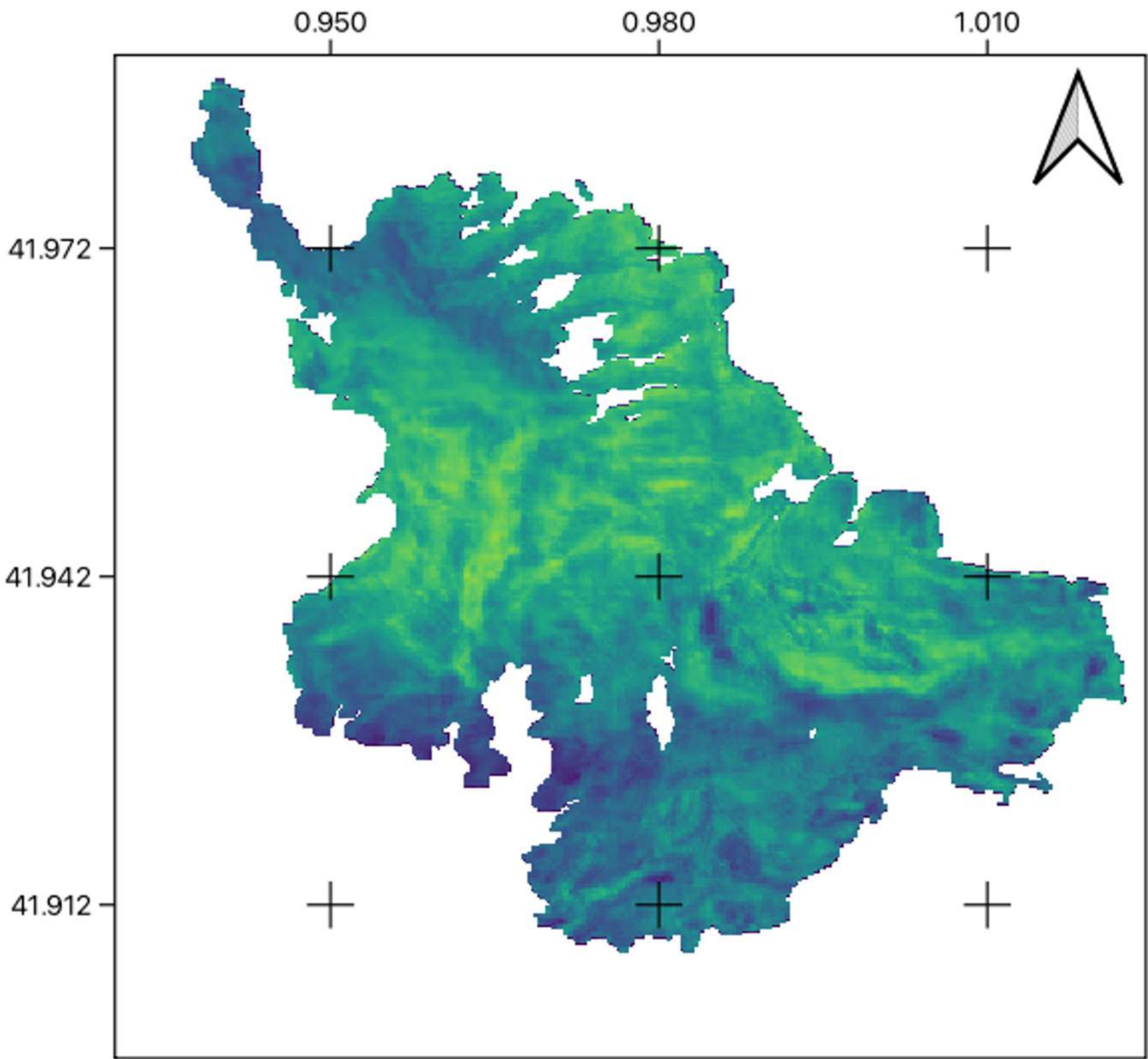
Meteorological Fire Danger

Integrated climatological weather conditions influencing ignition probability and fire spread potential.

Results



Ground truth



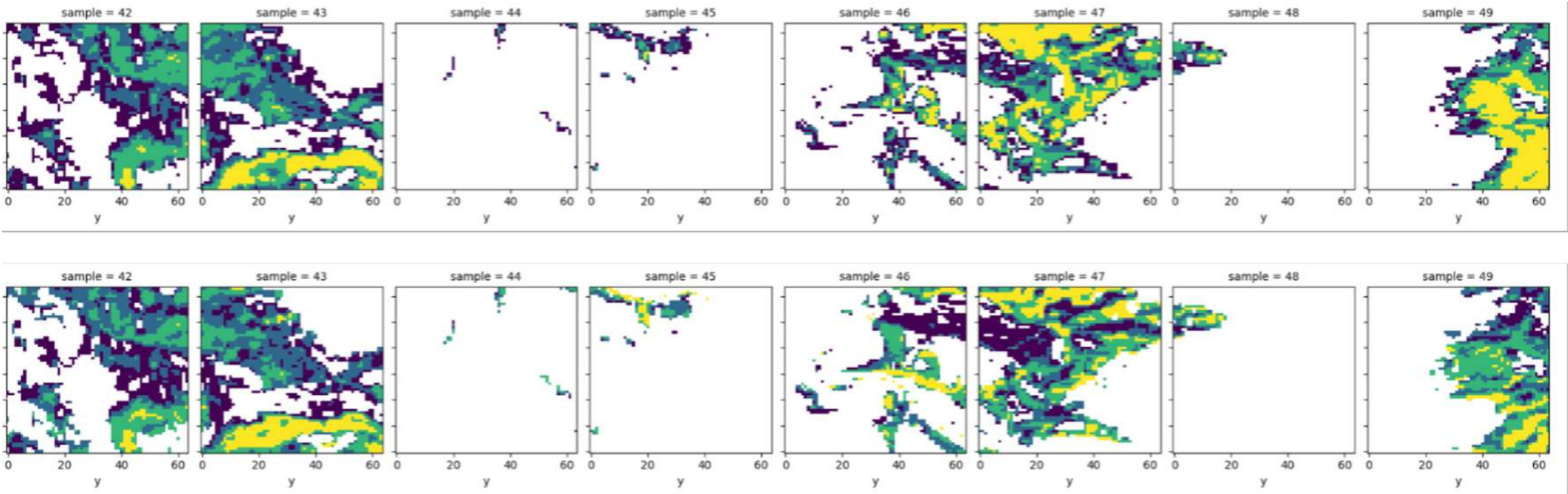
Severity prediction

Results

Example 1

Observed
severity

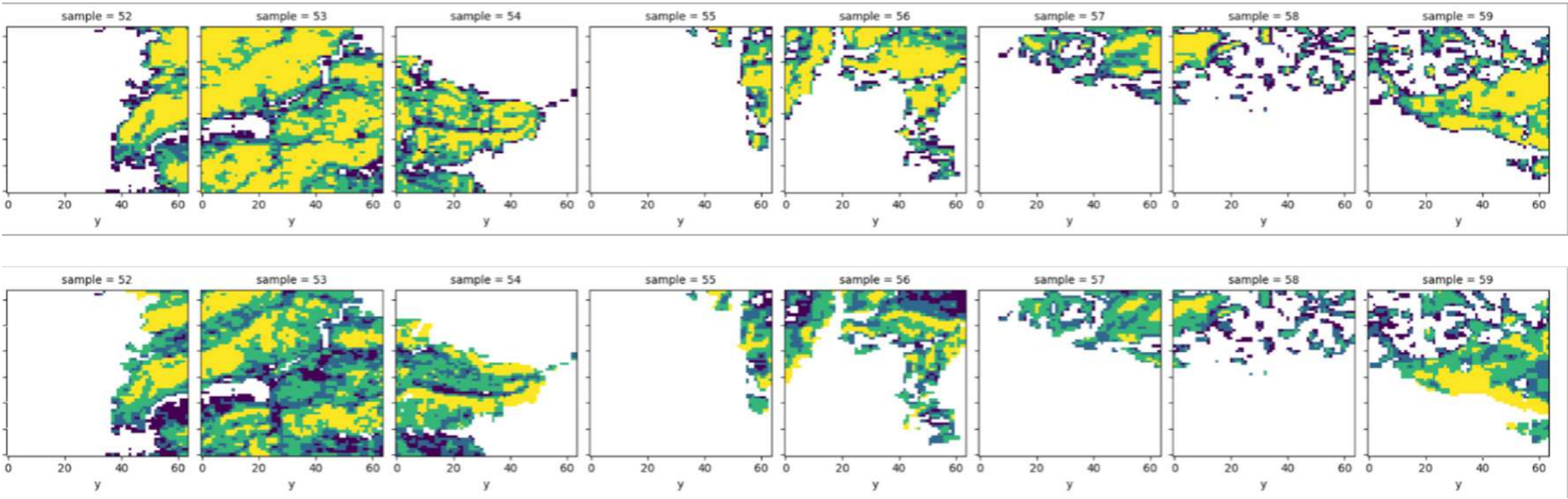
Prediction



Example 2

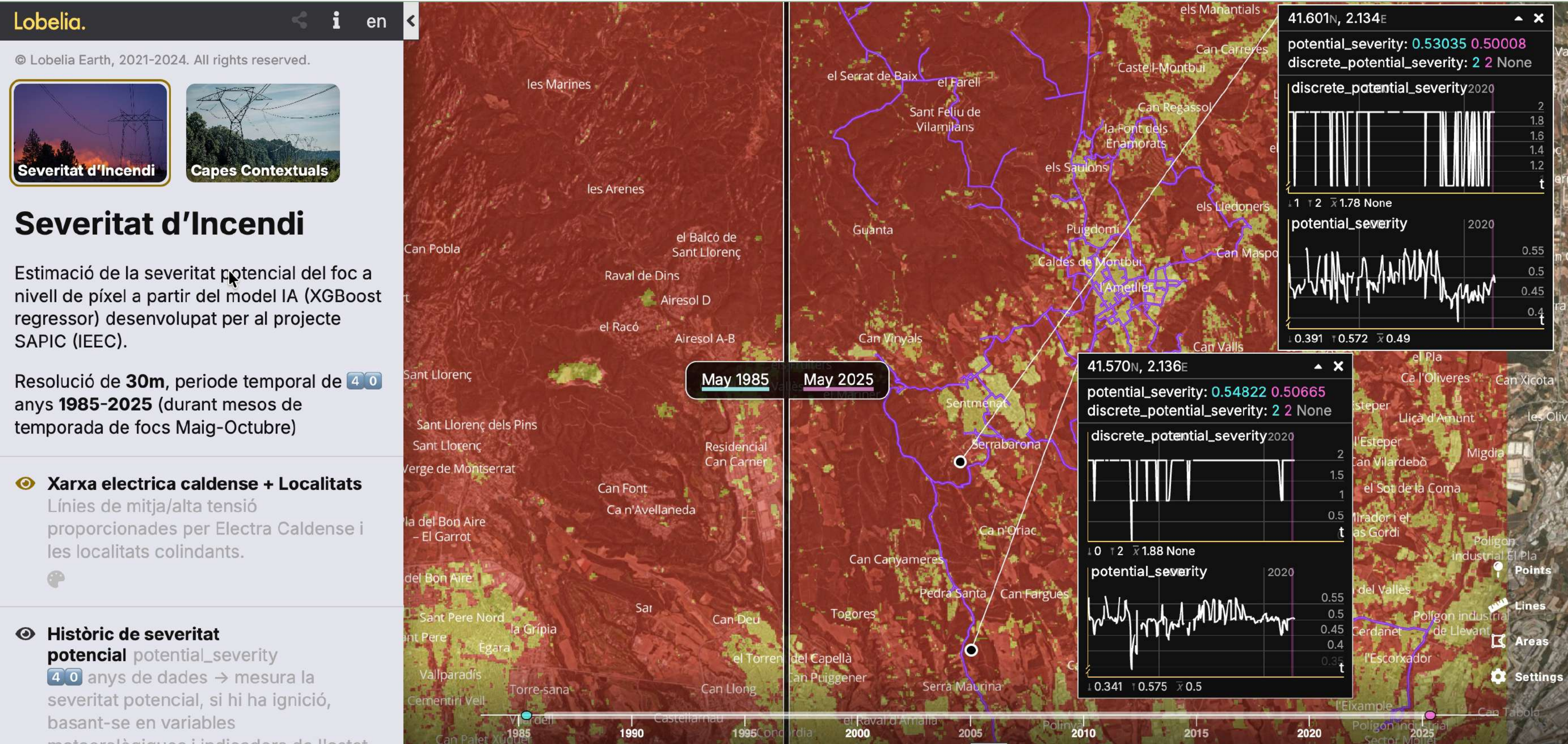
Observed
severity

Prediction



4 Severity classes: Low - Medium - High - Very High: Maximum class classification accuracy of 70%

Results in the viewer



Prediction of the severity of fire at two points of the Electra Caldense Network where it can be seen how it changes over time

[illegible]

End-User Validation

Results presented to key stakeholders (Electra Caldense & PEFC). Core operational feedback:

OPERATIONAL CONTROL

Near Real-Time (NRT) Capability

High interest in evolving the diagnostic tool into an operational control panel for immediate, real-time decision making during high-risk events.

POST-FIRE AUDITING

Post-Fire & Certification Analysis

Valuable tool for post-event analysis, integrating severity and biomass loss metrics directly into PEFC forest certification requirements.

PREVENTION PROOF

Justification of Active Prevention

Strong appreciation for scientific data proving that active forest management and fuel reduction directly decrease fire severity.

End-user validation: Economic impact

The value generated for end users such as forest owners and power grid operators is focused on the following aspects:



Resource optimization

.

Prioritization of actions in risk areas to maximize efficiency in forest management and surveillance.



Operational savings

Potential 20-30% reduction in unnecessary inspections and maintenance, with savings of hundreds of thousands of euros per year.



Prevention vs. Extinction

Mitigation of large fires with recovery costs that can exceed €40,000/ha.



Infrastructure protection

.

Improved strategic decision-making to protect electricity grids and economic operations.

Market Deployment: target users

Priority customer segments for operational wildfire intelligence



01 Electricity network operators

Protect exposed assets and support real-time operational decisions.

02 Public administrations

Prioritise prevention, emergency response and territorial resilience.



03 Private forest management operators

Reduce fire severity and protect sustainable wood production.

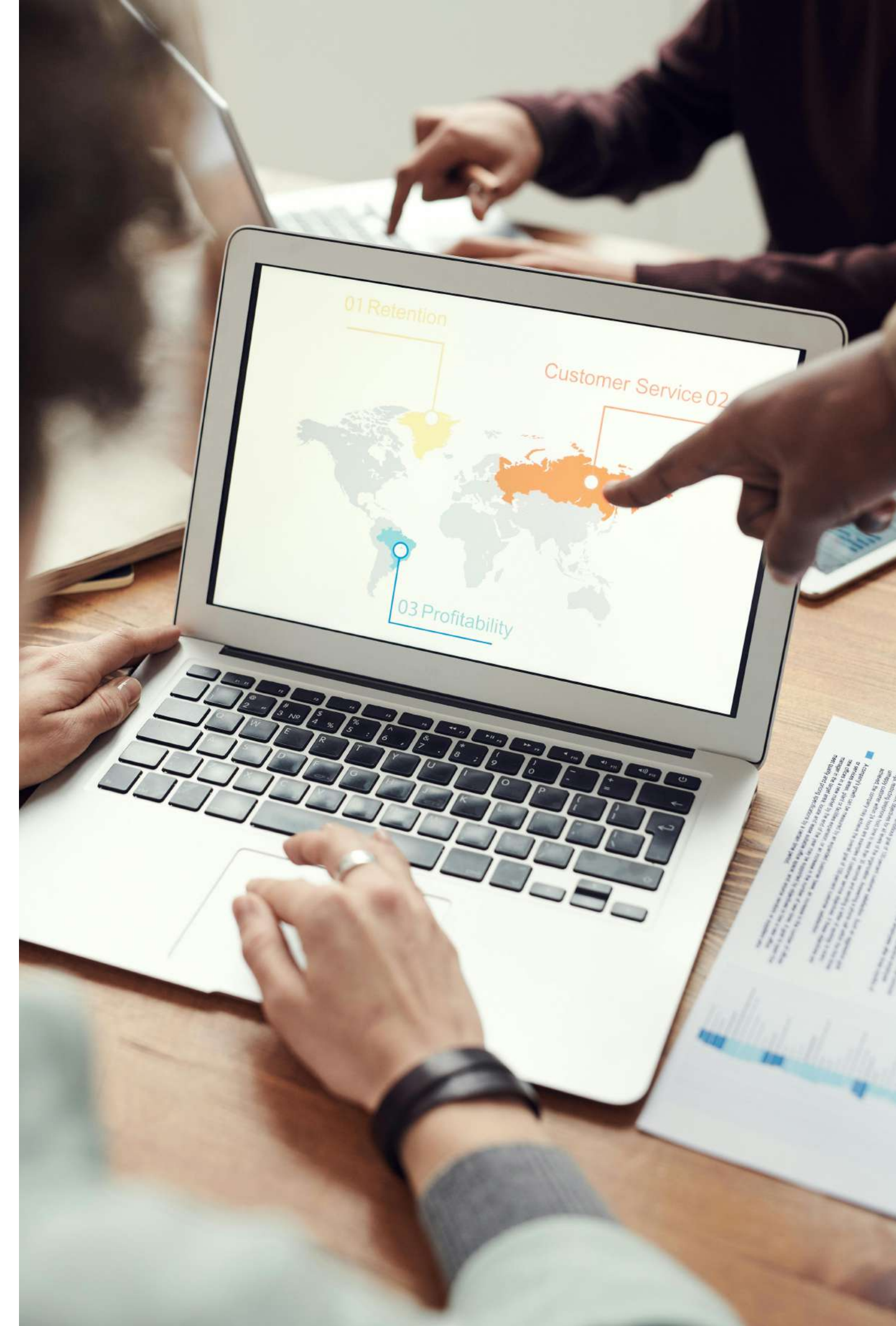
04 Carbon project operators

Strengthen permanence monitoring and evidence for forest carbon assets.

Exploitation potential and scalability

The potential for use of the solution developed at SAPIC can be considerably extended:

- **Inherent global scalability:** Solution based on global Earth observation data, easily replicable in any region with similar climate risks.
- **Commercial expansion to other territories:** Progressive growth from the regional and national level towards international markets (Southern Europe, California, Australia or Chile).
- **Other strategic sectors:** Opening up to the insurance market (parametric insurance) and the financial market (compliance with the TNFD nature risk framework).
- **Digital business model:** Modular and adaptable product through a subscription model or integration with other datasets with high long-term growth potential.



Conclusions

SAPIC conviert reactive response to predictive operations

High-resolution fire monitoring (10–30 m) combines Earth observation and AI to support operational decisions.

01 Direct impact on business

Prioritization of actions
Potential 20–30% reduction in operating costs
Better protection of critical infrastructures

02 Validated and actionable solution

~70% accuracy in severity rating
Proven value in prevention and post-fire

03 Scalable and monetizable model

DaaS and SaaS model
Applicable to utilities, forest managers and the public sector

04 Clear global potential

Globally replicable
Expansion into insurance and finance (physical risk / TNFD)

Lobelia.

Thank you

