

WILDFIRE RISK MANAGEMENT ON LARGE MEDITERRANEAN LANDSCAPES

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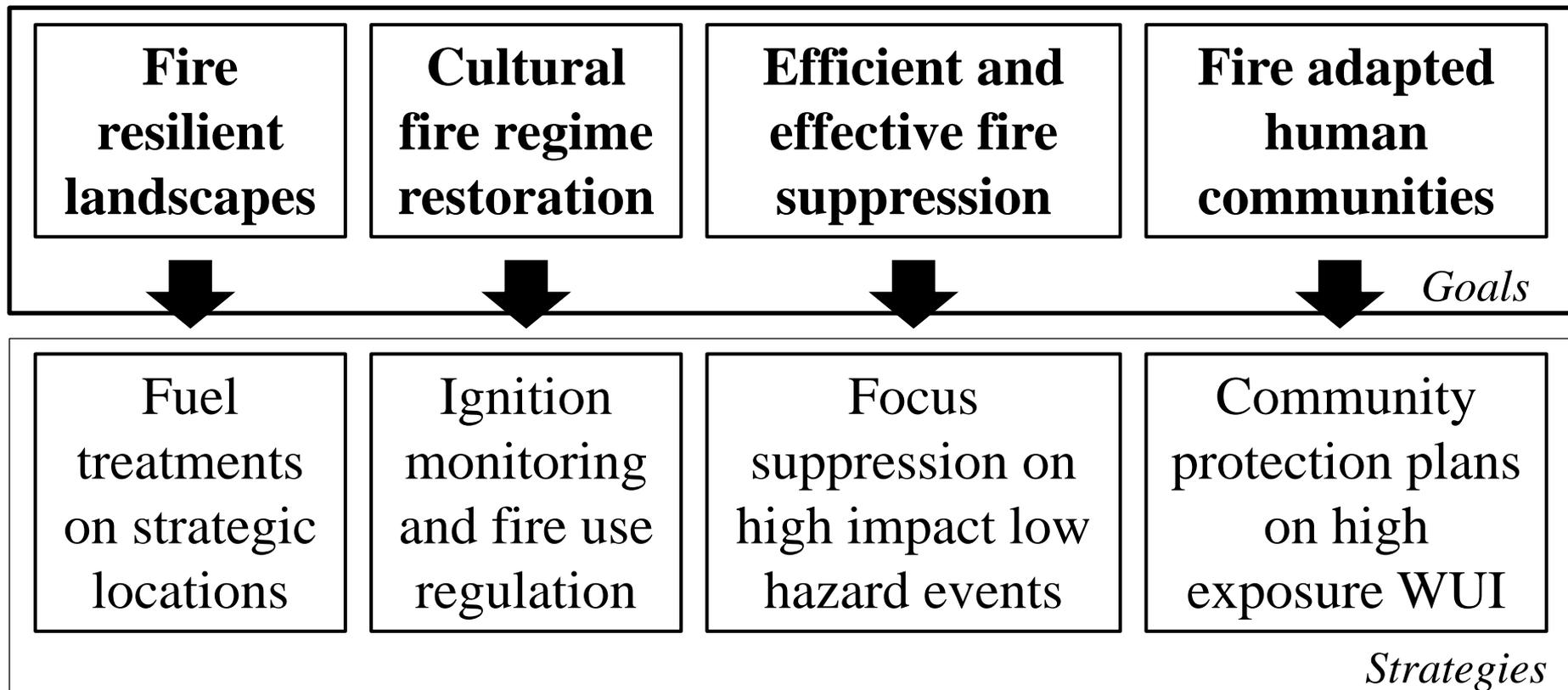
University of Coimbra (Portugal), 23 to 26 of May, 2017.

Putting the Mediterranean fires into context

- Annually 48.6 thousand fires burn 447.8 thousand ha on southern EU countries.
- Few large fires account for most of the burned area.
- Large fires overwhelm suppression capabilities, spread for long distances and concentrate on simultaneity episodes.
- Climate change and rural exodus will likely enhance the mega fire escalade.
- Increasing WUI areas represent a civil protection issue.
- **Current total fire suppression policy, accidental ignition prevention programs and scattered fuel treatment projects alone are insufficient to mitigate risk on fire-prone Mediterranean landscapes.**

We purpose a cohesive strategy for southern EU

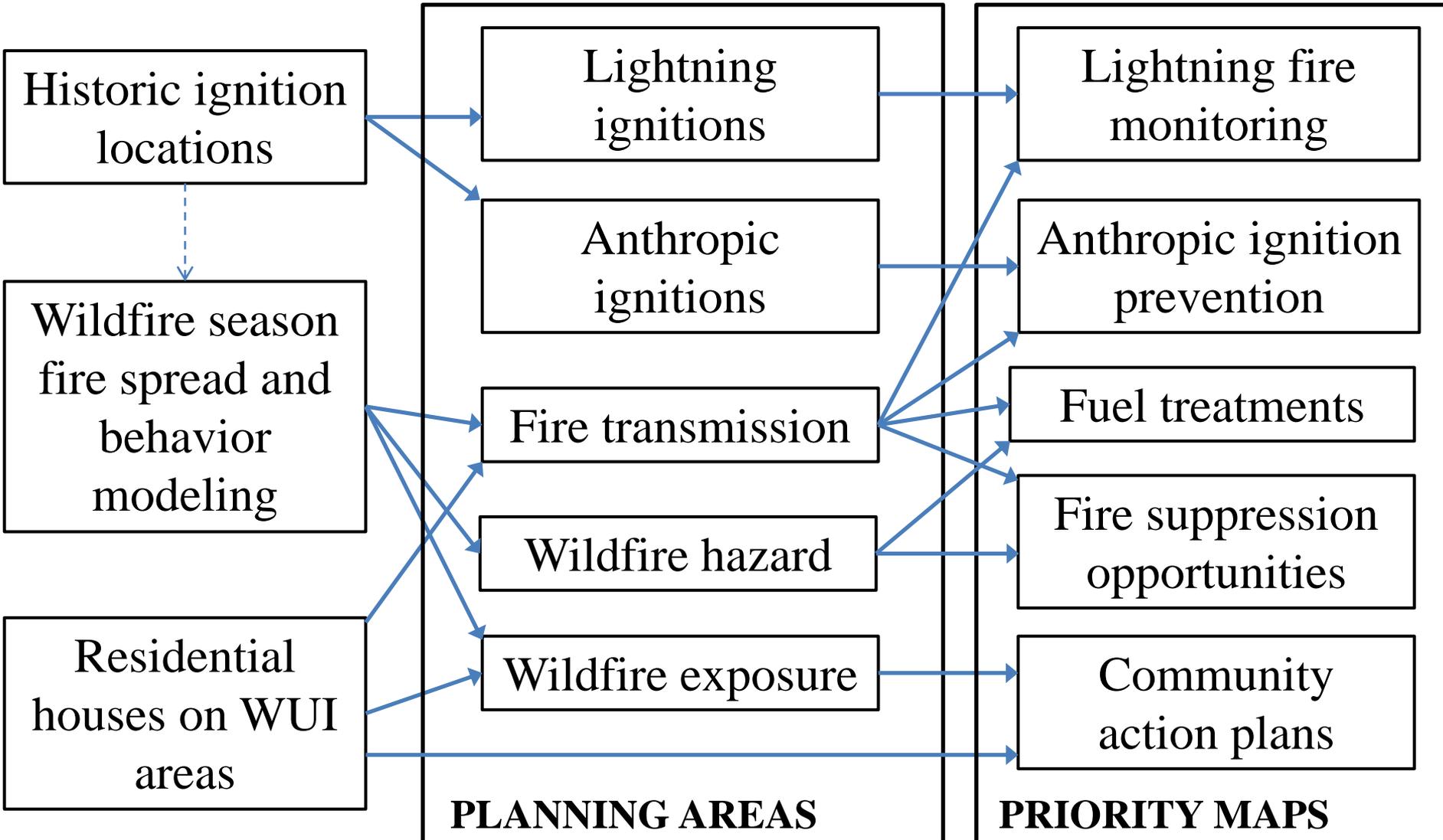
- We adapted the *US Cohesive Strategy* to a large Mediterranean landscape, and generated a set of municipality level **spatial priority maps for wildfire risk management.**



General framework

Risk causative factors

Mitigation strategies

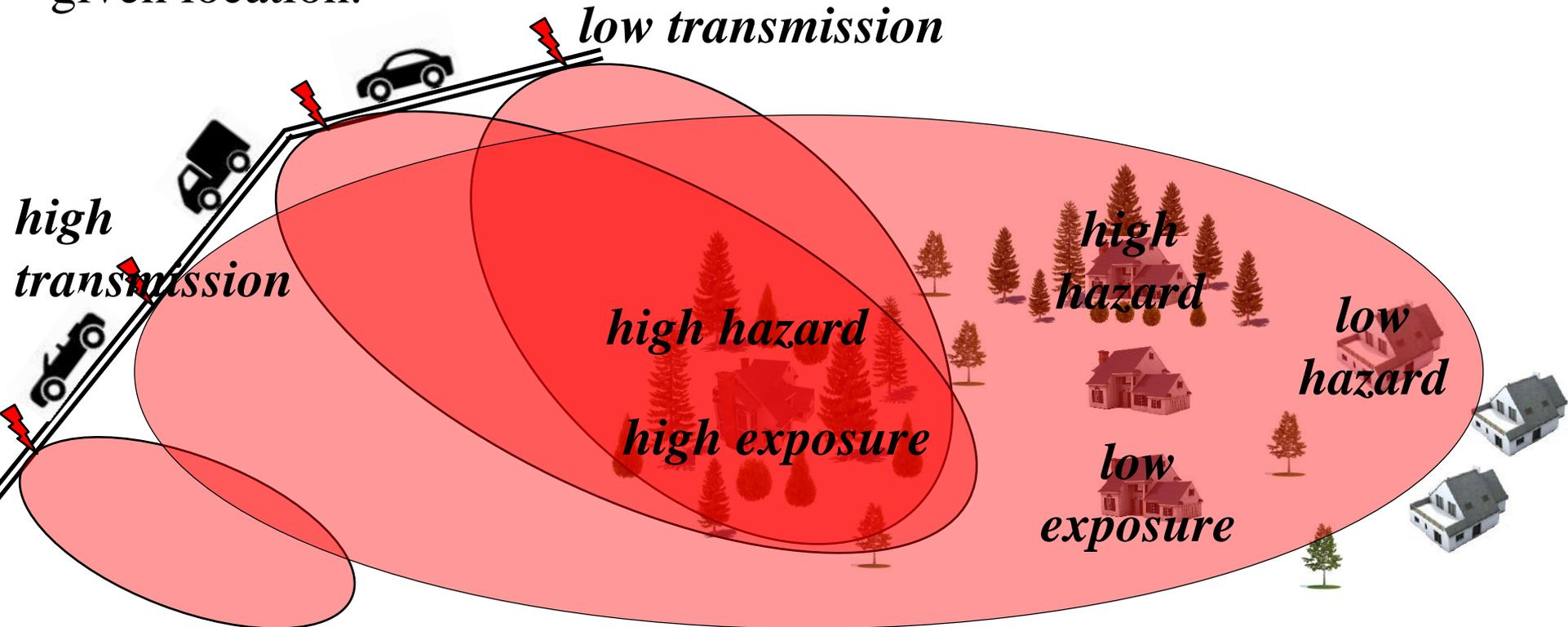


Wildfire risk causative factors

Hazard: potential for loss given a fire event, related to fire intensity.

Exposure: juxtaposition of assets with fire behavior (wildfire likelihood and intensity).

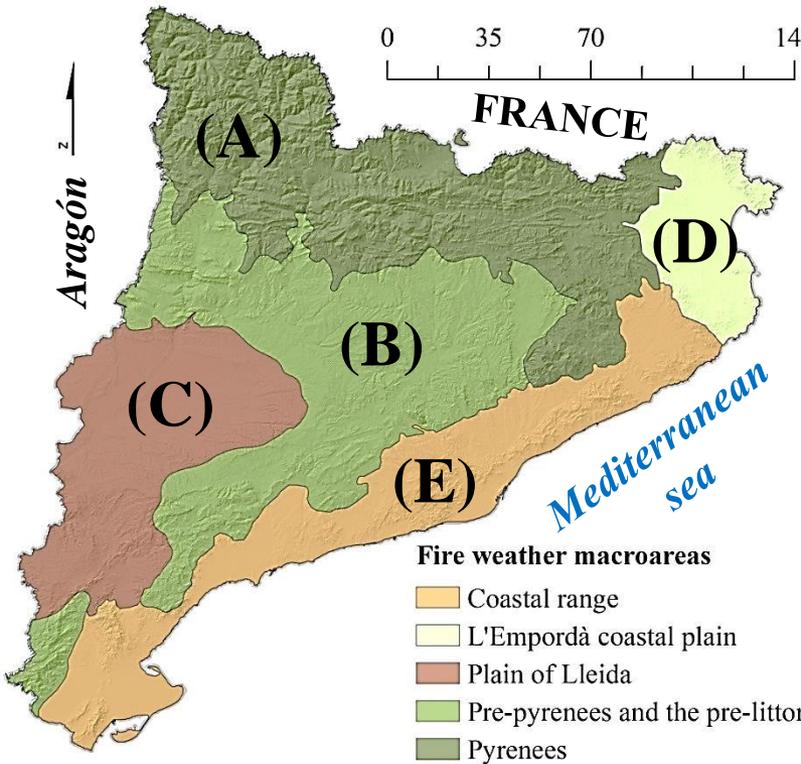
Transmission: potential to affect distant assets from ignited fires in a given location.



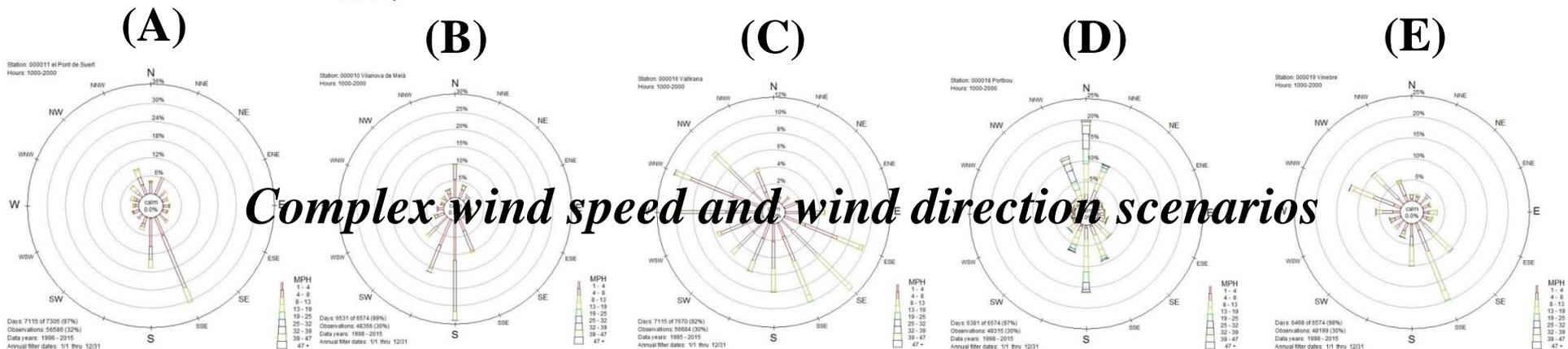
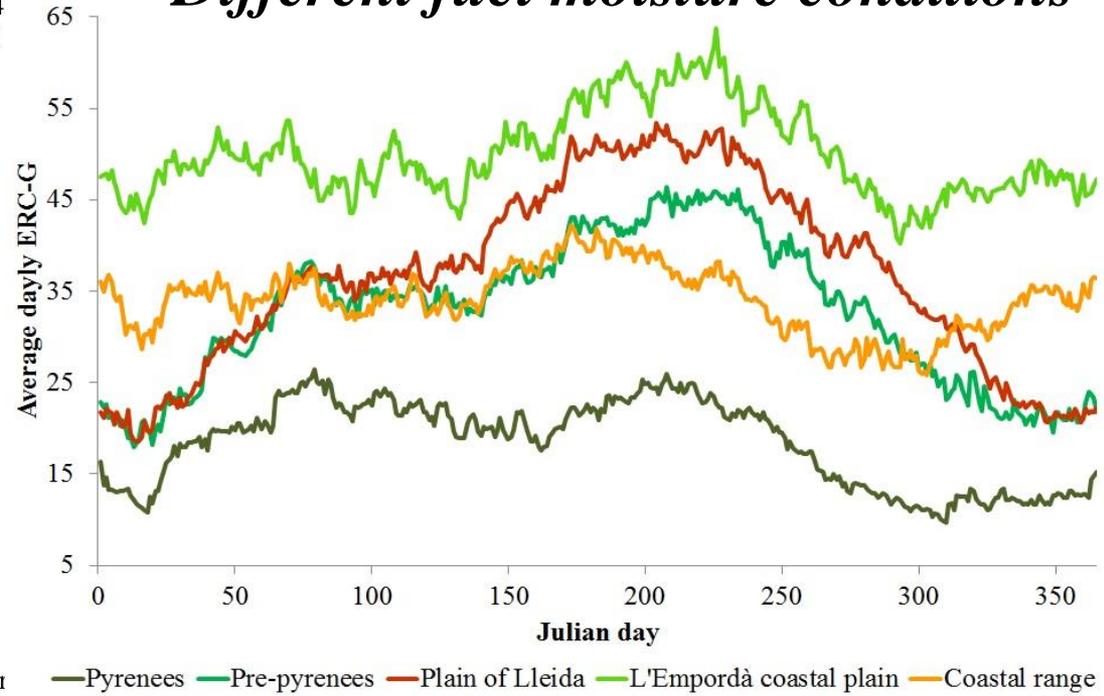
A case study on a large Mediterranean landscape

- We generated wildfire risk management maps for Catalonia (32 thousand km², north-eastern Spain).
- Annually some 580 fires burn ~ 11.3 thousand ha
- Using FConst MTT fire modeling program we replicated 10,000 wildfire seasons at 150 m resolution considering extreme fire weather conditions to assess wildfire hazard, exposure and transmission to human communities.
- Historic ignitions (1983 to 2014) were used to identify anthropic and lightning fire source prevalence areas.
- Municipality boundaries were used as Planning Areas.
- Priorities were classified into High (**H**), Moderate (**M**), low (**L**) and very low (**VL**).

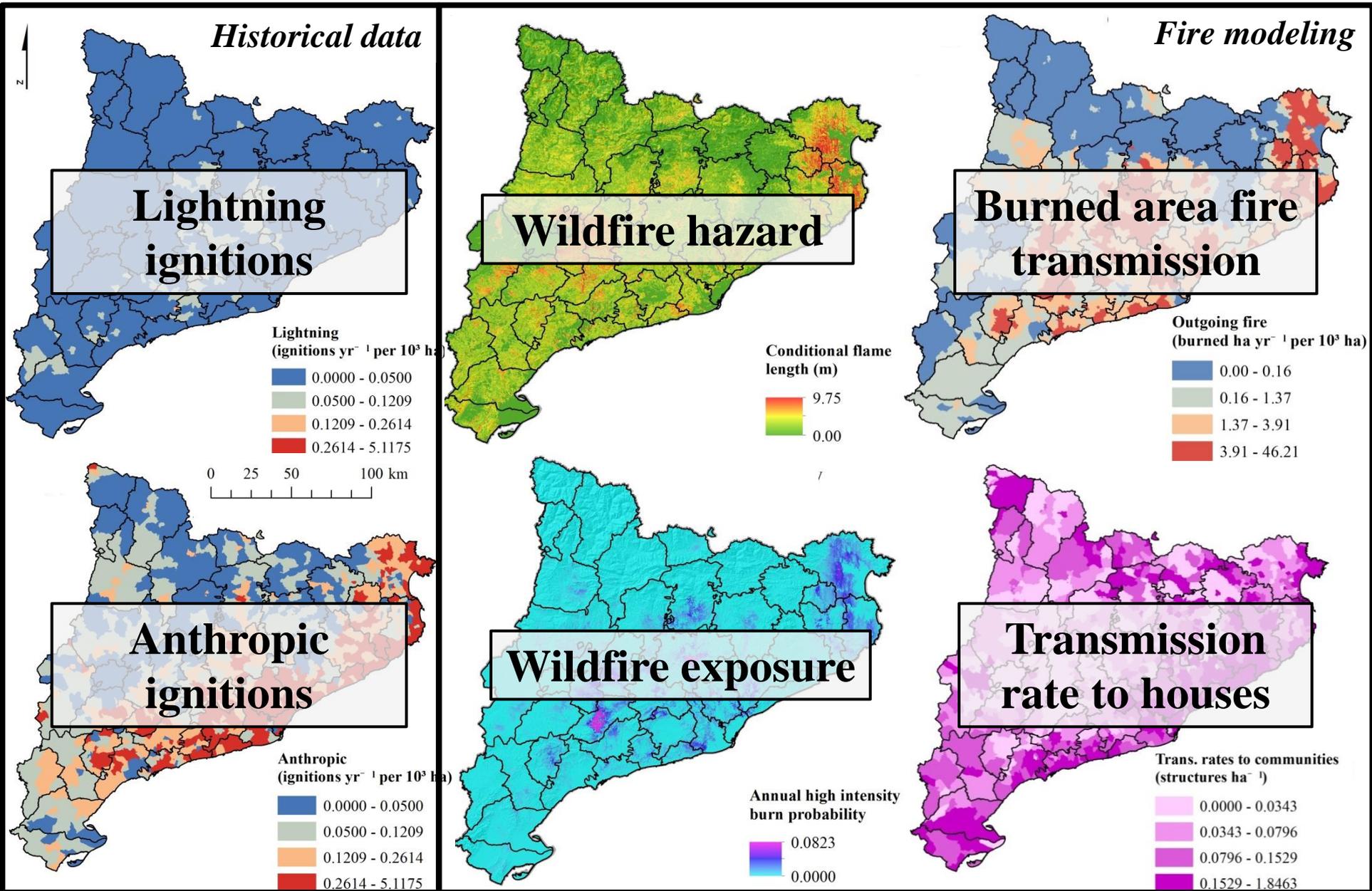
Fire modeling on large heterogeneous landscapes



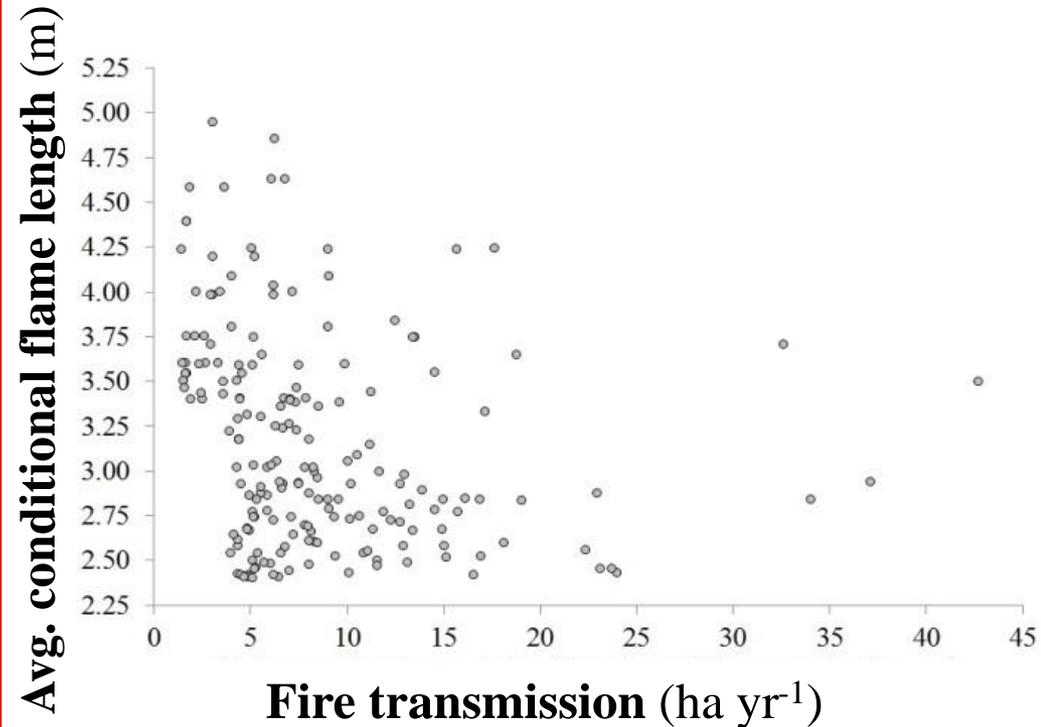
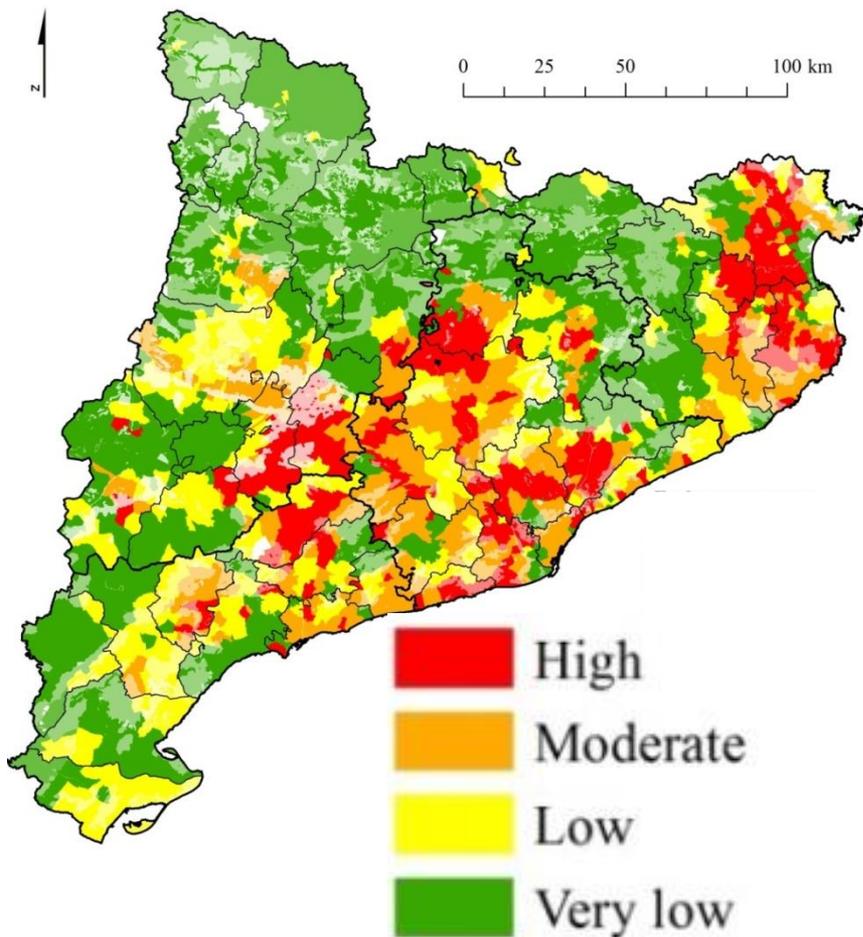
Different fuel moisture conditions



Results for the risk causative factors



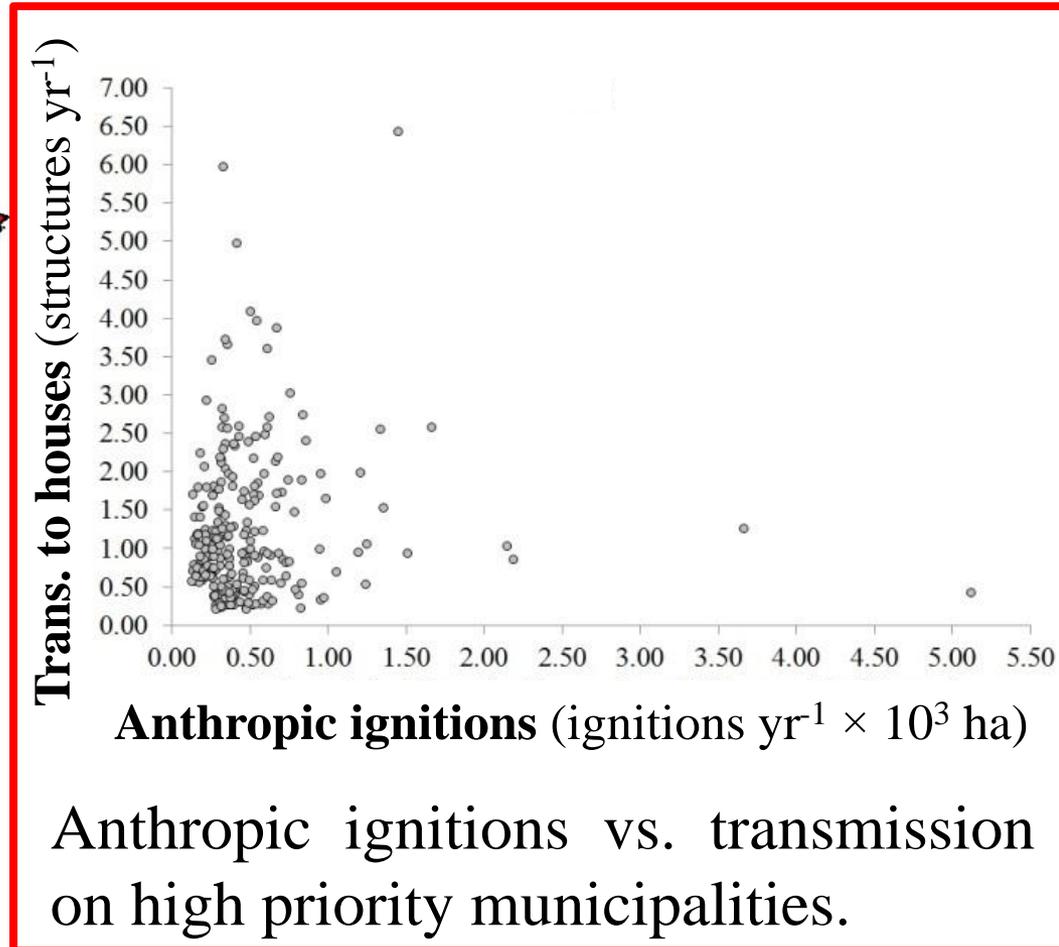
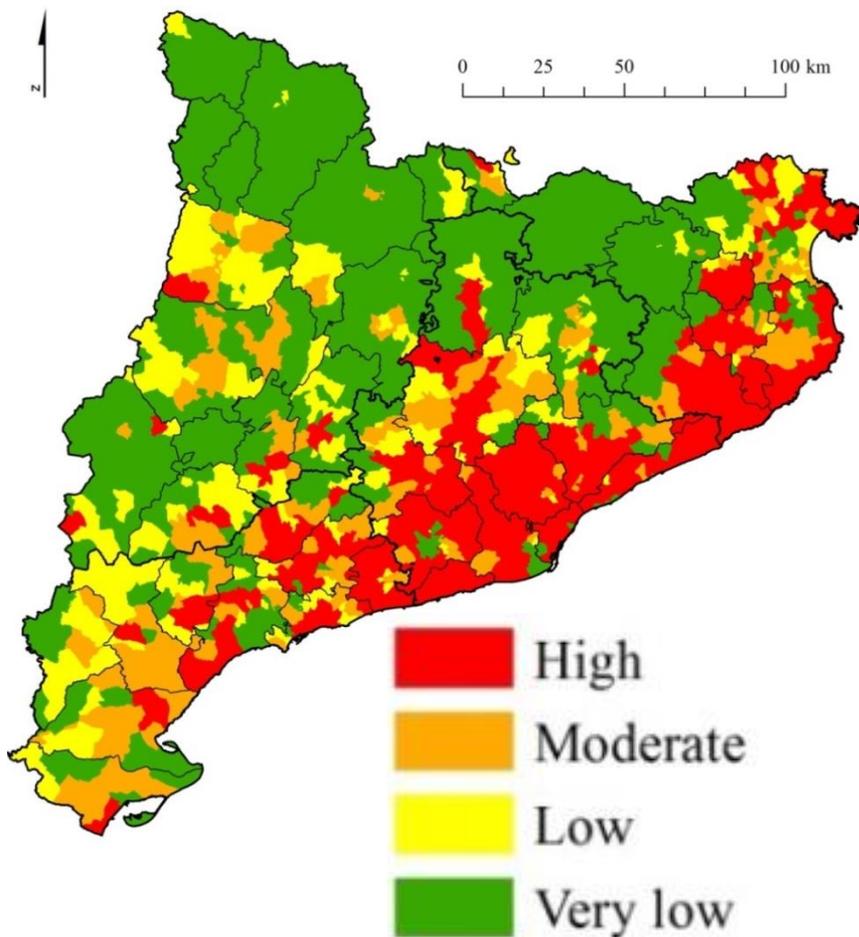
(1) Fuel treatment prioritization



Transmission vs. hazard on high priority municipalities.

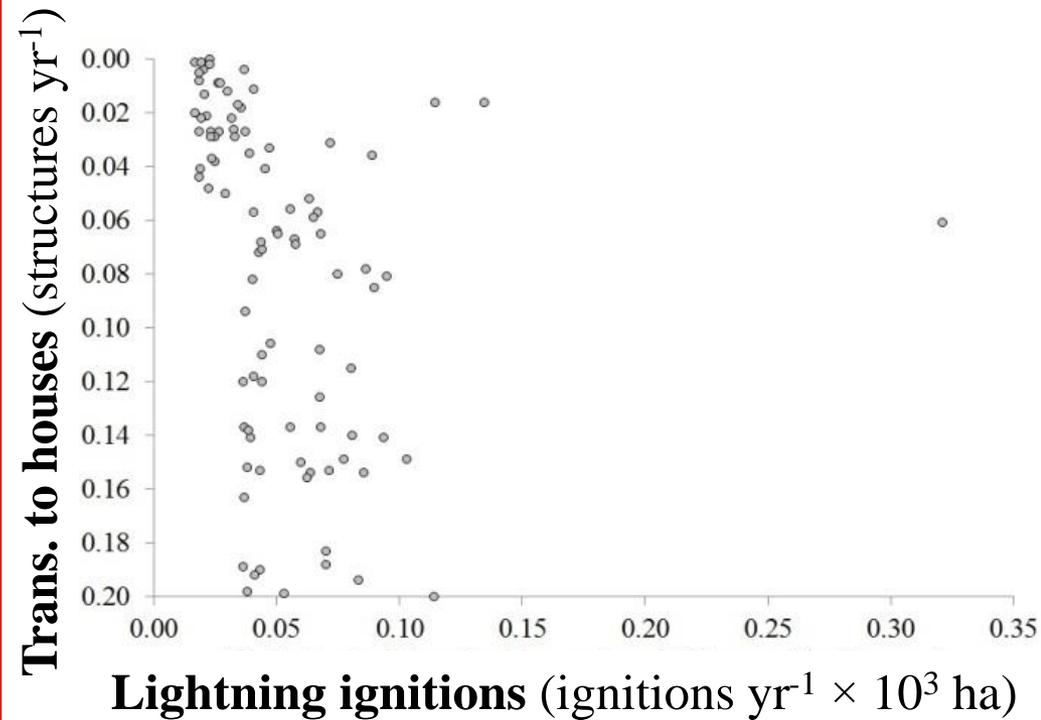
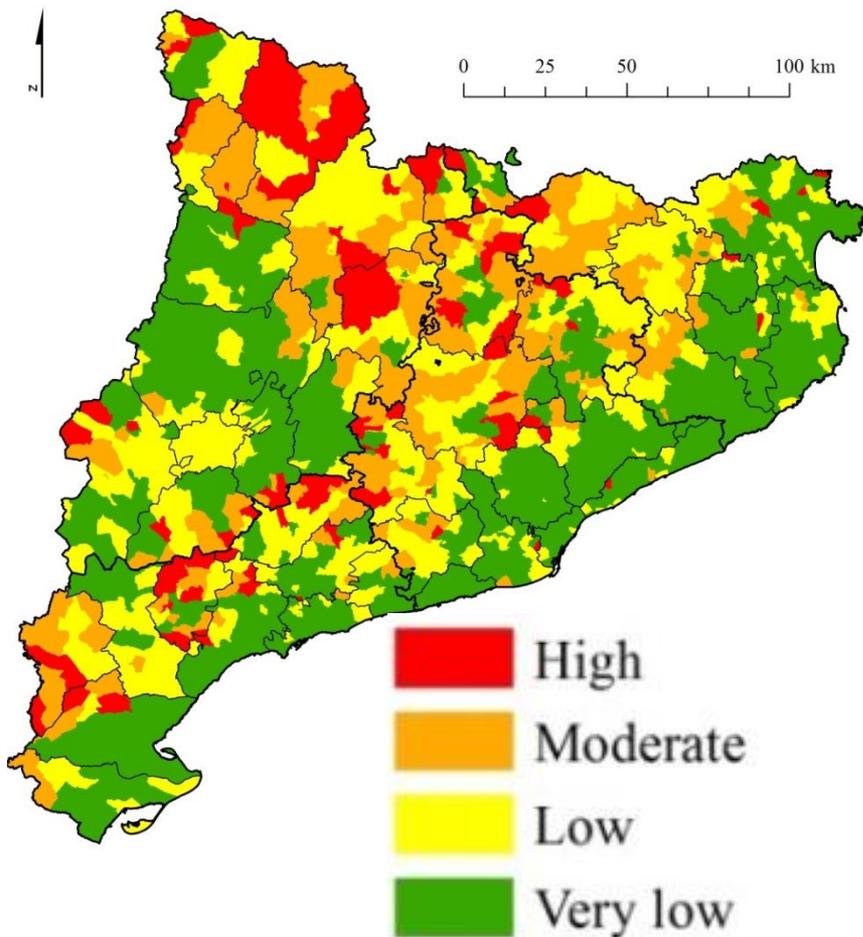
Preferences for fuel treatment programs locate on **large fire source municipality hazardous fuels**. Protected area land designations might locally represent a limiting factor for fuel treatments.

(2.1) Anthropogenic ignition prioritization



Preferences for accidental fire ignition prevention programs locate on **high transmission to houses and high anthropic ignition density municipalities.**

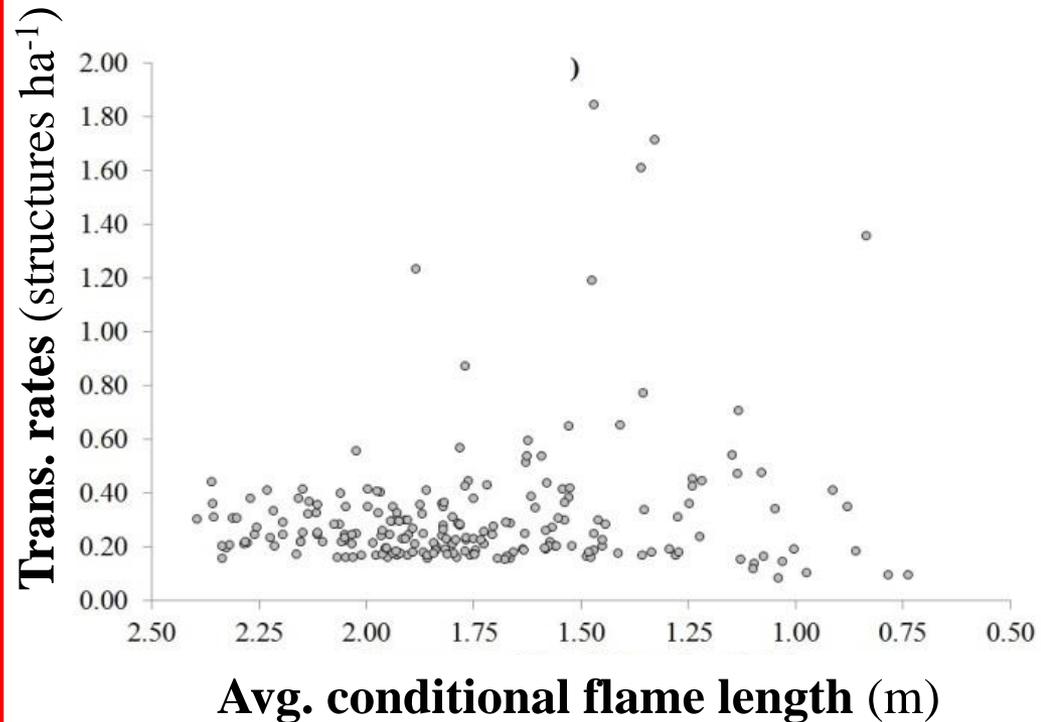
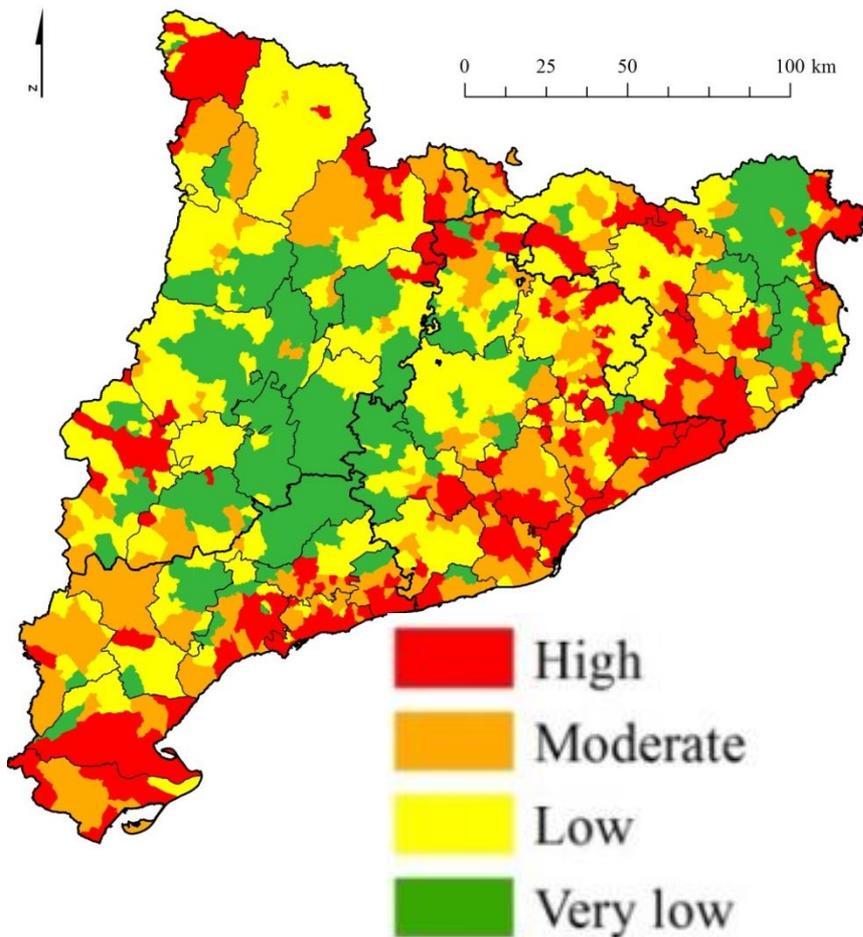
(2.2) Lightning fire monitoring prioritization



Lightning ignitions vs. transmission on high priority municipalities.

Preferences for natural fire reintroduction locate on remote municipalities with **high lightning ignition densities and low transmission** (or fire scape risk) to residential houses.

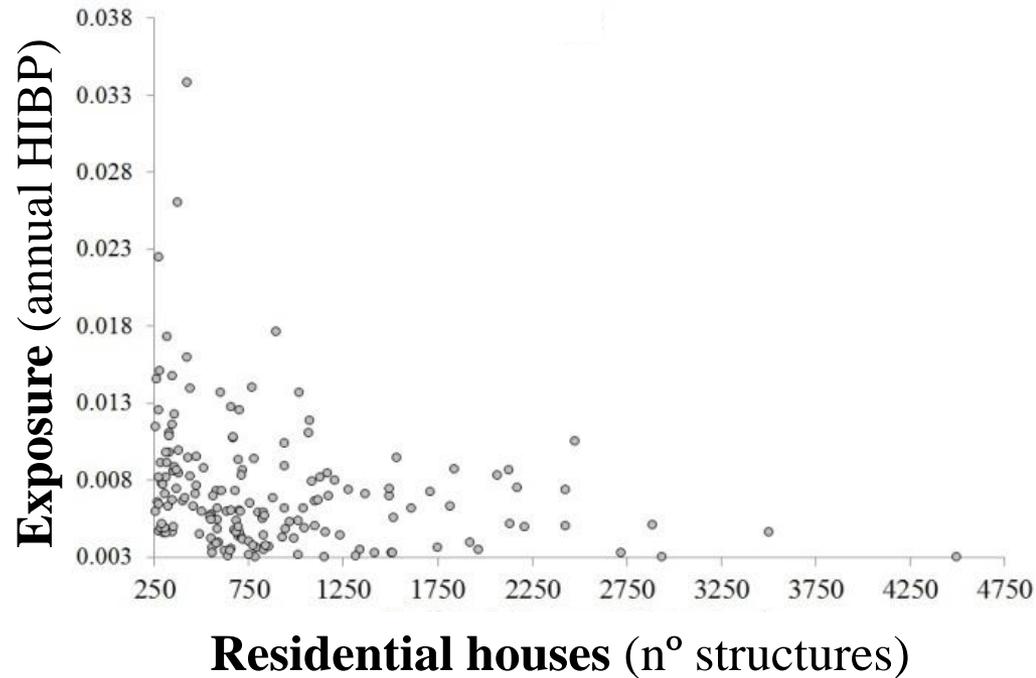
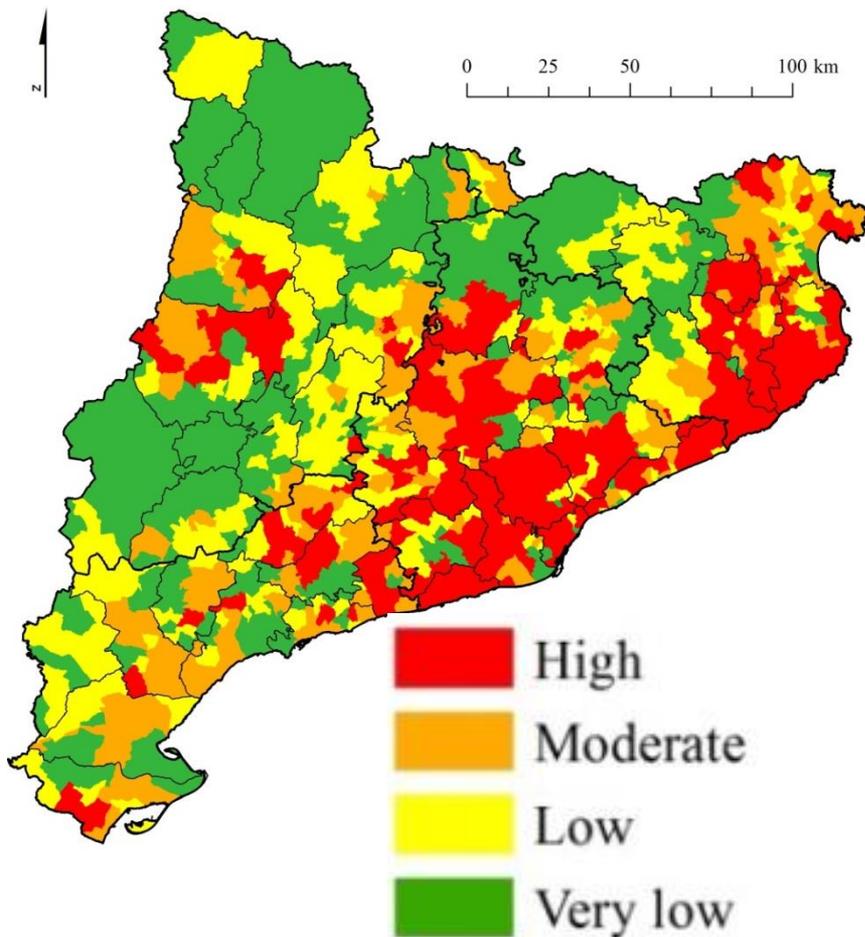
(3) Fire suppression opportunities



Hazard vs. transmission rate on high priority municipalities.

Opportunities for a safe and efficient fire suppression locate on **low hazard and high transmission rate** municipalities, where fire containment can substantially reduce the number of burned houses.

(4) Community action prioritization



Houses on WUI vs. exposure on high priority municipalities.

Priority areas for community action programs locate on municipalities with **several houses on the WUI and a high wildfire exposure**. Homeowners involvement on HIZ fuel maintenance is indispensable.

Concluding remarks

- In this study we present a wildfire risk management Cohesive Strategy to minimize negative impacts from uncharacteristic fires on the Mediterranean landscapes.
- More specifically, a set of maps was generated to **prioritize fuel treatment projects, implement ignition prevention programs, assist lightning fire monitoring, identify suppression opportunities and support community action.**
- We used modeling quantitative outcomes for the key wildfire risk causative factors to provide spatial priorities at municipality level (n= 948) on a very large landscape (> 32 thousand km²).

Management implications

- Results revealed very heterogeneous spatial priorities across the study area, and locally highlighted most appropriate management strategies.
- Prioritizing management actions is necessary under budgetary restrictions to efficiently allocate economic resources.
- This study should be considered as a preliminary step to downscaling efforts (e.g., landscape fuel treatment optimization) on high priority Planning Areas.
- This methodological framework could be easily extended to other Mediterranean fire-prone areas.

Many thanks for your attention!

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