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Does large fire activity vary within the French Mediterranean area?

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Does large fire activity vary within the French Mediterranean area?

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WILDLAND FIRE

6th International Conference on Fire Behavior and Fuels
April 29th-May 3rd, 2019 – Marseille, France



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INTRODUCTION

- Large fires (LF) => huge socio-economic and environmental impacts, especially in WUI
- Need to better understand the spatial distribution of LF along a longitudinal transect in French Mediterranean area over 60 years of fire history

- Objectives:

= > To identify the locations associated with LF recurrence and to quantify the spatial extent of the region with reburns

=> To establish the fire return level along a longitudinal transect

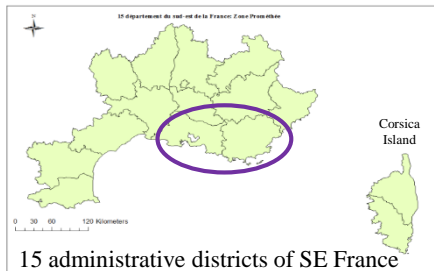
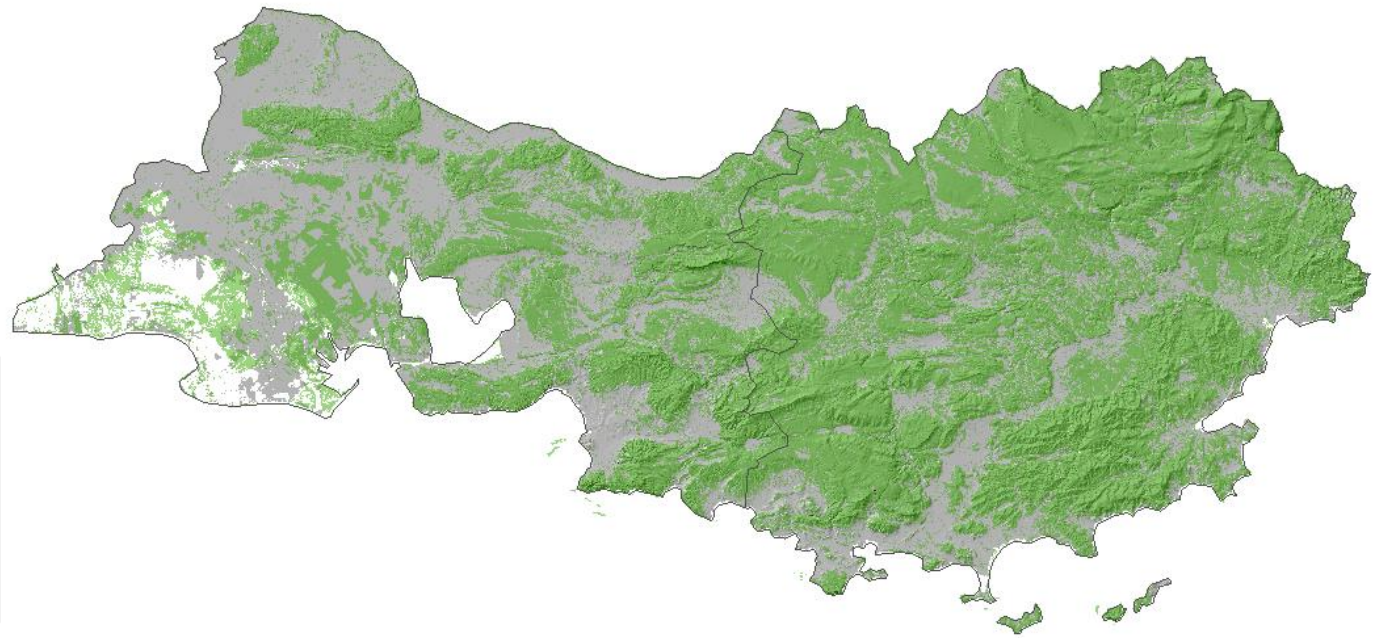
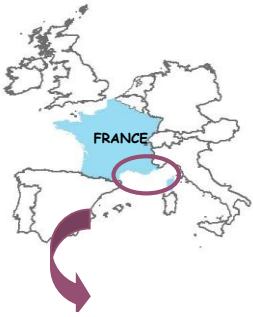
=> To identify the possible role of climate conditions and fuel continuity in shaping this longitudinal gradient



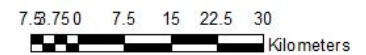
METHODOLOGY

➤ Study Area

Increasing Precipitation and Forest Cover



Increasing Wildland-Urban Interfaces



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METHODOLOGY

➤ Study Area



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METHODOLOGY

➤ Study Area

... but landscape shaped by fires for millenia



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METHODOLOGY

➤ Fire Data

- LF \geq 100 ha
- Long-term geo-referenced fire perimeter database (1958-2017) – ONF-DDTM
=> **Spatio-temporal analysis of large fires (LF) : recurrence, time-since the last fire**
- Regional fire database Prométhée (1973-2017)
=> **Spatio-temporal analysis of detailed large fire causes**

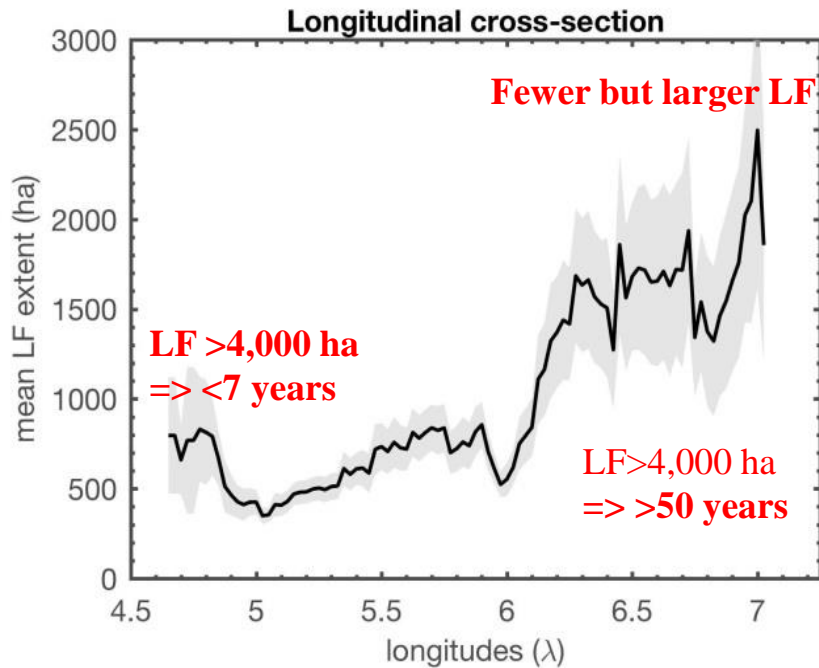
➤ Climate and Land Cover Data

- **Daily Fire Weather Index (FWI)** from SAFRAN dataset
- **Fuel cover** data from the “BD Forêt 2014” (IGN)

SOME RESULTS

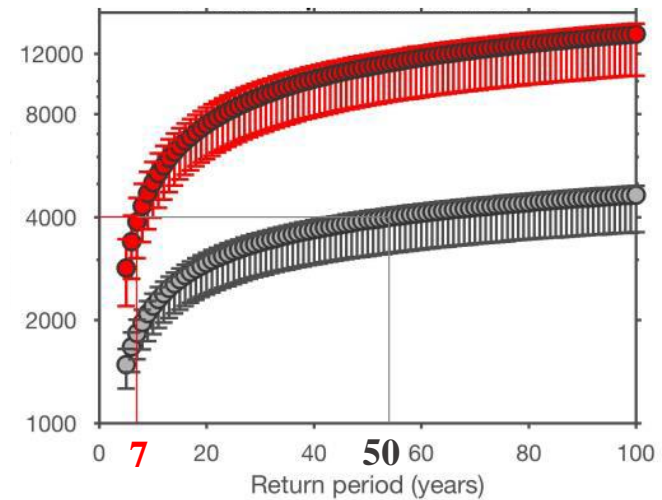
➤ Spatio-temporal trends of LF

LF = 28% of the total number of fires but 94% of burned area



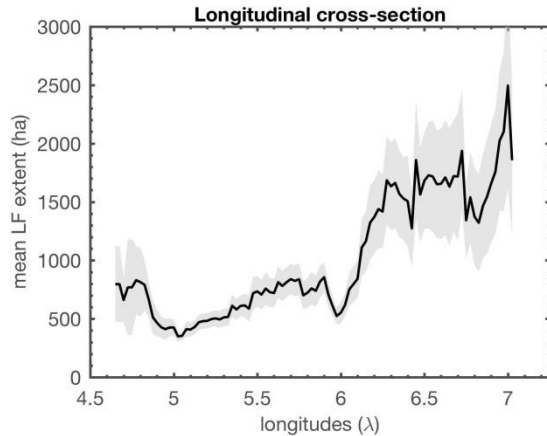
but contrasting patterns between the East and the West in terms of:

- Number and size
- Average time of occurrence



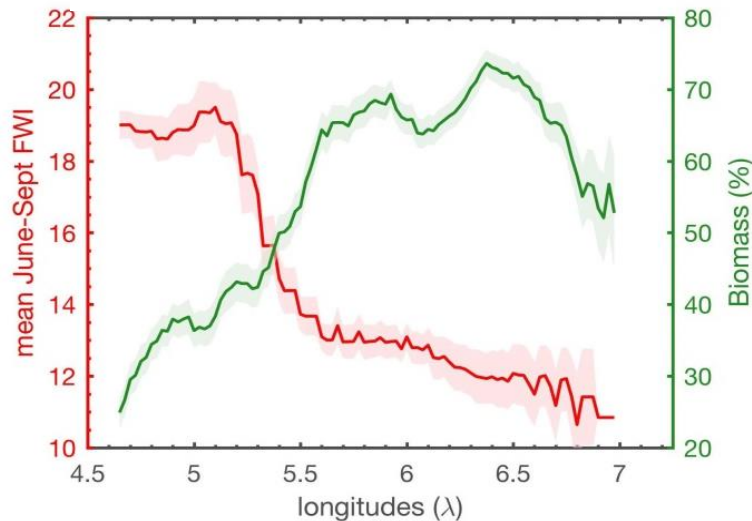
SOME RESULTS

➤ Spatio-temporal trends of LF



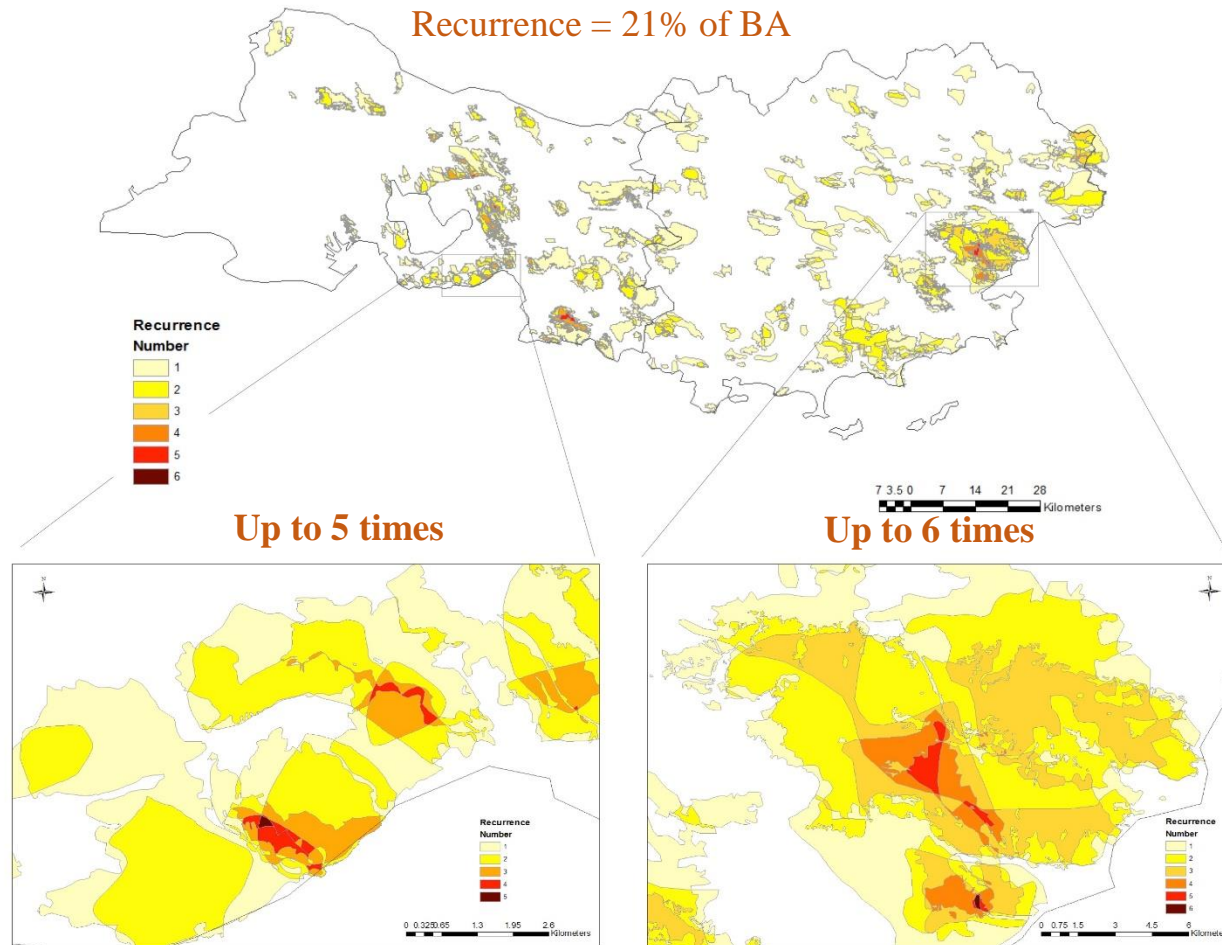
Contrasting patterns between the East and the West

- Not consistent with the **strong decrease in mean fire weather conditions in the East**
- Consistent with **larger fuel cover in the East** => strong role of fuel continuity in fire spread
- Consistent with **lower WUI in the East** => enhancing fire spread



SOME RESULTS

➤ Spatial variation of fire recurrence

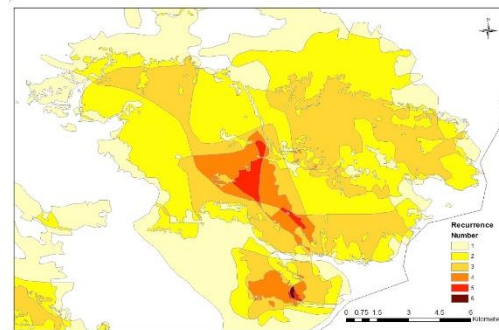
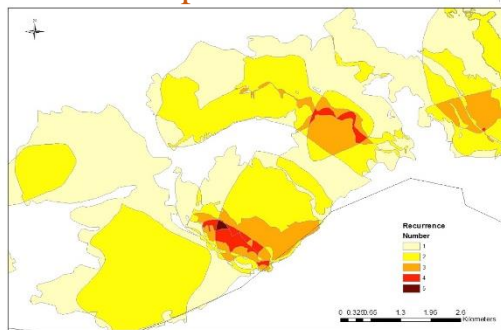


SOME RESULTS

➤ Spatial variation of fire recurrence

Up to 5 times

Up to 6 times



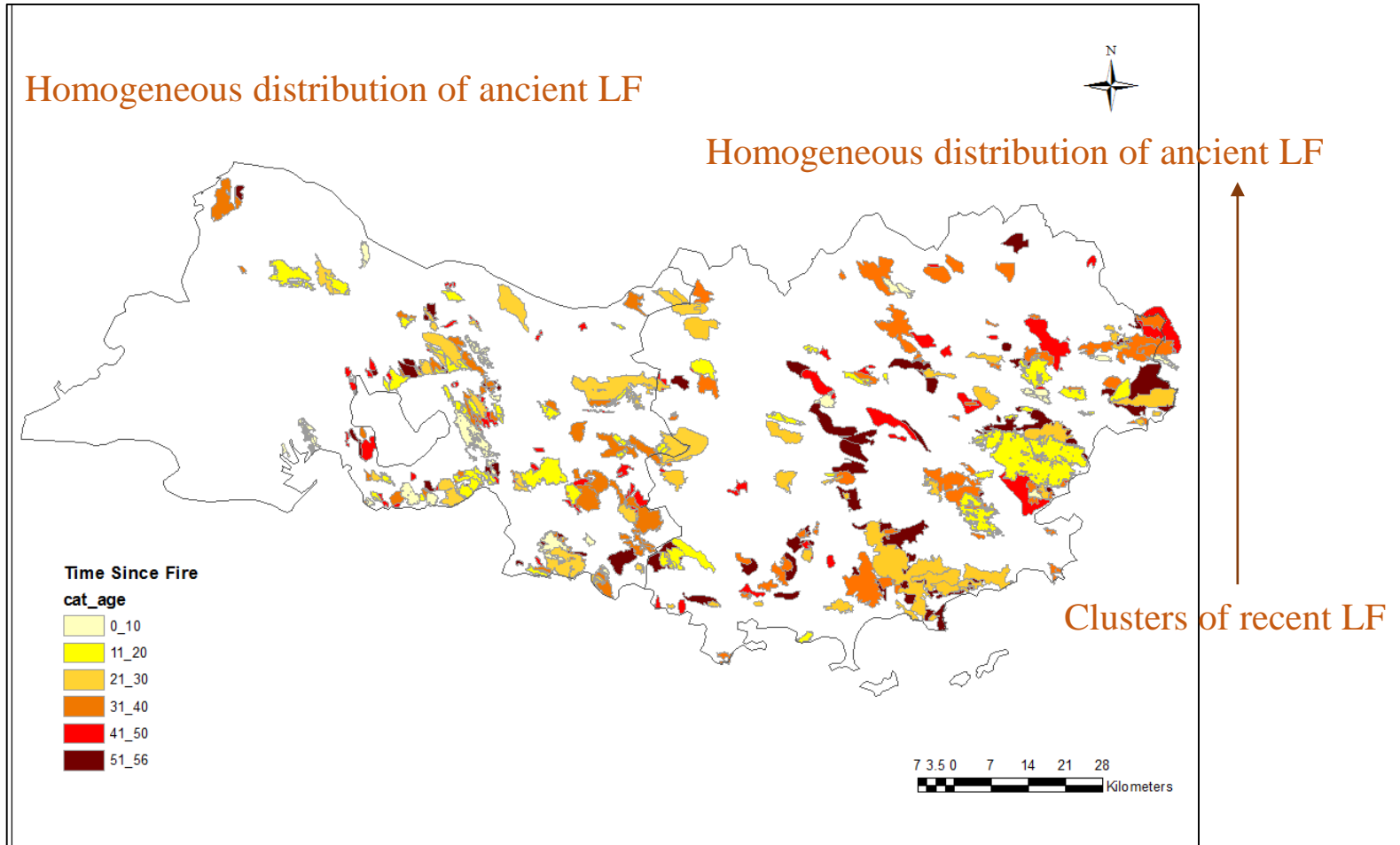
Recurrence = 21% of BA

=> potential impact on forest resilience



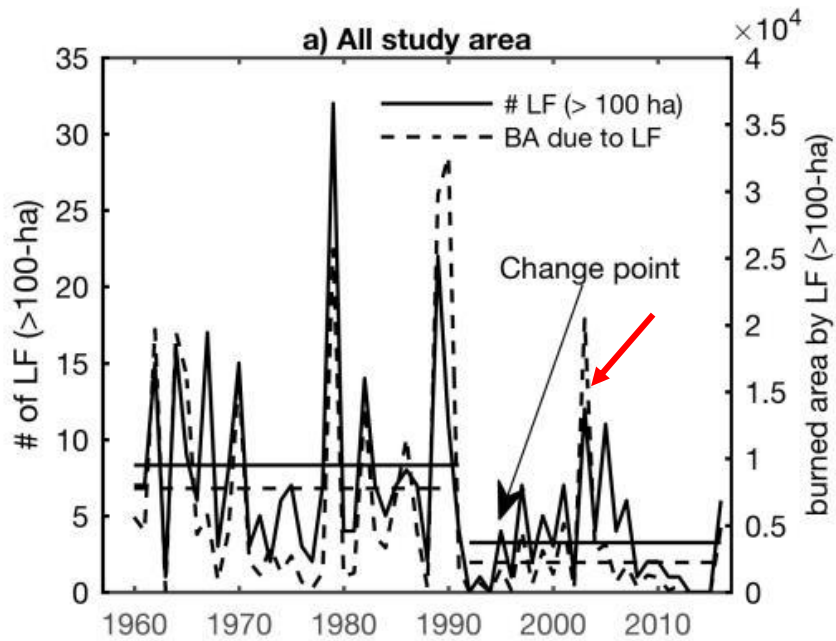
SOME RESULTS

➤ Spatial variation of time-since-LF



SOME RESULTS

➤ temporal variation of LF trend



Sharp decrease in both LF frequency and burned area in the early 1990s

⇒ Reinforced fire suppression and prevention ⇒ weakening of the functional climate-fire relationship



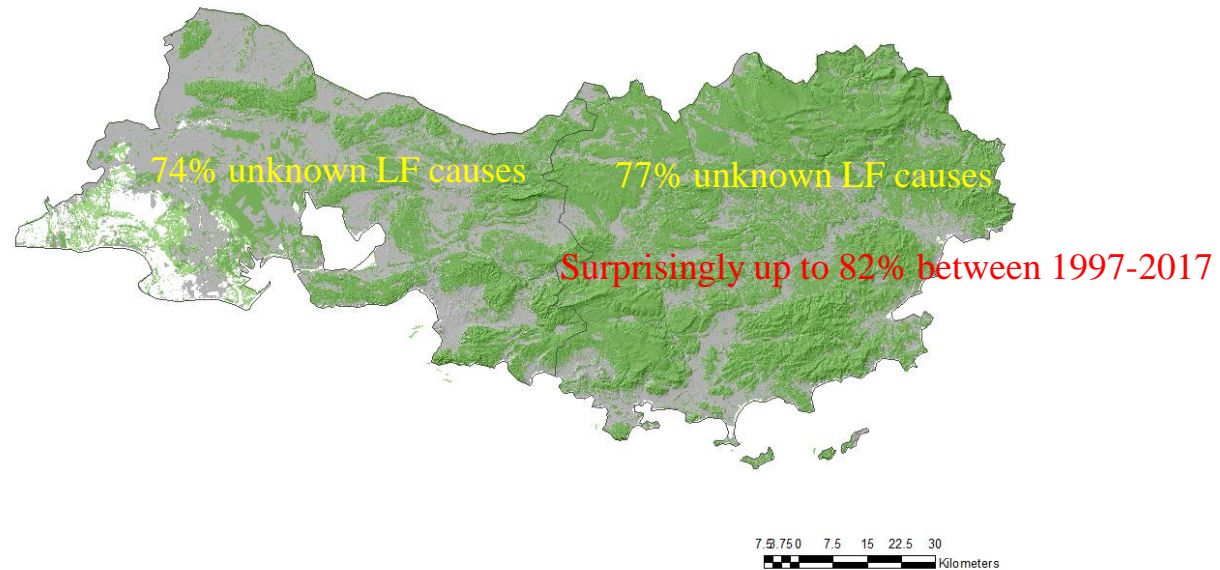
⇒ Possible outbreaks due to extreme weather conditions (e.g. 2003)



SOME RESULTS

- Spatio-temporal variation of LF causes (BD Prométhée)

Bad knowledge of the fire causes (regardless of the size)



1997: Creation of teams for fire cause investigation



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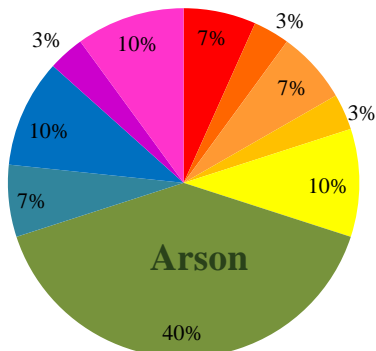
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SOME RESULTS

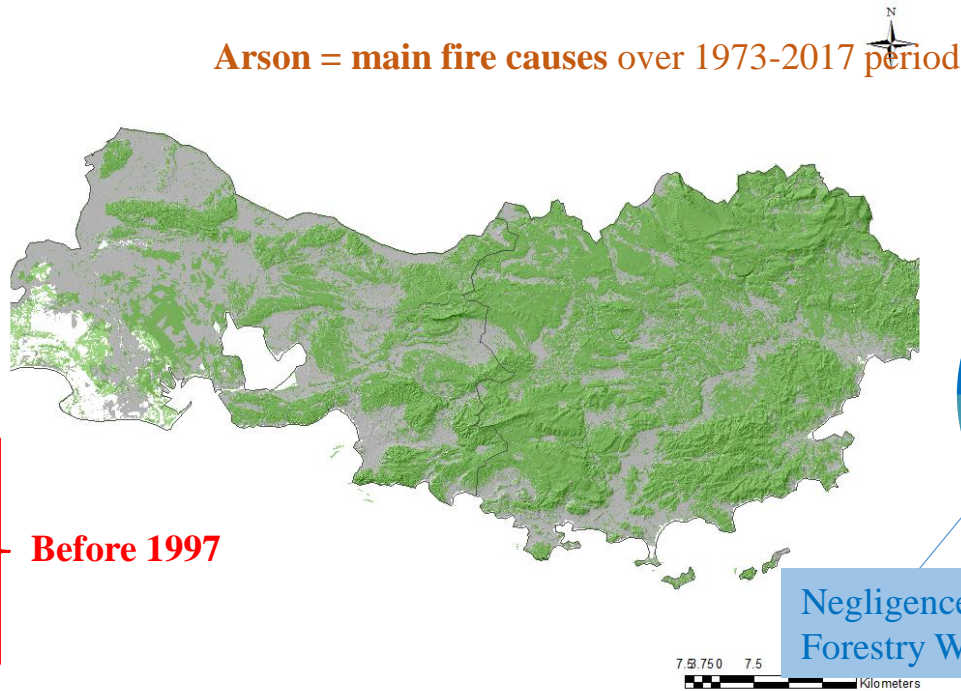
➤ Spatio-temporal variation of LF causes (BD Prométhée)



Negligence during Agricultural works

Negligence during Glowing objects

Accident during Vehicles



Before 1997

After 1997

Negligence during Forestry Works

Before 1997

➔ Targeting fire ignitions will differ spatially



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CONCLUSIONS

- Analysis of LF trends based on long-term geo-referenced fire time series (1958-2017)
- 21% of the total area burned by LF occurred on a surface that already burned in the past
- LF were less frequent but larger in the eastern part of the study area with shorter time of occurrence between LF => according to the land cover longitudinal trend but in contrast to FWI
- Abrupt decline in LF in the early 1990s => Change in fire management policy
=> Except if extreme weather conditions
- Bad knowledge of LF causes and arson = most frequent cause in the study area

Thank you for your attention



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