Does large fire activity vary within the French Mediterranean area?

Anne Ganteaume, R. Barbero

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SDIS 13

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

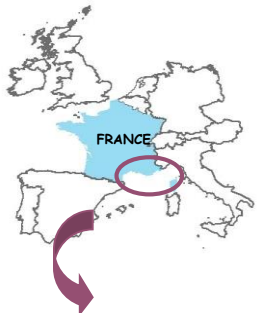
=> To establish the fire return level along a longitudinal transect

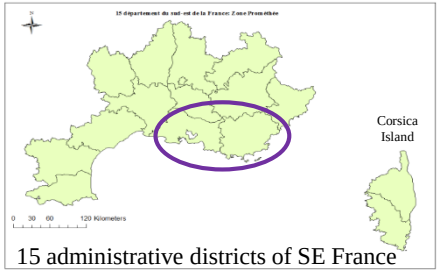
=> To identify the possible role of climate conditions and fuel continuity in shaping this longitudinal gradient

Oleg Skripochka from the International Space Station ISS: (August 10, 2016 3:45pmTU so 5:45pm. ©

METHODOLOGY

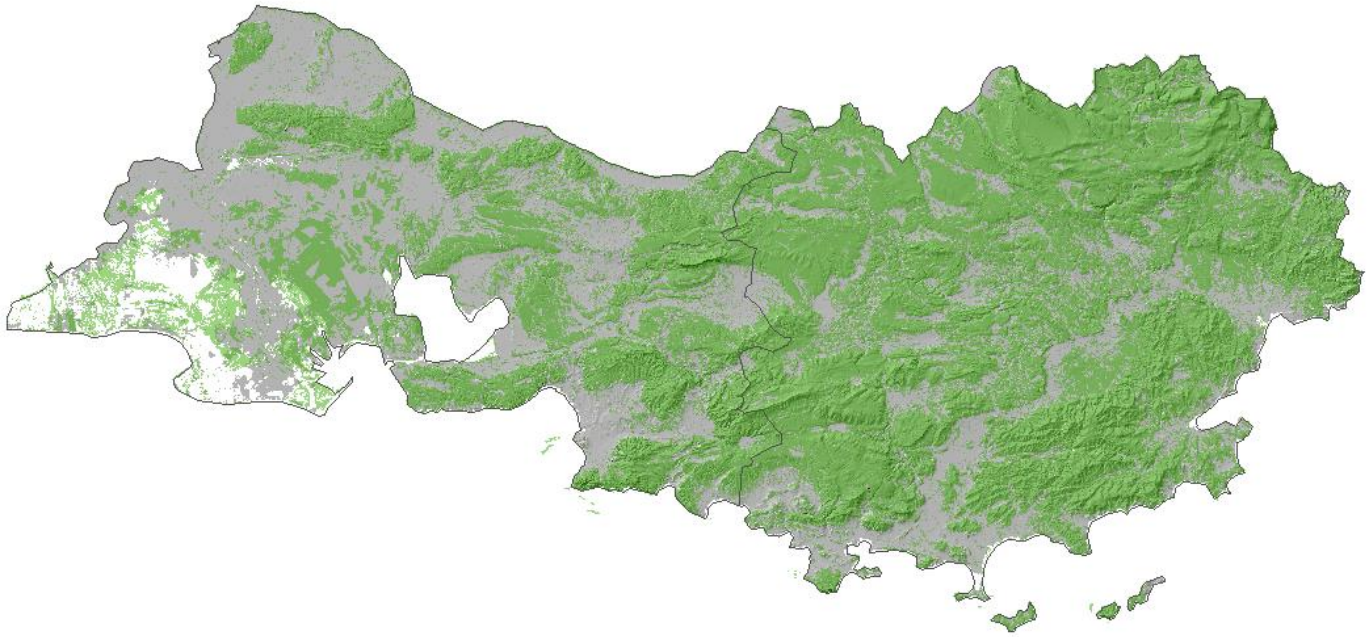
➢ Study Area





15 administrative districts of SE France

Increasing Precipitation and Forest Cover



Increasing Wildland-Urban Interfaces

7.5 3.75 0 7.5 15 22.5 30
Kilometers

METHODOLOGY

- **Study Area**

METHODOLOGY

- **Study Area**

METHODOLOGY

➢ Fire Data

- LF ≥ **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

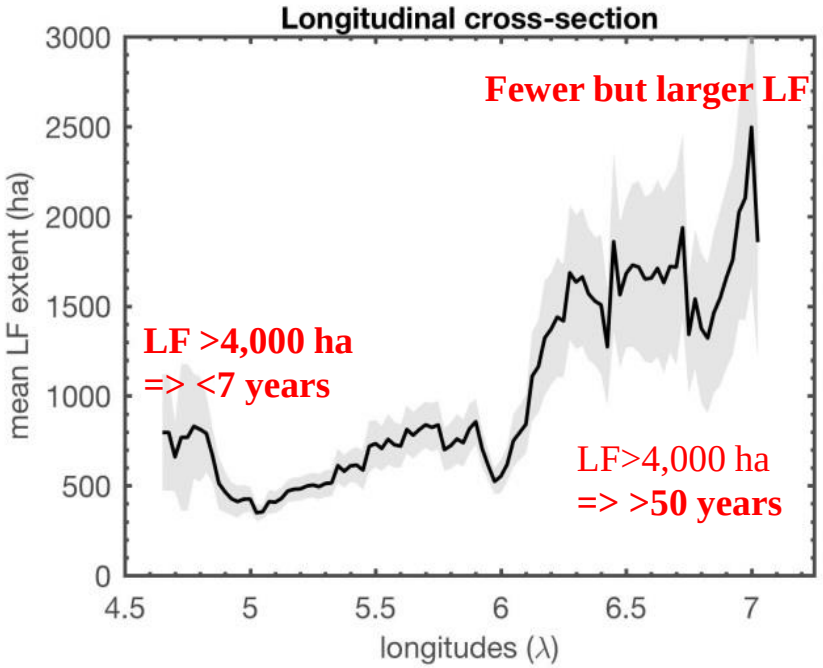
- **Daily Fire Weather Index** (FWI) from SAFRAN dataset

- **Fuel cover** data from the "BD Forêt 2014" (IGN)

SOME RESULTS

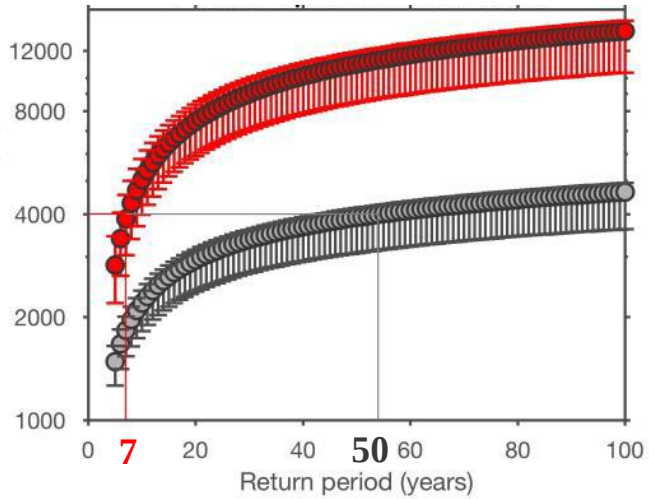
- **Spatio-temporal trends of LF**

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



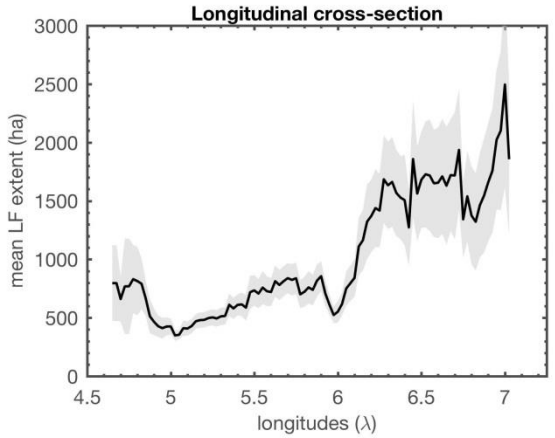
but **contrasting patterns between the East and the West** in terms of:

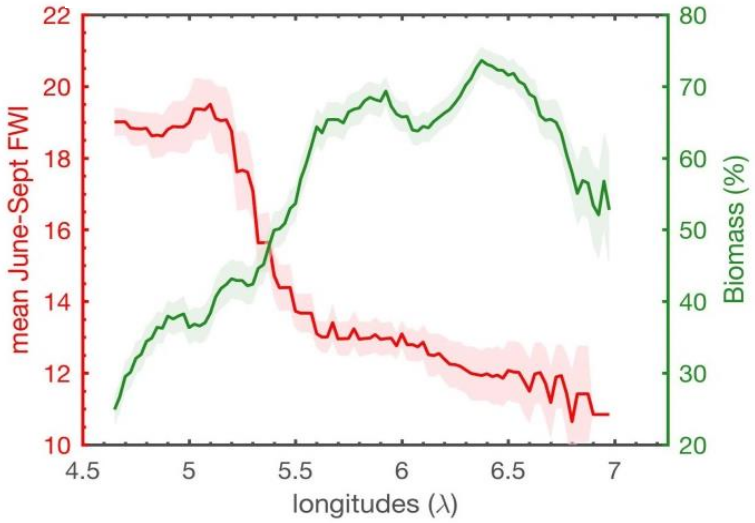
- **Number and size**
- **Average time of occurrence**



SOME RESULTS

➢ Spatio-temporal trends of LF





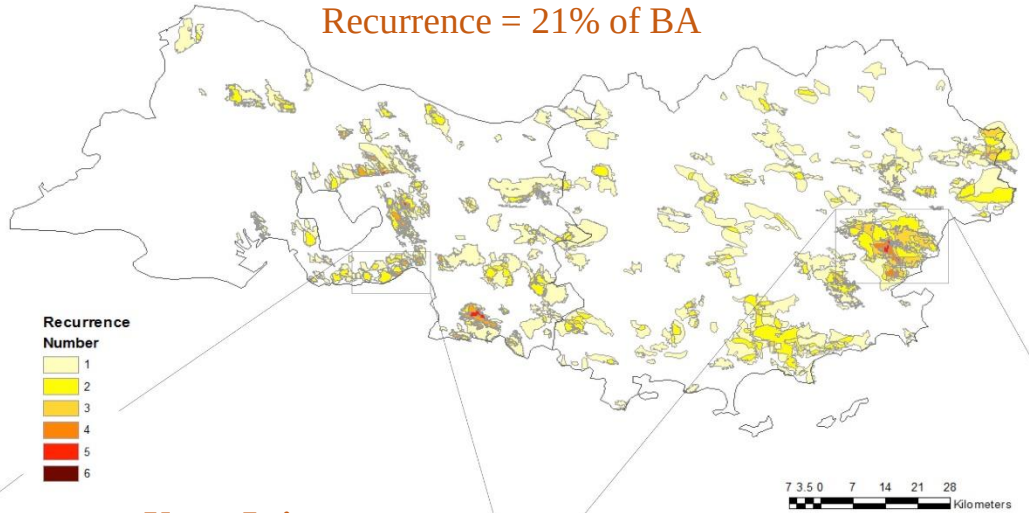
Contrasting patterns between the East and the West

- 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

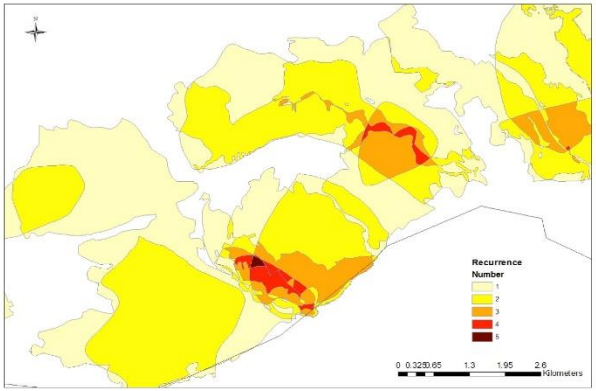
SOME RESULTS

- **Spatial variation of fire recurrence**

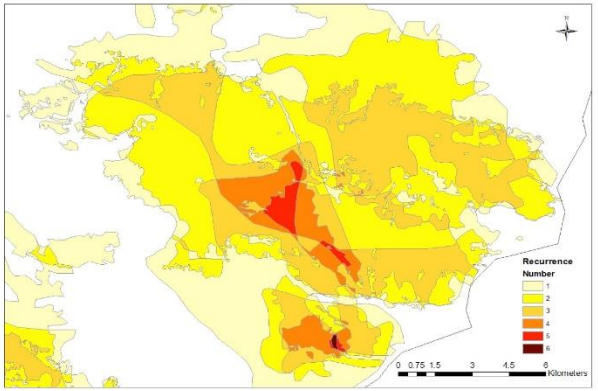
Recurrence = 21% of BA



Up to 5 times



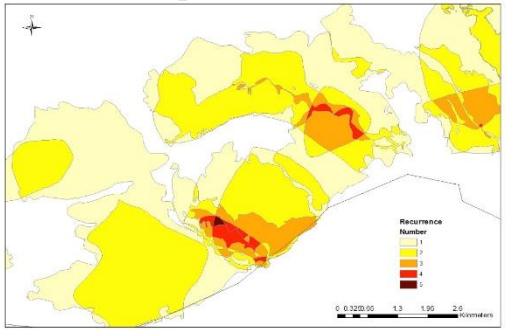
Up to 6 times



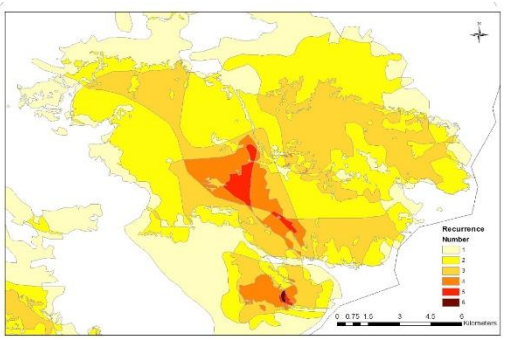
SOME RESULTS

➢ **Spatial variation of fire recurrence**

Up to 5 times



Up to 6 times

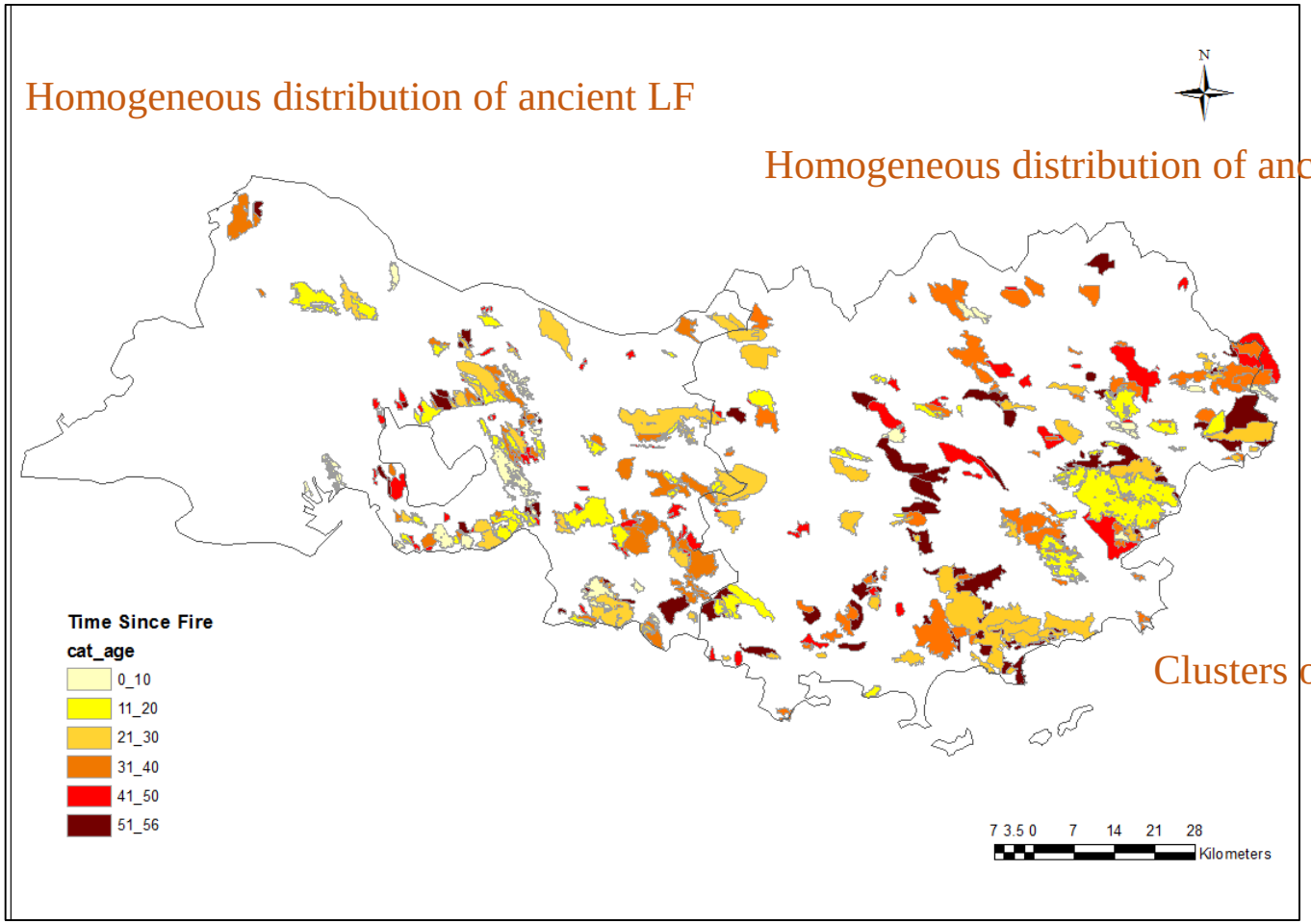


Recurrence = 21% of BA

=> **potential impact on forest resilience**

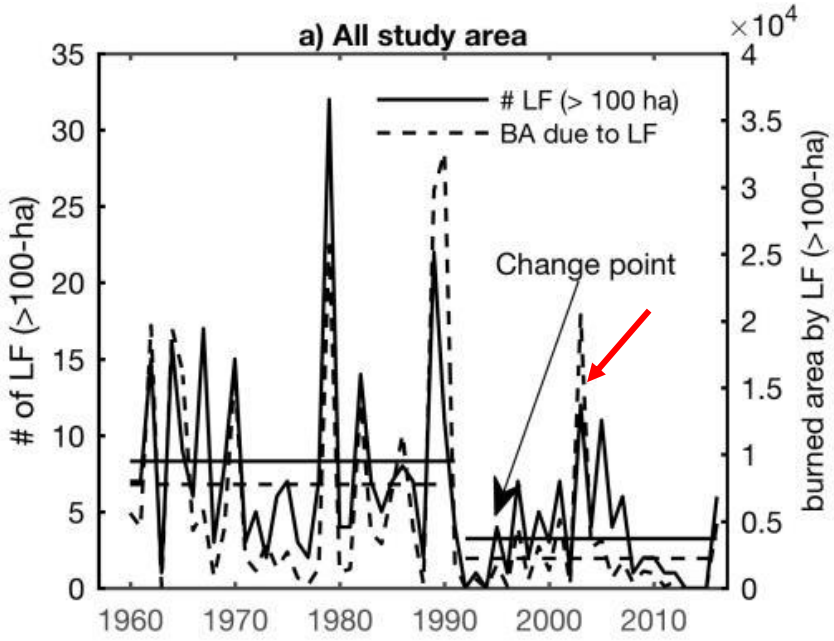
SOME RESULTS

➢ **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

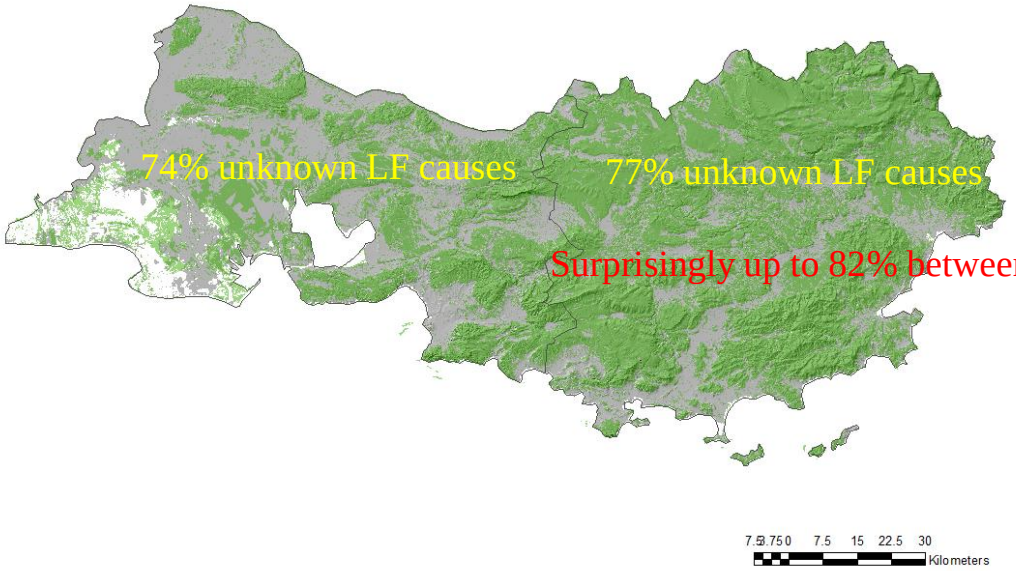
=> Reinforced **fire suppression and prevention** => weakening of the functional climate-fire relationship

=> Possible outbreaks due to **extreme weather conditions** (e.g. 2003)

SOME RESULTS

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

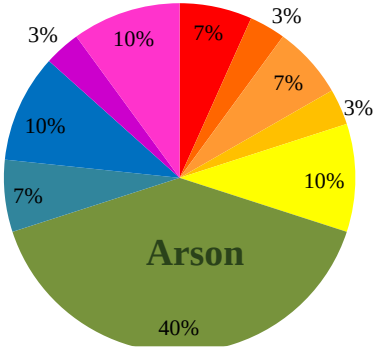
Bad knowledge of the fire causes (regardless of the size)



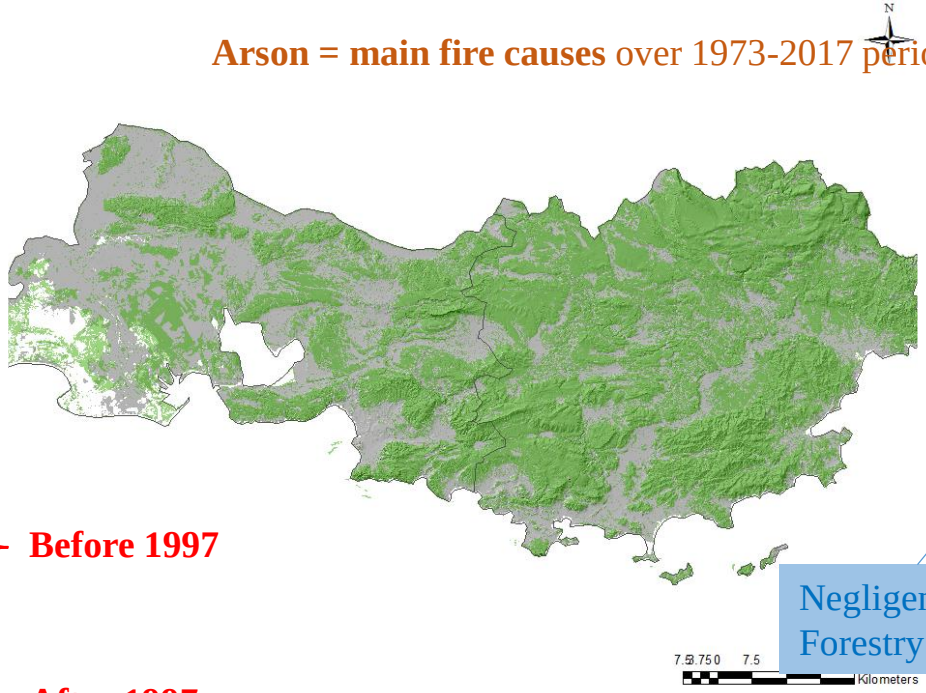
1997: Creation of teams for fire cause investigation

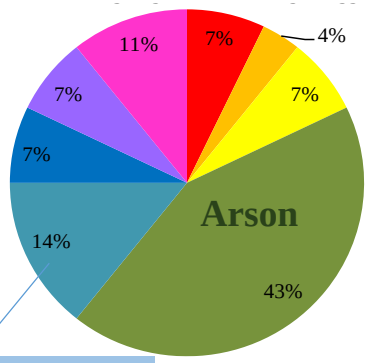
SOME RESULTS

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



Arson = main fire causes over 1973-2017 period





Negligence during Agricultural works

Negligence _ Glowing objects

Before 1997

Accident _ Vehicles

After 1997

Negligence during Forestry Works

Before 1997

Targeting fire ignitions will differ spatially

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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