40 years of fire history in SE France : What's the story ?

Anne Ganteaume

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40 years of fire history in SE France : What's the story ?

Anne Ganteaume

SDIS 13

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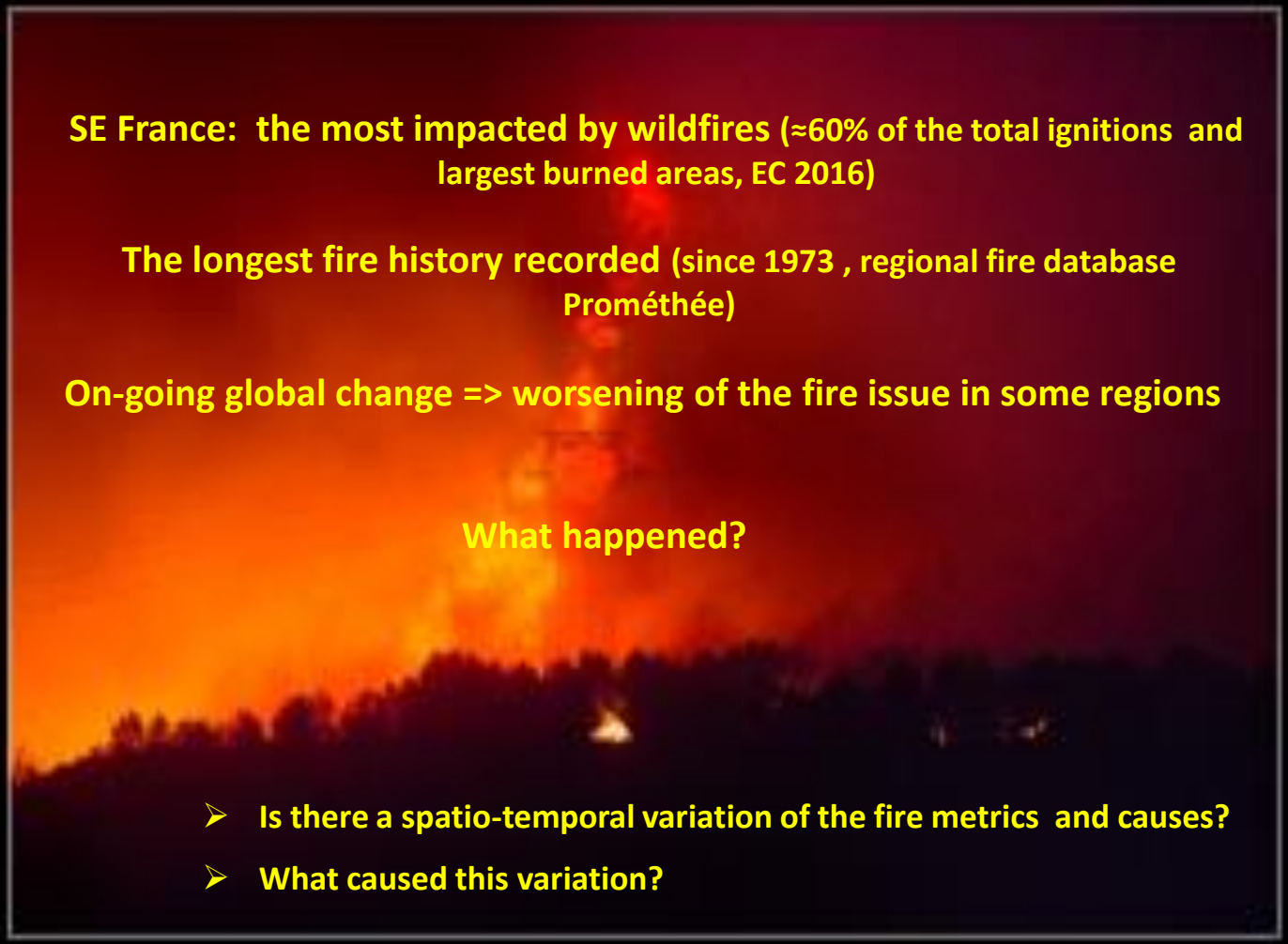
Introduction



SE France: the most impacted by wildfires (≈60% of the total ignitions and largest burned areas, EC 2016)

The longest fire history recorded (since 1973 , regional fire database Prométhée)

On-going global change => worsening of the fire issue in some regions

What happened?

- **Is there a spatio-temporal variation of the fire metrics and causes?**
- **What caused this variation?**

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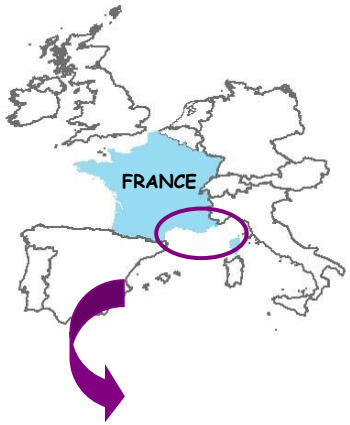
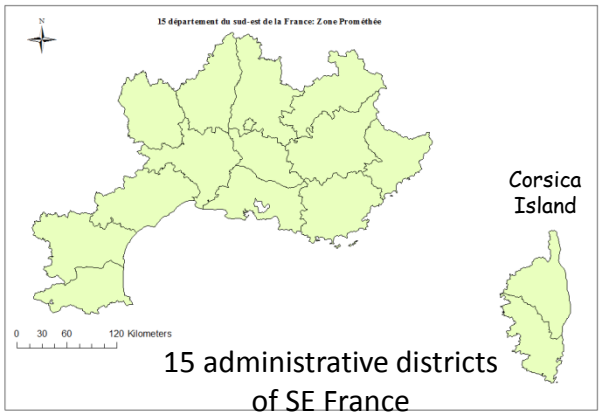
Methodology

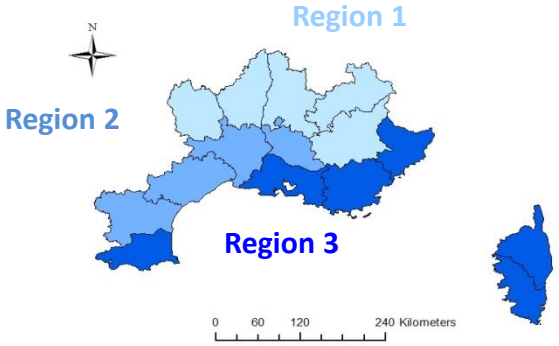


➢ **STUDY AREA**



15 administrative districts of SE France

SE France



3 regions

➢ Climate

➢ Land cover/Land Use

➢ Socio-economic context

Methodology

➢ DATA

DATA

Regional database Prométhée :

Wildfires recorded in the 15 départements of SE France since 1973

Parameters recorded for each fire:

-Date
-Location
-Fire size (ha)
-Fire cause

Temporal and spatial distribution of fires

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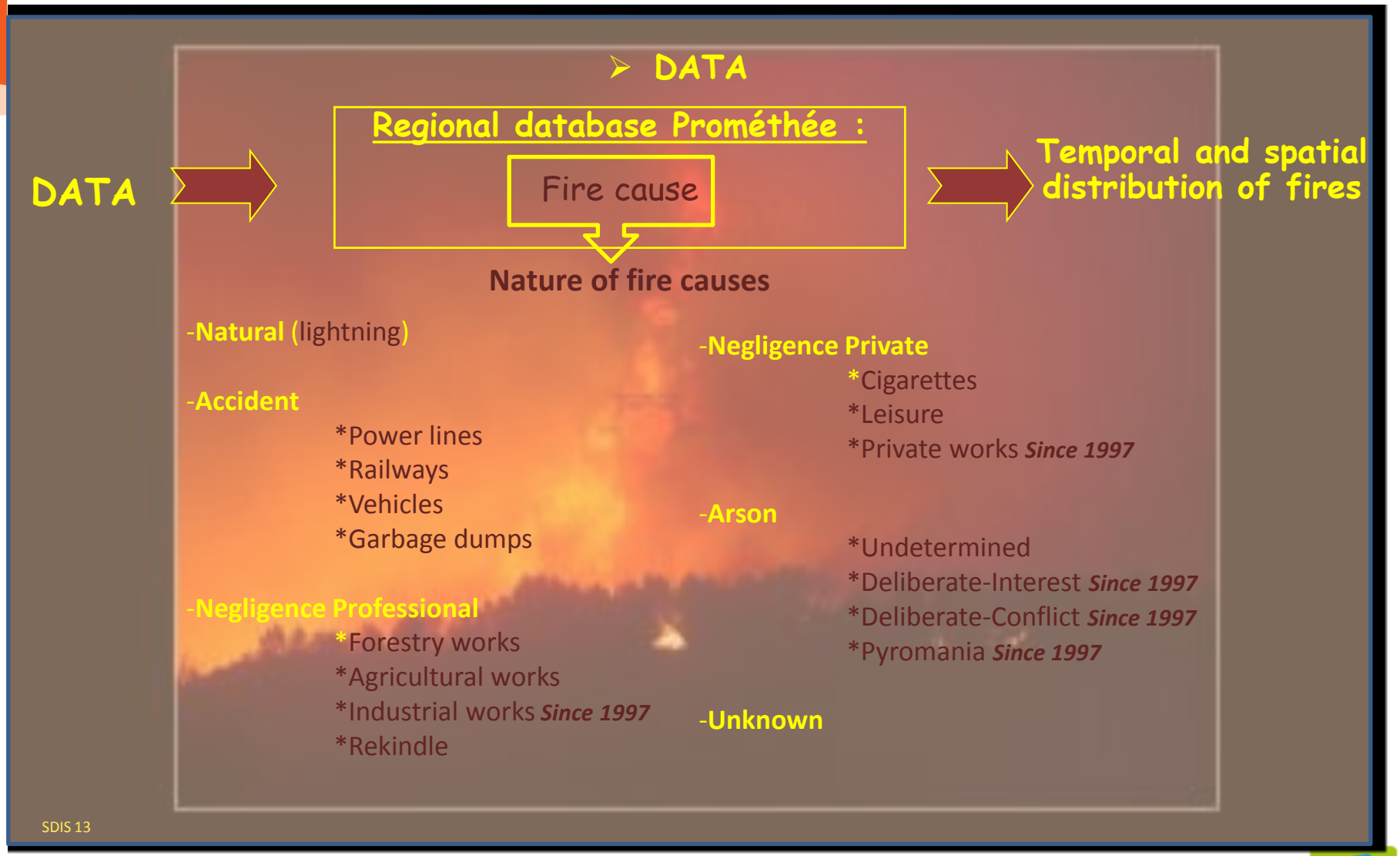
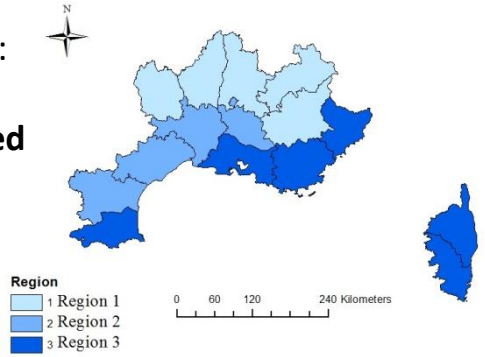
Methodology



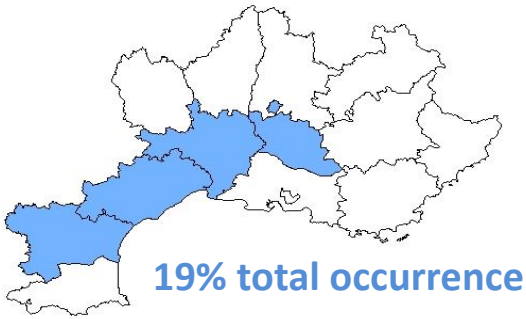
Results

- **Is there a spatio-temporal variation of the fire metrics ?**

1973-2015 period:
107 097 fires
8 034 640 ha burned



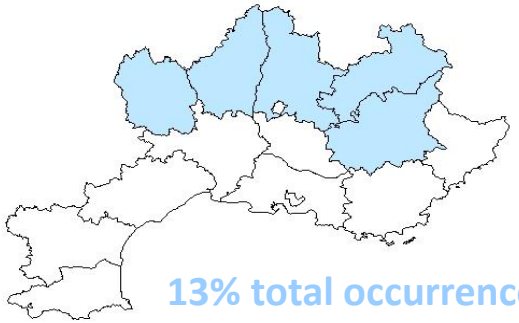
Region 2



19% total occurrence

17% total BA

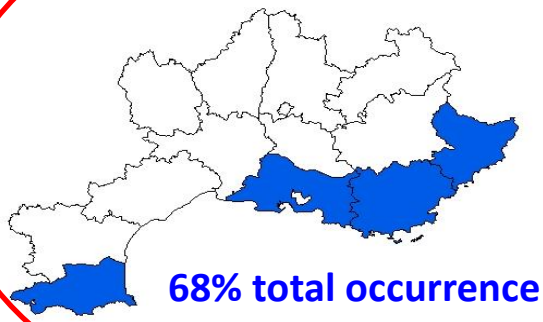
Region 1



13% total occurrence

11% total BA

Region 3

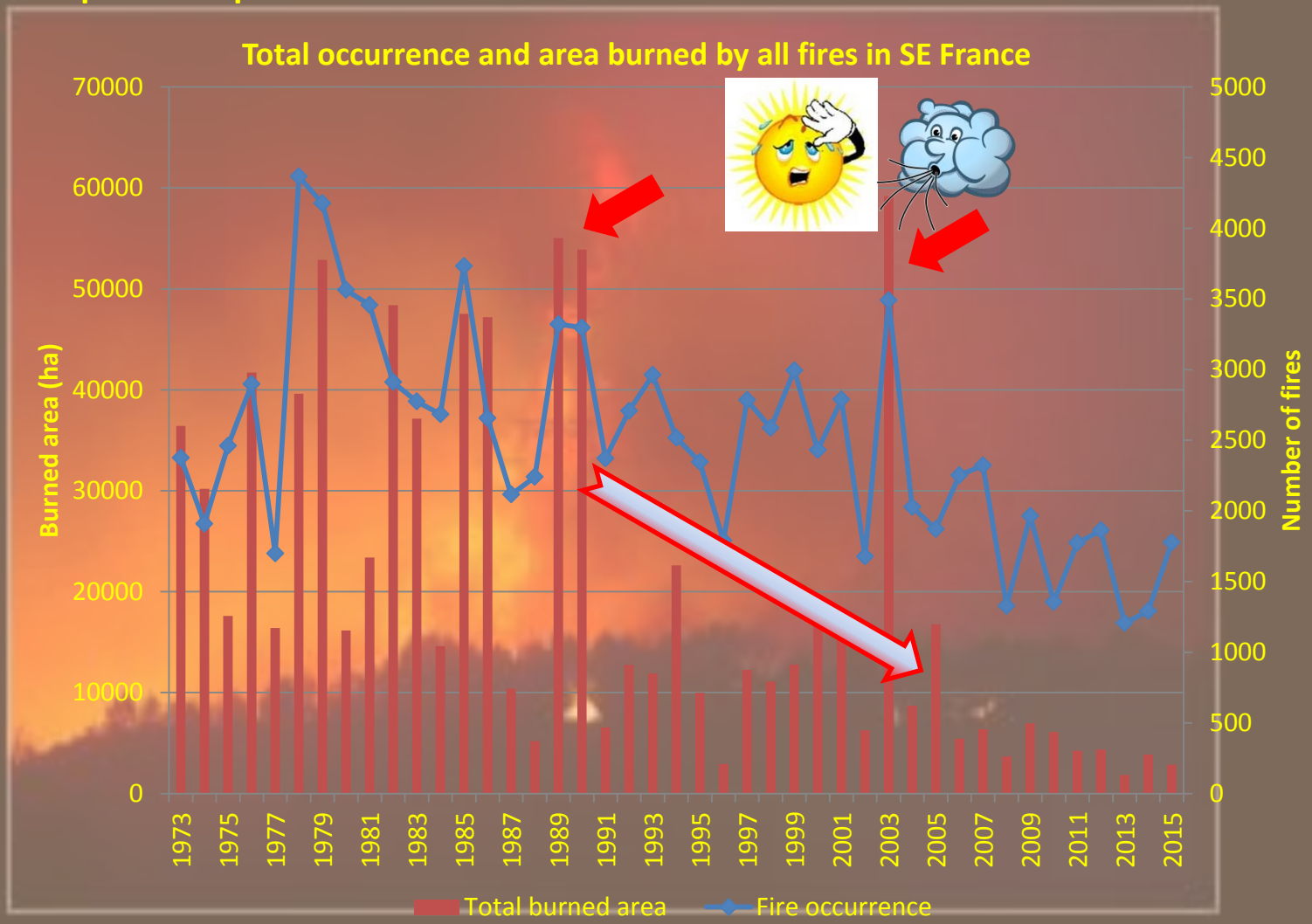


68% total occurrence

72% total BA

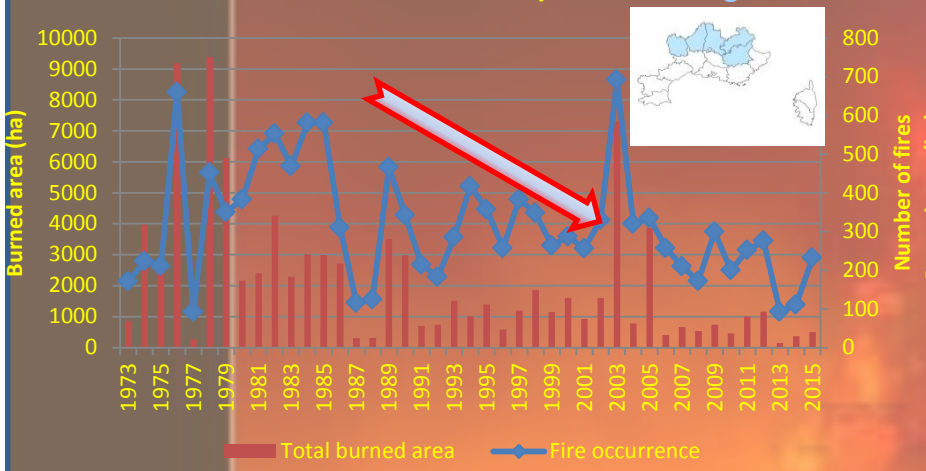
Results

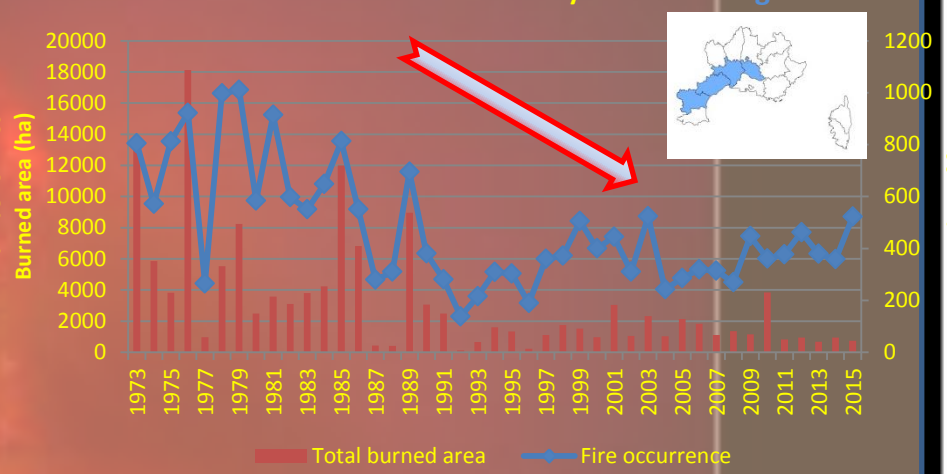
- Is there a spatio-temporal variation of the fire metrics ?

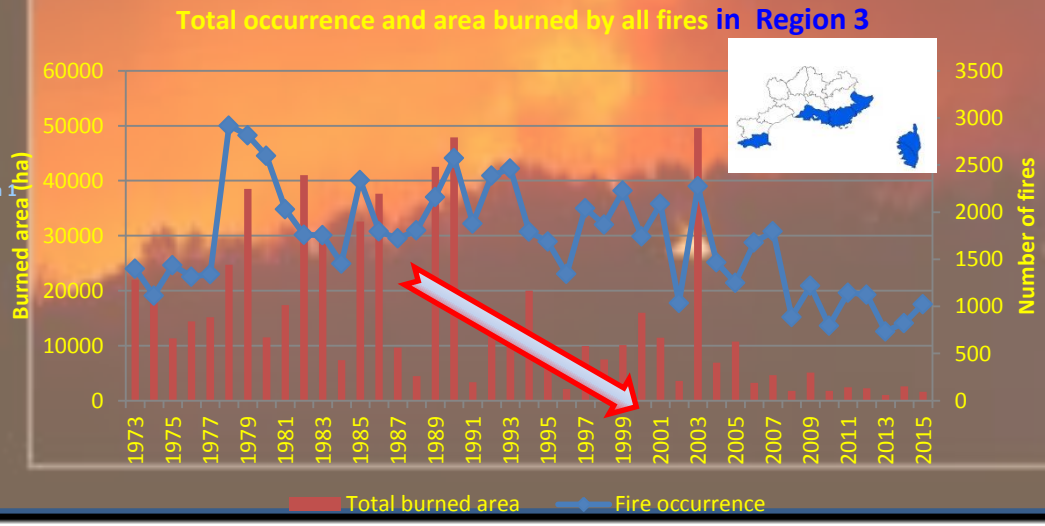


Results

➢ **Is there a spatio-temporal variation of the fire metrics ?**







=> Same trend regardless of the region

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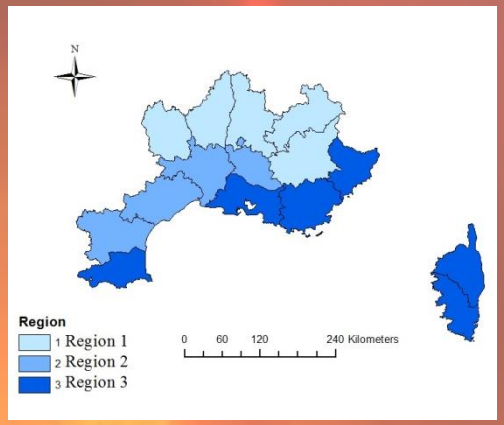
Results

- **Distribution of fire size ?**

1973-2015 period:
107 097 fires
8 034 640 ha burned



Mostly in region 3

Occ: 63%
BA: 1.3%

S < 1 ha

Occ: 36%
BA: 27%

1 ≤ S < 100 ha

Occ: 1.2%
BA: 71%

S ≥ 100 ha

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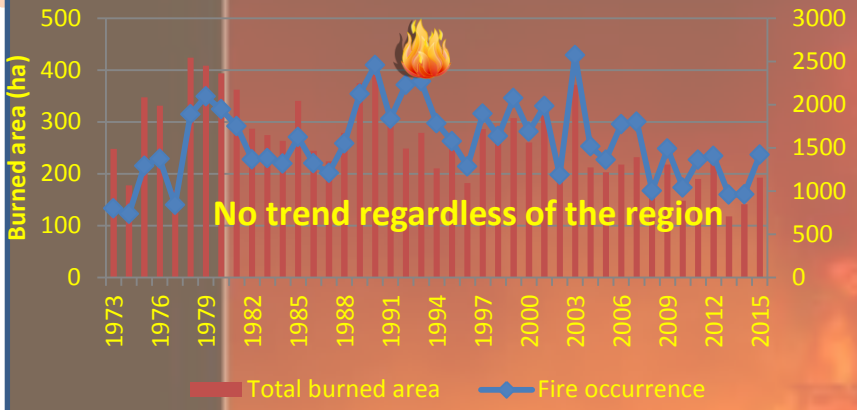
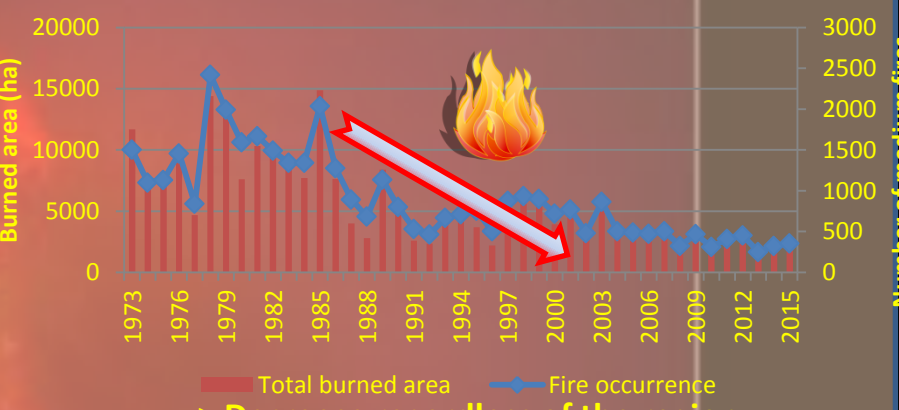
Results

➢ **Is there a spatio-temporal variation of the fire size ?**

Occurrence and total area burned by small fires

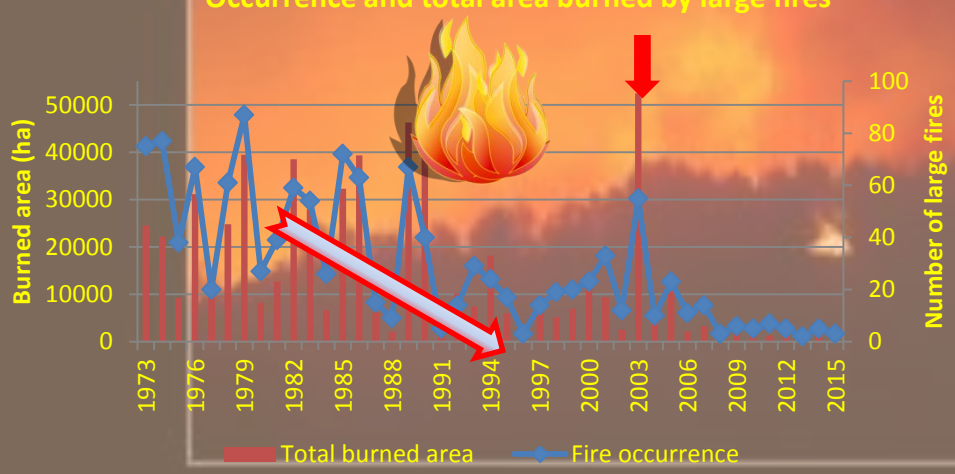


Occurrence and total area burned by medium fires

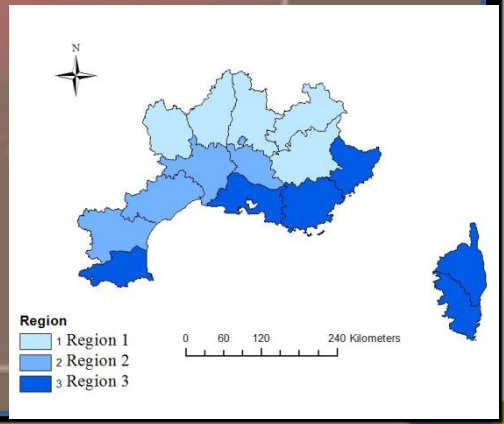


=> Decrease regardless of the region

Occurrence and total area burned by large fires



=> Decrease regardless of the region



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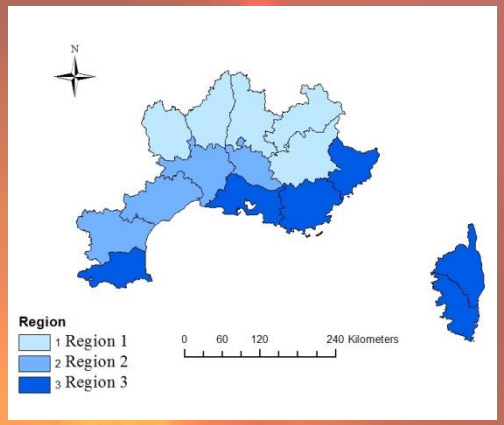
Results

- **How good is the knowledge of fires ?**

1973-2015 period:

107 097 fires

8 034 640 ha burned



39% occurrence known

42% BA known

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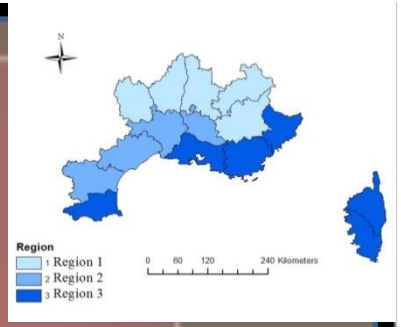
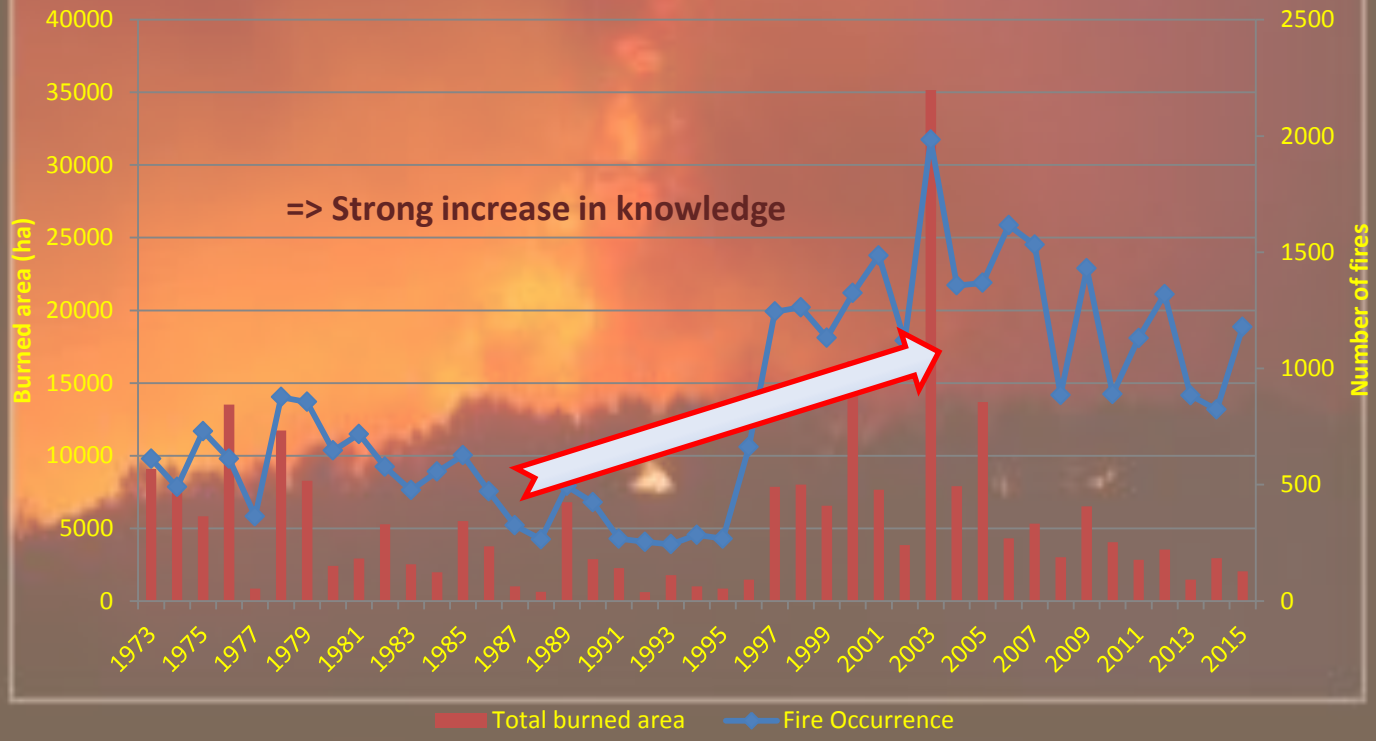
Results

➢ How good is the knowledge of fires ?

39% occurrence known
42% BA known

Occurrence and total area burned by known fires in SE France





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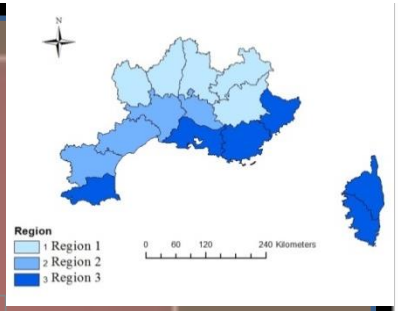
Results

- How good is the knowledge of fires ?

Strong temporal variation



Occurrence and total area burned by known fires in SE France

60% occurrence known
69% BA known

18% occurrence known
15% BA known

Burned area (ha)

Number of fires

Total burned area

Fire Occurrence

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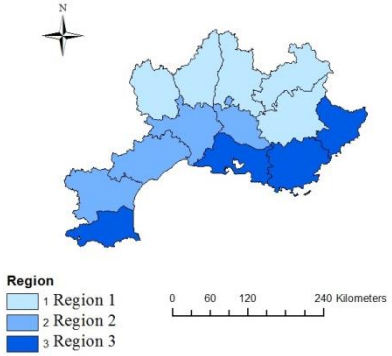
Results

- How good is the knowledge of fires?



39% occurrence known

42% BA known

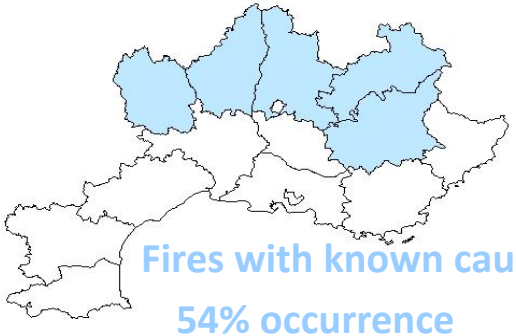
Region 2

Fires with known causes:

46% occurrence

32% burned area

Region 1

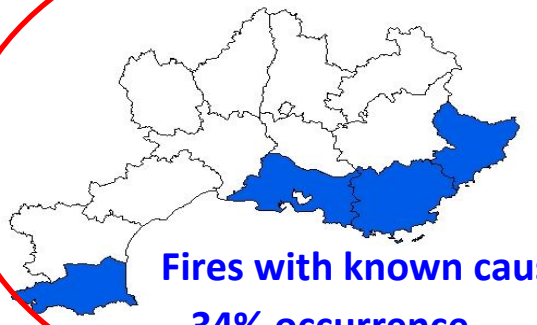


Fires with known causes:

54% occurrence

56% burned area

Region 3



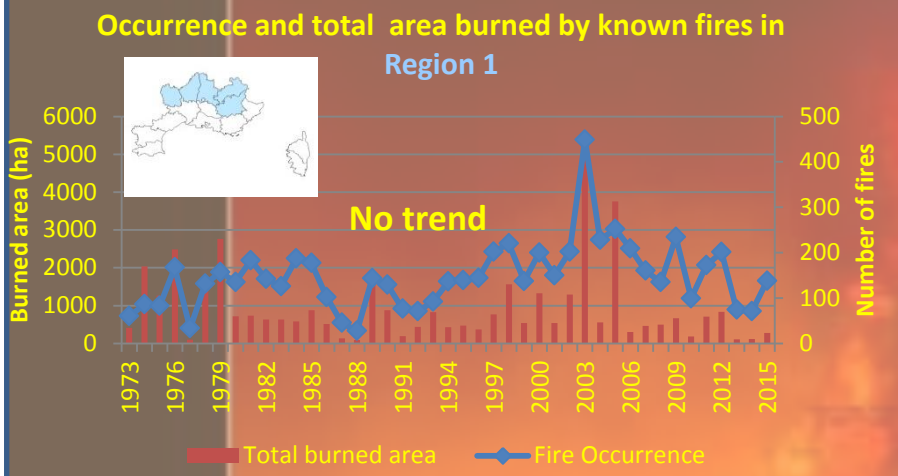
Fires with known causes:

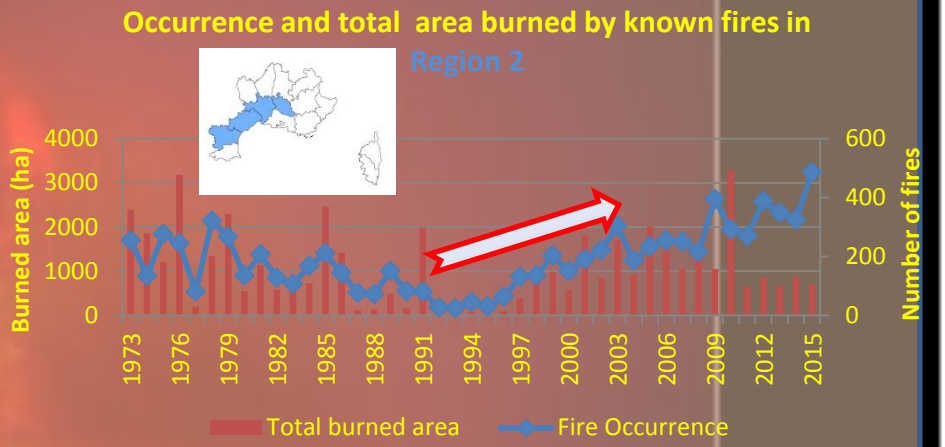
34% occurrence

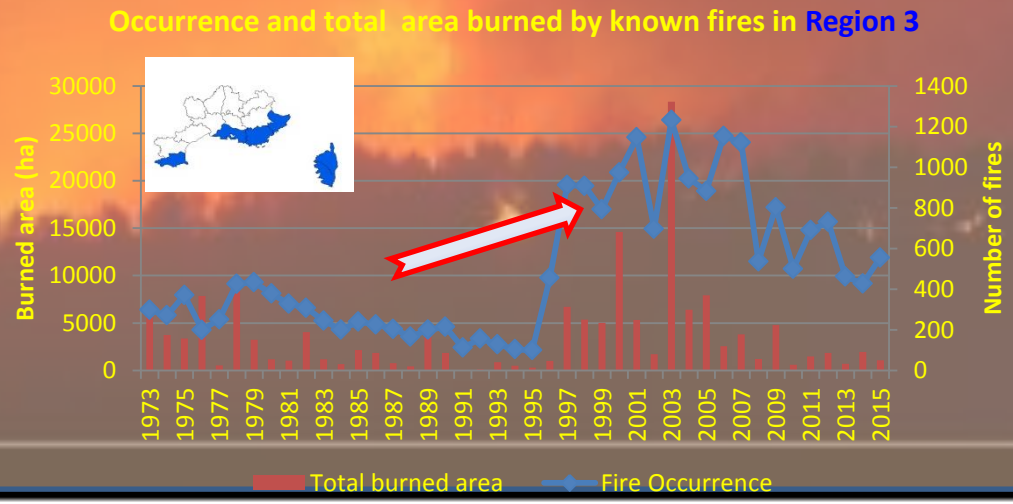
38% burned area

Results

How good is the knowledge of fires?







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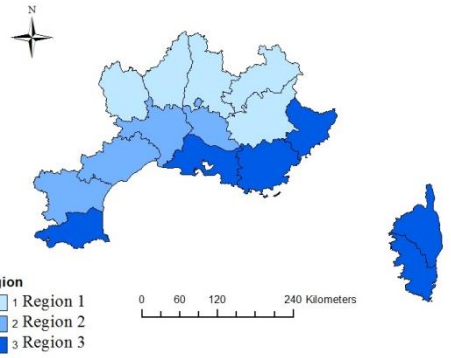
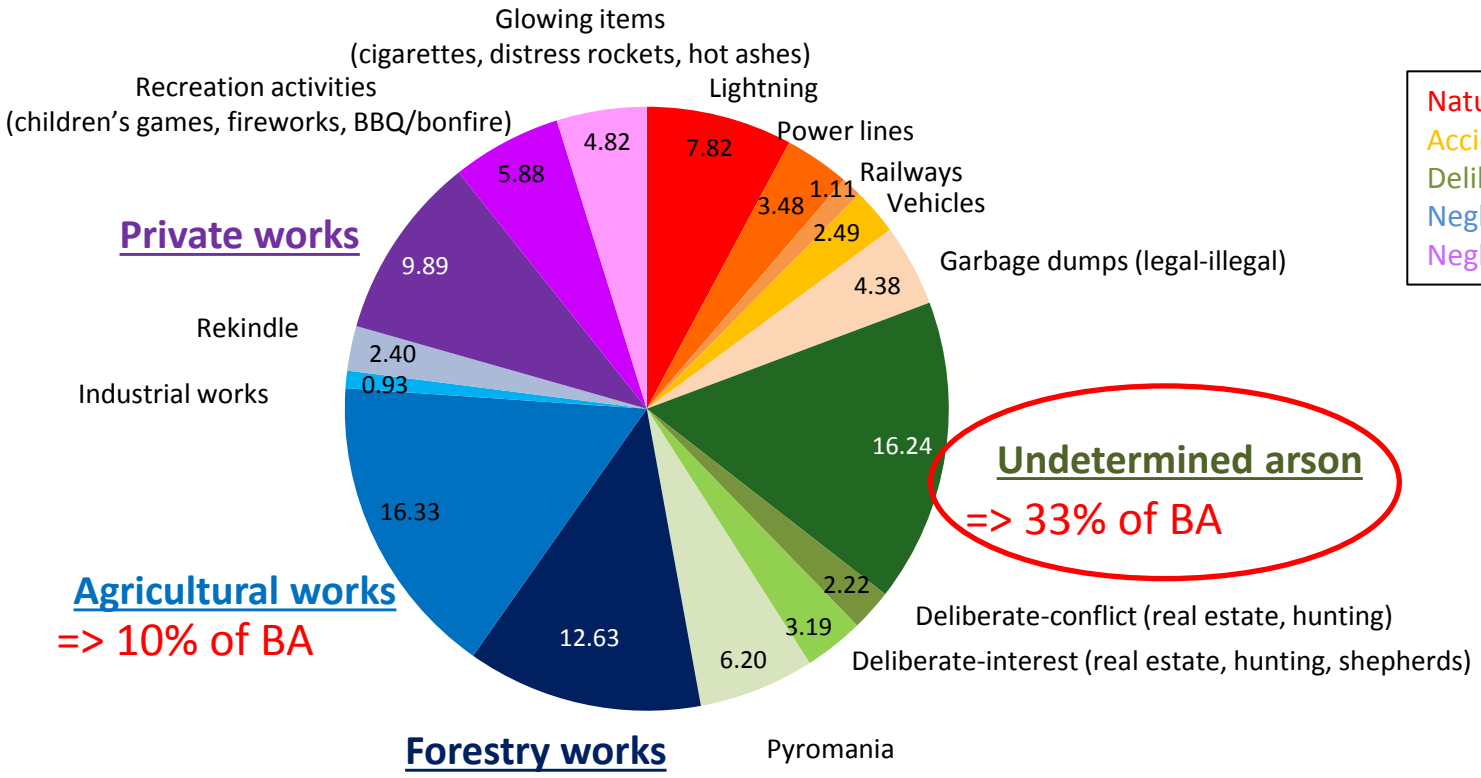
Results



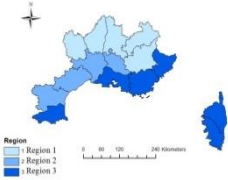
➢ **Distribution of fire causes?**

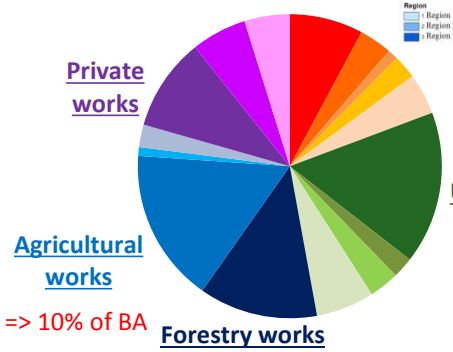
Fire metrics according to the nature of fire causes

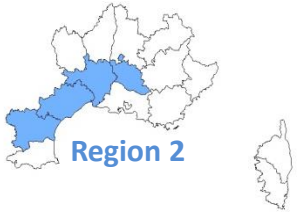


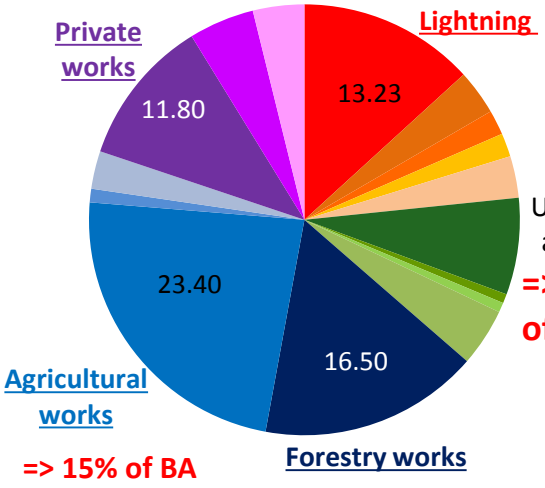
Results

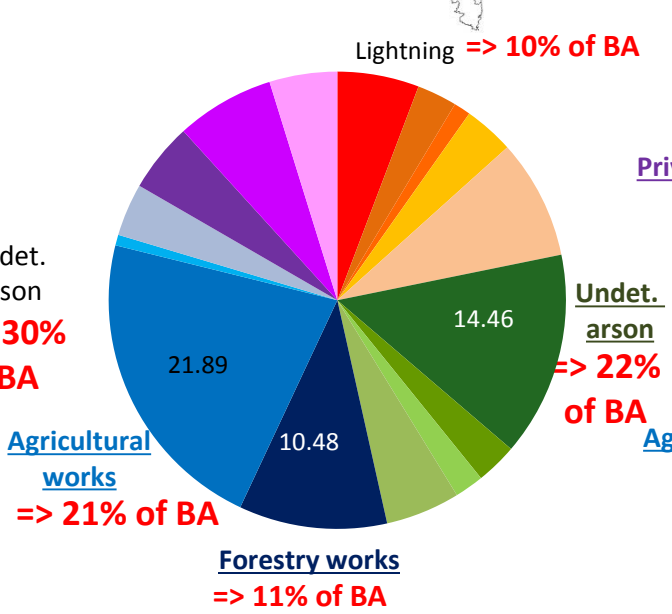
- Is there a spatial variation of fire causes?

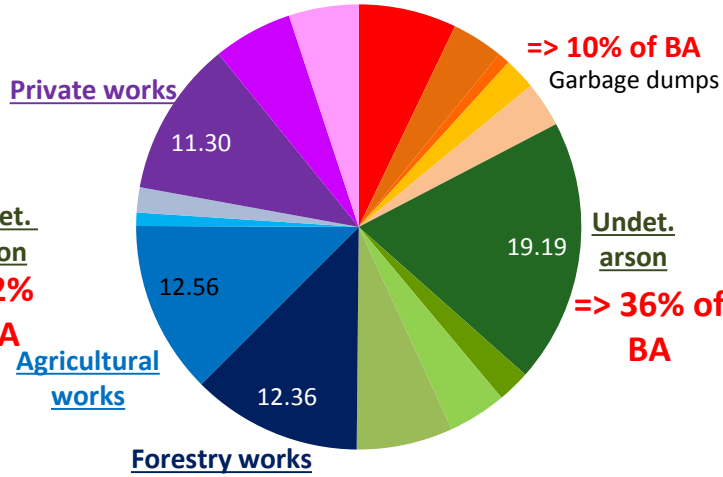






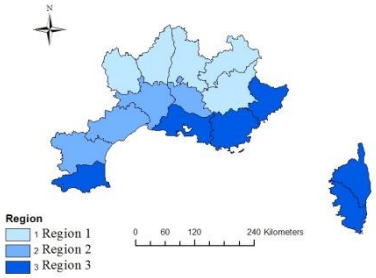


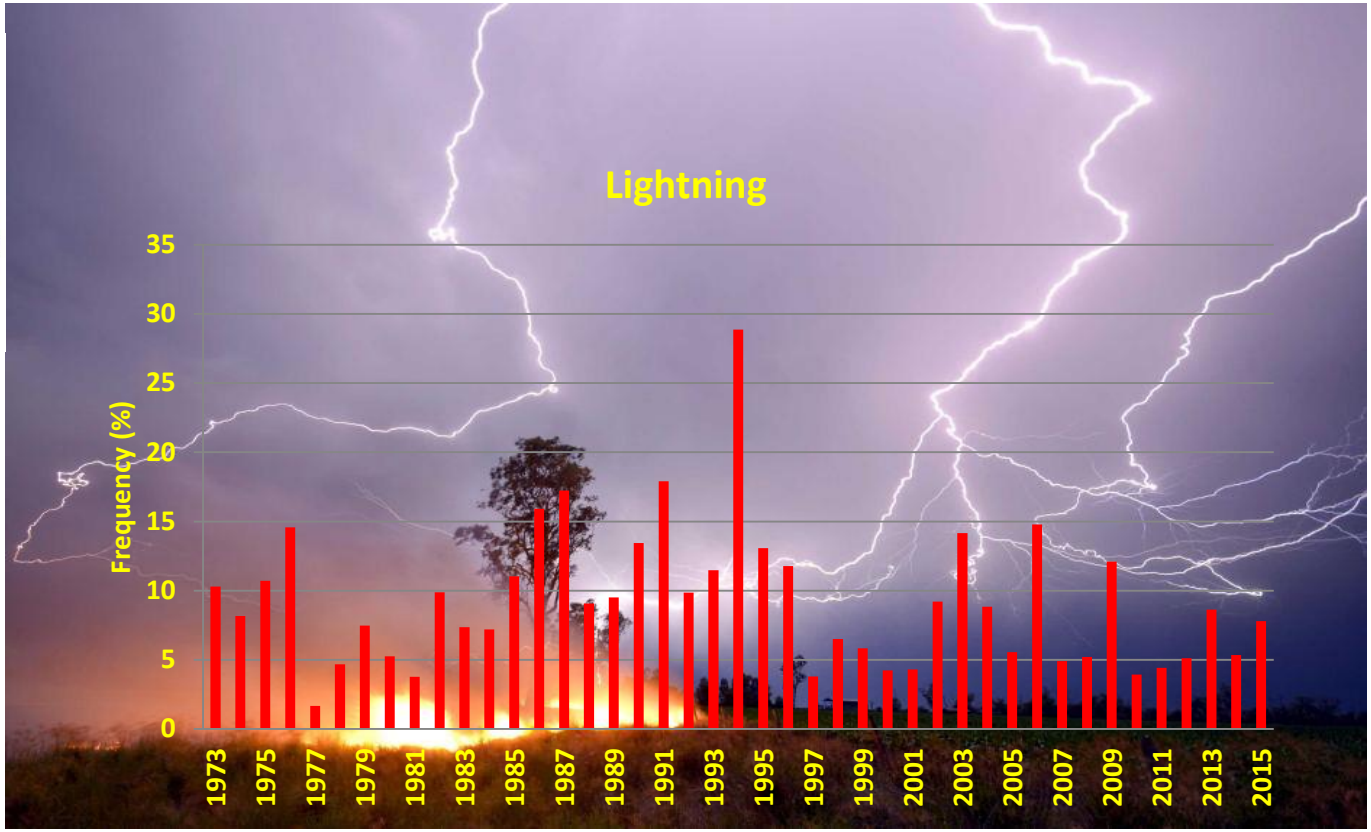




Results

- **Is there a temporal variation of fire causes?**

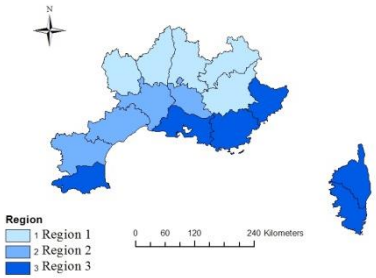


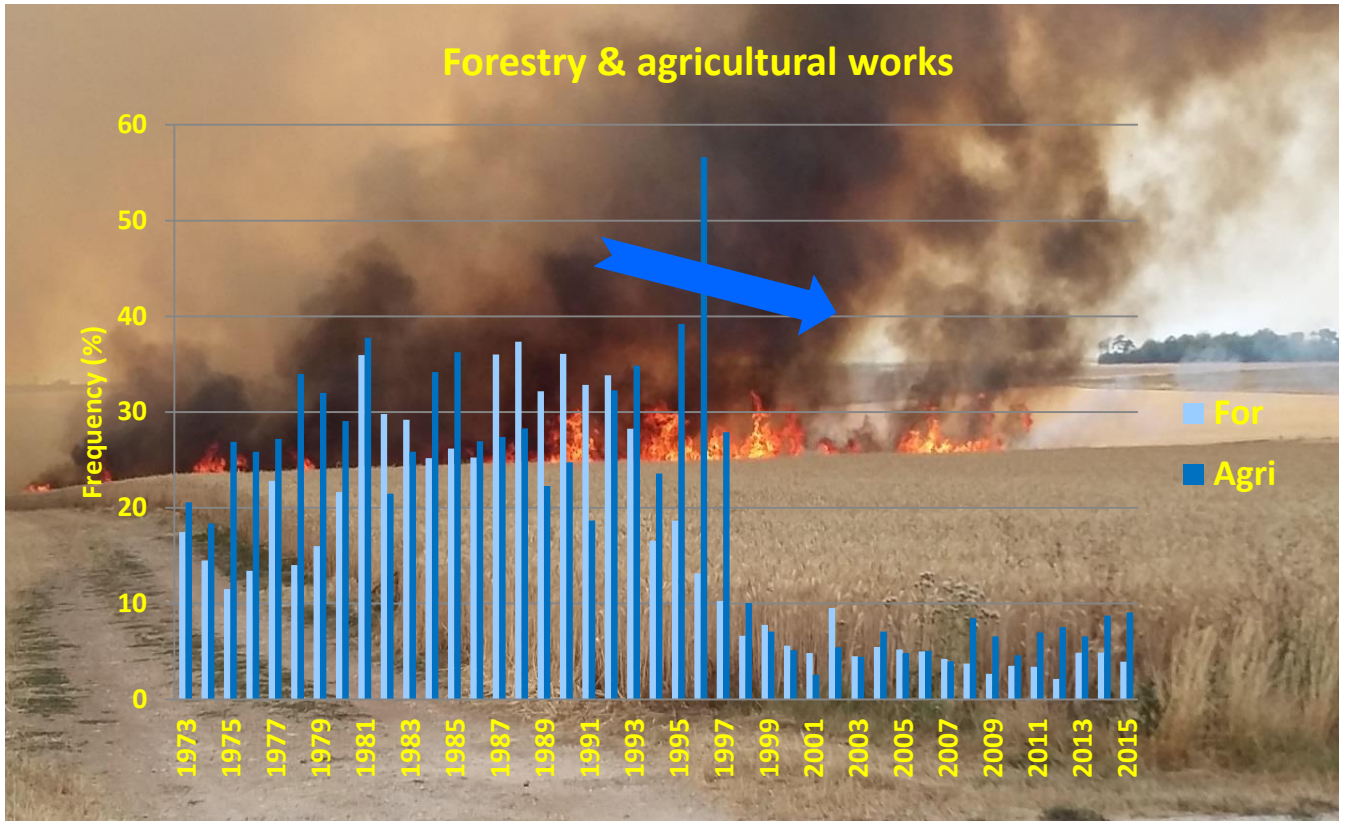


=> No temporal trend regardless of the region (mostly in R1)

Results

- **Is there a temporal variation of fire causes?**





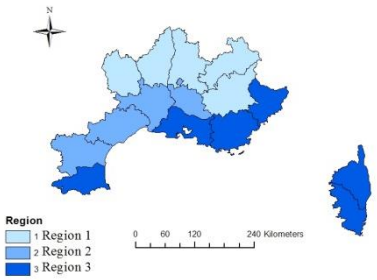
=> Same trend in the 3 regions

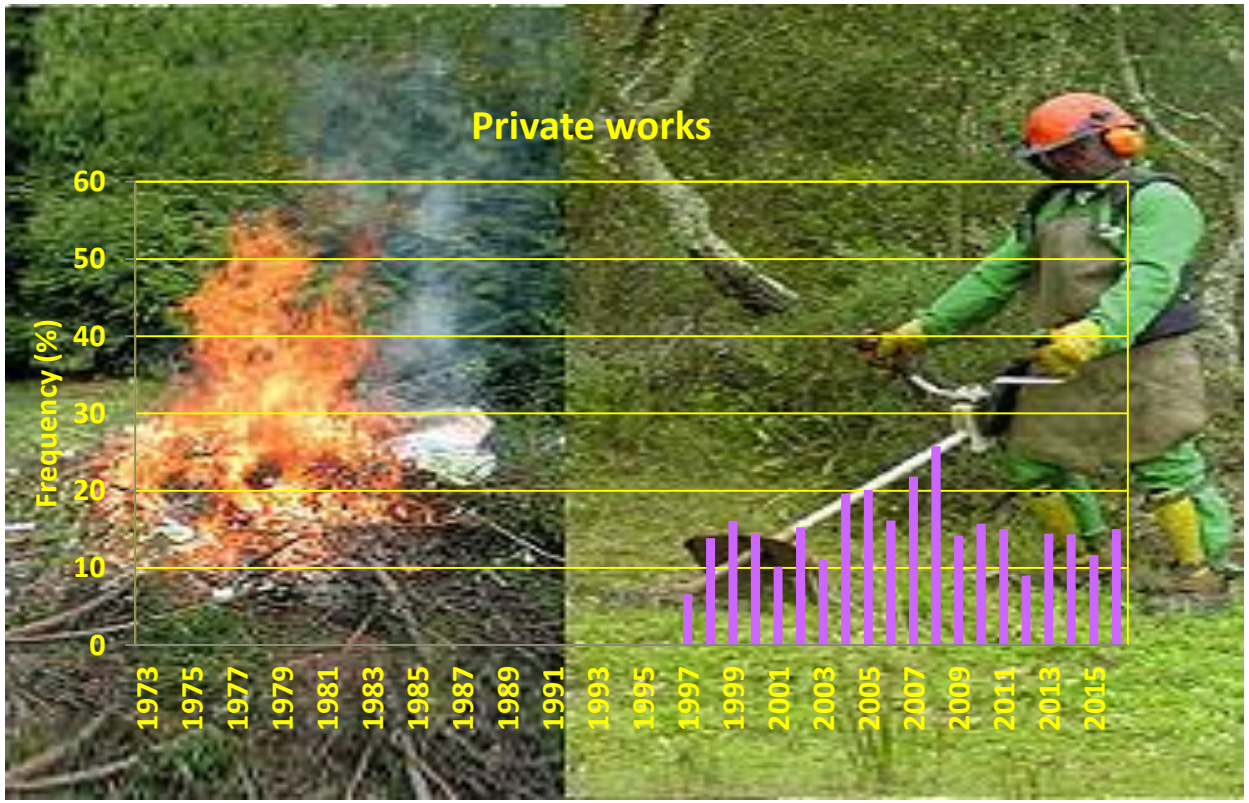
⇒ **Change in activities : less professional works ?**

⇒ **Better management of these activities ?**

Results

- **Is there a temporal variation of fire causes?**





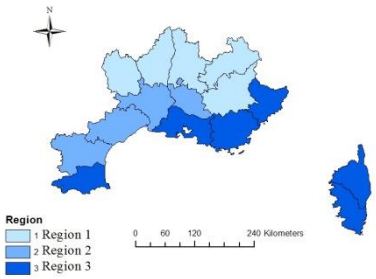
Cause added to the classification scheme in 1997

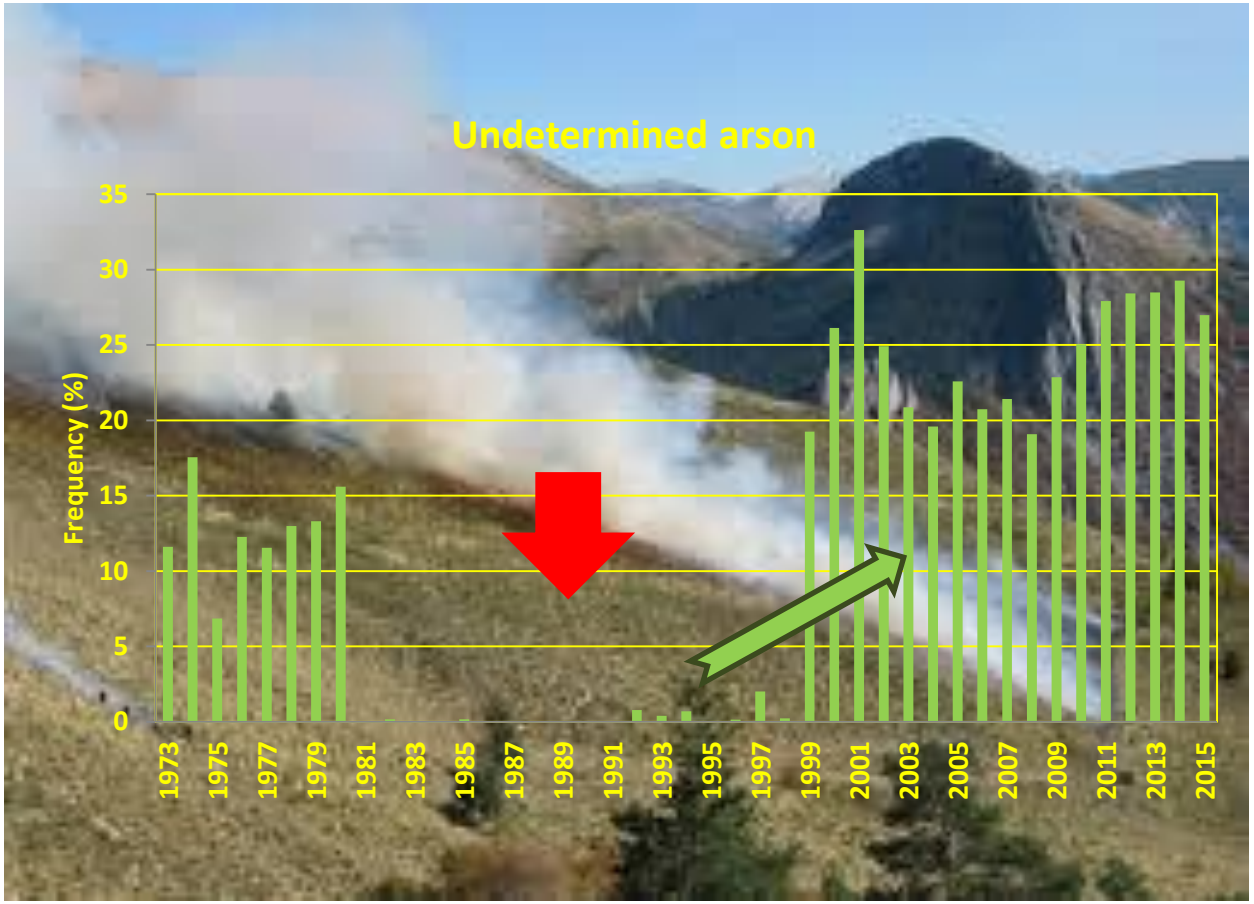
=> No temporal trend since 1997 (mostly in R1 & R3)

⇒ **Better recording of causes : better differenciation between professional & private works**

Results

- **Is there a temporal variation of fire causes?**



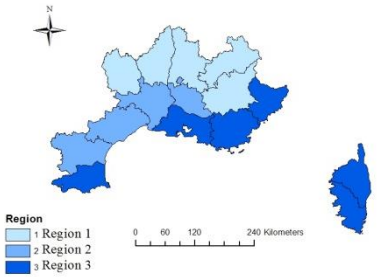


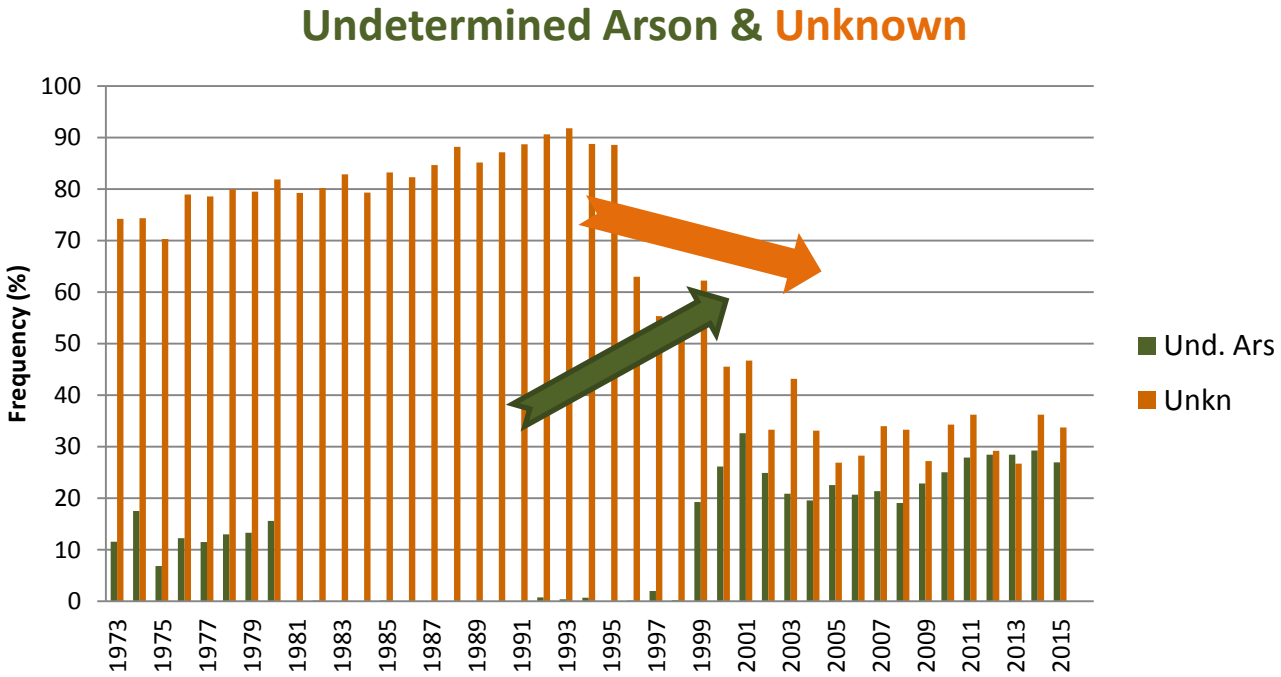
=> Same trend in R2 & R3 mostly

⇒ **Better recording of arson fires (better knowledge of fire causes) since 1997**

Results

- **Is there a temporal variation of fire causes?**





=> Same trend in R2 & R3 mostly

⇒ **Fire knowledge improved**

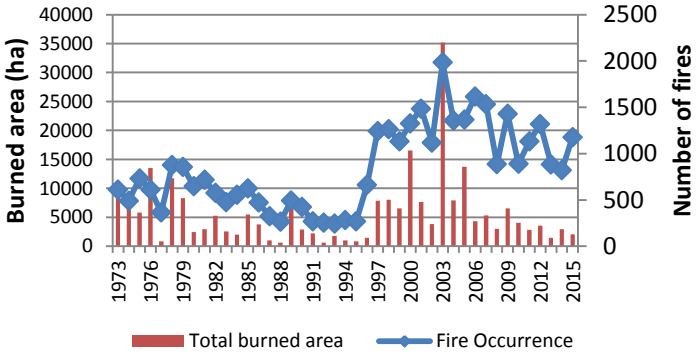
⇒ **Most fires of unknown causes => arson fires**

Results

- Is there a temporal variation of fire causes?

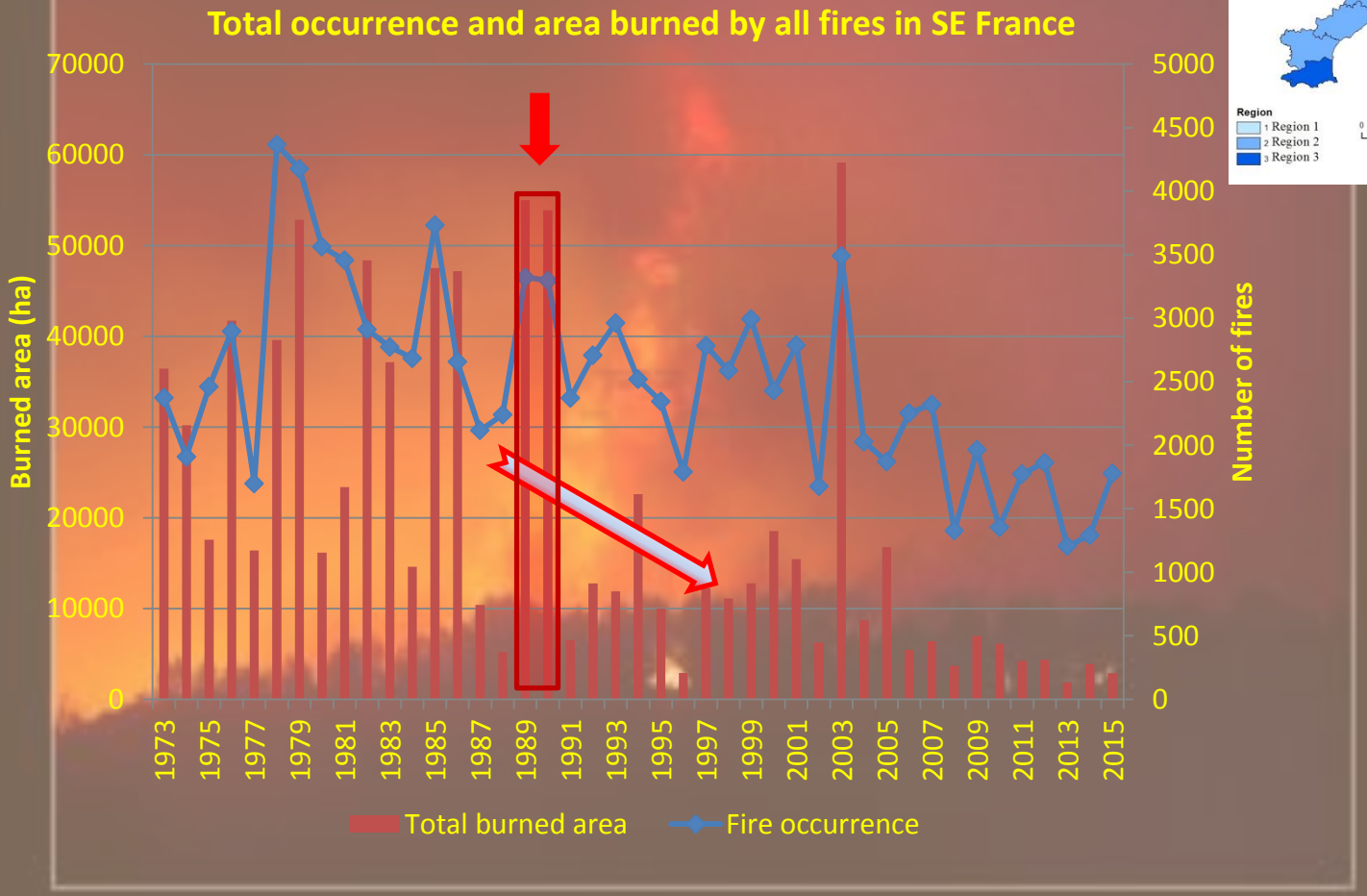
⇒ Fire knowledge improved

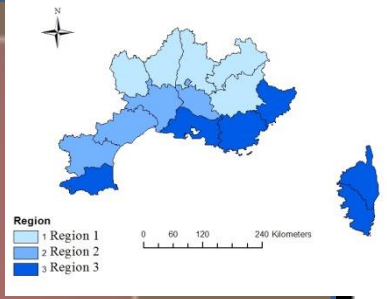
Since 1997: Team for the investigation of fire cause



Results

- What caused this variation?





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Results

- What caused this variation?

  => Better fire suppression

Since 1990 (then in 2003):

⇒ Increase in means (more aircrafts, more trucks, etc.)

⇒ Early attack on the fire

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Results

- **What caused this variation?**
  - Better fire suppression
  - **Better fire prevention**

New regulations since 1990 (reinforced in 2003):

- **Mandatory brush clearing** around housing in WUI, roads, power lines and railways
- **Limiting or banning the use of fire**
- **Limiting the access to forests when high FWI**
- Implementation of **plans for protection of forests against fire**

Results

- **What caused this variation?**
  - Better fire suppression
  - **Better fire prevention**

réseau hydrique

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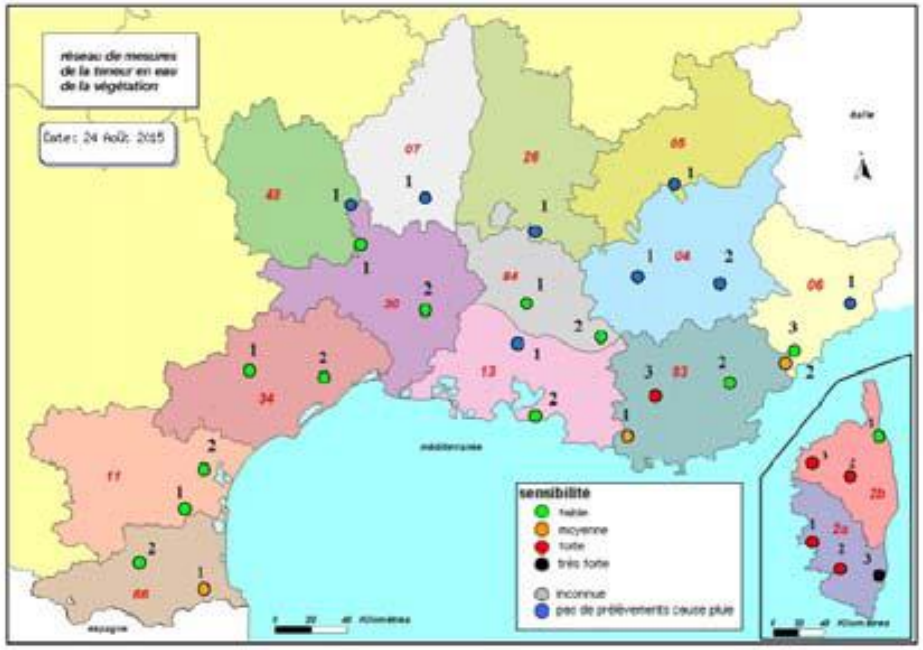
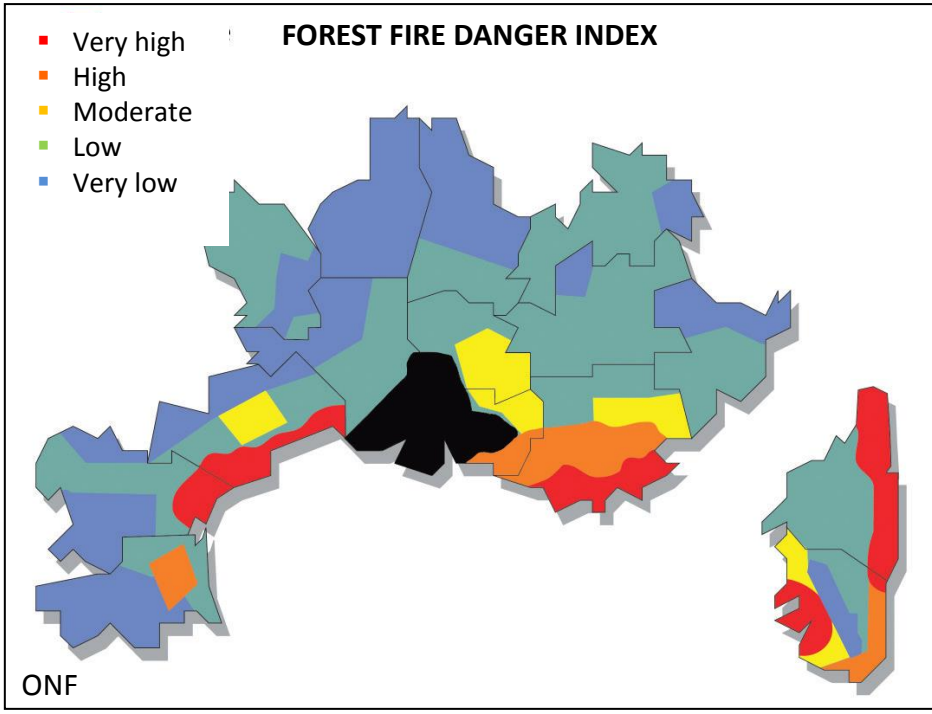
RÉPUBLIQUE FRANÇAISE

Conservatoire de la Forêt Méditerranéenne





Monitoring of the vegetation dryness in summer => **Forecasting the Forest Fire Danger Index**

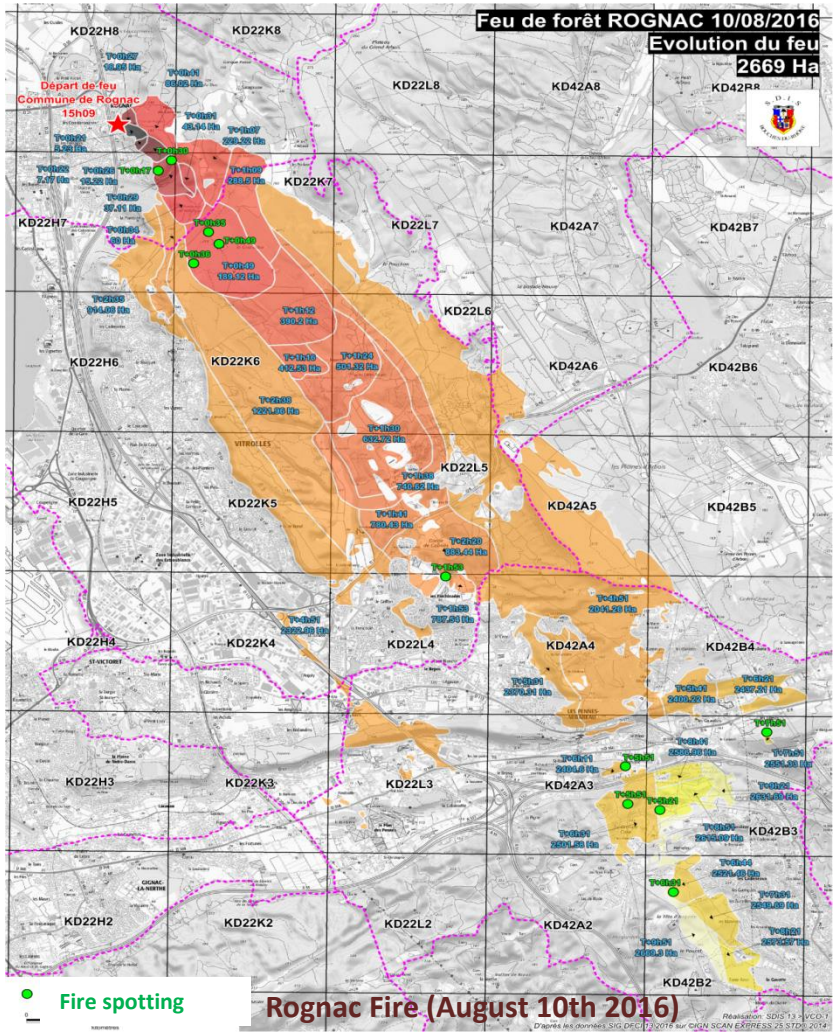
Results

- **What caused this variation?**
  - Better fire suppression
  - **Better fire prevention**

More means for **hydrants, networks of forest tracks, watchtowers**

Results

However, sometimes it is not enough… when extreme fire weather conditions occurred



Conclusions

So, what's the story in SE France?

- **Is there a spatio-temporal variation of the fire metrics ?**

-R3 the most impacted by fires, especially large fires
-Decrease in number of fires (medium and large sizes) and burned area especially since 1990, regardless of the region

- **What caused this variation?**

Better suppression & prevention
BUT
not always efficient especially when severe fire weather conditions occurred

- **How good is the knowledge of fire causes ?**

-Poor knowledge on average, R3 having the worst
-Improvement since 1997

- **Is there a spatio-temporal variation of fire causes?**

-Spatial variation but undetermined arson => largest impact
-Temporal variation except for lightning & private works


Thank you for your attention!
SDIS 13