Understanding Landscapes through Historical Fire Scenarios and Fire Regimes in the Iberian Central Mountain System

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Context

Forests and **Fire** have coexisted throughout the history of the Iberian peninsula. However, in recent years, Mediterranean forests have experienced large fires, and media reports on high risk of fire catastrophes. Although the 20th-century interaction of forests and fires in rural landscapes is widely studied, long-term historical knowledge is limited yet could provide valuable context for understanding resilience

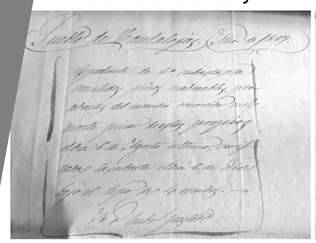
Objective

To assess the fire history and landscape dynamics in two case studies (Estrela and Ayllón massifs) using geohistorical and geospatial information sources, and methods of Geographical History and GIS techniques

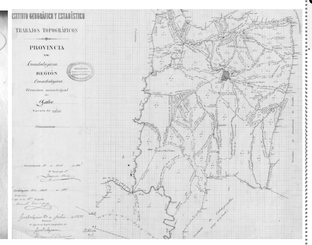
Methodology

Geohistorical sources

Documentary texts from the 18th century & Historical cartography



Auction of wood of a fire, 1867



Topographic map 1895

Spatial data

- Aerial photography & CORINE Land Cover
- Landscape units map
- Digital Terrain models

Statistical data

- **Population Census** from late 19th century, 10 yr. interval
- **Census of Agriculture** – Cattle units, from late 19th-century, 10 yr. interval
- **FAO Climate database** – Temperature and rain, from 1961
- **Wildfire data** from 1980 for Portugal, and from 1968 for Spain

Scales of analysis

Temporal scales

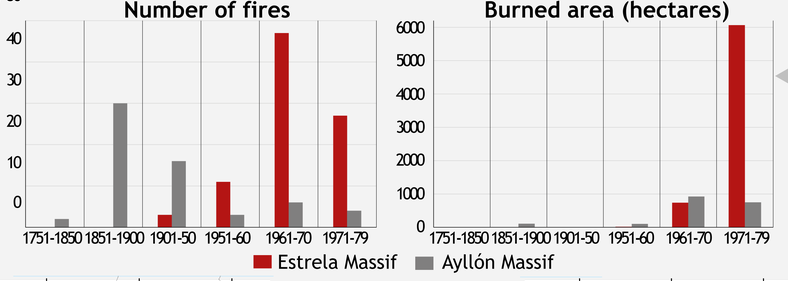
- Historical long-term (19th-20th centuries)
- Medium-term (second half of the 20th century)

Spatial scales

- Regional (Central Mountain System)
- Intermediate (Estrela and Ayllón massifs)
- Local (municipalities)

Results & Discussion

1 An original Fire History Georeferenced Dataset



nonlinear progression in both fire history and landscape change

2 Historical Fire Scenarios The influence of contextual factors on fire occurrence (from the 19th century until 2000)

Photo from Manteigas town, in Estrela Massif March 2017

- General **forest** area progressing against **shrublands** and **pastures**, although featuring some local particularities
- Period marked by **Afforestation** State Plans and **disentailment** processes in Portugal and in Spain

Key elements

Population & Settlement

- Population has always been **scarce** by district standards
- Population **declined** in the 1960's, 1970's and part of the 1980's due to **emigration** processes and **rural exodus**

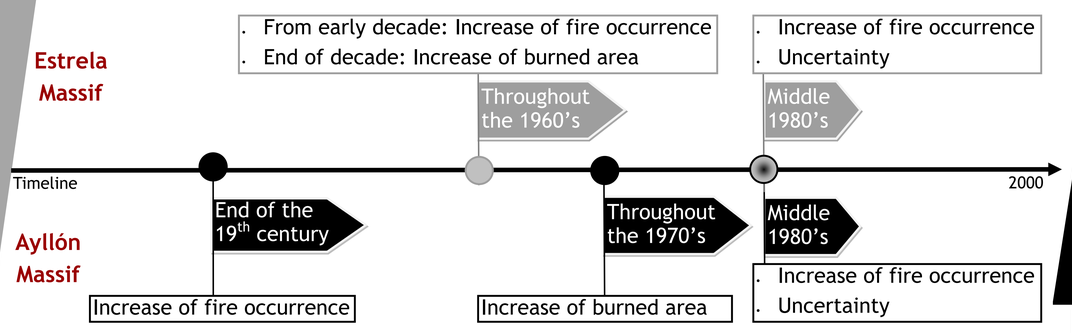
Land-use

Photo from Galve de Sorbe town, in Ayllón Massif. Dic 2016

Land management practices

- Local societies are **rural mountain communities**. They lived off subsistence farming, raising livestock and of the transhumance of wool livestock (much more important in Spain than in Portugal)
- In the 20th century there was a **steep decline** in number of livestock
- Grazing fields have become **fewer and smaller** since reforestation began
- The vast majority of the land was **communal** and had practically no wage labor in both mountain areas

Identification of **Tipping-Points** in **Fire History** that are linked to the **Historical Fire Scenarios:**



Conclusions

Fire is an **integral component** of the cultural landscape

Fire was a **well-integrated element** of the rural landscapes serving as a land management tool before the second pyrotransition in the mid-20th century

Fire regime stepped up to a **wildfire regime,** after the general disarticulation of the traditional rural system

- In **Estrela massif,** fire has turned out to be a **Landscape Degradation Factor**
- In **Ayllón massif**, maintenance of land management and cultural heritage have created a **Landscape More Resilient to Fires**

Understanding these historical dynamics could inform policy development because they illustrate how important land uses and policy are in driving landscape change

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