

Historical forest fires in the high Catalan-Andorran-Occitan Pyrenees: the Desbosiguem! dataset

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1. Introduction

Global climate change will increase the frequency and intensity of forest fires in mountain regions, even affecting areas that have historically been at low risk. This is the case of the Pyrenees, where the combination of rising temperatures, droughts and changes in land use, is leading to an increased risk of major forest fires.

The Desbosiguem! project (01/04/2024-31/03/2027, poc.tefa.eu/proyectos/efa089-01-id-desbosiguem/), aims to develop solutions for reopening the landscape, restoring pastures and reducing fire risk. One of the project's outputs is the provision of fire modelling tools to support rural managers. These modelling tools use the Desbosiguem! dataset, which includes the historical forest fire footprints of the high Catalan-Andorran-Occitan Pyrenees. The dataset covers the cross-border area formed by the Pallars Sobirà, Cerdanya and Alt Urgell in Catalonia, the Principality of Andorra and Ariège in Occitanie. This poster provides a preliminary analysis of the cross-border dataset, focusing on the fire recurrence and fire size distributions.

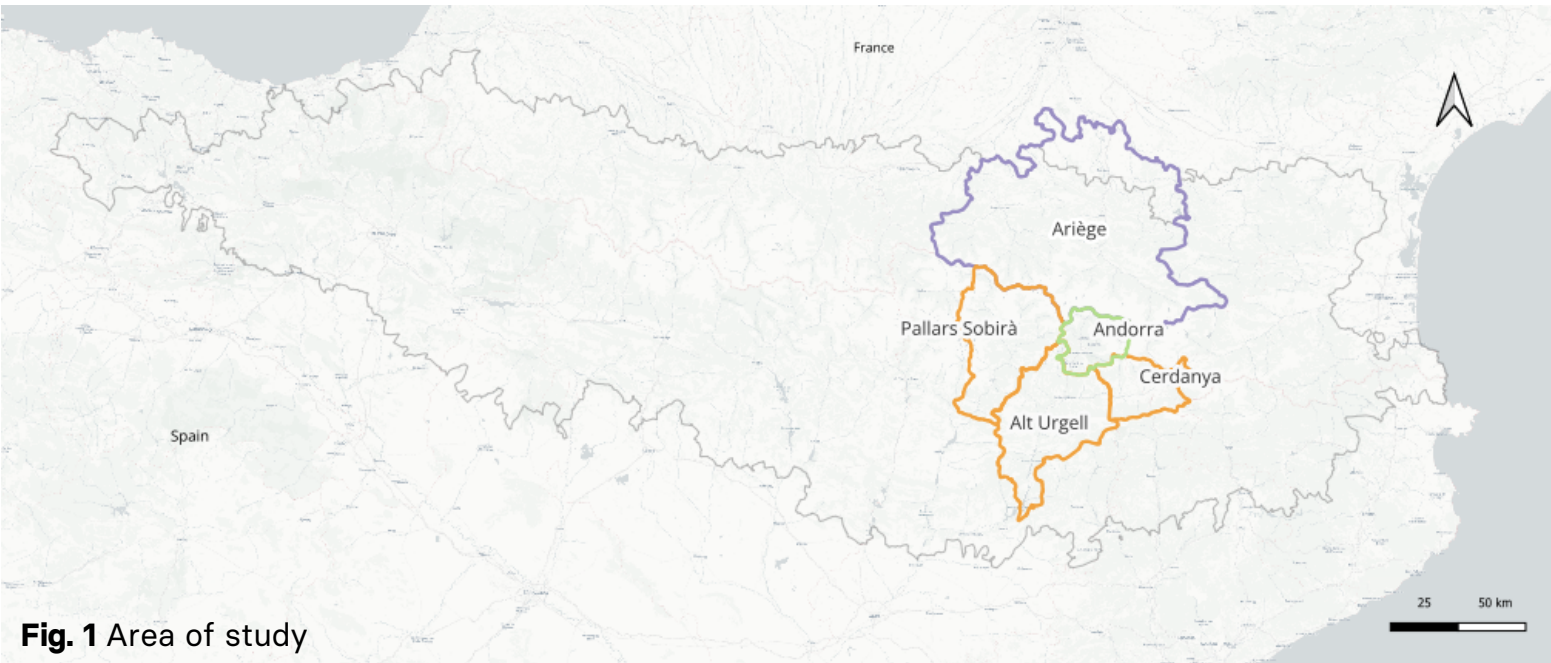


Fig. 1 Area of study

2. Methodology

Four sources of information from three different administrations were used to compile forest fire footprints.

In Catalonia, updated data from the [Catalan Fire and Rescue Service \(CFRS\)](#) was used until 2022 and was supplemented with the fire footprints from the [Generalitat de Catalunya](#). Most of the recent footprints (i.e. those occurring after 2000) in the CFRS data were obtained using GPS, while the older ones were obtained using satellite imagery.

In Andorra, the forest fire footprints were identified using the [ORNA database](#) (AR+I, 2025) as a starting point. This database is based on the archives of the *Cos de Bombers d'Andorra* and the Andorran press. Some footprints of the most significant forest fires (i.e. those covering more than 1 ha) were incorporated into the Desbosiguem! dataset. These were identified using orthophotos from the Government of Andorra, the [Institut Cartogràfic i Geogràfic de Catalunya](#), the [Instituto Geográfico Nacional](#) and [EOSDA Landviewer](#)'s high-resolution satellite imagery.

In Ariège, the *Office national des forêts* (ONF) provided data including registers up to 2024. The footprints were identified using satellite imagery (e.g. Landsat and Sentinel), with some identified via GPS.

The Desbosiguem! dataset is structured into six fields (see Table 1) and incorporates date information and an identifier to link to the original data source if necessary. Homogenization was applied to some fields, especially the date fields, as well as duplicate identification and merging of some features, to ensure data consistency and uniqueness.

The geometries of fire footprints are represented in multipolygons in ETRS89/UTM zone 31N (EPSG:25831) coordinate reference system.

Table 1 Fields, type and description of the Desbosiguem! dataset

name	type	description
id	String	Identifier code of the dataset
year	Integer	Year the fire started
month	Integer	Month the fire started
day	Integer	Day the fire started
source	String	Original source: ONF (<i>Office national des forêts</i>) AR+I (Andorra Research + Innovation) GENCAT (<i>Generalitat de Catalunya</i>) CFRS (<i>Catalan Fire and Rescue Service</i>)
source_id	String	Identifier code to join with the original source

In the preliminary analysis, fire recurrence was analysed using geographic information systems (GIS), identifying intersections between footprints. The fire size distributions of the regions under consideration were qualitatively compared by plotting their cumulative probability distributions.

3. Preliminary results

The latest version of the Desbosiguem! dataset includes 343 fire footprints, of which 154 are in Catalonia, 17 are in Andorra and 172 are in Ariège. Fig. 2 shows the spatial distribution of historical fires and their footprints. In the study area, recurrence was detected in 3903 ha, representing 11% of total area covered by the fire footprints (4% in Catalonia, 0% in Andorra and 20% in Ariège).

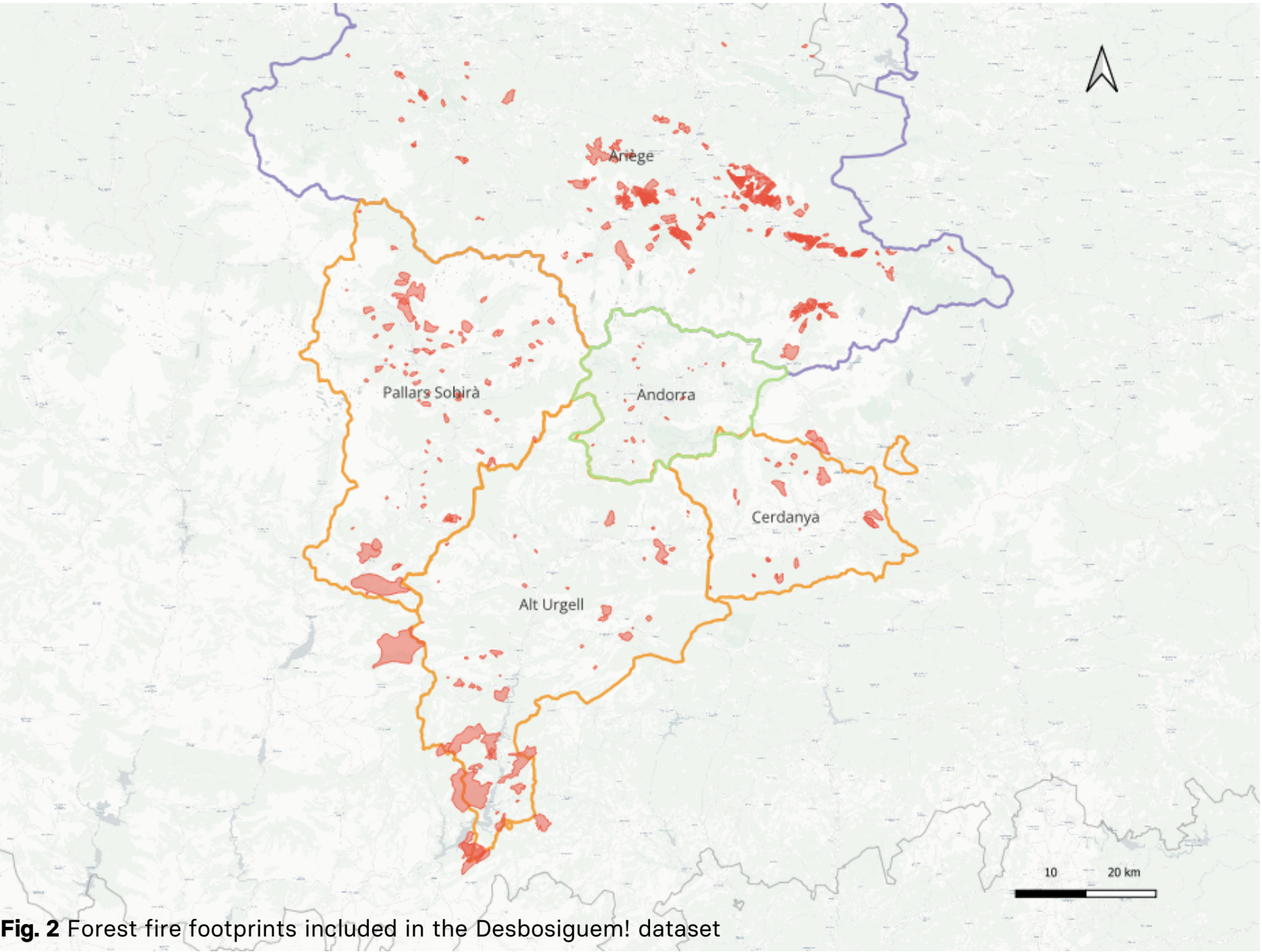


Fig. 2 Forest fire footprints included in the Desbosiguem! dataset

The cumulative probability distributions of fire sizes for the considered regions suggest similar statistical signatures for Ariège, Cerdanya and Pallars Sobirà (see Fig. 3).

The different behaviour of the probability distribution in Andorra is due to its limited data, while the difference in Alt Urgell could be caused by factors such as climate, latitude and orography. In fact, Alt Urgell has the highest probability of fire exceeding 100 hectares.

Curiously, Ariège has the highest probability for fire sizes between 10 and 100 hectares. This could be an effect of prescribed fires, but this needs to be clarified.

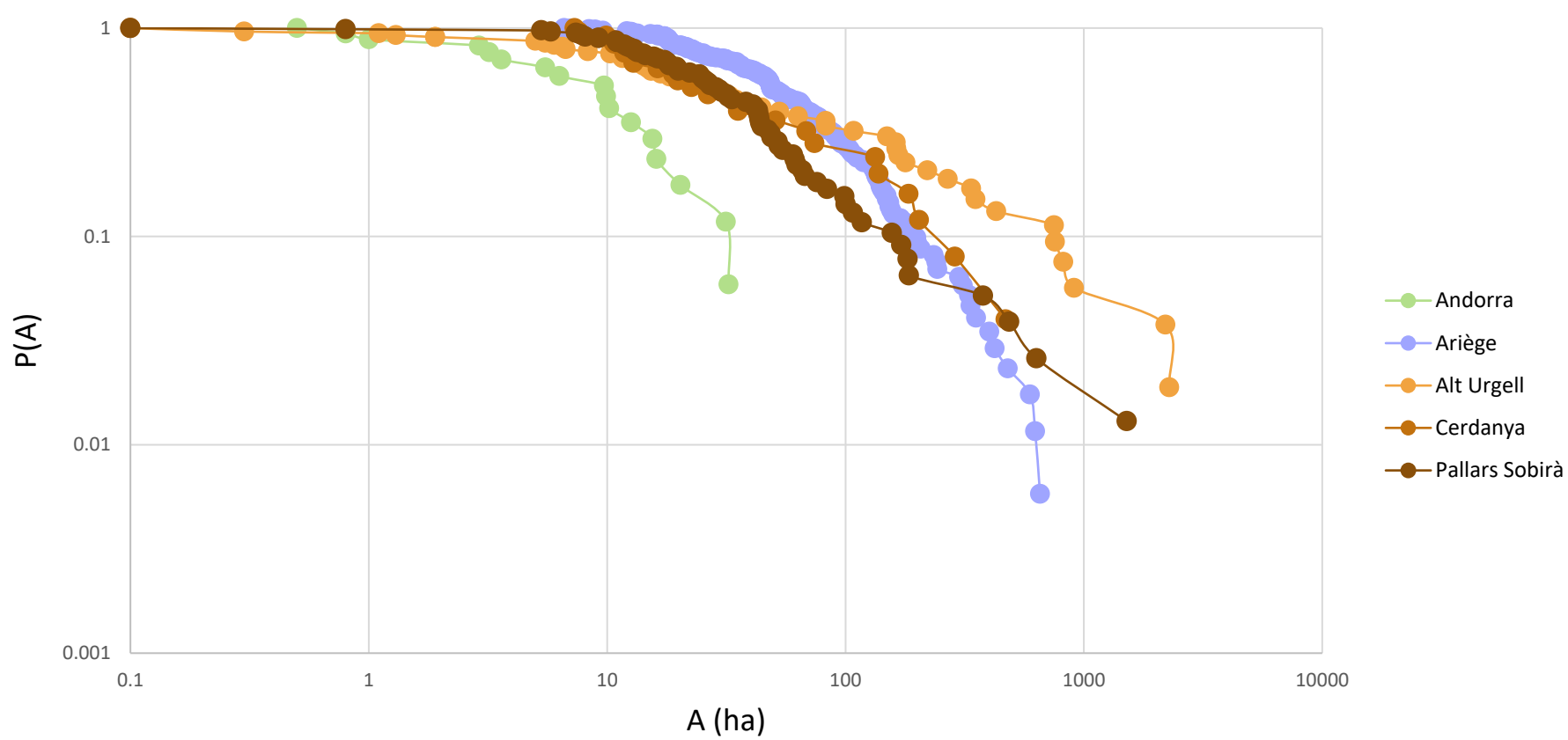


Fig. 3 Cumulative probability distributions of fire sizes

The possibility to compare the statistical signatures of fire size distributions in different regions within the same geophysical space opens up the possibility of developing similar transboundary strategies for managing the landscape and climate change adaptation.

4. Conclusions and next steps

The changing behaviour of fires in recent years, due to global change, highlights the importance of developing tools to adapt to new areas that were historically at low risk. This poster presents the first historical cross-border forest fire dataset in the high Catalan-Andorran-Occitan Pyrenees. This dataset includes 343 registered fire footprints between 1915 and 2025. It should be noted that the increased frequency of fires in recent years is, at least in part, due to greater capacity and resources for identifying and measuring footprints in the field. The Desbosiguem! dataset is a key resource for implementing modelling tools in this field of study, particularly for calibration and validation processes.

This poster presents preliminary data and results. Prior to final publication under an open license, the current dataset requires revision by the data providers to ensure accuracy and completeness (e.g. month and day fields) as well as incorporating ongoing work in Andorra. Further work will focus on including additional information in linkable tables, such as synoptic situations for the most significant forest fires. Implementing of the Desbosiguem! dataset, which incorporates data from three different administrations, highlights the importance of transboundary cooperation in facilitating common tools for the Pyrenees bioregion.