

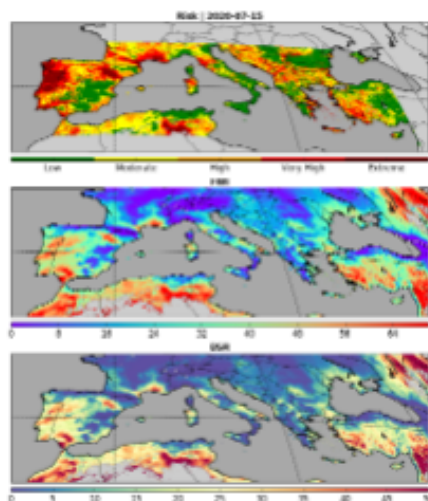
LSA SAF Products for Fire Forecast and Monitoring

Célia Gouveia
(IPMA LSA-SAF)

20 May 2022

Fire Danger Near Real Time Monitoring in the Mediterranean region

Fire Risk Map version 2 (FRMv2, LSA-504.2)



Product Available since Jan 2017

GET DATA HERE

Rural fires are common events in ecosystems characterized by oscillations between rainy and drought periods, which inevitably lead to high levels of vegetation stress and to the accumulation of fuels during the dry phase. This is particularly true in Mediterranean region, where rainy and mild winters are followed by warm and dry summers. Meteorological factors play a crucial role in the setting and spreading of wildfire and are an important factor in the resulting fire severity. Fire risk indices may be based on single or combined use of meteorological observations, weather forecast model outputs and remote sensing estimations. The latter are particularly useful to identify pre-fire indicators (e.g. signals of vegetation stress), which merged with meteorological parameters may lead to the formulation of indicators of fire risk.

Product Documentation

This operational product is documented in the following documents:

- [Product User Manual \(PUM\)](#)
- [Product Output Format \(POF\)](#)
- [Validation Report \(VR\)](#)
- [Algorithm Theoretical Basis Document \(ATBD\)](#)
- [Algorithm Changes Record](#)

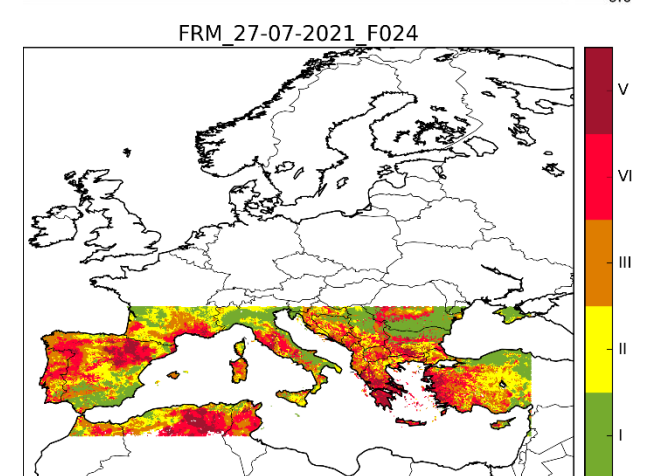
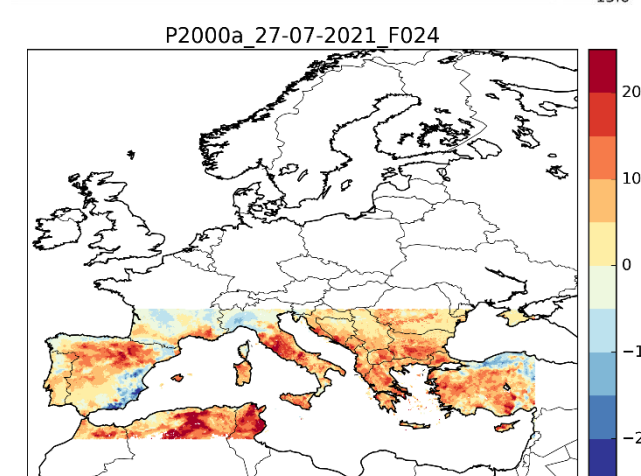
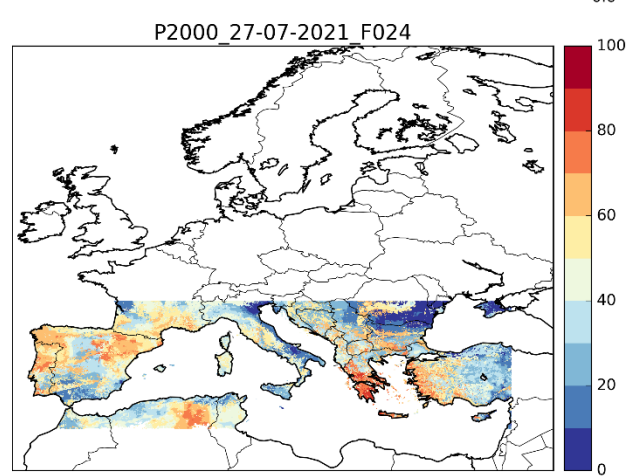
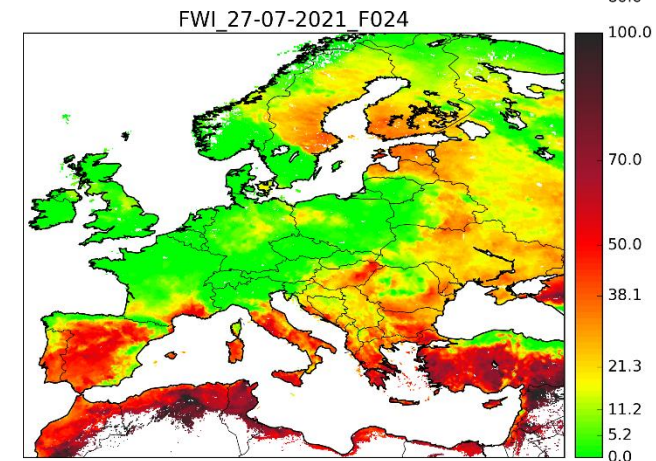
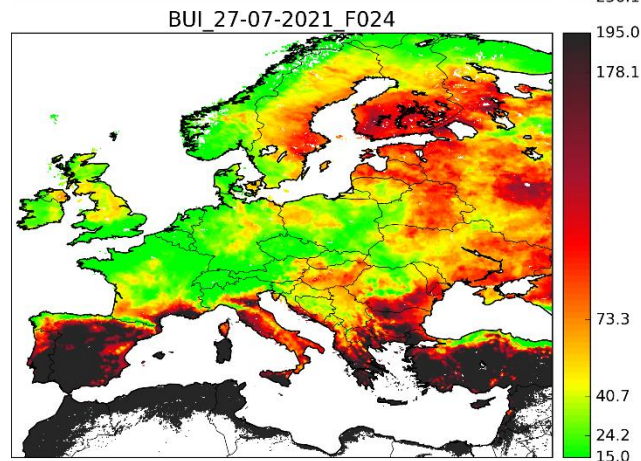
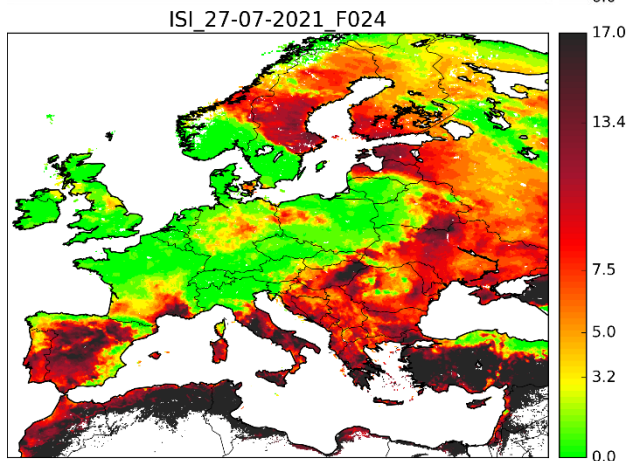
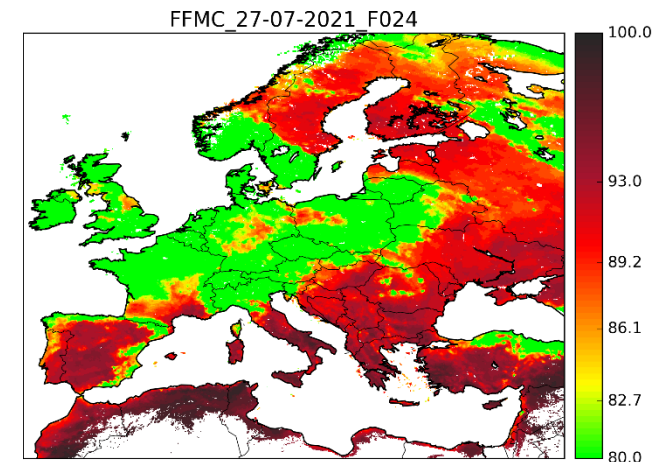
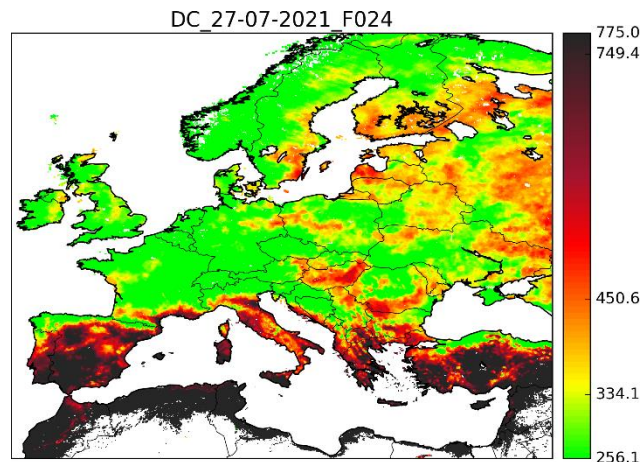
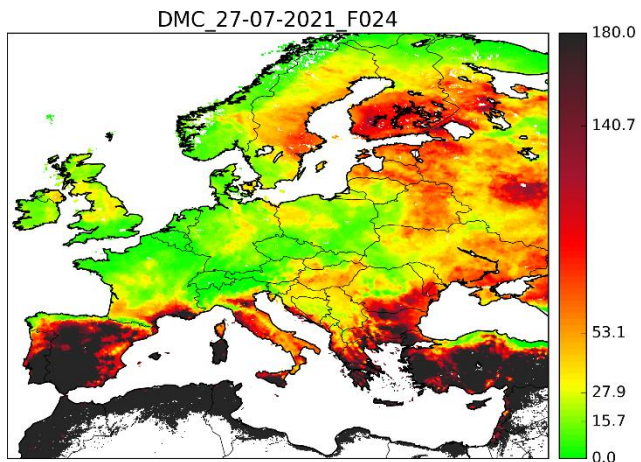
Please see Product Peer-Review publications in References.

Acknowledgements

Example of Product

Product Description

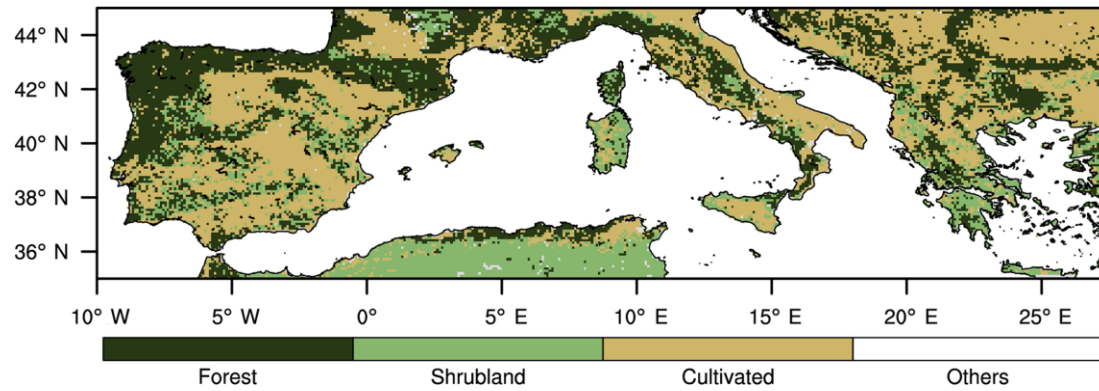
References



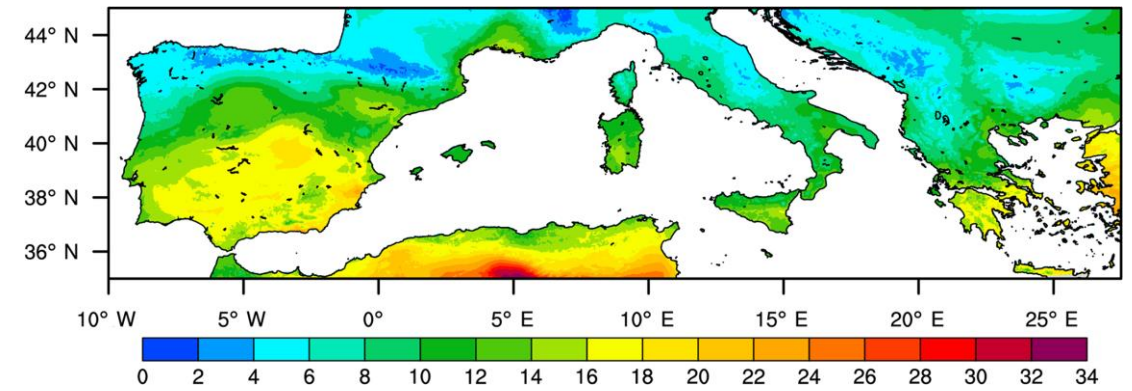
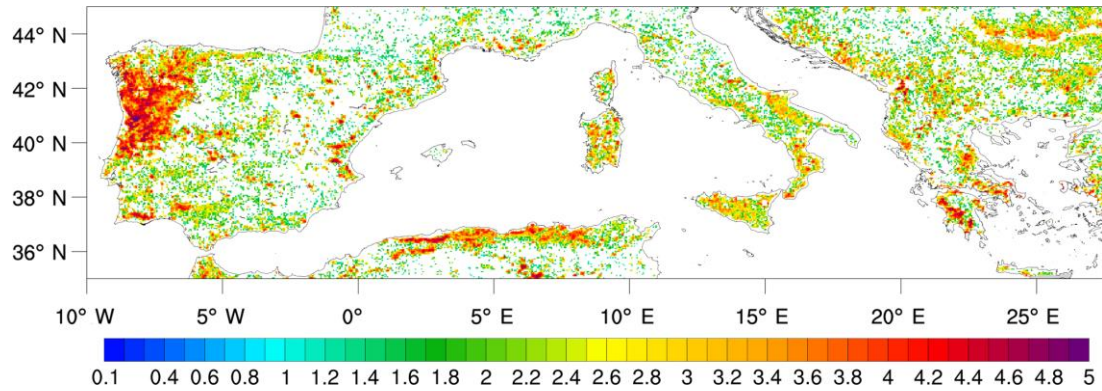
FRM v2 Layers

FWI computed using ECMWF data downscaling to MSG grid

1. Static probability of exceedance for the threshold of 2000 GJ.

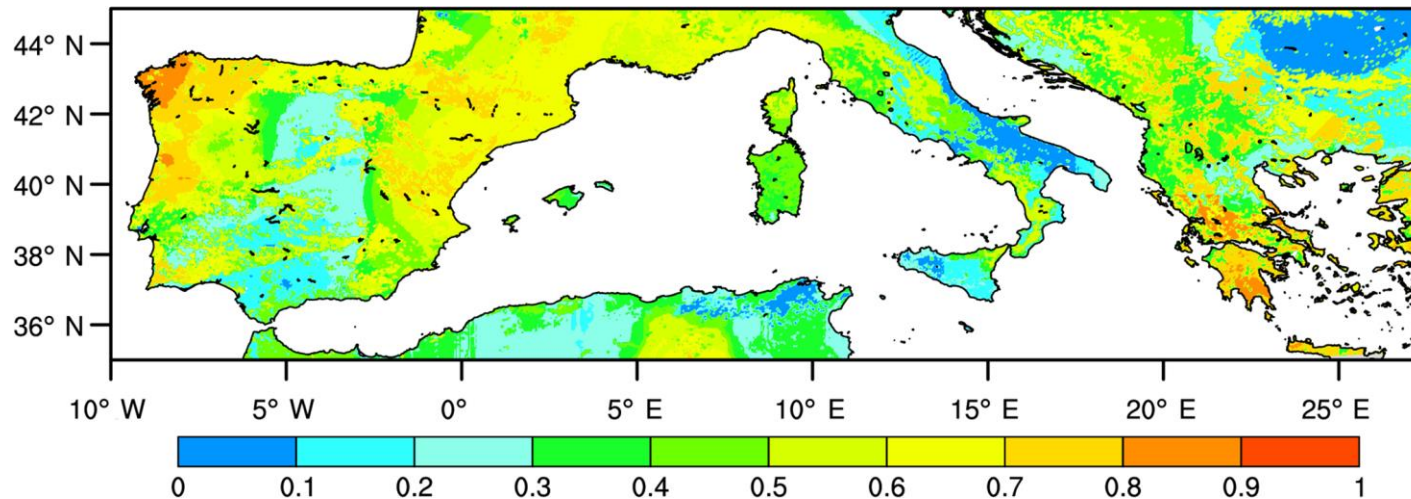


Types of vegetation cover/land use as derived from the GLC2000 database.



Total energy released by fire during the calibration period (2004–2016).

FWI average over the 1979–2016 period.



Static probability of exceedance for the threshold of 2000 GJ.

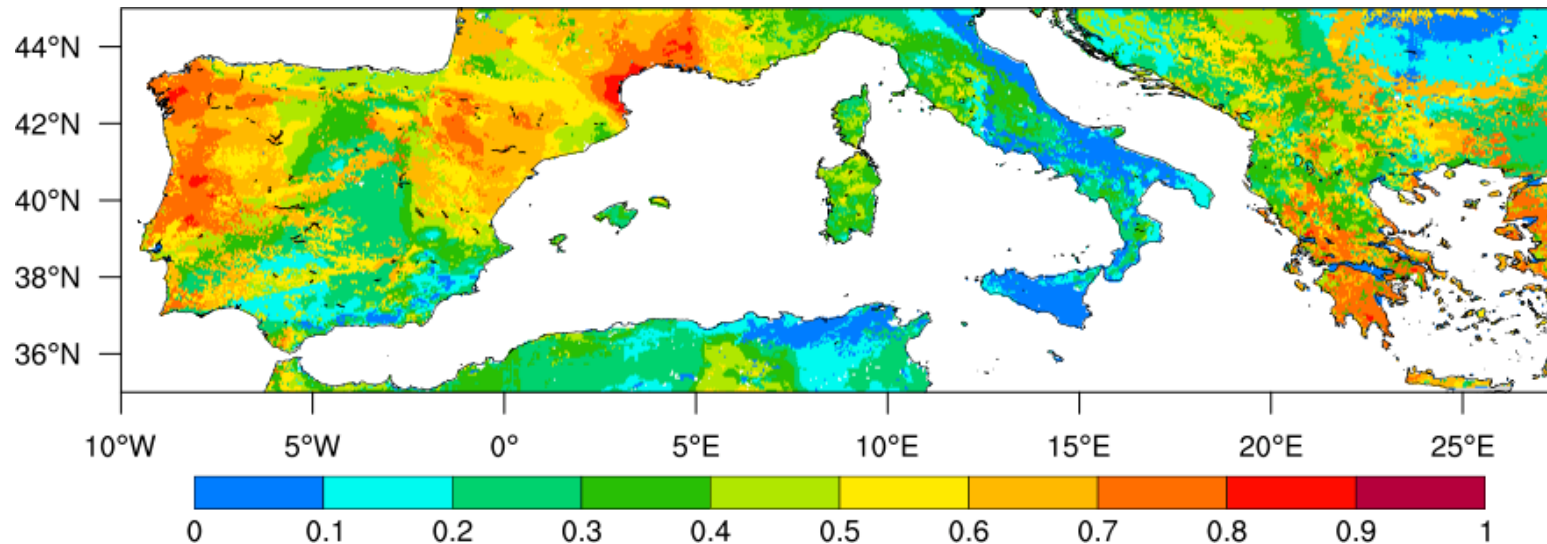
LSA-SAF (MSG Products)

Fire Risk Map (FRM)

Probability of exceedance 2000 GJ/day

Product derived using:

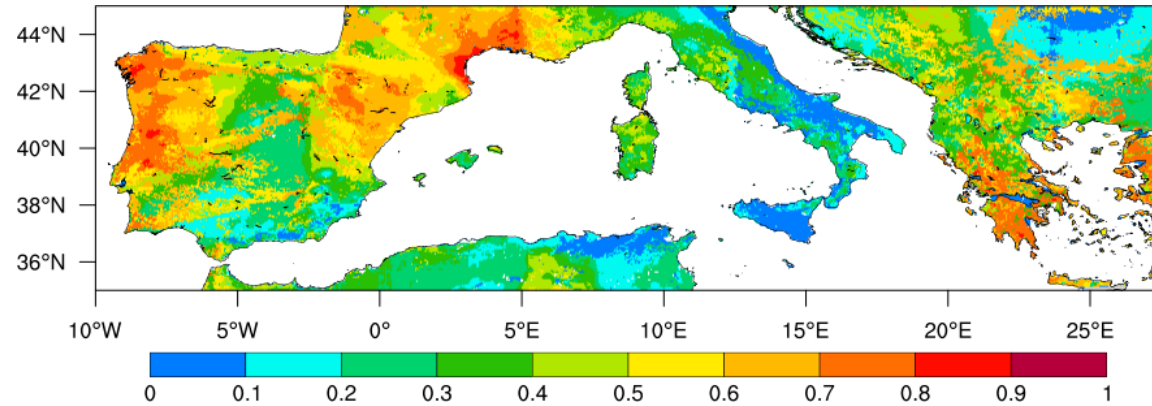
- FWI computed using ECMWF data
- Historical analysis based on FRP (2004-2018)
- Main land cover types



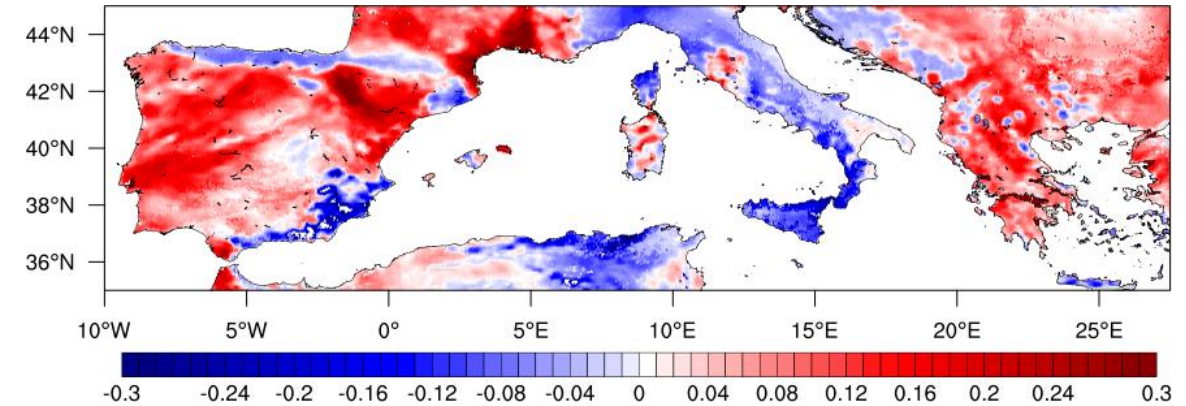
FRM v2 (5 classes; better fitting)

FRP statistics for different land cover types
FWI computed using ECMWF data downscaling to MSG grid

Probability of exceedance 2000 GJ/day

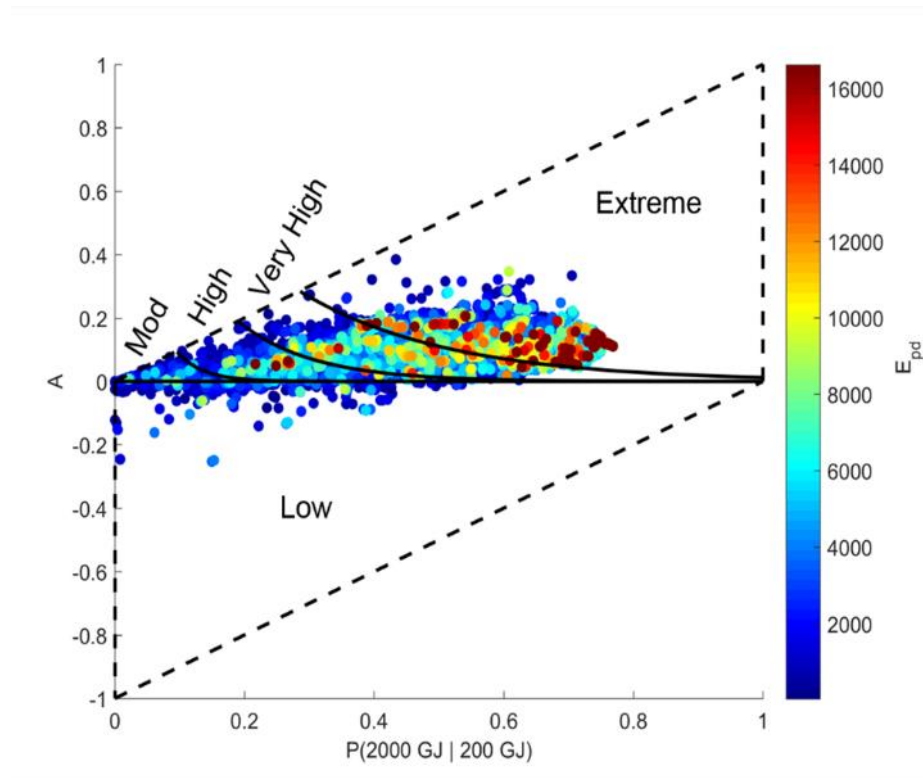


Anomalies of Probability

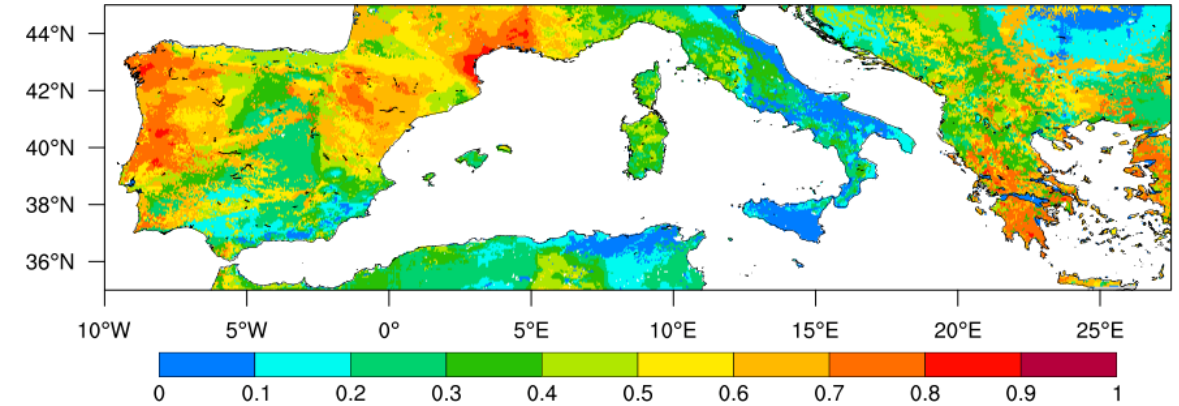


LSA-SAF (MSG Products)

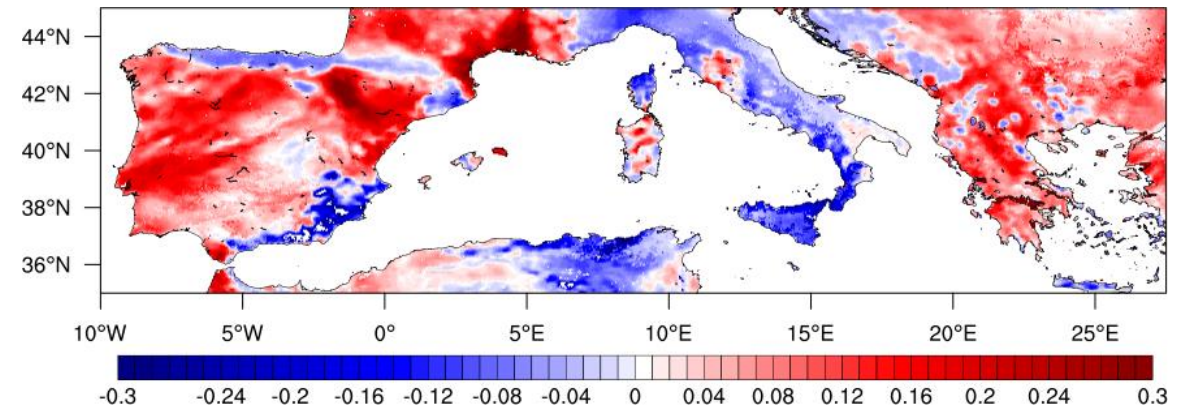
Fire Risk Map (FRM)



Pinto et al., 2018



Probability of exceedance 2000 GJ/day



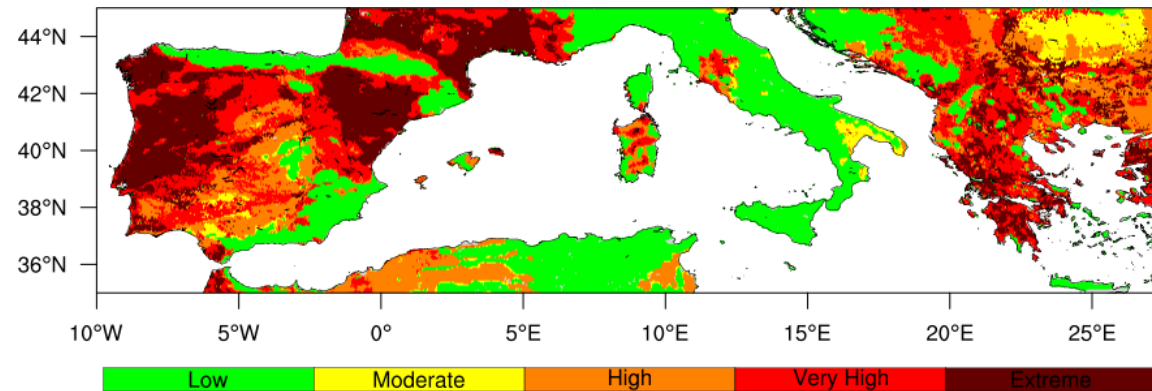
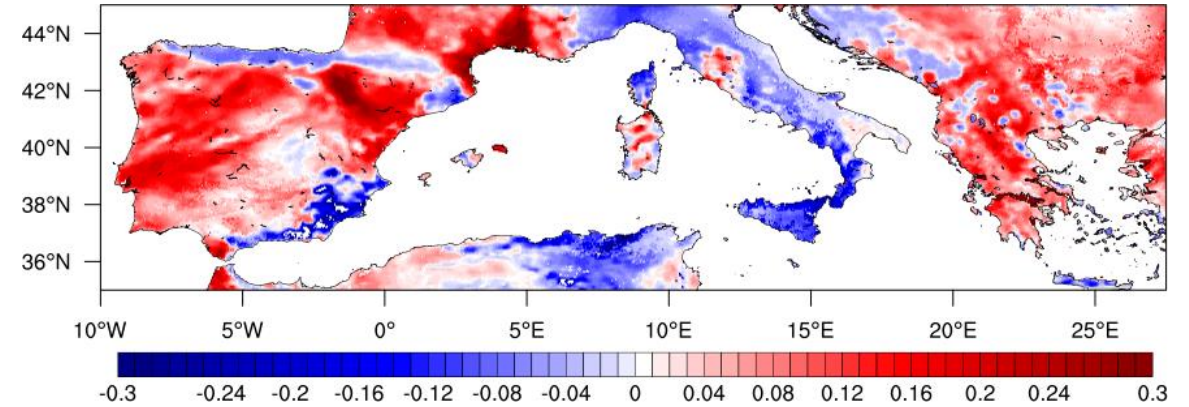
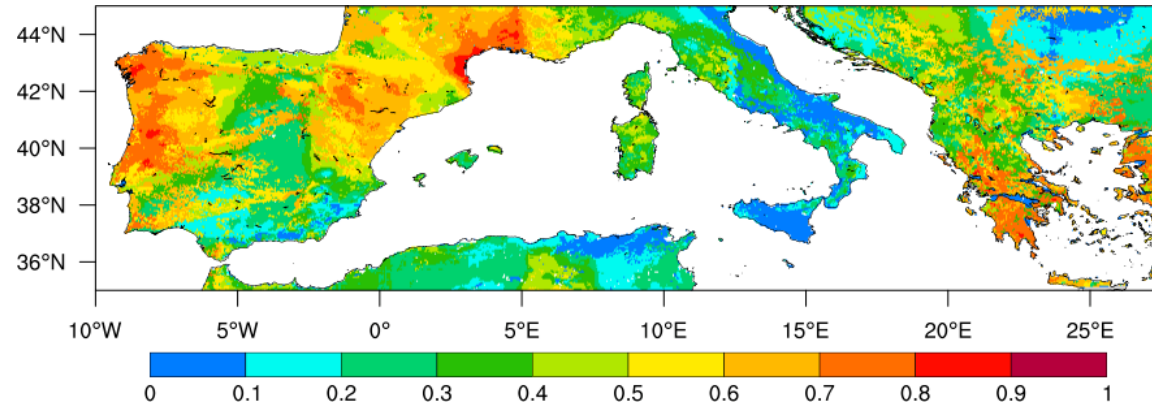
Anomalies of Probability

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FRP statistics for different land cover types
FWI computed using ECMWF data downscaling to MSG grid

Probability of exceedance 2000 GJ/day

Anomalies of Probability

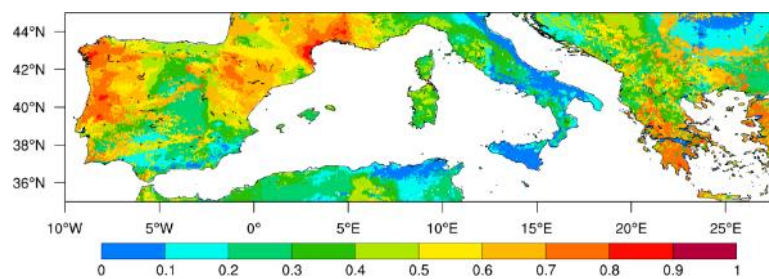
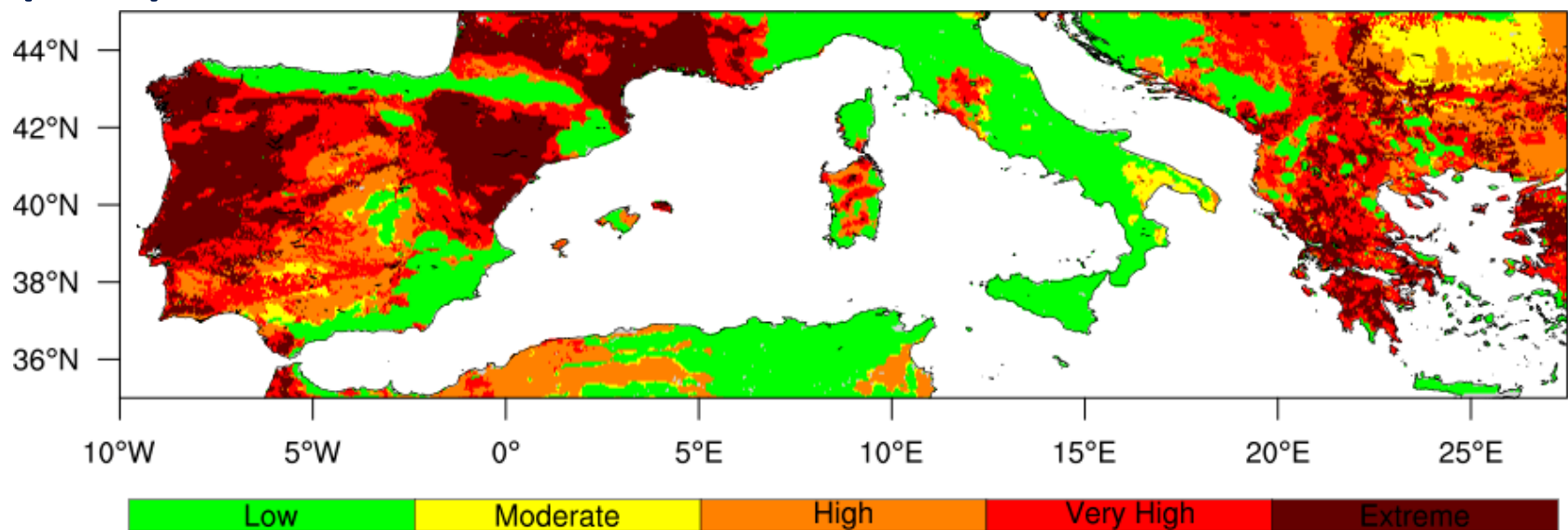


LSA-SAF (MSG Products)

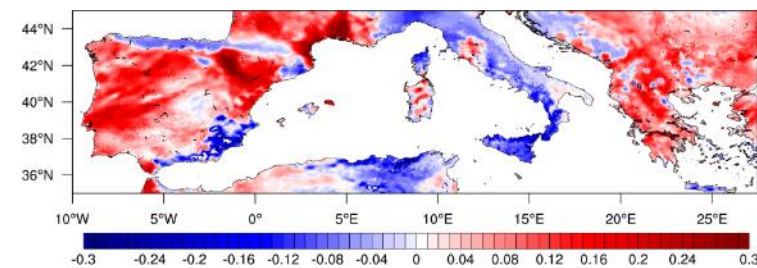
Mediterranean Europe

5 days of forecast risk

Fire Risk Map (FRM)



Probability of exceedance 2000 GJ/day



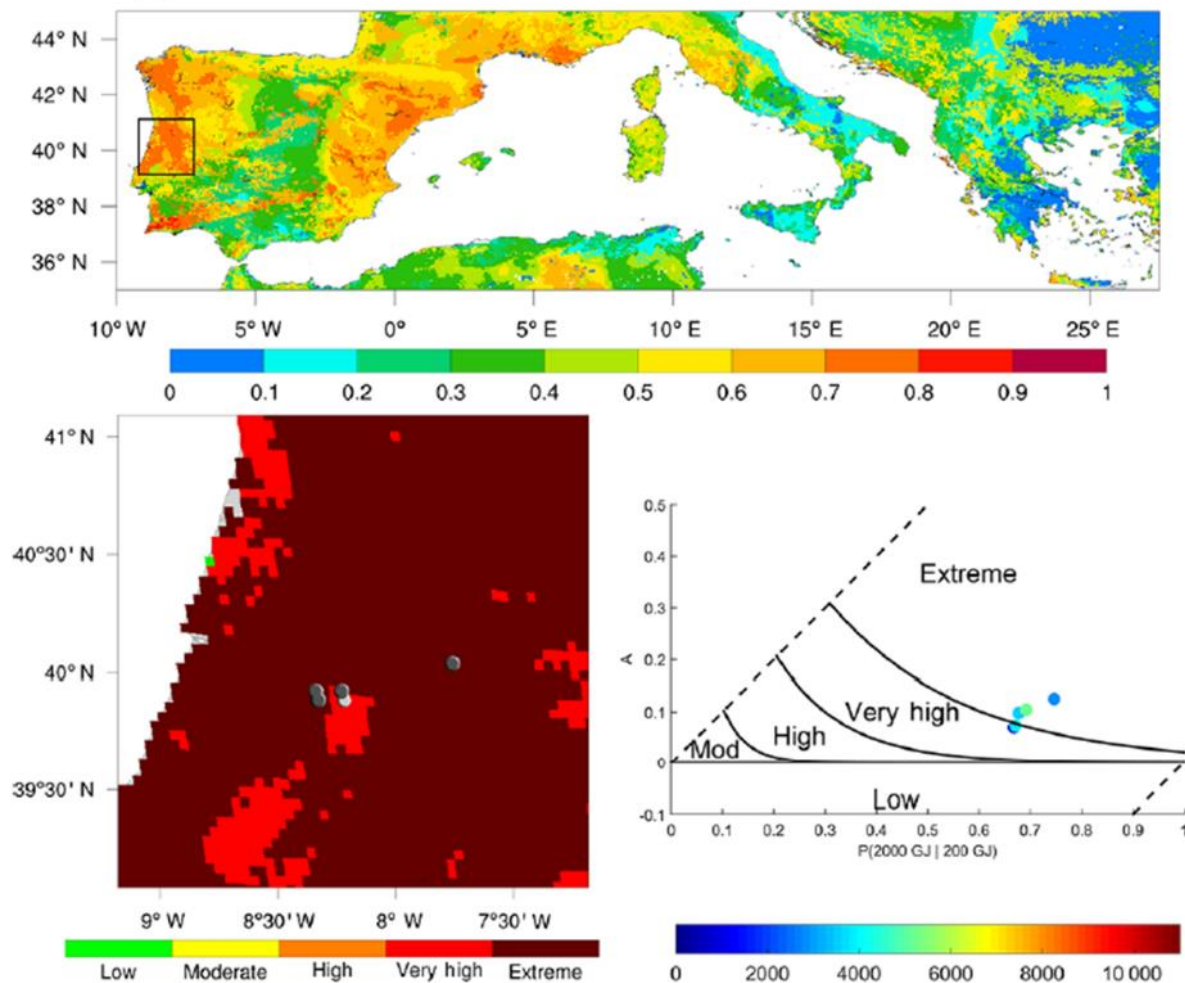
Anomalies of Probability

LSA-SAF (MSG Products)

Fire Risk Map (FRM)

Applications: Pedrogão Fire (Portugal)
18th June 2017

High Probability of exceedance and low anomalies of probability

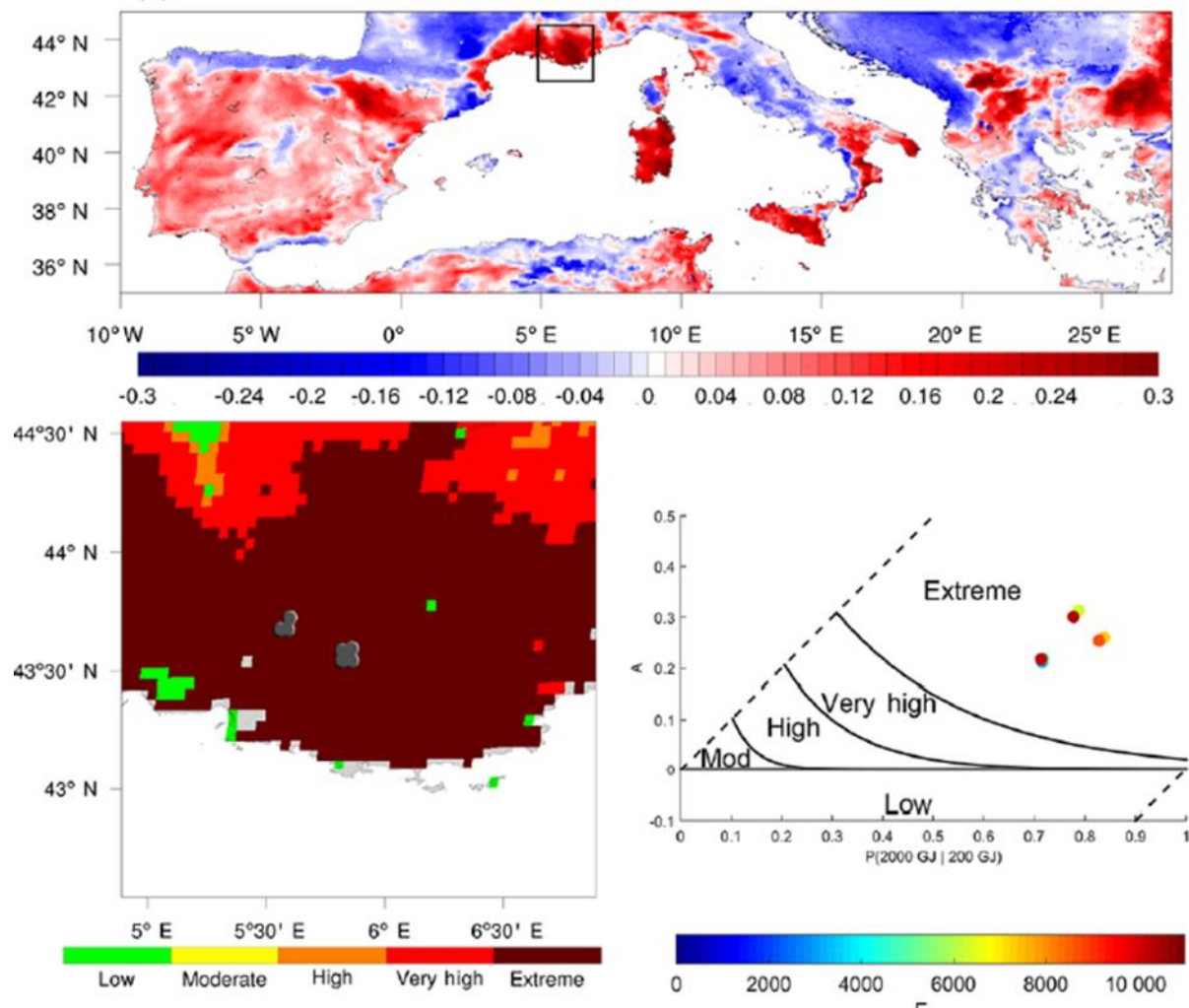


LSA-SAF (MSG Products)

Fire Risk Map (FRM)

Applications: Marseilha Fire (France)
25th June 2017

High anomalies of probability and high probability of exceedance and low



Validation FRM v1

Table 1. Distributions during the calibration period (2004–2016) of fire events among classes of fire danger for three ranges of daily energy released by fires when classes are obtained from the daily model, the LSA SAF product and the EFFIS module. Each cell contains the number of observed events and [in brackets] the corresponding fraction (%) of the total number of events belonging to the same energy layer.

	Energy [GJ]	Low	Moderate	High	Very high	Extreme	Total
Daily model	< 2000	984 [12]	732 [9]	2146 [26]	2723 [33]	1652 [20]	8237 [100]
	2000–10 000	272 [4]	58 [1]	685 [11]	2367 [38]	2893 [46]	6275 [100]
	> 10 000	13 [1]	1 [0]	10 [1]	318 [26]	898 [72]	1240 [100]
LSA-SAF	< 2000	180 [2]	589 [7]	3319 [40]	2950 [36]	1199 [15]	8237 [100]
	2000–10 000	37 [1]	225 [4]	1790 [28]	2837 [45]	1386 [22]	6275 [100]
	> 10 000	0 [0]	14 [1]	172 [14]	573 [46]	481 [39]	1240 [100]
EFFIS	< 2000	135 [2]	418 [5]	2855 [35]	2816 [34]	2013 [24]	8237 [100]
	2000–10 000	66 [1]	210 [3]	2048 [33]	2091 [33]	1860 [30]	6275 [100]
	> 10 000	6 [1]	23 [2]	335 [27]	365 [29]	511 [41]	1240 [100]

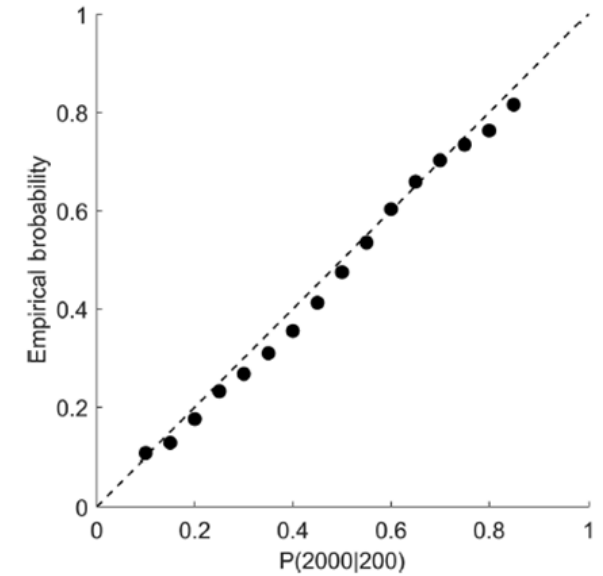
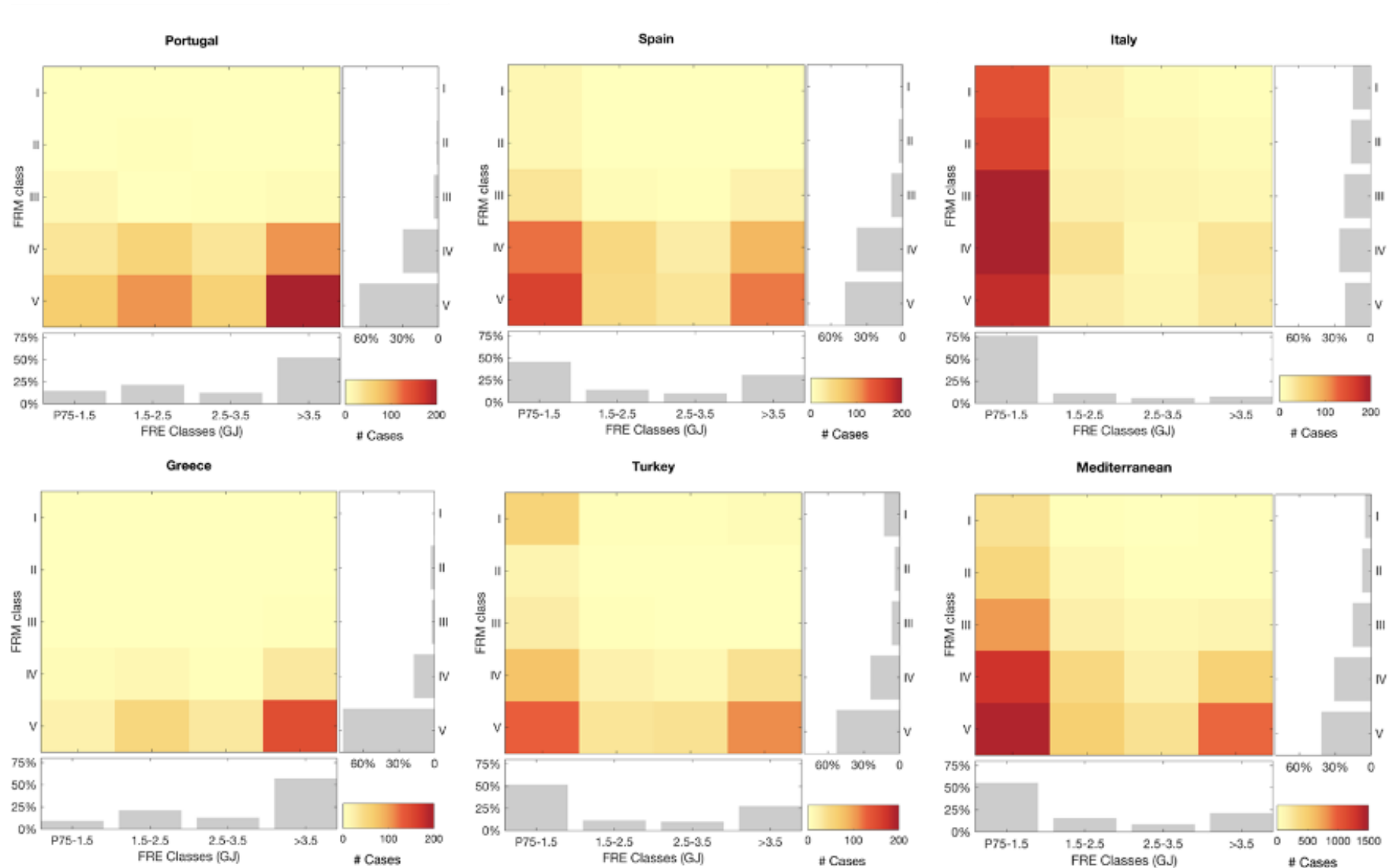


Figure 12. Empirical values of probability computed from observations of fire events as a function of $P(2000|200)$ derived from the daily model during the calibration period (2004–2016).

Pinto et al., 2018

Validation FRM v2

FRM 2017-2021
FRP 2017-2021
Mediterranean



Oleiros, July 2020

Duration: 25th to 29th of July, 2020

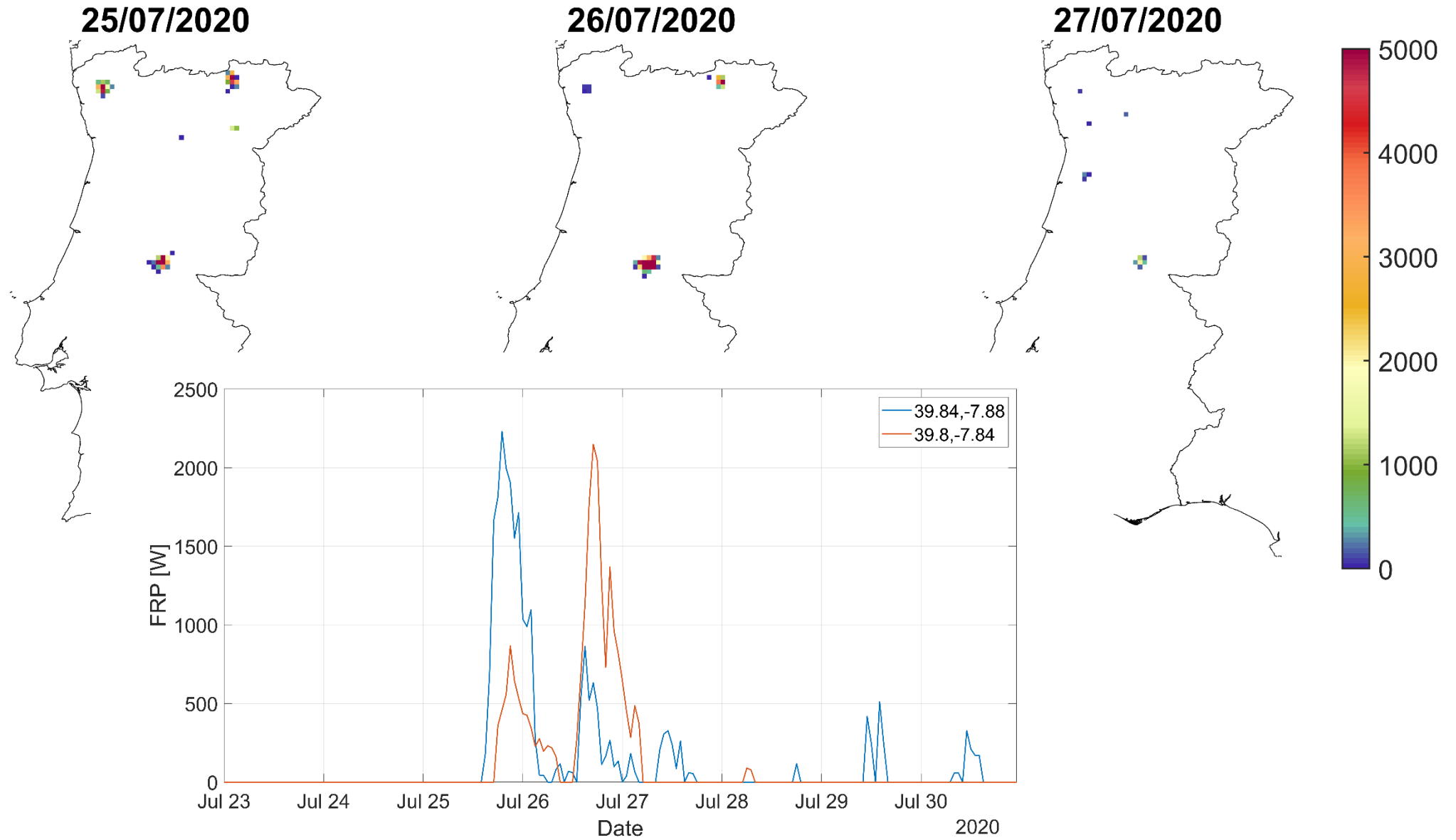
Burnt area: > 6000 ha (ICNF)

Casualties : 1

Activation of Copernicus Emergency Management Service

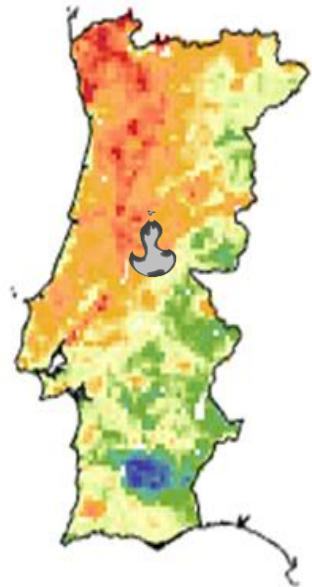


Fire Event: July 2020

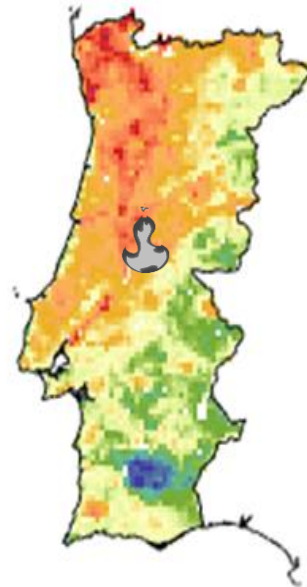


Fraction Vegetation Cover (FVC)

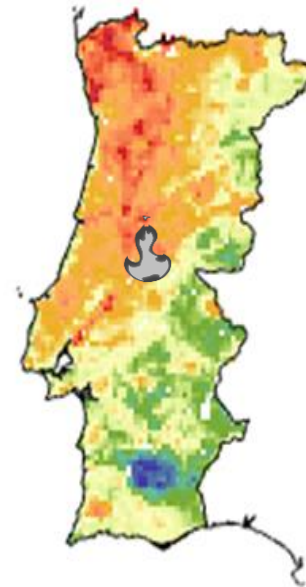
23/07/2020



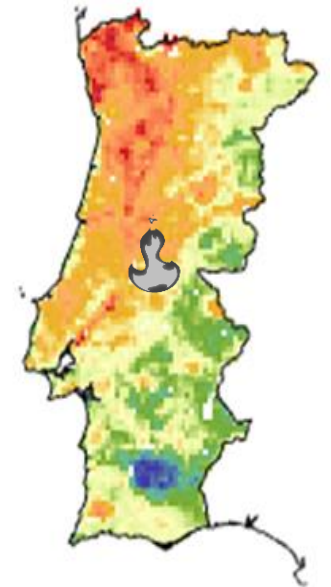
24/07/2020



25/07/2020



26/07/2020



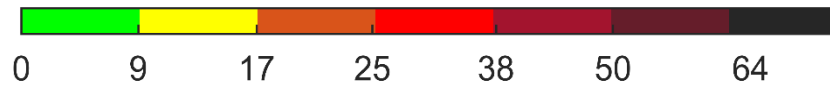
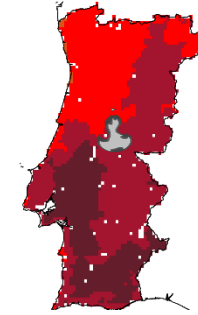
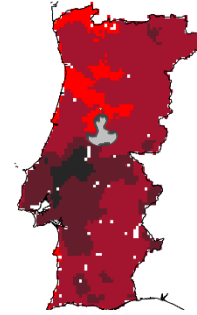
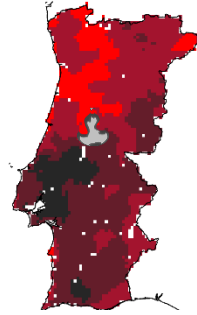
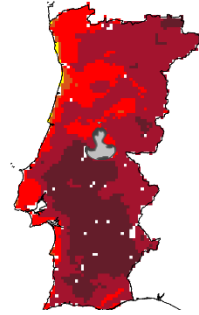
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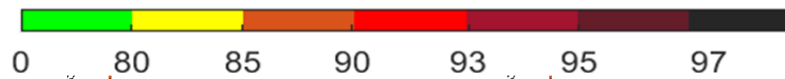
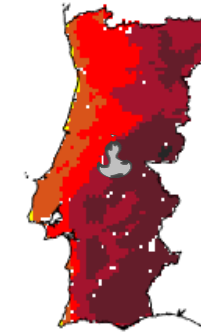
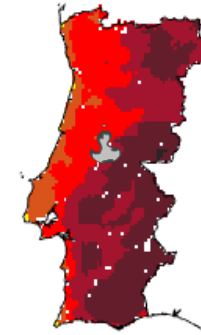
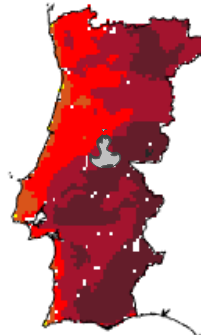
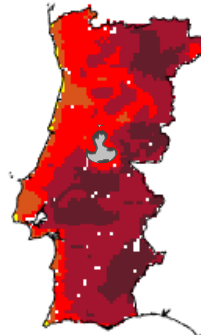
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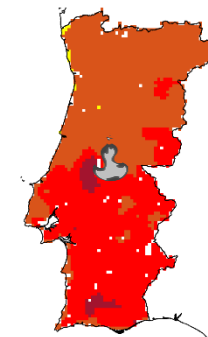
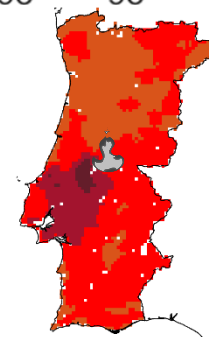
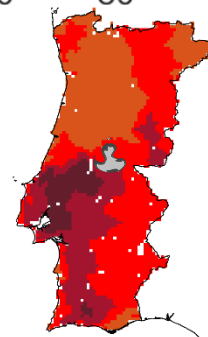
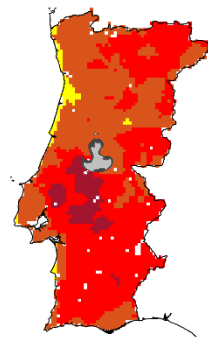
FWI



FFMC



ISI



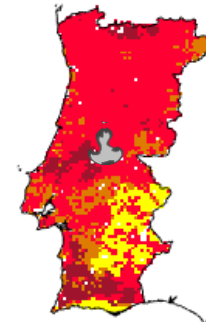
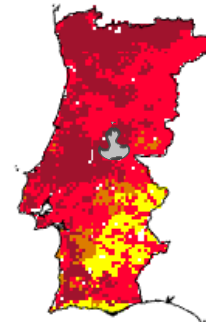
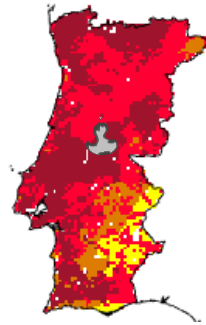
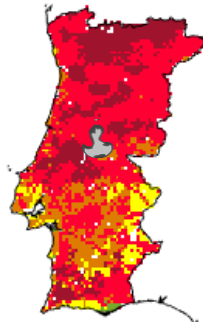
FRM

23/07/2020

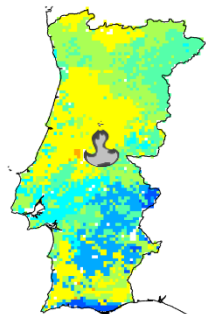
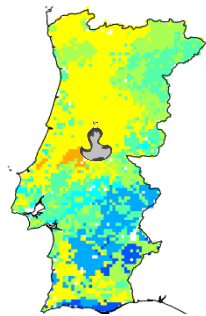
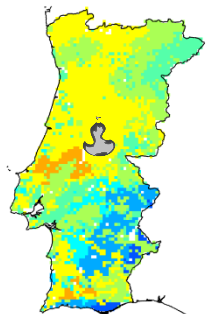
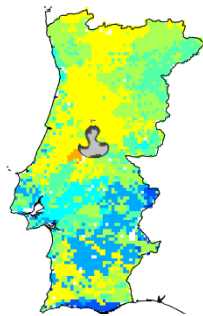
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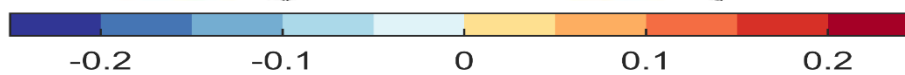
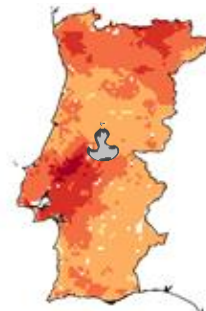
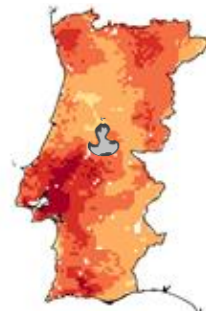
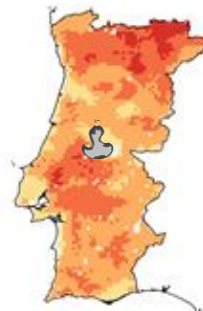
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Probability



Anomaly



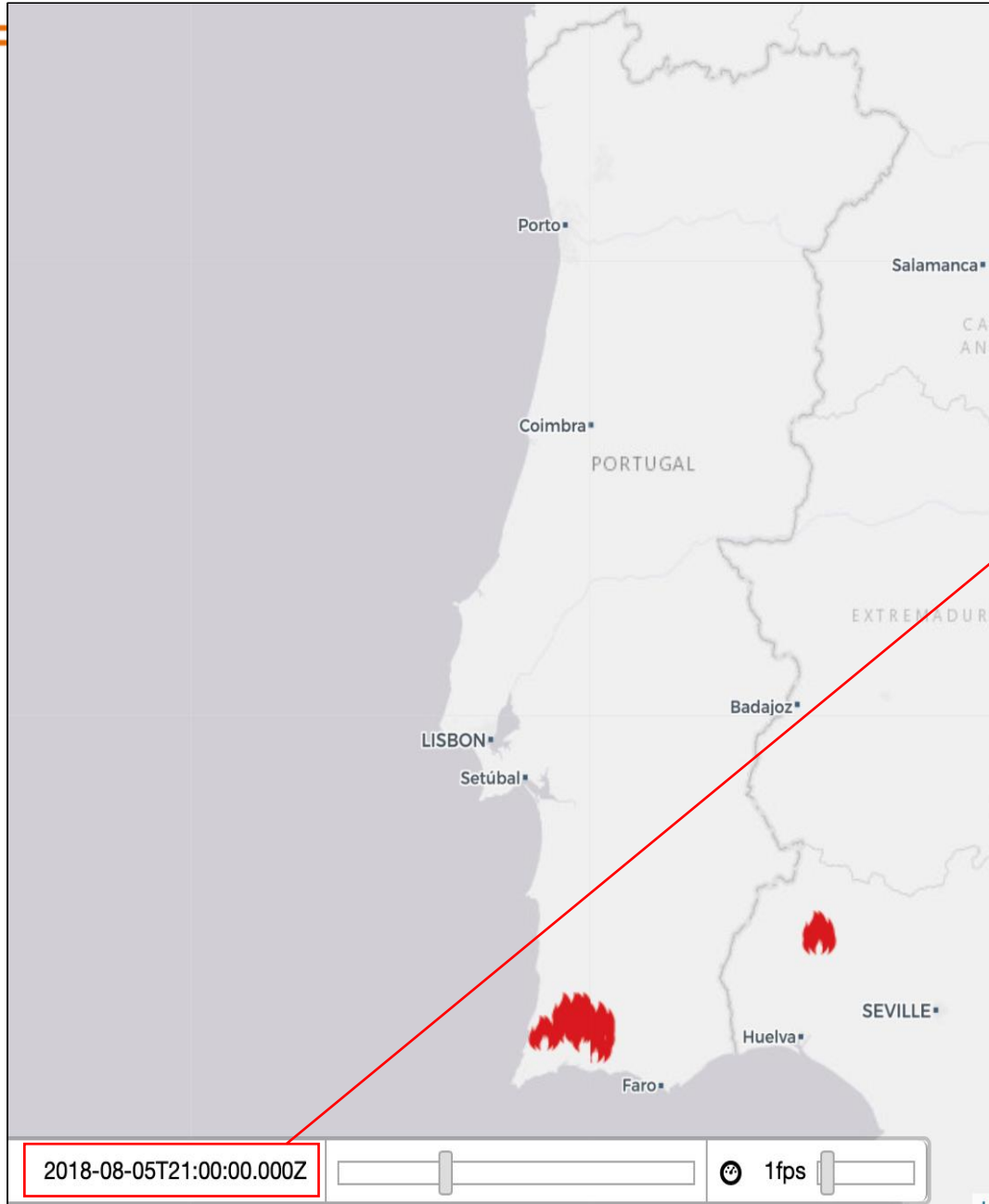
Monchique, August 2018

Duration: 3rd to 10th of August, 2018

Burnt area: ~ 27000 ha (ICNF)

No casualties





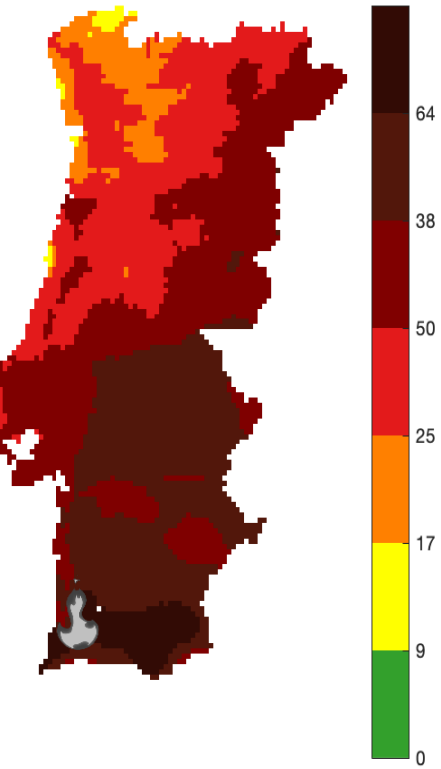
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2018-08-05T21:00:00.000Z

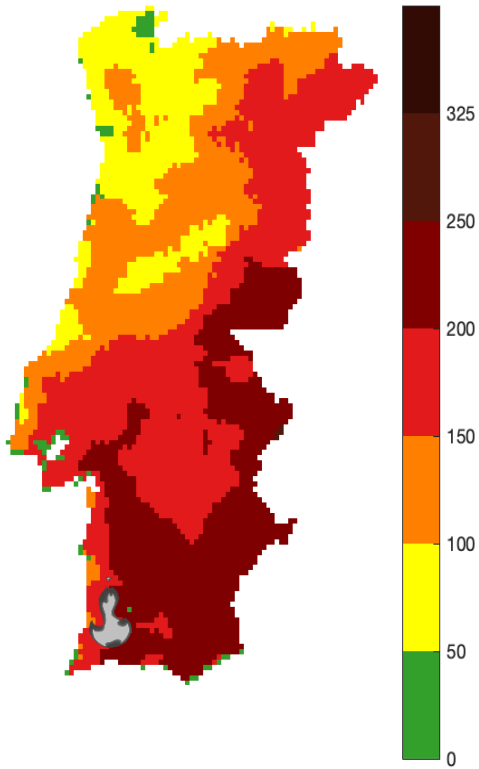
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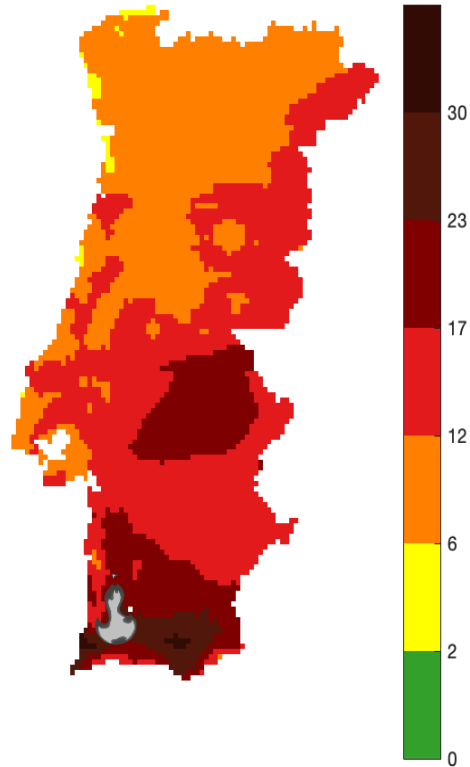
FWI 201883



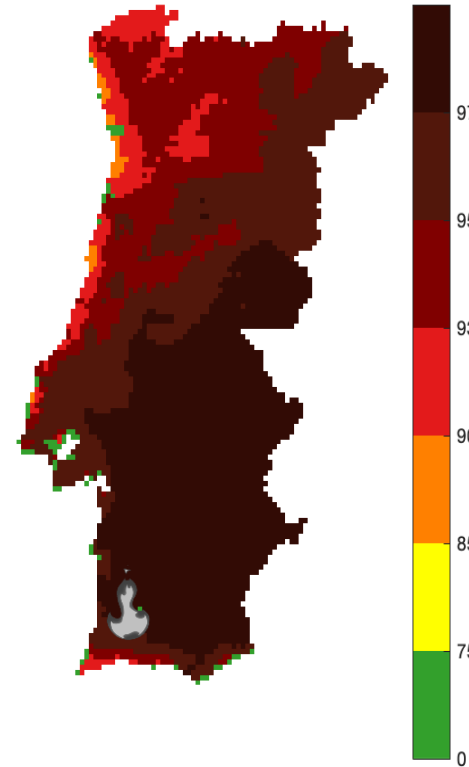
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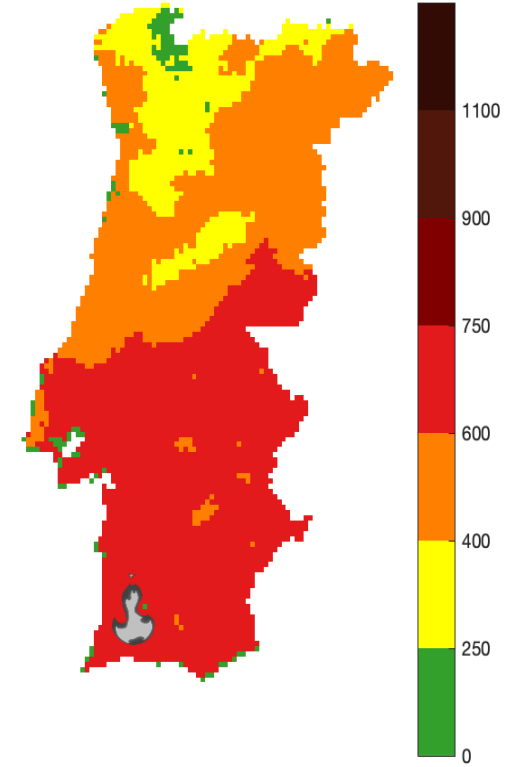
ISI 201883



FFMC 201883

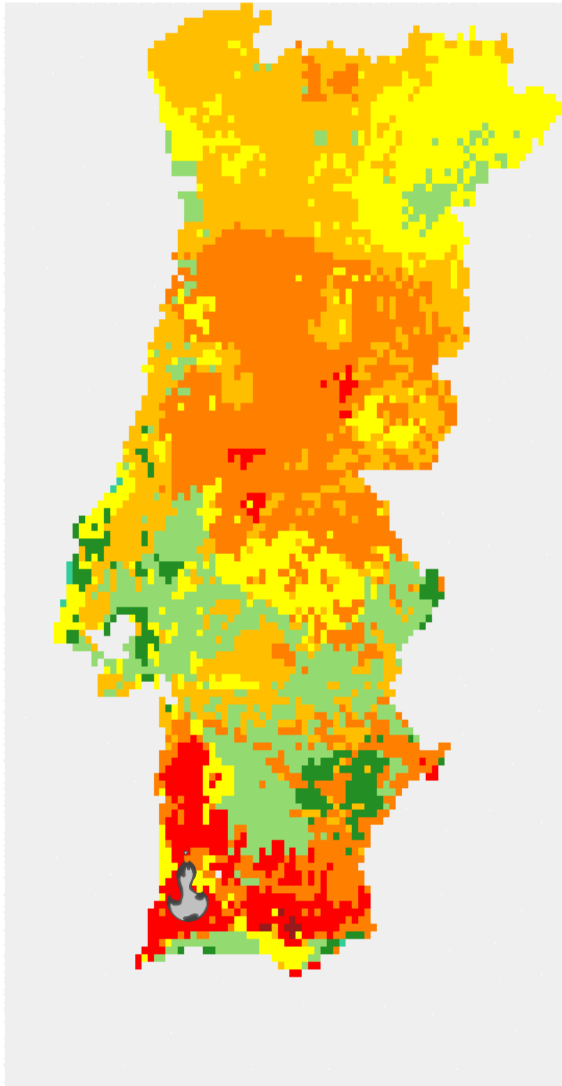


DC 201883

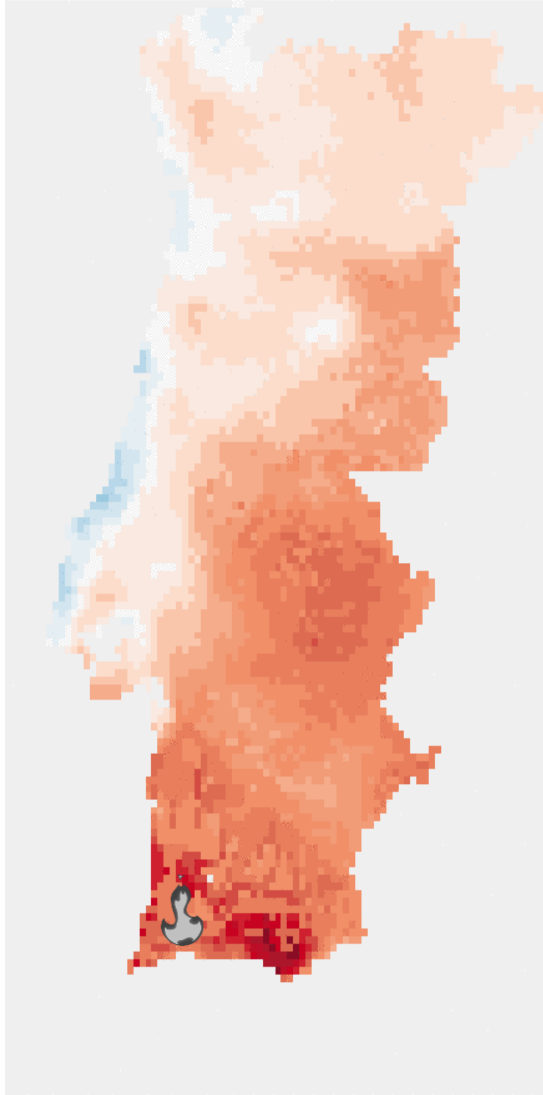


FRM - Mapa de Risco de Fogo

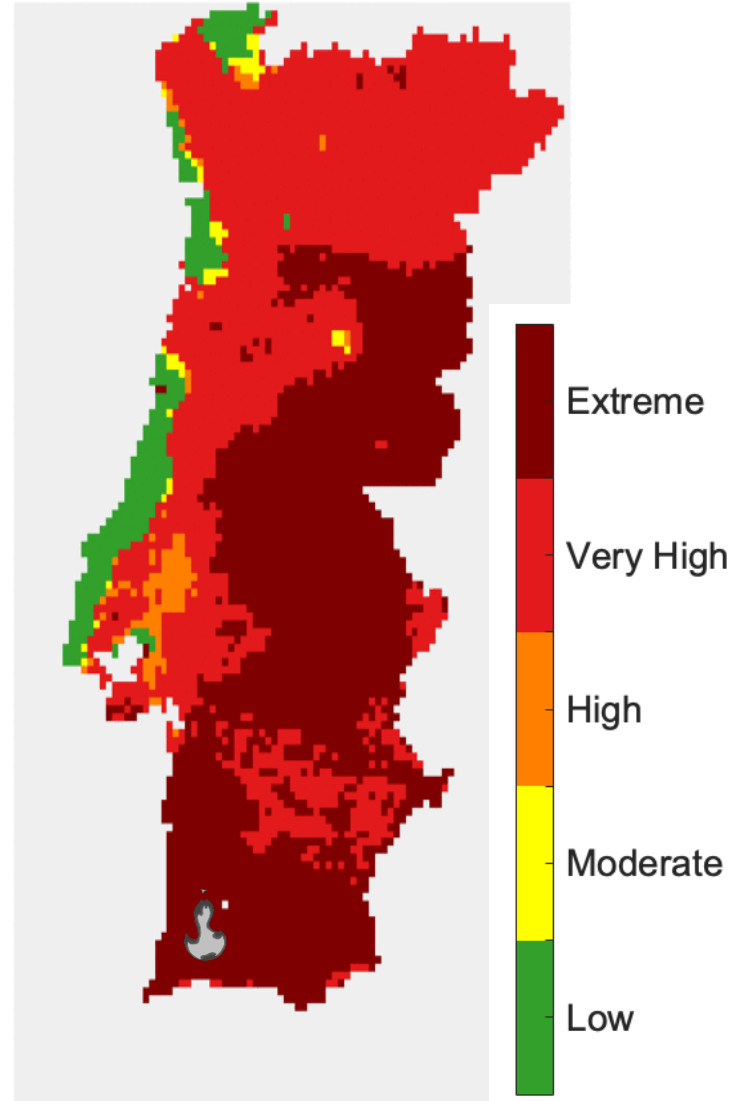
Probability 201882



Anomaly 201882



FRM 201882



Thank you for your attention!

Special thanks to:

Isabel Trigo

Carlos DaCamara

Rita Durão

Catarina Alonso

QUESTIONS?
celia.gouveia@ipma.pt