The role of meteorological factors on interannual variability of fire activity in Iberia: an assessment performed over four subregions

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Motivation

The Iberian Peninsula is recurrently affected by severe wildfires :

- because of increased fuel availability resulting both from land abandonment associated with a population shift from rural to urban areas, and from the expansion of forest and shrubland areas
- due to the effects of climate change that have been leading to an increase in the occurrence of prolonged droughts and in the number of days with extreme fire weather.

The fact that the entire Mediterranean basin, and the Iberian Peninsula in particular, is considered as a hotspot of climate change, calls for the need of paying particular attention to the role played by atmospheric conditions on wildfire activity.

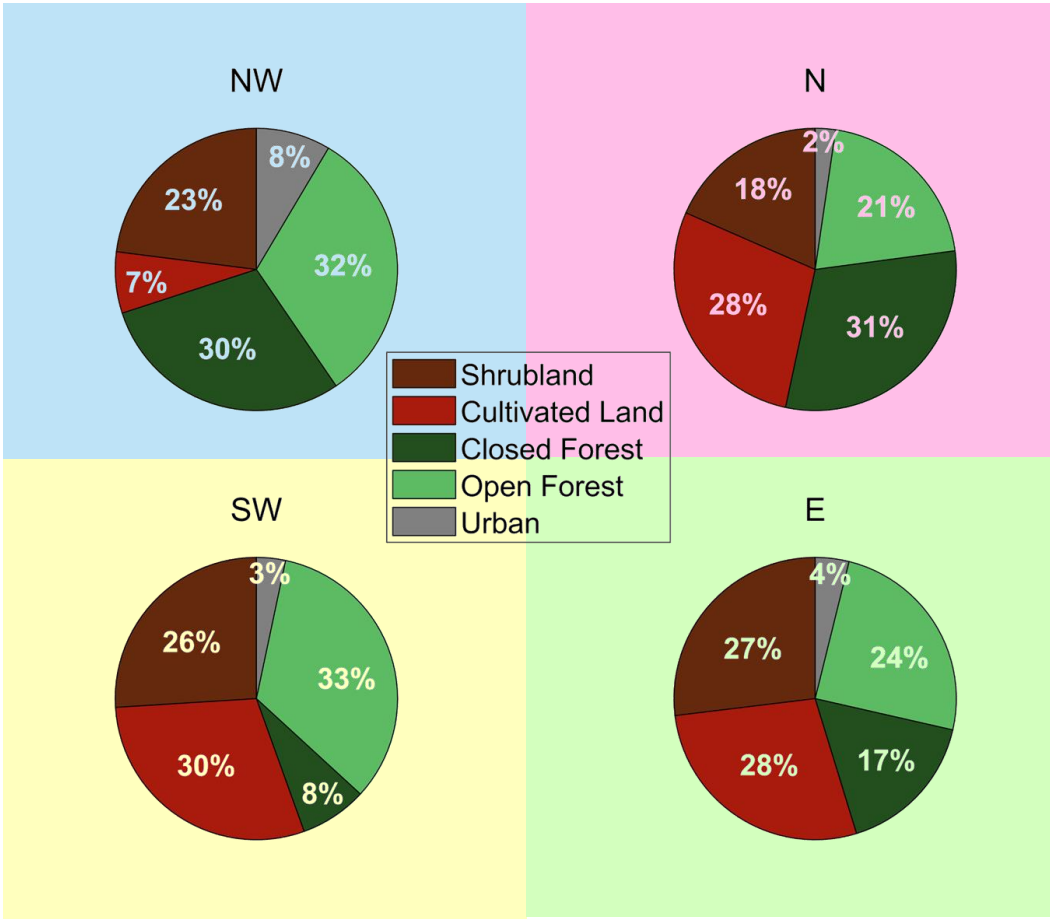
Aim

The aim of our work is twofold:

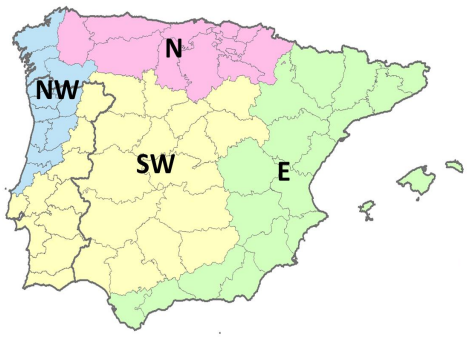
- to present a statistical model that is able to simulate the probability of occurrence of a fire event that releases a given amount of Fire Radiative Power, provided a specified level of meteorological fire danger as rated by the Fire Weather Index (FWI);

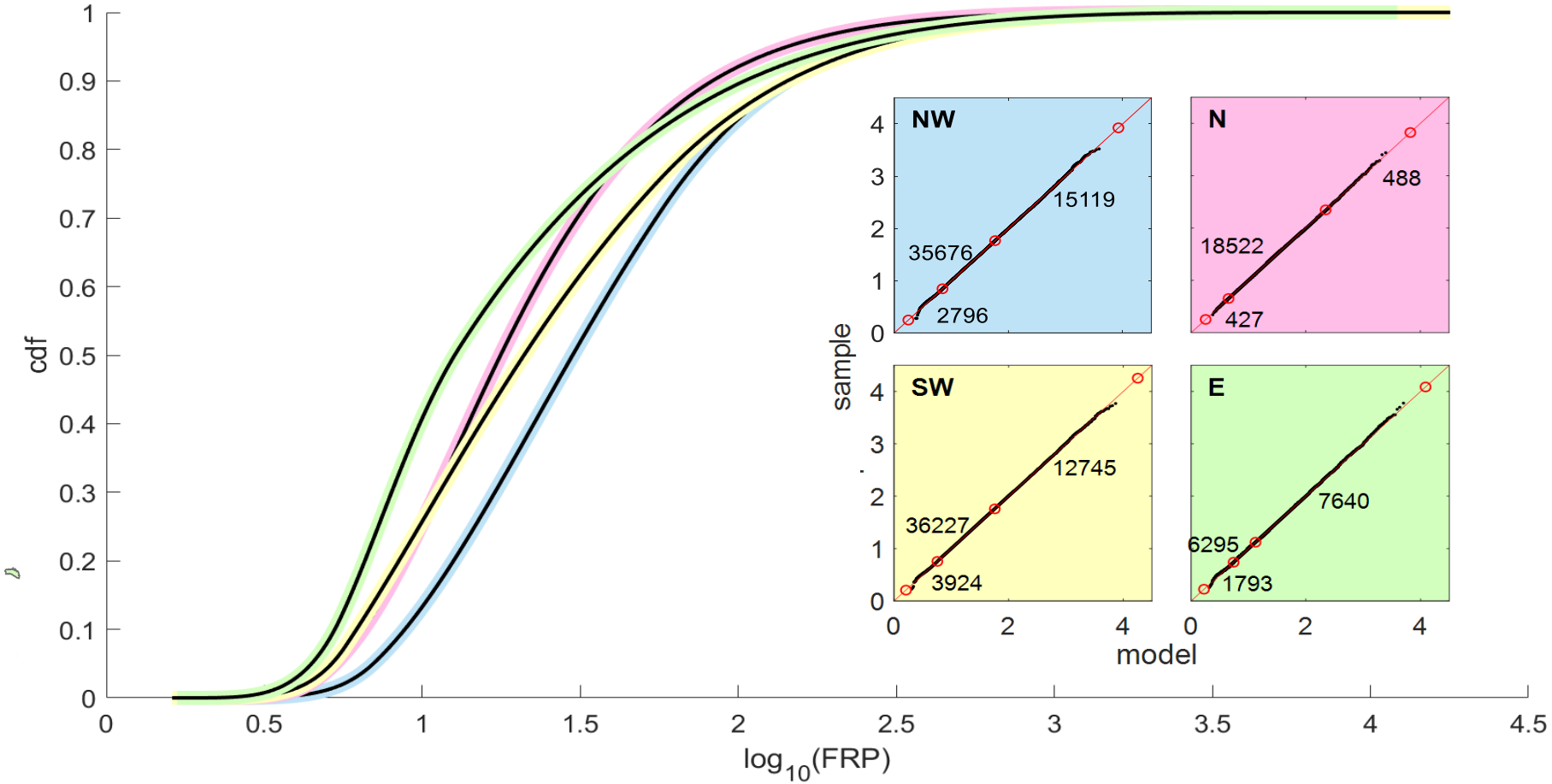
- to assess the impact of meteorological conditions on the interannual variability of fire activity in four pyroregions of the Iberian Peninsula.

The four pyroregions

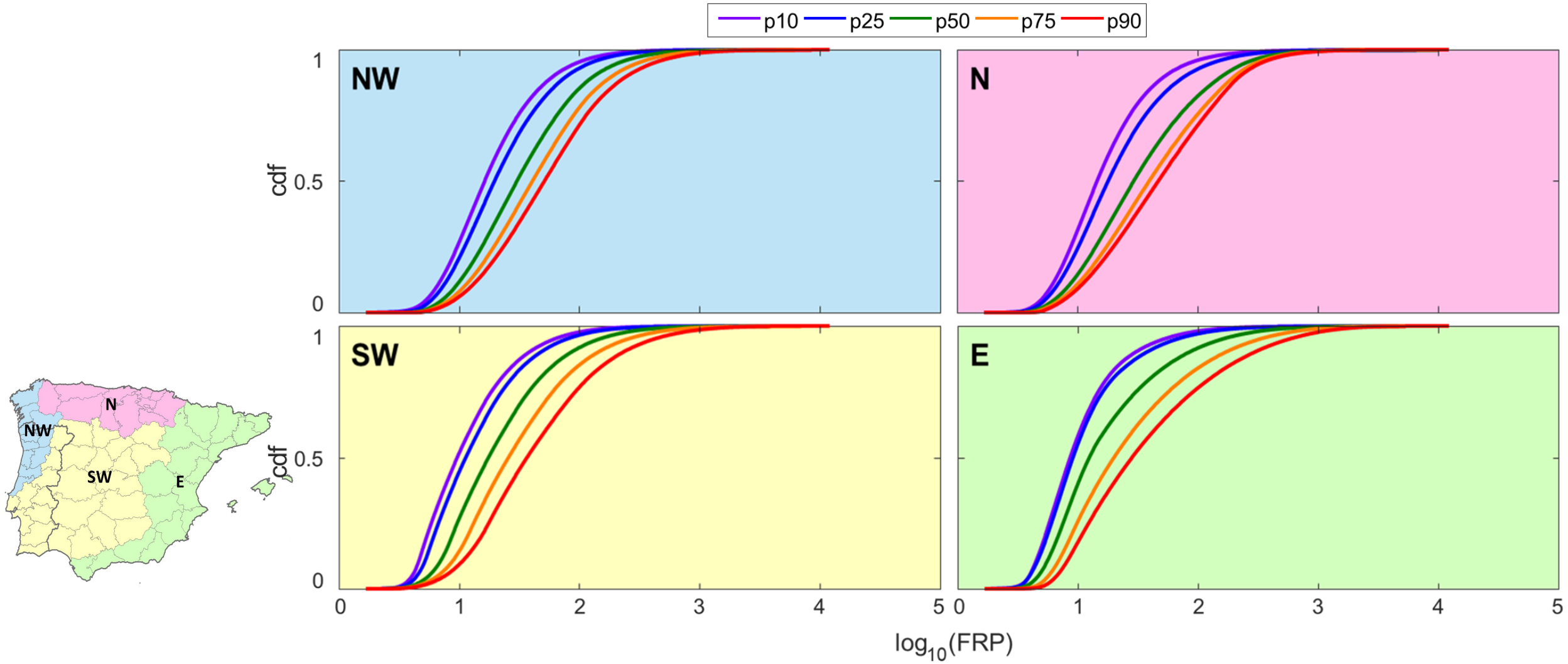


The base model

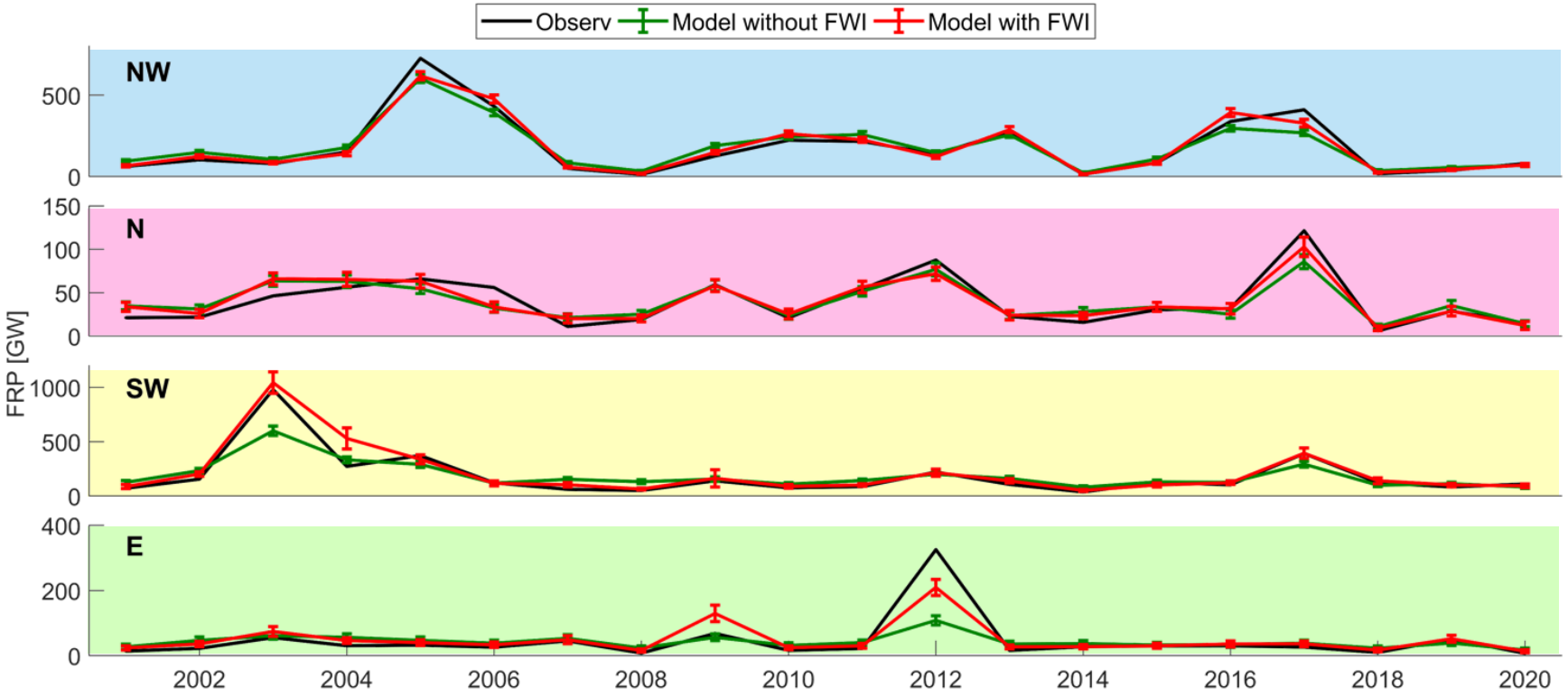


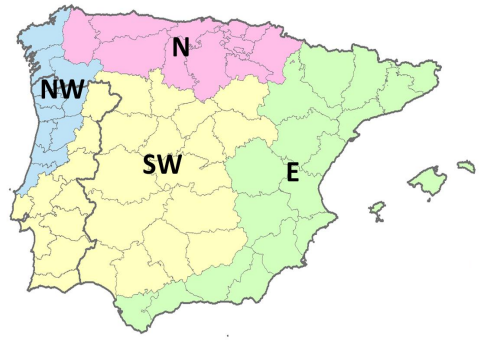


The model with fire danger



Interannual variability





		NW	N	SW	E
Mean [GW]	Observed	179	40	185	43
	Model without FWI	180	40	184	42
	Model with FWI	179	40	186	47
St. Dev. [GW]	Observed	181	29	211	68
	Model without FWI	143	21	121	20
	Model with FWI	167	24	179	46
Expl. Variance [%]	Model without FWI	95	84	90	79
	Model with FWI	96	89	96	86

Conclusions

Results obtained clearly indicate the importance of atmospheric conditions as drivers of interannual variability in fire activity, measured by annual FRP values . This is especially true in pyroregions SW and E, where climate change is expected to have a pronounced impact in terms of increase in frequency both of drought events and of days with extreme fire weather.

It is worth pointing out that the assessment performed in this work is likely to be conservative, given that time series of annual FRP were estimated by randomly generating values for all hotspots identified by the MODIS instrument for the study period.