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Supplementary material

Contribution of human and biophysical factors to the spatial distribution of forest fire ignitions and large wildfires in a French Mediterranean region

Julien Ruffault[A,B,C,D,E] *and Florent Mouillot*[A]

[A]CEFE, UMR 5175, CNRS-Université de Montpellier-Université Paul Valéry Montpellier, EPHE-IRD, 1919 route de Mende, F-34293 Montpellier, France.

[B]CEREGE, Aix-Marseille Université, CNRS, IRD, Technopôle de l'Arbois-Méditerranée, BP80, F-13545 Aix en Provence cedex 4, France.

[C]IRSTEA, UR RECOVER, 3275 route Cézanne, CS 40061,
F-13182 Aix-en-Provence cedex 5, France.

[D]IMBE, Aix Marseille University, CNRS, IRD, Avignon Université, CS 80249, Case 4,
F-13331 Marseille cedex 03, France.

[E]Corresponding author. Email: julien.ruff@gmail.com

Table S1. Original exploratory variables computed to model the spatial distribution of fires in Mediterranean southern France between 1990 and 2006

Seven variables (Table 1) were selected for model building from this list by iteratively eliminating correlated and non-informative variables

Variable	Expected effect on fire ignition	Expected effect on fire spread	Description (unit) and methodology	Data source
Human and socio economic factors				
Population Density	+/-	-	Population density in 2002 (habitants km^{-2})	BDTOPO
Road Density	+/-	-	Density of roads of major importance in 2002 (km km^{-2})	BDTOPO
Rail Density	+/-	X	Density of Railway lines in 2002 (km km^{-2})	BDTOPO
Housing Density	+/-	-	Density of housing in 2002 (houses km^{-2})	BDTOPO
Touristic housing density	+/-	-	Density of touristic housing in 2002 (houses km^{-2})	BDTOPO
Electric line Density	+/-	X	Density of electric lines in 2002 (km km^{-2})	BDTOPO
Distance to the nearest fire intervention station	-	-	Distance to the nearest fire intervention station (km)	BDTOPO
Wildland Urban Interface	+	-	Wildland Urban Interface Percentage in 2002. Determined using the method of Lampin-Maillet *et al.* (2010)	BDTOPO
Δ_Vineyard	+	-	Vineyard area change between 1988 and 2000 (km^2 km^{-2})	Census of agriculture
Δ_Agricultural	+	-	Agricultural area change between 1988 and 2000 (km^2 km^{-2})	Census of agriculture
Δ_Population	-	+	Population change between 1988 and 2000 (hab km^{-2})	Census of agriculture
Δ_Livetock	+	-	Livestock change between 1988 and 2000 (nb km^{-2})	Census of agriculture
Land cover and vegetation				
Agricultural area	+	-	Agricultural areas from reclassified CLC (%)	Corine land cover (CLC)
Shrubland area	+	+	Shrubland area from reclassified CLC (%)	CLC
Forest area	+	+	Forest area from reclassified CLC (%)	CLC
Non-combustibles area	-	-	Areas of non-combustibles land cover classes (urban area, open water) from reclassified CLC (%)	CLC
Diversity of landscapes	+	+	Diversity of landscapes. Calculated with the method proposed by McGarigal *et al.* (2002) from reclassified CLC	CLC
Diversity of land cover	+	-	Diversity of land cover. Calculated with the method proposed by McGarigal *et al.* (2002) from reclassified CLC	CLC
Forest/vineyard interfaces	+	-	Forest/vineyard interfaces. Calculated with the method proposed by McGarigal *et al.* (2002) from reclassified CLC	CLC
Forest/cultivated land interface	+	-	Forest/cultivated land interface. Calculated with the method proposed by McGarigal *et al.* (2002) from reclassified CLC	CLC
Weather				
Fire weather season length	+	+	Number of days suitable for fires. Computed for each class of fire size.	-

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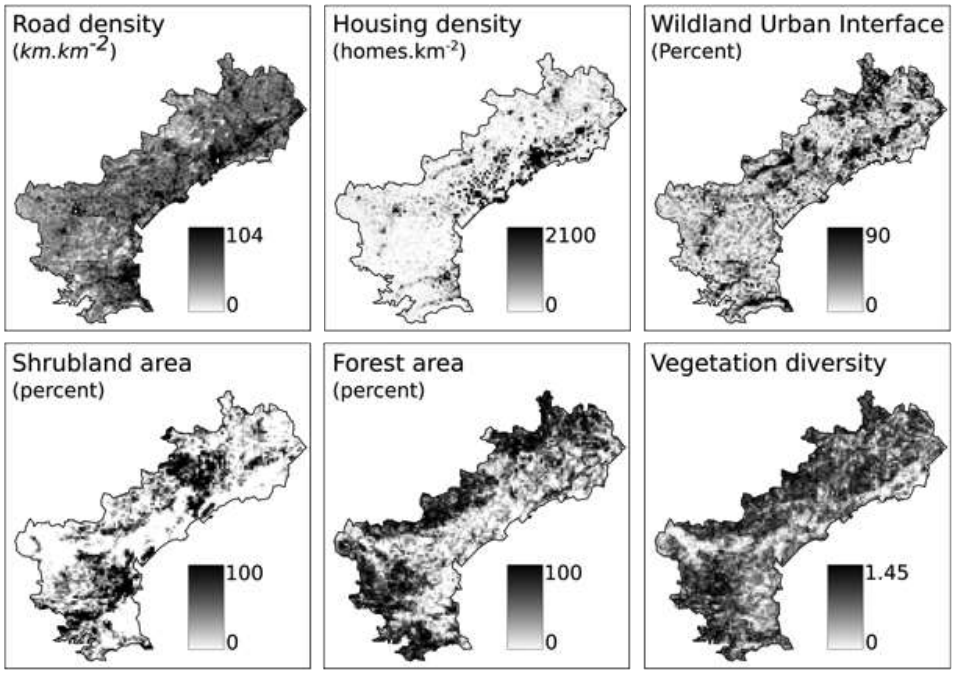

Fig. S1. Maps of human and land-cover explanatory variables used to model the spatial distribution of fires in Mediterranean France between 1990 and 2006.

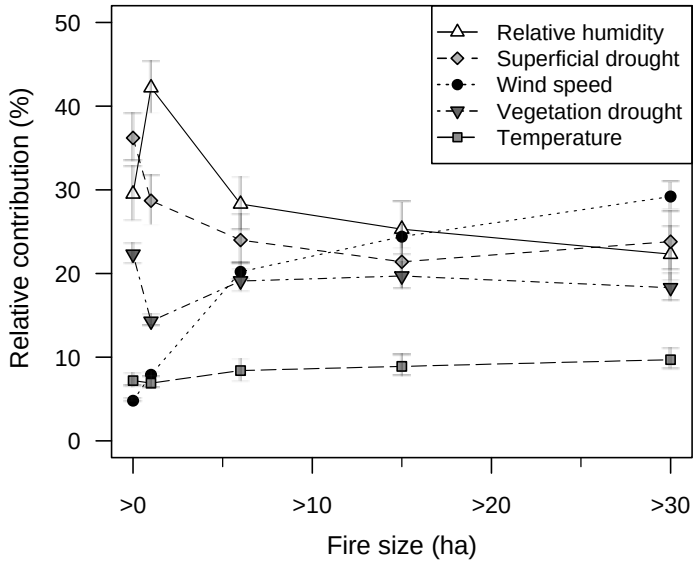

Fig. S2. Relative contribution of explanatory variables in boosted regression tree models predicting the probability of fire for different classes of final fire size. The mean and confidence interval of an ensemble of 25 models are reported. See Table S2 for results on models performance. More details can be found in Ruffault and Mouillot (2015).

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Table S2. Performance of boosted regression tree (BRT) models in predicting the spatio-temporal probability of fire occurrence based on five drought and weather indices in Mediterranean France between 1990 and 2006

For each fire size class, 10 000 voxels (spatio-temporal units) were randomly chosen as used as negative (absence) elements. Half of the points were used to build models, the other were used for validation. The mean and standard deviation of an ensemble of 20 BRT models are reported. More details can be found in Ruffault and Mouillot (2015)

Size of fire event	Omission error (%)	Commission error (%)	AUC
All fires	22.9 ±1.2	26.9 ±1.6	0.822 ± 0.003
>1 ha	21.6 ±1.3	25.5 ±1.3	0.840 ± 0.004
>6 ha	18.2 ±1.7	20.1 ±2.7	0.885 ± 0.007
>15 ha	16.6 ±2.1	18.8 ±2.3	0.901 ± 0.007
>30 ha	14.1 ±2.9	14.2 ±3.2	0.931 ± 0.008

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