

Supplementary material

Environmental susceptibility model for predicting forest fire occurrence in the Western Ghats of India

Quentin Renard^{A,C}, Raphaël Pélissier^{A,B}, B. R. Ramesh^A and Narendran Kodandapani^A

^AInstitut Français de Pondichéry (IFP), UMIFRE MAEE-CNRS 21, 11, St Louis Street, Puducherry 605001, India.

^BInstitut de Recherche pour le Développement (IRD), UMR AMAP, TA A51/PS2, F-34398 Montpellier cedex 05, France.

^CCorresponding author. Email: raphael.pelissier@ird.fr

Table S1. Geographic, bioclimatic and vegetation features of the three areas studied in the southern Western Ghats of India.

Mean annual rainfall and temperature ranges are from the Wordclim database (Hijmans *et al.* 2005).

Vegetation cover types are extracted from the simplified *FIP* vegetation map (Renard *et al.* 2010)

Variable	Southern Western Ghats	Uttara Kannada	Nelliampathi Hills
Area (km ²)	73 784	10 284	1861
Latitudinal range (°N)	8–16	13.5–15.3	10–10.3
Elevation range (m)	0–2594	0–1006	25–1537
Mean annual number of fire occurrences (2003–07)	1487.6	278.4	57.6
Mean annual precipitation range (mm)	383–7150	734–5105	1416–3741
Mean annual temperature range (°C)	12.2–29.2	22.5–27.6	18.9–27.8
Vegetation types (% total cover):			
• Primary and degraded deciduous forest	15.3	1.7	3.0
• Non-forest and agricultural	14.9	18.9	1.5
• Degraded formation in the potential area of wet evergreen zone	14.1	8.4	0
• Wet evergreen primary forest	10.9	4.1	31.4
• Secondary moist deciduous forest	9.8	17.4	23.8
• Wet evergreen secondary or disturbed forest	8.1	29.2	8.4
• Commercial plantation	6.8	0	2.7
• Forest plantation	6.2	4.2	18.5
• Tree savanna to grassland in dry zone	4.6	1.4	0
• Primary moist deciduous forest and degradation	4.5	12.4	2.3
• Tree savanna to grassland in wet zone + mountain grassland	2.4	2.3	8.3
• Mountain forest and degraded stages	1.4	0	0
• Dry evergreen forest and degradation	0.8	0	0

Table S2. Definition of the 19 bioclimatic variables of the Wordclim database, as given at <http://www.worldclim.org/bioclim>

Code	Variable
BIO1	Annual mean temperature
BIO2	Mean diurnal range (mean of monthly (maximum temperature – minimum temperature))
BIO3	Isothermality (BIO2/BIO7) ($\times 100$)
BIO4	Temperature seasonality (standard deviation $\times 100$)
BIO5	Maximum temperature of warmest month
BIO6	Minimum temperature of coldest month
BIO7	Temperature annual range (BIO5 – BIO6)
BIO8	Mean temperature of wettest quarter
BIO9	Mean temperature of driest quarter
BIO10	Mean temperature of warmest quarter
BIO11	Mean temperature of coldest quarter
BIO12	Annual precipitation
BIO13	Precipitation of wettest month
BIO14	Precipitation of driest month
BIO15	Precipitation seasonality (coefficient of variation)
BIO16	Precipitation of wettest quarter
BIO17	Precipitation of driest quarter
BIO18	Precipitation of warmest quarter
BIO19	Precipitation of coldest quarter

Table S3. Number of fire occurrences used for training (70%) and testing (30%) the annual and integrated (2003–07) models

	Western Ghats			Uttara Kannada			Nelliyampathi Hills		
	Training	Testing	Total	Training	Testing	Total	Training	Testing	Total
2003	460	197	657	162	69	231	3	1	4
2004	1871	802	2673	307	131	438	126	54	180
2005	1035	444	1479	286	123	409	33	14	47
2006	804	345	1149	131	56	187	4	2	5
2007	1036	444	1480	89	38	127	36	16	52
2003–07	5207	2231	7438	974	418	1392	202	86	288