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Supplementary material for

An empirical-based, multi-phase model for predicting the forward spread rate of wildfires in eucalypt forests

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Tables with parameters and fit statistics for models developed with the Burrows (1999) and linear fuel moisture effect functions.

Table S1 Parameter values and model fit statistics for the two models developed for rate of fire spread within phase I.

	Fuel moisture content effect function	
Parameters	ΦMd_B	ΦMd_L
a	0.03841 (0.097)	0.04270 (0.08)
b	0.95231 (0.053)	0.95909 (0.04)
c	0.8909 (0.0218)	0.73180 (0.05)
	Fit statistics	
MAE	0.042	0.046
MAPE	60	55
RMSE	0.049	0.052

Table S2. Parameter values and model fit statistics for the two models developed for rate of fire spread within phase II.

	Fuel moisture content effect function	
Parameters	ΦMd_B	ΦMCd_L
a	0.139 (<0.0001)	0.18814 (0.001)
b	0.85683 (<0.0001)	0.80827 (<0.0001)
c	0.57634 (0.005)	0.37770 (0.04)
d	0.49248 (<0.0001)	0.49501 (<0.0001)
	Fit statistics	
MAE	0.097	0.125
MAPE	30	33
RMSE	0.125	0.164

Table S3. Parameter values and model fit statistics for the two models developed for rate of fire spread within phase III.

	Fuel moisture content effect function	
Parameters	ΦMd_B	ΦMd_L
a	0.05874 (0.48)	0.04750 (0.37)
b	0.9840 (0.014)	1.21425 (0.0007)
	Fit statistics	
MAE	0.791	1.195
MAPE	37	28
RMSE	1.082	1.521

Table S4. Parameter values and model fit statistics for the two models developed for the transition between Phase I and II.

	Fuel moisture content input	
Parameters	Observed	ΦMd_L
β_1	-7.0596 (0.099)	-32.4430 (0.007)
β_2	1.7103 (0.005)	1.7103 (0.005)
β_3	-1.0576 (0.06)	21.1532 (0.06)
β_4	9.4529 (0.006)	9.4533 (0.006)
	Fit statistics	
AIC	38.4	40
McFadden pseudo R^2	0.62	0.59
Area under the curve	96.5%	96%

Table S5. Parameter values and model fit statistics for the two models developed for the transition between Phase II and III.

Parameters	Fuel moisture content input Observed / estimated	ΦMd_L
β_1	-0.2164 (0.95)	-44.3266 (0.01)
β_2	0.4343 (0.01)	0.4343 (0.006)
β_3	-1.8379 (0.02)	36.7885 (0.04)
	Fit statistics	
AIC	22.9	24.67
McFadden pseudo R^2	0.80	0.79
Area under the curve	99%	99%

Observed MC for experimental fires and estimated for wildfires.

Table S6 Model fit statistics obtained by the rate of fire spread model systems with distinct fuel moisture functions against the data used in model development.

Model	Fuel moisture function ΦMd_B	ΦMd_L
Vesta experimental data (n = 87)		
MAE	0.108	0.119
MAPE	46	54
MBE	0.003	0.027
RMSE	0.143	0.152
Cheney et al. (2012) wildfires (n = 17)		
MAE	1.350	1.168
MAPE	42	38
MBE	0.109	-0.223
RMSE	1.853	1.440

Table S7 Model fit statistics obtained by the rate of fire spread model systems with distinct fuel moisture functions against independent experimental and wildfire data.

Model	Fuel moisture function ΦMd_B	ΦMd_L
Aquarius experimental fires (n = 14)		
MAE	0.174	0.171
MAPE	53	52
MBE	0.1	0.099
RMSE	0.25	0.20
Kilinc et al. (2012) wildfires (n = 71; DF >9.0)		
MAE	2.796	1.36
MAPE	146	82
MBE	1.886	0.228
RMSE	4.357	1.895
Kilinc et al. (2012) wildfires – n = 18; DF <9.0)		
	No *FA* correction	
MAE	1.155	1.636
MAPE	105	138
MBE	0.300	0.644
RMSE	1.565	2.588
	With ΦFA_S - Equation (11)	
MAE	1.063	1.258
MAPE	95	101
MBE	0.130	-0.110
RMSE	1.408	2.032