International Journal of Wildland Fire 26(3), 191–208
doi: 10.1071/WF16106_AC

Supplementary material

Hillslope-scale prediction of terrain and forest canopy effects on temperature and near-surface soil moisture deficit

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Here we present detailed results of cross-validation testing of models for screen-level air temperature (Table S1) and litter layer temperature (Table S2). We found that model parameters show only minor to moderate variation when individual sites are left out. However, for the two driest sites (Casterton and Hattah), litter temperature predictions showed larger errors (Table S2, first two rows) when these sites were left out of the model fitting process. This suggests that litter model performance is likely to be weaker in very dry climates.

Table S1. Cross-validation summary for screen-level air temperature (proposed model, Eqn 6)

Data in columns *f*, *h* and *k* are the fitted model parameters. MAE = mean absolute error, Bias = mean error, RMSE = root mean square error

Site left out	*f*	*h*	*k*	MAE (ºC)	Bias (ºC)	RMSE (ºC)	r^2
Casterton	1.02	0.16	0.12	0.6	0.4	0.8	0.989
Hattah	1.03	0.15	0.15	0.9	0.8	1.1	0.993
Healesville North	1.01	0.17	0.09	1.2	0.7	1.4	0.976
Healesville South	1.01	0.16	0.10	1.0	0.3	1.3	0.978
Reefton Aspect Study East	1.01	0.16	0.11	1.5	–1.1	2.1	0.934
Reefton Aspect Study North	1.01	0.14	0.13	1.7	–1.1	2.3	0.909
Reefton Aspect Study South	1.01	0.17	0.10	1.5	0.0	1.9	0.900
Reefton Aspect Study West	1.01	0.16	0.10	1.4	0.1	1.9	0.923
Reefton North Drainage	1.01	0.19	0.08	1.5	1.1	1.9	0.961
Reefton North Midslope	1.01	0.16	0.10	1.3	0.0	1.7	0.952
Reefton North Upper	1.01	0.15	0.11	1.4	–0.5	1.9	0.937
Reefton South Drainage	1.01	0.16	0.09	1.7	1.5	2.1	0.963
Reefton South Midslope	1.01	0.16	0.10	1.3	0.4	1.7	0.946
Reefton South Upper	1.01	0.19	0.10	1.3	–0.9	1.7	0.962
Christmas Hills North	1.01	0.17	0.10	0.9	0.4	1.1	0.986
Christmas Hills South	1.01	0.19	0.08	1.0	–0.5	1.3	0.980
The Triangle North	1.01	0.16	0.10	1.6	0.6	2.0	0.935
The Triangle South	1.01	0.17	0.10	1.4	0.0	1.8	0.927
NONE	**1.01**	**0.17**	**0.10**	**1.3**	**0.1**	**1.7**	**0.954**
Minimum	*1.01*	*0.14*	*0.08*	*0.6*	*–1.1*	*0.8*	***0.900***
Maximum	*1.03*	*0.19*	*0.15*	*1.7*	*1.5*	*2.3*	***0.993***

Table S2. Cross-validation summary for litter layer temperature (proposed model, Eqn 6)

Data in columns *f*, *h* and *k* are the fitted model parameters. MAE = mean absolute error, Bias = mean error, RMSE = root mean square error

Site left out	*f*	*h*	*k*	MAE (°C)	Bias (°C)	RMSE (°C)	r^2
Casterton	1.38	0.37	0.34	4.5	–1.7	6.0	0.849
Hattah	1.52	0.27	0.58	4.7	3.9	5.8	0.882
Healesville North	1.42	0.32	0.43	2.8	–0.8	3.9	0.864
Healesville South	1.42	0.32	0.42	1.8	0.8	2.3	0.903
Reefton Aspect Study East	1.42	0.34	0.39	2.2	1.5	2.9	0.895
Reefton Aspect Study North	1.42	0.30	0.44	2.7	–1.3	3.7	0.832
Reefton Aspect Study South	1.42	0.34	0.40	1.4	–0.4	1.8	0.877
Reefton Aspect Study West	1.42	0.33	0.40	2.4	–0.1	3.3	0.819
Reefton North Drainage	1.40	0.39	0.33	3.0	2.6	3.7	0.860
Reefton North Midslope	1.42	0.37	0.35	2.6	1.1	3.4	0.825
Reefton North Upper	1.42	0.31	0.43	2.9	–1.1	3.8	0.821
Reefton South Drainage	1.41	0.31	0.41	2.6	2.3	3.3	0.857
Reefton South Midslope	1.43	0.36	0.40	2.3	–2.3	2.8	0.878
Reefton South Upper	1.42	0.36	0.38	1.6	–1.4	2.1	0.902
Christmas Hills North	1.41	0.30	0.44	3.6	–1.9	5.1	0.857
Christmas Hills South	1.42	0.33	0.41	1.8	0.5	2.4	0.918
The Triangle North	1.42	0.34	0.40	2.2	–1.1	2.8	0.875
The Triangle South	1.42	0.33	0.41	1.7	0.2	2.2	0.849
NONE	**1.4**	**0.3**	**0.4**	**2.5**	**0.0**	**3.4**	**0.874**
Minimum	*1.38*	*0.27*	*0.33*	*1.4*	*–2.3*	*1.8*	***0.819***
Maximum	*1.52*	*0.39*	*0.58*	*4.7*	*3.9*	*6.0*	***0.918***