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Supplement of

Emissions from prescribed fires in temperate forest in south-east Australia: implications for carbon accounting

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- 2 Supplementary Figure 1. Schematic of experimental set-up used for the combustion analysis.
- 3 Dimensions of certain components are provided but the figure is not drawn to scale.

1 Supplementary Table 1. The carbon content of a range of fuel types before combustion in a mass-loss calorimeter and that of the subsequent
2 ash. The fuel types were collected from four forest sites in East Gippsland, south-eastern Australia. Coarse woody debris was assumed to
3 have the same values as for twigs. Values are means $\pm$ one standard deviation (n = 3).

Fuel type	Carbon content (% dry weight)			
	Oliver		Pettmans	
	Pre-burn	Ash	Pre-burn	Ash
Twigs	49.67 $\pm$ 0.15	46.41 $\pm$ 16.66	48.78 $\pm$ 0.88	63.35 $\pm$ 1.11
Decomposing matter	29.79 $\pm$ 6.04	17.78 $\pm$ 7.87	23.87 $\pm$ 7.05	17.21 $\pm$ 10.58
Ground layer	46.68 $\pm$ 0.08	13.60 $\pm$ 5.94	46.74 $\pm$ 1.36	15.26 $\pm$ 6.24
Leaf litter	56.80 $\pm$ 1.02	31.28 $\pm$ 5.16	52.35 $\pm$ 1.92	19.57 $\pm$ 16.04
Understorey	53.55 $\pm$ 0.36	45.55 $\pm$ 4.84	53.55 $\pm$ 0.36	45.55 $\pm$ 4.84
Overstorey	55.74 $\pm$ 1.00	51.65 $\pm$ 1.00	55.74 $\pm$ 1.00	51.65 $\pm$ 1.00
Fuel type	South Boundary		Upper Tambo	
Twigs	49.59 $\pm$ 0.42	34.68 $\pm$ 14.56	49.14 $\pm$ 1.26	51.91 $\pm$ 17.79
Decomposing matter	32.13 $\pm$ 2.69	10.02 $\pm$ 4.28	35.42 $\pm$ 2.06	25.69 $\pm$ 6.55
Ground layer	47.72 $\pm$ 1.85	12.18 $\pm$ 7.47	47.57 $\pm$ 0.94	11.66 $\pm$ 4.61
Leaf litter	53.55 $\pm$ 2.45	50.94 $\pm$ 5.36	53.70 $\pm$ 1.69	42.31 $\pm$ 4.77
Understorey	53.55 $\pm$ 0.36	45.55 $\pm$ 4.84	53.55 $\pm$ 0.36	45.55 $\pm$ 4.84
Overstorey	55.74 $\pm$ 1.00	51.65 $\pm$ 1.00	55.74 $\pm$ 1.00	51.65 $\pm$ 1.00

- 1 Supplementary Table 2. The initial bulk density and residual mass fraction of fuel types from four forest sites in East Gippsland, south-eastern
2 Australia, that were combusted in a mass-loss calorimeter. Values are means $\pm$ one standard deviation (n = 3).

Fuel type	Oliver		Pettmans	
	Initial bulk density (kg m ⁻³)	Residual mass fraction (%)	Initial bulk density (kg m ⁻³)	Residual mass fraction (%)
Twigs	86.16 $\pm$ 0.23	13.33 $\pm$ 2.84	87.33 $\pm$ 0.18	13.96 $\pm$ 2.92
Decomposing matter	80.44 $\pm$ 0.94	43.41 $\pm$ 7.21	95.64 $\pm$ 2.01	56.16 $\pm$ 9.35
Ground layer	17.22 $\pm$ 0.11	7.81 $\pm$ 1.75	26.59 $\pm$ 0.17	12.26 $\pm$ 1.13
Leaf litter	22.31 $\pm$ 0.22	7.88 $\pm$ 1.78	15.79 $\pm$ 0.14	6.56 $\pm$ 1.02
Understorey	31.83 $\pm$ 0.76	9.49 $\pm$ 1.22	31.83 $\pm$ 0.76	9.49 $\pm$ 1.22
Overstorey	21.96 $\pm$ 0.21	6.32 $\pm$ 1.50	21.96 $\pm$ 0.21	6.32 $\pm$ 1.50
Fuel type	South Boundary		Upper Tambo	
	Initial bulk density (kg m ⁻³)	Residual mass fraction (%)	Initial bulk density (kg m ⁻³)	Residual mass fraction (%)
Twigs	62.54 $\pm$ 0.06	12.28 $\pm$ 1.88	85.39 $\pm$ 0.23	13.55 $\pm$ 1.99
Decomposing matter	78.86 $\pm$ 3.07	47.74 $\pm$ 3.29	80.07 $\pm$ 0.50	51.18 $\pm$ 5.05
Ground layer	24.38 $\pm$ 1.11	13.64 $\pm$ 9.96	12.58 $\pm$ 5.54	5.58 $\pm$ 1.31
Leaf litter	31.16 $\pm$ 0.05	12.48 $\pm$ 1.14	26.85 $\pm$ 0.14	10.76 $\pm$ 1.18
Understorey	31.83 $\pm$ 0.76	9.49 $\pm$ 1.22	31.83 $\pm$ 0.76	9.49 $\pm$ 1.22
Overstorey	21.96 $\pm$ 0.21	6.32 $\pm$ 1.50	21.96 $\pm$ 0.21	6.32 $\pm$ 1.50

Supplementary Table 3. Ratio of excess CO, and pooled methane (CH₄), volatile organic compound (VOC) and particulate matter (PM) concentrations to CO₂ concentrations for different fuel types from four forest sites in East Gippsland, south-eastern Australia, that were combusted in a mass-loss calorimeter. Coarse woody debris was assumed to have the same values as for twigs. Δ represents the excess molar mixing ratio of a species (CO₂, CO, CH₄, ΣVOC and PM) over the background). Values are means ± one standard deviation (n = 3).

Fuel type	Oliver		Pettmans	
	$\Delta\text{CO}/\Delta\text{CO}_2$	$\Delta(\Sigma\text{CH}_4, \text{VOC, PM})/\Delta\text{CO}_2$	$\Delta\text{CO}/\Delta\text{CO}_2$	$\Delta(\Sigma\text{CH}_4, \text{VOC, PM})/\Delta\text{CO}_2$
Twigs	0.03 ± 0.01	0.49 ± 0.11	0.04 ± 0.01	0.39 ± 0.06
Decomposing matter	0.07 ± 0.02	0.06 ± 0.10	0.06 ± 0.02	0
Ground layer	0.05 ± 0.01	0.56 ± 0.05	0.05 ± 0.01	0.65 ± 0.13
Leaf litter	0.04 ± 0.01	0.80 ± 0.06	0.05 ± 0.01	0.72 ± 0.19
Understorey	0.03 ± 0.02	0.35 ± 0.27	0.03 ± 0.02	0.35 ± 0.27
Overstorey	0.03 ± 0.01	0.19 ± 0.09	0.03 ± 0.01	0.19 ± 0.09
Fuel type	South Boundary		Upper Tambo	
	$\Delta\text{CO}/\Delta\text{CO}_2$	$\Delta(\Sigma\text{CH}_4, \text{VOC, PM})/\Delta\text{CO}_2$	$\Delta\text{CO}/\Delta\text{CO}_2$	$\Delta(\Sigma\text{CH}_4, \text{VOC, PM})/\Delta\text{CO}_2$
Twigs	0.05 ± 0.01	0.76 ± 0.03	0.03 ± 0.01	0.21 ± 0.10
Decomposing matter	0.05 ± 0.01	0.10 ± 0.11	0.05 ± 0.01	0
Ground layer	0.05 ± 0.03	0.39 ± 0.30	0.07 ± 0.02	0.20 ± 0.17
Leaf litter	0.03 ± 0.01	0.46 ± 0.19	0.04 ± 0.01	0.33 ± 0.07
Understorey	0.03 ± 0.02	0.35 ± 0.27	0.03 ± 0.02	0.35 ± 0.27
Overstorey	0.03 ± 0.01	0.19 ± 0.09	0.03 ± 0.01	0.19 ± 0.09