10.1071/WF23079
International Journal of Wildland Fire

Supplementary Material

GAMBUT field measurement of emissions from a tropical peatland fire experiment: from ignition to spread to suppression

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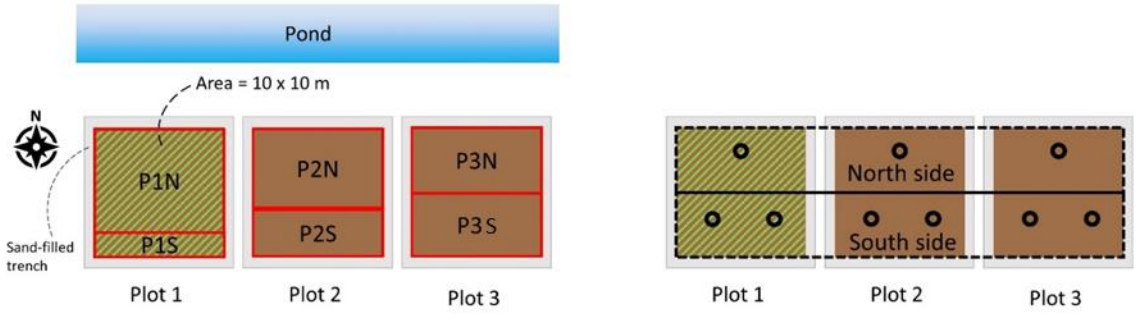

Figure S1. Locations for in situ soil sampling. Each plot was divided into 2 sections: north side and south side. Soils at the depth of 0-10 cm, 10- 20 cm, 20- 30 cm and 30- 40 cm from 6 different locations in the 3 plots were sampled.

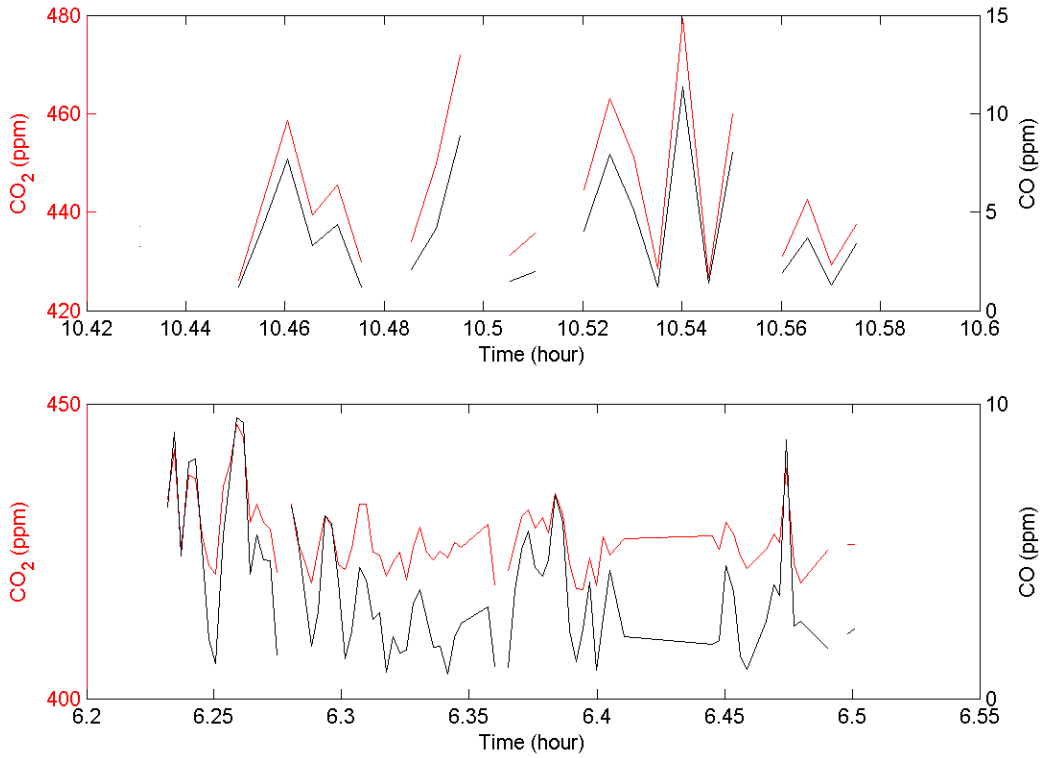

Figure S2. Example time series of path-averaged mole fractions CO_2 and CO from a smoke plume measurement from an ember ignition attempt (EI2, top) and a suppression attempt (SP1, bottom). The gas mole fraction gaps were possibly caused by periods of low signal-to-noise within the spectral window used for the retrieval of CO_2 and CO [Smith et al. 2018].

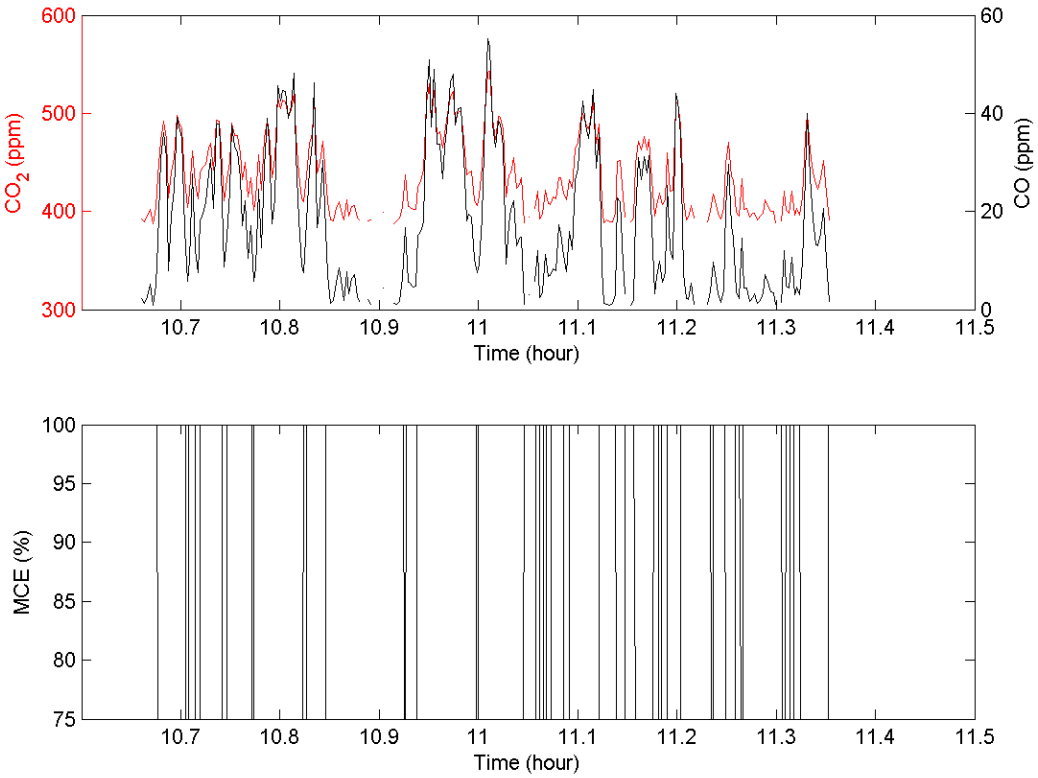

Figure S3. Example time series of path-averaged mole fractions CO_2 and CO (top) and the transient MCE calculated (bottom) from a smouldering spread smoke plume measurement (SS26). Changes in transient mole fractions of CO_2 and CO lead to significant variations of the transient MCE.

Table S1. Soil type and properties for all 40 fire smoke plume measurements.

Location	Fuel	Soil C%	Soil ash% [a]	Ash-corrected C%
P1S	Charcoal Ember	78.0	n/a	78.0
P1S	Peat	23.9	58.6	57.8
P1N	Peat	33.7	34.2	51.3
P1N	Surface Vegetation	55.0	n/a	55.0
P2N	Surface Vegetation	55.0	n/a	55.0
P2N	Peat	28.7	49.5	56.7
P3N	Surface Vegetation	55.0	n/a	55.0
P3N	Peat	28.1	49.8	55.9

[a] Inorganic content of surface peat (0-10cm) was used for ash-corrected C% calculation for P2 and P3.

Table S2. Emission ratios ($ER_{i/CO}$) and the R^2 value for all 40 fire smoke plume measurements.

	CO_2	CH_4	C_2H_2	C_2H_4	C_2H_6	CH_2O	CH_3OH	CH_3COOH	NH_3	HCN	N_2O
EI1	7.34 (0.68)	--	--	--	--	0.02 (0.04)	--	--	--	0.0006 (0)	0.0148 (0.4)
EI2	5.08 (0.97)	0.016 (0.31)	--	--	--	0.0071 (0.13)	--	--	--	--	0.0085 (0.87)
EI3	5.18 (0.95)	0.029 (0.56)	--	--	--	--	--	--	0.019 (1)	0.0061 (0.65)	0.006 (0.7)
SS1	4.49 (0.71)	0.018 (0.47)	--	--	0.017 (0.06)	--	--	--	0.0154 (0.42)	0.0117 (0.61)	0.0042 (0.38)
SS2	3.75 (0.95)	0.023 (0.47)	--	--	0.02 (0.04)	--	--	--	0.0524 (0.73)	0.0177 (0.87)	0.0019 (0.24)
SS3	4.14 (0.97)	0.018 (0.57)	--	--	--	--	--	--	0.0251 (0.95)	0.0158 (0.89)	0.0039 (0.69)
SS4	3.59 (0.97)	0.021 (0.79)	--	--	--	0.001 (0.02)	0.0075 (0.52)	--	0.0275 (0.94)	0.0205 (0.95)	0.0023 (0.7)
SS5	3.93 (0.64)	0.058 (0.45)	0.0002 (0.02)	--	0.009 (0.02)	--	0.0087 (0.81)	--	0.0209 (0.89)	0.0115 (0.82)	0.0041 (0.5)
EI4	5.32 (0.96)	0.083 (0.94)	--	0.0045 (0.87)	0.074 (0.75)	0.0052 (0.2)	0.0096 (0.93)	--	0.0316 (0.94)	0.0268 (0.95)	0.0064 (0.75)
EI5	5.01 (0.96)	0.023 (0.82)	--	--	0.012 (0.1)	--	0.0051 (0.64)	--	0.0228 (0.98)	0.0117 (0.95)	0.0047 (0.66)
EI6	5.04 (0.98)	0.034 (0.43)	--	0.001 (0.43)	0.08 (0.11)	--	0.0074 (0.95)	--	0.0238 (0.99)	0.0147 (0.97)	0.0041 (0.53)
SS6	3.82 (0.92)	0.033 (0.44)	0.0003 (0.01)	--	--	--	--	--	0.0298 (0.62)	0.0176 (0.77)	0.0027 (0.17)
SS7	2.22 (0.2)	0.021 (0.32)	--	--	0.009 (0.03)	0.0018 (0.03)	0.008 (0.45)	--	0.0195 (0.88)	0.0152 (0.88)	--
SS8	3.18 (0.79)	0.028 (0.39)	--	--	0.037 (0.12)	--	--	--	0.0328 (0.94)	0.0196 (0.93)	0.0026 (0.06)
SS9	3.86 (0.84)	0.046 (0.65)	--	--	0.022 (0.22)	--	0.0066 (0.63)	0.0001 (0.02)	0.0234 (0.88)	0.0151 (0.78)	0.003 (0.5)
SS10	3.44 (0.94)	0.031 (0.89)	--	--	0.026 (0.64)	0.0022 (0.24)	0.0025 (0.16)	--	0.0176 (0.92)	0.0101 (0.83)	0.0031 (0.79)
SS11	2.95 (0.95)	0.056 (0.88)	--	--	0.062 (0.69)	0.002 (0.02)	--	--	0.0239 (0.91)	0.0145 (0.81)	0.0028 (0.6)
SS12	2.7 (0.91)	0.05 (0.8)	--	--	0.046 (0.67)	0.003 (0.04)	0.0055 (0.35)	0.009 (0.71)	0.0288 (0.92)	0.0204 (0.84)	0.0006 (0.04)
SB1	12.93 (0.78)	0.073 (0.98)	0.0006 (0.51)	0.0163 (0.98)	0.058 (0.96)	0.0248 (0.96)	0.0091 (0.94)	0.0088 (1)	0.0213 (0.97)	0.0104 (0.94)	0.0036 (0.38)
SS13	3.64 (0.91)	0.054 (0.81)	--	0.0025 (0.15)	--	0.008 (0.52)	0.0128 (0.84)	0.011 (0.63)	0.0237 (0.88)	0.0105 (0.7)	0.0027 (0.67)
SS14	3.14 (0.94)	0.038 (0.83)	--	--	0.004 (0.01)	0.0032 (0.2)	0.0023 (0.02)	0.0011 (0.64)	0.0197 (0.97)	0.0179 (0.87)	0.0029 (0.67)
SS15	3.37 (0.64)	0.029 (0.9)	--	0.0021 (0.28)	0.027 (0.73)	0.0043 (0.14)	0.0127 (0.86)	0.0106 (0.23)	0.0206 (0.89)	0.0206 (0.91)	0.0009 (0.21)

SB2	3.55 (0.91)	0.079 (0.95)	0.0008 (0.72)	0.0109 (0.87)	0.074 (0.95)	0.0148 (0.93)	0.0114 (0.87)	--	0.0149 (0.95)	0.0105 (0.95)	0.002 (0.54)
SB3	2.2 (0.97)	0.057 (0.92)	--	0.0042 (0.82)	0.054 (0.91)	0.0081 (0.83)	0.0105 (0.88)	0.0063 (0.64)	0.0105 (0.92)	0.0085 (0.9)	0.001 (0.84)
SS16	3.19 (0.95)	0.03 (0.8)	--	--	0.034 (0.61)	0.0022 (0.08)	0.0094 (0.84)	--	0.0317 (0.92)	0.0218 (0.82)	0.0024 (0.72)
SS17	3.17 (0.95)	0.039 (0.85)	--	--	0.039 (0.73)	--	0.009 (0.81)	--	0.0274 (0.91)	0.0152 (0.71)	0.002 (0.57)
SS18	3.24 (0.96)	0.041 (0.83)	--	--	0.034 (0.55)	0.001 (0)	0.008 (0.59)	--	0.0318 (0.96)	0.0157 (0.75)	0.0026 (0.66)
SS19	2.98 (0.98)	0.035 (0.95)	--	0.0017 (0.66)	0.029 (0.75)	0.0006 (0)	0.0085 (0.88)	--	0.0229 (0.91)	0.0122 (0.73)	0.0012 (0.54)
SS20	3.08 (0.92)	0.036 (0.9)	--	0.001 (0.43)	0.031 (0.69)	0.0012 (0.01)	0.011 (0.87)	--	0.0352 (0.91)	0.0232 (0.91)	0.0021 (0.46)
SS21	3.01 (0.96)	0.033 (0.94)	0.0001 (0.03)	--	0.03 (0.64)	0.0013 (0.03)	0.0091 (0.88)	--	0.0315 (0.95)	0.0204 (0.94)	0.0029 (0.86)
SB4	4.33 (0.55)	0.085 (0.9)	0.0031 (0.14)	0.0288 (0.64)	0.079 (0.8)	0.0223 (0.69)	0.0161 (0.79)	0.0574 (0.84)	0.0259 (0.86)	0.0123 (0.74)	0.0025 (0.68)
SS22	2.95 (0.92)	0.035 (0.88)	--	0.0014 (0.38)	0.036 (0.56)	0.001 (0)	0.0087 (0.85)	--	0.0352 (0.95)	0.0184 (0.8)	0.0018 (0.48)
SS23	2.45 (0.89)	0.041 (0.96)	--	0.0009 (0.18)	0.037 (0.85)	0.0006 (0.01)	0.0101 (0.95)	0.0034 (0.26)	0.028 (0.97)	0.0158 (0.89)	0.002 (0.66)
SS24	2.66 (0.97)	0.045 (0.94)	--	0.0014 (0.35)	0.042 (0.76)	0.0013 (0.04)	0.0095 (0.89)	--	0.0307 (0.96)	0.0185 (0.92)	0.0006 (0.25)
SS25	3.15 (0.68)	0.038 (0.83)	--	--	--	0.002 (0.01)	0.005 (0.22)	--	0.0185 (0.79)	0.0172 (0.63)	0.0026 (0.49)
SS26	2.7 (0.97)	0.044 (0.83)	--	0.0012 (0.21)	0.043 (0.71)	0.0024 (0.07)	0.0107 (0.84)	--	0.0309 (0.94)	0.0163 (0.79)	0.0018 (0.55)
SS27	3.24 (0.91)	0.042 (0.92)	--	0.0016 (0.57)	0.04 (0.73)	0.0004 (0.01)	0.0103 (0.94)	--	0.0318 (0.93)	0.015 (0.85)	0.0025 (0.65)
SP1	2.26 (0.87)	0.041 (0.75)	--	--	0.025 (0.09)	--	--	--	0.0351 (0.85)	0.0156 (0.34)	0.0013 (0.12)
SP2	2.88 (0.95)	0.041 (0.91)	--	--	0.039 (0.66)	0.0023 (0.04)	0.0071 (0.45)	--	0.0257 (0.78)	0.0149 (0.69)	0.0014 (0.35)
SP3	4.67 (0.79)	0.074 (0.81)	0.0003 (0.05)	--	0.053 (0.43)	--	0.0052 (0.08)	--	0.0252 (0.99)	0.0114 (0.71)	0.0044 (0.45)