

Science Question

- How do environmental factors influence fire behavior in tropical peat and can improved methodologies increase the accuracy of total landscape-level carbon emission estimates?

Analysis

- Novel field methodologies were developed to improve peat fire carbon emissions calculations (fig.1) for observed wildfires
- IPCC Tier 3 peat fire data were collected *in situ* and analysed using the IPCC emissions formula
- Inaccuracies due to methods of choice, data assumptions and seasonality were analysed and quantified

Results/Significance

- Observed rates of peat fire spread were $0.8 \pm 0.3 \text{ cm hr}^{-1}$ vertically and $2.7 \pm 1.6 \text{ cm hr}^{-1}$ horizontally but varied seasonally such that the associated peat volume losses were $102 \text{ m}^3 \text{ ha}^{-1}$ in August but increased to $754 \text{ m}^3 \text{ ha}^{-1}$ in September
- Using locally-collected peat bulk density and emission factors, corresponding total carbon emissions were estimated as 27.2 t ha^{-1} (24.7 Mg ha^{-1}) and 200.7 t ha^{-1} (182.1 Mg ha^{-1}) in August and September, respectively
- Peat fire behaviour and the related temporal and spatial variability of total carbon emissions were quantified. Current methods and data assumptions introduce various errors and inaccuracies (table 1) into emissions estimates
- We highlight the importance of further *in situ* measurements and refined methods to improve accuracies of greenhouse gas emissions estimates from tropical peat fires

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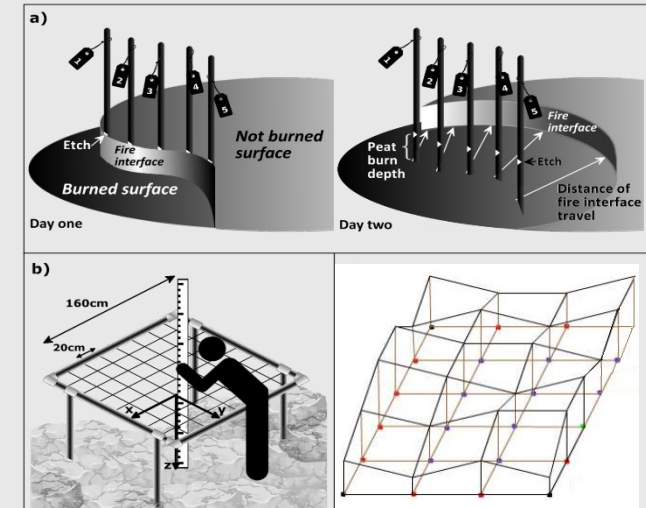


Figure 1: Novel methods for recording : a) rate of peat fire spread and, b) peat volume loss.

Method/data assumption	Season comparison	Error margin (%)
Rod method	Early	798%
	Late	146%
Nation-wide bulk density data	Early	-26%
	Late	-26%
Combustion factor of 1	Early	133%
	Late	13%
IPCC Emission factors	Early	4%
	Late	4%
All combined	Early	1509%
	Late	114%

Table.1 Level of error and inaccuracy that can be introduced dependent on method choice, data assumption or seasonality