

Carbon dioxide and particulate emissions from the 2013 Tasmanian Firestorm: Implications for Australian carbon accounting

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Additional File 2

Table S1: Comparison of total emissions (in Tg) and per-hectare emissions (in t ha⁻¹) among wildfires in Australia. Burnt area estimates (BA; in ha) for each fire event are indicated in rounded brackets. CO₂-equivalent (CO₂-e) emissions are totals from CO₂, methane and nitrous oxide emissions. The estimate for the Forcett-Dunalley fire (this study) has also been compared with estimates from the FullCAM model that is used in Australia for national GHG accounting.

Fire event (BA)	CO ₂ emissions		PM _{2.5} emissions	
	Emission (Tg)	Area-normalized (t ha ⁻¹)	Emission (Tg)	Area-normalised (t ha ⁻¹)
Australia				
This study (20,200 ha)	1.125	55.7 142 (<i>FullCAM</i>)	0.022 ± 0.006	1.08
2003 Canberra forest fire [1] (260,000)	20.2	78	-	-
2009 Black Saturday fires, Victoria [2] (267,200 -GFED)	18	67.4	-	-
2019-2020 Eastern Australian <i>Euc.</i> Fires [1] (7.4 M)	850 940 CO ₂ -e	115 130 CO ₂ -e	-	-
2013 <i>Euc.</i> forest fire, Victoria [3]	-	105 -long-unburnt 42 -fuel-reduced		
Four 2015 prescribed fires in Victorian forests [4] (56-293)	-	-	-	0.073–0.164
Regeneration fire in southern Tasmanian native forest [5] (1,127)	-	-	0.008	6.91
2000-2004 Western Arnhem savanna fires [6] (2,389,300)	0.272 CO ₂ -e p.a.	0.11	-	-

References

1. Commonwealth of Australia: **Estimating greenhouse gas emissions from bushfires in Australia's temperate forests: focus on 2019-20**: Department of Industry, Science, Energy and Resources; 2020.
2. Paton-Walsh C, Emmons LK, Wiedinmyer C: **Australia's Black Saturday fires – Comparison of techniques for estimating emissions from vegetation fires**. *Atmos Environ* 2012, **60**:262-270.

3. Volkova L, Meyer CM, Murphy S, Fairman T, Reisen F, Weston C: **Fuel reduction burning mitigates wildfire effects on forest carbon and greenhouse gas emission.** *Int J Wildland Fire* 2014, **23**(6):771-780.
4. Reisen F, Meyer CP, Weston CJ, Volkova L: **Ground-Based Field Measurements of PM_{2.5} Emission Factors From Flaming and Smoldering Combustion in Eucalypt Forests.** *J Geophys Res Atmos* 2018, **123**(15):8301-8314.
5. Meyer CP, Reisen F, Keywood MD, Crumeyrolle S: **Impacts of smoke from regeneration burning on air quality in the Huon Valley, Tasmania.** CSIRO, Melbourne, Australia; 2011.
6. Russell-Smith J, Murphy BP, Meyer CP, Cook GD, Maier S, Edwards AC, Schatz J, Brocklehurst P: **Improving estimates of savanna burning emissions for greenhouse accounting in northern Australia: limitations, challenges, applications.** *Int J Wildland Fire* 2009, **18**(1):1-18.