

**Supplementary Information for**  
**Global CO<sub>2</sub> emissions from dry inland waters**  
**share common drivers across ecosystems**

**by**

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# Supplementary Tables

**Supplementary Table 1: CO<sub>2</sub> fluxes (FCO<sub>2</sub>) from dry and inundated inland water systems in the literature. Shown is the mean  $\pm$  standard deviation.**

System, condition and location	FCO <sub>2</sub> (mmol m <sup>-2</sup> d <sup>-1</sup> )	Reference
<b>Dry</b>		
Drawdown area of Nam Theun 2 reservoir, Laos	279 $\pm$ 27	Deshmukh et al., (2018) <sup>1</sup>
Drawdown area of CDU reservoir, wet season, Brazil	155	Almeida et al. (2019) <sup>2</sup>
Drawdown area of CDU reservoir, dry season, Brazil	203	Almeida et al. (2019) <sup>2</sup>
Intermittent kettle holes, dry phase, Germany	89 $\pm$ 20	Reverey et al., (2018) <sup>3</sup>
Intermittent ponds, annual cycle, Spain	48 $\pm$ 36	Catalan et al., (2014) <sup>4</sup>
	149 $\pm$ 111	Obrador et al., (2018) <sup>5</sup>
Dry areas of Boadella reservoir, summer, Spain	216 $\pm$ 177	Gómez-Gener et al., (2015) <sup>6</sup>
Dry areas of Soyang reservoir, extreme drought, South Korea	515 $\pm$ 377	Jin et al., (2016) <sup>7</sup>
Intermittent streams, summer, USA	44 $\pm$ 23	Gallo et al., (2014) <sup>8</sup>
Intermittent streams, after rain event, USA	569 $\pm$ 530	Gallo et al., (2014) <sup>8</sup>
Intermittent streams, summer, Spain	781 $\pm$ 390	Gómez-Gener et al., (2016) <sup>9</sup>
Intermittent stream, summer dry-wet cycles, Australia	72 $\pm$ 27	Looman et al. (2017) <sup>10</sup>
Intermittent streams, Spring & Summer, Italy	2.7 – 60.1	Bolpagni et al. (2016) <sup>11</sup>
<b>Inundated</b>		
Ponds, global estimate	35 $\pm$ 5.21	Holgerson & Raymond, (2016) <sup>12</sup>
Lakes, global estimate	18	Raymond et al., (2013) <sup>13</sup>
Reservoirs, global estimate	28 $\pm$ 37	Deemer et al., (2016) <sup>14</sup>
Streams, global estimate	663	Raymond et al., (2013) <sup>13</sup>

**Supplementary Table 2: Results from linear mixed effects models of CO<sub>2</sub> emission (FCO<sub>2</sub>). Estimates (B) and 95% confidence intervals (CI) are reported. Variables were log<sub>10</sub>- and z-transformed prior to analysis.**

Fixed parts	FCO <sub>2</sub>	
	<i>B</i>	<i>CI</i>
(Intercept)	0.04	-0.13 – 0.22
Elevation	-0.22	-0.36 – -0.08
Latitude	0.25	0.05 – 0.44
Conductivity	-0.14	-0.26 – 0.02
Temperature	0.3	0.18 – 0.42
Moisture	0.4	0.26 – 0.51
Organic matter	0.3	0.17 – 0.41
Interaction (Moisture : Organic matter)	0.23	0.14 – 0.32
Interaction (Moisture : Temperature)	0.12	0.02 – 0.22
Random parts		
$\sigma$	0.47	
$\sigma_{\text{Team}}$	0.13	

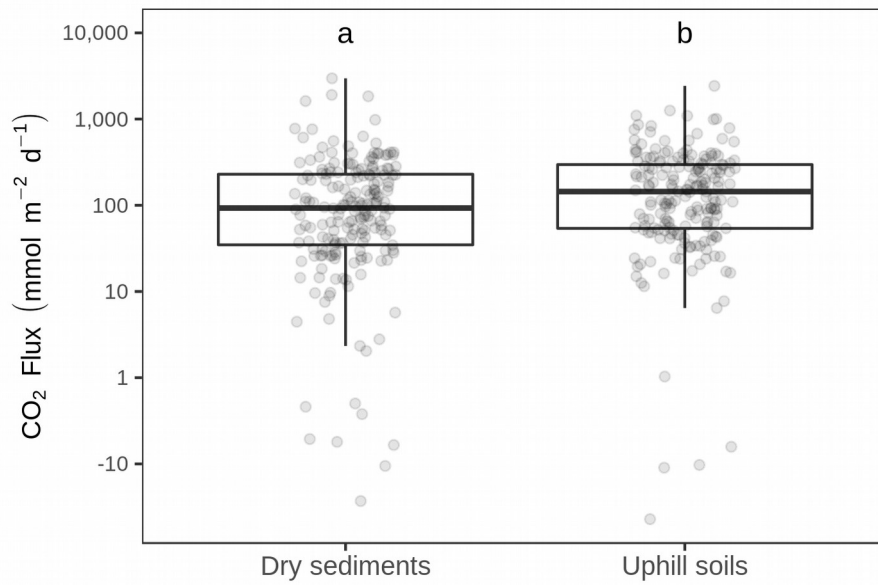
**Supplementary Table 3: Global estimate of CO<sub>2</sub> fluxes from dry inland waters. Shown is the mean  $\pm$  standard deviation.**

Type of system	Accumulated dry area during a year (including seasonal and permanent drying) (km <sup>2</sup> )	CO <sub>2</sub> emission rate (mmol m <sup>-2</sup> d <sup>-1</sup> )	Global C emission (Pg C y <sup>-1</sup> )
Streams and rivers	84,461 <sup>13</sup>	128 $\pm$ 218	0.047 $\pm$ 0.081
Lakes, reservoirs	187,542 <sup>15</sup>	207 $\pm$ 405	0.052 $\pm$ 0.1
Ponds	18,390 <sup>15</sup>	267 $\pm$ 221	0.022 $\pm$ 0.018
Total	290,393		0.12 $\pm$ 0.13

**Supplementary Table 4: Environmental variables used for modeling CO<sub>2</sub> emissions.**

<b>Variable</b>	<b>Source</b>	<b>Present in final model</b>
Sediment temperature	Measured <i>in situ</i>	
LOI	Measured <i>in situ</i>	X
Moisture	Measured <i>in situ</i>	X
pH	Measured <i>in situ</i>	
Conductivity	Measured <i>in situ</i>	X
Texture	Measured <i>in situ</i>	
Air temperature	Measured <i>in situ</i>	X
Elevation	Determined locally	X
Latitude	Determined locally	X
Type of system	Determined locally	
Annual precipitation	Worldclim <sup>16</sup>	
Annual mean temperature	Worldclim <sup>16</sup>	
Climate zone	Köppen-Geiger <sup>17</sup>	

# Supplementary Figures



**Supplementary Figure 1: CO<sub>2</sub> flux from dry inland waters and uphill soils.** Box = 25th and 75th percentiles, whiskers = 1.5 \* inter-quartile range. Black line = median. Letters indicate significant differences between systems. (Wilcoxon signed rank test,  $P < 0.05$ ). Note log<sub>10</sub>-scale in y-axis.

## Supplementary References

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