



*Supplement of*

## **Sources of nitrous oxide and the fate of mineral nitrogen in subarctic permafrost peat soils**

**Jenie Gil et al.**

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**Table S1.** Gross N process rates from bare peat (BP). Values are mean of three plots (n = 3).

(a) in units of  $\mu\text{g N cm}^{-3} \text{ d}^{-1}$

		Mineralization ( $\mu\text{g N cm}^{-3} \text{ d}^{-1}$ )	$\text{NH}_4^+$ consumption ( $\mu\text{g N cm}^{-3} \text{ d}^{-1}$ )	Nitrification ( $\mu\text{g N cm}^{-3} \text{ d}^{-1}$ )	$\text{NO}_3^-$ consumption ( $\mu\text{g N cm}^{-3} \text{ d}^{-1}$ )
<b>24 hours</b>	<b>average</b>	8.76	8.10	0.30	0.23
	<b>std</b>	2.36	1.93	0.42	0.84
	<b>se</b>	1.36	1.11	0.24	0.48
<b>72 hours</b>	<b>average</b>	3.3	3.5	0.9	0.9
	<b>std</b>	2.0	2.7	0.9	0.5
	<b>se</b>	1.1	1.6	0.5	0.3
<b>120 hours</b>	<b>average</b>	5.19	5.63	0.15	0.02
	<b>std</b>	0.49	0.88	0.08	0.24
	<b>se</b>	0.28	0.51	0.05	0.14
<b>216 hours</b>	<b>average</b>	1.87	1.97	0.02	-0.17
	<b>std</b>	0.62	0.79	0.17	0.36
	<b>se</b>	0.36	0.45	0.10	0.21
<b>360 hours</b>	<b>average</b>	1.45	1.13	0.00	-0.09
	<b>std</b>	0.63	0.80	0.13	0.23
	<b>se</b>	0.37	0.46	0.07	0.13
<b>24 days</b>	<b>average</b>	0.88	0.79	0.10	0.11
	<b>std</b>	0.29	0.27	0.05	0.07
	<b>se</b>	0.17	0.16	0.03	0.04

(b) in units of  $\mu\text{g N cm}^{-3} \text{ d}^{-1}$

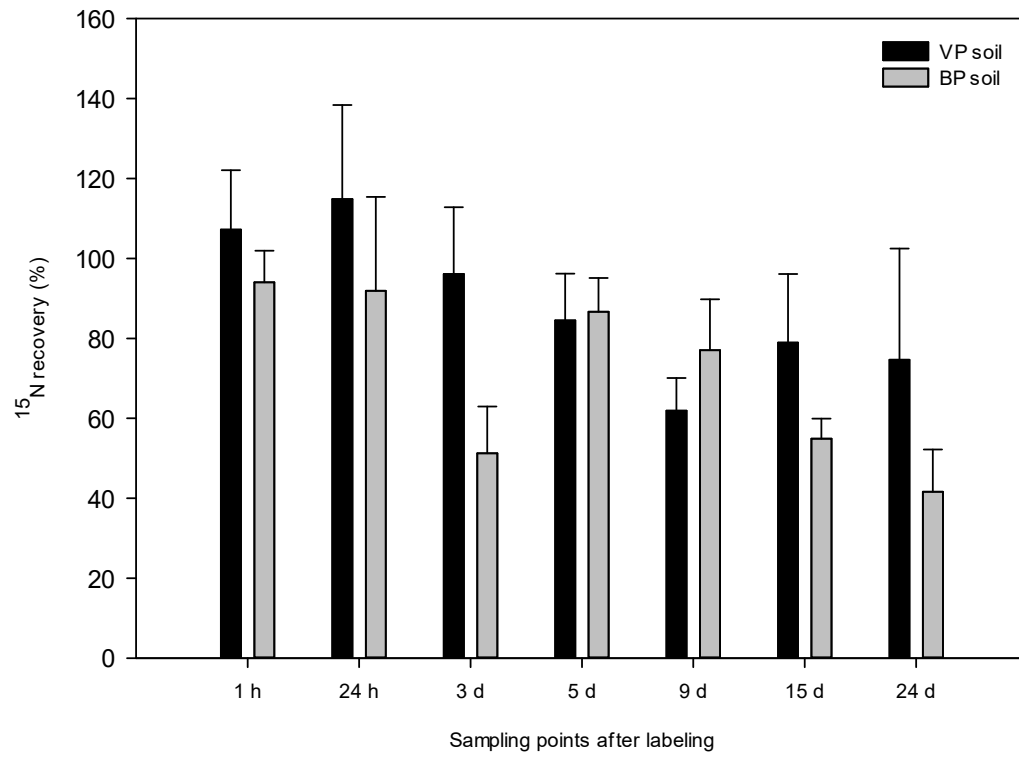
		Mineralization ( $\mu\text{g N g}^{-1} \text{ dw}^{-1}$ )	$\text{NH}_4^+$ consumption ( $\mu\text{g N g}^{-1} \text{ dw}^{-1}$ )	Nitrification ( $\mu\text{g N g}^{-1} \text{ dw}^{-1}$ )	$\text{NO}_3^-$ consumption ( $\mu\text{g N g}^{-1} \text{ dw}^{-1}$ )
<b>24 hours</b>	<b>average</b>	32.45	29.98	1.11	0.84
	<b>std</b>	8.72	7.13	1.57	3.11
	<b>se</b>	5.04	4.12	0.91	1.79
<b>72 hours</b>	<b>average</b>	12.27	12.97	3.21	3.41
	<b>std</b>	7.31	9.98	3.27	1.98
	<b>se</b>	4.22	5.76	1.89	1.14
<b>120 hours</b>	<b>average</b>	19.23	20.84	0.55	0.07
	<b>std</b>	1.80	3.27	0.31	0.89
	<b>se</b>	1.04	1.89	0.18	0.51
<b>216 hours</b>	<b>average</b>	6.94	7.31	0.08	0.00
	<b>std</b>	2.28	2.92	0.63	1.33
	<b>se</b>	1.32	1.68	0.36	0.77
<b>360 hours</b>	<b>average</b>	5.36	4.18	0.00	0.00
	<b>std</b>	2.35	2.96	0.47	0.85
	<b>se</b>	1.36	1.71	0.27	0.49
<b>24 days</b>	<b>average</b>	3.26	2.91	0.38	0.42
	<b>std</b>	1.06	1.00	0.19	0.26
	<b>se</b>	0.61	0.58	0.11	0.15

**Table S2.** Gross N process rates from vegetated peat (VP). Values are mean of three plots (n = 3)(a) in units of  $\mu\text{g N cm}^{-3} \text{ d}^{-1}$ 

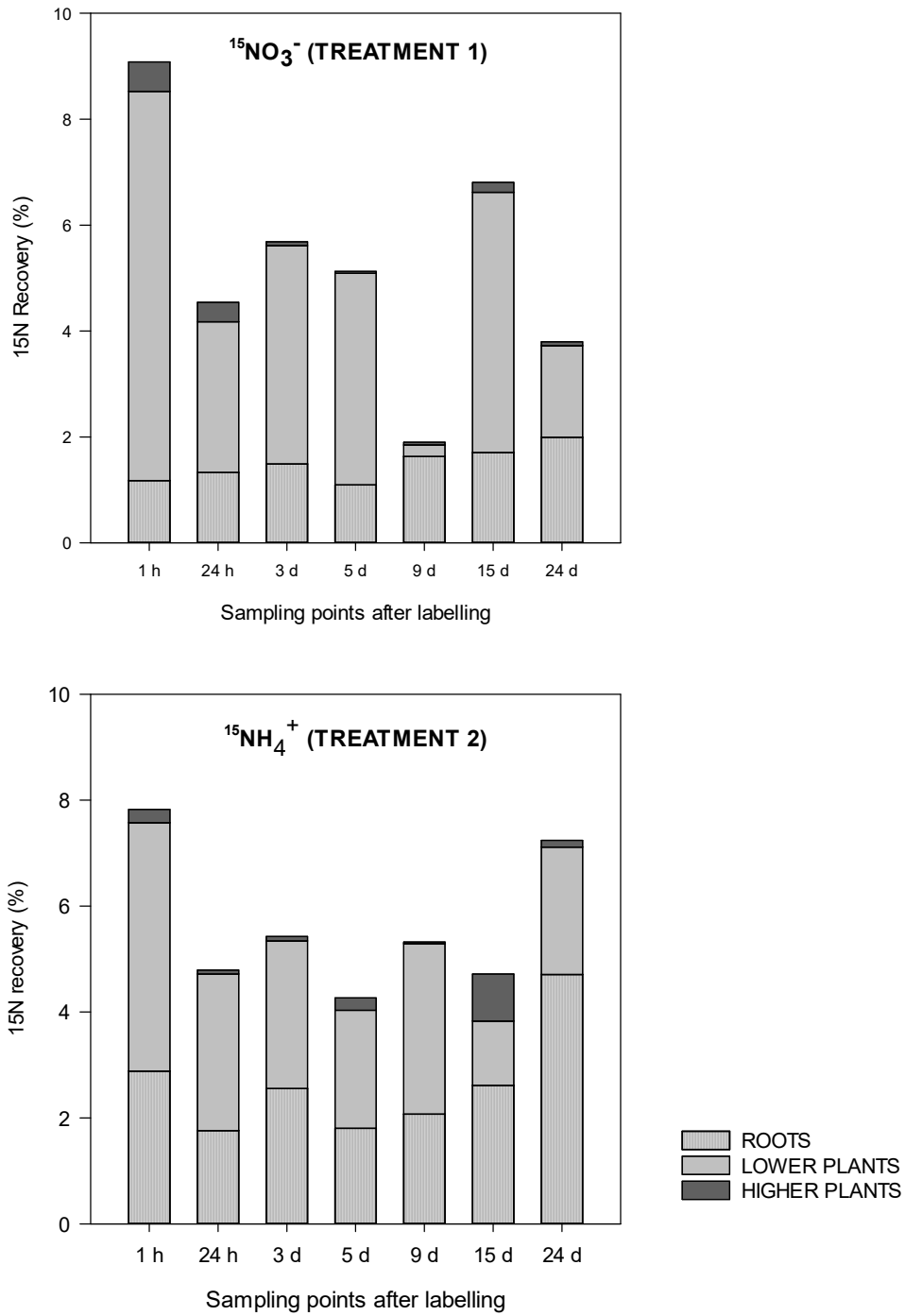
		Mineralization ( $\mu\text{g N cm}^{-3} \text{ d}^{-1}$ )	$\text{NH}_4^+$ consumption ( $\mu\text{g N cm}^{-3} \text{ d}^{-1}$ )	Nitrification ( $\mu\text{g N cm}^{-3} \text{ d}^{-1}$ )	$\text{NO}_3^-$ consumption ( $\mu\text{g N cm}^{-3} \text{ d}^{-1}$ )
<b>24 hours</b>	<b>average</b>	0.00	0.00	0.02	0.04
	<b>std</b>	1.94	3.32	0.13	0.13
	<b>se</b>	1.12	1.92	0.08	0.08
<b>72 hours</b>	<b>average</b>	0.5	0.4	0.0	0.0
	<b>std</b>	1.0	1.0	0.0	0.0
	<b>se</b>	0.6	0.6	0.0	0.0
<b>120 hours</b>	<b>average</b>	1.15	1.11	0.00	0.00
	<b>std</b>	0.76	0.66	0.01	0.01
	<b>se</b>	0.44	0.38	0.01	0.01
<b>216 hours</b>	<b>average</b>	0.63	0.63	0.00	0.00
	<b>std</b>	0.46	0.43	0.00	0.00
	<b>se</b>	0.26	0.25	0.00	0.00
<b>360 hours</b>	<b>average</b>	0.37	0.36	0.00	0.00
	<b>std</b>	0.25	0.25	0.01	0.00
	<b>se</b>	0.15	0.14	0.00	0.00
<b>24 days</b>	<b>average</b>	0.22	0.23	0.00	0.00
	<b>std</b>	0.18	0.15	0.00	0.00
	<b>se</b>	0.10	0.09	0.00	0.00

(b) in units of  $\mu\text{g N cm}^{-3} \text{ d}^{-1}$ 

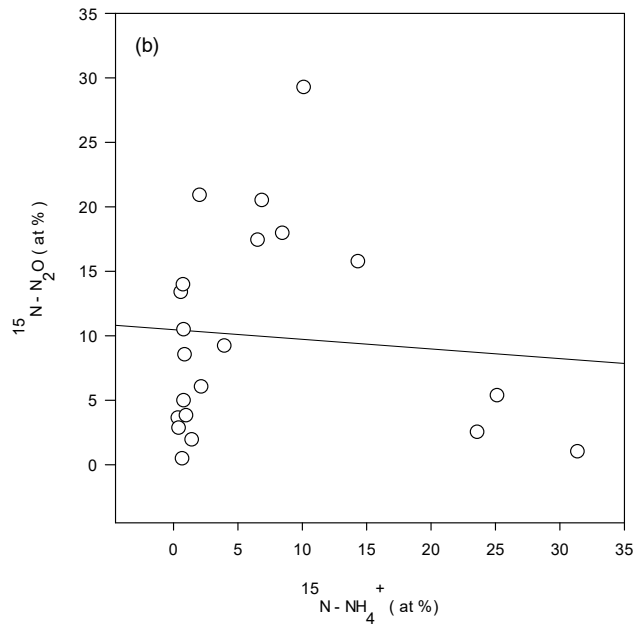
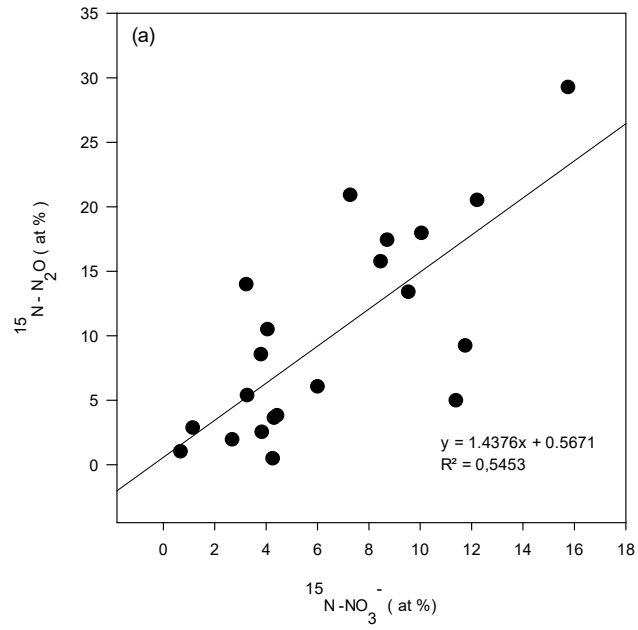
		Mineralization ( $\mu\text{g N g}^{-1} \text{ dw}^{-1}$ )	$\text{NH}_4^+$ consumption ( $\mu\text{g N g}^{-1} \text{ dw}^{-1}$ )	Nitrification ( $\mu\text{g N g}^{-1} \text{ dw}^{-1}$ )	$\text{NO}_3^-$ consumption ( $\mu\text{g N g}^{-1} \text{ dw}^{-1}$ )
<b>24 hours</b>	<b>average</b>	0.00	0.00	0.43	0.87
	<b>std</b>	38.70	66.35	2.61	2.61
	<b>se</b>	22.34	38.31	1.51	1.51
<b>72 hours</b>	<b>average</b>	10.96	8.60	0.00	0.20
	<b>std</b>	19.21	19.42	0.45	0.45
	<b>se</b>	11.09	11.21	0.26	0.26
<b>120 hours</b>	<b>average</b>	22.97	22.22	0.00	0.00
	<b>std</b>	15.15	13.15	0.18	0.18
	<b>se</b>	8.75	7.60	0.10	0.10
<b>216 hours</b>	<b>average</b>	12.63	12.63	0.08	0.10
	<b>std</b>	9.18	8.62	0.08	0.08
	<b>se</b>	5.30	4.98	0.05	0.05
<b>360 hours</b>	<b>average</b>	7.33	7.21	0.06	0.06
	<b>std</b>	5.10	4.93	0.14	0.05
	<b>se</b>	2.94	2.84	0.08	0.03
<b>24 days</b>	<b>average</b>	4.46	4.62	0.07	0.08
	<b>std</b>	3.53	2.96	0.06	0.06
	<b>se</b>	2.04	1.71	0.03	0.03



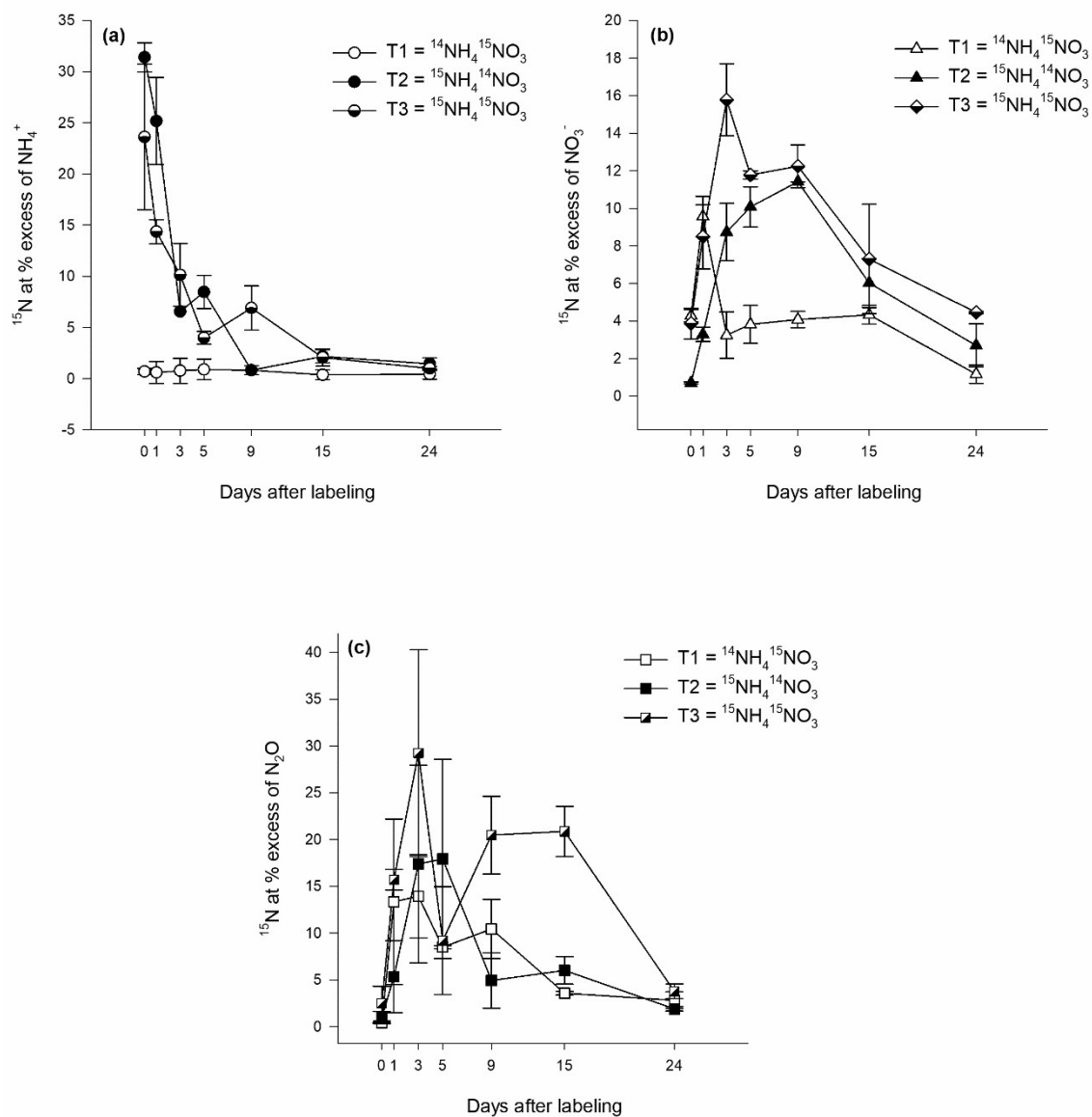
**Figure S1.** Average  $^{15}\text{N}$  recovery (%) from applied label from treatment 1 ( $\text{NH}_4^{15}\text{NO}_3$ ) and treatment 2 ( $^{15}\text{NH}_4\text{NO}_3$ ) for bare peat (BP) and vegetated peat (VP) soil. Error bars represent +1 SE of six replicates.



**Figure S2.** Distribution of the  $^{15}\text{N}$  label recovered from the plants in the vegetated peat soil (VP) for treatment 1 ( $\text{NH}_4^{15}\text{NO}_3$ ) and treatment 2 ( $^{15}\text{NH}_4\text{NO}_3$ ).



**Figure S3.** Correlation between  $^{15}\text{N}$  at % in  $\text{N}_2\text{O}$  and mineral N ( $\text{NO}_3^-$  and  $\text{NH}_4^+$ ) from all treatments.



**Figure S4.**  $^{15}\text{N}$  at % excess (APE) of (a)  $\text{NH}_4^+$  (b)  $\text{NO}_3^-$  and (c)  $\text{N}_2\text{O}$  during the sampling period for all three treatments applied in BP. (Values are mean  $\pm$  S.E,  $n=3$ ). Only data from treatment 1 ( $\text{T1} = ^{15}\text{N}\text{-NO}_3^-$ ) and treatment 2 ( $\text{T2} = ^{15}\text{N}\text{-NH}_4^+$ ) was used in the calculations of the gross N transformation rates.