

Supplement to manuscript “Vegetation, drainage and peat depth control ecosystem scale nitrogen loading from a cultivated peatland”

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1 Sensor calibration

Table S1. Summary of the laboratory samples. Values indicate median of all samples and in parentheses full range of observations. Concentration in the units mg l⁻¹

	Overall N = 50	Block-1 N = 10	Block-2 N = 8	Block-3 N = 8	Block-4 N = 12	Block-5 N = 9	Block-6 N = 3
DOC	28 (22, 39)	39 (27, 49)	47 (39, 53)	19 (16, 27)	24 (21, 28)	24 (23, 30)	28 (20, 32)
NO ₃ -N	6 (1, 10)	3 (1, 8)	19 (3, 26)	8 (3, 13)	6 (2, 11)	6 (1, 6)	4 (1, 5)
Date	2023-05-30,2024-12-09	2023-05-30,2024-11-11	2023-10-10,2024-11-11	2023-05-30,2024-12-09	2023-05-30,2024-12-09	2023-09-11,2024-10-22	2023-10-11,2024-04-09

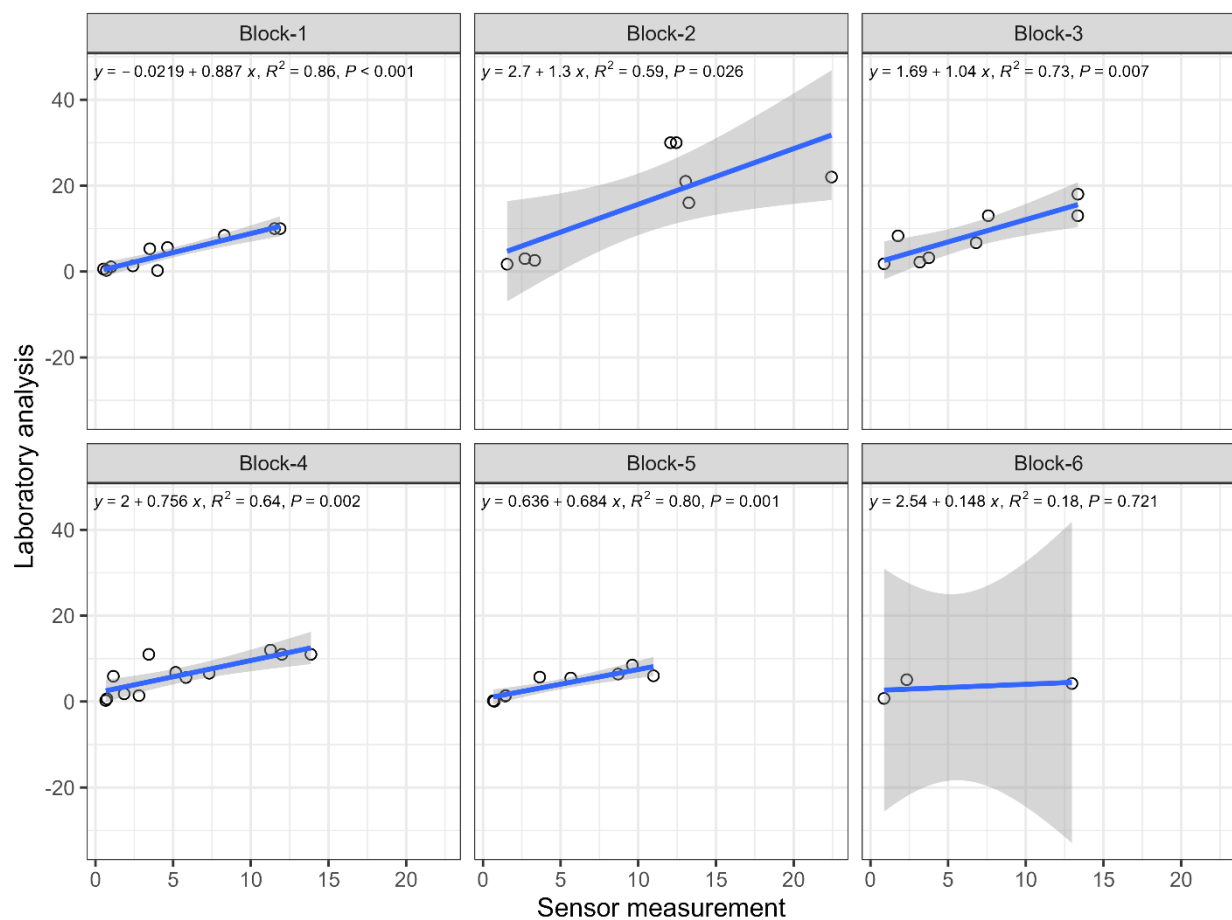


Figure S1. Sensor calibration data for NO₃-N sensor calibration for each drainage block. Measurements in mg NO₃-N l⁻¹

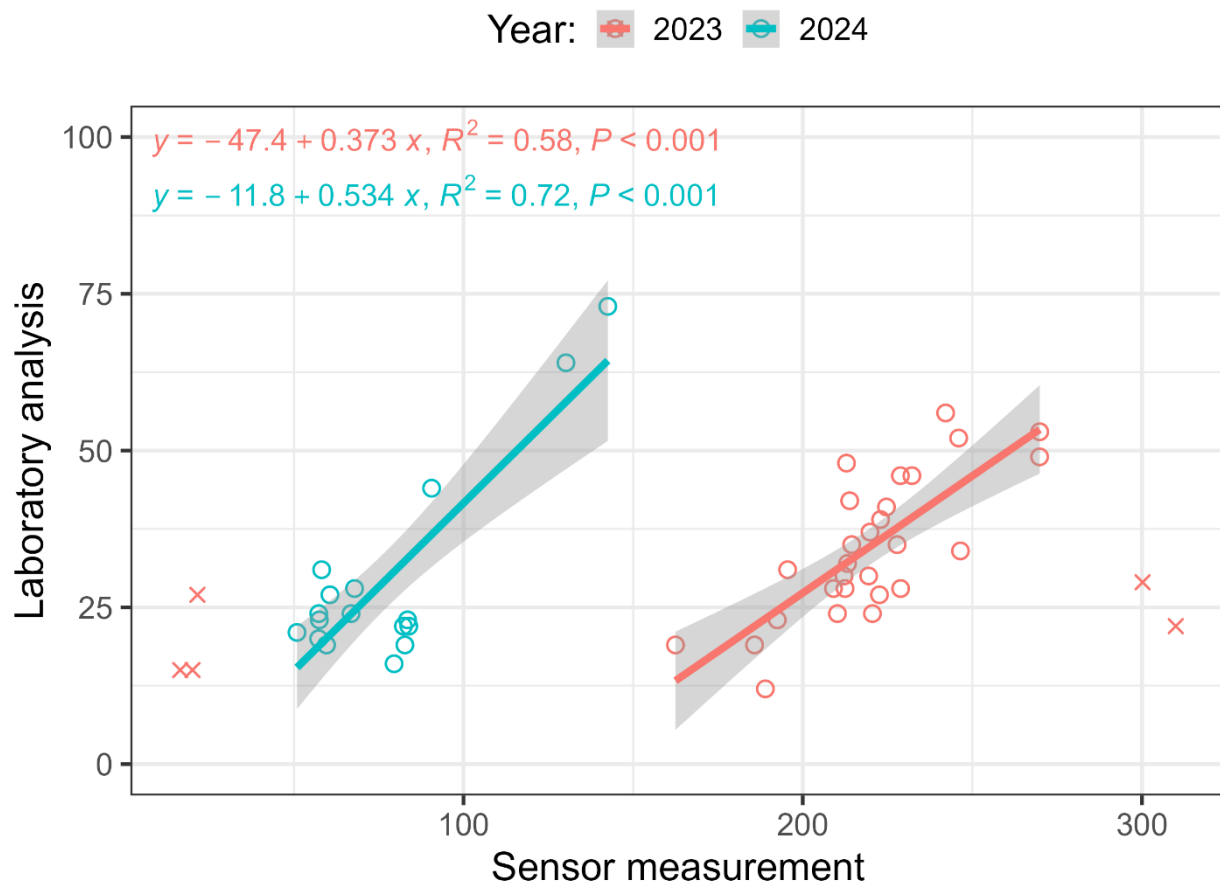


Figure S2. Laboratory dissolved organic carbon DOC in units mg C l⁻¹ used versus optical sampler carbon parameter. Samples marked with X are omitted from the year 2023 regression. Group of three omitted samples were taken on 30th May 2023, and group of two omitted samples were sampled of 27th September 2023.

2 Management impact to N-NO₃ leaching

Table S2. Summary statistics for parameters related to drain nitrate leaching. First 402 days had average drainage depth in the field set to 80 cm depth and last 332 days drainage depth was set to average 30 cm depth. Values show are mean values and, in the parenthesis, full range of observations.

	Average drainage depth 30 cm N = 1,869 ^I	Average drainage depth 80 cm N = 2,495 ^I
Precipitation [mm d ⁻¹]	1.44 (0.00,26.00)	1.51 (0.00,42.57)
Drain discharge [mm d ⁻¹]	0.18 (0.00, 8.35)	0.78 (0.00, 20.34)
Water table depth [m]	0.84 (0.04, 1.90)	0.69 (0.00, 1.83)
Drain N-NO ₃ concentration [mg l ⁻¹]	1.7 (0.0, 19.5)	2.7 (0.0, 28.9)

3 Event and Spatial heterogeneity of leaching across blocks

Table S2. Input and output during two mobilization events during the monitoring period. Snow water equivalent (SWE) is measured close to the beginning of the monitoring start in spring 2023.

	Block	1	2	3	4	5	6
Spring 2023	SWE [mm] (2023-04-11)	71	48	47	38	35	40
	Water input (SWE + P)	142	119	118	109	106	111
	Drain discharge (mm)	139	49	45	114	62	0.3
	NO ₃ -N output (kg ha ⁻¹)	12.3	7.5	6.9	11.2	8.1	0.005
Winter 2025	Precipitation (mm)	142					
	Drain discharge (mm)	11.3	6.01	45.8	86.8	24.6	1.77
	NO ₃ -N output (kg ha ⁻¹)	0.417	0.487	1.28	1.63	0.848	0.0204

4 Co-variation of drainage N-NO₃ and atmospheric N₂O concentrations

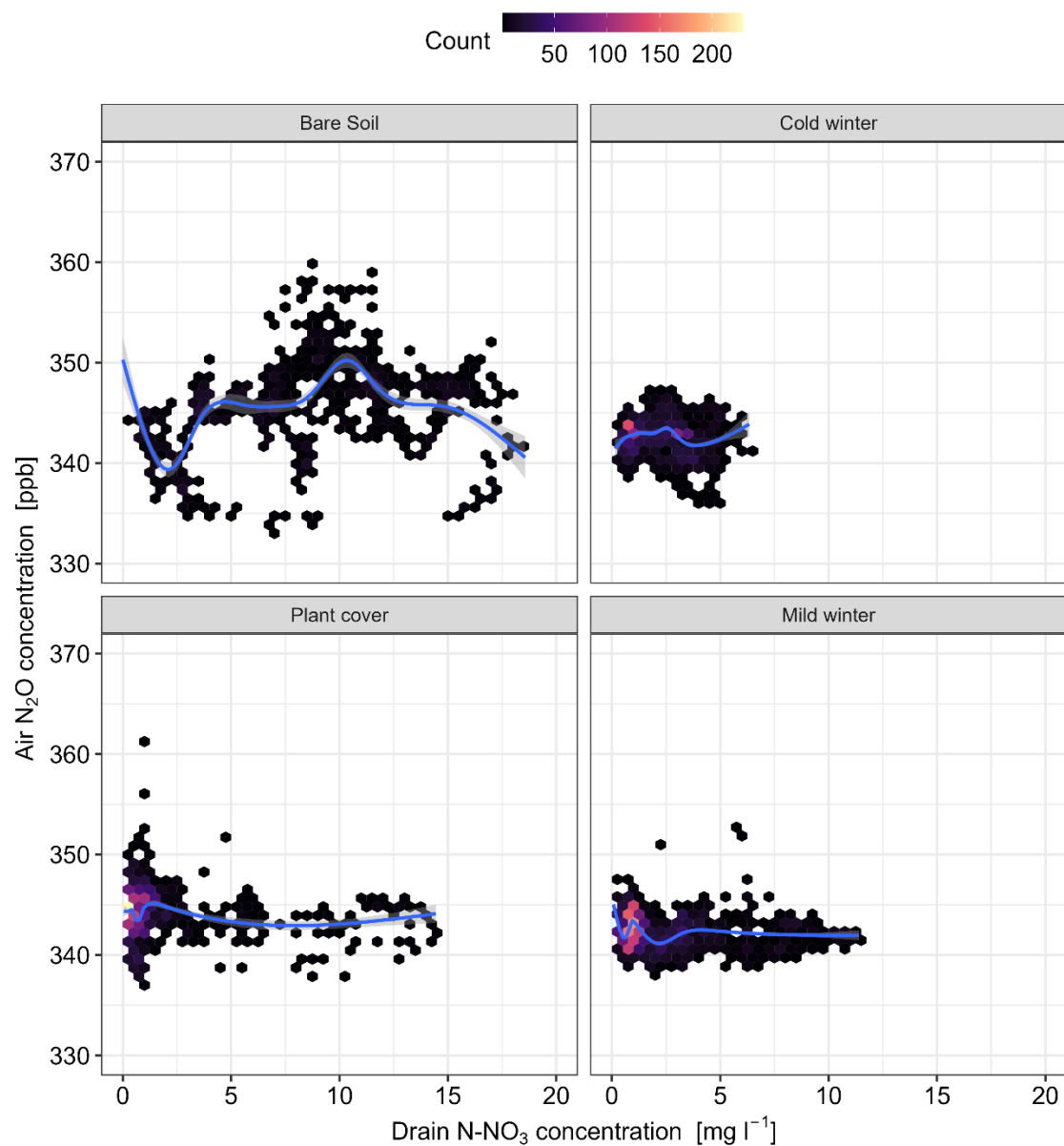


Figure S3. Heatmap of simultaneous drain N-NO₃ and air N₂O observations. Colour of the bin marks the number of observations within the bin.