

An underestimated contribution of deltaic denitrification in reducing nitrate export to the coastal zone (Po River-Adriatic Sea, Northern Italy)

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Supplementary Material

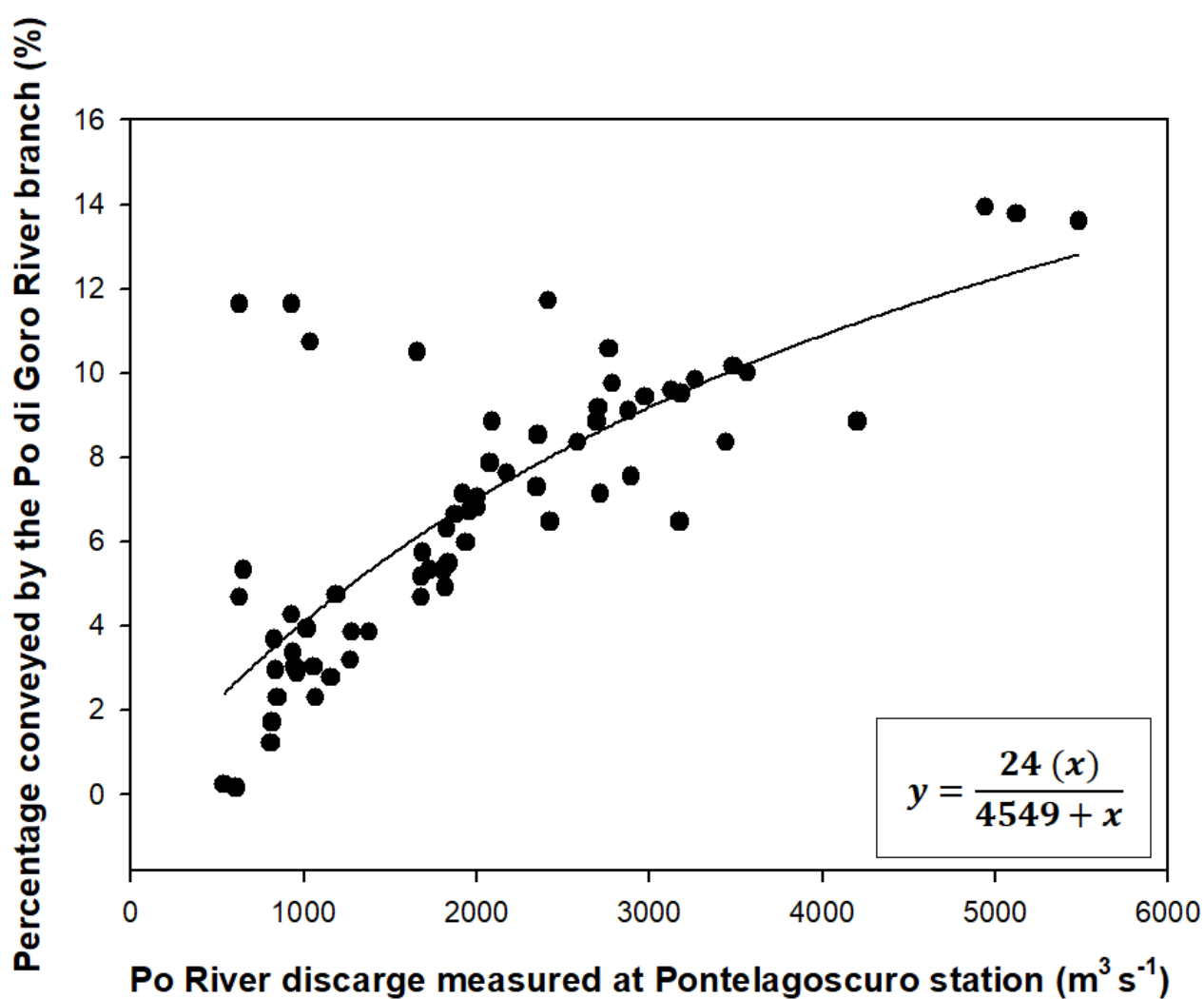


Figure S1: Relation between the Po River discharge measured at Pontelagoscuro station and the percentage conveyed by the Po di Goro branch (data from [1]).

Table S1: Total denitrification rates measured via Isotope Pairing Technique in different aquatic ecosystems of the Po River basin during the period of the highest temperature of the year (CW, connected wetlands; IW, isolated wetlands; R, rivers; LK, lakes; LG, lagoons). Main sediment and water features are reported for comparison. SOD and Dt_{tot} are expressed as average values with associated standard deviation (in brackets).

Type	Location	T (°C)	NO ₃ ⁻ (μM)	OM (%)	SOD (μmol O ₂ m ⁻² h ⁻¹)	Dt _{tot} (μmol N m ⁻² h ⁻¹)	References
CW	Gabbioneta (oxbow lake)	25.0	378	10.71	3240 ± 530	1888 ± 628	[2]
CW	Gerre Gavazzi (oxbow lake)	23.0	849	11.26	1540 ± 90	448 ± 338	
CW	Runate dx (oxbow lake)	23.0	390	1.47	1460 ± 70	384 ± 134	
CW	Runate sn (oxbow lake)	24.0	729	8.13	2530 ± 520	707 ± 221.87	
CW	Cà Nuove Bernini (pond)	26.0	1048	13.51	2010 ± 360	329 ± 197	
IW	Bine (oxbow lake)	26.0	4	16.32	2500 ± 320	24 ± 5	
IW	Mosio (marsh)	25.0	9	5.77	3700 ± 200	106 ± 26	
IW	Marcaria (marsh)	25.0	147	33.18	2420 ± 320	231 ± 24	
IW	Belforte (marsh)	25.0	2	19.20	3040 ± 130	9 ± 3	
IW	Gerre de' Caprioli (oxbow lake)	22.0	2	8.61	1580 ± 190	17 ± 1	
IW	Lancone (oxbow lake)	27.0	1	12.24	1590 ± 210	13 ± 2	
IW	Lazzaretto (pond)	27.0	8	23.40	2830 ± 80	27 ± 2	
IW	Gerre Ugolani (pond)	23.0	2	8.81	3620 ± 310	14 ± 4	
IW	Cà de' Gatti (pond)	23.0	29	27.51	3070 ± 710	192 ± 68	
IW	Cascina S. Margherita (pond)	27.0	2	13.57	1810 ± 110	50 ± 22	
IW	Ostiglia (marsh)	25.0	9	34.80	2410 ± 200	54 ± 15	
R	Bogina canal	24.0	113	6.43	1810 ± 110	338 ± 102	
R	Mincio River	24.0	9	17.80	-	38 ± 3	
CW	Middle Lake	25.9	163	15.00	962 ± 85	405 ± 21	[3]
CW	Middle Lake	29.1	3	15.00	1667 ± 85	58 ± 5	
CW	Middle Lake	22.2	50	15.00	1196 ± 85	329 ± 25	
R	Mincio River	22.4	122	9.30	1780 ± 210	340 ± 99	[4]
R	Mincio River	25.1	124	9.30	3000 ± 830	359 ± 97	
R	Fornaro canal	26.4	39	-	3390 ± 930	282 ± 99	[5]
R	Codrea canal	23.2	57	-	2220 ± 500	138 ± 36	
R	Quartesane canal	21.8	57	-	2870 ± 260	201 ± 36	
R	Fossa Lavezzola canal	23.0	11	-	-	45 ± 27	
R	Spring-fed canal 1	17.1	395	4.22	2660 ± 490	480 ± 130	[6]
R	Spring-fed canal 2	17.1	386	0.73	1350 ± 420	60 ± 20	
LK	Bosco della Lite (pit lake)	27.0	56	3.11	2270 ± 130	114 ± 8	[7]
LK	Ca' Morta (pit lake)	27.0	92	2.12	1290 ± 400	191 ± 32	

LK	Isola Giarola (pit lake)	27.0	51	3.23	2400 ± 440	159 ± 34	
LK	Ca' Stanga (pit lake)	27.0	144	2.51	1870 ± 00	316 ± 37	
LK	Lake Verde (pit lake)	27.0	156	2.01	1960 ± 220	224 ± 18	
LK	Lake Idro	23.0	54	6.82	-	96 ± 11	[8]
LK	Piacenza pit lake	27.0	155	2.10	2400 ± 280	326 ± 51	[9]
LG	Sacca di Goro lagoon - Giralda	26.0	19	6.40	4800 ± 250	308	[10]
LG	Sacca di Goro lagoon - Giralda	27.0	14	6.40	-	79	
LG	Sacca di Goro lagoon - Gorino	28.0	24	4.40	-	28	
LG	Sacca di Goro lagoon - Gorino	22.0	11	4.40	-	107	
LG	Sacca di Goro lagoon - Giralda	27.0	1	3.00	6000 ± 1200	8	[11]
LG	Sacca di Goro lagoon - Gorino	26.0	2	-	5000 ± 1000	10 ± 2	
LG	Sacca di Goro lagoon - Goro-10	20.0	54	1.36	7330 ± 1410	223 ± 7	[12]
LG	Sacca di Goro lagoon - Goro-13	21.0	34	1.74	14650 ± 3110	124 ± 11	
LG	Sacca di Goro lagoon - Goro-15	21.0	40	2.38	11350 ± 1200	175 ± 5	
LG	Sacca di Goro lagoon - Goro-16	20.0	35	0.92	11450 ± 3310	102 ± 27	
LG	Sacca di Goro lagoon - Goro-21	20.0	1	1.62	6730 ± 1810	14 ± 1	
LG	Sacca di Goro lagoon - Gorino	25.0	47	3.00	3920 ± 300	217 ± 43	[13]
LG	Sacca di Goro lagoon - Giralda	23.0	26	-	4290 ± 870	70 ± 13	
R	Drainage canal	26.0	50	-	-	512 ± 236	[14]
R	Drainage canal	27.0	100	-	-	855 ± 130	
R	Drainage canal	28.0	200	-	-	1101 ± 98	
R	Drainage canal	29.0	300	-	-	1671 ± 230	
R	Drainage canal	30.0	500	-	-	1600 ± 366	

Table S2: Summary of benthic fluxes and denitrification rates measured in the Po di Goro. Average values ± standard deviations are reported.

Site	Parameter						
	NO ₃ ⁻ (μmol N m ⁻² h ⁻¹)	N ₂ (μmol N m ⁻² h ⁻¹)	NH ₄ ⁺ (μmol N m ⁻² h ⁻¹)	Dw (μmol N m ⁻² h ⁻¹)	Dn (μmol N m ⁻² h ⁻¹)	Dtot (μmol N m ⁻² h ⁻¹)	SOD (μmol O ₂ m ⁻² h ⁻¹)
M	- 402 ± 169	424 ± 103	444 ± 194	294 ± 94	128 ± 57	422 ± 99	2731 ± 521
G	- 397 ± 193	373 ± 250	821 ± 478	305 ± 123	0	305 ± 123	3111 ± 815
LV	- 83 ± 41	57 ± 42	656 ± 171	95 ± 13	10 ± 8	105 ± 5	2759 ± 234

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