

Supplement of

A Comprehensive Global Aquatic N₂O Emission Database (GANED): Unravelling N₂O Emission Patterns from Different Water Bodies

Jing Wei et al.

5 *Correspondence to:* *Jing Wei (sarawei.em@gmail.com)

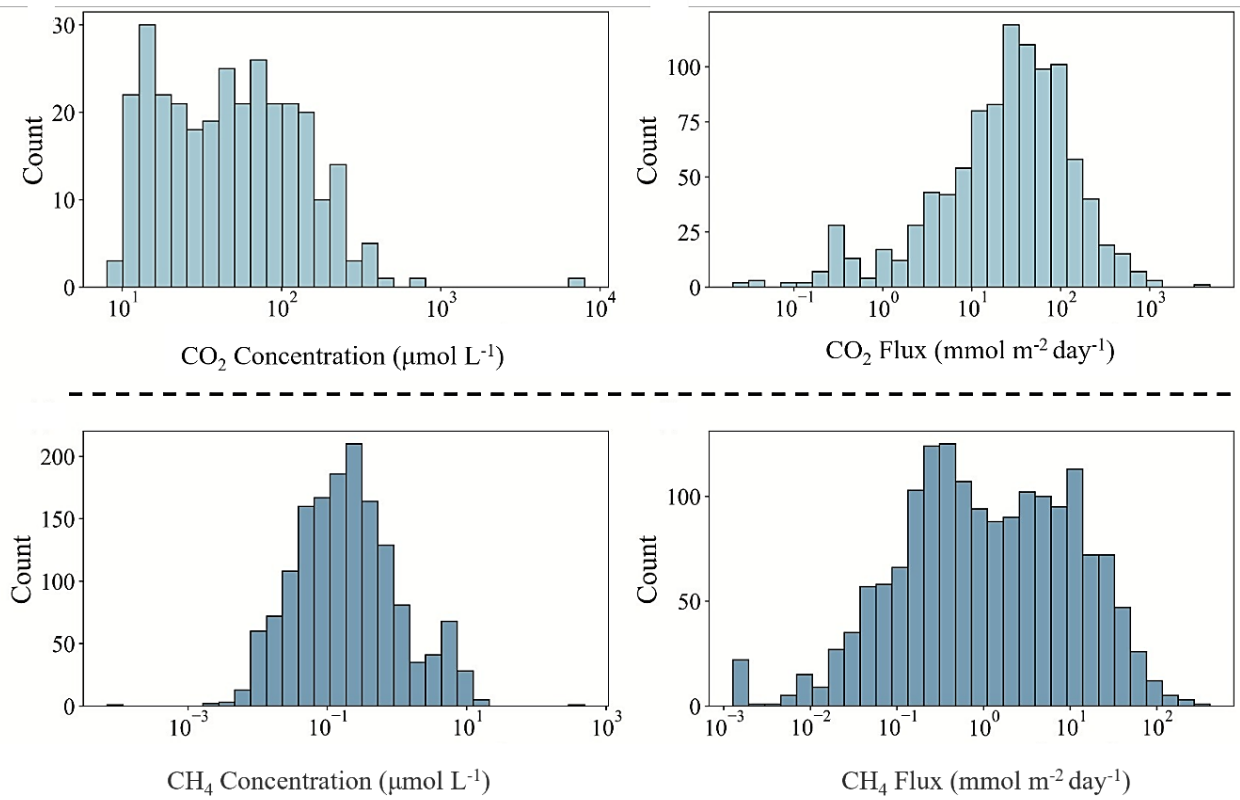
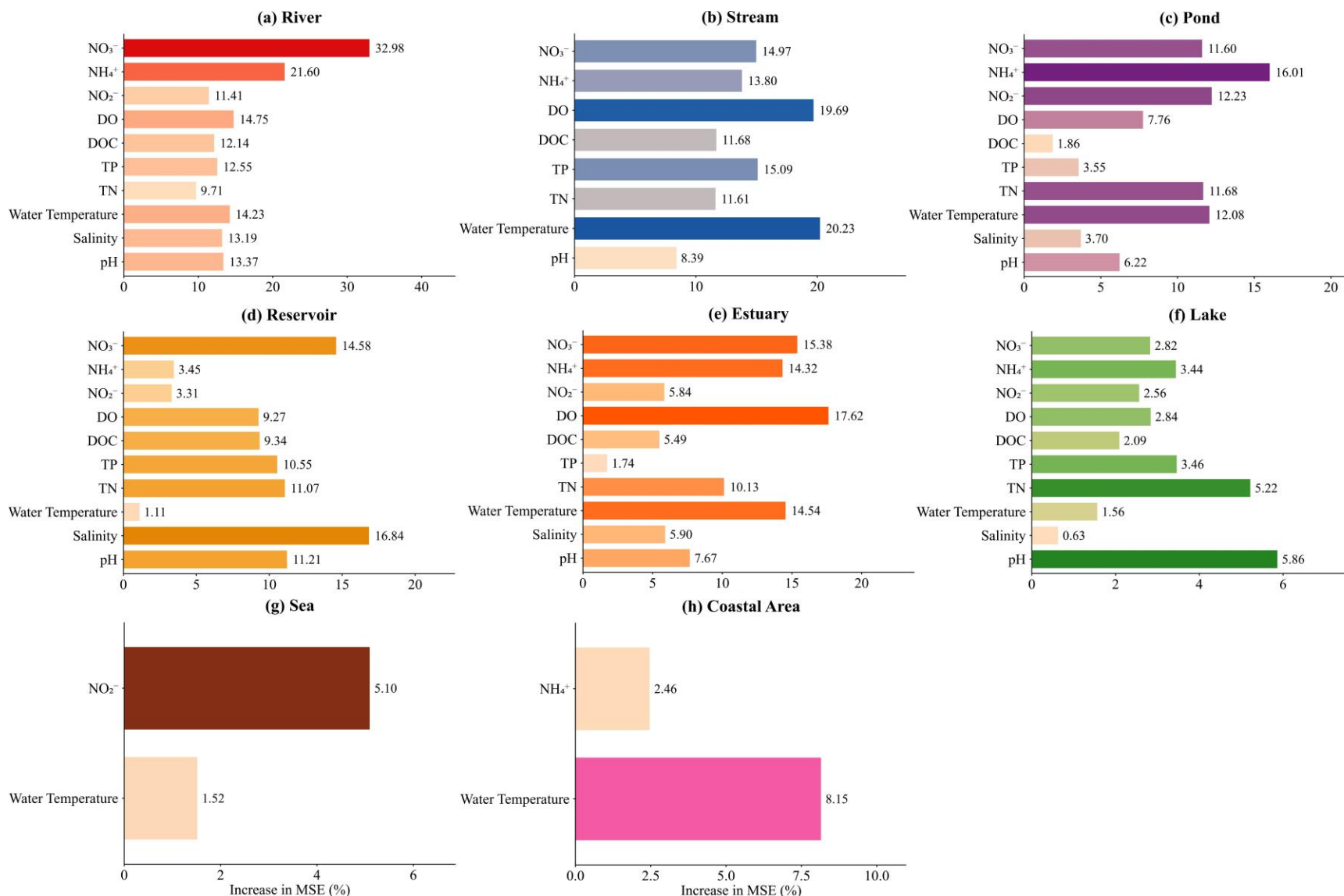


Figure S1: Histograms of CO₂, CH₄ concentrations and fluxes in GANED, excluding values reported as below detection limits or zero



10
 11 **Figure S2: Random Forest (RF) permutation feature importance (% increase in mean squared error, MSE%) for predicting N₂O flux in GANED, stratified by aquatic**
 12 **types (a) River, (b) Stream, (c) Pond, (d) Reservoir, (e) Estuary, (f) Lake (g) Sea, and (h) Coastal Area. Only systems with sufficient complete cases are shown with full**
 13 **predictor sets. Predictor abbreviations: Nitrate, NO₃⁻; ammonium, NH₄⁺; nitrite, NO₂⁻; Temp., Water temperature; Sal, salinity; dissolved oxygen, DO; dissolved organic**
 14 **carbon, DOC; total phosphorus, TP; total nitrogen, TN; and pH.**

15 **Table S1. Summary statistics for CO₂, and CH₄, concentrations and fluxes.**

Gas (and type)	Mean	Median	Max	Min	SD	CV
Concentration (μmol L ⁻¹)						
CO ₂	100.79	48.71	8011.36	8.05	462.19	458.55
CH ₄	1.14	0.18	491.39	0	12.65	1106.98
Flux (mmol m ⁻² d ⁻¹)						
CO ₂	51.99	16.17	4760.00	-120.10	171.79	330.44
CH ₄	7.08	0.81	410.11	-17.58	19.75	279.06

16

17 **Table S2. Overall descriptive statistics of N₂O fluxes and concentrations in GANED.**

Variable	Count	Mean	Median	Std. Dev.	Min	Max
N ₂ O Flux (mmol m ⁻² d ⁻¹)	7386	5.92	0.198	90.85	-260.97	4597.9
N ₂ O Concentration (μM)	5127	0.072	0.0005	0.65	0.0	12.23

18

19 **Table S3. Summary statistics of GANED-Concentration by Aquatic-type.**

Aquatic-type	count	mean	median	std	min	max
Lake	369	0.406	0.001	1.553	0.000	7.498
River	2622	0.077	0.001	0.683	0.000	12.233
Stream	471	0.029	0.001	0.121	0.000	0.865
Pond	421	0.004	0.000	0.048	0.000	0.913
Estuary	513	0.001	0.000	0.001	0.000	0.009
Reservoir	632	0.001	0.000	0.001	0.000	0.011
Coastal Area	41	0.001	0.000	0.001	0.000	0.003
Sea	58	0.000	0.000	0.000	0.000	0.002

20

21 **Table S4. Summary statistics of GANED-flux by Aquatic-type.**

Aquatic-type	count	mean	median	std	min	max
River	1835	15.45	0.30	175.75	-5.12	4597.90
Lake	976	10.34	0.16	63.13	-260.97	1024.31
Stream	425	3.75	0.68	13.21	-0.62	138.71
Estuary	439	1.74	0.28	6.92	-3.90	70.80
Reservoir	1109	0.94	0.19	3.49	-6.47	48.90
Pond	2488	0.72	0.13	2.85	-12.31	70.18
Coastal Area	45	0.62	0.28	0.69	-0.04	3.00
Sea	69	0.55	0.02	3.84	-0.05	31.98

22

23 **Table S5. Number of observations for all variables by continent. Variable titles correspond to GANED column titles and are defined in appendix A1-A4.**

Variable	Unit	Africa	Antarctica	Asia	Central America	Europe	North America	Oceania	South America	Total
Sites	-	185	10	1814	1	341	464	143	44	3002
Depth	m	43	0	1865	0	3	125	70	14	2120
Elevation	m	0	0	152	0	5	34	0	0	191
Surface area	km ²	0	0	1388	0	0	0	0	0	1388
N ₂ O flux	mmol m ⁻² d ⁻¹	50	5	6384	1	249	507	144	46	7386
N ₂ O concentration	μmol L ⁻¹	354	7	3150	0	866	577	159	17	5130
CO ₂ flux	mmol m ⁻² d ⁻¹	0	0	1205	0	39	27	6	0	1277
CO ₂ concentration	μmol L ⁻¹	0	0	228	0	41	35	0	0	304
CH ₄ flux	mmol m ⁻² d ⁻¹	0	0	1690	0	42	27	22	0	1781
CH ₄ concentration	μmol L ⁻¹	67	0	712	0	723	35	0	0	1537
DIN	mg-N L ⁻¹	0	0	246	0	16	98	0	0	360
DON	mg-N L ⁻¹	0	0	32	0	11	8	0	0	51
TN	mg L ⁻¹	0	0	1775	0	62	20	10	0	1867
NH ₄ ⁺	mg-N L ⁻¹	302	3	3102	0	822	143	82	1	4455
NO ₂ ⁻	mg-N L ⁻¹	219	0	1482	0	692	28	0	2	2423
NO ₃ ⁻	mg-N L ⁻¹	302	4	3378	0	833	207	89	16	4829
Water temperature	°C	354	2	3047	0	797	390	139	3	4732
Salinity	‰	0	0	739	0	22	0	66	0	827
pH	-	116	0	2215	0	107	61	45	6	2550
DO	mg L ⁻¹	11	0	3002	0	67	431	56	14	3581
Flow velocity	m s ⁻¹	5	0	339	0	5	21	20	0	390
Redox potential	mV	0	0	209	0	0	0	0	0	209
SO ₄ ²⁻	mg L ⁻¹	0	0	153	0	0	0	0	0	153
TP	mg L ⁻¹	0	0	1034	0	45	20	0	0	1099
Wind speed	m s ⁻¹	0	0	960	0	49	27	17	6	1059
Chl a	mg L ⁻¹	0	0	1033	0	442	102	0	0	1577
DOC	mg L ⁻¹	221	0	974	0	324	130	25	6	1680
DIC	mg L ⁻¹	0	0	21	0	0	0	0	0	21

24

25 **Table S6. Summary statistics for environmental variables. Variable titles correspond to GANED column titles and are**
 26 **defined in Appendix A4**

Variables	Unit	Mean	Median	Max	Min	SD	CV
NH ₄ ⁺	mg-N L ⁻¹	2.75	0.20	596.02	-0.14	25.85	941.65
NO ₂ ⁻	mg-N L ⁻¹	1.18	0.02	316.40	-0.01	11.84	1006.42
NO ₃ ⁻	mg-N L ⁻¹	2.22	1.00	665.42	0.00	11.25	507.30
DO	mg L ⁻¹	8.15	7.57	95.00	0.16	6.28	77.10
DOC	mg L ⁻¹	8.56	4.40	109.57	0.20	13.57	158.61
TN	mg L ⁻¹	6.86	2.29	2070.00	0.07	73.59	1072.22
TP	mg L ⁻¹	283.80	142.13	4941.41	0.04	467.79	164.83
Water temperature	°C	19.01	19.80	36.00	-1.09	7.80	41.03
Salinity	‰	13.37	5.37	67.01	0.00	15.41	115.26
pH	-	8.01	8.03	11.03	3.48	0.89	11.14

27