Supplement of Biogeosciences, 22, 3785–3805, 2025
https://doi.org/10.5194/bg-22-3785-2025-supplement

Biogeosciences
Open Access

Supplement of

Methane, carbon dioxide, and nitrous oxide emissions from two clear-water and two turbid-water urban ponds in Brussels (Belgium)

Thomas Bauduin et al.

Correspondence to: Alberto V. Borges (alberto.borges@uliege.be)

Table S1: Emerged, submerged, and total macrophyte cover and main species in summer 2023 in four urban ponds (Leybeek, Pêcheries, Tenreuken, and Silex) of the city of Brussels (Belgium).

Pond	Emergent macrophyte (EM) cover (%)	Submerged macrophyte (SM) cover (%)	Total macrophyte cover (%)	Main species
Leybeek	6	0 (*)	6	*Caltha palustris* (EM), *Lythrium salicaria* (EM), *Phragmites australis* (EM), *Veronica beccabunga* (EM)
Pêcheries	9	0	9	*Phragmites australis* (EM)
Tenreuken	11	57	68	*Certophyllum demersum* (SM), I*ris pseudocorus* (EM), *Lythrum salicaria* (EM), *Mentha aquatica* (EM), *Phragmites australis* (EM), *Potamogeton pectinatus* (SM)
Silex	13	87	100	*Lemna trisulca* (SM), *Phragmites australis* (EM).

(*) Due to high turbidity, the bottom sediment of the Leybeek pond was not visible and the submerged macrophytes were assumed absent. This assumption is based on the fact that in the Pêcheries pond where the bottom sediment was visible owing to lower turbidity, the presence of submerged macrophytes was not observed.

Table S2: Recent operations in four urban ponds (Leybeek, Pêcheries, Tenreuken, and Silex) of the city of Brussels (Belgium) (provided by Bruxelles Environnement).

Pond	Operation	Period
Leybeek	Riverbank redevelopment	Winter 2017-2018
Pêcheries	Dredging	Winter 2017-2018
Tenreuken	Draining	Winter 2014-2015
Silex	Partial draining	Winter 2015-2016

Table S3: Outcomes of post-hoc tests of the repeated measures analysis of variance (ANOVA) for data grouped by season on log_{10} transformed data, for chlorophyll-*a* (Chl-*a*, µg L^{-1}), total suspended matter (TSM, mg L^{-1}), oxygen saturation level (%O_2, %), partial pressure of CO_2 (pCO_2, ppm), dissolved CH_4 concentration (CH_4, nmol L^{-1}), N_2O saturation level (%N_2O, %), diffusive and ebullitive CH_4 fluxes (mmol m^{-2} d^{-1}), mean ratio of ebullitive CH_4 flux to total (diffusive + ebullitive) CH_4 flux (%)) in four urban ponds (Leybeek, Pêcheries, Tenreuken, and Silex) of the city of Brussels (Belgium) from June 2021 to December 2023. Each matrix shows means of the log_{10} transformed data along the diagonal, the *p*-values in the upper triangle, and the differences in the lower triangle.

Spring					Summer					Fall					Winter				
Chl-*a* (µg L^{-1})																			
	Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[3.51]	**<0.0001**	**<0.0001**	**0.0001**	Leybeek	[4.143]	**<0.0001**	**<0.0001**	**<0.0001**	Leybeek	[3.843]	**<0.0001**	**<0.0001**	**<0.0001**	Leybeek	[3.18]	0.0565	**0.0072**	0.3504
Pêcheries	1.68	[1.83]	0.295	0.9739	Pêcheries	1.512	[2.631]	**<0.0001**	**<0.0001**	Pêcheries	1.797	[2.046]	**<0.0001**	0.9356	Pêcheries	1.197	[1.98]	0.8024	0.7448
Silex	2.247	0.567	[1.26]	0.1388	Silex	3.521	2.009	[0.622]	**0.0052**	Silex	3.17	1.373	[0.673]	**<0.0001**	Silex	1.598	0.401	[1.58]	0.2483
Tenreuken	1.545	-0.135	-0.702	[1.96]	Tenreuken	2.828	1.316	-0.693	[1.315]	Tenreuken	1.933	0.136	-1.237	[1.910]	Tenreuken	0.749	-0.448	-0.849	[2.43]
TSM (mg L^{-1})																			
	Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[2.87]	**0.0291**	**<0.0001**	**0.0045**	Leybeek	[3.62]	**<0.0001**	**<0.0001**	**<0.0001**	Leybeek	[3.39]	**0.0046**	**0.0001**	**0.0316**	Leybeek	[3.13]	**0.0180**	0.1334	0.8349
Pêcheries	0.696	[2.17]	**0.0128**	0.8902	Pêcheries	1.168	[2.45]	**<0.0001**	**0.0007**	Pêcheries	1.225	[2.16]	0.5603	0.8778	Pêcheries	1.036	[2.10]	0.7800	0.1088
Silex	1.469	0.773	[1.40]	0.0717	Silex	2.148	0.98	[1.47]	0.8801	Silex	1.667	0.443	[1.72]	0.1857	Silex	0.731	-0.305	[2.40]	0.4936
Tenreuken	0.866	0.17	-0.603	[2.00]	Tenreuken	1.996	0.828	-0.152	[1.62]	Tenreuken	0.973	-0.251	-0.694	[2.41]	Tenreuken	0.27	-0.765	-0.46	[2.86]
%O_2 (%)																			
	Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[4.70]	0.2813	0.3066	0.8806	Leybeek	[4.64]	**0.0212**	0.8238	0.3765	Leybeek	[4.37]	**0.0146**	1	0.9451	Leybeek	[4.23]	1	0.9968	0.9998
Pêcheries	0.20486	[4.49]	0.9999	0.7039	Pêcheries	0.3311	[4.31]	0.1574	0.5317	Pêcheries	0.64372	[3.73]	**0.0130**	0.0559	Pêcheries	-0.00327	[4.23]	0.9955	0.9999
Silex	0.19876	-0.00611	[4.50]	0.7358	Silex	0.0968	-0.2343	[4.54]	0.8718	Silex	-0.00935	-0.65307	[4.38]	0.9315	Silex	0.02749	0.03076	[4.20]	0.9911
Tenreuken	0.08326	-0.12161	-0.1155	[4.62]	Tenreuken	0.1811	-0.15	0.0843	[4.46]	Tenreuken	0.11136	-0.53236	0.12071	[4.26]	Tenreuken	-0.01136	-0.00809	-0.03885	[4.24]
pCO_2 (ppm)																			
	Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[7.39]	0.8774	0.1255	1	Leybeek	[7.03]	**0.0015**	**0.0020**	0.0879	Leybeek	[8.02]	0.4447	0.8843	0.9995	Leybeek	[7.83]	0.9999	0.9985	0.8730
Pêcheries	-0.2679	[7.66]	0.4377	0.8923	Pêcheries	-0.9821	[8.02]	0.9998	0.4744	Pêcheries	-0.4009	[8.42]	0.8650	0.5111	Pêcheries	0.0205	[7.81]	0.9996	0.8947
Silex	-0.8124	-0.5444	[8.20]	0.1349	Silex	-0.9607	0.0214	[8.00]	0.5264	Silex	-0.1944	0.2065	[8.21]	0.9255	Silex	0.0614	0.0409	[7.77]	0.9317
Tenreuken	-0.0131	0.2548	0.7992	[7.40]	Tenreuken	-0.6143	0.3678	0.3464	[7.65]	Tenreuken	-0.0297	0.3712	0.1647	[8.05]	Tenreuken	0.293	0.2725	0.2317	[7.54]
CH_4 (nmol L^{-1})																			
	Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[7.47]	1	0.0940	0.3894	Leybeek	[7.59]	0.9975	0.0673	0.8204	Leybeek	[7.35]	0.9956	0.9483	0.9094	Leybeek	[7.02]	0.7150	0.9563	0.8229
Pêcheries	-0.0085	[7.47]	0.0988	0.4026	Pêcheries	0.05	[7.54]	**0.0385**	0.9022	Pêcheries	0.0959	[7.26]	0.8669	0.9720	Pêcheries	0.5289	[6.49]	0.9445	0.9972
Silex	-0.8562	-0.8477	[8.32]	0.8527	Silex	-0.65	-0.7	[8.24]	**0.0055**	Silex	-0.2256	-0.3214	[7.58]	0.6268	Silex	0.253	-0.2759	[6.77]	0.9841
Tenreuken	-0.5706	-0.5621	0.2856	[8.04]	Tenreuken	0.226	0.176	0.876	[7.36]	Tenreuken	0.2773	0.1815	0.5029	[7.08]	Tenreuken	0.4304	-0.0985	0.1774	[6.59]
%N_2O (%)																			
	Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[2.68]	**0.0043**	0.3503	0.9996	Leybeek	[2.73]	**<0.0001**	0.3954	**0.0219**	Leybeek	[3.01]	**0.0174**	0.9676	0.7439	Leybeek	[3.20]	0.4370	0.8081	0.9700
Pêcheries	0.3847	[2.29]	0.2136	**0.0057**	Pêcheries	0.739	[1.99]	**0.0010**	0.0597	Pêcheries	0.6261	[2.38]	0.0525	0.1667	Pêcheries	0.3187	[2.88]	0.9198	0.7025
Silex	0.1763	-0.2084	[2.50]	0.4070	Silex	0.214	-0.525	[2.51]	0.5175	Silex	0.0916	-0.5344	[2.92]	0.9451	Silex	0.1864	-0.1323	[3.01]	0.9691
Tenreuken	0.0111	-0.3736	-0.1652	[2.67]	Tenreuken	0.398	-0.341	0.184	[2.33]	Tenreuken	0.2023	-0.4237	0.1107	[2.81]	Tenreuken	0.0927	-0.226	-0.0937	[3.10]
Diffusive CH_4 flux (mmol m^{-2} d^{-1})																			
	Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[0.731]	0.9848	0.5416	0.2461	Leybeek	[0.763]	0.9816	0.0860	0.7022	Leybeek	[0.755]	0.9211	0.9995	0.8276	Leybeek	[0.799]	0.5670	0.5960	0.5253
Pêcheries	-0.0153	[0.746]	0.7547	0.4205	Pêcheries	0.00703	[0.756]	**0.0312**	0.8919	Pêcheries	0.01584	[0.739]	0.9536	0.9960	Pêcheries	0.08433	[0.715]	1	0.9999
Silex	-0.0586	-0.0432	[0.790]	0.9444	Silex	-0.04465	-0.05168	[0.808]	**0.0039**	Silex	0.00279	-0.01305	[0.752]	0.8786	Silex	0.08126	-0.00307	[0.718]	0.9994
Tenreuken	-0.0828	-0.0674	-0.0242	[0.814]	Tenreuken	0.02014	0.01311	0.06479	[0.743]	Tenreuken	0.02144	0.0056	0.01865	[0.734]	Tenreuken	0.08877	0.00444	0.00751	[0.710]
Ebullitive CH_4 flux (mmol m^{-2} d^{-1})																			
	Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[0.735]	0.9924	**<0.0001**	**0.0291**	Leybeek	[0.966]	**0.0020**	**<0.0001**	**<0.0001**	Leybeek	[0.756]	0.8897	**0.0003**	**0.0448**	Leybeek	[0.695]	**<0.0001**	**<0.0001**	**<0.0001**
Pêcheries	-0.0151	[0.750]	**<0.0001**	0.0557	Pêcheries	0.16	[0.806]	**<0.0001**	**<0.0001**	Pêcheries	0.0238	[0.732]	**<0.0001**	**0.0265**	Pêcheries	-0.014288	[0.710]	**<0.0001**	0.9996
Silex	-0.354	-0.3389	[1.089]	**0.0050**	Silex	-0.478	-0.638	[1.444]	**<0.0001**	Silex	-0.1525	-0.1763	[0.909]	**0.0074**	Silex	-0.061422	-0.047134	[0.757]	**<0.0001**
Tenreuken	-0.1586	-0.1435	0.1954	[0.894]	Tenreuken	-0.233	-0.393	0.245	[1.199]	Tenreuken	-0.0375	-0.0613	0.115	[0.794]	Tenreuken	-0.015041	-0.000753	0.04638	[0.710]
Ebullitive CH_4 ratio (%)																			
	Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken		Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[3.68]	0.2437	**0.0005**	**0.0130**	Leybeek	[4.36]	0.0819	0.0576	**0.0154**	Leybeek	[3.67]	0.6749	**0.0207**	0.1442	Leybeek	[2.14]	**<0.0001**	**<0.0001**	**<0.0001**
Pêcheries	-0.318	[3.99]	0.0775	0.5463	Pêcheries	0.1376	[4.22]	**<0.0001**	**<0.0001**	Pêcheries	-0.26	[3.93]	0.2325	0.7120	Pêcheries	-1.85036	[3.99]	**0.0429**	1
Silex	-0.735	-0.417	[4.41]	0.6554	Silex	-0.1461	-0.2838	[4.51]	0.9578	Silex	-0.705	-0.445	[4.37]	0.8217	Silex	-2.15178	-0.30142	[4.29]	**0.0397**
Tenreuken	-0.541	-0.223	0.194	[4.22]	Tenreuken	-0.1745	-0.3121	-0.0284	[4.54]	Tenreuken	-0.505	-0.246	0.2	[4.17]	Tenreuken	-1.85239	-0.00203	0.29939	[3.99]

Table S4: Results of generalized linear mixed models (GLMM) assessing the relationships between environmental variables and partial pressure of CO_2 (pCO_2, ppm), dissolved CH_4 concentration (CH_4, nmol L^{-1}), and N_2O saturation level ($\%N_2O$, %) for merged data collected in four urban ponds (Leybeek, Pêcheries, Tenreuken, and Silex) of the city of Brussels (Belgium) from June 2021 to December 2023. Fixed effects include water temperature (Tw, °C), daily precipitation (mm d^{-1}), concentration of chlorophyll-*a* (Chl-*a*, µg L^{-1}), concentration of total suspended matter (TSM, mg L^{-1}), oxygen saturation level ($\%O_2$, %), concentration of soluble reactive phosphorus (SRP, µmol L^{-1}), concentration of dissolved inorganic nitrogen (DIN, µmol L^{-1}), and concentrations of nitrite (NO_2^-, µmol L^{-1}), nitrate (NO_3^-, µmol L^{-1}), and ammonium (NH_4^+, µmol L^{-1}). Regression coefficients (β), standard errors (SE) and p-values are presented for each relationship tested on $\log_{10}$ transformed data. The models include "pond" and "sampling date" as a random effect to account for repeated measurements.

	pCO_2 (ppm)	**CH_4 (nmol L^{-1})**	**$\%N_2O$ (%)**
T_W (°C)	β = -0.05, SE = 0.16, p = 0.774	**β = 0.71, SE = 0.15, p < 0.001**	**β = -0.44, SE = 0.08, p < 0.001**
	Intercept = 7.91, SE = 0.46, p < 0.001	**Intercept = 5.57, SE = 0.42, p < 0.001**	**Intercept = 3.80, SE = 0.25, p < 0.001**
Precipitation (mm d^{-1})	**β = 0.23, SE = 0.06, p < 0.001**	β = -0.02, SE = 0.07, p = 0.812	β = -0.02, SE = 0.04, p = 0.599
	Intercept = 7.54, SE = 0.17, p < 0.001	Intercept = 7.51, SE = 0.18, p < 0.001	Intercept = 2.62, SE = 0.14, p < 0.00
Chl-*a* (µg L^{-1})	**β = -0.16, SE = 0.05, p = 0.008**	β = -0.09, SE = 0.07, p = 0.186	β = -0.00, SE = 0.03, p = 0.941
	Intercept = 8.13, SE = 0.16, p < 0.001	Intercept = 7.70, SE = 0.20, p < 0.001	Intercept = 2.60, SE = 0.15, p < 0.001
TSM (mg L^{-1})	β = -0.09, SE = 0.08, p = 0.228	β = -0.04, SE = 0.09, p = 0.679	β = 0.01, SE = 0.04, p = 0.761
	Intercept = 8.00, SE = 0.22, p < 0.001	Intercept = 7.58, SE = 0.26, p < 0.001	Intercept = 2.56, SE = 0.16, p < 0.001
$\%O_2$ (%)	**β = -1.16, SE = 0.12, p < 0.001**	β = -0.12, SE = 0.17, p = 0.495	β = 0.01, SE = 0.08, p = 0.942
	Intercept = 12.88, SE = 0.53, p < 0.001	Intercept = 8.02, SE = 0.78, p < 0.001	Intercept = 2.57, SE = 0.37, p < 0.001
SRP (µmol L^{-1})	**β = 0.45, SE = 0.09, p < 0.001**	β = 0.08, SE = 0.12, p = 0.468	β = -0.06, SE = 0.05, p = 0.254
	Intercept = 7.22, SE = 0.18, p < 0.001	Intercept = 7.39, SE = 0.21, p < 0.001	Intercept = 2.67, SE = 0.14, p < 0.001
DIN (µmol L^{-1})	**β = 0.30, SE = 0.07, p < 0.001**	β = -0.09, SE = 0.09, p = 0.309	**β = 0.09, SE = 0.04, p = 0.029**
	Intercept = 6.91, SE = 0.26, p < 0.001	Intercept = 7.76, SE = 0.30, p < 0.001	**Intercept = 2.32, SE = 0.18, p < 0.001**
NO_2^-(µmol L^{-1})			β = 0.12, SE = 0.08, p = 0.145
			Intercept = 2.54, SE = 0.13, p < 0.001
NO_3^-(µmol L^{-1})			β = 0.06, SE = 0.04, p = 0.152
			Intercept = 2.45, SE = 0.16, p < 0.001
NH_4^+(µmol L^{-1})			**β = 0.09, SE = 0.03, p = 0.007**
			Intercept = 2.45, SE = 0.14, p < 0.001

Table S5: Results of linear regression models between partial pressure of CO_2 (pCO_2, ppm), dissolved CH_4 concentration (CH_4, nmol L^{-1}), and N_2O saturation level ($\%N_2O$, %) and water temperature (T_W, °C), daily precipitation (mm d^{-1}), concentration of chlorophyll-*a* (Chl-*a*, µg L^{-1}), concentration of total suspended matter (TSM, mg L^{-1}), oxygen saturation level ($\%O_2$, %), concentration of soluble reactive phosphorus (SRP, µmol L^{-1}), concentration of dissolved inorganic nitrogen (DIN, µmol L^{-1}) in four urban ponds (Leybeek, Pêcheries, Tenreuken, and Silex) of the city of Brussels (Belgium) from June 2021 to December 2023.. Regression coefficients (β), standard errors (SE) and significance values (p) are presented for each relationship tested on $\log_{10}$ transformed data.

		Leybeek	
	pCO_2 (ppm)	**CH_4 (nmol L^{-1})**	**$\%N_2O$ (%)**
T_W (°C)	β = -0.58, SE = 0.31, p = 0.068	**β = 0.63, SE = 0.31, p = 0.048**	**β = -0.41, SE = 0.11, p < 0.001**
	Intercept = 9.02, SE = 0.86, p < 0.001	**Intercept = 5.72, SE = 0.85, p < 0.001**	**Intercept = 3.97, SE = 0.29, p < 0.001**
Precipitation (mm d^{-1})	**β = 0.42, SE = 0.11, p < 0.001**	**β = 0.25, SE = 0.12, p = 0.043**	β = -0.05, SE = 0.05, p = 0.315
	Intercept = 6.96, SE = 0.18, p < 0.001	**Intercept = 7.14, SE = 0.20, p < 0.001**	Intercept = 2.90, SE = 0.08, p < 0.001
Chl-*a* (µg L^{-1})	β = -0.39, SE = 0.24, p = 0.104	β = 0.22, SE = 0.24, p = 0.376	**β = -0.13, SE = 0.09, p = 0.150**
	Intercept = 8.92, SE = 0.91, p < 0.001	Intercept = 6.61, SE = 0.93, p < 0.001	**Intercept = 3.35, SE = 0.35, p < 0.001**
TSM (mg L^{-1})	β = 0.05, SE = 0.22, p = 0.810	β = 0.23, SE = 0.21, p = 0.281	β = -0.11, SE = 0.08, p = 0.169
	Intercept = 7.26, SE = 0.74, p < 0.001	Intercept = 6.65, SE = 0.73, p < 0.001	Intercept = 3.22, SE = 0.28, p < 0.001
$\%O_2$ (%)	**β = -1.66, SE = 0.31, p < 0.001**	β = -0.24, SE = 0.40, p = 0.539	β = -0.22, SE = 0.15, p = 0.150
	Intercept = 14.96, SE = 1.41, p < 0.001	Intercept = 8.54, SE = 1.80, p < 0.001	Intercept = 3.83, SE = 0.67, p < 0.001
SRP (µmol L^{-1})	β = 0.44, SE = 0.24, p = 0.078	β = -0.11, SE = 0.25, p = 0.650	β = -0.03, SE = 0.10, p = 0.728
	Intercept = 6.97, SE = 0.30, p < 0.001	Intercept = 7.55, SE = 0.31, p < 0.001	Intercept = 2.88, SE = 0.12, p < 0.001
DIN (µmol L^{-1})	**β = 0.49, SE = 0.16, p = 0.004**	β = 0.08, SE = 0.17, p = 0.658	**β = 0.14, SE = 0.06, p = 0.032**
	Intercept = 5.97, SE = 0.50, p < 0.001	Intercept = 7.19, SE = 0.55, p < 0.001	**Intercept = 2.42, SE = 0.20, p < 0.001**
		Pêcheries	
	pCO_2 (ppm)	**CH_4 (nmol L^{-1})**	**$\%N_2O$ (%)**
T_W (°C)	β = -0.01, SE = 0.18, p = 0.954	**β = 0.83, SE = 0.20, p < 0.001**	**β = -0.71, SE = 0.08, p < 0.001**
	Intercept = 8.02, SE = 0.50, p < 0.001	**Intercept = 5.04, SE = 0.57, p < 0.001**	**Intercept = 4.22, SE = 0.22, p < 0.001**
Precipitation (mm d^{-1})	**β = 0.20, SE = 0.06, p = 0.003**	β = -0.16, SE = 0.09, p = 0.077	β = 0.01, SE = 0.05, p = 0.770
	Intercept = 7.78, SE = 0.10, p < 0.001	Intercept = 7.49, SE = 0.15, p < 0.001	Intercept = 2.25, SE = 0.08, p < 0.001
Chl-*a* (µg L^{-1})	β = -0.02, SE = 0.11, p = 0.870	β = 0.07, SE = 0.15, p = 0.650	β = -0.10, SE = 0.08, p = 0.206
	Intercept = 8.04, SE = 0.26, p < 0.001	Intercept = 7.16, SE = 0.35, p < 0.001	Intercept = 2.49, SE = 0.19, p < 0.001
TSM (mg L^{-1})	β = -0.06, SE = 0.13, p = 0.647	β = 0.21, SE = 0.16, p = 0.212	β = -0.09, SE = 0.09, p = 0.307
	Intercept = 8.13, SE = 0.30, p < 0.001	Intercept = 6.84, SE = 0.39, p < 0.001	Intercept = 2.48, SE = 0.22, p < 0.001
$\%O_2$ (%)	**β = -0.88, SE = 0.15, p < 0.001**	β = 0.21, SE = 0.26, p = 0.416	β = -0.07, SE = 0.14, p = 0.648
	Intercept = 11.71, SE = 0.62, p < 0.001	Intercept = 6.43, SE = 1.09, p < 0.001	Intercept = 2.54, SE = 0.60, p < 0.001
SRP (µmol L^{-1})	β = 0.21, SE = 0.12, p = 0.099	β = 0.16, SE = 0.17, p = 0.332	β = -0.12, SE = 0.09, p = 0.211
	Intercept = 7.71, SE = 0.19, p < 0.001	Intercept = 7.09, SE = 0.26, p < 0.001	Intercept = 2.42, SE = 0.14, p < 0.001
DIN (µmol L^{-1})	β = 0.17, SE = 0.09, p = 0.059	**β = -0.41, SE = 0.10, p < 0.001**	β = 0.09, SE = 0.06, p = 0.156
	Intercept = 7.51, SE = 0.27, p < 0.001	**Intercept = 8.53, SE = 0.31, p < 0.001**	Intercept = 2.00, SE = 0.20, p < 0.001
		Tenreuken	
	pCO_2 (ppm)	**CH_4 (nmol L^{-1})**	**$\%N_2O$ (%)**
T_W (°C)	β = 0.03, SE = 0.26, p = 0.921	**β = 0.58, SE = 0.26, p = 0.031**	**β = -0.50, SE = 0.11, p < 0.001**
	Intercept = 7.59, SE = 0.72, p < 0.001	**Intercept = 5.75, SE = 0.72, p < 0.001**	**Intercept = 3.96, SE = 0.31, p < 0.001**
Precipitation (mm d^{-1})	**β = 0.23, SE = 0.10, p = 0.024**	β = -0.06, SE = 0.11, p = 0.576	β = -0.03, SE = 0.05, p = 0.631
	Intercept = 7.41, SE = 0.17, p < 0.001	Intercept = 7.40, SE = 0.19, p < 0.001	Intercept = 2.64, SE = 0.09, p < 0.001
Chl-*a* (µg L^{-1})	β = -0.24, SE = 0.16, p = 0.136	**β = -0.37, SE = 0.16, p = 0.024**	**β = 0.16, SE = 0.08, p = 0.044**
	Intercept = 8.07, SE = 0.30, p < 0.001	**Intercept = 7.97, SE = 0.31, p < 0.001**	**Intercept = 2.33, SE = 0.15, p < 0.001**
TSM (mg L^{-1})	β = 0.03, SE = 0.18, p = 0.862	β = -0.29, SE = 0.18, p = 0.122	**β = 0.30, SE = 0.08, p < 0.001**
	Intercept = 7.60, SE = 0.39, p < 0.001	Intercept = 7.92, SE = 0.40, p < 0.001	**Intercept = 1.99, SE = 0.17, p < 0.001**
$\%O_2$ (%)	**β = -1.46, SE = 0.24, p < 0.001**	β = 0.10, SE = 0.34, p = 0.764	β = -0.27, SE = 0.16, p = 0.091
	Intercept = 14.13, SE = 1.05, p < 0.001	Intercept = 6.88, SE = 1.51, p < 0.001	Intercept = 3.82, SE = 0.70, p < 0.001
SRP (µmol L^{-1})	**β = 0.57, SE = 0.20, p = 0.007**	β = 0.00, SE = 0.23, p = 1.000	β = 0.03, SE = 0.11, p = 0.768
	Intercept = 6.90, SE = 0.30, p < 0.001	Intercept = 7.33, SE = 0.34, p < 0.001	Intercept = 2.57, SE = 0.17, p < 0.001
DIN (µmol L^{-1})	**β = 0.43, SE = 0.13, p = 0.003**	β = -0.23, SE = 0.15, p = 0.147	β = 0.11, SE = 0.07, p = 0.163
	Intercept = 6.38, SE = 0.42, p < 0.001	Intercept = 8.01, SE = 0.48, p < 0.001	Intercept = 2.30, SE = 0.23, p < 0.001
		Silex	
	pCO_2 (ppm)	**CH_4 (nmol L^{-1})**	**$\%N_2O$ (%)**
T_W (°C)	β = 0.16, SE = 0.12, p = 0.190	**β = 0.83, SE = 0.21, p < 0.001**	β = -0.25, SE = 0.14, p = 0.080
	Intercept = 7.62, SE = 0.33, p < 0.001	**Intercept = 5.68, SE = 0.57, p < 0.001**	Intercept = 3.34, SE = 0.38, p < 0.001
Precipitation (mm d^{-1})	**β = 0.11, SE = 0.05, p = 0.021**	β = -0.09, SE = 0.10, p = 0.395	β = -0.04, SE = 0.06, p = 0.556
	Intercept = 7.98, SE = 0.09, p < 0.001	Intercept = 8.00, SE = 0.17, p < 0.001	Intercept = 2.71, SE = 0.11, p < 0.001
Chl-*a* (µg L^{-1})	**β = -0.26, SE = 0.09, p = 0.004**	**β = -0.34, SE = 0.18, p = 0.064**	β = -0.11, SE = 0.11, p = 0.337
	Intercept = 8.29, SE = 0.10, p < 0.001	**Intercept = 8.21, SE = 0.21, p < 0.001**	Intercept = 2.77, SE = 0.13, p < 0.001
TSM (mg L^{-1})	β = -0.06, SE = 0.10, p = 0.511	β = -0.26, SE = 0.19, p = 0.180	β = 0.06, SE = 0.12, p = 0.626
	Intercept = 8.16, SE = 0.17, p < 0.001	Intercept = 8.32, SE = 0.33, p < 0.001	Intercept = 2.57, SE = 0.21, p < 0.001
$\%O_2$ (%)	**β = -0.41, SE = 0.26, p = 0.012**	β = -0.02, SE = 0.52, p = 0.973	β = -0.14, SE = 0.31, p = 0.650
	Intercept = 9.86, SE = 1.15, p < 0.001	Intercept = 7.98, SE = 2.31, p = 0.001	Intercept = 3.30, SE = 1.39, p = 0.022
SRP (µmol L^{-1})	β = 0.24, SE = 0.12, p = 0.059	**β = 0.74, SE = 0.23, p = 0.002**	β = -0.21, SE = 0.15, p = 0.173
	Intercept = 7.72, SE = 0.18, p < 0.001	**Intercept = 6.90, SE = 0.33, p < 0.001**	Intercept = 2.95, SE = 0.22, p < 0.001
DIN (µmol L^{-1})	β = 0.12, SE = 0.09, p = 0.184	β = -0.17, SE = 0.18, p = 0.357	β = 0.10, SE = 0.11, p = 0.361
	Intercept = 7.68, SE = 0.28, p < 0.001	Intercept = 8.41, SE = 0.56, p < 0.001	Intercept = 2.37, SE = 0.34, p < 0.001

Table S6: Results of linear regressions in individual ponds and generalized linear mixed models (GLMM) merging all four ponds assessing the relationships with water temperature (T_W in °C) of concentration of chlorophyll-*a* (Chl-*a*, µg L^{-1}), concentration of total suspended matter (TSM, mg L^{-1}), oxygen saturation level (%O_2, %), concentration of soluble reactive phosphorus (SRP, µmol L^{-1}), and concentration of dissolved inorganic nitrogen (DIN, µmol L^{-1}). Regression coefficients (β), standard errors (SE) and significance values (p) are presented for each relationship tested on log_{10} transformed data.

Leybeek (Linear regression)	
Chl-*a* (µg L^{-1}) *versus* T_W (°C)	**β = 0.62, SE = 0.17, p < 0.001**
	Intercept = 2.10, SE = 0.48, p < 0.001
TSM (mg L^{-1}) *versus* T_W (°C)	β = 0.24, SE = 0.22, p = 0.269
	Intercept = 2.67, SE = 0.60, p < 0.001
%O_2 (%) *versus* T_W (°C)	**β = 0.32, SE = 0.11, p = 0.006**
	Intercept = 3.66, SE = 0.31, p < 0.001
SRP (µmol L^{-1}) *versus* T_W (°C)	β = 0.03, SE = 0.19, p = 0.889
	Intercept = 1.00, SE = 0.53, p = 0.065
DIN (µmol L^{-1}) *versus* T_W (°C)	β = -0.51, SE = 0.26, p = 0.060
	Intercept = 4.41, SE = 0.73, p < 0.001
Pêcheries (Linear regression)	
Chl-*a* (µg L^{-1}) *versus* T_W (°C)	β = 0.46, SE = 0.23, p = 0.051
	Intercept = 0.97, SE = 0.64, p = 0.138
TSM (mg L^{-1}) *versus* T_W (°C)	β = 0.39, SE = 0.20, p = 0.061
	Intercept = 1.22, SE = 0.56, p = 0.035
%O_2 (%) *versus* T_W (°C)	β = 0.23, SE = 0.13, p = 0.083
	Intercept = 3.57, SE = 0.37, p < 0.001
SRP (µmol L^{-1}) *versus* T_W (°C)	β = 0.38, SE = 0.20, p = 0.066
	Intercept = 0.34, SE = 0.56, p = 0.543
DIN (µmol L^{-1}) *versus* T_W (°C)	**β = -0.71, SE = 0.28, p = 0.014**
	Intercept = 4.91, SE = 0.78, p < 0.001
Tenreuken (Linear regression)	
Chl-*a* (µg L^{-1}) *versus* T_W (°C)	**β = -0.86, SE = 0.20, p < 0.001**
	Intercept = 4.07, SE = 0.57, p < 0.001
TSM (mg L^{-1}) *versus* T_W (°C)	**β = -0.83, SE = 0.18, p < 0.001**
	Intercept = 4.30, SE = 0.49, p < 0.001
%O_2 (%) *versus* T_W (°C)	β = 0.17, SE = 0.12, p = 0.155
	Intercept = 3.96, SE = 0.32, p < 0.001
SRP (µmol L^{-1}) *versus* T_W (°C)	**β = 0.42, SE = 0.16, p = 0.012**
	Intercept = 0.20, SE = 0.45, p = 0.666
DIN (µmol L^{-1}) *versus* T_W (°C)	**β = -0.86, SE = 0.22, p < 0.001**
	Intercept = 5.33, SE = 0.62, p < 0.001
Silex (Linear regression)	
Chl-*a* (µg L^{-1}) *versus* T_W (°C)	**β = -0.47, SE = 0.18, p = 0.010**
	Intercept = 2.17, SE = 0.48, p < 0.001
TSM (mg L^{-1}) *versus* T_W (°C)	**β = -0.52, SE = 0.17, p = 0.004**
	Intercept = 3.03, SE = 0.46, p < 0.001
%O_2 (%) *versus* T_W (°C)	**β = 0.19, SE = 0.06, p = 0.003**
	Intercept = 3.93, SE = 0.17, p < 0.001
SRP (µmol L^{-1}) *versus* T_W (°C)	**β = 0.47, SE = 0.12, p < 0.001**
	Intercept = 0.10, SE = 0.34, p = 0.766
DIN (µmol L^{-1}) *versus* T_W (°C)	β = -0.34, SE = 0.19, p = 0.079
	Intercept = 3.86, SE = 0.51, p < 0.001
All data four ponds (GLMM)	
Chl-*a* (µg L^{-1}) *versus* T_W (°C)	β = -0.11, SE = 0.11, p = 0.320
	Intercept = 2.46, SE = 0.68, p = 0.018
TSM (mg L^{-1}) *versus* T_W (°C)	β = -0.27, SE = 0.14, p = 0.064
	Intercept = 3.06, SE = 0.53, p < 0.001
%O_2 (%) *versus* T_W (°C)	**β = 0.22, SE = 0.06, p = 0.001**
	Intercept = 3.80, SE = 0.19, p < 0.001
SRP (µmol L^{-1}) *versus* T_W (°C)	**β = 0.32, SE = 0.12, p = 0.011**
	Intercept = 0.43, SE = 0.34, p = 0.214
DIN (µmol L^{-1}) *versus* T_W (°C)	**β = -0.46, SE = 0.19, p = 0.017**
	Intercept = 4.24, SE = 0.52, p < 0.001

Table S7: Outcomes of post-hoc tests of the generalized linear mixed models (GLMMs) for chlorophyll-*a* (Chl-*a*, µg L^{-1}), total suspended matter (TSM, mg L^{-1}), oxygen saturation level (%O_2, %), partial pressure of CO_2 (pCO_2, ppm), dissolved CH_4 concentration (CH_4, nmol L^{-1}), N_2O saturation level (%N_2O, %), diffusive and ebullitive CH_4 fluxes (mmol m^{-2} d^{-1}), mean ratio of ebullitive CH_4 flux to total (diffusive + ebullitive) CH_4 flux (%)) in four urban ponds (Leybeek, Pêcheries, Tenreuken, and Silex) of the city of Brussels (Belgium) from June 2021 to December 2023. Each matrix shows adjusted means of each pond based on GLMM along the diagonal, the *p*-values in the upper triangle, and the differences in the lower triangle.

Chl-*a* (µg L^{-1})				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[3.9809]	**<0.0001**	**<0.0001**	**<0.0001**
Pêcheries	1.553	[2.4279]	**<0.0001**	**<0.0001**
Silex	3.3036	1.7505	[0.6774]	**<0.0001**
Tenreuken	2.1335	0.5805	-1.17	[1.8474]
TSM (mg L^{-1})				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[3.42]	**<0.0001**	**<0.0001**	**<0.0001**
Pêcheries	1.157	[2.26]	**<0.0001**	0.2334
Silex	1.908	0.751	[1.51]	**0.0002**
Tenreuken	1.393	0.236	-0.515	[2.03]
%O_2 (%)				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[4.56]	**<0.0001**	0.262	0.2038
Pêcheries	0.3086	[4.25]	**0.0052**	**0.0085**
Silex	0.1101	-0.1985	[4.45]	0.999
Tenreuken	0.1185	-0.1901	0.0084	[4.44]
pCO_2 (ppm)				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[7.68]	**0.004**	**0.0011**	0.6695
Pêcheries	-0.3748	[8.05]	0.9824	0.1062
Silex	-0.4153	-0.0405	[8.09]	**0.0419**
Tenreuken	-0.1269	0.2479	0.2883	[7.80]
CH_4 (nmol L^{-1})				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[7.68]	0.4687	**0.0152**	0.8924
Pêcheries	0.213	[7.47]	**<0.0001**	0.8845
Silex	-0.443	-0.656	[8.12]	**0.0009**
Tenreuken	0.107	-0.105	0.55	[7.57]
%N_2O (%)				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[2.78]	**<0.0001**	0.1275	**0.0038**
Pêcheries	0.612	[2.17]	**<0.0001**	**<0.0001**
Silex	0.15	-0.462	[2.63]	0.6371
Tenreuken	0.231	-0.381	0.081	[2.55]
Diffusive CH_4 flux (mmol m^{-2} d^{-1})				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[0.132]	0.5752	0.5256	0.8845
Pêcheries	0.032	[0.100]	**0.039**	0.9458
Silex	-0.0339	-0.0659	[0.166]	0.1513
Tenreuken	0.0183	-0.0137	0.0522	[0.114]
Ebullitive CH_4 flux (mmol m^{-2} d^{-1})				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[0.262]	0.0617	**<0.0001**	**<0.0001**
Pêcheries	0.116	[0.146]	**<0.0001**	**<0.0001**
Silex	-0.5	-0.616	[0.761]	**<0.0001**
Tenreuken	-0.221	-0.337	0.279	[0.483]
Relative contribution of ebullitive CH_4 flux (%)				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[3.89]	0.0818	**<0.0001**	**<0.0001**
Pêcheries	-0.195	[4.09]	**0.0002**	**0.0304**
Silex	-0.524	-0.33	[4.42]	0.5134
Tenreuken	-0.414	-0.22	0.11	[4.31]
Diffusive N_2O flux (mmol m^{-2} d^{-1})				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[0.011667]	**0.0001**	0.9971	0.2096
Pêcheries	0.011149	[0.000518]	**0.0030**	0.0924
Silex	0.000528	-0.010621	[0.011139]	0.2958
Tenreuken	0.005095	-0.006054	0.004568	[0.006571]
Diffusive CO_2 flux (mmol m^{-2} d^{-1})				
	Leybeek	Pêcheries	Silex	Tenreuken
Leybeek	[0.344]	**0.0045**	**0.0030**	0.0876
Pêcheries	-0.125	[0.469]	0.8933	0.7459
Silex	-0.1512	-0.0263	[0.495]	0.3152
Tenreuken	-0.0877	0.0372	0.0635	[0.432]

Table S8: Results of linear regression models between N_2O saturation level (%N_2O, %) and concentrations of nitrite (NO_2^-, µmol L^{-1}), nitrate (NO_3^-, µmol L^{-1}) and ammonium (NH_4^+, µmol L^{-1}). Regression coefficients (β), standard errors (SE) and *p*-values are presented for each relationship tested on log_{10} transformed data.

Leybeek	
NO_2^- (µmol L^{-1})	β = 0.19, SE = 0.13, p = 0.167
	Intercept = 2.77, SE = 0.08, p < 0.001
NO_3^- (µmol L^{-1})	**β = 0.13, SE = 0.06, p = 0.029**
	Intercept = 2.51, SE = 0.16, p < 0.001
NH_4^+ (µmol L^{-1})	β = 0.06, SE = 0.06, p = 0.325
	Intercept = 2.76, SE = 0.11, p < 0.001
Pêcheries	
NO_2^- (µmol L^{-1})	β = 0.26, SE = 0.15, p = 0.092
	Intercept = 2.16, SE = 0.09, p < 0.001
NO_3^- (µmol L^{-1})	β = 0.01, SE = 0.06, p = 0.930
	Intercept = 2.25, SE = 0.15, p < 0.001
NH_4^+ (µmol L^{-1})	**β = 0.17, SE = 0.05, p = 0.001**
	Intercept = 1.95, SE = 0.11, p < 0.001
Tenreuken	
NO_2^- (µmol L^{-1})	β = 0.18, SE = 0.13, p = 0.176
	Intercept = 2.52, SE = 0.09, p < 0.001
NO_3^- (µmol L^{-1})	β = 0.05, SE = 0.08, p = 0.528
	Intercept = 2.47, SE = 0.23, p < 0.001
NH_4^+ (µmol L^{-1})	**β = 0.17, SE = 0.06, p = 0.004**
	Intercept = 2.36, SE = 0.10, p < 0.001
Silex	
NO_2^- (µmol L^{-1})	β = -0.12, SE = 0.15, p = 0.449
	Intercept = 2.72, SE = 0.10, p < 0.001
NO_3^- (µmol L^{-1})	β = 0.11, SE = 0.10, p = 0.278
	Intercept = 2.38, SE = 0.27, p < 0.001
NH_4^+ (µmol L^{-1})	β = 0.04, SE = 0.08, p = 0.617
	Intercept = 2.60, SE = 0.15, p < 0.001

Table S9: Exponential fit of ebullitive and diffusive CH_4 fluxes (mmol m^{-2} d^{-1}) as function of water temperature (Tw, in °C) and corresponding Q_{10} in four urban ponds (Leybeek, Pêcheries, Tenreuken, and Silex) of the city of Brussels (Belgium). Ebullitive CH_4 fluxes were measured in spring, summer, and fall in 2022 and 2023, totaling 8 days in Leybeek, Pêcheries and Tenreuken ponds and 24 days in Silex pond, with three bubble traps. Diffusive CH_4 fluxes were computed from CH_4 concentration measurements collected 46 times on each pond from June 2021 to December 2023. Dfd = degrees of freedom. Original data and fits are shown in Figure S9.

	Statistics	Leybeek	Pêcheries	Tenreuken	Silex
Ebullitive CH_4 fluxes	Function (Tw) (mmol m^{-2} d^{-1})	$0.01 \cdot e^{0.32 \cdot Tw}$	$0.16 \cdot e^{0.15 \cdot Tw}$	$0.10 \cdot e^{0.23 \cdot Tw}$	$0.54 \cdot e^{0.18 \cdot Tw}$
	Q_{10}	26.9	4.4	9.7	6.2
	r^2	0.89	0.23	0.72	0.92
	p-value	<0.0001	0.0032	<0.0001	<0.0001
	Dfd (N-2)	22	22	19	70
Diffusive CH_4 fluxes	Function (Tw) (mmol m^{-2} d^{-1})	$0.22 \cdot e^{0.07 \cdot Tw}$	$0.39 \cdot e^{0.02 \cdot Tw}$	$0.26 \cdot e^{0.06 \cdot Tw}$	$0.22 \cdot e^{0.11 \cdot Tw}$
	Q_{10}	2.1	1.2	1.9	2.9
	r^2	0.11	0.13	0.10	0.18
	p-value	0.0012	0.0009	0.0032	0.0004
	Dfd (N-2)	45	45	46	46
Ratio of ebullitive CH_4 flux to total (diffusive + ebullitive) CH_4 flux	Function (Tw) (%)	$\frac{1}{1 + 22 \times e^{-0.25 \cdot Tw}}$	$\frac{1}{1 + 2.43 \times e^{-0.13 \cdot Tw}}$	$\frac{1}{1 + 2.60 \times e^{-0.17 \cdot Tw}}$	$\frac{1}{1 + 0.40 \times e^{-0.07 \cdot Tw}}$
	r^2	0.71	0.17	0.45	0.30
	p-value	<0.0001	0.0043	<0.0001	<0.0001
	Dfd (N-2)	45	45	46	46

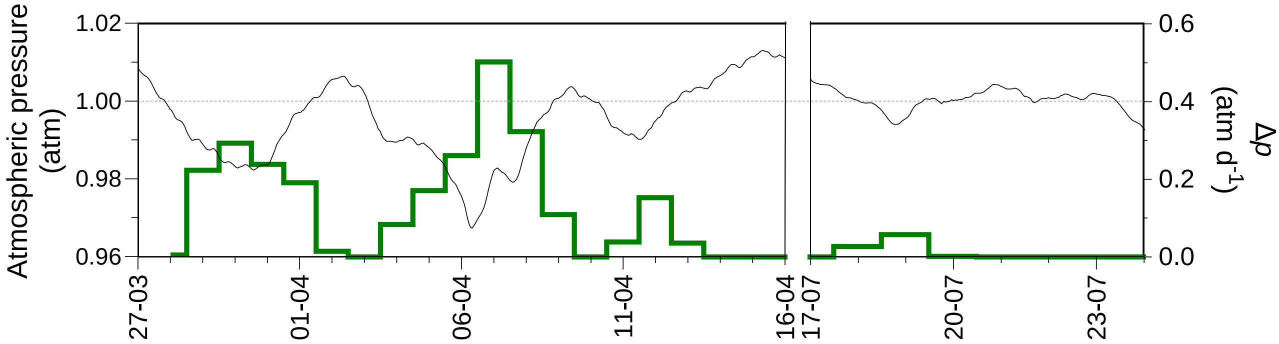

Figure S1: Atmospheric pressure (atm) and atmospheric pressure drop factor (Δp in atm d^{-1}) computed from Equation (4) according to Zhao et al. (2017) from 27 March 2022 to 15 April 2022 and from 18 July 2022 to 23 July 2022 corresponding to the period of bubble flux measurements in the Silex pond in the city of Brussels (Belgium) (Fig. 5).

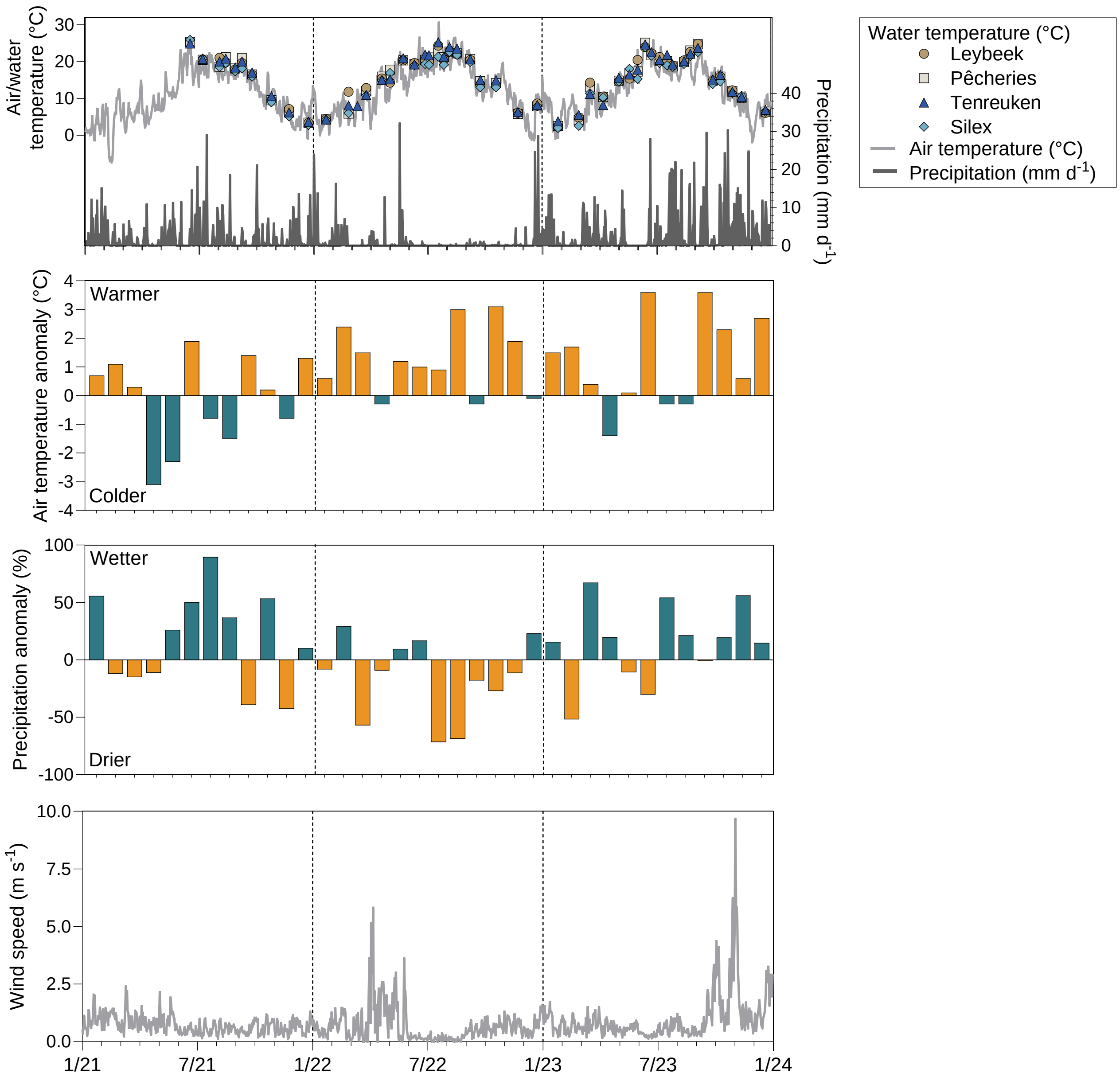

Figure S2: Daily mean air temperature (light grey line) and water temperature during sampling four urban ponds (Leybeek, Pêcheries, Tenreuken, and Silex) of the city of Brussels (Belgium), daily precipitation (dark grey line), monthly temperature anomaly (°C) relative to the 1991-2020 period, and daily wind speed (m s^{-1}) from January 2021 to December 2023.

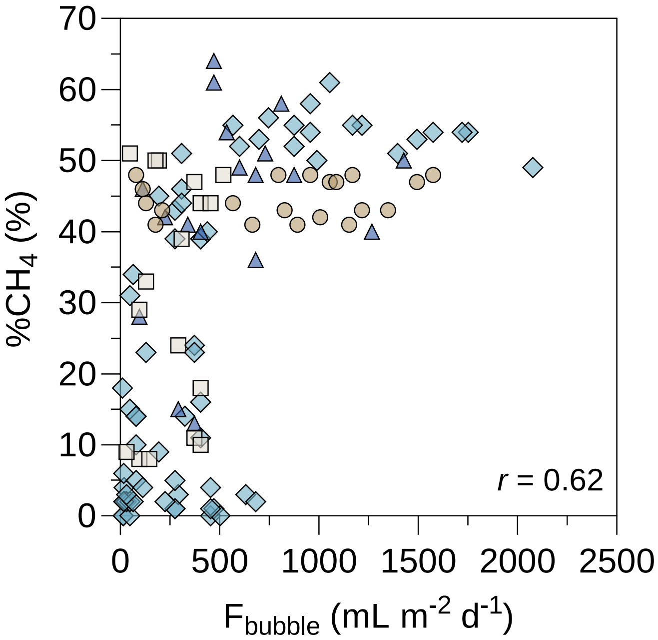

Figure S3: The relative CH_4 content in bubbles (%CH_4, in %) as a function of bubble flux (F_{bubble} in ml m^{-2} d^{-1}) in four ponds (Leybeek, Pêcheries, Tenreuken, and Silex) in the city of Brussels (Belgium). Bubbles fluxes were measured with three bubble traps in spring, summer, and fall of 2022 and 2023, totalling 8 days in the Leybeek, Pêcheries, and Tenreuken ponds and 24 days in the Silex pond. %CH_4 correlated positively to $\log_{10}(F_{bubble})$ (Pearson r=0.62, p<0.0001, n=122).

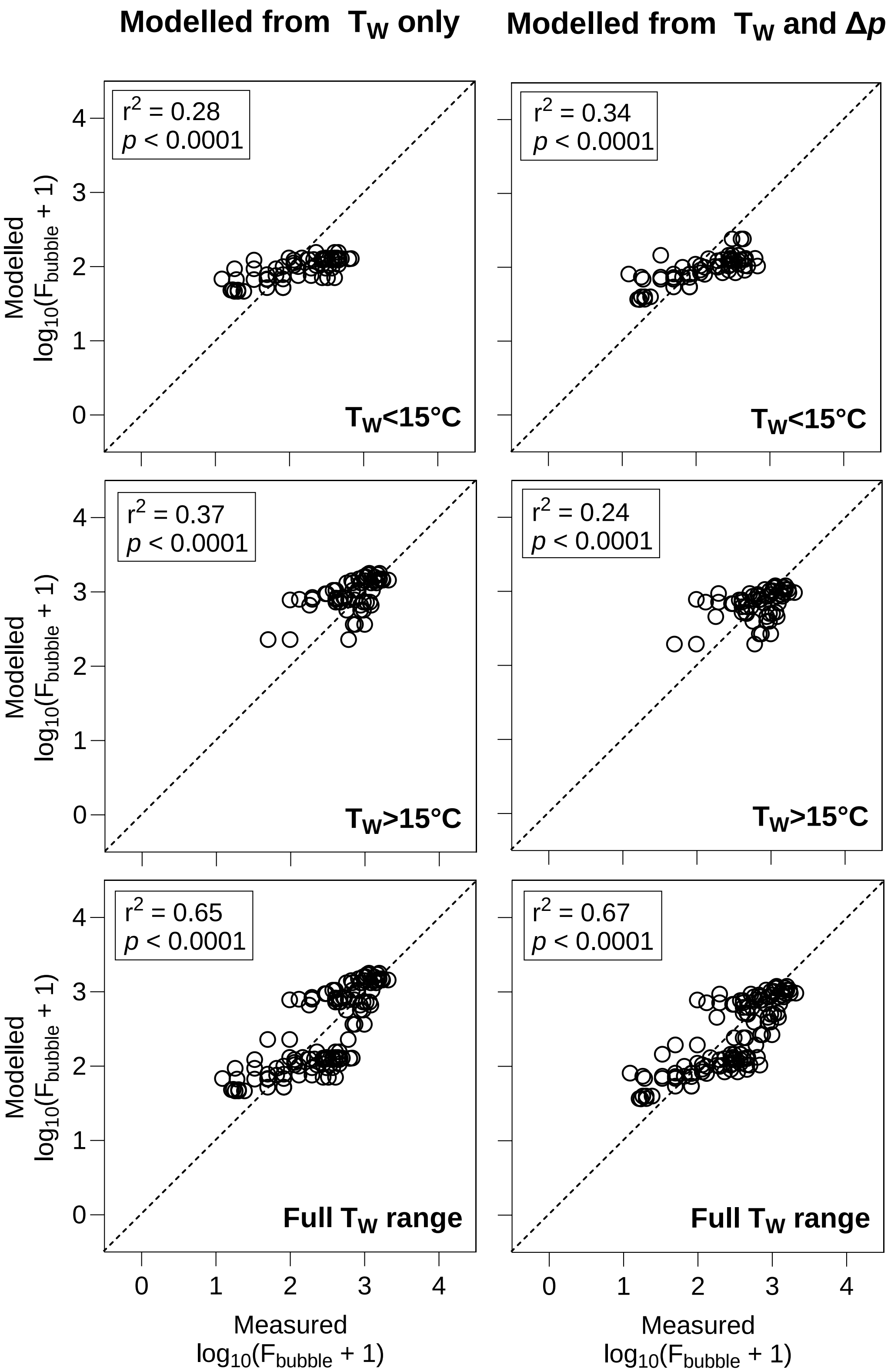

Figure S4: Comparison between measured bubble flux (F_{bubble}) and modelled F_{bubble} at low water temperature (T_w < 15°C), high temperature (T_w >15°C), and full T_w range from multiple linear regression models with T_w alone or both T_W and atmospheric pressure drops (Δp) as drivers in four urban ponds (Leybeek, Pêcheries, Tenreuken, and Silex) of the city of Brussels (Belgium). Bubble fluxes were measured at different seasons in 2022 and 2023, totaling 8 days in Leybeek, Pêcheries and Tenreuken ponds, and 24 days in Silex pond, with three bubble traps. To account for zero values, $\log_{10}$ was computed from F_{bubble} plus 1. The model based on Tw alone corresponds to $\log_{10}(F_{bubble} + 1) = 0.096 \times T_w + 0.821$. The model based on both TW and Δp corresponds to $\log_{10}(F_{bubble} + 1) = 0.078 \times T_w - 0.731 \times \Delta p + 0.991$

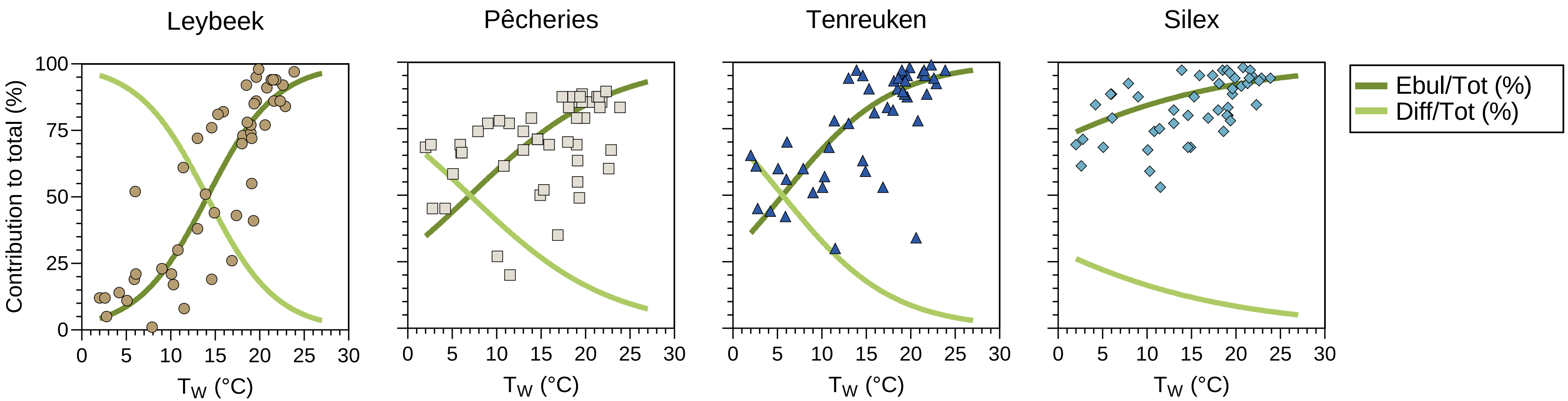

Figure S5: Relative contribution of ebullitive and diffusive CH_4 fluxes to total (ebullitive + diffusive) CH_4 flux as function of water temperature (T_W in °C) in four urban ponds (Leybeek, Pêcheries, Tenreuken, and Silex) of the city of Brussels (Belgium). Ebullitive CH_4 fluxes were measured at different seasons in 2022 and 2023, totaling 8 days in Leybeek, Pêcheries and Tenreuken ponds, and 24 days in Silex pond, with three bubble traps. Data were collected 46 times on each pond from June 2021 to December 2023 for diffusive CH_4 fluxes. Regression lines of fitted data of the relative contribution of ebullition to total (Ebul/Tot) are shown in light green and the relative contribution of diffusion to total (Diff/Tot) in dark green (Table S9). These patterns of temperature dependency are consistent with those previously shown in ponds in Québec (DelSontro et al., 2016).

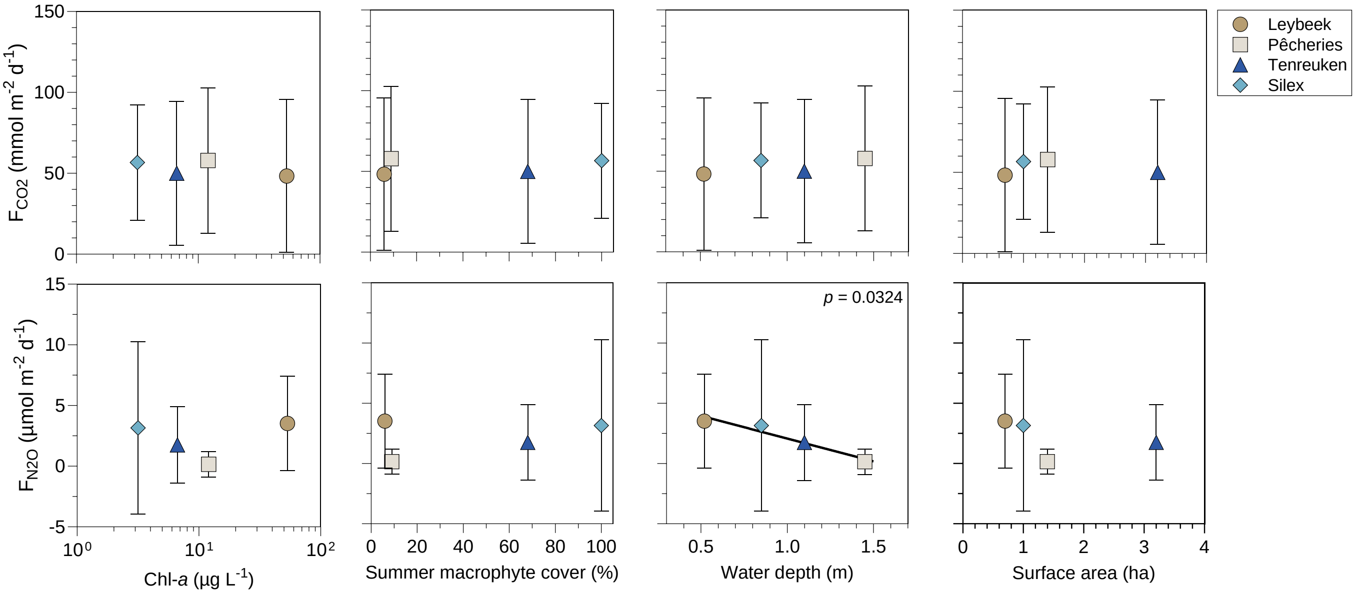

Figure S6: Mean annual diffusive CO_2 flux (F_{CO2} in mmol m^{-2} d^{-1}) and mean annual N_2O flux (F_{N2O}, µmol m^{-2} d^{-1}) versus chlorophyll-*a* (Chl-*a*, µg L^{-1}), total macrophyte cover in summer (%), water depth (m), and lake surface area (ha) in four ponds (Leybeek, Pêcheries, Tenreuken, and Silex) in the city of Brussels (Belgium) from June 2021 to December 2023. Error bars indicate the standard deviation.