

1 Table 1 Mean values (\pm standard error) of main environmental variables (water
 2 temperatures (T_w), air temperature (T_a), chlorophyll a concentration ($Chl-a$),
 3 air pressure (Pa), concentrations of total nitrogen (TN) and concentrations of
 4 total phosphorus (TP)) and CH_4 (diffusive (D_{CH_4}) and ebullition (B_{CH_4})) fluxes
 5 among seasons.

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	Winter	Spring	Summer	Autumn
Pa (hpa)	1018.5 \pm 0.4 <i>a</i>	1008.5 \pm 0.7 <i>b</i>	997.2 \pm 0.3 <i>c</i>	1007.4 \pm 0.3 <i>b</i>
$Chl-a$ ($\mu\text{g L}^{-1}$)	110.7 \pm 4.7 <i>c</i>	249.6 \pm 15.5 <i>b</i>	290.0 \pm 15.1 <i>a</i>	236.6 \pm 15.0
T_a ($^{\circ}\text{C}$)	9.0 \pm 0.6 <i>c</i>	18.3 \pm 0.5 <i>b</i>	26.8 \pm 0.4 <i>a</i>	19.4 \pm 0.4 <i>b</i>
T_w ($^{\circ}\text{C}$)	11.4 \pm 0.3 <i>c</i>	20.8 \pm 0.3 <i>b</i>	28.8 \pm 0.3 <i>a</i>	20.3 \pm 0.4 <i>b</i>
TN ($\text{mg}\cdot\text{L}^{-1}$)	2.1 \pm 0.03 <i>c</i>	2.9 \pm 0.15 <i>b</i>	2.6 \pm 0.25 <i>bc</i>	4.9 \pm 0.20 <i>a</i>
TP ($\text{mg}\cdot\text{L}^{-1}$)	0.04 \pm 0.00 <i>c</i>	0.22 \pm 0.03 <i>b</i>	0.18 \pm 0.04 <i>b</i>	0.76 \pm 0.04 <i>a</i>
D_{CH_4} ($\text{mg}\cdot\text{m}^{-2}\cdot\text{h}^{-1}$)	0.103 \pm 0.006 <i>c</i>	0.146 \pm 0.005 <i>a</i>	0.128 \pm 0.005 <i>b</i>	0.017 \pm 0.006 <i>d</i>
B_{CH_4} ($\text{mg}\cdot\text{m}^{-2}\cdot\text{d}^{-1}$)	33.1 \pm 14.9	86.8 \pm 74.3	201.3 \pm 59.5	64.2 \pm 55.4

7 Lowercase different letters mean significant differences among seasons ($p < 0.05$).

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11 Table 2 Correlations between the difference between daily maximum flux and minimum
12 diffusive CH₄ flux (ΔD_{CH_4}), daily total CH₄ ebullition (T_{BCH_4}), diurnal variations of
13 environmental variables. F_{BCH_4} , the frequency of daily CH₄ ebullition; ΔTw , diurnal
14 variation of Tw ; ΔTa , diurnal variation of Ta ; $\Delta Chl-a$, diurnal variation of $Chl-a$; ΔPa ,
15 diurnal variation of Pa .

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Variable	ΔTw (°C)	ΔTa (°C)	$\Delta Chl-a$ ($\mu g L^{-1}$)	ΔPa (hPa)	F_{CH_4} (%)
ΔDCH_4 ($mg CH_4 \cdot m^{-2} \cdot h^{-1}$)	0.794**	0.712**	0.181	- 0.150	0.583*
T_{BCH_4} ($mg \cdot m^{-2} \cdot d^{-1}$)	0.257	0.148	0.407	- 0.397	0.932**

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19 **denotes a significant correlation at the 0.01 level; * denotes a significant
20 correlation at the 0.05 level

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30 Table 3 Differences between daily mean diffusive CH₄ flux and the averaged
 31 diffusive CH₄ fluxes for sampling periods when the difference between water
 32 and air temperature (ΔT) was small ($-1\text{ }^{\circ}\text{C} < \Delta T < 1\text{ }^{\circ}\text{C}$).

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Date	Daily mean D _{CH₄} (mg·m ⁻² ·h ⁻¹)	Averaged D _{CH₄}	Sig. value
		under $-1 < \Delta T < 1$ (mg·m ⁻² ·h ⁻¹)	
Dec 29	0.023 ± 0.001	0.022 ± 0.002	0.813
Jan 19	0.075 ± 0.003	0.062 ± 0.007	0.102
Feb 28	0.172 ± 0.012	0.165 ± 0.010	0.877
Mar 25	0.063 ± 0.003	0.075 ± 0.004	0.067
Apr 26	0.116 ± 0.004	0.122 ± 0.011	0.578
May 18	0.207 ± 0.009	0.220 ± 0.013	0.670
Jun 29	0.114 ± 0.006	0.129 ± 0.025	0.509
Jul 17	0.135 ± 0.005	0.140 ± 0.029	0.751
Aug 29	0.176 ± 0.008	0.227 ± 0.018	0.013
Sep 24	0.073 ± 0.004	0.077 ± 0.007	0.676
Oct 27	0.017 ± 0.001	0.019 ± 0.002	0.452
Nov 20	0.011 ± 0.001	0.010 ± 0.001	0.475

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43 Fig 1 Diffusive CH₄ fluxes (a) and CH₄ ebullition (b) as a function of water
44 temperature (T_w) for a range of TP concentrations.

