

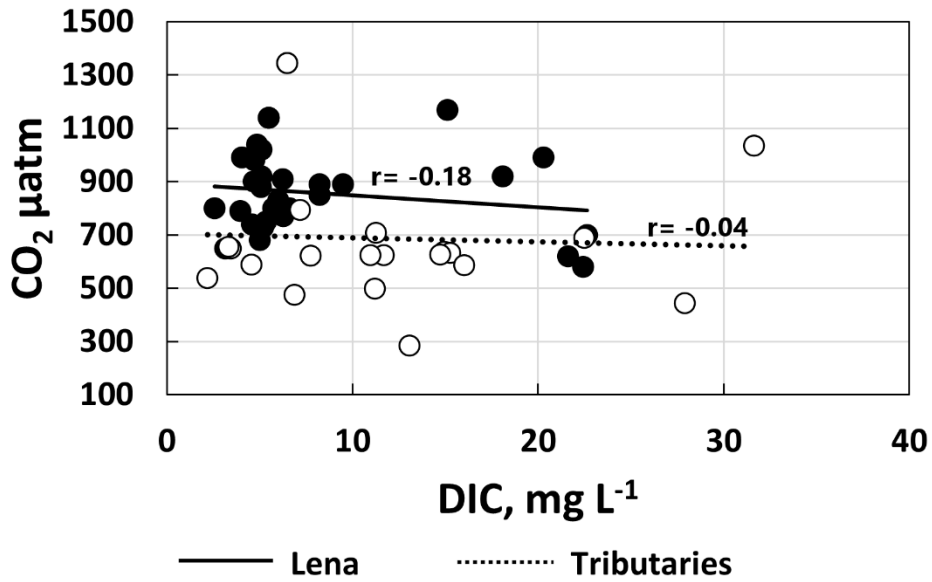
Table R1. Measured water temperature, pCO₂, calculated CO₂ flux, CH₄, DOC, and DIC concentrations and pH in the Lena River main stem (average ± s.d.; (n) is number of measurements). The CO₂ emission fluxes (FCO₂) are calculated for two values of transfer coefficient (*k*) of 4.464 m d⁻¹ (Karlsson et al., 2021) and 3.00 m d⁻¹ (lowerst range of world rivers in Raymond et al., 2013).

River transect	T _{water} , °C	pCO ₂ , μatm	FCO ₂ , g C m ⁻² d ⁻¹ <i>k</i> = 4.464	FCO ₂ , g C m ⁻² d ⁻¹ <i>k</i> = 3.00
Lena upstream of Kirenga (0-578 km)	12.65±0.22 (99)	714±22 (99)	0.849±0.061 (99)	0.571±0.041 (99)
Lena Kirenga – Vitim (579-1132 km)	9.17±0.15 (87)	806±8.8 (87)	1.19±0.024 (87)	0.802±0.016 (87)
Lena Vitim -Nuya (1132-1331 km)	8.10±0.115 (27)	797±22 (27)	1.22±0.072 (27)	0.817±0.048 (27)
Lena Nuya – Tuolba (1331-2008 km)	9.61±0.09 (95)	846±12 (95)	1.29±0.034 (95)	0.868±0.023 (95)
Lena Tuolba – Aldan (2008-2381 km)	10.6±0.21 (52)	1003±28 (52)	1.69±0.081 (5)	1.21±0.048 (52)

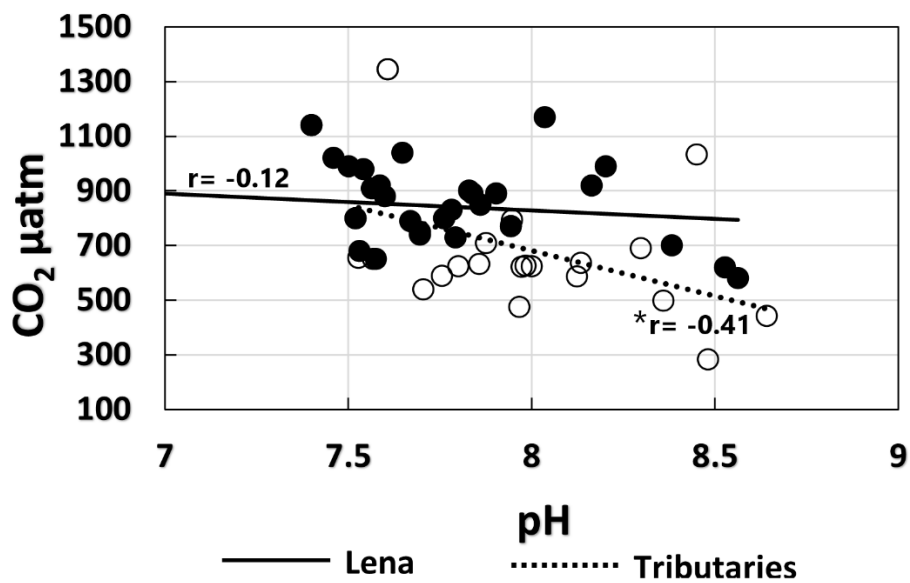
	CH ₄ , μmol L ⁻¹	DOC, mg L ⁻¹	DIC, mg L ⁻¹	pH
Lena upstream of Kirenga (0-578 km)	0.068±0.003 (6)	13.9±1.4 (6)	20.0±1.2 (6)	8.12±0.203 (7)
Lena Kirenga – Vitim (579-1132 km)	0.040±0.002 (12)	7.55±0.246 (14)	6.30±0.485 (14)	7.77±0.040 (14)
Lena Vitim -Nuya (1132-1331 km)	0.038±0.003 (5)	9.02±0.29 (3)	4.55±0.70 (3)	7.69±0.063 (3)
Lena Nuya – Tuolba (1331-2008 km)	0.037±0.002 (6)	10.4±0.78 (2)	5.09±1.157 (2)	7.62±0.052 (2)
Lena Tuolba – Aldan (2008-2381 km)	0.088±0.034 (5)	11.6±0.27 (5)	5.24±0.102 (5)	7.49±0.044 (5)

Table R2. Measured water temperature, pCO₂, calculated CO₂ flux, CH₄, DOC, DIC concentration and pH in the tributaries (average ± s.d.; (n) is number of measurements). The CO₂ emission fluxes (FCO₂) are calculated for two values of transfer coefficient (*k*) of 4.464 m d⁻¹ (Karlsson et al., 2021) and 3.00 m d⁻¹ (lowest range of world rivers in Raymond et al., 2013).

Tributary	T _{water} , °C	pCO ₂ , μatm	FCO ₂ , g C m ⁻² d ⁻¹ k = 4.464	FCO ₂ , g C m ⁻² d ⁻¹ k = 3.00
№4 Orlinga (208 km)	8.0±0.0 (13)	515±2.9 (13)	0.347±0.01 (13)	0.233±0.005 (13)
№5 Nijnaya Kitima (228 km)	6.8±0.0 (11)	462±9.4 (11)	0.193±0.03 (11)	0.130±0.020 (11)
№8 Taiur (416 km)	8.5±0.0 (10)	575±31 (10)	0.523±0.095 (10)	0.351±0.064 (10)
№10 Bol. Tira (529 km)	11.9±0.0 (15)	788±12 (15)	1.04±0.03 (15)	0.701±0.021 (15)
№12 Kirenga (579 km)	10.2±0.0 (323)	448±4 (323)	0.131±0.01 (323)	0.088±0.008 (323)
№25 Thcayka (1025 km)	8.6±0.01 (8)	856±13 (8)	1.37±0.04 (8)	0.922±0.026 (8)
№28 Tchuya (1110 km)	5.9±0.0 (5)	751±5.7 (5)	1.16±0.019 (5)	0.779±0.013 (5)
№29 Vitim (1132 km)	6.8±0.0 (10)	654±10 (10)	0.812±0.03 (10)	0.602±0.018 (10)
№32 Ykte (1265 km)	4.9±0.0 (11)	676±4.8 (11)	0.943±0.02 (11)	0.634±0.011 (11)
№34 Kenek (1312 km)	7.60±0.0 (11)	710±2.6 (11)	0.964±0.01 (11)	0.648±0.005 (11)
№36 Nuya (1331 km)	11.8±0.0 (10)	752±6.0 (10)	0.947±0.02 (10)	0.637±0.011 (10)
№38 Bol. Patom (1670 km)	6.9±0.0 (5)	730±12 (5)	1.05±0.04 (5)	0.706±0.026 (5)
№39 Biriuk (1712 km)	14.2±0.0 (5)	929±19 (5)	1.32±0.05 (5)	0.888±0.032 (5)
№40 Olekma (1750 km)	6.4±0.0 (11)	802±14 (11)	1.30±0.05 (11)	0.876±0.032 (11)
№43 Markha (1948 km)	17.5±0.0 (15)	844±15 (15)	0.998±0.03 (15)	0.671±0.023 (15)
№44 Tuolba (2008 km)	12.3±0.0 (305)	1181±6 (305)	2.08±0.02 (305)	1.395±0.010 (305)
№46 Siniaya (2118 km)	18.5±0.0 (24)	894±19 (24)	1.08±0.04 (24)	0.727±0.029 (24)
№48 Buotama (2170 km)	18.5±0.0 (24)	1160±25 (24)	1.66±0.06 (24)	1.118±0.037 (24)
№52-54 Aldan (2381 km)	14.8±0.02 (316)	1715±12 (316)	3.23±0.03 (316)	2.172±0.020 (316)



A



B

Fig. R1. Pearson correlations between pCO₂ and DIC (A) and pH (B) of the Lena River main stem (solid circles, solid line) and Lena tributaries (open circles, dotted line). Significant correlations ($p < 0.05$) are marked by asterisk.