Table S1. Summary of ANOVA examining the effect of reaches on physical and chemical variables, GHG concentrations and fluxes during sampling period.

	df	**Ta**		**Tw**		**WD**		**FV**		**AP**		**DO**		**pH**	
		F	***p***	***F***	***p***	***F***	***p***	***F***	***p***	***F***	***p***	***F***	***p***	***F***	***p***
September	2	0.74	0.49	0.54	0.59	1.45	0.26	1.66	0.22	2.67	0.98	-	-	2.48	0.11
April	2	1.09	0.36	0.13	0.88	0.07	0.93	0.27	0.77	7.70	0.00	0.23	0.79	0.22	0.81
All data	2	0.90	0.41	0.07	0.93	0.56	0.57	1.16	0.33	9.99	0.00	0.50	0.61	0.32	0.73
		NH_4^+-N		c_{CO2}		f_{CO2}		c_{CH4}		f_{CH4}		c_{N2O}		f_{N2O}	
		F	*p*	*F*	*p*	*F*	*p*	*F*	*p*	*F*	*p*	*F*	*p*	*F*	*p*
September	2	1.11	0.35	2.09	0.15	1.53	0.24	3.56	0.04	2.41	0.12	4.12	0.04	5.48	0.01
April	2	0.17	0.84	0.13	0.88	0.74	0.49	0.70	0.51	0.41	0.67	0.80	0.47	1.17	0.33
All data	2	0.59	0.56	0.08	0.92	0.05	0.96	2.64	0.09	1.73	0.19	0.56	0.58	1.03	0.37

Note: Ta, air temperature; Tw, water temperature; WD, water depth; FV, flow velocity; AP, air pressure; DO, dissolved oxygen; NH_4^+-N, ammonium. c_{CO2}, c_{CH4} and c_{N2O} represent dissolved CO_2, CH_4 and N_2O concentrations; f_{CO2}, f_{CH4} and f_{N2O} represent diffusive CO_2, CH_4 and N_2O fluxes.

Table S2. Relations between GHG concentrations and fluxes and environmental variables in each campaign

		c_{CO2}	f_{CO2}	c_{CH4}	f_{CH4}	c_{N2O}	f_{N2O}
September	urban	0.332	0.102	-0.073	-0.073	-0.176	-0.171
	water	0.22	-0.112	0.105	0.031	-0.053	-0.342
	forest	-0.124	0.372	-0.231	-0.182	0.448	0.439
	farm	-0.113	-0.183	0.42	0.442	-0.443	-0.052
	grass	-0.103	-0.393	-0.257	-0.335	-0.18	-0.355
	unused	0.353	-0.102	0.45	0.428	-0.163	-0.351
April	urban	-0.049	-0.072	-0.007	-0.036	0.051	0.08
	water	-0.107	-0.088	0.219	0.191	-0.185	-0.161
	forest	0.07	0.48	-0.31	-0.276	-0.001	-0.102
	farm	0.149	0.156	0.365	0.359	0.177	0.248
	grass	-0.126	-0.072	0.067	0.062	-0.313	-0.248
	unused	-0.162	-0.189	0.082	0.04	0.245	0.255

Table S3. Dissolved GHG concentrations in surface water and diffusive GHG emissions from the Qingyijiang River compared with other studies

Rivers	Site	Climate	CO_2 concentration (μM)	CO_2 flux (mmol m^{-2} d^{-1})	CH_4 concentration (μM)	CH_4 flux (μmol m^{-2} d^{-1})	N_2O concentration (nM)	N_2O flux (μmol m^{-2} d^{-1})	References
Amazon River	Brazil	Tropic	-	-	0.9	1060	-	-	[9]
Indian rivers	India	Tropic	-	20.1	0.7	300	-	-	[53]
Urban rivers in Shanghai	China	Subtropic	-	565.83	-	1164.17	-	137.14	[35, 36]
Rivers in TGR catchment	China	Subtropic	-	-	1.12	3060	-	-	[37]
Urban rivers in Tianjin	China	Subtropic	35.55	16.34	0.80	984	44.57	36.46	[54]
Jurong rivers	China	Subtropic	112	409	0.51	1600	-	-	[57]
Urban rivers in Chongqing	China	Subtropic	-	450.28			-	-	[58]
Qingyijiang River	**China**	Subtropic	**28.17**	**31.89**	**0.27**	**697.22**	**16.16**	**18.12**	**This study**
Xilin river	China	Temperate	-	2586	-	4730	-	20.96	[61]
Rivers in Skogaryd catchment	Sweden	Boreal	131.60	1600	1.70	8800	-	-	[79]
Alaska streams	USA	Boreal	-	450.14	-	630.72	-	-	[18]
Forest and agricultural streams	Sweden	Boreal	-	-	-	-	100	533	[59]