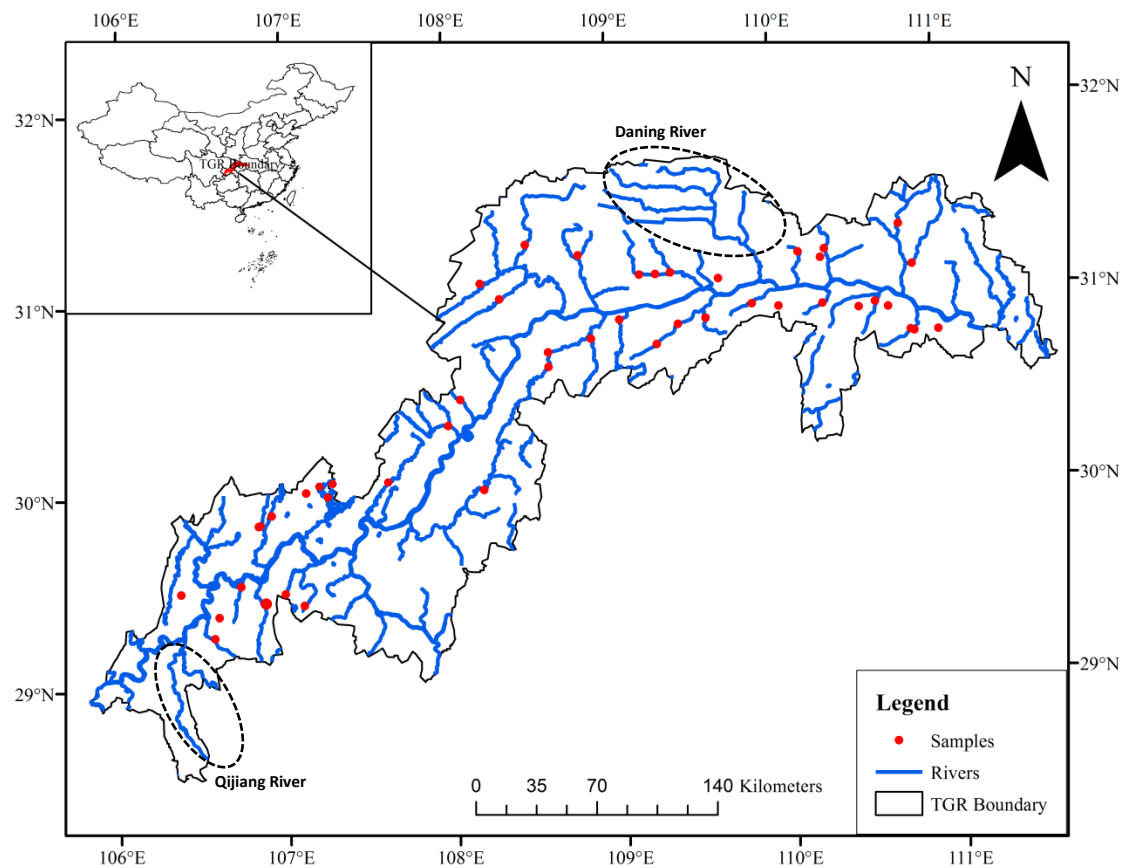


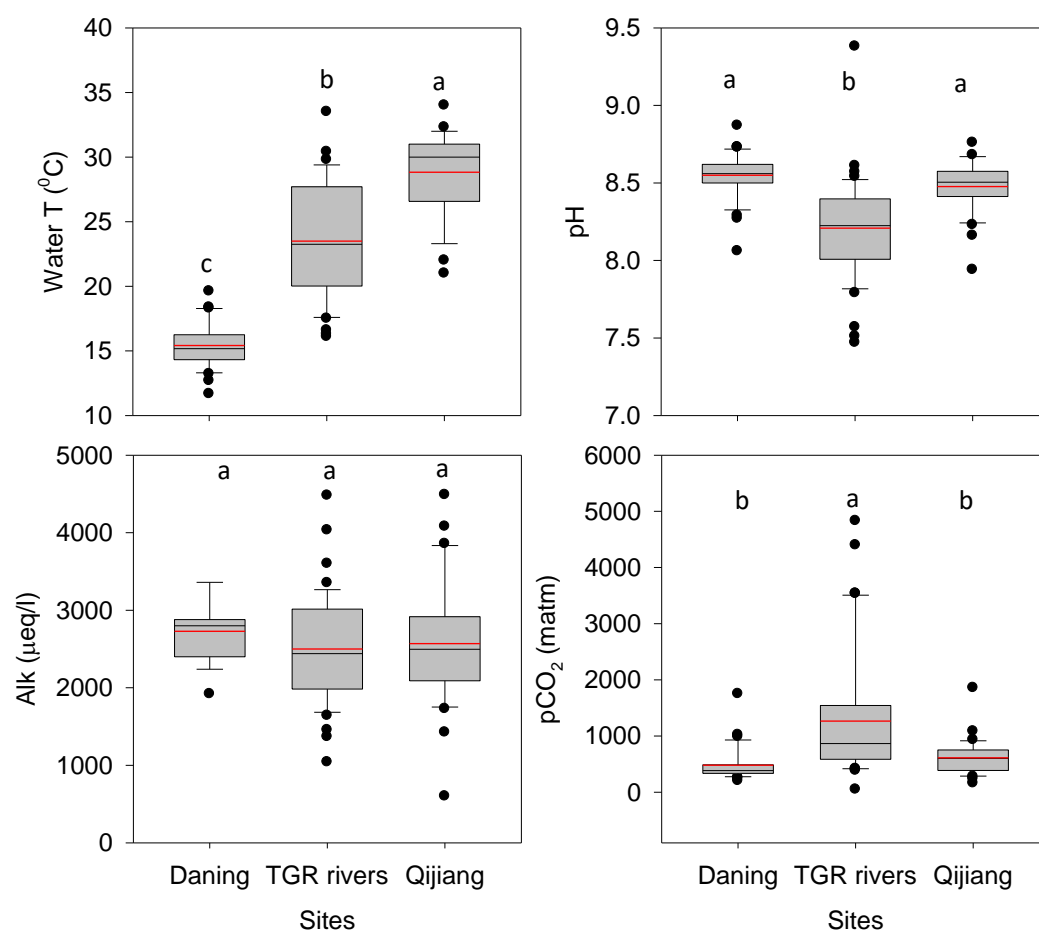
# Gas transfer velocities of CO<sub>2</sub> in subtropical monsoonal climate streams and small rivers

Siyue Li\*, Rong Mao, Yongmei Ma, VVSS Sarma

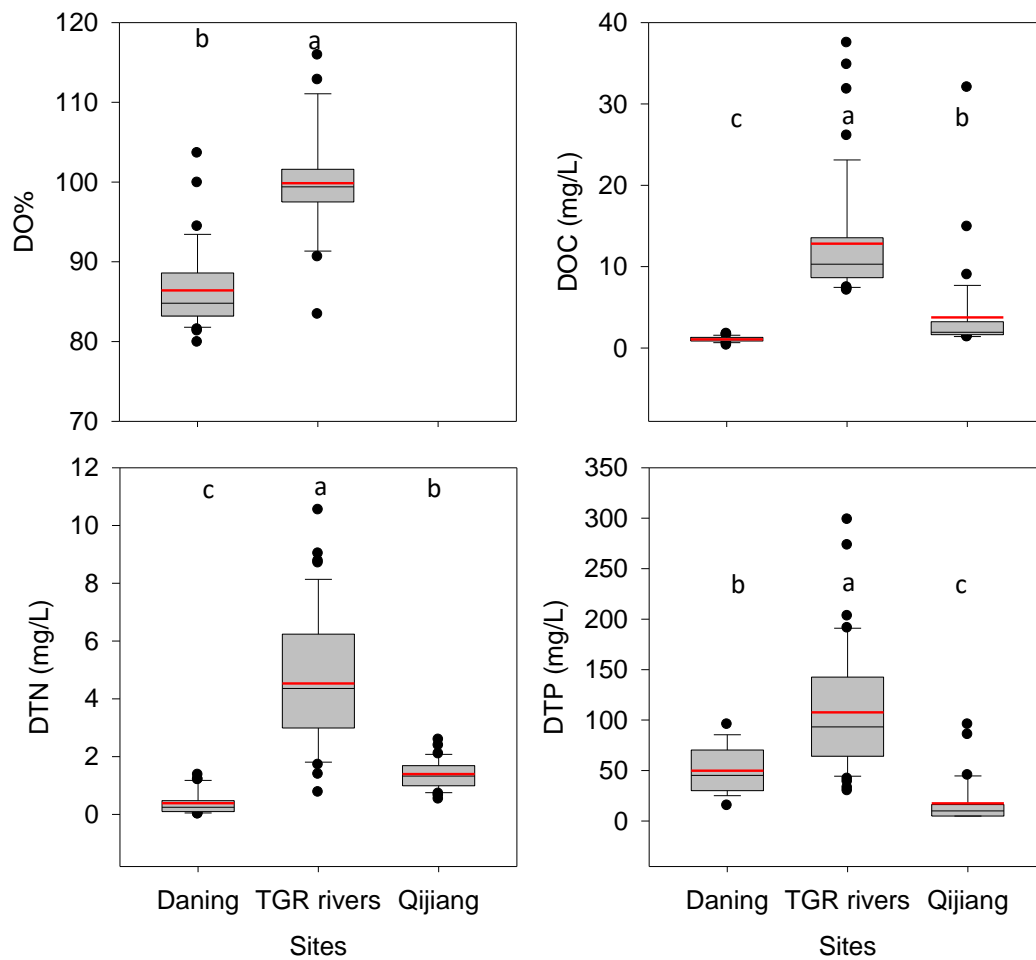
Appendix Table A1. Dataset in relation to our study.



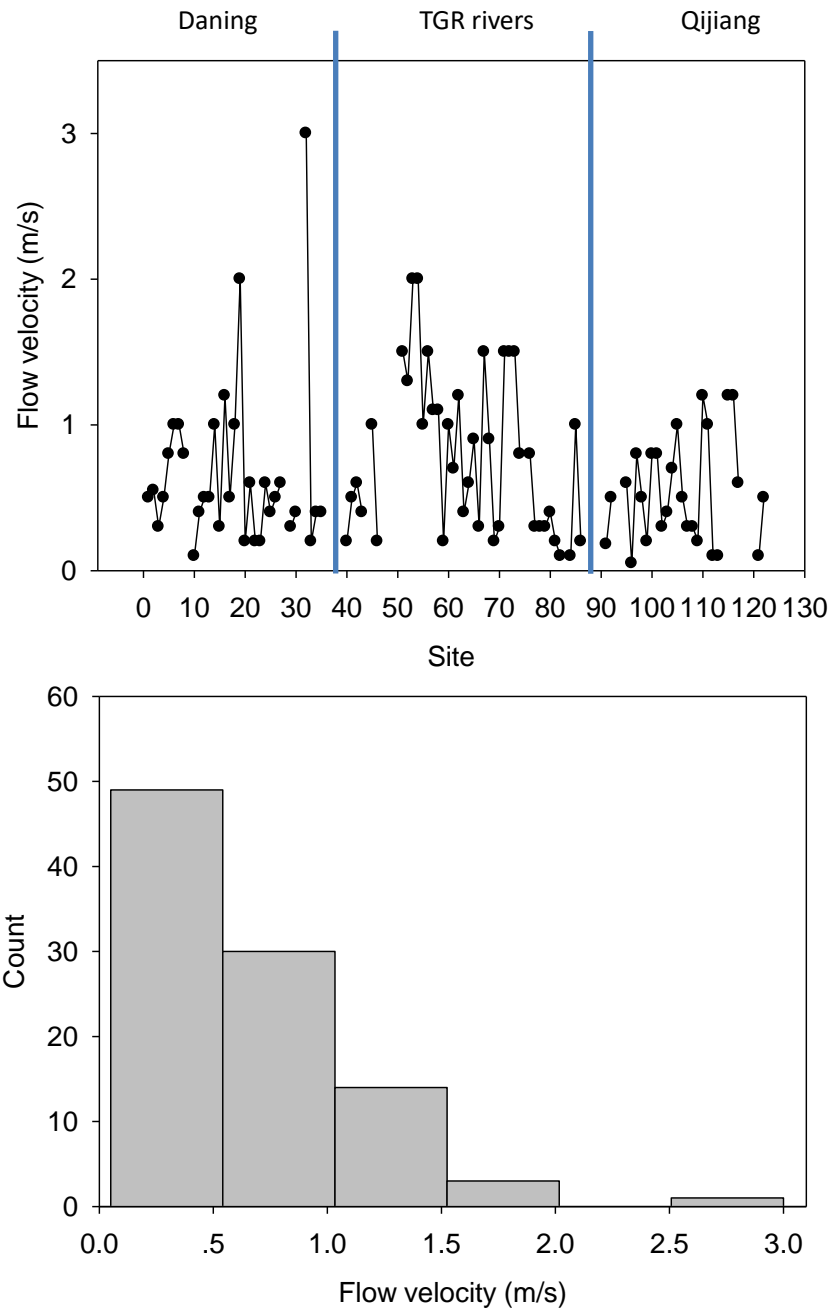
**Fig. S1.** Map of sampling locations of major rivers and streams in the Three Gorges Reservoir region, China.



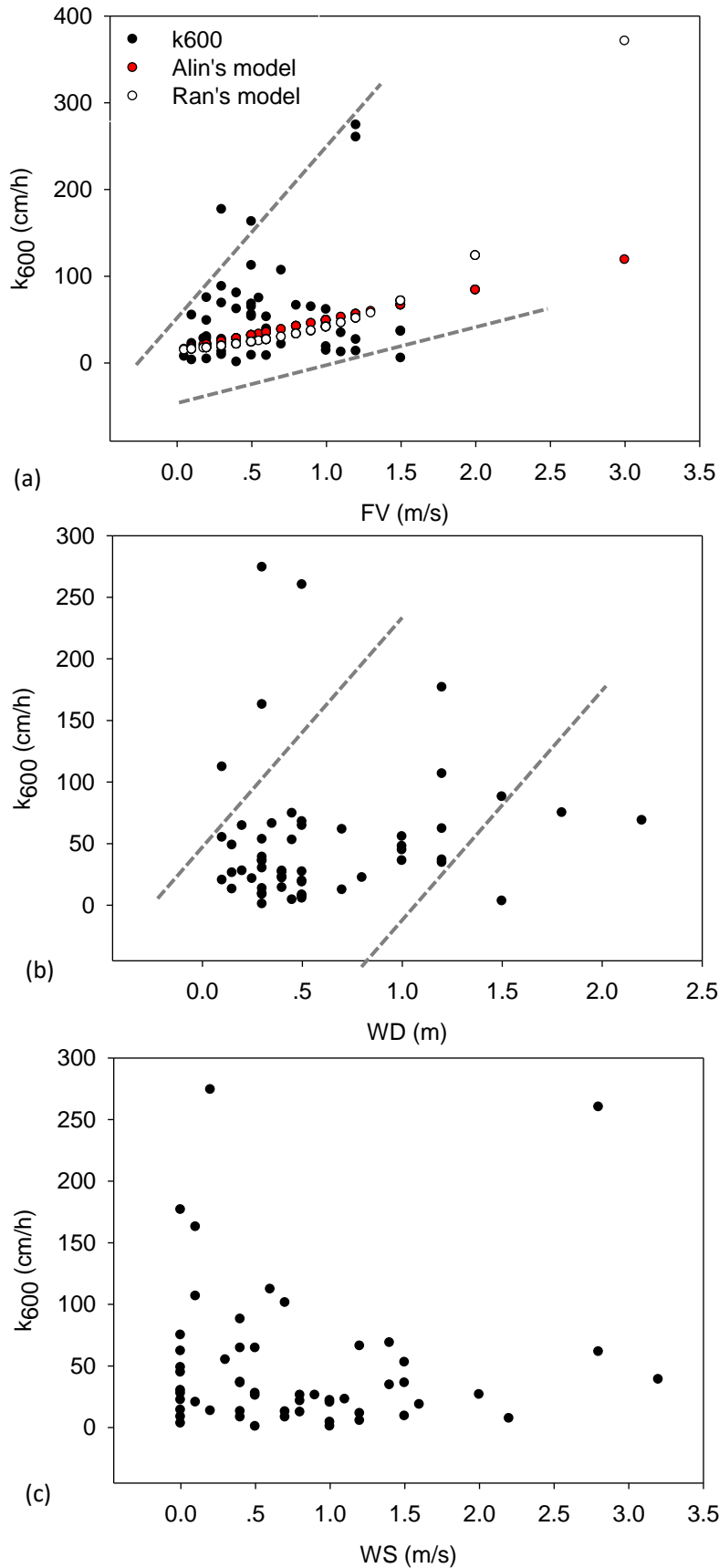
**Fig. S2.** Boxplots of water temperature, pH, alkalinity and pCO<sub>2</sub> in the subtropical rivers (different letters represent statistical differences at  $p < 0.05$ ). (the black and red lines, lower and upper edges, bars and dots in or outside the boxes represent median and mean values, 25th and 75th, 5th and 95th, and <5th and >95<sup>th</sup> percentiles of all data, respectively). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article).



**Fig. S3.** Boxplots of organic carbon and nutrients in the subtropical rivers (different letters represent statistical differences at  $p < 0.05$ ). (the black and red lines, lower and upper edges, bars and dots in or outside the boxes demonstrate median and mean values, 25th and 75th, 5th and 95th, and <5th and >95<sup>th</sup> percentiles of all data, respectively). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article).



**Fig. S4.** Current velocity in our studied rivers.



**Fig. S5.** Plots of  $k_{600}$  and flow velocity (FV, unit in m/s) (a), WD (water depth, unit in m) (b), and WS (wind speed, unit in m/s) (c). The circle and red-dotted lines in Fig. 3a

represent the model developed by Ran et al. (2015) and Alin et al (2011), respectively.

**Table S1.** Estimated  $k_{600}$  levels in our rivers.

		Daning	TGR rivers	Qijiang	Total
Mean		50.23	40.36	60.20	48.41
Median		50.46	30.04	25.81	32.22
Std. Deviation		20.10	37.60	78.85	53.20
Minimum		19.48	0.75	4.22	0.75
Maximum		80.50	176.71	274.12	274.12
Percentiles	25	35.809	12.628	13.213	16.303
	75	67.754	61.537	64.827	63.194
95% CI for Mean	Lower Bound	35.86	27.02	24.31	35.12
	Upper Bound	64.61	53.69	96.10	61.70

CI-Confidence Interval

**Table S2.** CO<sub>2</sub> emission from total rivers.(a) Upscaling using CO<sub>2</sub> areal flux by FC.

	Catchment Area km <sup>2</sup>	Water surface km <sup>2</sup>	CO <sub>2</sub> areal flux mmol/m <sup>2</sup> /d	CO <sub>2</sub> emission Tg CO <sub>2</sub> /y
Daning	4200	21.42	122.0 ± 239.4	0.042
Qijiang	4400	30.8	50.3 ± 177.2	0.025
TGR river	50000	377.78	217.7 ± 334.7	1.321
Total				1.39

(b) Upscaling using determined k average and models (whole dataset are used here).

		From determined k mean	Flow velocity-based model (Fig. 3b)	Water depth-based model (Fig.3a)	Alin's model
Mean		1.37	3.29	1.08	1.06
S.D.		1.28	3.08	1.01	1.00
95% CI for Mean	Lower Bound	0.89	2.15	0.71	0.69
	Upper Bound	1.84	4.43	1.46	1.43

A total water area of approx. 430 km<sup>2</sup> for all tributaries (water area is from Landsat ETM+ in 2015).

## References

Alin, S.R., Rasera, M., Salimon, C.I., Richey, J.E., Holtgrieve, G.W., Krusche, A.V., Snidvongs, A., 2011. Physical controls on carbon dioxide transfer velocity and flux in low-gradient river systems and implications for regional carbon budgets. *Journal of Geophysical Research-Biogeosciences* 116. G01009.