

Table S1. Basic information on the sampling sites in the Liuxi River Basin.

	Sample site	Lithology	Land use	Sampling date	Distance to the Liuxi Reservoir (L1) (km)
river water	L1	Granite	Forest	10/2017, 1/2018, 4/2018, 7/2018, 10/2018	0
	L2	Granite	Forest		15.6
	L3	Limestone	Forest and Orchard		34.4
	L4	Limestone	Orchard		41.7
	L5	Granite	Built-up area		50.3
	L6	Granite	Built-up area		60.9
	L7	Granite	Orchard		85.4
	L8	Granite	Vegetable land		105.7
	L9	Granite	Vegetable land and Built-up area		120.0
	L10	Granite	Vegetable land and Built-up area		135.6
	L11	Granite	Vegetable land and Built-up area		150.8
	L12	Granite	Built-up area		163.1
	L13	Granite/Limestone	Built-up area		170.5
Rain water	L4	Limestone	Orchard	7/2018	41.7

Table S2. Contribution of sea salt deposition to major ions in river water (%).

Watershed name	Sampling date	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	Cl ⁻
The Liuxi River	10/2017	0.3	9.64	2.54	0.68	1.82	7.32
	1/2018	0.35	9.81	2.88	0.54	2.01	7.50
	4/2018	0.31	10.1	3.49	0.48	2.38	10.8
	7/2018	0.38	10.7	4.16	0.56	2.71	11.5
	10/2018	0.24	9.42	2.71	0.59	1.46	7.78
	Average ± SD	0.32±0.05b	9.93±0.50b	3.16±0.67b	0.57±0.07b	2.08±0.49b	8.98±2.00b
The Shima River ^e	2/2012	0.20	8.01	2.36	0.24	0.38	2.92
	11/2012	0.24	11.6	8.31	0.41	0.50	6.96
	6/2014	0.22	8.71	2.63	0.23	0.19	1.97
	Average ± SD	0.22±0.02b	9.44±1.90b	4.43±3.360b	0.29±0.10b	0.36±0.16c	3.95±2.65c
The coastal basin of Sun Yat-sen	1/2007	3.00	41.0	11.0	2.00	9.00	22.0
	7/2007	3.00	60.0	21.0	2.00	15.0	45.0
University, Zhuhai ^f	Average	3.00a	50.5a	16.0a	2.00a	12.0a	33.5a

a, b, and c indicate significant difference among basins ($p < 0.05$); ^eData from Gao *et al.* (2015); ^fData from Xie *et al.* (2011).

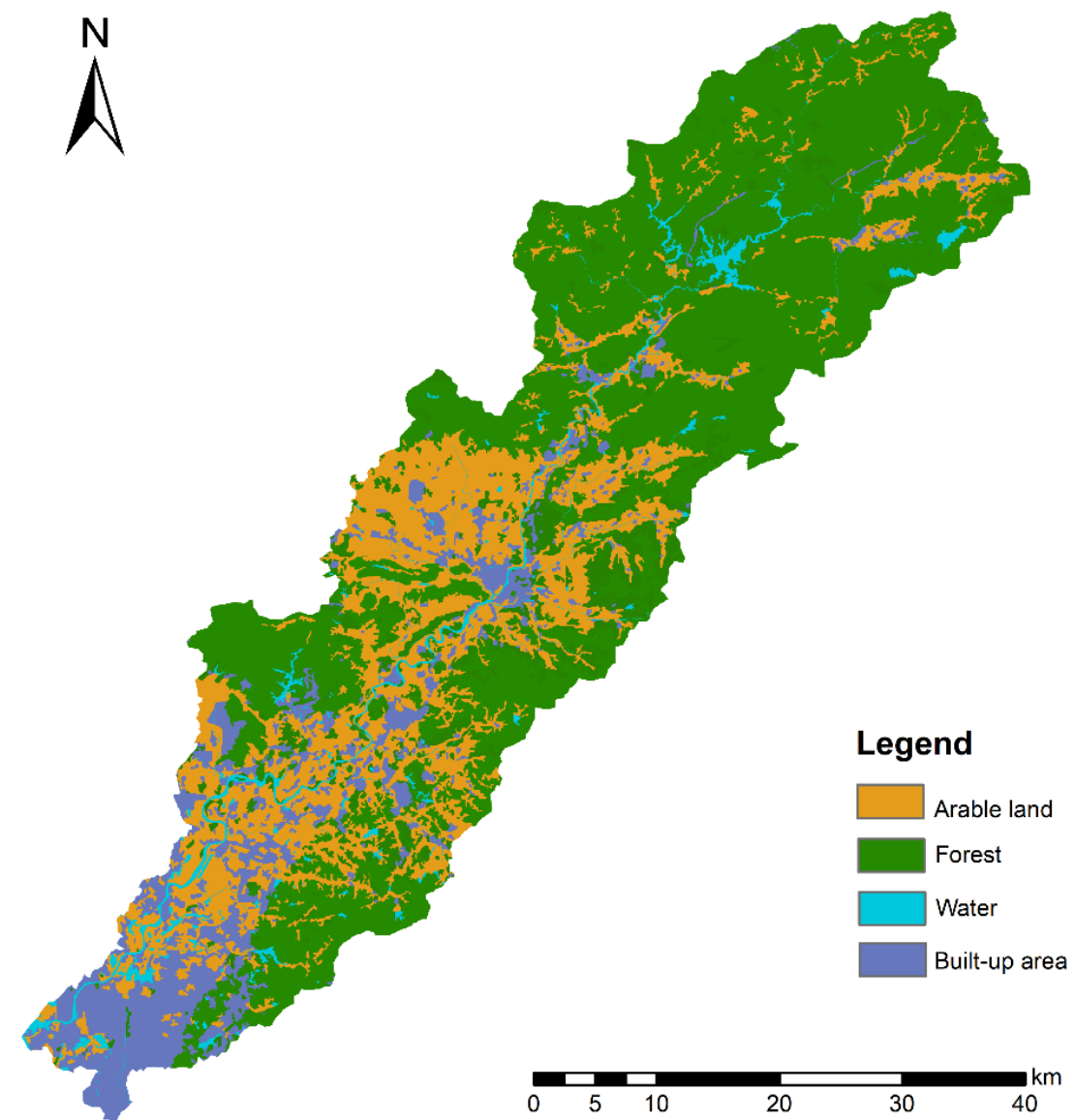


Fig. S1. The spatial characteristics of land use in the Liuxi River Basin.

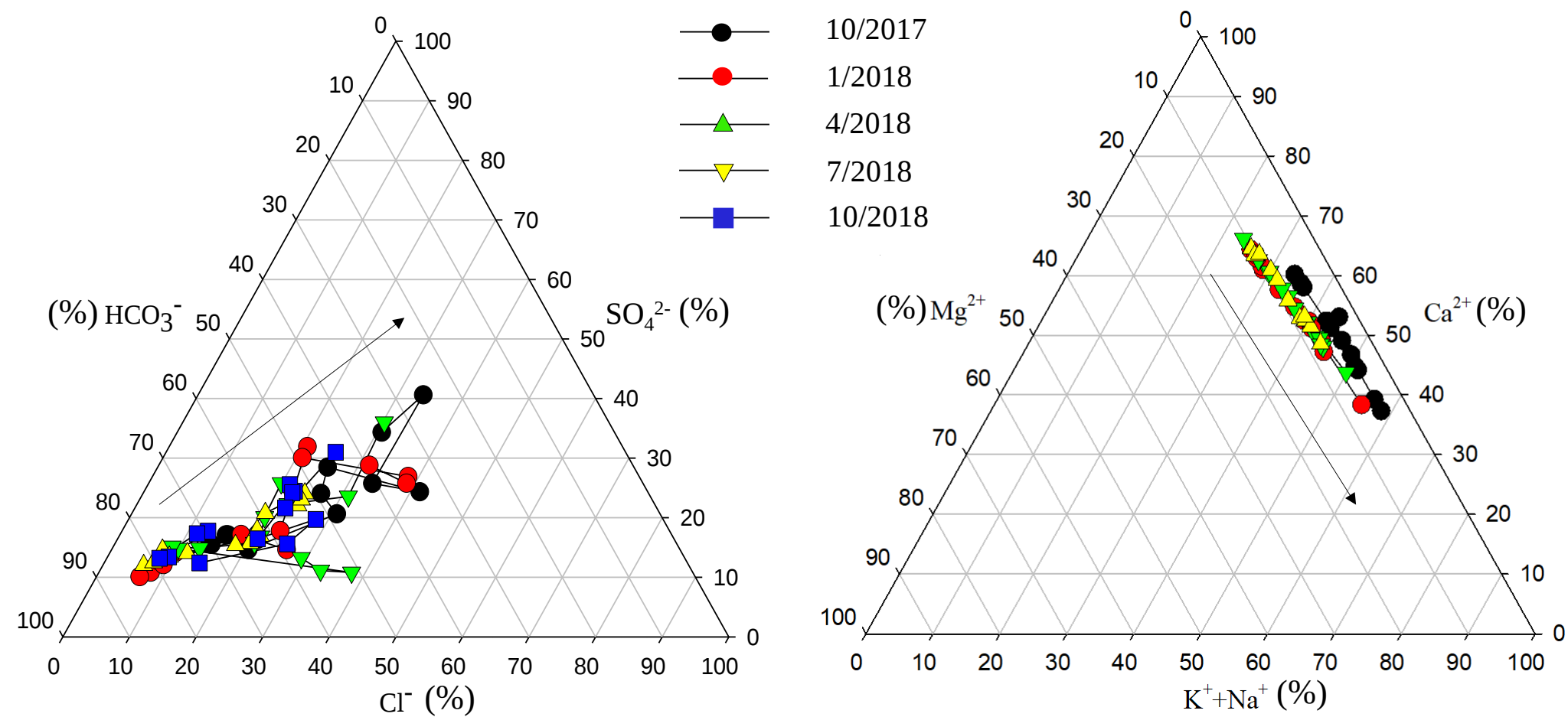


Fig. S2. Ternary plot for the hydrochemistry of river water samples. Arrow direction indicates direction from upstream (L1–L4) to downstream (L10–L13) and the hydrochemical types are generally transformed from $\text{HCO}_3\text{-Ca}$ to $\text{HCO}_3\text{-Ca-Na}$ and $\text{HCO}_3\text{-Cl-Ca-Na}$.



Fig. S3. Observations during sampling: (a) and (b) Water hyacinth at L9 sampling site in April 2018 and October 2018.

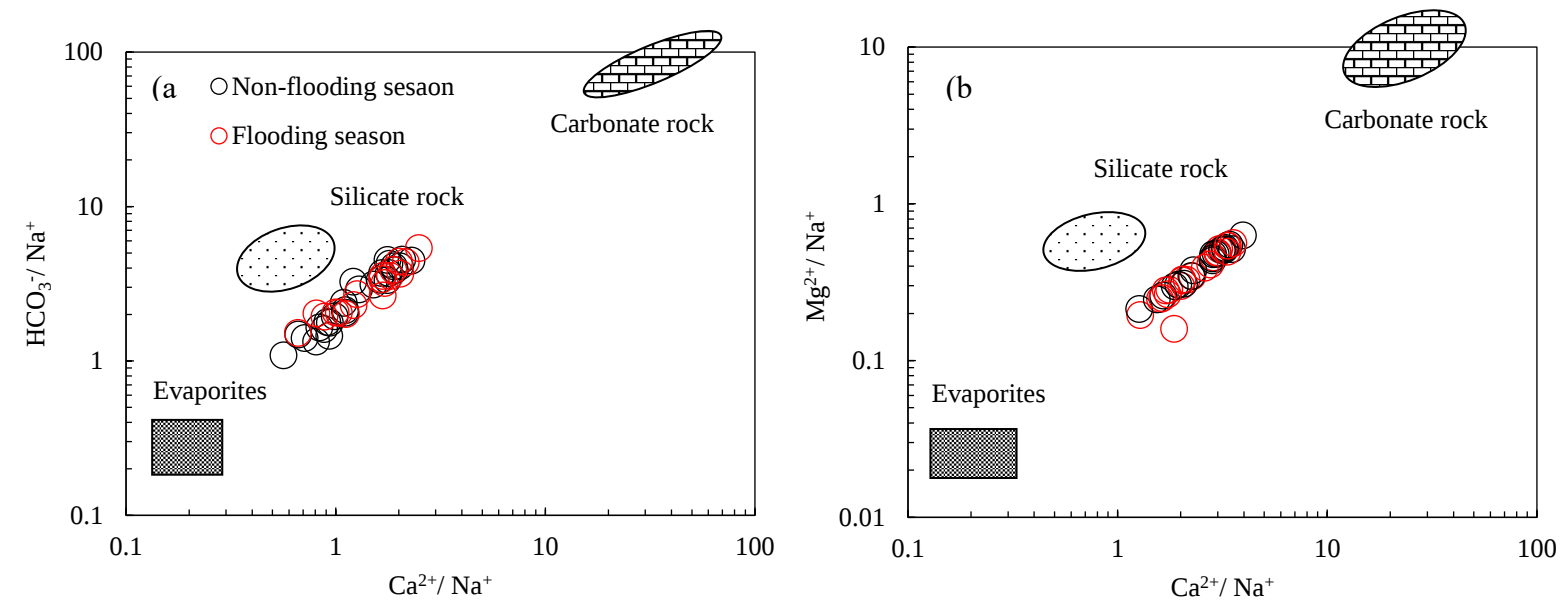


Fig. S4. A precipitation-corrected molar ratio plot for the non-flooding seasons and flooding seasons (modified from Dessert *et al.* 2003): (a) $(\text{HCO}_3^{-}/\text{Na}^{+})/(\text{Ca}^{2+}/\text{Na}^{+})$ and (b) $(\text{Mg}^{2+}/\text{Na}^{+})/(\text{Ca}^{2+}/\text{Na}^{+})$. End-member compositions for carbonate rock, silicate rock, and evaporites are from Gaillardet *et al.* (1999).

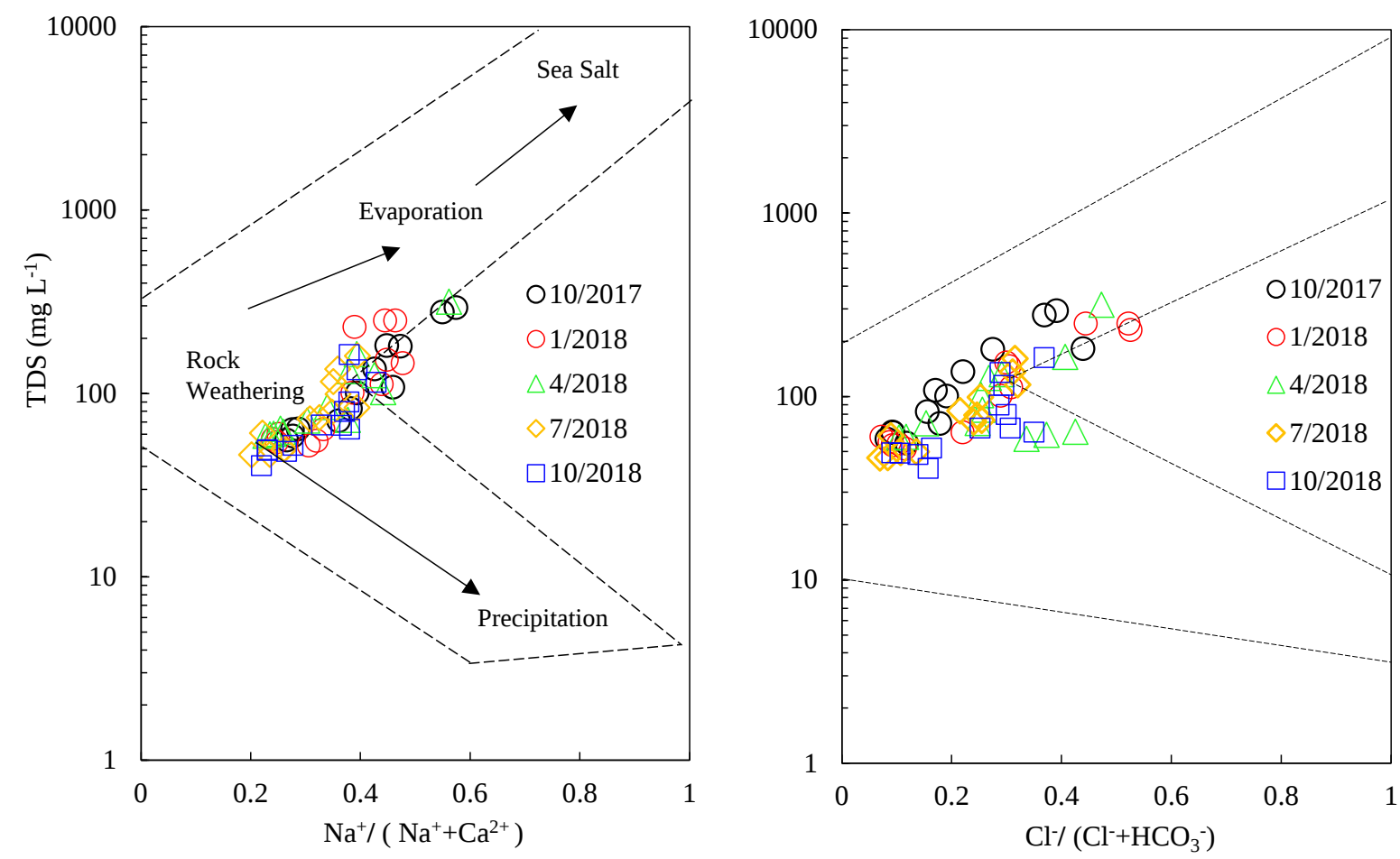


Fig. S5. Gibbs boomerang envelope of river water samples from the Liuxi River Basin