

1 **List of Tables:**

2 **Table 1** Physicochemical characteristics of the water column in the Yangtze River.

3 **Table 2** Pearson's correlation analysis between NH_4^+ recycling rates and environmental variables (n=44).

4 **Table 3** NH_4^+ recycling rates in the Yangtze River and some other rivers and lakes.

5

Table 1 Physicochemical characteristics of the water column in the Yangtze River.

Sampling sites	Statistics	WT (°C)	Chl- <i>a</i> (µg/L)	COD (mg/L)	SS (mg/L)	DOC (mg/L)	TN (µmol/L)	TP (µmol/L)	PN (µmol/L)	NH ₄ ⁺ (µmol/L)	NO _x ⁻ (µmol/L)	Urea (µmol/L)
Anhui	Range	27.4~30.1	0.0~13.1	3.12~5.92	7~183	1.4~18.4	131~271	1.39~5.45	1~78	1.4~8.1	41~172	0.0~19.7
	Mean ± SD	28.1 ± 0.8 A	2.2 ± 3.1 A	4.05 ± 0.75 A	98 ± 57 A	6.6 ± 4.0 A	185 ± 33 A	3.35 ± 1.39 B	35 ± 27 A	3.5 ± 1.7 A	117 ± 37 A	4.6 ± 7.1 A
Jiangsu	Range	27.6~30.2	0.0~10.0	3.53~6.55	16~208	0.6~22.8	129~307	0.32~4.48	2~102	0.7~13.0	76~214	0.0~11.1
	Mean ± SD	28.4 ± 0.7 A	2.2 ± 2.6 A	4.75 ± 0.80 A	85 ± 57 A	8.6 ± 5.4 A	188 ± 42 A	1.69 ± 1.23 A	48 ± 32 A	4.7 ± 3.2 AB	126 ± 34 A	3.0 ± 3.8 A
Estuary	Range	28.6~30.0	0~10	4.26~9.56	86~1315	7.9~25.5	186~271	0.97~7.03	45~158	2.2~11.2	50~157	0.5~1.7
	Mean ± SD	29.2 ± 0.5 B	4.8 ± 3.9 B	6.14 ± 1.74 B	423 ± 379 B	14.5 ± 5.3 B	227 ± 26 B	2.33 ± 1.87 AB	108 ± 42 B	6.1 ± 3.3 B	105 ± 36 A	1.1 ± 0.5 A

Note: WT: water temperature; Chl-*a*: Chlorophyll *a*; COD: Chemical oxygen demand; SS: Suspended solid; TN: Total nitrogen; TP: Total phosphorus; PN: Particulate nitrogen; NH₄⁺: Ammonium; NO_x⁻: the sum of nitrate and nitrite. Different capital letters within the same column indicate statistically significantly among the different sampling area ($p < 0.05$).

Table 2 Pearson’s correlation analysis between NH_4^+ recycling rates and environmental variables (n=44).

	Rates	WT	Chl- <i>a</i>	COD	SS	TN	PN	NH_4^+	NO_x^-	Urea
<i>r</i>	REG	0.392	0.220	0.608	0.644	0.380	0.455	0.313	-0.107	-0.009
	U_{pot}	0.295	0.257	0.575	0.825	0.353	0.511	0.292	-0.178	-0.224
	CBAD	0.111	0.235	0.386	0.815	0.227	0.439	0.192	-0.212	-0.409
<i>p</i>	REG	0.008**	0.152	0.000**	0.000**	0.011**	0.002**	0.038*	0.489	0.951
	U_{pot}	0.052	0.092	0.000**	0.000**	0.019**	0.000**	0.054	0.247	0.144
	CBAD	0.475	0.124	0.010**	0.000**	0.138	0.003**	0.211	0.166	0.006**

Note: WT: water temperature; Chl-*a*: Chlorophyll *a*; COD: Chemical oxygen demand; SS: Suspended solid; TN: Total nitrogen; PN: Particulate nitrogen; NH_4^+ : Ammonium; NO_x^- : the sum of nitrate and nitrite.
 * $p < 0.05$; ** $p < 0.01$.

17 **Table 3** NH₄⁺ recycling rates in the Yangtze River and some other rivers and lakes.

Study area	Type	Study period	REG (μmol L ⁻¹ h ⁻¹)	U _{pot} (μmol L ⁻¹ h ⁻¹)	REG/ U _{pot} (%)	Reference
Liangxi River	River	10/2002	2.52 ± 0.73	4.17 ± 0.82	—	(Mccarthy <i>et al.</i> , 2007a)
Old Woman River	River	7/2003-7/2004	0.075 ± 0.037	0.151 ± 0.031	—	(Mccarthy <i>et al.</i> , 2007b)
Aransas River	River	8/2010-6/2011	0.03~0.10	0.05~0.28	7~143 ^a (66 ± 37) ^b	(Bruesewitz <i>et al.</i> , 2015)
Mission River	River	8/2010-6/2011	0.01~0.04	0.22~0.24	2~188 (81 ± 67)	(Bruesewitz <i>et al.</i> , 2015)
Taihu Rivers	River	8/2016-11/2016	0.25~3.30	0.27~4.88	60~147 (85 ± 29)	(Jiang <i>et al.</i> , 2019)
Lake Taihu	Lake	8/2016-11/2016	0.09~1.76	0.20~2.66	24~74 (48 ± 15)	(Jiang <i>et al.</i> , 2019)
Lake Petit saut	Lake	4/1997-11/1997	1.2~6.3	0.06~0.31	—	(Collos <i>et al.</i> , 2001)
Lake Maracaibo	Lake	9/1995	0~2	1~8	11~52 (29 ± 21)	(Gardner <i>et al.</i> , 1998)
Yangtze River	River	8/2018	0.05~1.19	— 0.22~1.99	26~294 (88 ± 56)	This study

18 ^a Range
19 ^b Mean ± standard error
20