water

MDPI

Supplementary Material

Interaction Among Controlling Factors on Riverine DIN Export in Small Mountainous Rivers of Taiwan: Inseparable Human-Landscape System

Wen-Shiuan Lee [1], Jr-Chuan Huang [1,*], Chung-Te Chang [2,*], Shih-Chien Chan [3], Ying-San Liou [4], Chien-Sen Liao [5], Li-Chin Lee [1], Jun-Yi Lee [1], Yu-Ting Shih [1], Meng-Chang Lu [1], Pei-Hao Chen [1]

[1] Department of Geography, National Taiwan University, Taipei 10617, Taiwan; b06208033@ntu.edu.tw (W.-S.L.); d04228001@ntu.edu.tw (L.-C.L.); d02228001@ntu.edu.tw (J.-Y.L.); d00228003@ntu.edu.tw (Y.-T.S.); b99208035@ntu.edu.tw (M.-C.L.); d06228001@ntu.edu.tw (P.-H.C.)
[2] Center for Ecology and Environment, Tunghai University, Taichung 40799, Taiwan
[3] Department of Geography, National Changhua University of Education, Changhua 50074, Taiwan; scchan@cc.ncue.edu.tw (S.-C.C.)
[4] Department of Natural Resources and Environmental Studies, National Dong-Hwa University, Hualien 974301, Taiwan; yingsan@gms.ndhu.edu.tw (Y.-S.L.)
[5] Department of Civil and Ecological Engineering, I-Shou University, Kaohsiung 84001, Taiwan; csliao@isu.edu.tw (C.-S.L.)
* Correspondence: riverhuang@ntu.edu.tw (J.-C.H); chungtechang@thu.edu.tw (C.-T.C.)

Received: 21 September 2020; Accepted: 21 October 2020; Published: date

Table S1. The basic landscape characteristics of the 43 sampling sites.

Station Name	Watershed characteristic					Land use		
	Area	Average Temperature	Average Slope	Average Flow	Average Rainfall	Forest	Agri.	Buildup
	(km^2)	(°C)	(%)	(mm)	(mm)	(%)	(%)	(%)
1. Wu-Tu	198	20.9	35	4258	4857	83	3	8
2. Po-Bridge	111	21.6	39	3876	3988	76	8	11
3. San-Hsia	126	20.8	44	2122	2733	80	13	4
4. Hsin-Pu	210	21.2	26	1411	2031	60	21	9
5. Nei-Wan	147	20.0	54	2961	3001	90	4	2
6. Shang-Ping	212	17.1	61	2200	2770	93	3	1
7.Ping-An-Bridge	297	20.1	42	1485	2254	80	10	4
8. Yun-Hsin-Chou	146	19.0	54	2264	2767	92	3	1
9. Pei-Shih Bridge	475	19.7	41	842	1591	74	14	5
10. I-Li	629	16.5	64	976	1759	83	6	1
11. Lung-An Bridge	969	15.5	69	848	2347	86	6	1
12. Chi-Nan Bridge	266	21.4	26	1616	1840	42	29	18
13. Yu-Feng Bridge	2096	18.3	67	1682	2443	85	4	1
14. Chi-Chou Bridge	2969	18.7	59	1093	2023	76	10	2
15. Pei-Kang-2	220	22.1	9	1704	2275	18	53	18
16. Tun-Kun Bridge	578	22.0	8	1068	1765	12	65	15
17. Chun-Huei Bridge	115	19.2	42	2061	3131	58	26	5
18. Chu-Kuo	81	18.5	53	2800	3607	70	21	2
19. Ho-Sung Bridge	440	21.2	20	3111	3768	23	57	10
20. Shin-Ying	225	22.3	19	1786	2840	36	47	7
21. Yu-Tien	159	22.1	37	1077	2413	68	21	2
22. Hsin-Shih	142	23.4	11	1500	2612	33	42	14
23. A-Lien-2	176	23.6	21	1724	2943	59	21	5
24. Chung-Te	140	23.6	21	1903	3024	57	22	5
25. Li-Lin Bridge	2869	20.3	54	1879	3546	77	12	2
26. Liu-Kwei	890	18.1	65	2600	3870	85	4	1
28. San-Ti-Men	409	21.8	65	3542	4737	93	2	1
31. Chih-Pen	164	23.4	58	2223	3592	93	3	1
32. Li-Chia	147	20.2	63	2121	3856	95	1	0
33. Tai-Tung Bridge	1574	17.5	56	1685	3680	59	19	1
34. Yen-Ping	469	18.0	64	1740	3388	69	10	0
35. Hsin-Wu-Lu	628	16.1	64	2021	3208	60	17	0
36. Yu-Li Bridge	999	19.9	57	1754	2889	81	8	1
37. Jui-Sui Bridge	1528	20.4	55	2463	3367	80	9	1
38. His-Po Bridge	240	20.7	69	2495	4084	88	1	0
39. Ping-Lin	210	20.1	76	1330	3015	87	1	0
40. Jen-Shou Bridge	441	17.0	71	2181	3358	90	1	0
41. Hua-Lien Bridge	1497	19.8	57	2876	4044	76	11	2
42. Lu-Shui	433	14.9	74	3129	3667	90	1	0
43. Chi-Neng-Pu	536	17.6	67	2983	3524	91	0	0
44. Jhong-Yue	136	21.2	60	3156	3052	95	2	0
45. Niu-Tou	453	15.0	60	1788	3059	89	2	0
46. Lan-Yang Bridge	823	17.3	50	2361	3111	79	9	2

The Agri. indicates agriculture.

Table S2. Estimated annual and seasonal DIN, NO_3^- and NH_4^+ concentrations for 43 sampling sites in 2015 (unit: mg-N L^{-1}).

2015	**DIN**			**NO_3^-**			**NH_4^+**		
Station Name	Annual	Dry	Wet	Annual	Dry	Wet	Annual	Dry	Wet
1. Wu-Tu	2.51	2.77	2.31	1.36	1.55	1.20	1.04	1.07	1.02
2. Po-Bridge	2.25	2.87	2.10	1.19	1.26	1.18	0.96	1.43	0.84
3. San-Hsia	2.27	1.96	2.31	1.45	0.59	1.59	0.76	1.24	0.69
4. Hsin-Pu	2.09	2.54	1.98	1.55	1.93	1.45	0.46	0.49	0.45
5. Nei-Wan	0.91	0.67	0.94	0.77	0.63	0.80	0.13	0.04	0.15
6. Shang-Ping	0.66	0.44	0.73	0.64	0.39	0.71	0.03	0.05	0.02
7.Ping-An-Bridge	1.08	0.75	1.10	0.89	0.61	0.91	0.14	0.08	0.14
8. Yun-Hsin-Chou	0.80	0.62	0.84	0.79	0.61	0.83	0.01	0.01	0.01
9. Pei-Shih Bridge	2.12	2.99	2.06	1.51	1.42	1.52	0.50	1.33	0.44
10. I-Li	1.57	1.73	1.56	1.47	1.45	1.48	0.05	0.27	0.03
11. Lung-An Bridge	1.38	0.97	1.48	1.18	0.62	1.31	0.19	0.34	0.16
12. Chi-Nan Bridge	4.15	4.94	3.74	2.20	2.07	2.27	1.65	2.51	1.20
13. Yu-Feng Bridge	0.96	0.80	1.03	0.60	0.41	0.67	0.34	0.35	0.33
14. Chi-Chou Bridge	2.06	1.47	2.11	1.28	0.44	1.35	0.74	0.96	0.72
15. Pei-Kang-2	5.68	6.61	5.40	1.64	1.26	1.75	3.78	5.13	3.37
16. Tun-Kun Bridge	8.87	7.58	9.51	2.66	1.22	3.39	4.59	6.14	3.81
17. Chun-Huei Bridge	2.01	2.47	1.96	1.40	1.07	1.43	0.57	1.29	0.49
18. Chu-Kuo	2.25	4.81	2.06	1.60	0.31	1.70	0.65	4.50	0.36
19. Ho-Sung Bridge	3.07	5.27	2.91	1.62	1.27	1.64	1.18	3.46	1.01
20. Shin-Ying	3.85	4.94	3.63	2.20	1.69	2.30	1.42	2.95	1.11
21. Yu-Tien	2.00	1.36	2.03	1.92	1.29	1.95	0.03	0.02	0.03
22. Hsin-Shih	4.99	9.74	4.37	1.17	0.46	1.26	3.35	9.13	2.59
23. A-Lien-2	3.95	6.70	3.67	1.15	0.90	1.18	2.52	5.37	2.23
24. Chung-Te	4.73	6.74	4.56	1.38	1.17	1.40	2.99	4.98	2.82
25. Li-Lin Bridge	0.76	0.83	0.75	0.67	0.66	0.68	0.05	0.09	0.04
26. Liu-Kwei	0.43	0.24	0.47	0.40	0.22	0.45	0.02	0.02	0.02
28. San-Ti-Men	0.81	0.16	0.82	0.77	0.14	0.79	0.03	0.01	0.04
31. Chih-Pen	0.55	0.45	0.60	0.41	0.29	0.46	0.11	0.11	0.11
32. Li-Chia	0.57	0.37	0.63	0.55	0.35	0.61	0.01	0.01	0.01
33. Tai-Tung Bridge	0.73	0.61	0.78	0.65	0.52	0.70	0.05	0.05	0.05
34. Yen-Ping	0.50	0.42	0.53	0.37	0.28	0.42	0.10	0.11	0.09
35. Hsin-Wu-Lu	0.39	0.35	0.41	0.32	0.29	0.33	0.04	0.04	0.05
36. Yu-Li Bridge	0.53	0.48	0.56	0.46	0.43	0.48	0.06	0.05	0.08
37. Jui-Sui Bridge	0.53	0.54	0.52	0.45	0.44	0.45	0.04	0.06	0.03
38. His-Po Bridge	0.58	0.59	0.58	0.46	0.45	0.46	0.09	0.11	0.07
39. Ping-Lin	0.35	0.32	0.36	0.33	0.30	0.34	0.02	0.02	0.02
40. Jen-Shou Bridge	0.42	0.36	0.43	0.39	0.33	0.41	0.02	0.03	0.02
41. Hua-Lien Bridge	0.81	0.81	0.81	0.73	0.72	0.73	0.04	0.05	0.04
42. Lu-Shui	0.47	0.36	0.52	0.45	0.34	0.50	0.02	0.02	0.02
43. Chi-Neng-Pu	0.84	0.73	0.88	0.30	0.27	0.30	0.54	0.44	0.57
44. Jhong-Yue	0.46	0.36	0.48	0.43	0.35	0.46	0.02	0.01	0.02
45. Niu-Tou	0.58	0.46	0.62	0.56	0.44	0.59	0.02	0.01	0.02
46. Lan-Yang Bridge	1.09	1.25	1.01	0.61	0.62	0.60	0.45	0.58	0.39

Table S3. Estimated annual and seasonal DIN, NO_3^- and NH_4^+ concentrations for 43 sampling sites in 2016 (unit: mg-N L^{-1}).

2016	**DIN**			**NO_3^-**			**NH_4^+**		
Station Name	Annual	Dry	Wet	Annual	Dry	Wet	Annual	Dry	Wet
1. Wu-Tu	1.93	2.05	1.83	1.20	1.37	1.06	0.66	0.59	0.71
2. Po-Bridge	1.79	1.95	1.69	1.21	1.29	1.17	0.50	0.57	0.45
3. San-Hsia	1.84	1.70	1.91	1.32	1.17	1.39	0.46	0.48	0.44
4. Hsin-Pu	1.55	1.68	1.47	1.31	1.42	1.24	0.19	0.21	0.18
5. Nei-Wan	0.76	0.72	0.78	0.74	0.70	0.76	0.02	0.02	0.02
6. Shang-Ping	0.83	0.70	0.99	0.79	0.68	0.93	0.04	0.02	0.06
7.Ping-An-Bridge	1.05	1.03	1.06	0.93	0.91	0.96	0.08	0.09	0.07
8. Yun-Hsin-Chou	0.80	0.79	0.82	0.79	0.78	0.81	0.01	0.01	0.01
9. Pei-Shih Bridge	1.71	1.65	1.78	1.39	1.39	1.39	0.22	0.18	0.28
10. I-Li	1.26	1.23	1.28	1.21	1.20	1.24	0.03	0.03	0.03
11. Lung-An Bridge	1.56	0.88	1.75	1.37	0.82	1.53	0.18	0.05	0.21
12. Chi-Nan Bridge	3.55	3.88	3.31	2.15	2.15	2.15	1.15	1.46	0.92
13. Yu-Feng Bridge	0.81	0.75	0.84	0.65	0.60	0.69	0.14	0.14	0.14
14. Chi-Chou Bridge	1.45	1.12	1.55	1.24	0.86	1.36	0.18	0.23	0.16
15. Pei-Kang-2	4.61	4.75	4.55	1.80	1.47	1.94	2.56	3.05	2.34
16. Tun-Kun Bridge	8.91	6.39	10.45	2.79	1.50	3.58	3.49	4.66	2.78
17. Chun-Huei Bridge	1.77	2.05	1.72	1.40	1.31	1.42	0.34	0.68	0.28
18. Chu-Kuo	1.90	1.17	2.03	1.69	0.63	1.89	0.20	0.54	0.14
19. Ho-Sung Bridge	2.85	3.92	2.60	1.67	1.51	1.70	0.95	2.07	0.68
20. Shin-Ying	3.03	4.28	2.71	2.08	2.19	2.05	0.75	1.82	0.49
21. Yu-Tien	1.36	1.27	1.37	1.31	1.23	1.31	0.04	0.02	0.04
22. Hsin-Shih	4.24	5.62	3.94	1.38	1.03	1.46	2.21	4.30	1.75
23. A-Lien-2	2.89	3.87	2.71	1.18	1.11	1.19	1.45	2.51	1.26
24. Chung-Te	2.94	3.87	2.79	1.36	1.18	1.39	1.32	2.40	1.15
25. Li-Lin Bridge	0.73	0.60	0.76	0.67	0.52	0.69	0.05	0.06	0.05
26. Liu-Kwei	0.37	0.29	0.42	0.34	0.25	0.38	0.03	0.03	0.03
28. San-Ti-Men	0.83	0.40	0.87	0.77	0.36	0.81	0.05	0.03	0.05
31. Chih-Pen	0.58	0.38	0.63	0.51	0.29	0.56	0.06	0.07	0.06
32. Li-Chia	0.54	0.36	0.57	0.52	0.34	0.55	0.02	0.01	0.02
33. Tai-Tung Bridge	0.69	0.61	0.71	0.57	0.53	0.58	0.10	0.05	0.11
34. Yen-Ping	0.44	0.35	0.46	0.35	0.25	0.38	0.08	0.08	0.08
35. Hsin-Wu-Lu	0.35	0.31	0.37	0.26	0.25	0.26	0.09	0.05	0.10
36. Yu-Li Bridge	0.51	0.45	0.52	0.46	0.41	0.47	0.05	0.04	0.05
37. Jui-Sui Bridge	0.47	0.49	0.47	0.43	0.42	0.43	0.03	0.04	0.03
38. His-Po Bridge	0.39	0.45	0.36	0.30	0.35	0.27	0.07	0.08	0.07
39. Ping-Lin	0.28	0.28	0.28	0.26	0.26	0.25	0.02	0.02	0.02
40. Jen-Shou Bridge	0.31	0.31	0.31	0.29	0.29	0.29	0.01	0.01	0.01
41. Hua-Lien Bridge	0.74	0.74	0.74	0.67	0.68	0.67	0.05	0.04	0.06
42. Lu-Shui	0.45	0.38	0.48	0.42	0.36	0.45	0.02	0.02	0.02
43. Chi-Neng-Pu	0.44	0.33	0.47	0.26	0.22	0.27	0.17	0.11	0.19
44. Jhong-Yue	0.46	0.30	0.50	0.44	0.28	0.48	0.02	0.01	0.02
45. Niu-Tou	0.56	0.49	0.61	0.54	0.47	0.59	0.01	0.01	0.01
46. Lan-Yang Bridge	0.71	0.68	0.73	0.60	0.57	0.61	0.09	0.08	0.10

Table S4. Estimated annual and seasonal DIN, NO_3^- and NH_4^+ exports for 43 sampling sites in 2015 (unit: kg-N km^{-2} yr^{-1}).

2015	**DIN**			**NO_3^-**			**NH_4^+**		
Station Name	Annual	Dry	Wet	Annual	Dry	Wet	Annual	Dry	Wet
1. Wu-Tu	9716.71	4730.03	4986.69	5251.62	2657.45	2594.17	4032.04	1823.26	2208.78
2. Po-Bridge	8149.36	2051.85	6097.51	4324.16	897.03	3427.13	3457.11	1024.81	2432.30
3. San-Hsia	4596.03	532.95	4063.08	2945.93	160.76	2785.17	1543.94	335.89	1208.05
4. Hsin-Pu	2148.27	533.99	1614.28	1587.06	405.15	1181.91	471.97	103.04	368.92
5. Nei-Wan	2777.96	264.68	2513.28	2364.10	248.57	2115.53	404.55	14.90	389.65
6. Shang-Ping	1135.58	174.50	961.08	1085.60	155.19	930.41	44.13	18.01	26.12
7.Ping-An-Bridge	1140.62	41.08	1099.55	942.43	33.36	909.07	149.36	4.48	144.88
8. Yun-Hsin-Chou	1401.07	171.11	1229.96	1381.66	167.76	1213.89	14.10	2.50	11.60
9. Pei-Shih Bridge	1289.23	114.12	1175.10	921.65	54.06	867.60	302.71	50.53	252.18
10. I-Li	1500.99	115.70	1385.29	1406.19	96.47	1309.71	49.19	18.13	31.06
11. Lung-An Bridge	857.85	118.90	738.95	730.99	76.38	654.61	120.63	42.06	78.57
12. Chi-Nan Bridge	5703.13	2319.58	3383.55	3031.06	973.38	2057.68	2262.53	1179.46	1083.07
13. Yu-Feng Bridge	956.11	234.62	721.49	591.48	120.87	470.61	332.82	103.17	229.64
14. Chi-Chou Bridge	1467.35	78.32	1389.03	909.48	23.23	886.25	526.75	50.96	475.79
15. Pei-Kang-2	8655.88	2336.25	6319.63	2495.31	446.42	2048.90	5757.24	1815.02	3942.21
16. Tun-Kun Bridge	10228.53	2928.19	7300.34	3069.35	471.44	2597.91	5295.93	2372.08	2923.85
17 Chun-Huei Bridge	3993.16	460.76	3532.39	2776.41	199.98	2576.43	1125.29	239.93	885.36
18. Chu-Kuo	5676.69	855.25	4821.44	4037.10	55.22	3981.88	1630.81	798.61	832.20
19. Ho-Sung Bridge	8423.14	1014.76	7408.38	4430.78	244.68	4186.10	3227.25	665.71	2561.54
20. Shin-Ying	5348.58	1156.47	4192.11	3052.76	395.20	2657.56	1968.95	689.68	1279.27
21. Yu-Tien	1351.23	38.85	1312.38	1297.32	36.90	1260.42	22.29	0.57	21.73
22. Hsin-Shih	3372.15	760.94	2611.21	786.61	35.71	750.90	2259.05	713.22	1545.83
23. A-Lien-2	3510.56	555.23	2955.33	1021.13	74.89	946.23	2238.02	445.08	1792.95
24. Chung-Te	5129.99	559.25	4570.74	1496.72	97.24	1399.47	3241.01	413.65	2827.36
25. Li-Lin Bridge	892.00	122.51	769.49	792.07	97.99	694.07	59.11	13.92	45.19
26. Liu-Kwei	777.39	87.37	690.02	731.07	79.76	651.32	38.67	6.44	32.23
28. San-Ti-Men	2213.22	7.82	2205.40	2108.81	7.13	2101.68	94.51	0.53	93.99
31. Chih-Pen	645.26	158.55	486.71	474.42	102.00	372.42	127.11	37.65	89.46
32. Li-Chia	402.18	60.09	342.09	390.84	57.42	333.42	9.18	2.17	7.01
33. Tai-Tung Bridge	1067.90	270.92	796.98	947.42	231.04	716.38	74.43	21.91	52.52
34. Yen-Ping	463.58	123.99	339.59	347.72	81.08	266.64	89.85	33.10	56.75
35. Hsin-Wu-Lu	416.62	124.10	292.52	342.13	101.70	240.42	47.35	13.42	33.93
36. Yu-Li Bridge	318.93	133.68	185.25	276.05	118.42	157.63	39.32	13.52	25.81
37. Jui-Sui Bridge	778.94	239.78	539.15	658.66	194.73	463.93	58.52	25.09	33.43
38. His-Po Bridge	734.86	288.43	446.43	576.62	218.81	357.80	107.64	51.71	55.93
39. Ping-Lin	227.01	23.04	203.97	212.23	21.52	190.71	12.83	1.30	11.53
40. Jen-Shou Bridge	621.19	98.82	522.37	587.67	90.97	496.70	28.98	7.02	21.96

41. Hua-Lien Bridge	1535.52	554.04	981.48	1383.95	494.27	889.67	79.59	32.14	47.45
42. Lu-Shui	1219.21	271.85	947.36	1159.83	254.23	905.61	51.56	15.32	36.24
43. Chi-Neng-Pu	1813.06	366.13	1446.93	637.16	137.60	499.56	1155.22	223.62	931.59
44. Jhong-Yue	1039.55	195.86	843.69	989.74	186.49	803.24	42.86	7.73	35.14
45. Niu-Tou	796.83	134.19	662.64	767.89	128.95	638.94	21.80	4.21	17.60
46. Lan-Yang Bridge	2610.60	958.63	1651.97	1459.61	477.56	982.05	1085.13	446.47	638.67

Table S5. Estimated annual and seasonal DIN, NO_3^- and NH_4^+ exports for 43 sampling sites in 2016 (unit: kg-N km^{-2} yr^{-1}).

2016	**DIN**			**NO_3^-**			**NH_4^+**		
Station Name	Annual	Dry	Wet	Annual	Dry	Wet	Annual	Dry	Wet
1. Wu-Tu	8969.66	4368.11	4601.55	5588.05	2917.20	2670.85	3057.74	1266.15	1791.59
2. Po-Bridge	7398.15	3091.21	4306.94	5018.76	2042.00	2976.76	2064.52	910.54	1153.98
3. San-Hsia	4087.80	1134.80	2953.00	2928.48	779.03	2149.45	1008.39	320.66	687.73
4. Hsin-Pu	2788.76	1222.67	1566.09	2358.99	1034.81	1324.18	343.33	151.50	191.82
5. Nei-Wan	2188.83	656.69	1532.14	2123.12	634.50	1488.61	56.99	19.42	37.57
6. Shang-Ping	2223.44	1059.24	1164.21	2116.83	1028.12	1088.71	95.50	25.82	69.68
7.Ping-An-Bridge	2001.76	1023.84	977.92	1784.31	903.06	881.26	145.86	84.33	61.53
8. Yun-Hsin-Chou	2233.86	1032.21	1201.65	2203.41	1017.87	1185.54	21.99	10.35	11.64
9. Pei-Shih Bridge	1839.54	983.85	855.69	1495.45	827.15	668.30	240.86	104.50	136.35
10. I-Li	1253.49	666.02	587.47	1211.64	645.61	566.03	31.00	15.28	15.71
11. Lung-An Bridge	1672.74	207.19	1465.55	1471.95	194.12	1277.83	189.57	11.96	177.61
12. Chi-Nan Bridge	6602.35	3093.40	3508.95	3997.99	1714.69	2283.29	2138.87	1164.33	974.54
13. Yu-Feng Bridge	1925.92	637.74	1288.18	1551.78	503.19	1048.59	333.45	118.68	214.77
14. Chi-Chou Bridge	2135.77	410.36	1725.42	1824.86	313.57	1511.29	263.57	85.13	178.44
15. Pei-Kang-2	8689.27	2724.01	5965.27	3381.86	841.47	2540.39	4824.23	1752.17	3072.06
16. Tun-Kun Bridge	8753.00	2383.04	6369.96	2744.42	560.30	2184.13	3432.72	1738.66	1694.06
17. Chun-Huei Bridge	3775.87	634.74	3141.13	2990.73	405.71	2585.01	727.57	209.75	517.82
18. Chu-Kuo	5845.26	558.26	5287.00	5207.82	299.54	4908.28	627.92	257.03	370.90
19. Ho-Sung Bridge	9923.87	2617.95	7305.92	5801.49	1005.11	4796.38	3290.64	1380.35	1910.30
20. Shin-Ying	6597.14	1869.92	4727.22	4533.52	958.08	3575.44	1646.04	793.90	852.14
21. Yu-Tien	2015.85	144.97	1870.88	1928.94	140.19	1788.75	58.14	2.42	55.71
22. Hsin-Shih	9866.62	2339.83	7526.79	3219.43	427.36	2792.07	5131.80	1789.08	3342.72
23. A-Lien-2	7407.47	1558.67	5848.80	3017.74	446.49	2571.26	3724.09	1013.29	2710.80
24. Chung-Te	7996.46	1416.81	6579.65	3708.44	433.94	3274.50	3587.16	880.45	2706.70
25. Li-Lin Bridge	1895.92	224.18	1671.74	1719.90	192.47	1527.43	128.42	22.39	106.03
26. Liu-Kwei	1265.41	329.55	935.86	1137.47	287.68	849.79	111.79	36.89	74.90
28. San-Ti-Men	3601.51	149.80	3451.70	3357.73	135.50	3222.23	229.15	12.85	216.29
31. Chih-Pen	1909.00	223.34	1685.66	1677.96	173.28	1504.68	206.32	39.45	166.87
32. Li-Chia	1912.49	169.83	1742.65	1843.54	161.85	1681.69	58.20	6.55	51.65
33. Tai-Tung Bridge	2530.44	460.47	2069.97	2091.88	399.07	1692.81	366.97	41.32	325.66
34. Yen-Ping	1217.58	203.61	1013.97	975.90	148.82	827.09	228.66	49.45	179.21
35. Hsin-Wu-Lu	1045.22	220.66	824.55	763.28	177.93	585.35	267.64	35.99	231.65
36. Yu-Li Bridge	1469.58	265.64	1203.94	1321.70	238.85	1082.85	134.25	23.06	111.19
37. Jui-Sui Bridge	1736.30	371.29	1365.01	1559.84	318.24	1241.60	124.73	33.30	91.43
38. His-Po Bridge	1440.55	540.30	900.24	1115.19	421.83	693.37	272.19	93.87	178.32
39. Ping-Lin	564.91	129.97	434.94	516.70	119.07	397.62	42.06	9.50	32.56
40. Jen-Shou Bridge	881.70	349.09	532.61	835.16	330.56	504.61	37.81	15.08	22.73
41. Hua-Lien Bridge	2863.30	867.02	1996.28	2577.31	789.22	1788.08	195.40	47.53	147.87

42. Lu-Shui	1655.20	426.72	1228.48	1565.33	403.51	1161.83	78.65	19.78	58.87
43. Chi-Neng-Pu	1384.30	214.63	1169.67	819.23	143.39	675.84	541.99	67.54	474.45
44. Jhong-Yue	1086.77	140.09	946.68	1036.32	133.22	903.10	43.28	5.44	37.84
45. Niu-Tou	1224.92	463.01	761.91	1186.15	447.28	738.86	29.25	12.22	17.04
46. Lan-Yang Bridge	1641.88	647.50	994.37	1381.13	547.98	833.15	216.21	79.70	136.51

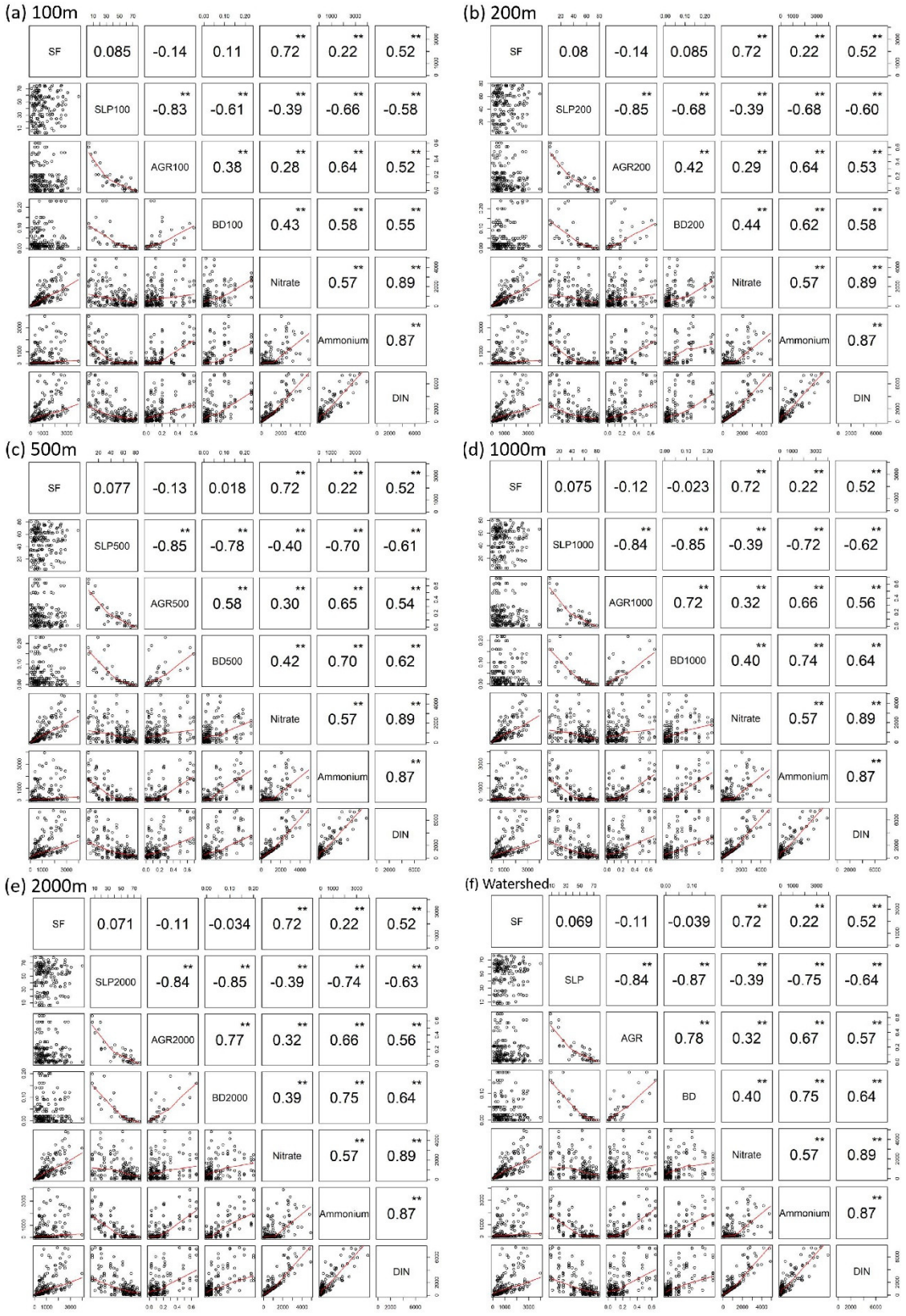

Figure S1. Scatterplot matrix among streamflow [SF; mm], slope [SLP; %], the proportion of agriculture [AGR; %], the proportion of buildup [BD; %] of various scales and annual NO_3^-, and NH_4^+, and DIN exports at **(a)** 100 m, **(b)** 200 m, **(c)** 500 m, **(d)** 1000 m, **(e)** 2000 m, and **(f)** entire watershed scales. The asterisk indicates that the correlation is statistic significant (p-value: ** < 0.01 < * < 0.05), and the red lines indicate smooth transition regressions.

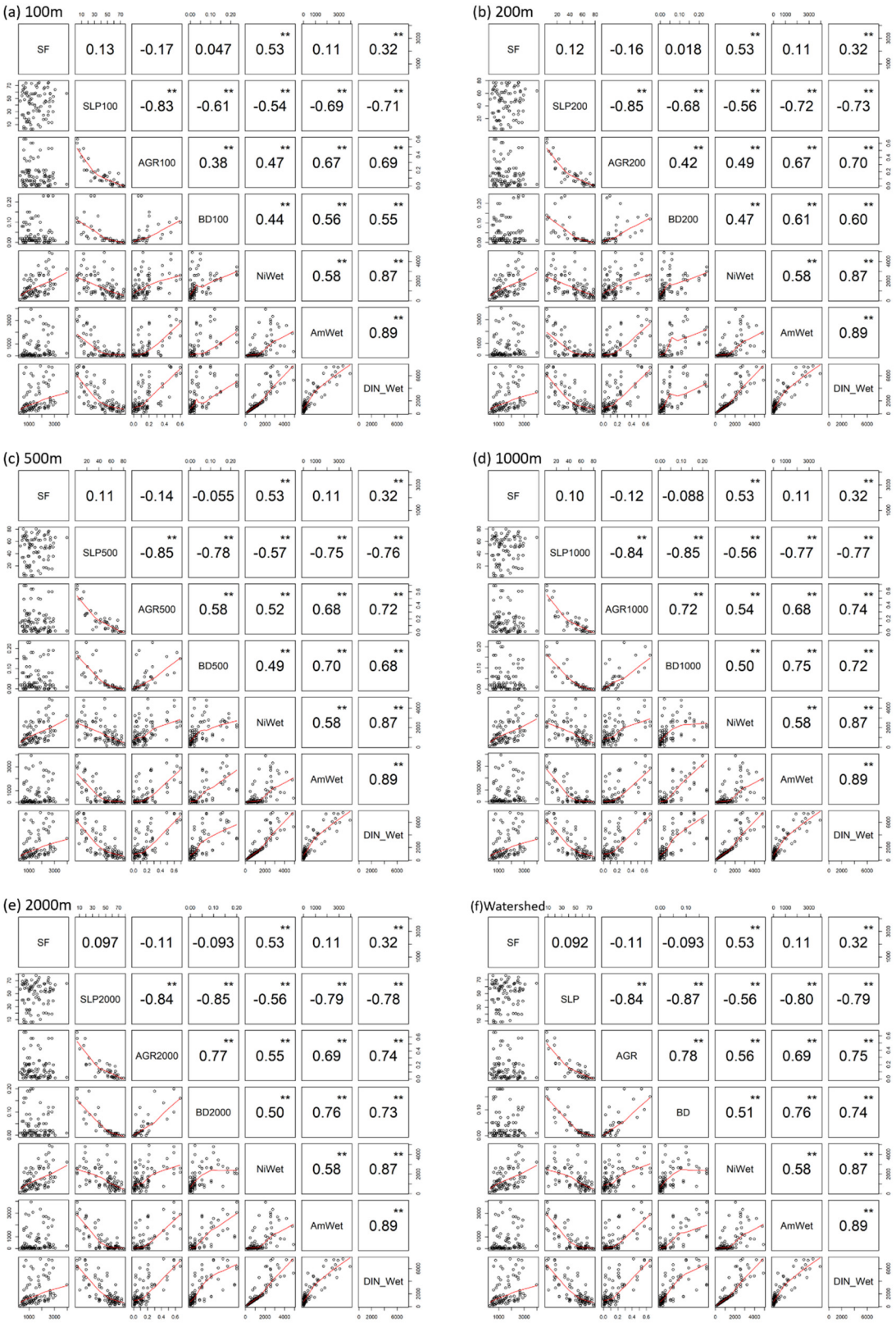

Figure S2. Scatterplot matrix among streamflow [SF; mm], slope [SLP; %], the proportion of agriculture [AGR; %], the proportion of buildup [BD; %] of various scales and NO_3^- (Ni), and NH_4^+ (Am), and DIN exports during wet season at **(a)** 100 m, **(b)** 200 m, **(c)** 500 m, **(d)** 1000 m, **(e)** 2000 m, and **(f)** entire watershed scales. The asterisk indicates that the correlation is statistic significant (p-value: ** < 0.01 < * < 0.05), and the red lines indicate smooth transition regressions.

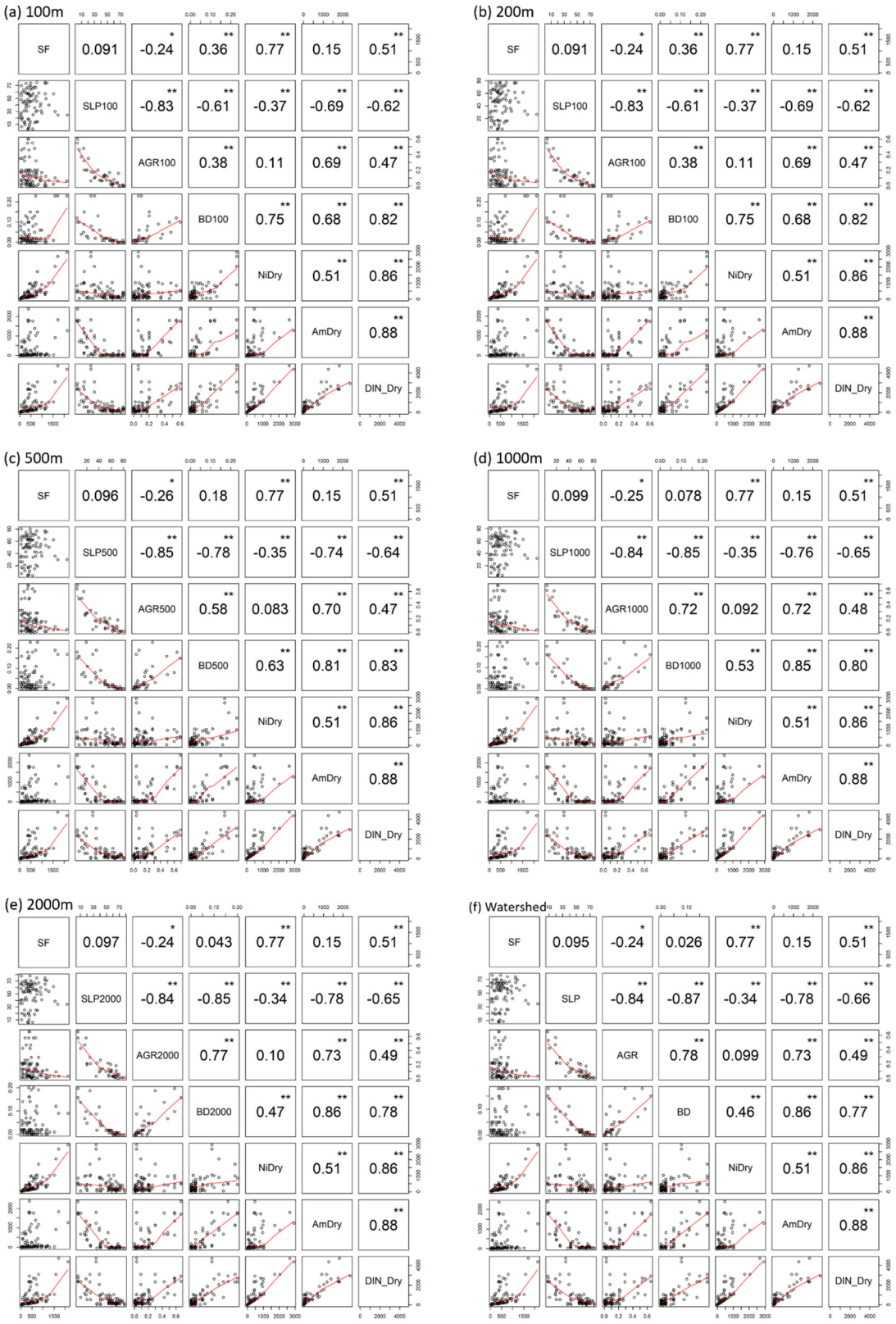

Figure S3. Scatterplot matrix among streamflow [SF; mm], slope [SLP; %], the proportion of agriculture [AGR; %], the proportion of buildup [BD; %] of various scales and NO_3^- (Ni), and NH_4^+ (Am), and DIN exports during dry season at (**(a)** 100 m, **(b)** 200 m, **(c)** 500 m, **(d)** 1000 m, **(e)** 2000 m, and **(f)** entire watershed scales. The asterisk indicates that the correlation is statistic significant (p-value: ** < 0.01 < * < 0.05), and the red lines indicate smooth transition regressions.

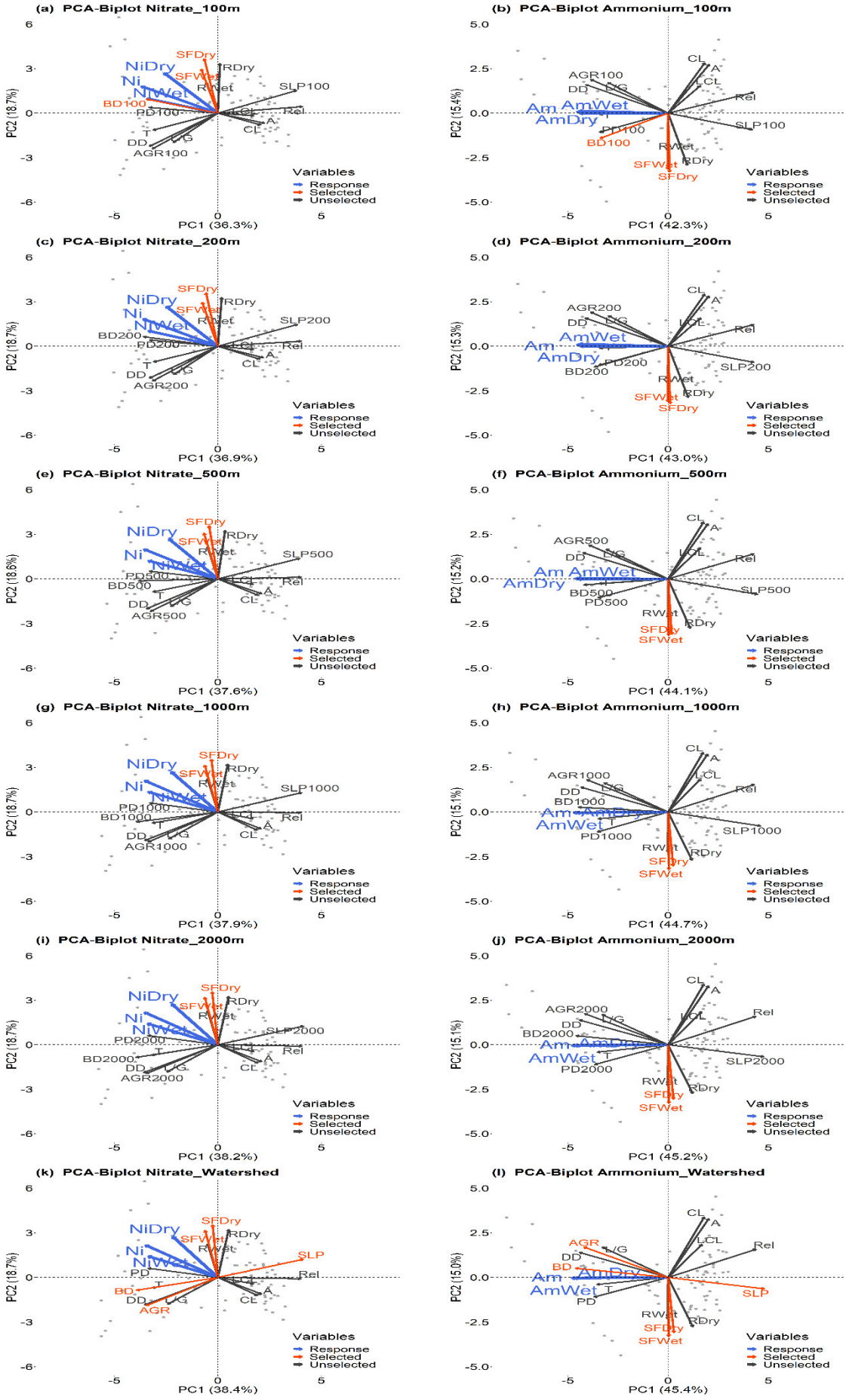
(a) PCA-Biplot Nitrate_100m
PC1 (36.3%)
PC2 (18.7%)
(b) PCA-Biplot Ammonium_100m
PC1 (42.3%)
PC2 (15.4%)
(c) PCA-Biplot Nitrate_200m
PC1 (36.9%)
PC2 (18.7%)
(d) PCA-Biplot Ammonium_200m
PC1 (43.0%)
PC2 (15.3%)
(e) PCA-Biplot Nitrate_500m
PC1 (37.6%)
PC2 (18.6%)
(f) PCA-Biplot Ammonium_500m
PC1 (44.1%)
PC2 (15.2%)
(g) PCA-Biplot Nitrate_1000m
PC1 (37.9%)
PC2 (18.7%)
(h) PCA-Biplot Ammonium_1000m
PC1 (44.7%)
PC2 (15.1%)
(i) PCA-Biplot Nitrate_2000m
PC1 (38.2%)
PC2 (18.7%)
(j) PCA-Biplot Ammonium_2000m
PC1 (45.2%)
PC2 (15.1%)
(k) PCA-Biplot Nitrate_Watershed
PC1 (38.4%)
PC2 (18.7%)
(l) PCA-Biplot Ammonium_Watershed
PC1 (45.4%)
PC2 (15.0%)
Variables
Response
Selected
Unselected

Figure S4. Principal components analysis of environmental variables for 43 catchments (gray dots) for NO_3^- export (left panel) and NH_4^+ export (right panel) at different buffer zones: (a, b) 100 m, (c, d) 200 m, (e, f) 500 m, (g, h) 1000 m, (i, j) 2000 m and (k, l) entire watershed. Red-labeled variables are main components for PC1 and PC2. Blue-labeled variables indicate annual nitrate (Ni), dry season nitrate (NiDry), and wet season nitrate export (NiWet) in (left panel) and annual ammonium (Am), dry season ammonium (AmDry) and wet season ammonium export (AmWet) in (right panel).

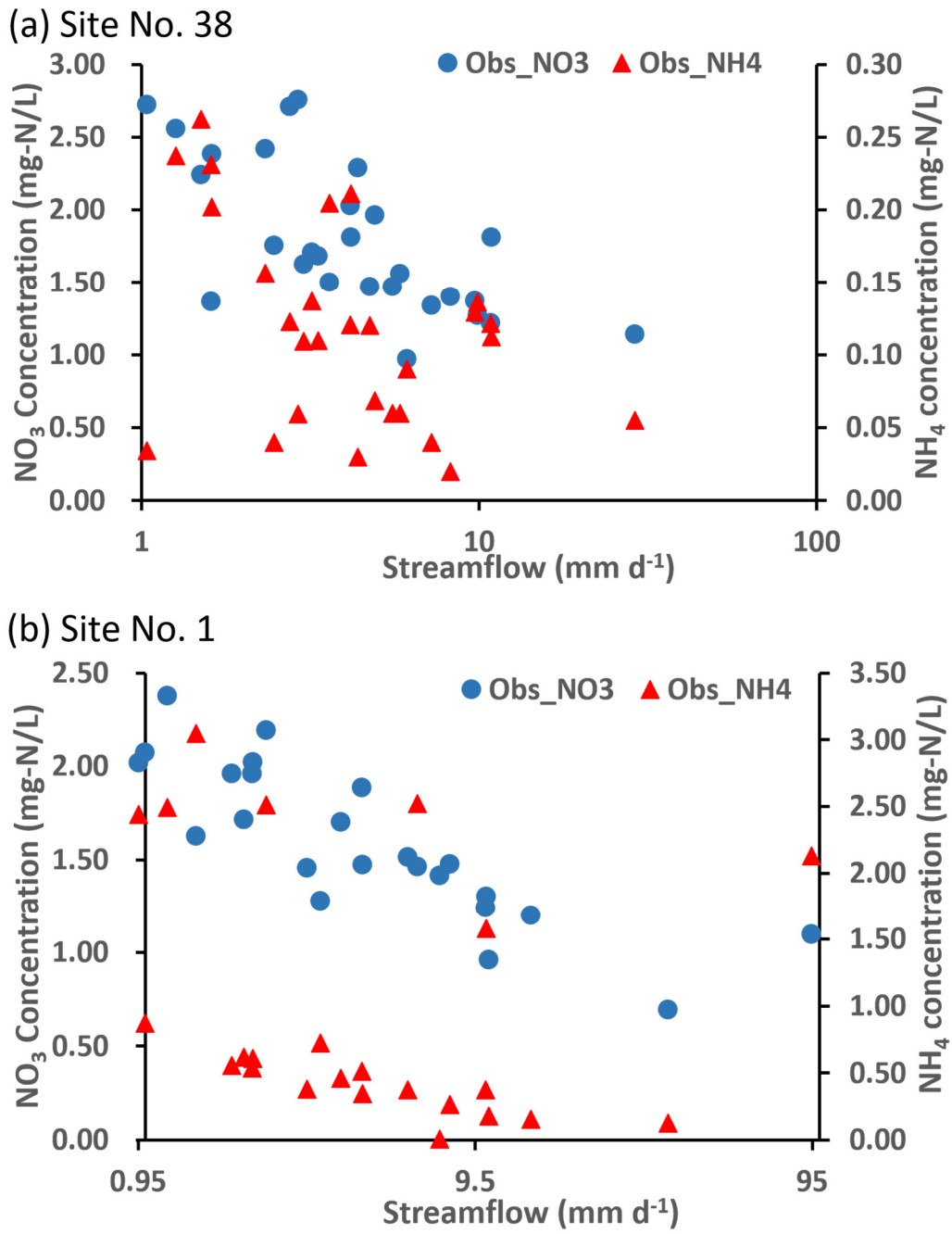

Figure S5. The relationship between the observed concentration (y-axis) and the simulated discharge (x-axis) in site no.38 **(a)** and no.1 **(b)** during the study period. Obs_NO3 is the observed NO_3^- concentration; Obs_NH4 is the observed NH_4^+ concentration.