

Table S2. Weight of climate and underlying surface factors for physical similarity in Poyang lake Basin

Basin	Climate	Vegetation & land use	Soil	Landform & geology	Terrain	Human activity	Watershed morphology
Wanjiabu	2.1248	0.7524	-0.8688	-0.1072	2.8602	-2.1484	-2.2508
Maygang	0.1495	-1.8732	-1.4816	-0.6760	1.6311	-4.2500	-2.2483
Xiajiang	-0.4159	-1.1525	0.7523	0.2102	-0.1131	-0.3452	4.5111
Shicheng	0.2960	0.6391	-0.6952	-0.4333	0.2969	2.9737	-1.8170
Ningdu	-0.1164	-0.4714	0.3817	-0.8397	-0.6085	2.0003	-1.5658
Mazhou	-1.8774	2.1870	1.4860	-0.0133	-1.1110	2.2973	-1.4154
Hanlinqiao	-0.5256	-3.5137	-1.6871	-0.2311	-1.1413	0.7090	-1.3730
Julongtan	-1.1159	0.8339	0.4560	0.2659	-1.2920	0.7345	-0.5979
Bashang	-0.7744	-1.1462	-0.9449	1.3465	0.6849	-2.5335	-0.6192
Linkeng	1.8050	6.2718	-0.7842	1.6522	2.0947	2.2333	-1.4703
Shangshalan	1.2204	0.9853	-0.4476	0.5761	0.5899	1.0780	-0.9951
Saitang	1.2368	0.5181	-0.5767	0.8585	1.2779	0.6884	-1.3560
Baisha	0.3866	5.6503	1.2346	1.0172	-0.5081	2.7038	-1.5896
Xintian	0.3009	1.1012	-0.1212	-0.8915	-0.3896	1.5638	-1.4468
Gao An	1.0958	-0.3088	-1.3067	-0.4992	-0.9757	-2.4824	-1.1567
Fenkeng	-0.9504	-1.3505	1.1034	-0.8642	-0.9608	1.5085	-1.0403
Waizhou	-0.0396	-2.6563	0.3641	-0.0475	-0.2405	-3.8892	6.4673
Xiashan	-1.4350	-1.0182	1.2996	-0.3542	-0.9908	0.8475	0.0426
Dongbei	-1.0302	-1.2543	0.9004	0.2751	-0.2866	-0.5491	2.5435
Jian	-0.5088	-1.0214	0.8133	0.3336	-0.0674	-0.2957	4.0227
Zhangshu	-0.2152	-1.6927	0.6562	0.0783	-0.1387	-2.1933	5.3269
Weight	0.0942	0.1166	0.1098	0.0717	0.1957	0.0890	0.3230

Table S3. Physical similarity and spatial similarity of Poyang Lake Basin Based on leave-one-out cross validation

	Physical similarity			Spatial similarity /m		
	Xiushui River	Xinjiang River	Ganjiang River (Xiajiang)	Xiushui River	Xinjiang River	Ganjiang River (Xiajiang)
Wanjiabu	-	1.33	0.50	-	240853	282511
Maygang	1.36	-	0.57	240853	-	340173
Xiajiang	0.50	0.57	-	282511	340173	-
Shicheng	1.04	1.17	0.72	286835	232083	144358
Ningdu	0.73	0.93	0.87	239497	233853	109760
Mazhou	0.58	0.60	0.70	391844	378049	129470
Hanlinqiao	0.66	0.97	0.71	272815	307814	36729
Julongtan	0.64	0.66	0.91	410488	447855	128432
Bashang	0.89	1.22	0.83	353555	431255	91082
Linkeng	1.11	0.76	0.47	263942	377566	78533
Shangshalan	1.10	0.95	0.77	230073	368720	111994
Saitang	1.33	1.17	0.68	181480	333014	134291
Baisha	0.61	0.61	0.66	225790	260159	80460

Xintian	0.84	0.95	0.80	180291	227609	122331
Gaoan	0.93	1.13	0.70	75879	286198	228678
Fenkeng	0.59	0.77	0.89	272136	254644	103953
Waizhou	0.45	0.57	1.67	231904	308886	50771
Xiashan	0.56	0.66	1.02	318992	312136	84468
Dongbei	0.54	0.62	2.71	330557	367333	49680
Jian	0.51	0.58	9.56	296082	351833	13824
Zhangshu	0.50	0.59	3.93	262496	329159	20469