

Supplementary Materials for

Homogenization of urban forests across the subtropical zones of China

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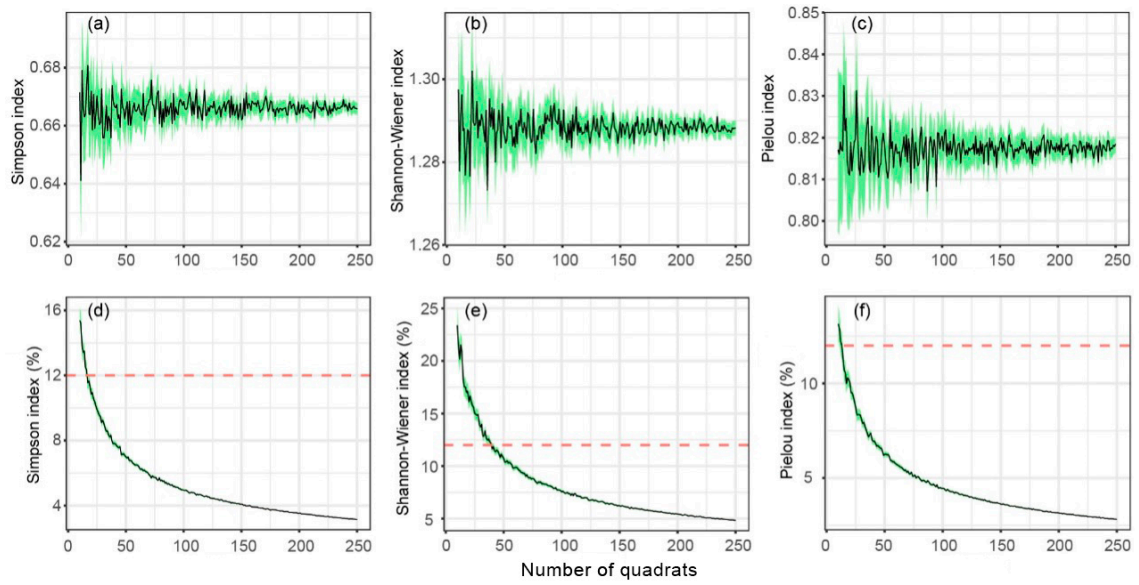


Figure S1. Estimated value and relative standard deviation of tree species diversity of green space quadrats in Guangzhou. (a) Simpson index, (b) Shannon-Wiener index, (c) Pielou index. The black line is the average estimate, and the green area is the 95% confidence interval of the average estimate. The relative standard deviation of the Simpson index (d), Shannon-Wiener index (e), Pielou index (f). The black line is the average relative standard error, the green area is the 95% confidence interval of the average relative standard error, and the red dotted line represents the 12% relative standard error.

Changzhou	Wuxi	Suzhou	Shanghai	Ningbo	Hangzhou	Taizhou	Fuzhou	Ganzhou	Wuhan	Changsha	Ankang	Chengdu	Chongqing	Kunming	Guangzhou	Nanning	Lhasa	
0.33	0.41	0.38	0.32	0.34	0.52	0.32	0.19	0.31	0.35	0.30	0.30	0.26	0.22	0.21	0.14	0.11	0.11	Nanjing
	0.37	0.44	0.41	0.37	0.33	0.37	0.19	0.34	0.32	0.41	0.39	0.33	0.28	0.24	0.15	0.13	0.17	Changzhou
		0.45	0.39	0.35	0.41	0.35	0.20	0.35	0.37	0.38	0.32	0.31	0.28	0.23	0.14	0.12	0.14	Wuxi
			0.46	0.40	0.40	0.42	0.20	0.34	0.43	0.42	0.37	0.36	0.28	0.24	0.15	0.13	0.17	Suzhou
				0.38	0.34	0.34	0.21	0.36	0.38	0.40	0.32	0.34	0.27	0.24	0.15	0.13	0.15	Shanghai
					0.33	0.40	0.22	0.37	0.30	0.40	0.32	0.30	0.27	0.19	0.16	0.14	0.12	Ningbo
						0.33	0.20	0.31	0.36	0.31	0.28	0.26	0.23	0.21	0.15	0.14	0.10	Hangzhou
							0.21	0.38	0.33	0.35	0.37	0.33	0.27	0.24	0.18	0.14	0.13	Taizhou
								0.29	0.19	0.23	0.22	0.28	0.29	0.22	0.36	0.29	0.10	Fuzhou
									0.31	0.40	0.41	0.46	0.37	0.32	0.23	0.17	0.14	Ganzhou
										0.34	0.32	0.29	0.24	0.20	0.17	0.14	0.15	Wuhan
											0.36	0.35	0.31	0.22	0.17	0.15	0.18	Changsha
												0.38	0.30	0.27	0.18	0.13	0.17	Ankang
													0.37	0.34	0.22	0.17	0.18	Chengdu
														0.26	0.21	0.18	0.13	Chongqing
															0.18	0.15	0.13	Kunming
																0.36	0.06	Guangzhou
																	0.03	Nanning

Figure S2. Jaccard similarity index between urban forests for pairs of cities.

Region2	Region3	Region4	Region5	Region6	
0.23	0.36	0.19	0.17	0.00	Region1
	0.27	0.15	0.24	0.00	Region2
		0.26	0.20	0.00	Region3
			0.15	0.00	Region4
				0.00	Region5

Figure S3. Jaccard similarity index between urban forests for pairs of natural regions.

Table S1. Summary of socio-economic characteristics and climatic conditions of 19 case cities on the precipitation gradient from east to west in the subtropical zone of China

City	Population (million)	Built-up area (km ²)	GDP (Billion Yuan)	Per capita GDP (Thousand Yuan)	Precipitation (mm)
Guangzhou	12.70	1237	1321	136.2	1852
Taizhou	5.97	140	130	64.3	1559
Nanning	6.66	287	254	69.9	1491
Ganzhou	8.38	141	254	40.8	1484
Fuzhou	7.12	260	283	92.0	1458
Changsha	7.04	364	539	137.0	1424
Hangzhou	8.70	506	872	121.7	1406
Ningbo	7.61	322	488	135.8	1331
Wuhan	9.79	455	881	116.8	1259
Shanghai	23.02	999	2484	105.7	1155
Suzhou	10.46	458	749	136.6	1149
Wuxi	6.37	329	435	120.3	1123
Chongqing	28.85	1329	793	62.3	1115
Changzhou	4.59	250	454	115.5	1109
Nanjing	8.00	755	972	118.2	1054
Chengdu	14.05	616	846	92.0	963
Kunming	6.43	438	307	77.6	937
Ankang	2.63	45	23	26.7	873

Notes: The population data come from the sixth population census of China. The GDP, built-up area and per capita GDP data are from the China City Statistical Yearbook 2016. The annual mean temperature, precipitation and humidity data are from the Resource and Environmental Science Data Center of the Chinese Academy of Sciences, based on the average of 1951-2011.

Table S2. The number of transects and quadrats established in each case city.

City	Time of field investigation (year.month)	Number of transects	Number of quadrats		
			From field survey	From literature	Total
Nanjing	2018.08	4	54	210	264
Changzhou	2017.08	4	54	50	104
Wuxi	2018.08	4	50	75	125
Suzhou	2018.08	4	52	26	78
Shanghai	2019.08	4	117	210	327
Ningbo	2017.08	4	52	348	400
Hangzhou	2017.08	4	150	648	798
Taizhou	2017.08	4	50	31	81
Fuzhou	2019.08	4	55	374	429
Ganzhou	2020.08	4	50	45	95
Wuhan	2019.08	4	50	234	284
Changsha	2020.08	4	50	188	238
Ankang	2020.08	4	50	138	188
Chengdu	2018.08	4	55	25	80
Chongqing	2017.08	4	50	407	457
Kunming	2020.08	4	50	81	131
Guangzhou	2019.08	4	102	214	316
Nanning	2020.08	4	50	209	259
Lhasa	2020.08	4	50	20	70

Table S3. Comparison between the number of tree species in green spaces of each city counted in this study and that counted based on the information provided by the government departments responsible for urban greening.

City	Statistics from this study		Statistics based on the information provided by the government department responsible for urban greening		Relative error (%)
	Number of tree species	Ways to obtain the tree species list	Number of tree species	Source	
Nanjing	193	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://ylj.nanjing.gov.cn/ , accessed: 2020.9)	169	[41]	12
Changzhou	151	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://cgj.changzhou.gov.cn/ , accessed: 2020.9)	153	[42]	1
Wuxi	158	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://gyj.wuxi.gov.cn/ , accessed: 2020.9)	148	[43]	6
Suzhou	190	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://ylj.suzhou.gov.cn/ , accessed: 2020.9)	183	[44]	4
Shanghai	183	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://lhsr.sh.gov.cn/ , accessed: 2020.9)	177	[45]	3

Ningbo	167	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://zhzfj.ningbo.gov.cn/col/col1229101783/index.html , accessed: 2020.9)	165	[46]	1
Hangzhou	235	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://www.hangzhou.gov.cn/col/col809995/index.html , accessed: 2020.9)	231	[47]	2
Taizhou	150	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://zjf.zjtz.gov.cn/ , accessed: 2020.9)	140	[48]	7
Fuzhou	207	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://ylj.fuzhou.gov.cn/ , accessed: 2020.9)	203	[49]	2
Ganzhou	138	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://cgj.ganzhou.gov.cn/ , accessed: 2020.9)	150	[50]	9
Wuhan	294	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://ylj.wuhan.gov.cn/ , accessed: 2020.9)	292	[51]	1
Changsha	151	1. Field survey 2. Literature	131	[52]	13

		3. Official website of government department responsible for greening (http://cgj.changsha.gov.cn/ , accessed: 2020.9)			
Ankang	131	1. Field survey 2. Literature 3. Official website of government department responsible for greening (https://zjj.ankang.gov.cn/ , accessed: 2020.9)	122	[53]	7
Chengdu	145	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://cdbpw.chengdu.gov.cn/ , accessed: 2020.9)	134	[54]	8
Chongqing	157	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://cgj.cq.gov.cn/cgyw/zqlh/ , accessed: 2020.9)	145	[55]	8
Kunming	146	1. Field survey 2. Literature 3. Official website of government department responsible for greening (https://cgj.km.gov.cn/ , accessed: 2020.9)	149	[56]	2
Guangzhou	246	1. Field survey 2. Literature 3. Official website of government department responsible for greening (http://lyylj.gz.gov.cn/ , accessed: 2020.9)	239	[57]	3
Lhasa	99	1. Field survey 2. Literature 3. Official website of government department responsible for greening (https://lycyj.lasa.gov.cn/ , accessed: 2020.9)	93	[58]	6

Notes: The data of tree species number in 5 cities (such as Xilinhot) counted based on the information provided by the government departments were from the official websites of the government departments responsible for greening or books written by them, and that in the remaining 13 cities (such as Beijing) were from the published paper. In those published papers, the authors clearly pointed out that the data were provided by the government departments responsible for greening. The calculation of relative error referred to previous study [59],

$$r(\%) = \frac{x - x_0}{x_0} \times 100$$

where, r is the relative error; x is the measured value, and it refers to the number of tree species in green spaces of each city collected by us; x_0 is the true value, which is replaced by the number of tree species counted based on the information provided by the government departments.

Table S4. Commonly used greening tree species in different types of green spaces in 19 case cities

Tree species	Park GSs	Production GSs	Protective GSs	Attached GSs
<i>Lagerstroemia indica</i>	√	-	√	-
<i>Salix babylonica</i>	√	-	√	√
<i>Acer palmatum</i>	√	-	√	-
<i>Celtis sinensis</i>	√	-	√	√
<i>Camphora officinarum</i>	√	-	√	-
<i>Elaeocarpus decipiens</i>	√	-	√	-
<i>Eriobotrya japonica</i>	-	√	-	√
<i>Koelreuteria paniculata</i>	√	√	√	√
<i>Liriodendron chinense</i>	√	-	√	√
<i>Metasequoia glyptostroboides</i>	√	√	-	-
<i>Platycladus orientalis</i>	√	√	√	-
<i>Podocarpus macrophyllus</i>	-	√	-	√
<i>Juniperus chinensis</i>	√	-	√	√
<i>Taxodium distichum</i>	√	-	√	-
<i>Trachycarpus fortunei</i>	√	√	-	√
<i>Albizia julibrissin</i>	√	-	√	-
<i>Prunus mume</i>	√	-	-	√
<i>Camptotheca acuminata</i>	-	-	√	√
<i>Ginkgo biloba</i>	√	√	√	√
<i>Magnolia grandiflora</i>	√	√	-	√
<i>Yulania liliiflora</i>	√	-	-	√
<i>Morella rubra</i>	-	√	-	√
<i>Osmanthus fragrans</i>	√	√	√	√
<i>Triadica sebifera</i>	√	-	√	√
<i>Ulmus pumila</i>	-	-	√	√
<i>Bischofia polycarpa</i>	-	-	√	√

<i>Cedrus deodara</i>	√	-	-	√
<i>Diospyros kaki</i>	-	√	-	√
<i>Juniperus chinensis 'Kaizuca'</i>	√	-	√	√
<i>Liquidambar formosana</i>	√	-	√	
<i>Malus halliana</i>	√	-	√	√
<i>Melia azedarach</i>	√	-	√	√
<i>Pterocarya stenoptera</i>	√	-	√	√
<i>Styphnolobium japonicum</i>	√	√	√	√
<i>Taxodium distichum</i> var. <i>imbricatum</i>	√	-	-	-
<i>Toona sinensis</i>	√	√	√	-
<i>Ulmus parvifolia</i>	√	√	√	-