

Combined effects of impervious surface change and large-scale afforestation on the surface urban heat island intensity of Beijing, China based on remote sensing analysis

Na Yao ¹, Conghong Huang ², Jun Yang ³, Cecil C. Konijnendijk van den Bosch ⁴, Lvyi Ma ¹ and Zhongkui Jia ^{1,*}

Table. S1. The results of daytime SUHIs (derived from the slopes of linear regression models revealed in Fig. S1) and significance tests during 2009-2018 of different seasons. SP, SU, AU, WI, WA, and CO represent spring, summer, autumn, winter, warm season, and cold season, respectively.

Time division	Label	Period I:			Period II:				Period III:		
		Before the planting			During the planting				After the planting		
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SP	SUHII	-	-	-	-	-	-	-	-	-	2.81
	R^2	0.77	0.63	0	0.52	0.31	0.54	0.77	0.66	0.37	0.87
SU	SUHII	7.61	6.17	7.7	6.94	8.49	7.71	7.01	8.82	9.26	8.92
	R^2	0.98	0.96	0.97	0.93	0.99	0.96	0.94	0.97	0.99	0.97
AU	SUHII	2.77	3.43	3.02	2.8	2.73	2.19	3.96	3.59	3.12	2.45
	R^2	0.95	0.97	0.95	0.97	0.97	0.91	0.92	0.94	0.96	0.9
WI	SUHII	-	-	-1.25	-	-	-1.5	-	-	-	-
	R^2	0.78	0.75	0.9	0.77	0.64	0.87	0.63	0.36	0.39	0.24
WA	SUHII	5.21	5.04	5.1	5.28	5.37	5.39	5.46	6.71	5.93	6.3
	R^2	0.98	0.97	0.94	0.95	0.97	0.94	0.95	0.98	0.98	0.97
CO	SUHII	-	-	-1.49	-2.64	-	-1.3	-	-	-	-
	R^2	0.64	0.48	0.82	0.84	0.56	0.8	0.46	0.4	0.24	0.19

Table. S2. The results of nighttime SUHIs (derived from the slopes of linear regression models revealed in Fig. S1) and significance tests during 2009-2018 of different seasons. SP, SU, AU, WI, WA, and CO represent spring, summer, autumn, winter, warm season, and cold season, respectively.

Time division	Label	Period I:			Period II:				Period III:		
		Before the planting			During the planting				After the planting		
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SP	SUHII	5.57	4.06	5.98	6.12	5.36	6.47	5.75	6.13	6.77	5.64
	R^2	0.94	0.94	0.93	0.95	0.91	0.92	0.9	0.86	0.88	0.86
SU	SUHII	4.49	4.36	4.47	2.8	4.48	4.75	4.92	5.32	4.37	4.26
	R^2	0.96	0.97	0.96	0.97	0.93	0.93	0.93	0.91	0.92	0.94
AU	SUHII	4.81	4.94	5.14	4.98	5.23	6.05	3.88	4.02	5.48	6.4
	R^2	0.92	0.92	0.92	0.91	0.91	0.92	0.88	0.85	0.85	0.86
WI	SUHII	6.06	5.48	-	7.25	6.99	7.52	6.85	7.51	7.93	8
	R^2	0.91	0.92	0.77	0.92	0.86	0.91	0.87	0.85	0.86	0.86
WA	SUHII	4.71	4.07	4.92	4.93	4.67	5.4	4.51	4.49	4.94	5.12
	R^2	0.95	0.95	0.94	0.92	0.92	0.93	0.86	0.88	0.85	0.9
CO	SUHII	5.9	5.22	6.69	6.48	6.53	7.26	6.14	7	7.44	7.46
	R^2	0.92	0.91	0.91	0.91	0.87	0.9	0.87	0.86	0.87	0.85

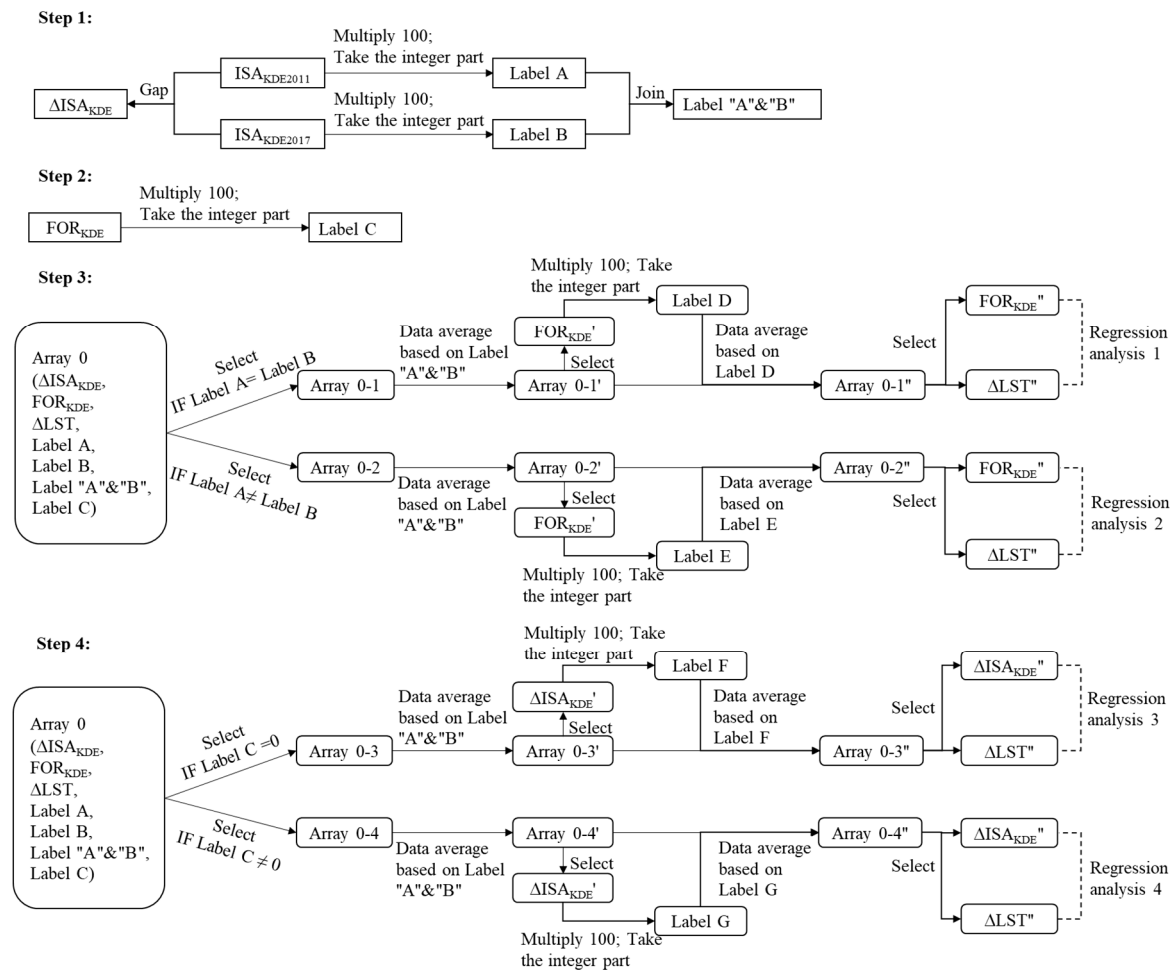


Figure S1. The workflow of the controlled regression analysis of LST changes in relation to ISA changes and afforestation.

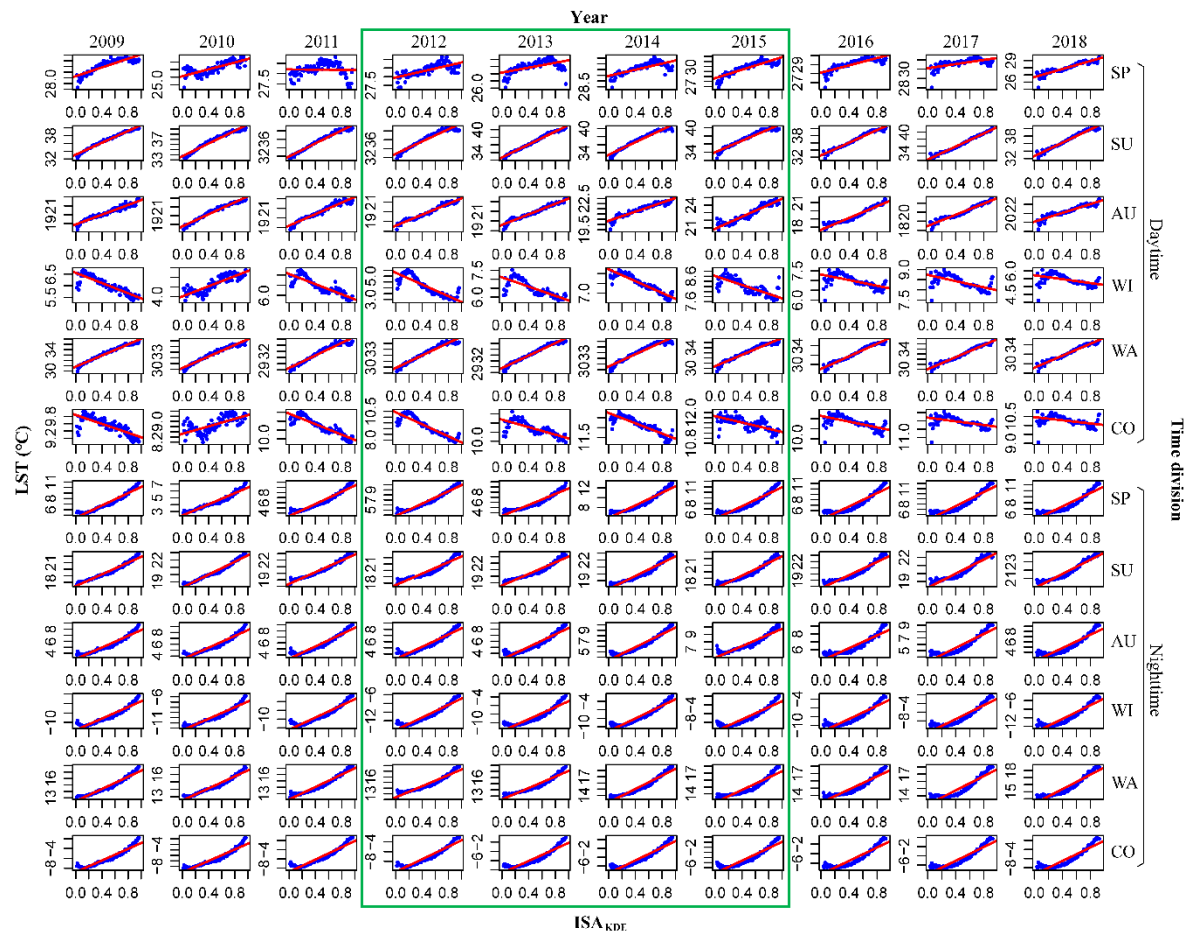


Figure S2. The linear regression analysis of LST and ISA_{KDE} in different time-divisions during 2009-2018. Blue dots are the percentile-averaged data. Red lines are the fitted linear regression functions. SU, AU, WI, WA, and CO represent spring, summer, autumn, winter, warm season, and cold season, respectively. The green rectangle highlights the planting years of 2012-2015.

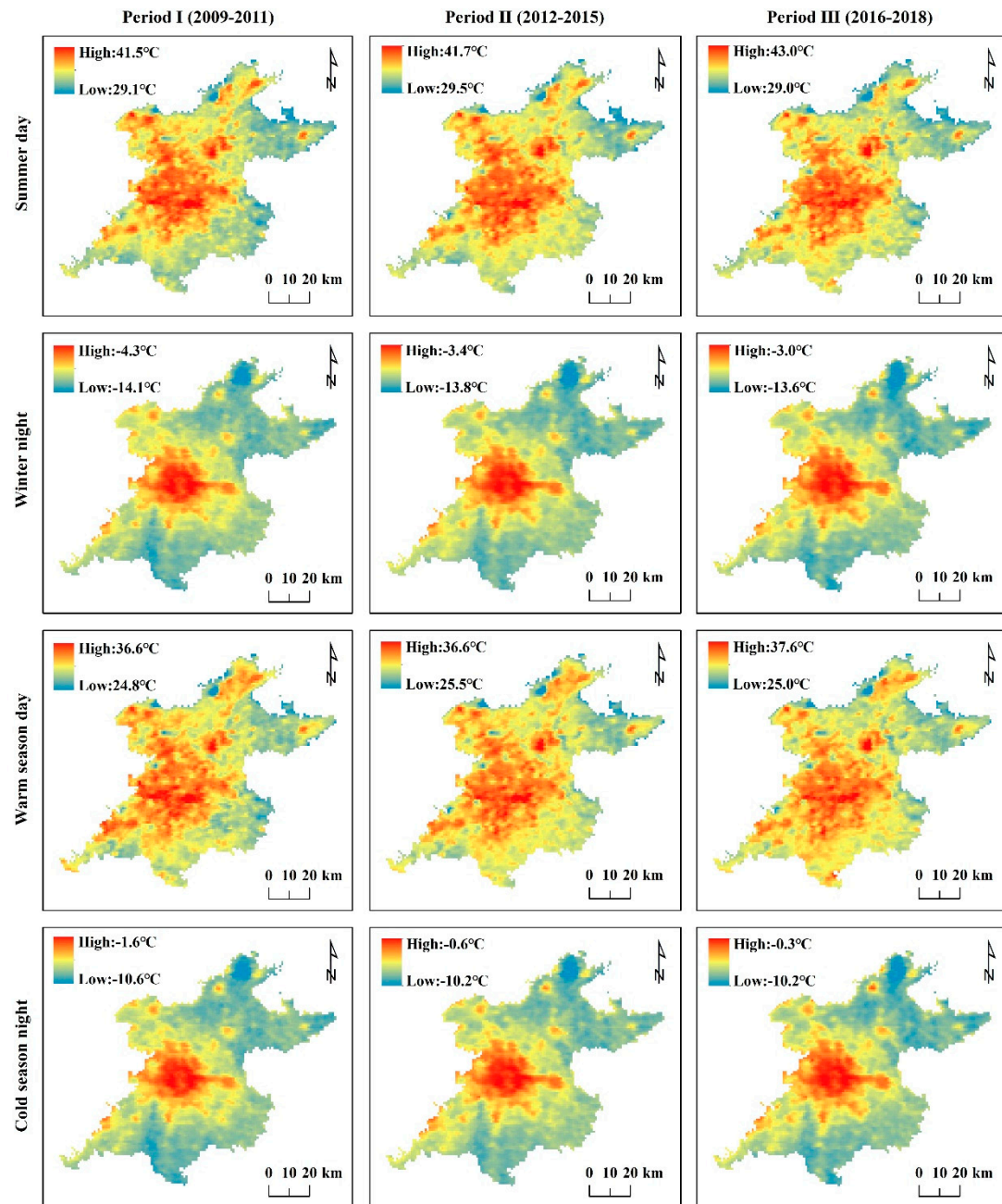


Figure S3. Distribution of average LST during the three periods in Beijing's plain area.