

Spatially Explicit Modeling of Anthropogenic Heat Intensity in Beijing Center Area: An Investigation of Driving Factors with Urban Spatial Forms

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Table S1. Correlation analysis of AHF and urban form elements in functional zone A.

		AHF	BD	BH	FAR	BV	FC	FD	FVC	AIA
AHF	Pearson Correlation	1	0.098**	0.293**	0.339**	0.228**	0.032	0.188**	−0.267**	0.241**
	Sig. (2-tailed)		0.007	0.000	0.000	0.000	0.374	0.000	0.000	0.000
	N	764	764	764	764	764	764	764	764	764
BD	Pearson Correlation	0.098**	1	−0.130**	0.547**	−0.059	0.019	0.298**	−0.621**	0.531**
	Sig. (2-tailed)	0.007		0.000	0.000	0.105	0.597	0.000	0.000	0.000
	N	764	764	764	764	764	764	764	764	764
BH	Pearson Correlation	0.293**	−0.130**	1	0.563**	0.605**	−0.019	0.097**	−0.054	0.065
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.601	0.007	0.137	0.072
	N	764	764	764	764	764	764	764	764	764
FAR	Pearson Correlation	0.339**	0.547**	0.563**	1	0.467**	−0.008	0.360**	−0.492**	0.488**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.818	0.000	0.000	0.000

	N	764	764	764	764	764	764	764	764	764
	Pearson Correlation	0.228**	-0.059	0.605**	0.467**	1	-0.066	0.000	-0.027	-0.126**
BV	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.611	0.004	0.504	0.000
	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	0.009	0.198**	0.022	0.128**	0.019	1	-0.326**	-0.193**	0.200**
FC	Sig. (2-tailed)	0.818	0.000	0.557	0.001	0.611		0.000	0.000	0.000
	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	0.172**	0.196**	0.140**	0.291**	0.108**	-0.326**	1	-0.149**	0.260**
FD	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.004	0.000		0.000	0.000
	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	-0.110**	-0.588**	-0.001	-0.386**	-0.025	-0.193**	-0.149**	1	-0.606**
FVC	Sig. (2-tailed)	0.003	0.000	0.979	0.000	0.504	0.000	0.000		0.000
	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	0.089*	0.547**	0.023	0.363**	-0.162**	0.200**	0.260**	-0.606**	1
AIA	Sig. (2-tailed)	0.017	0.000	0.540	0.000	0.000	0.000	0.000	0.000	
	N	719	719	719	719	719	719	719	719	719

**. Correlation is significant at the 0.01 level (2-tailed).

		AHF	BD	BH	FAR	BV	FC	FD	FVC	AIA
AHF	Pearson Correlation	1	0.148**	0.360**	0.498**	0.223**	0.033	0.376**	−0.210**	0.293**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.287	0.000	0.000	0.000
	N	1072	1072	1072	1072	1072	1072	1072	1072	1072
BD	Pearson Correlation	0.148**	1	−0.013	0.558**	0.063*	0.183**	0.178**	−0.445**	0.439**
	Sig. (2-tailed)	0.000		0.664	0.000	0.040	0.000	0.000	0.000	0.000
	N	1072	1072	1072	1072	1072	1072	1072	1072	1072
BH	Pearson Correlation	0.360**	−0.013	1	0.608**	0.442**	0.072*	0.371**	−0.131**	0.244**
	Sig. (2-tailed)	0.000	0.664		0.000	0.000	0.019	0.000	0.000	0.000
	N	1072	1072	1072	1072	1072	1072	1072	1072	1072
FAR	Pearson Correlation	0.498**	0.558**	0.608**	1	0.400**	0.204**	0.414**	−0.363**	0.484**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000
	N	1072	1072	1072	1072	1072	1072	1072	1072	1072
BV	Pearson Correlation	0.223**	0.063*	0.442**	0.400**	1	0.020	0.055	−0.095**	−0.068*
	Sig. (2-tailed)	0.000	0.040	0.000	0.000		0.512	0.071	0.002	0.026
	N	1072	1072	1072	1072	1072	1072	1072	1072	1072
FC	Pearson Correlation	0.033	0.183**	0.072*	0.204**	0.020	1	−0.257**	−0.222**	0.225**

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	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	0.185**	-0.170**	1	0.647**	0.687**	0.022	0.140**	-0.001	0.023
BH	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.557	0.000	0.979	0.540
	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	0.188**	0.453**	0.647**	1	0.594**	0.128**	0.291**	-0.386**	0.363**
FAR	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.001	0.000	0.000	0.000
	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	0.276**	-0.148**	0.687**	0.594**	1	0.019	0.108**	-0.025	-0.162**
BV	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.611	0.004	0.504	0.000
	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	0.009	0.198**	0.022	0.128**	0.019	1	-0.326**	-0.193**	0.200**
FC	Sig. (2-tailed)	0.818	0.000	0.557	0.001	0.611		0.000	0.000	0.000
	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	0.172**	0.196**	0.140**	0.291**	0.108**	-0.326**	1	-0.149**	0.260**
FD	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.004	0.000		0.000	0.000
	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	-0.110**	-0.588**	-0.001	-0.386**	-0.025	-0.193**	-0.149**	1	-0.606**
FVC	Sig. (2-tailed)	0.003	0.000	0.979	0.000	0.504	0.000	0.000		0.000

	N	719	719	719	719	719	719	719	719	719
	Pearson Correlation	0.089*	0.547**	0.023	0.363**	−0.162**	0.200**	0.260**	−0.606**	1
AIA	Sig. (2-tailed)	0.017	0.000	0.540	0.000	0.000	0.000	0.000	0.000	
	N	719	719	719	719	719	719	719	719	719
**. Correlation is significant at the 0.01 level (2-tailed).										
*. Correlation is significant at the 0.05 level (2-tailed).										

Table S4. Correlation analysis of AHF and urban form elements in functional zone G.

		AHF	BD	BH	FAR	BV	FC	FD	FVC	AIA
	Pearson Correlation	1	0.424**	0.354**	0.428**	0.134**	0.340**	0.288**	−0.522**	0.537**
AHF	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1798	1798	1798	1798	1798	1798	1798	1798	1798
	Pearson Correlation	0.424**	1	0.298**	0.846**	0.106**	0.323**	0.330**	−0.526**	0.636**
BD	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1798	1798	1798	1798	1798	1798	1798	1798	1798
	Pearson Correlation	0.354**	0.298**	1	0.500**	0.585**	0.233**	0.102**	−0.349**	0.350**
BH	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000
	N	1798	1798	1798	1798	1798	1798	1798	1798	1798
	Pearson Correlation	0.428**	0.846**	0.500**	1	0.257**	0.280**	0.305**	−0.493**	0.556**
FAR	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000

	N	1798	1798	1798	1798	1798	1798	1798	1798	1798
BV	Pearson	0.134**	0.106**	0.585**	0.257**	1	0.039	0.015	-0.157**	0.131**
	Correlation									
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.095	0.522	0.000	0.000
	N	1798	1798	1798	1798	1798	1798	1798	1798	1798
FC	Pearson	0.340**	0.323**	0.233**	0.280**	0.039	1	0.034	-0.380**	0.394**
	Correlation									
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.095		0.147	0.000	0.000
	N	1798	1798	1798	1798	1798	1798	1798	1798	1798
FD	Pearson	0.288**	0.330**	0.102**	0.305**	0.015	0.034	1	-0.250**	0.282**
	Correlation									
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.522	0.147		0.000	0.000
	N	1798	1798	1798	1798	1798	1798	1798	1798	1798
FVC	Pearson	-0.522**	-0.526**	-0.349**	-0.493**	-0.157**	-0.380**	-0.250**	1	-0.756**
	Correlation									
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000
	N	1798	1798	1798	1798	1798	1798	1798	1798	1798
AIA	Pearson	0.537**	0.636**	0.350**	0.556**	0.131**	0.394**	0.282**	-0.756**	1
	Correlation									
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	N	1798	1798	1798	1798	1798	1798	1798	1798	1798

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

		AHF	BD	BH	FAR	BV	FC	FD	FVC	AIA
AHF	Pearson Correlation	1	0.329**	0.227**	0.354**	0.145**	0.157**	0.199**	-0.309**	0.304**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	755	755	755	755	755	755	755	755	755
BD	Pearson Correlation	0.329**	1	0.255**	0.863**	0.134**	0.214**	0.323**	-0.418**	0.505**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	755	755	755	755	755	755	755	755	755
BH	Pearson Correlation	0.227**	0.255**	1	0.367**	0.517**	0.137**	0.180**	-0.167**	0.250**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000
	N	755	755	755	755	755	755	755	755	755
FAR	Pearson Correlation	0.354**	0.863**	0.367**	1	0.251**	0.116**	0.350**	-0.367**	0.450**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.001	0.000	0.000	0.000
	N	755	755	755	755	755	755	755	755	755
BV	Pearson Correlation	0.145**	0.134**	0.517**	0.251**	1	-0.040	0.032	-0.086*	0.060
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.276	0.378	0.018	0.098
	N	755	755	755	755	755	755	755	755	755
FC	Pearson Correlation	0.157**	0.214**	0.137**	0.116**	-0.040	1	-0.014	-0.174**	0.230**

		AHF	BD	BH	FAR	BV	FC	FD	FVC	AIA
AHF	Pearson Correlation	1	0.329**	0.227**	0.354**	0.145**	0.157**	0.199**	-0.309**	0.304**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	755	755	755	755	755	755	755	755	755
BD	Pearson Correlation	0.329**	1	0.255**	0.863**	0.134**	0.214**	0.323**	-0.418**	0.505**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	755	755	755	755	755	755	755	755	755
BH	Pearson Correlation	0.227**	0.255**	1	0.367**	0.517**	0.137**	0.180**	-0.167**	0.250**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000
	N	755	755	755	755	755	755	755	755	755
FAR	Pearson Correlation	0.354**	0.863**	0.367**	1	0.251**	0.116**	0.350**	-0.367**	0.450**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.001	0.000	0.000	0.000
	N	755	755	755	755	755	755	755	755	755
BV	Pearson Correlation	0.145**	0.134**	0.517**	0.251**	1	-0.040	0.032	-0.086*	0.060
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.276	0.378	0.018	0.098
	N	755	755	755	755	755	755	755	755	755
FC	Pearson Correlation	0.157**	0.214**	0.137**	0.116**	-0.040	1	-0.014	-0.174**	0.230**

	Sig. (2-tailed)	0.000	0.000	0.000	0.001	0.276		0.704	0.000	0.000
	N	755	755	755	755	755	755	755	755	755
	Pearson Correlation	0.199**	0.323**	0.180**	0.350**	0.032	−0.014	1	−0.260**	0.278**
FD	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.378	0.704		0.000	0.000
	N	755	755	755	755	755	755	755	755	755
	Pearson Correlation	−0.309**	−0.418**	−0.167**	−0.367**	−0.086*	−0.174**	−0.260**	1	−0.567**
FVC	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.018	0.000	0.000		0.000
	N	755	755	755	755	755	755	755	755	755
	Pearson Correlation	0.304**	0.505**	0.250**	0.450**	0.060	0.230**	0.278**	−0.567**	1
AIA	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.098	0.000	0.000	0.000	
	N	755	755	755	755	755	755	755	755	755
**, Correlation is significant at the 0.01 level (2-tailed).										
*, Correlation is significant at the 0.05 level (2-tailed).										

Table S6. Correlation analysis of AHF and urban form elements in functional zone S.

		AHF	BD	BH	FAR	BV	FC	FD	FVC	AIA
	Pearson Correlation	1	0.528**	0.009	0.567**	0.625**	−0.409**	0.023	−0.783**	0.589**
AHF	Sig. (2-tailed)		0.000	0.940	0.000	0.000	0.000	0.851	0.000	0.000
	N	72	72	72	72	72	72	72	72	72
BD	Pearson Correlation	0.528**	1	0.136	0.903**	0.361**	−0.109	0.251*	−0.457**	0.488**

	Sig. (2-tailed)	0.000		0.254	0.000	0.002	0.363	0.033	0.000	0.000
	N	72	72	72	72	72	72	72	72	72
	Pearson Correlation	0.009	0.136	1	0.356**	0.195	0.219	0.467**	-0.167	0.256*
BH	Sig. (2-tailed)	0.940	0.254		0.002	0.101	0.064	0.000	0.160	0.030
	N	72	72	72	72	72	72	72	72	72
	Pearson Correlation	0.567**	0.903**	0.356**	1	0.458**	-0.109	0.520**	-0.498**	0.490**
FAR	Sig. (2-tailed)	0.000	0.000	0.002		0.000	0.363	0.000	0.000	0.000
	N	72	72	72	72	72	72	72	72	72
	Pearson Correlation	0.625**	0.361**	0.195	0.458**	1	-0.185	0.041	-0.377**	0.275*
BV	Sig. (2-tailed)	0.000	0.002	0.101	0.000		0.119	0.735	0.001	0.020
	N	72	72	72	72	72	72	72	72	72
	Pearson Correlation	-0.409**	-0.109	0.219	-0.109	-0.185	1	0.081	0.369**	-0.199
FC	Sig. (2-tailed)	0.000	0.363	0.064	0.363	0.119		0.500	0.001	0.094
	N	72	72	72	72	72	72	72	72	72
	Pearson Correlation	0.023	0.251*	0.467**	0.520**	0.041	0.081	1	-0.188	0.242*
FD	Sig. (2-tailed)	0.851	0.033	0.000	0.000	0.735	0.500		0.115	0.040
	N	72	72	72	72	72	72	72	72	72
	Pearson Correlation	-0.783**	-0.457**	-0.167	-0.498**	-0.377**	0.369**	-0.188	1	-0.738**
FVC	Sig. (2-tailed)	0.000	0.000	0.160	0.000	0.001	0.001	0.115		0.000
	N	72	72	72	72	72	72	72	72	72
AIA	Pearson Correlation	0.589**	0.488**	0.256*	0.490**	0.275*	-0.199	0.242*	-0.738**	1

Sig. (2-tailed)	0.000	0.000	0.030	0.000	0.020	0.094	0.040	0.000
N	72	72	72	72	72	72	72	72

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table S7. Multicollinearity test among urban form elements

	VIF					
	A	B	R	G	M	S
BD	2.877	2.268	3.202	4.692	4.576	5.664
BH	2.644	2.408	3.344	2.120	1.589	-
FAR	4.320	3.619	5.297	4.686	4.585	6.289
BV	1.964	1.470	2.805	1.557	1.439	1.359
FC	-	-	-	1.258	1.136	1.191
FD	1.238	1.349	1.132	1.157	1.201	-
FVC	1.995	1.478	1.961	2.441	1.549	2.709
AIA	2.036	1.850	2.102	2.953	1.767	2.375

Table S8. Regression results and t test of urban form elements in functional zone A.

	Unstandardized		Standardized	t	P	VIF	R ²	Adjusted R ²	F
	Coefficients		Coefficients						
	B	Std. Error	Beta						
(Constant)	0.078	0.013	0	6.074	0.000***	-			F=23.835
BD	-0.063	0.02	-0.171	-3.069	0.002***	2.877	0.181	0.173	P=0.000***

BH	0.037	0.019	0.105	1.947	0.052*	2.664
FAR	0.076	0.036	0.146	2.137	0.033**	4.32
BV	0.684	0.327	0.096	2.091	0.037**	1.964
FD	0.054	0.028	0.070	1.904	0.057*	1.238
FVC	-0.074	0.017	-0.200	-4.291	0.000***	1.995
AIA	0.028	0.011	0.121	2.573	0.010**	2.036

Dependent variable: AHF

***. Correlation is significant at the 0.01 level (2-tailed). **. Correlation is significant at the 0.05 level (2-tailed). *. Correlation is significant at the 0.1 level (2-tailed).

Table S9. Regression results and t test of urban form elements in functional zone B.

	Unstandardized		Standardized							
	Coefficients		Coefficients		t	P	VIF	R ²	Adjusted R ²	F
	B	Std. Error	Beta							
(Constant)	0.065	0.017	-		3.827	0.000***	-			
BD	-0.152	0.024	-0.243		-6.354	0.000***	2.268			
BH	-0.051	0.024	-0.083		-2.099	0.036**	2.408			
FAR	0.361	0.033	0.532		11.019	0.000***	3.619	0.314	0.310	F=69.658
BV	0.328	0.21	0.048		1.565	0.118	1.47			P=0.000***
FD	0.157	0.024	0.194		6.591	0.000***	1.349			
FVC	-0.054	0.023	-0.072		-2.334	0.020**	1.478			
AIA	0.026	0.017	0.054		1.57	0.117	1.85			

Dependent variable: AHF

***. Correlation is significant at the 0.01 level (2-tailed). **. Correlation is significant at the 0.05 level (2-tailed). *. Correlation is significant at the 0.1 level (2-tailed).

Table S10. Regression results and t test of urban form elements in functional zone R.

	Unstandardized		Standardized	t	P	VIF	R ²	Adjusted R ²	F
	Coefficients		Coefficients						
	B	Std. Error	Beta						
(Constant)	0.126	0.026	-	4.902	0.000***	-			
BD	-0.313	0.043	-0.443	-7.275	0.000***	3.202			
BH	-0.1	0.027	-0.230	-3.692	0.000***	3.344			
FAR	0.167	0.053	0.246	3.141	0.002***	5.297	0.175	0.168	F=21.650
BV	2.59	0.643	0.230	4.027	0.000***	2.805			P=0.000***
FD	0.115	0.032	0.131	3.606	0.000***	1.132			
FVC	-0.097	0.03	-0.155	-3.26	0.001***	1.961			
AIA	0.064	0.02	0.157	3.17	0.002***	2.102			

Dependent variable: AHF

***. Correlation is significant at the 0.01 level (2-tailed). **. Correlation is significant at the 0.05 level (2-tailed). *. Correlation is significant at the 0.1 level (2-tailed).

Table S11. Regression results and t test of urban form elements in functional zone G.

	Unstandardized		Standardized	t	P	VIF	R²	Adjusted R²	F
	Coefficients		Coefficients						
	B	Std. Error	Beta						
(Constant)	0.026	0.003	0	7.732	0.000***	-			
BH	0.033	0.005	0.133	6.092	0.000***	1.374			
FAR	0.042	0.016	0.067	2.680	0.007***	1.798			
FC	0.014	0.002	0.125	6.059	0.000***	1.231	0.377	0.375	F=180.909
FD	0.106	0.015	0.139	6.982	0.000***	1.146			P=0.000***
AIA	0.024	0.003	0.216	7.053	0.000***	2.689			
FVC	-0.027	0.004	-0.197	-6.767	0.000***	2.439			

Dependent variable: AHF

***. Correlation is significant at the 0.01 level (2-tailed). **. Correlation is significant at the 0.05 level (2-tailed). *. Correlation is significant at the 0.1 level (2-tailed).

Table S12. Regression results and t test of urban form elements in functional zone M.

	Unstandardized		Standardized						
	Coefficients		Coefficients	t	P	VIF	R ²	Adjusted R ²	F
	B	Std. Error	Beta						
(Constant)	0.031	0.003	0	9.640	0.000***	-			
BH	0.027	0.01	0.096	2.690	0.007***	1.168	0.178	0.174	F=40.735
FAR	0.101	0.016	0.239	6.330	0.000***	1.301			P=0.000***

FC	0.008	0.003	0.082	2.436	0.015**	1.045
FVC	-0.031	0.006	-0.191	-5.313	0.000***	1.181

Dependent variable: AHF

***. Correlation is significant at the 0.01 level (2-tailed). **. Correlation is significant at the 0.05 level (2-tailed). *.
Correlation is significant at the 0.1 level (2-tailed).

Table S13. Regression results and t test of urban form elements in functional zone S.

	Unstandardized		Standardized						
	Coefficients		Coefficients	t	P	VIF	R ²	Adjusted R ²	F
	B	Std. Error	Beta						
(Constant)	0.181	0.014	0	13.132	0.000***	-			
BV	0.264	0.045	0.385	5.807	0.000***	1.166	0.740	0.733	F=98.353
FVC	-0.239	0.025	-0.638	-9.633	0.000***	1.166			P=0.000***

Dependent variable: AHF

***. Correlation is significant at the 0.01 level (2-tailed). **. Correlation is significant at the 0.05 level (2-tailed). *.
Correlation is significant at the 0.1 level (2-tailed).