

Supplementary Material

Table S1. Input parameters prescribed and/or required in the CLASS and TEB schemes. The subareas values prescribed for Philadelphia (39.97 °N, 75.17 °W), Chicago (41.82 °N, 87.68 °W), and Cincinnati (39.15 °N, 84.50 °W) cities which indicate, respectively, the representative cities located for Coastal, Great Lakes, and inland region used in this study, are presented. The parameter values are extracted from the nearest grid to each city's location.

Scheme	Parameters		Variable name	Philadelphia	Chicago	Cincinnati
CLASS	Albedo (Visible/near IR) for bare soil			0.23 / 0.46	0.05 / 0.30	0.16 / 0.32
	Roughness length (m)			1.2394	1.1974	1.2541
TEB	Geometric parameters	Building fraction	BLDF	0.1391	0.1664	0.1742
		Building height (m)	BLDH	7.8208	7.9236	8.1302
		Ratio vertical per horizontal surface	WHOR	0.4440	0.3877	0.6413
		Impervious fraction (road)	PAVF	0.3928	0.4216	0.3513
		Urban fraction	UF (=BLDF+PAVF)	0.5319	0.5879	0.5255
		Canyon aspect ratio	$0.5 \cdot \text{WHOR} / (1 - \text{UF})$	0.4742	0.4704	0.6757
	Radiative parameters	Roof albedo	ALRF	0.1519	0.1502	0.1501
		Wall albedo	ALWL	0.2513	0.2500	0.2500
		Road albedo	ALRD	0.1865	0.1742	0.1692
		Roof emissivity	EMRF	0.9094	0.9081	0.9105
		Wall emissivity	EMWL	0.8524	0.8506	0.8562
		Road emissivity	EMRD	0.9023	0.9202	0.9205
	Thermal parameters	Roof	TCRF	1.5176	1.5113	1.5111
		Wall	TCWL	0.9453	0.9359	0.9355
		Road	TCRD	0.8323	0.7965	0.7945
		Roof roughness length	ZORF	0.1501	0.1502	0.1501
		Road roughness length	ZORD	0.0579	0.0661	0.0525

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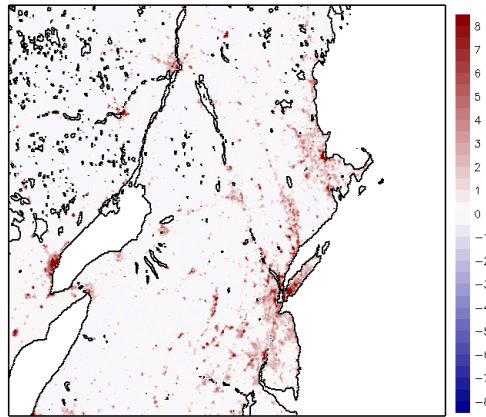


Figure S1. Difference of input parameter for roughness length (m) between GEM_TEB and GEM experiments prescribed in this study. Here, the positive value means the higher roughness length in GEM_TEB than GEM simulation, whereas the negative value means the opposite.