



Supplement of

GloUCP: a global 1 km spatially continuous urban canopy parameters for the WRF model

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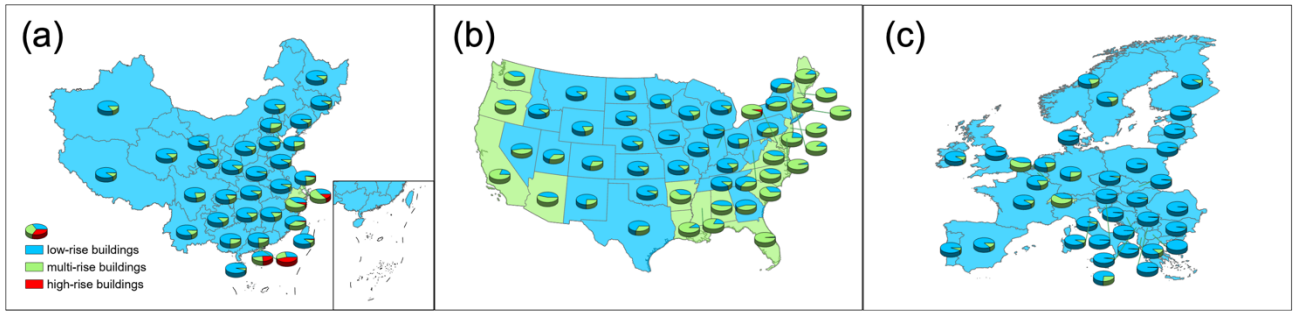


Figure S1. The spatial distribution of different building type proportions in China, the contiguous United States, and Europe. Specifically, low-rise buildings are defined as those with heights less than 10 m, multi-rise buildings as those with heights between 10 and 24 m, and high-rise buildings as those with heights exceeding 24 m. The pie charts represent the proportion of these three building types in various subregions, with the color of each subregion indicating the predominant building type in that area.

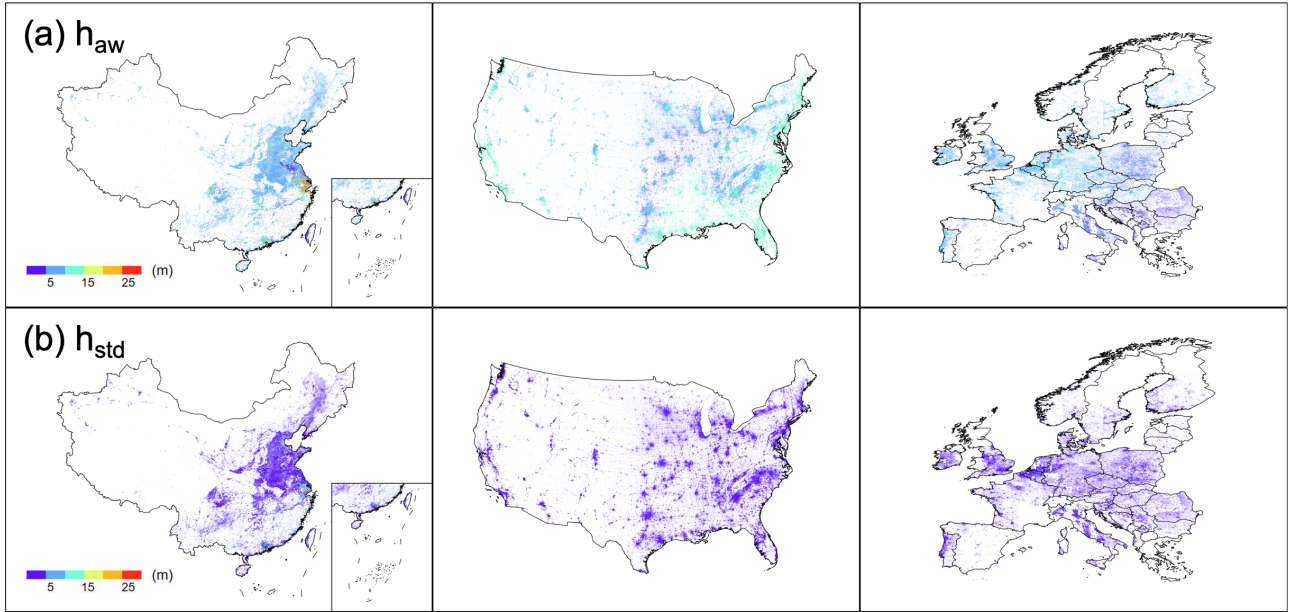


Figure S2. The spatial distribution of (a) area-weighted mean building height and (b) standard deviation of building height in China, the contiguous United States, and Europe.

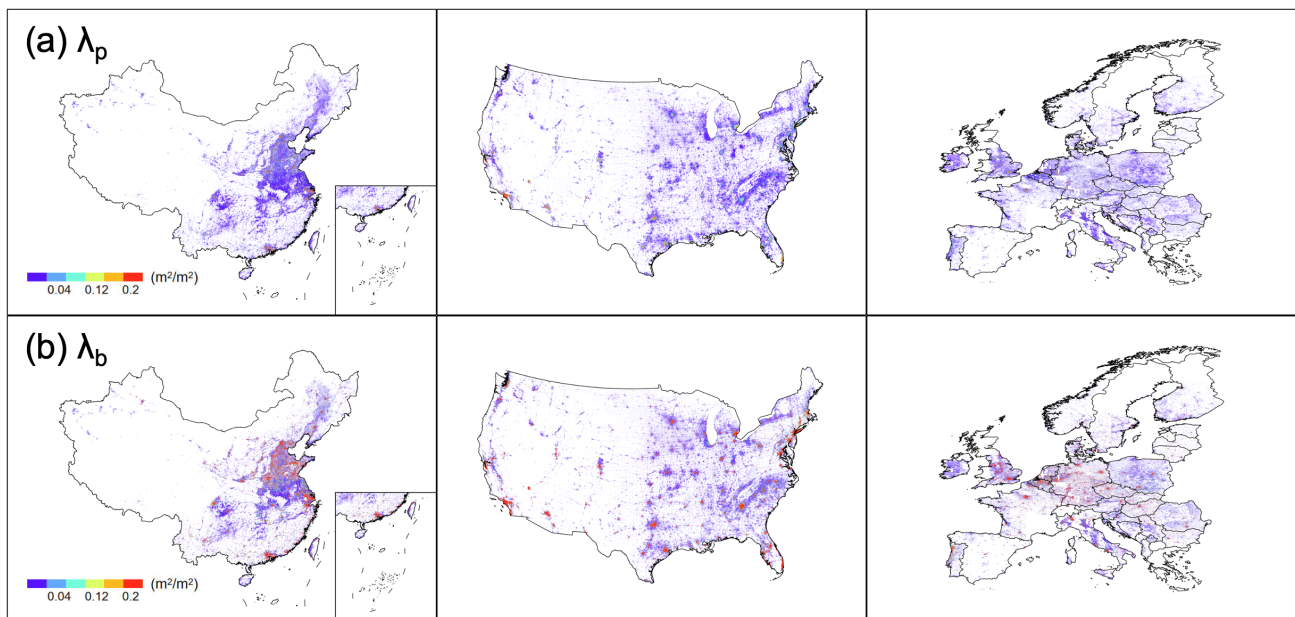


Figure S3. The spatial distribution of (a) plan area fraction and (b) ratio of building surface to plan area in China, the contiguous United States, and Europe.

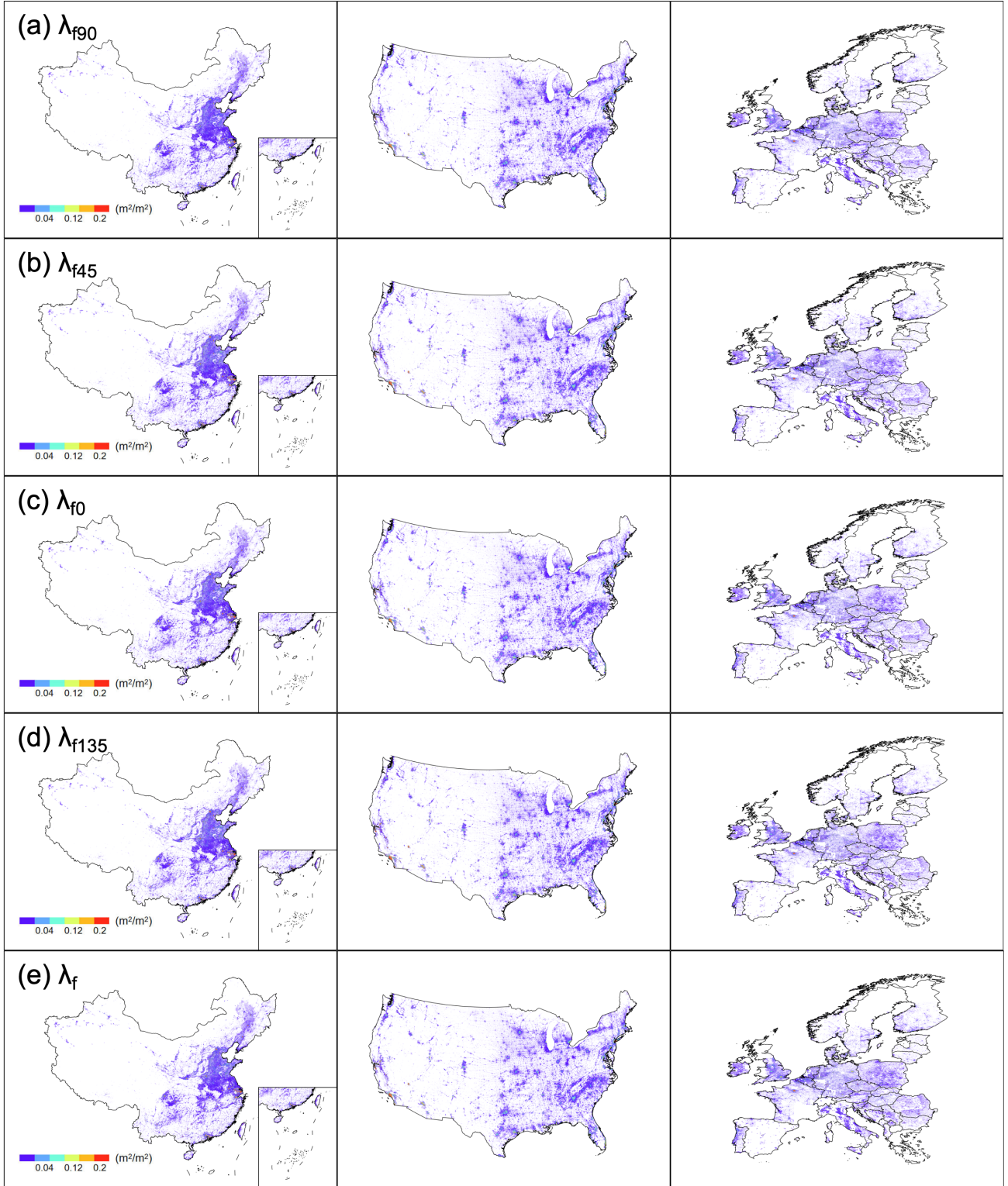


Figure S4. The spatial distribution of frontal area index for (a) northward, (b) northeastward, (c) eastward, (d) southeastward, and (e) the average frontal area index in China, the contiguous United States, and Europe.

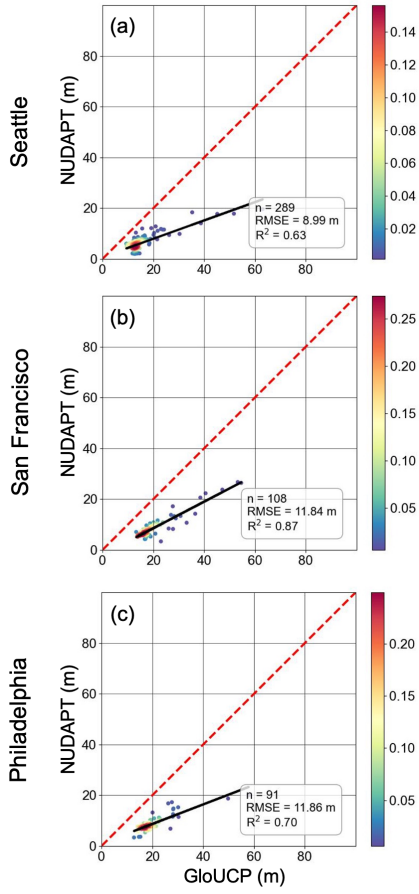


Figure S5. Pixel-scale comparison of mean building heights between GloUCP and NUDAPT across three representative cities in the United States. The dashed red line represents the 1:1 line, while the solid black line indicates the fitted regression line.

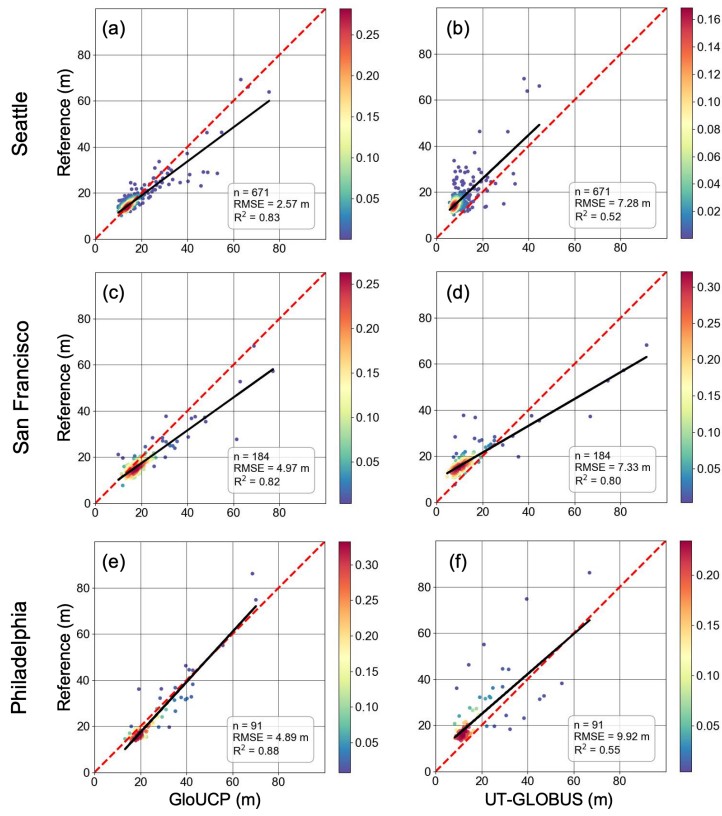


Figure S6. Pixel-scale comparison of area-weighted mean building height between GloUCP and UT-GLOBUS across three representative cities in the United States. The dashed red line represents the 1:1 line, while the solid black line indicates the fitted regression line.

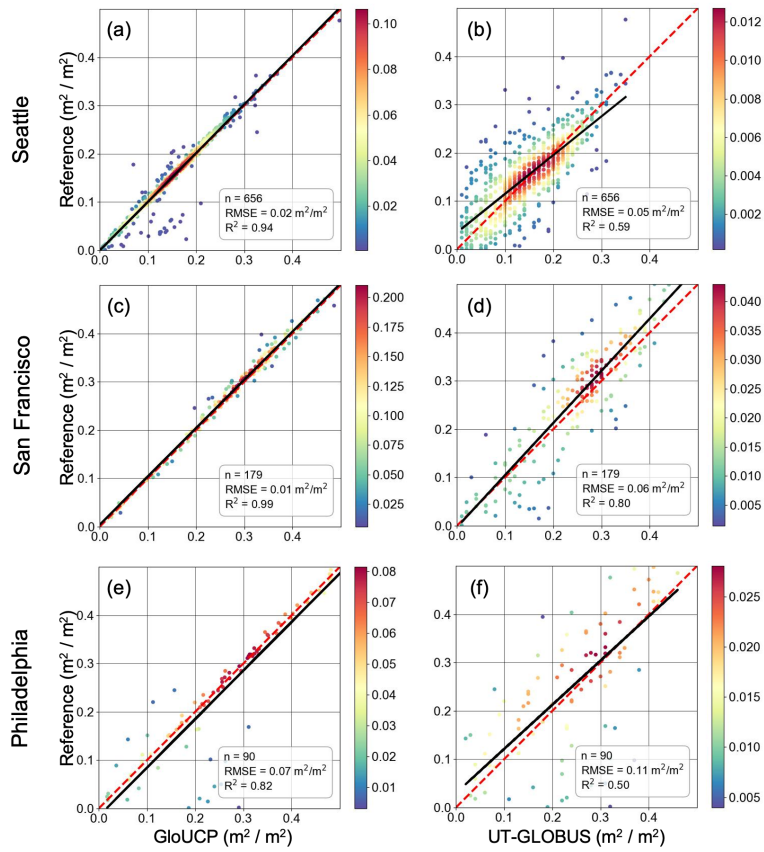


Figure S7. Pixel-scale comparison of plan area fraction between GloUCP and UT-GLOBUS across three representative cities in the United States. The dashed red line represents the 1:1 line, while the solid black line indicates the fitted regression line.

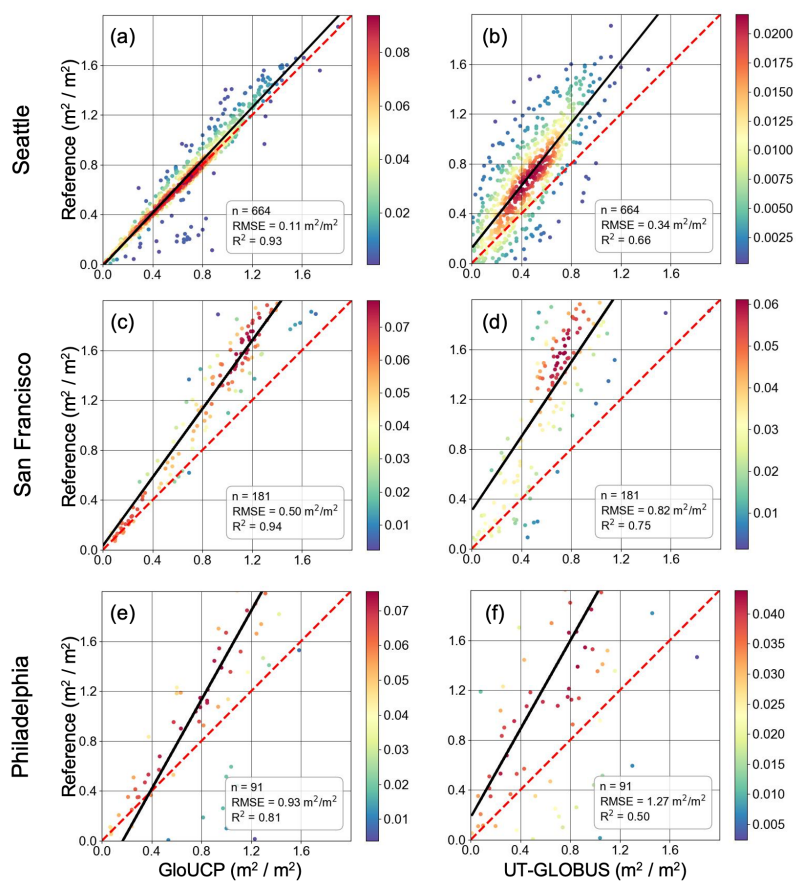


Figure S8. Pixel-scale comparison of ratio of building surface to plan area between GloUCP and UT-GLOBUS across three representative cities in the United States. The dashed red line represents the 1:1 line, while the solid black line indicates the fitted regression line.

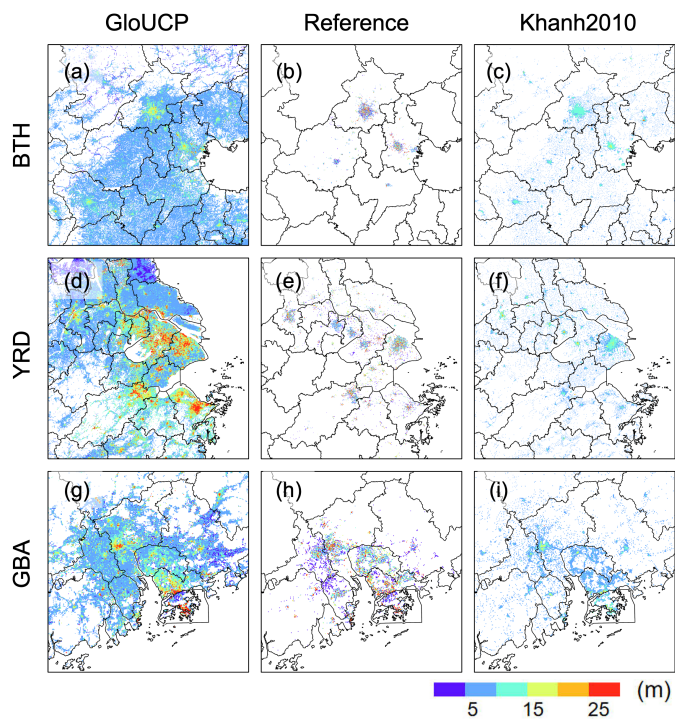


Figure S9. Comparison of the spatial distribution of mean building heights in GloUCP, reference data, and Khanh2010 across three major urban agglomerations in China.

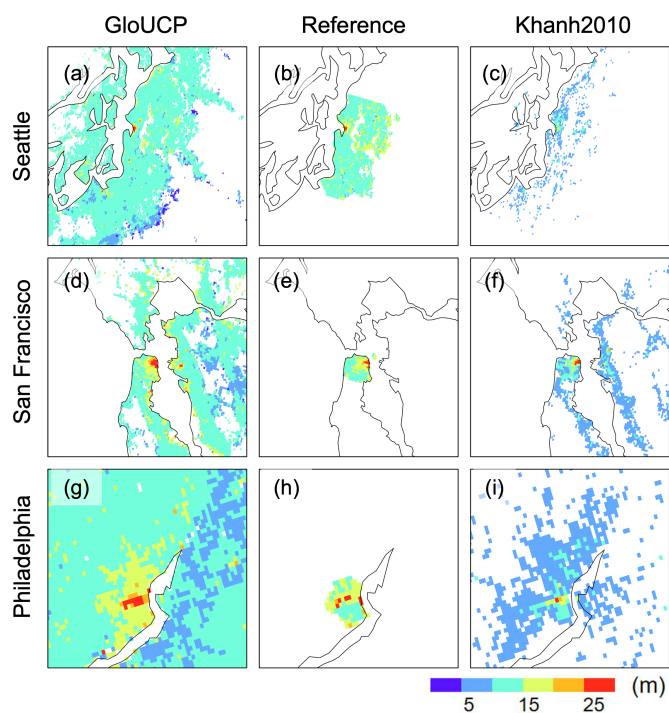


Figure S10. Comparison of the spatial distribution of mean building heights in GloUCP, reference data and Khanh2010 across three representative cities in the United States.

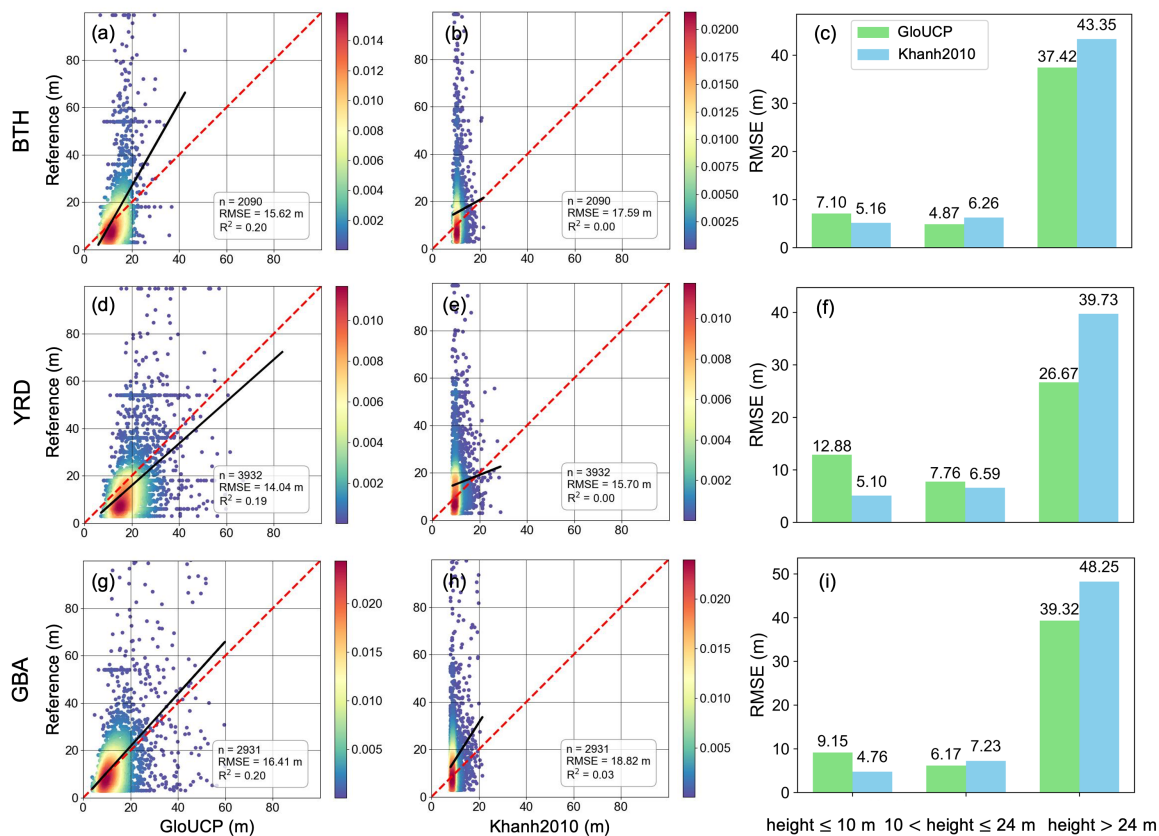


Figure S11. Pixel-scale comparison of mean building heights in GloUCP, reference data, and Khanh2010 across three major urban agglomerations in China. The dashed red line represents the 1:1 line, while the solid black line indicates the fitted regression line.

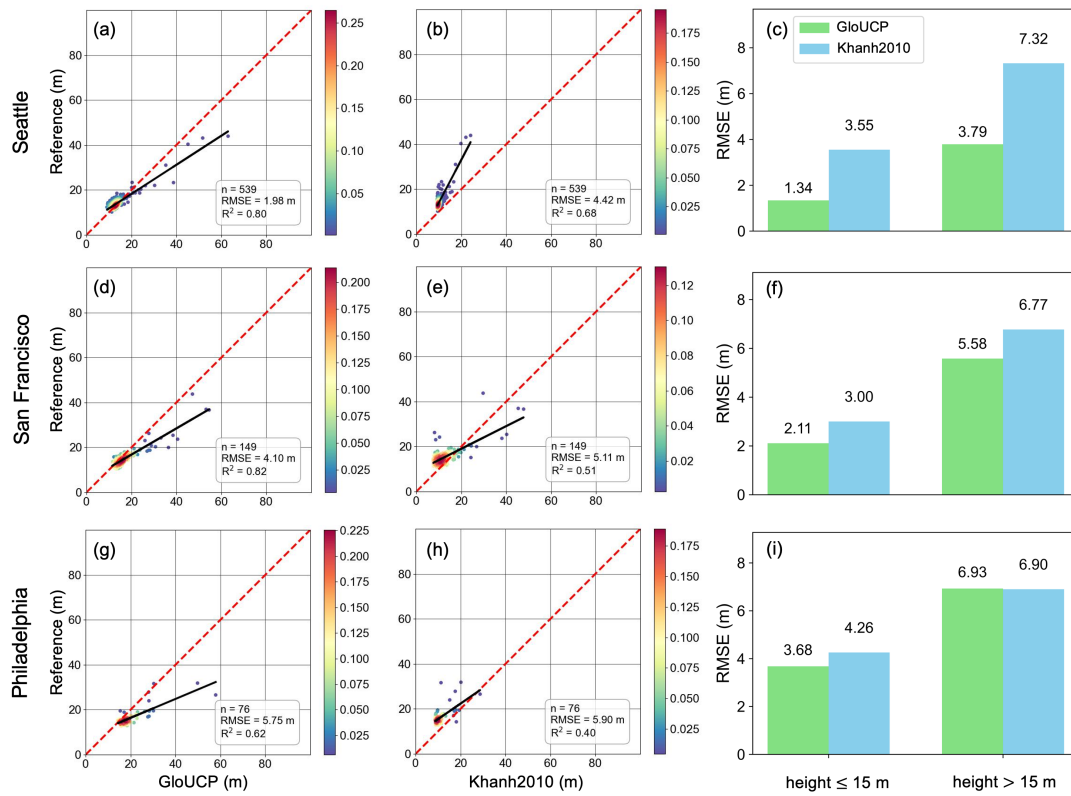


Figure S12. Pixel-scale comparison of mean building heights in GloUCP, reference data and Khanh2010 across three representative cities in the United States. The dashed red line represents the 1:1 line, while the solid black line indicates the fitted regression line.

Table S1. Comparison of mean building heights in GloUCP, reference data, and Sun2021 across three major urban agglomerations in China. Evaluation statistics used are coefficient of determination (R^2) and root mean square errors (RMSE).

Region	Dataset	All		RMSE (m)		
		R^2	RMSE (m)	height $\leq$ 10 m	10 < height $\leq$ 24 m	height > 24 m
BTH	GloUCP	0.19	14.32	7.12	4.49	33.93
	Sun2021	0.09	15.22	7.39	7.08	35.38
YRD	GloUCP	0.20	15.88	14.02	9.02	28.93
	Sun2021	0.06	16.79	10.63	6.77	37.18
GBA	GloUCP	0.17	17.88	9.17	5.96	41.78
	Sun2021	0.07	19.29	12.36	8.11	42.48

Table S2. Comparison of mean building heights in GloUCP, reference data, and NUDAPT across three representative cities in the United States. Evaluation statistics used are coefficient of determination (R^2) and root mean square errors (RMSE).

Region	Dataset	All		RMSE (m)	
		R^2	RMSE (m)	height $\leq$ 15 m	height $>$ 15 m
Seattle	GloUCP	0.81	2.51	1.45	8.29
	NUDAPT	0.64	9.03	4.15	10.72
San Francisco	GloUCP	0.83	4.73	2.41	7.48
	NUDAPT	0.73	8.57	5.78	9.22
Philadelphia	GloUCP	0.52	5.50	3.58	7.14
	NUDAPT	0.39	8.50	6.46	9.29