Supplementary Information

The following describes the datasets used in this study.

Datasets	Spatial resolution	Time	Source
NAIP	1 m	The most recent images were collected from 2016-2020 in each city during summer months.	US Department of Agriculture, https://naip-usdaonline.hub.arcgis.com/
LiDAR	1 m	The most recently available data were collected in period of 2012-2019	USGS, https://usgs.entwine.io/
Building footprint data	-	2018	Microsoft building footprint dataset, https://www.microsoft.com/en-us/maps/bing-maps/building-footprints
Meteorological data	-	2019	National Renewable Energy Lab, https://sam.nrel.gov/weather-data
Climate zone data	-	2020	Climate Zones - DOE Building America Program, https://atlas.eia.gov/datasets/eia::climate-zones-doe-building-america-program/about
Census data	-	2015-2019 American Community Survey Datasets	US Census Bureau, https://data.census.gov/

The National Agricultural Image Program (NAIP) multispectral aerial images, LiDAR data, and building footprint data were combined to generate the building height model and the tree canopy height model, both of which were used to represent the 3D urban geometries and model radiation fluxes within urban spaces.

The meteorological data from National Renewable Energy Lab (NREL) includes air temperature, global horizonal radiation, direct radiation, diffuse radiation, relative humidity, and wind speed information at hour level. Those hourly meteorological data were used as input for the microclimate modeling to compute and map UTCI values. The microclimate modeling and socio-environmental analyses were based on the meteorological data of 2017, because the meteorological

data of 2017 is the most recent available data when we started to conduct the massive scale microclimate modeling.