Worldwide Potential of Emissive Materials Based Radiative Cooling Technologies to Mitigate Urban Overheating

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Table S1: Background condition for the substrate used in the simulation.

|  |  |  |  |
| --- | --- | --- | --- |
| Background condition | Material | Thickness | Thermal conductivity |
| Conductive | Metallic sheet | 0.005 m | 400 W·m-1·K-1 |

Table S2: City selection with climate association (based on crossing data from [41] and [40]).

| KÖPPEN-GEIGER | NAME (Country) | Abbr. | Daytime T difference (°C) | Nighttime T difference (°C) |
| --- | --- | --- | --- | --- |
| Equatorial zone climates (A) | | | | |
| Af | Bandung (Indonesia) | BDO | 5.25 | 1.67 |
| Af | Singapore\* (Singapore) | SIN | 1.91 | 1.19 |
| Am | Yangon City (Myanmar) | YAN | 0.10 | 0.66 |
| Aw | Lagos (Nigeria) | LOS | 2.80 | 0.82 |
| Aw | Rio de Janeiro (Brazil) | RIO | 4.87 | 1.91 |
| Arid zone climates (B) | | | | |
| BSh | Monterrey (Mexico) | MTY | 1.74 | 1.28 |
| BSh | Phoenix (USA) | PHX | 0.10 | 1.18 |
| BSk | Zaragoza (Spain) | ZAZ | -1.22 | 0.75 |
| BWh | Alice Springs(Australia) | ASP | -0.83 | 0.38 |
| BWh | Karachi (Pakistan) | KHI | 2.93 | 1.58 |
| Warm temperate zone (C) | | | | |
| Cfa | Sydney (Australia) | SYD | 5.08 | 0.90 |
| Cfa | Tokyo (Japan) | TYO | 5.61 | 1.43 |
| Cfb | London (UK) | LON | 2.64 | 1.02 |
| Cfb | Milano (Italy) | MIL | 4.30 | 1.19 |
| Cfb | Pamplona (Spain) | PNA | 3.48 | 0.41 |
| Csa | Madrid (Spain) | MAD | 2.15 | 1.27 |
| Csa | Athens (Greece) | ATH | 3.67 | 1.61 |
| Cwa | Delhi (India) | DEH | 2.43 | 1.06 |
| Cwb | Taipei (Taiwan) | TAY | 3.81 | 2.30 |
| Snow zone climates (D) | | | | |
| Dfa | Chicago (USA) | CHI | 3.96 | 0.86 |
| Dfb | Montréal (Canada) | MON | 2.76 | 0.42 |
| Dwa | Beijing (China) | BEI | 4.90 | 1.68 |



Figure S1: Daytime temperature difference (cooling need) versus nighttime temperature difference (cooling potential) from the 86 resulting cities.



Figure S2: Climate distribution comparison in percentage for three conditions, all the cities (black line), cities with more than 5,000 inhabitants and positive daytime and nighttime temperature (blue dashed line), and cities with more than 3 million inhabitants and positive daytime and nighttime temperature (green point dashed line).



Figure S3: Af climate graphs:(a) Bandung and (b) Singapore; Am climate graph: (c) Yangon; and Aw climate graphs: (d) Lagos and (e) Rio de Janeiro.



Figure S4: BSh climate graphs: (a) Monterrey and (b) Phoenix; BSK climate graph: (c) Zaragoza; and BWh climate graphs: (d) Alice Springs and (e) Karachi.



Figure S5: Cfa climate graphs (a) Sydney and (b) Tokyo; and Cfb (c) London (d) Milano and (e) Pamplona.



Figure S6: Csa climate graphs: (a) Madrid and (b) Athens; Cwa climate graph: (c) Dehli; Cwb climate graph: (d) Taipei.



Figure S7:Dfa climate graph: (a) Chicago; Dfb climate graph: (b) Montreal; and Dwa climate graph: (c) Beijing.