

Supplementary Materials: Urban Heat Islands as Viewed by Microwave Radiometers and Thermal Time Indices

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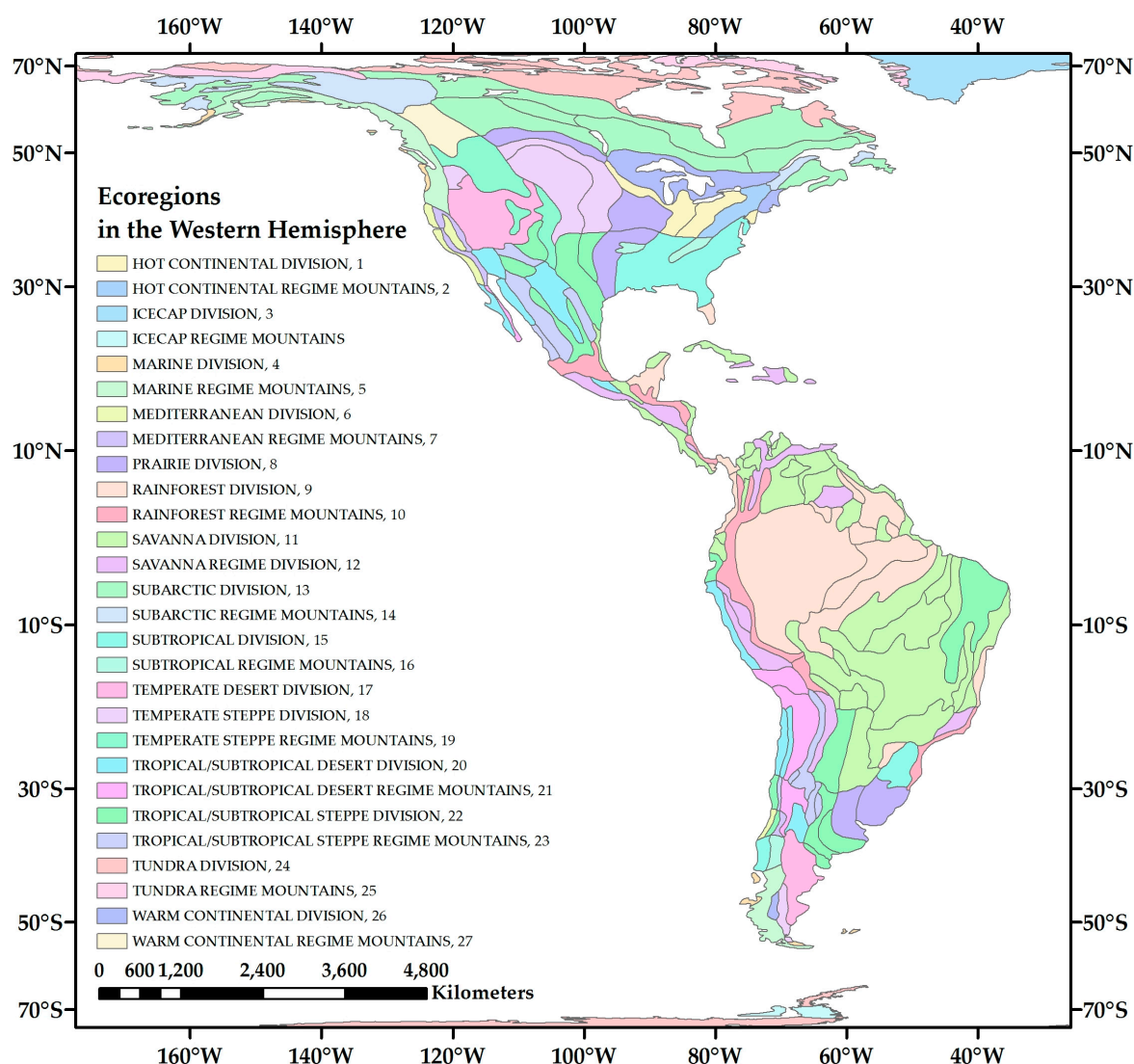


Figure S1. Ecoregions of the Western Hemisphere [1].

Table S1. The largest urban agglomerations by the extent in the Western Hemisphere [2].

Nation	Urban Agglomeration	2016 Estimated Population	Area (sq. km)	Urban ID
USA	New York, NY-NJ-CT	20,685,000	11,642	47
USA	Chicago, IL-IN-WI	9,185,000	6856	40 *
USA	Atlanta, GA	5,120,000	6851	45 *
USA	Los Angeles, CA	15,135,000	6299	21
USA	Boston, MA-NH-RI	4,490,000	5325	49
USA	Dallas-Fort Worth, TX	6,280,000	5175	28 *
USA	Philadelphia, PA-NJ-DE-MD	5,595,000	5131	48
USA	Houston, TX	6,005,000	4828	12 *
USA	San Diego, CA	3,110,000	4000	19
USA	Detroit, MI	3,660,000	3463	35 *
USA	Washington, DC-VA-MD	4,950,000	3424	46 *
USA	Phoenix, AZ	4,295,000	3225	26 *
USA	Miami, FL	5,820,000	3209	39
USA	Seattle, WA	3,475,000	2989	16 *
USA	San Francisco-San Jose, CA	5,955,000	2797	20
Brazil	Sao Paulo	20,605,000	2707	4
Argentina	Buenos Aires	14,280,000	2681	3
USA	Minneapolis-St. Paul, MN-WI	2,795,000	2647	17 *
USA	Tampa-St. Petersburg, FL	2,660,000	2479	38
USA	St. Louis, MO-IL	2,195,000	2393	24 *
USA	Pittsburgh	1,730,000	2344	37 *
Canada	Toronto, ON	6,550,000	2287	34 *
Mexico	Mexico City	20,230,000	2072	31
USA	Cincinnati, OH-KY-IN	1,695,000	2041	42
Brazil	Rio de Janeiro	11,815,000	2020	9
USA	Cleveland, OH	1,785,000	1999	36
USA	Charlotte, NC-SC	1,600,000	1919	44 *
USA	Indianapolis, IN	1,645,000	1829	41 *
USA	Kansas City, MO-KS	1,610,000	1756	52 *
USA	Denver, CO	2,600,000	1730	23 *
USA	San Antonio, TX	2,025,000	1546	29 *
Canada	Montreal, QC	3,570,000	1546	51 *
USA	Nashville, TN	1,105,000	1458	43 *
USA	Memphis, TN-MS-AR	1,110,000	1287	25 *
Canada	Vancouver, BC	2,310,000	1150	15 *
Brazil	Belo Horizonte	4,560,000	1088	8
USA	Oklahoma City, OK	930,000	1064	18 *
Chile	Santiago	6,265,000	984	1
Peru	Lima	10,950,000	919	2
Canada	Edmonton, AB	1,060,000	855	13 *
Brazil	Curitiba	3,160,000	842	5
Brazil	Porto Alegre	3,435,000	803	6
Mexico	Guadalajara	4,675,000	751	30
USA	Salt Lake City, UT	1,100,000	720	22 *
Canada	Calgary, AB	1,215,000	704	14 *
Canada	Quebec, QC	740,000	668	50 *
USA	El Paso, TX-NM	880,000	650	27 *
Colombia	Bogota	9,520,000	562	32
Brazil	Fortaleza	3,460,000	518	10
Brazil	Recife	3,375,000	414	11
Brazil	Salvador	3,230,000	350	7
Colombia	Medellín	3,845,000	241	33

* included in comparison between GHCN and AMSR data.

Table S2. Multi-years average accumulated thermal times as estimated by AMSR and GHCN data.

Station_ID	Areas	UR	G_ADDD	G_ANDD	A_ADDD	A_ANDD
GHCND:USW00013874	Atlanta	1	5264	3345	5045	3129
GHCND:USW00053863	Atlanta	1	5307	3159	4954	3094
GHCND:USR0000ASHK	Atlanta	0	5177	2958	5144	3034
GHCND:USC00095874	Atlanta	0	5621	3109	5315	3268
GHCND:USC00092517	Atlanta	0	5219	2910	5234	3089
GHCND:CA003031875	Calgary	1	3167	1072	3414	1126
GHCND:CA00303C642	Calgary	0	3470	911	3566	1182
GHCND:USW00013881	Charlotte	1	5238	2992	4907	2965
GHCND:USC00318964	Charlotte	0	5319	3100	5180	3119
GHCND:USC00386293	Charlotte	0	5157	2670	5171	3019
GHCND:USC00317618	Charlotte	0	5027	2747	4919	2840
GHCND:USC00314996	Charlotte	0	5149	2770	4895	2862
GHCND:USC00310090	Charlotte	0	5112	2935	4985	2920
GHCND:USC00111577	Chicago	1	4433	2610	3990	2032
GHCND:USC00116661	Chicago	0	4333	2094	4327	2111
GHCND:USW00013960	Dallas-Fort Worth	1	5917	3901	5350	3521
GHCND:USC00414980	Dallas-Fort Worth	0	5663	3451	5411	3406
GHCND:USR0000TATH	Dallas-Fort Worth	0	5785	3678	5495	3487
GHCND:USW00093985	Dallas-Fort Worth	0	5911	3360	5825	3711
GHCND:USC00052223	Denver	1	4945	1878	4713	2289
GHCND:USC00052790	Denver	0	4001	906	4267	1978
GHCND:USC00051179	Denver	0	4785	1594	5484	2678
GHCND:USC00051681	Denver	0	3134	826	4176	1962
GHCND:USC00202015	Detroit	1	4486	2121	3622	1981
GHCND:USC00200842	Detroit	0	4235	1894	4075	2078
GHCND:USC00201502	Detroit	0	4284	1944	4112	2088
GHCND:USC00203947	Detroit	0	4425	1765	3989	2095
GHCND:CA003012209	Edmonton	1	3325	1423	3041	1026
GHCND:CA00301222F	Edmonton	0	3297	1302	3127	1015
GHCND:CA003011120	Edmonton	0	3448	1045	3178	1019
GHCND:USW00023044	El Paso	1	5999	3386	6038	3421
GHCND:USC00298127	El Paso	0	5917	2901	6215	3485
GHCND:USC00419088	El Paso	0	5953	2636	6004	3219
GHCND:USC00414326	Houston	1	5862	4113	5048	3485
GHCND:USC00411911	Houston	0	6139	3061	5813	3706
GHCND:USR0000THUN	Houston	0	5789	3712	5465	3533
GHCND:USC00124272	Indianapolis	1	4558	2453	4475	2446
GHCND:USC00121873	Indianapolis	0	4501	2182	4473	2367
GHCND:USC00126164	Indianapolis	0	4486	2173	4462	2304
GHCND:USC00127522	Indianapolis	0	4935	2525	4533	2412
GHCND:USC00123547	Indianapolis	0	4772	2657	4593	2420
GHCND:USW00013988	Kansas City	1	5035	3061	4728	2697
GHCND:USC00233838	Kansas City	0	4726	2668	4825	2655
GHCND:USW00013991	Kansas City	0	4801	2645	4743	2601
GHCND:USC00141612	Kansas City	0	4900	2717	4885	2752
GHCND:USW00013893	Memphis	1	5482	3528	4952	3079
GHCND:USC00038052	Memphis	0	5326	3192	5002	3132
GHCND:USC00400876	Memphis	0	5197	2908	5116	2964
GHCND:USW00053959	Memphis	0	5324	3183	4932	3097
GHCND:USC00400137	Memphis	0	5405	2958	5166	3015
GHCND:USC00218450	Minneapolis-St Paul	1	4286	2252	3962	2070
GHCND:USC00214884	Minneapolis-St Paul	1	4400	2265	3962	2070
GHCND:USC00213076	Minneapolis-St Paul	0	4193	2079	4134	1923
GHCND:USC00219249	Minneapolis-St Paul	0	4195	1878	4062	1902
GHCND:USC00475335	Minneapolis-St Paul	0	4283	1908	4060	1918
GHCND:USW00014995	Minneapolis-St Paul	0	4256	1730	3970	1848
GHCND:CA007024745	Montreal	1	3821	2209	2851	1717
GHCND:CA007033650	Montreal	0	3881	1853	3637	1691
GHCND:CA007022375	Montreal	0	3795	1788	3563	1651
GHCND:CA007022800	Montreal	0	3779	1960	3777	1728
GHCND:CA007023075	Montreal	0	3861	1831	3721	1760
GHCND:USW00013897	Nashville	1	5260	3091	4881	2869

Table S2. Cont.

Station_ID	Areas	UR	G_ADDD	G_ANDD	A_ADDD	A_ANDD
GHCND:USC00404876	Nashville	0	5278	2729	5048	2863
GHCND:USC00402989	Nashville	0	5098	2802	5052	2868
GHCND:USC00403465	Nashville	0	5241	2633	5027	2912
GHCND:USC00280907	New York	1	4465	2273	4069	2254
GHCND:USC00283029	New York	0	4561	2223	4360	2384
GHCND:USW00054779	New York	0	4344	2144	4191	2237
GHCND:USW00003954	Oklahoma City	1	5464	3252	5276	3259
GHCND:USW00013967	Oklahoma City	1	5531	3202	5401	3310
GHCND:USC00340830	Oklahoma City	0	5529	3047	5531	3383
GHCND:USC00343277	Oklahoma City	0	5524	3046	5638	3471
GHCND:USC00343497	Oklahoma City	0	5338	2967	5576	3449
GHCND:USC00346638	Oklahoma City	0	5481	3295	5324	3227
GHCND:USW00023183	Phoenix	1	6925	4473	6407	3683
GHCND:USC00020288	Phoenix	0	6654	3589	6497	3656
GHCND:USC00020404	Phoenix	0	6839	3455	6818	3875
GHCND:USC00365573	Pittsburg	1	4597	2104	4399	2270
GHCND:USC00362942	Pittsburg	0	4504	1895	4333	2165
GHCND:USC00466442	Pittsburg	0	4521	2321	4446	2272
GHCND:USW00024127	Salt Lake City	1	4900	2347	4027	1670
GHCND:USC00425892	Salt Lake City	0	4453	1372	4008	1559
GHCND:USC00429165	Salt Lake City	0	4544	1148	4013	1519
GHCND:USW00012970	San Antonio	1	6149	3870	6021	3998
GHCND:USC00410902	San Antonio	0	5823	3334	5817	3837
GHCND:USC00414254	San Antonio	0	5996	3595	6226	4045
GHCND:USC00416368	San Antonio	0	6050	3579	6172	4022
GHCND:USW00024234	Seattle	1	3838	2099	3369	1633
GHCND:USC00454486	Seattle	0	3691	1485	3476	1658
GHCND:USC00451233	Seattle	0	3063	1346	3548	1704
GHCND:USW00003960	St Louis	1	5006	2707	4697	2669
GHCND:USC00114442	St Louis	0	4824	2322	4581	2431
GHCND:USC00114400	St Louis	0	4798	2524	4668	2617
GHCND:USC00113106	St Louis	0	4969	2605	4656	2575
GHCND:USC00233043	St Louis	0	4810	2552	4868	2648
GHCND:USC00233038	St Louis	0	4978	2479	4939	2720
GHCND:CA00615S001	Toronto	1	4109	2083	3586	1524
GHCND:CA006155790	Toronto	0	3728	1542	3855	1890
GHCND:USC00028815	Tucson	1	6377	3831	5990	3290
GHCND:USW00053131	Tucson	0	6322	3499	6189	3490
GHCND:USW00013743	Washington DC	1	4945	3138	4358	2569
GHCND:USC00448084	Washington DC	0	4776	2430	4479	2617

UR: 1 for urban areas and 0 for rural areas. G_ADDD, G_ANDD: GHCN accumulated diurnal and nocturnal degree-days. A_ADDD, A_ANDD: AMSR accumulated diurnal and nocturnal degree-days.

References

1. Ecoregions of the Continents. Available online: <http://www.fs.fed.us/rm/ecoregions/products/map-ecoregions-continents/#> (accessed on 30 May 2016).
2. Demographia—World Urban Areas. Available online: <http://www.demographia.com/db-worldua.pdf> (accessed on 5 March 2016).



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