



Supplement of

HiTIC-Monthly: a monthly high spatial resolution (1 km) human thermal index collection over China during 2003–2020

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Figures

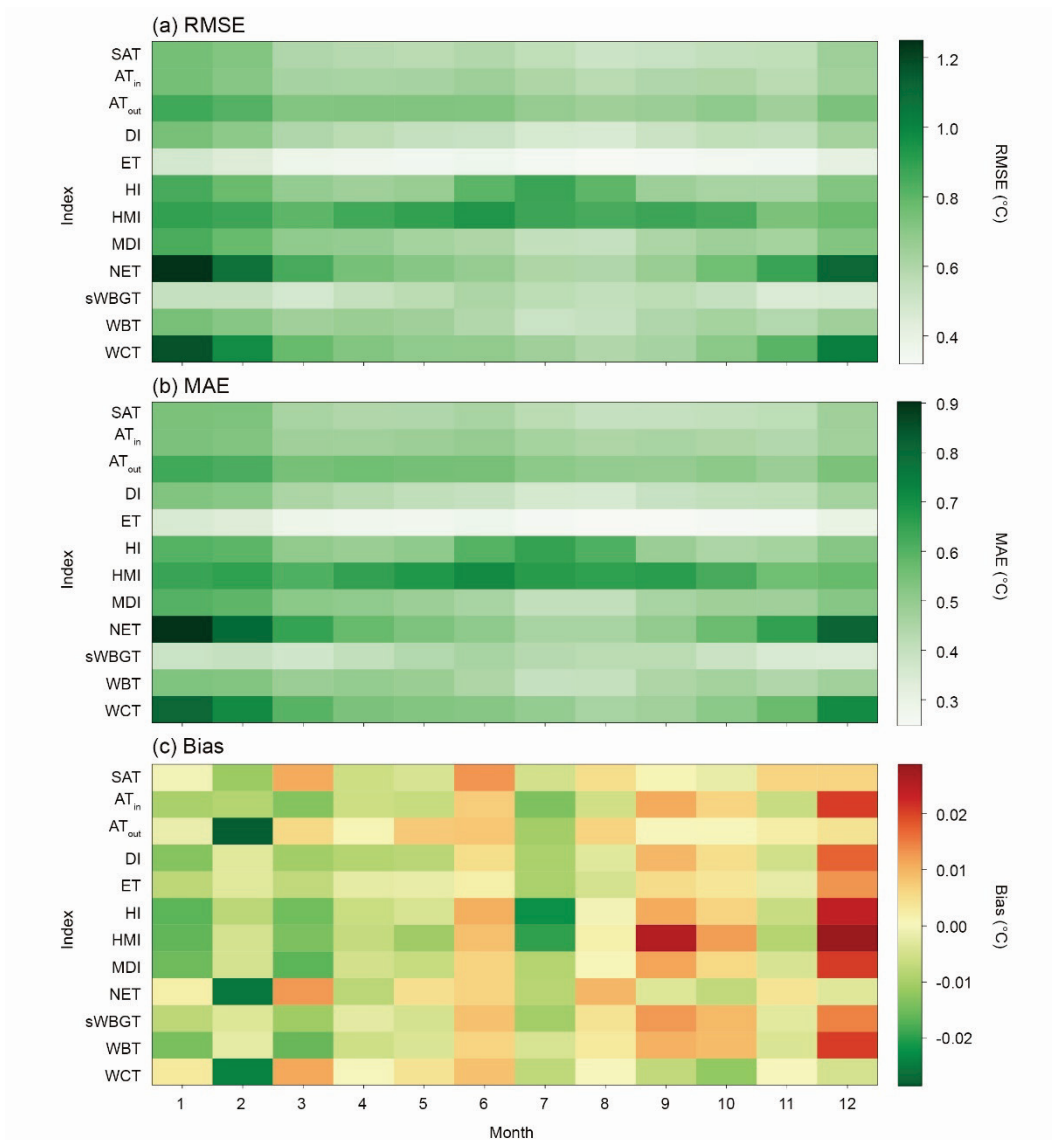


Figure S1. Monthly prediction accuracies of the 12 human thermal indices over the mainland of China during 2003–2020.

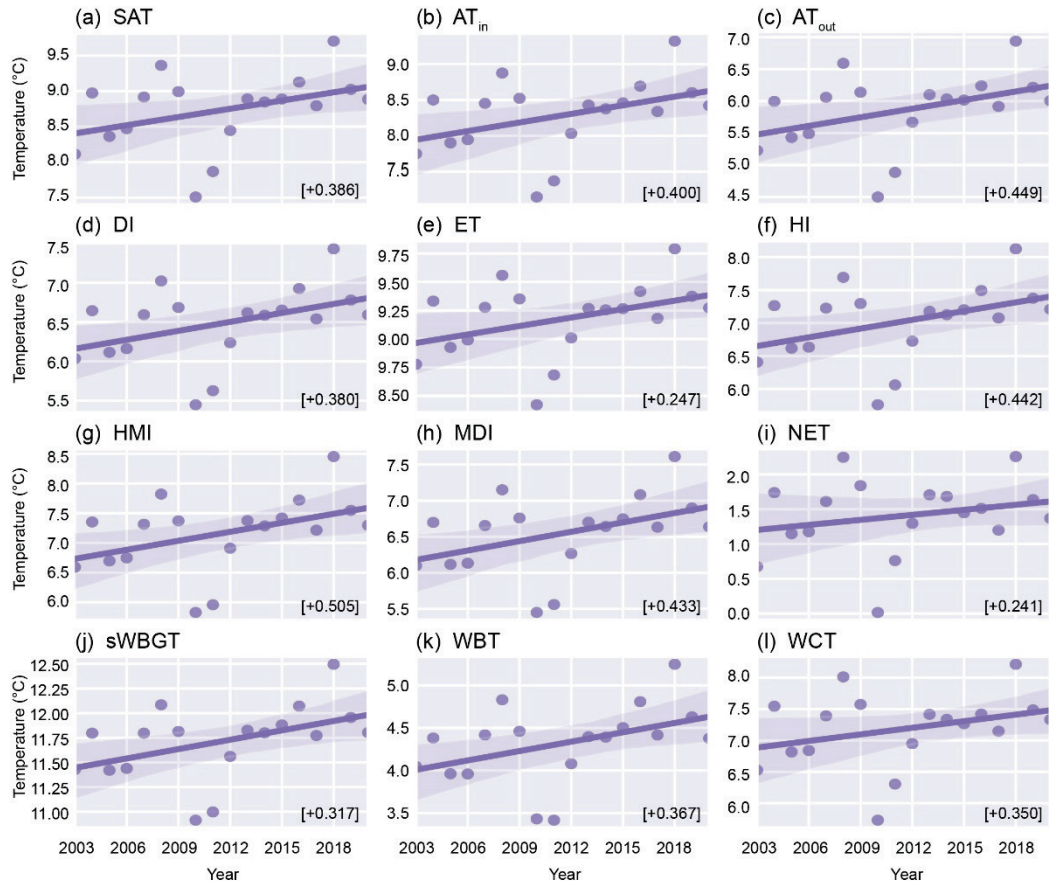


Figure S2. Temporal changes of the national average of spring mean human thermal indices over the mainland of China during 2003–2020. The straight line illustrates the linear trend, and the number in the square bracket means the corresponding trend per decade. The asterisk next to the number indicates that the trend is significant at the 0.05 level.

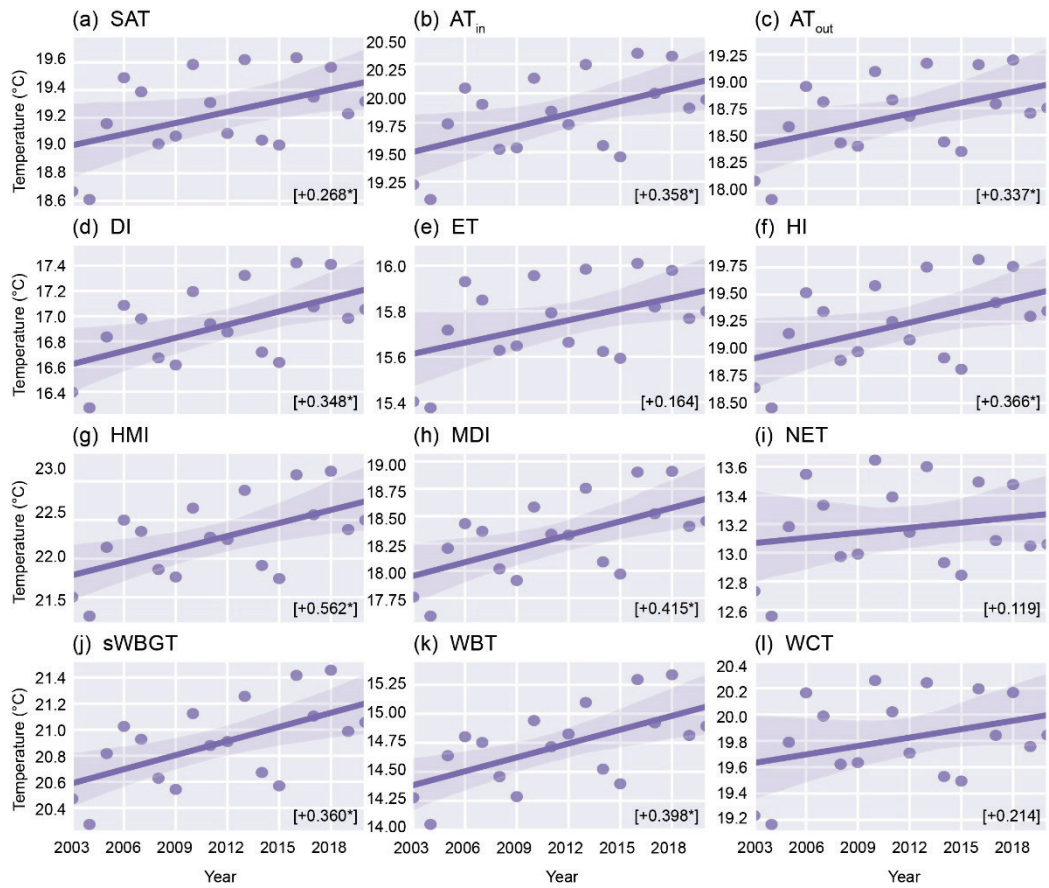


Figure S3. As Figure S2 but for summer mean.

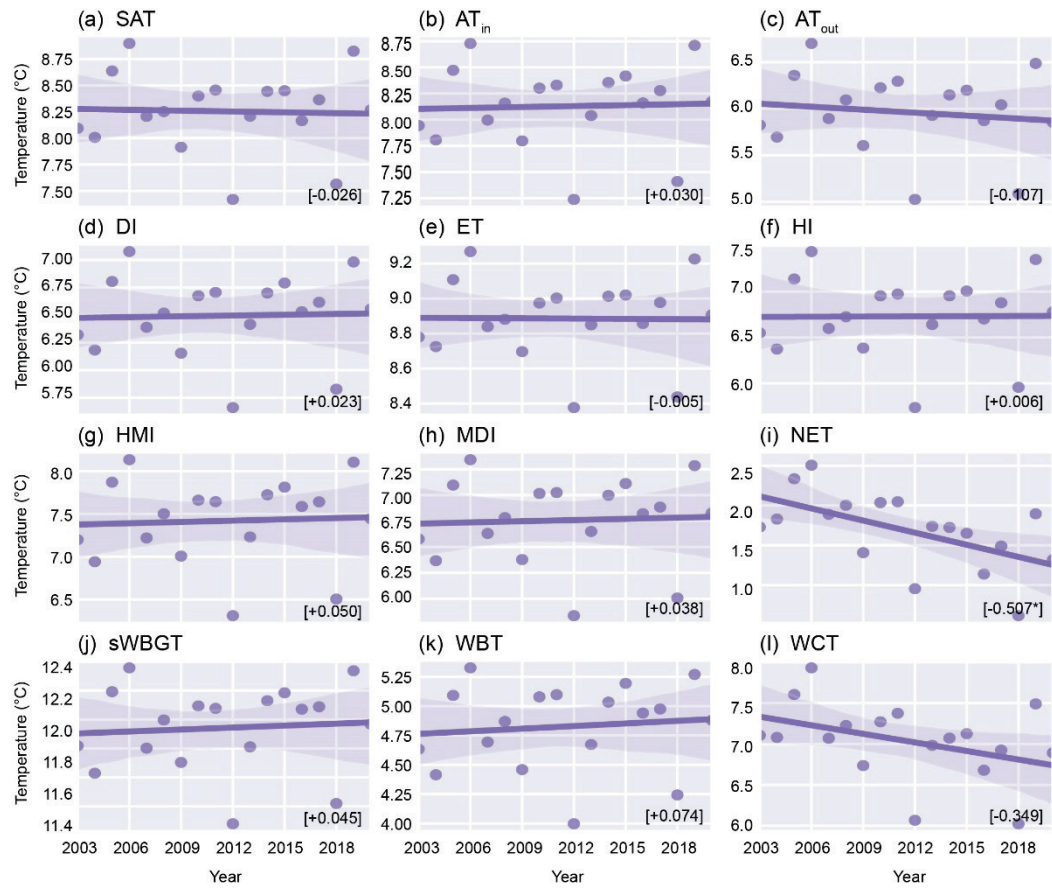


Figure S4. As Figure S2 but for autumn mean.

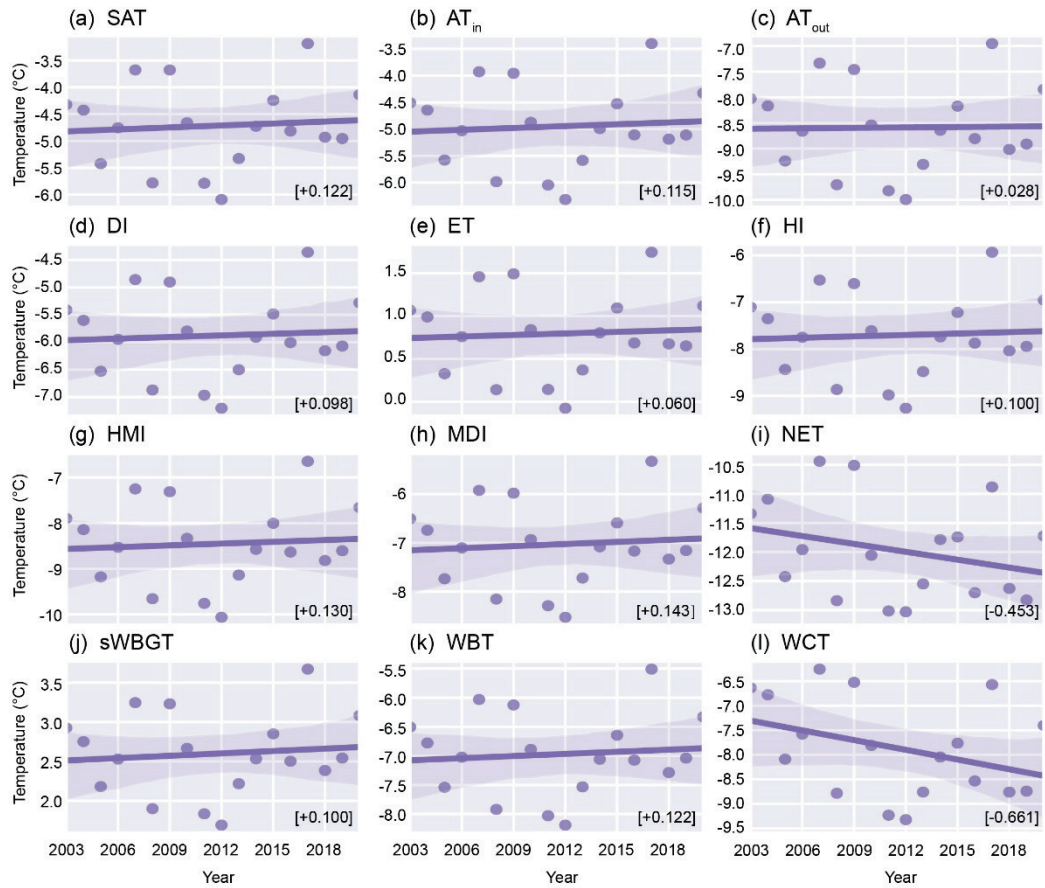


Figure S5. As Figure S2 but for winter mean.

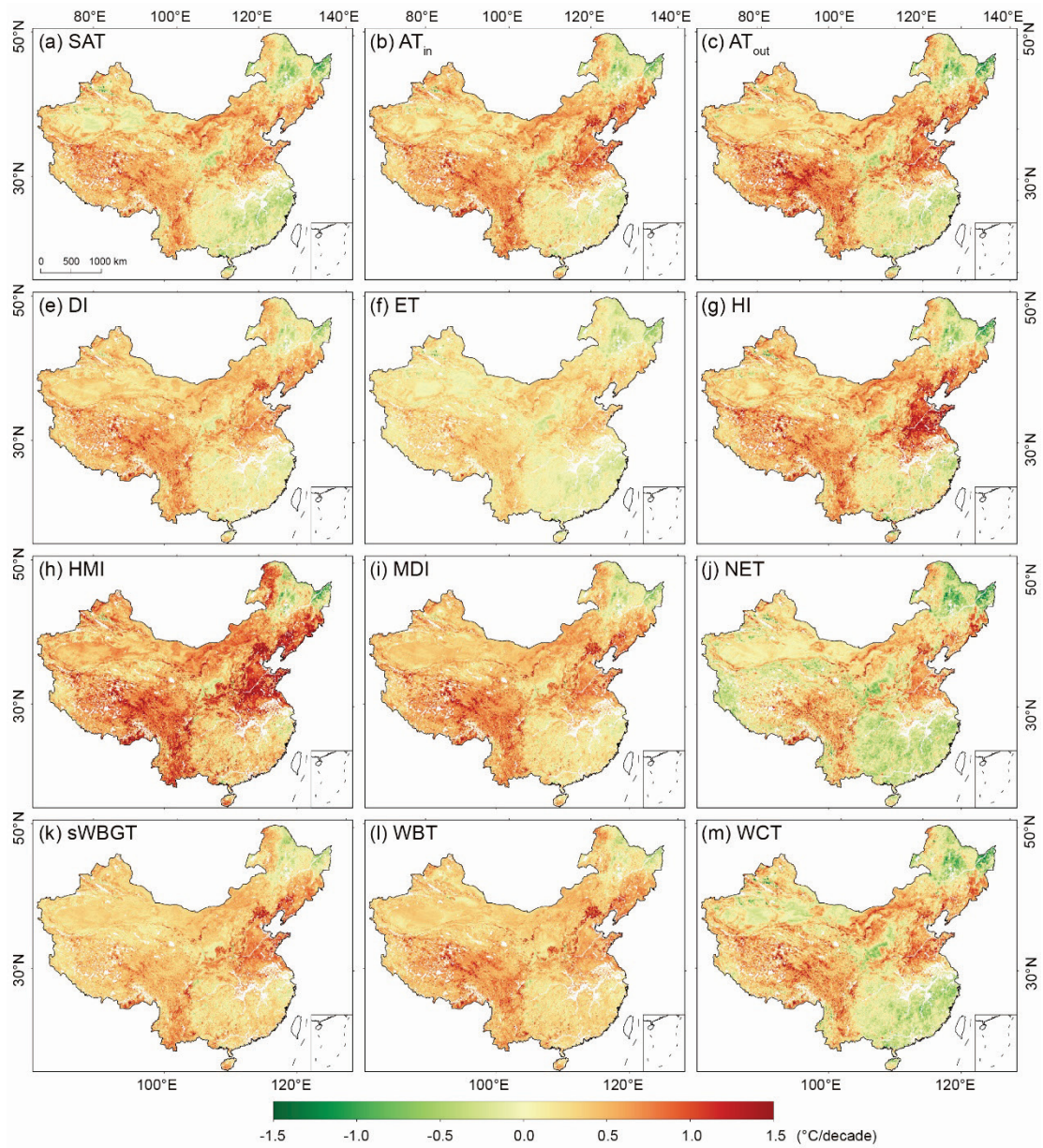


Figure S6. Spatial distributions of the trends (unit: °C/decade) of summer mean human thermal indices over the mainland of China during 2003–2020.

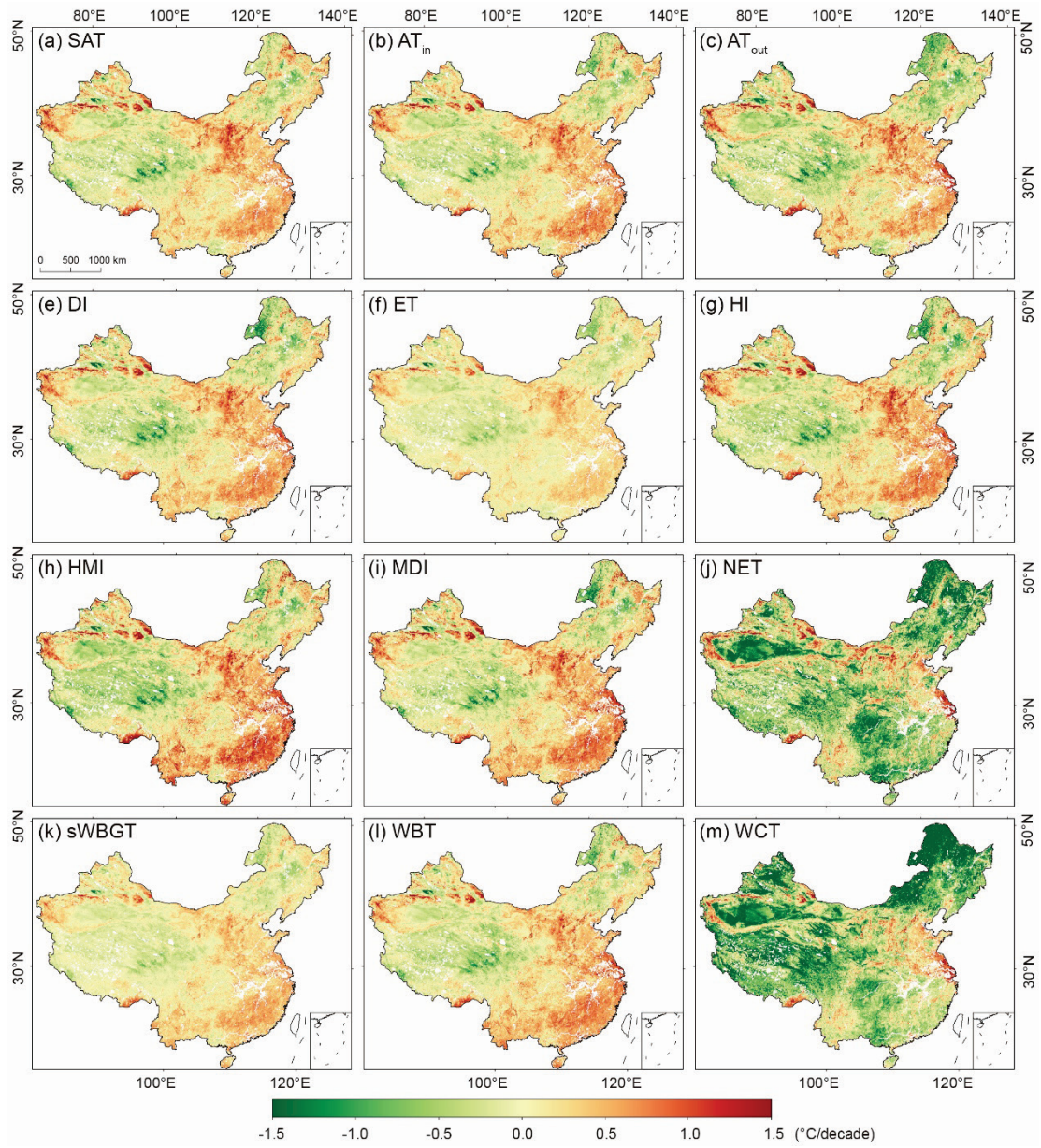


Figure S7. As Figure S6 but for winter mean.

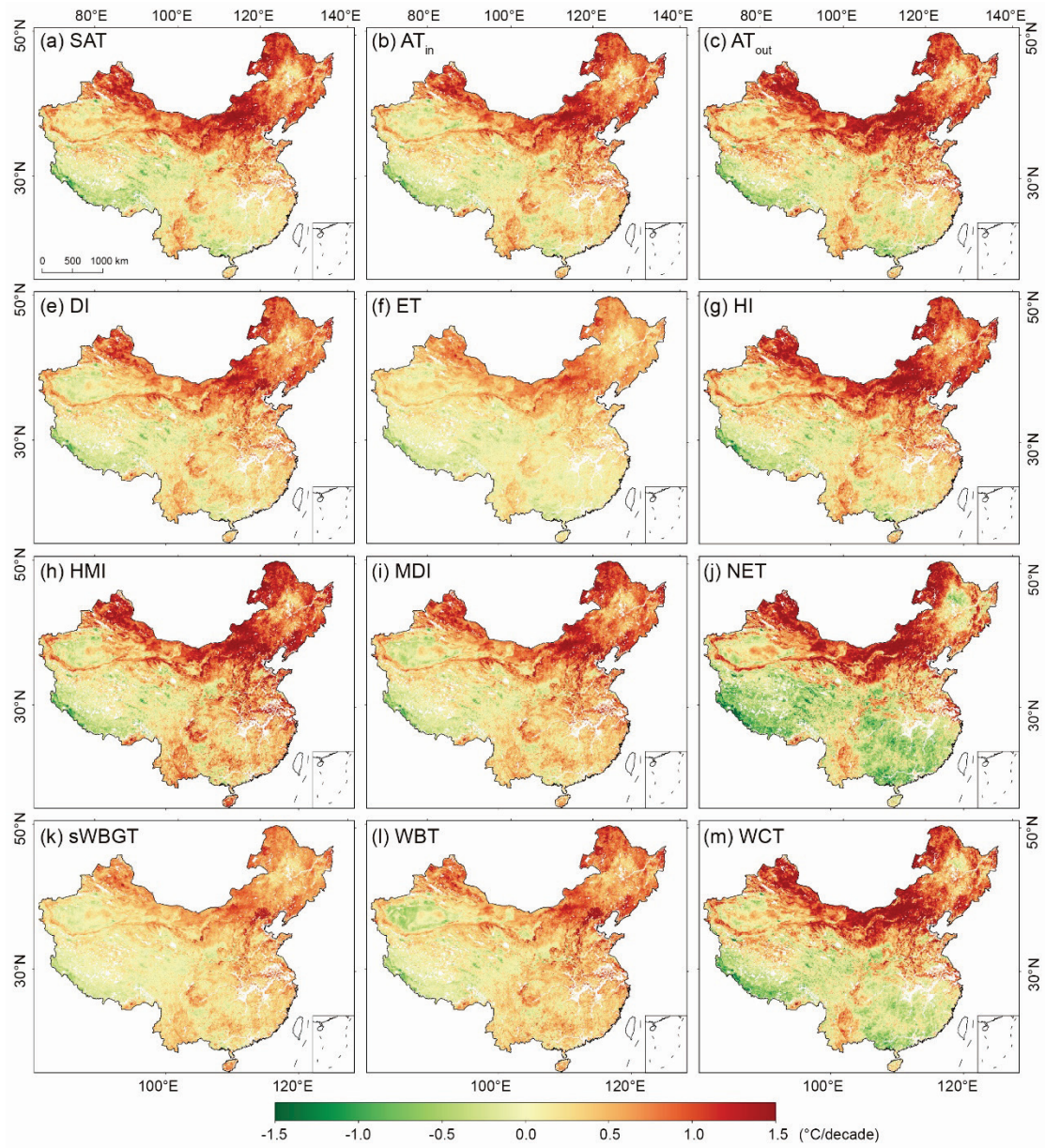


Figure S8. As Figure S6 but for spring mean.

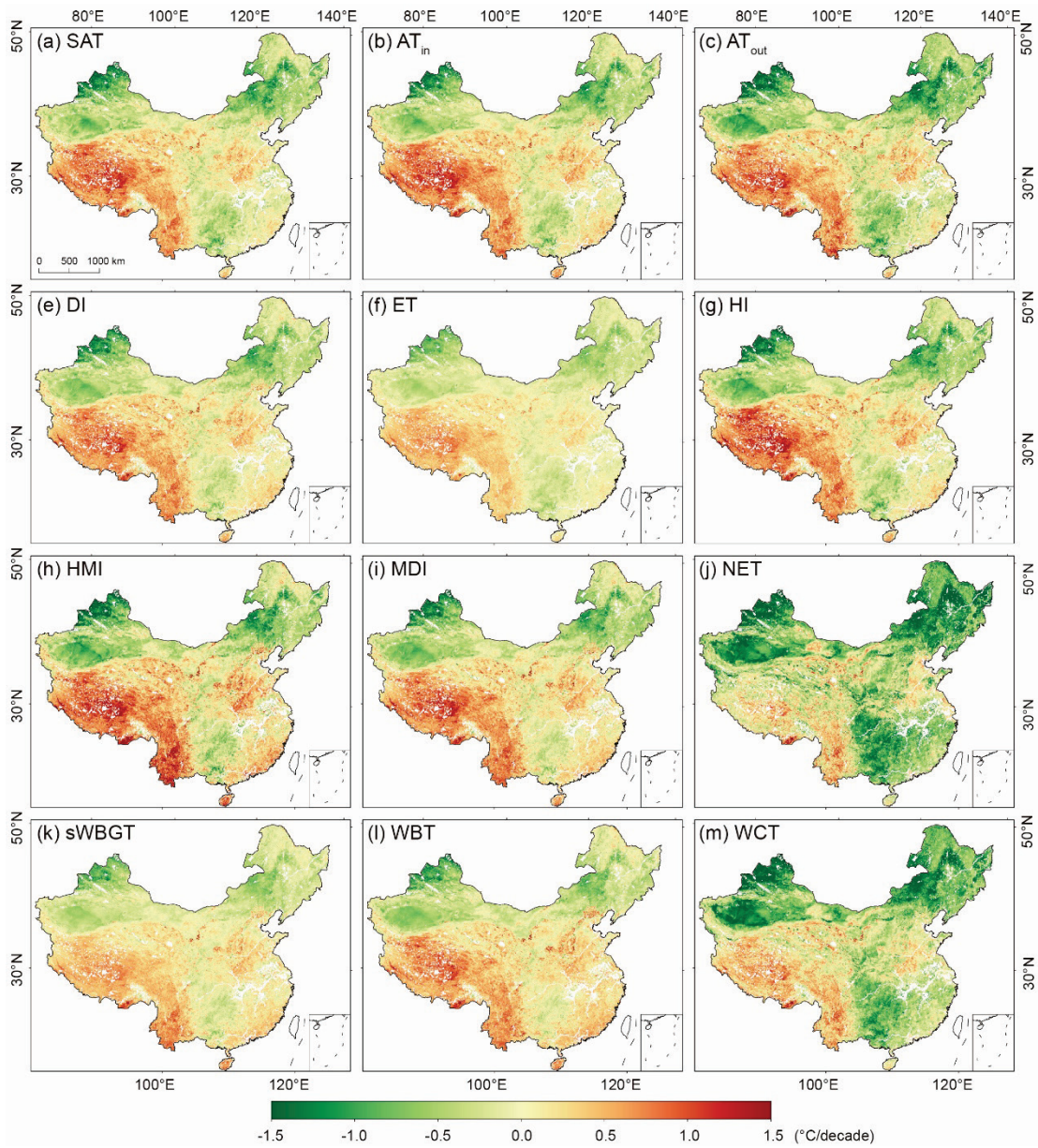


Figure S9. As Figure S6 but for autumn mean.

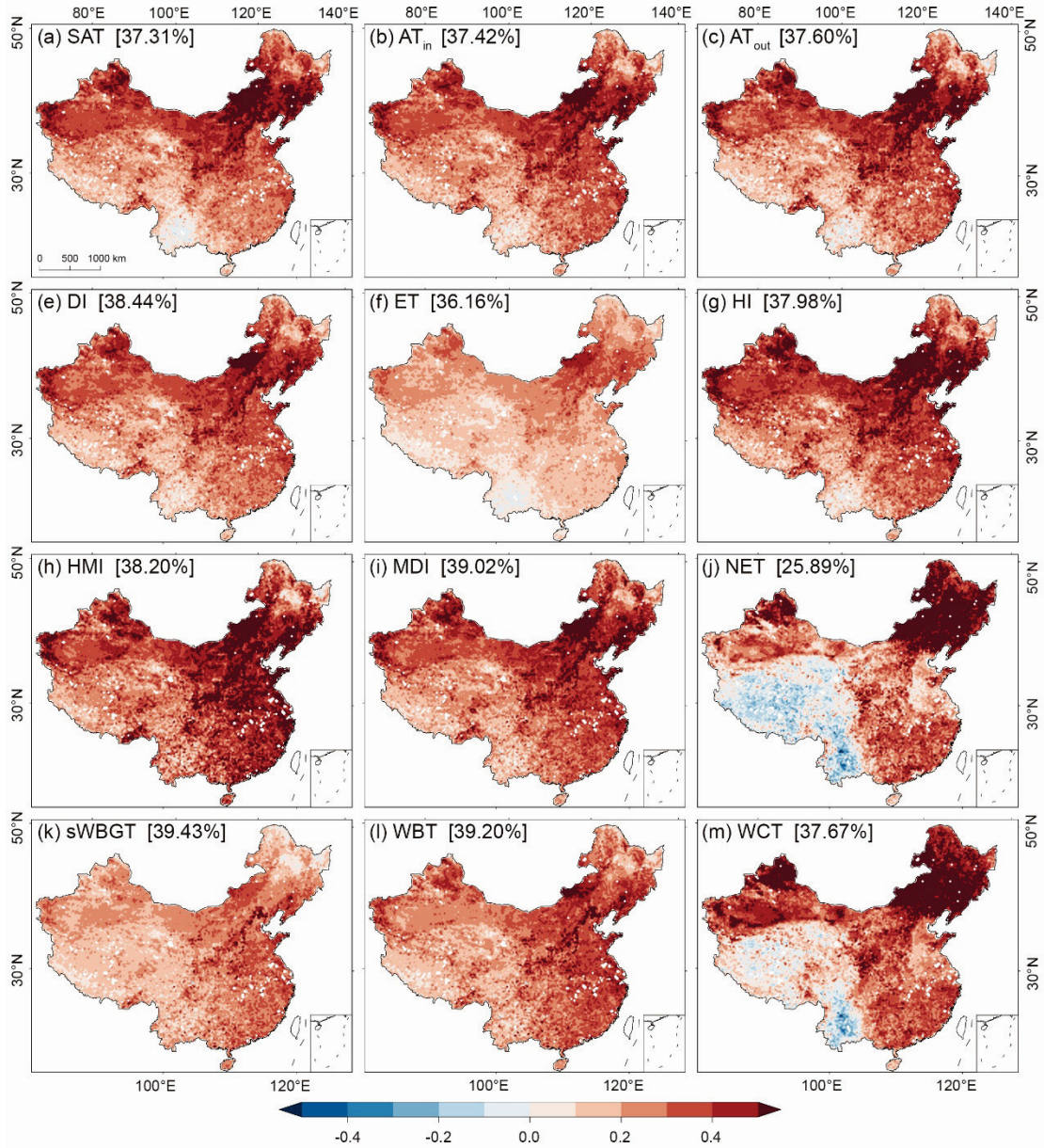


Figure S10. Spatial distributions of the first empirical orthogonal function (EOF1) mode of the 12 human thermal indices over the mainland of China. The number in square brackets represents the percentage of the variance explained by the corresponding EOF mode.

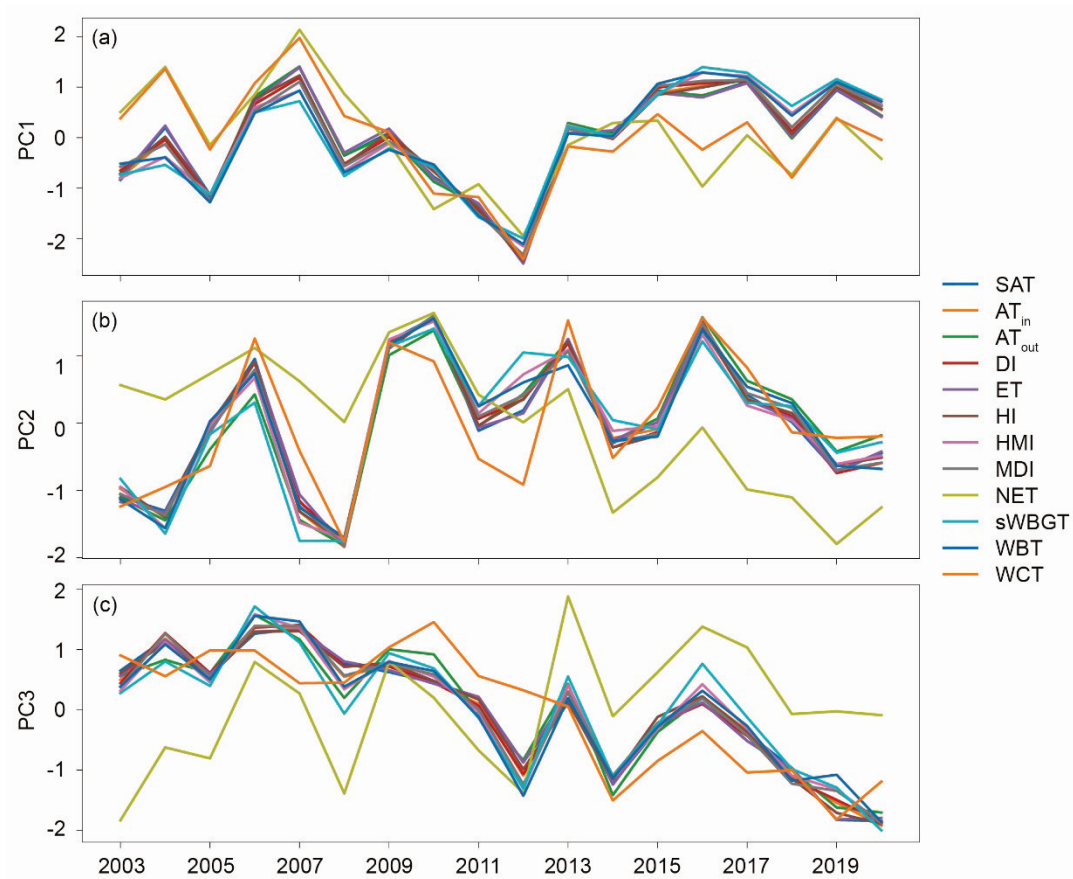


Figure S11. Time series of the principal components (PCs) corresponding to the first three EOF modes of the 12 human thermal indices over the mainland of China during 2003–2020.

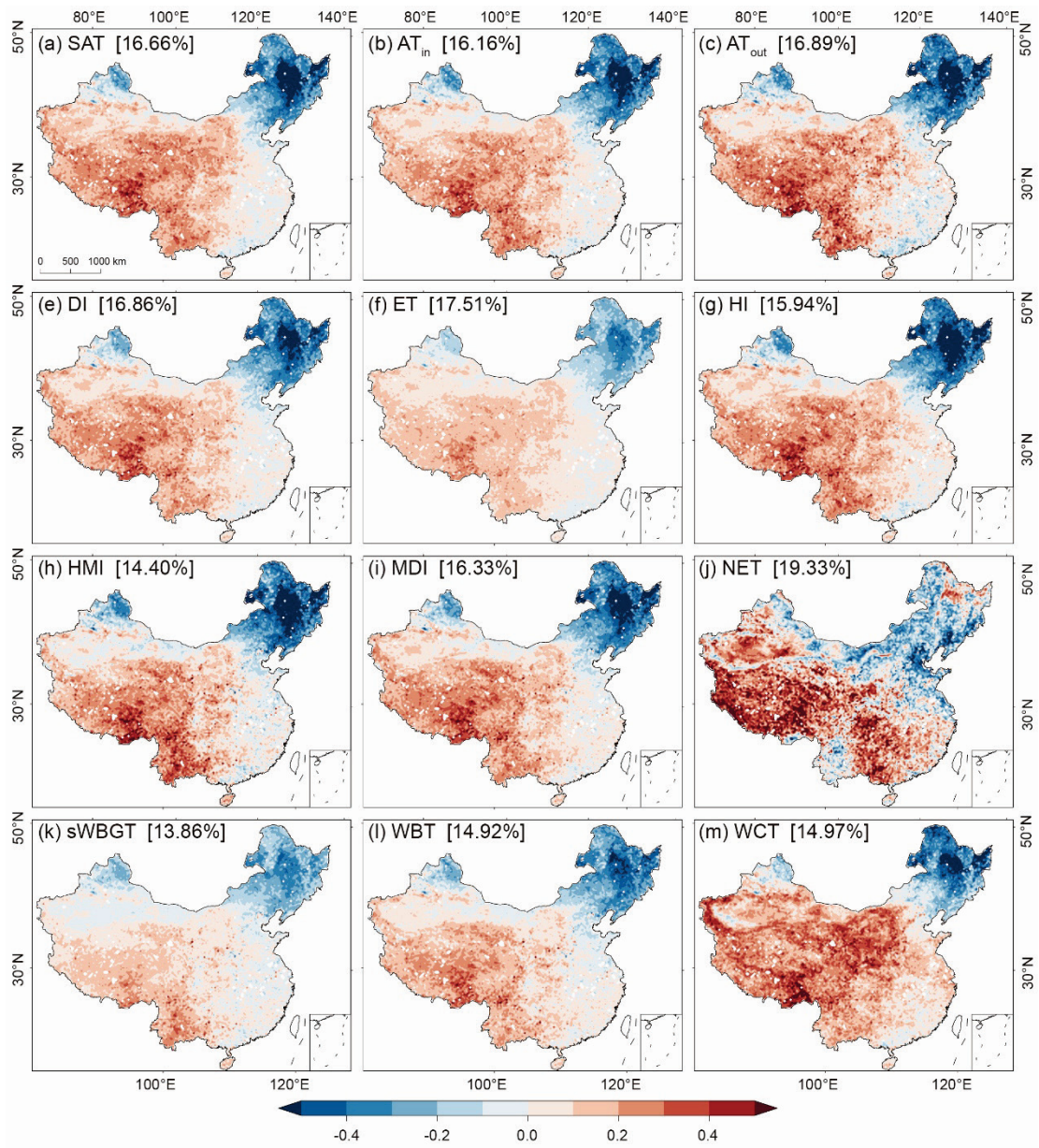


Figure S12. As Figure S10 but for the second EOF (EOF2).

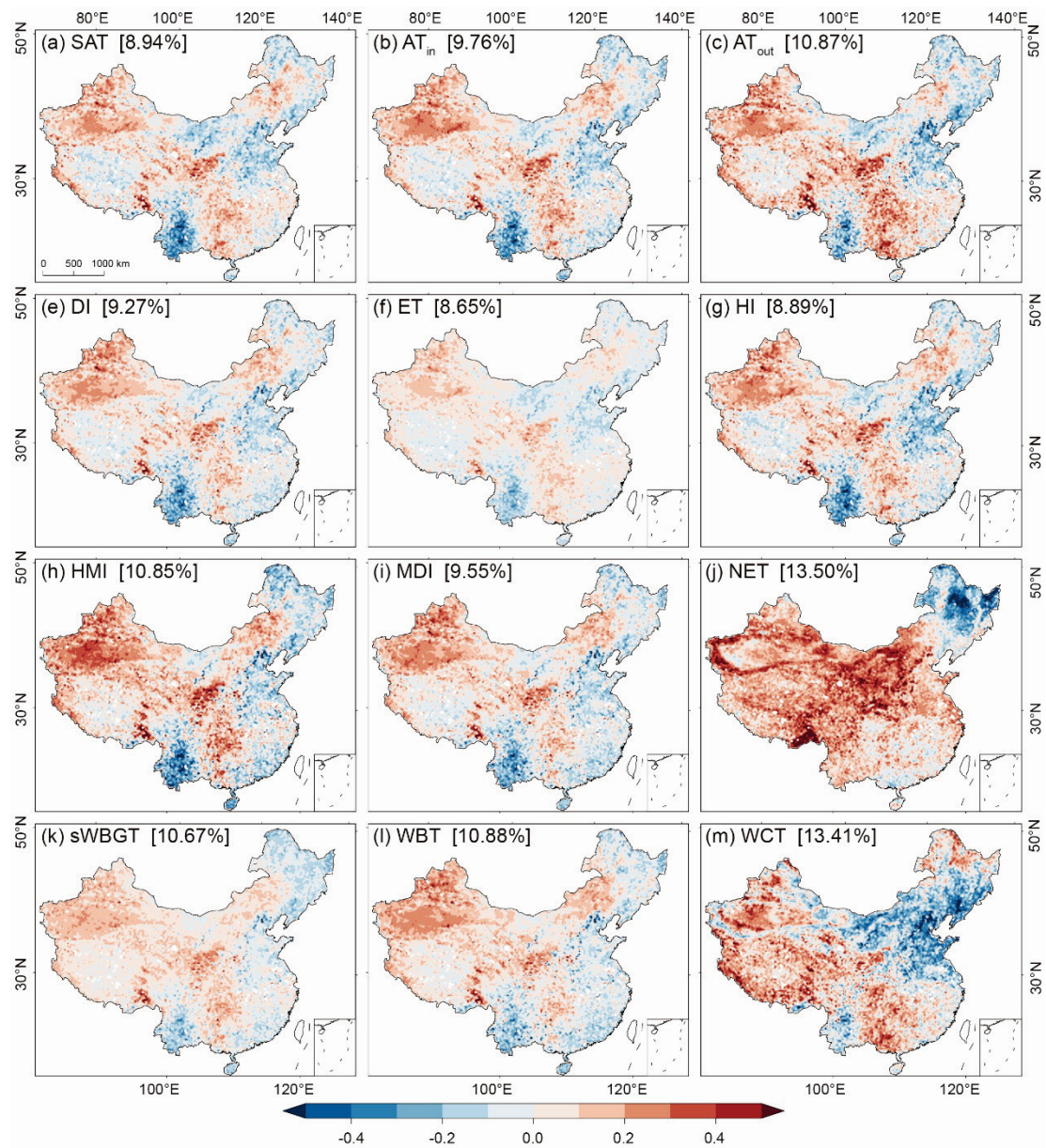


Figure S13. As Figure S10 but for the third EOF (EOF3).

Tables

Table S1. R^2 of the 12 predicted human thermal indices in the 20 major urban agglomerations (UAs) of the mainland of China during 2003–2020.

UAs	SAT	AT _{in}	AT _{out}	DI	ET	HI	HMI	MDI	NET	sWBGT	WBT	WCT
Beibu Gulf	0.9874	0.9884	0.9881	0.9886	0.9880	0.9851	0.9881	0.9883	0.9862	0.9871	0.9866	0.9872
Beijing-Tianjin-Hebei	0.9979	0.9979	0.9978	0.9977	0.9979	0.9974	0.9974	0.9975	0.9964	0.9972	0.9966	0.9974
Central Guizhou	0.9930	0.9931	0.9927	0.9929	0.9928	0.9928	0.9927	0.9926	0.9871	0.9923	0.9912	0.9899
Central Henan	0.9972	0.9973	0.9973	0.9973	0.9972	0.9967	0.9970	0.9971	0.9946	0.9968	0.9960	0.9957
Central Shanxi	0.9973	0.9974	0.9974	0.9973	0.9973	0.9972	0.9973	0.9971	0.9943	0.9971	0.9965	0.9955
Central Yunnan	0.9892	0.9912	0.9898	0.9912	0.9899	0.9904	0.9913	0.9915	0.9837	0.9913	0.9904	0.9876
Chengdu-Chongqing	0.9929	0.9936	0.9932	0.9931	0.9929	0.9921	0.9932	0.9926	0.9884	0.9931	0.9910	0.9897
Guanzhong	0.9959	0.9959	0.9958	0.9957	0.9958	0.9955	0.9957	0.9952	0.9925	0.9954	0.9943	0.9939
Harbin-Changchun	0.9983	0.9984	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9961	0.9981	0.9980	0.9973
Hu-Bao-E-Yu	0.9977	0.9978	0.9976	0.9977	0.9976	0.9978	0.9977	0.9975	0.9942	0.9975	0.9968	0.9955
Jiang-Huai	0.9966	0.9970	0.9968	0.9968	0.9968	0.9955	0.9966	0.9967	0.9953	0.9964	0.9960	0.9962
Lanzhou-Xining	0.9964	0.9969	0.9968	0.9969	0.9968	0.9970	0.9969	0.9970	0.9939	0.9969	0.9966	0.9952
Mid-southern Liaoning	0.9974	0.9973	0.9971	0.9973	0.9975	0.9971	0.9969	0.9971	0.9949	0.9966	0.9966	0.9967
Middle Reaches of Yangtze River	0.9957	0.9959	0.9956	0.9958	0.9957	0.9943	0.9956	0.9955	0.9933	0.9955	0.9946	0.9946
Ningxia Yellow River	0.9974	0.9978	0.9975	0.9980	0.9978	0.9978	0.9978	0.9978	0.9948	0.9978	0.9972	0.9967
North Tianshan Mountain	0.9955	0.9949	0.9941	0.9942	0.9952	0.9947	0.9943	0.9938	0.9903	0.9938	0.9924	0.9905
Pearl River Delta	0.9893	0.9901	0.9907	0.9904	0.9899	0.9855	0.9893	0.9902	0.9896	0.9888	0.9889	0.9906
Shandong Peninsula	0.9975	0.9976	0.9973	0.9975	0.9976	0.9970	0.9972	0.9973	0.9960	0.9969	0.9965	0.9970

West Coast of Taiwan Strait	0.9925	0.9922	0.9928	0.9923	0.9923	0.9897	0.9916	0.9917	0.9904	0.9911	0.9905	0.9920
Yangtze River Delta	0.9972	0.9974	0.9971	0.9974	0.9972	0.9960	0.9972	0.9972	0.9961	0.9970	0.9966	0.9969

Table S2. RMSE (°C) of the 12 predicted human thermal indices in the 20 major urban agglomerations (UAs) of the mainland of China during 2003–2020.

UAs	SAT	AT_{in}	AT_{out}	DI	ET	HI	HMI	MDI	NET	sWBGT	WBT	WCT
Beibu Gulf	0.626	0.713	0.786	0.587	0.382	0.908	1.031	0.671	0.757	0.672	0.634	0.725
Beijing-Tianjin-Hebei	0.513	0.548	0.618	0.515	0.315	0.640	0.781	0.607	0.699	0.494	0.612	0.649
Central Guizhou	0.574	0.633	0.707	0.564	0.369	0.646	0.864	0.645	0.887	0.545	0.610	0.776
Central Henan	0.492	0.532	0.595	0.475	0.309	0.622	0.747	0.557	0.748	0.471	0.567	0.704
Central Shanxi	0.525	0.549	0.601	0.518	0.334	0.607	0.703	0.598	0.782	0.442	0.567	0.776
Central Yunnan	0.487	0.485	0.592	0.432	0.296	0.509	0.651	0.481	0.717	0.399	0.456	0.621
Chengdu-Chongqing	0.607	0.646	0.730	0.574	0.380	0.738	0.898	0.663	0.832	0.558	0.633	0.813
Guanzhong	0.581	0.630	0.705	0.582	0.370	0.690	0.837	0.685	0.826	0.528	0.656	0.813
Harbin-Changchun	0.590	0.591	0.661	0.563	0.371	0.650	0.749	0.642	0.991	0.463	0.591	0.855
Hu-Bao-E-Yu	0.589	0.566	0.664	0.545	0.371	0.631	0.703	0.619	0.967	0.434	0.587	0.952
Jiang-Huai	0.511	0.549	0.613	0.487	0.313	0.721	0.788	0.557	0.686	0.502	0.536	0.626
Lanzhou-Xining	0.553	0.532	0.591	0.502	0.332	0.574	0.655	0.554	0.729	0.392	0.505	0.723
Mid-southern Liaoning	0.604	0.650	0.746	0.604	0.374	0.717	0.891	0.699	0.932	0.560	0.670	0.806
Middle Reaches of Yangtze River	0.547	0.606	0.686	0.526	0.345	0.773	0.857	0.610	0.765	0.534	0.584	0.702
Ningxia Yellow River	0.541	0.509	0.612	0.449	0.313	0.552	0.627	0.527	0.786	0.373	0.501	0.706
North Tianshan Mountain	0.981	1.025	1.183	1.009	0.635	1.136	1.277	1.135	1.405	0.783	1.034	1.531
Pearl River Delta	0.557	0.660	0.683	0.537	0.346	0.922	0.988	0.614	0.648	0.635	0.585	0.615
Shandong Peninsula	0.498	0.533	0.627	0.490	0.303	0.630	0.764	0.569	0.709	0.486	0.571	0.640
West Coast of Taiwan Strait	0.551	0.652	0.679	0.542	0.346	0.833	0.956	0.634	0.696	0.612	0.599	0.650
Yangtze River Delta	0.453	0.505	0.575	0.436	0.288	0.668	0.706	0.504	0.617	0.451	0.487	0.554

Table S3. MAE (°C) of the 12 predicted human thermal indices in the 20 major urban agglomerations (UAs) of the mainland of China during 2003–2020.

UAs	SAT	AT_{in}	AT_{out}	DI	ET	HI	HMI	MDI	NET	sWBGT	WBT	WCT
Beibu Gulf	0.489	0.550	0.605	0.448	0.296	0.687	0.775	0.506	0.583	0.506	0.481	0.567
Beijing-Tianjin-Hebei	0.389	0.418	0.473	0.384	0.239	0.478	0.587	0.454	0.528	0.369	0.457	0.496
Central Guizhou	0.437	0.493	0.533	0.431	0.283	0.491	0.665	0.489	0.645	0.419	0.460	0.570
Central Henan	0.376	0.403	0.458	0.359	0.236	0.460	0.555	0.419	0.542	0.351	0.424	0.516
Central Shanxi	0.402	0.417	0.472	0.386	0.250	0.454	0.537	0.447	0.588	0.336	0.429	0.554
Central Yunnan	0.377	0.380	0.459	0.332	0.230	0.395	0.505	0.371	0.545	0.308	0.349	0.475
Chengdu-Chongqing	0.455	0.488	0.545	0.425	0.286	0.545	0.680	0.490	0.602	0.424	0.470	0.582
Guanzhong	0.439	0.472	0.530	0.432	0.279	0.513	0.634	0.507	0.611	0.397	0.494	0.596
Harbin-Changchun	0.435	0.442	0.494	0.415	0.276	0.485	0.556	0.475	0.666	0.341	0.438	0.569
Hu-Bao-E-Yu	0.458	0.434	0.517	0.407	0.281	0.485	0.538	0.466	0.689	0.332	0.448	0.629
Jiang-Huai	0.387	0.421	0.480	0.370	0.240	0.528	0.598	0.424	0.536	0.379	0.409	0.488
Lanzhou-Xining	0.432	0.408	0.462	0.386	0.261	0.446	0.503	0.429	0.571	0.302	0.393	0.553
Mid-southern Liaoning	0.465	0.495	0.577	0.458	0.286	0.541	0.671	0.530	0.692	0.423	0.512	0.610
Middle Reaches of Yangtze River	0.418	0.464	0.521	0.397	0.263	0.575	0.651	0.459	0.567	0.406	0.440	0.529
Ningxia Yellow River	0.422	0.400	0.486	0.343	0.242	0.423	0.483	0.409	0.592	0.291	0.372	0.535
North Tianshan Mountain	0.715	0.772	0.861	0.743	0.460	0.838	0.988	0.843	0.963	0.602	0.783	0.977
Pearl River Delta	0.428	0.492	0.522	0.399	0.261	0.663	0.715	0.455	0.495	0.459	0.427	0.470
Shandong Peninsula	0.379	0.408	0.477	0.372	0.234	0.475	0.577	0.432	0.522	0.364	0.433	0.482
West Coast of Taiwan Strait	0.427	0.509	0.530	0.425	0.269	0.623	0.748	0.492	0.530	0.474	0.464	0.501
Yangtze River Delta	0.346	0.378	0.438	0.324	0.217	0.476	0.525	0.373	0.470	0.331	0.360	0.425

Table S4. Bias (°C) of the 12 predicted human thermal indices in the 20 major urban agglomerations of the mainland of China during 2003–2020.

UAs	SAT	AT_{in}	AT_{out}	DI	ET	HI	HMI	MDI	NET	sWBGT	WBT	WCT
Beibu Gulf	-0.072	-0.089	-0.121	-0.079	-0.037	-0.094	-0.147	-0.082	-0.096	-0.098	-0.108	-0.106
Beijing-Tianjin-Hebei	0.052	0.073	0.073	0.069	0.034	0.080	0.119	0.086	0.024	0.096	0.059	0.079
Central Guizhou	0.008	-0.004	-0.020	-0.018	0.005	-0.008	-0.023	-0.029	-0.008	-0.037	0.010	-0.024
Central Henan	0.009	0.023	-0.009	0.026	0.005	0.024	0.051	0.035	-0.015	0.040	-0.020	0.037
Central Shanxi	0.037	0.027	0.031	0.031	0.016	0.036	0.047	0.034	0.041	0.037	0.038	0.028
Central Yunnan	-0.008	-0.019	-0.057	-0.018	-0.007	-0.011	-0.041	-0.023	-0.039	-0.029	-0.055	-0.020
Chengdu-Chongqing	-0.063	-0.053	-0.075	-0.054	-0.029	-0.056	-0.082	-0.071	-0.064	-0.063	-0.064	-0.043
Guanzhong	0.002	0.014	-0.009	0.012	0.013	0.015	0.022	0.017	0.001	0.013	0.022	0.014
Harbin-Changchun	0.008	0.011	0.014	0.009	0.001	0.010	0.028	0.011	0.007	0.012	0.006	0.017
Hu-Bao-E-Yu	0.027	0.007	0.051	0.003	0.003	0.008	0.022	0.011	0.021	0.012	0.003	0.014
Jiang-Huai	0.020	-0.022	-0.016	-0.035	-0.015	-0.020	-0.030	-0.029	-0.012	-0.035	-0.014	-0.023
Lanzhou-Xining	0.018	0.035	0.040	0.043	0.020	0.040	0.053	0.038	0.069	0.044	0.048	0.031
Mid-southern Liaoning	0.078	0.086	0.104	0.079	0.043	0.090	0.123	0.091	0.111	0.085	0.103	0.084
Middle Reaches of Yangtze River	-0.019	-0.028	-0.030	-0.023	-0.016	-0.028	-0.030	-0.030	-0.022	-0.029	-0.027	-0.017
Ningxia Yellow River	0.028	-0.017	0.006	-0.001	-0.001	-0.007	-0.003	0.000	0.003	0.025	0.056	-0.006
North Tianshan Mountain	-0.108	0.015	-0.004	-0.003	-0.017	-0.029	0.064	-0.014	-0.096	0.016	-0.145	0.048
Pearl River Delta	-0.089	-0.105	-0.083	-0.085	-0.061	-0.154	-0.160	-0.099	-0.065	-0.102	-0.069	-0.095
Shandong Peninsula	0.039	0.042	0.072	0.033	0.019	0.051	0.058	0.039	0.070	0.046	0.048	0.038
West Coast of Taiwan Strait	-0.029	-0.058	-0.040	-0.047	-0.023	-0.056	-0.091	-0.056	-0.039	-0.057	-0.036	-0.052
Yangtze River Delta	0.000	-0.020	-0.021	-0.021	-0.011	-0.024	-0.022	-0.023	-0.019	-0.018	-0.024	-0.020