

Supplementary Material:

Supplementary Table 1 The acquisition information of Landsat 8 images

Landsat Scene ID	Acquisition date	Acquisition time(BJT)
LC81490322019091LGN00	01 April 2019	13:33:44
LC81490332019091LGN00	01 April 2019	13:34:08
LC81470312019093LGN00	03 April 2019	13:20:58
LC81470322019093LGN00	03 April 2019	13:21:22
LC81430302019097LGN00	07 April 2019	12:55:50
LC81430312019097LGN00	07 April 2019	12:56:14
LC81440302019104LGN00	14 April 2019	13:01:58
LC81440312019104LGN00	14 April 2019	13:02:22
LC81420312019106LGN00	16 April 2019	12:50:00
LC81410292019131LGN00	11 May 2019	12:43:05
LC81410302019131LGN00	11 May 2019	12:43:29
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LC81380312019094LGN00	04 April 2019	12:25:21
LC81390302019085LGN00	26 March 2019	12:31:10
LC81390312019085LGN00	26 March 2019	12:31:34
LC81450282019095LGN00	05 April 2019	13:07:25
LC81350322019105LGN00	15 April 2019	12:07:08
LC81350332019105LGN00	15 April 2019	12:07:32
LC81360322019112LGN00	22 April 2019	12:13:16
LC81380322019094LGN00	04 April 2019	12:25:45
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LC81330332019139LGN00	19 May 2019	11:55:19
LC81320332019100LGN00	10 April 2019	11:49:02
LC81320342019100LGN00	10 April 2019	11:49:26
LC81310342019141LGN00	21 May 2019	11:43:23
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LC81300332020105LGN00	14 April 2020	11:36:47
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LC81290342019095LGN00	05 April 2019	11:30:55
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LC81300342019102LGN00	12 April 2019	11:37:03
LC81300352019102LGN00	12 April 2019	11:37:27
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LC81280322019104LGN00	14 April 2019	11:23:53
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LC81340352019114LGN00	24 April 2019	12:02:05
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LC81490332019219LGN00	07 August 2019	13:34:41
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LC81390312019213LGN00	01 August 2019	12:32:03
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LC81300342019182LGN00	01 July 2019	11:37:28
LC81290332019207LGN00	26 July 2019	11:31:00
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LC81290332019303LGN00	30 October 2019	11:31:23
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LC81290312019319LGN00	15 November 2019	11:30:33
LC81290322019319LGN00	15 November 2019	11:30:56
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LC81360352019288LGN00	15 October 2019	12:15:26
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LC81360352019272LGN00	29 September 2019	12:15:24
LC81340342019290LGN00	17 October 2019	12:02:41
LC81340352019290LGN00	17 October 2019	12:03:05
LC81330352019299LGN00	26 October 2019	11:56:54
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LC81470322019029LGN00	29 January 2019	13:21:37
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LC81430312019081LGN00	22 March 2019	12:56:18
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LC81410302019035LGN00	04 February 2019	12:43:44
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LC81420302019026LGN00	26 January 2019	12:49:56
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LC81380302019046LGN00	15 February 2019	12:25:10
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LC81290342019047LGN00	16 February 2019	11:31:08
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LC81280322019008LGN00	08 January 2019	11:24:16
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LC81290322019031LGN00	31 January 2019	11:30:22
LC81290332019031LGN00	31 January 2019	11:30:46
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LC81290312019015LGN00	15 January 2019	11:30:02
LC81290322019015LGN00	15 January 2019	11:30:26
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LC81360352019016LGN00	16 January 2019	12:14:53
LC81340342019034LGN00	03 February 2019	12:02:03
LC81340352019034LGN00	03 February 2019	12:02:27
LC81320352019004LGN00	04 January 2019	11:50:12

Supplementary Table 2 Geographical information and buffer landscape composition of all selected PV stations

id	Province	Geographical coordinates	Elevation(m)	Area(ha)	Buffer Landscape Composition			Köppen
					Bareland	Grassland	Built-up	Climate Classification
1	Xinjiang	[94.053°E ,42.750°N]	899.772	215.574	0.999	0	0.001	Bwk
2		[94.938°E ,43.610°N]	1290.682	55.027	0.999	0	0	Bwk
3		[94.792°E ,41.991°N]	733.260	159.298	0.995	0	0	Bwk
4		[94.684°E ,41.946°N]	1263.752	173.795	1	0	0	Bwk
5		[93.589°E ,43.049°N]	1071.385	2580.011	0.993	0	0.002	Bwk
6		[92.902°E ,43.148°N]	1038.586	1109.865	1	0	0	Bwk
7		[90.267°E ,44.062°N]	914.876	2732.793	0.971	0	0.001	Bwk
8		[89.302°E ,43.134°N]	653.310	942.043	0.999	0	0	Bwk
9		[89.375°E ,43.133°N]	721.255	91.945	0.999	0	0	Bwk
10		[88.900°E ,43.076°N]	484.152	198.415	0.985	0	0.016	Bwk
11		[88.966°E ,43.154°N]	765.317	41.173	0.700	0.054	0.158	Bwk
12		[88.810°E ,44.043°N]	829.336	56.537	0.761	0.057	0.102	Bsk
13		[86.251°E ,42.364°N]	1205.215	132.536	0.921	0.008	0.003	Bwk
14		[86.216°E ,42.358°N]	1172.344	74.336	0.977	0.001	0	Bwk

15		[86.225°E ,42.380°N]	1297.876	193.656	0.992	0	0.001	Bwk
16		[86.057°E ,42.130°N]	1329.706	61.554	1	0	0	Bwk
17		[86.080°E ,42.113°N]	1295.153	55.873	1	0	0	Bwk
18		[86.137°E ,42.099°N]	1213.890	65.384	0.991	0	0.006	Bwk
19		[86.180°E ,42.091°N]	1175.310	51.048	1	0	0	Bwk
20		[85.569°E ,41.921°N]	1020.037	43.849	0.996	0	0	Bwk
21		[85.613°E ,41.743°N]	900.541	213.278	1	0	0	Bwk
22		[85.361°E ,41.776°N]	898.928	92.062	1	0	0	Bwk
23		[79.733°E ,41.073°N]	1331.318	407.471	0.999	0	0	Bwk
24		[75.832°E ,39.675°N]	1663.857	101.280	1	0	0	Bwk
25		[75.925°E ,39.687°N]	1555.118	38.559	1	0	0	Bwk
26		[75.492°E ,39.076°N]	1700.308	142.727	0.971	0.003	0.025	Bwk
27		[84.736°E ,46.351°N]	743.466	231.579	0.994	0.003	0.004	Bwk
28		[94.460°E ,40.145°N]	1203.955	2692.935	0.959	0.002	0.039	Bwk
29		[98.047°E ,39.726°N]	1887.318	674.877	0.996	0	0.002	Bwk
30		[98.010°E ,39.706°N]	1944.613	302.603	0.966	0	0.034	Bwk
31		[98.517°E ,39.580°N]	1718.486	420.774	0.998	0	0	Bwk
32		[98.562°E ,39.588°N]	1599.864	471.486	0.999	0	0	Bwk
33		[98.509°E ,39.625°N]	1618.273	462.668	0.869	0.010	0.036	Bwk
34		[96.402°E ,40.606°N]	1346.826	265.144	0.785	0.175	0.039	Bwk
35		[98.012°E ,39.747°N]	1882.101	128.236	0.995	0	0.001	Bwk
36		[99.621°E ,39.320°N]	1551.980	431.489	0.994	0	0.005	Bwk
37		[99.502°E ,39.446°N]	1556.393	123.737	0.976	0	0.022	Bwk
38		[100.053°E ,39.043°N]	1437.509	139.064	0.975	0	0.008	Bwk
39	Shaanxi	[100.064°E ,39.068°N]	1385.545	117.484	0.912	0.076	0.010	Bwk
40		[100.403°E ,38.726°N]	1641.379	238.027	0.984	0.007	0.008	Bwk
41		[100.827°E ,38.752°N]	1616.648	24.915	0.983	0.002	0.002	Bwk
42		[100.938°E ,38.853°N]	1718.923	43.269	1	0	0	Bwk
43		[100.941°E ,38.830°N]	1703.458	128.399	0.950	0.036	0.008	Bwk
44		[102.300°E ,38.278°N]	1790.090	114.433	0.912	0.030	0.019	Bwk
45		[102.275°E ,38.288°N]	1719.078	129.979	0.972	0	0.019	Bwk
46		[102.205°E ,38.309°N]	1664.257	596.324	0.966	0	0.034	Bwk
47		[98.073°E ,39.778°N]	1678.314	124.581	0.785	0.175	0.039	Bwk
48		[99.515°E ,39.289°N]	1723.820	193.251	0.930	0.052	0.018	Bwk
49		[99.482°E ,39.292°N]	1635.148	349.114	0.934	0.031	0.034	Bwk
50		[103.120°E ,37.776°N]	1823.527	752.092	0.881	0.087	0.033	Bwk
51		[106.730°E ,39.347°N]	1145.896	213.823	0.888	0.002	0.096	Bwk
52		[106.898°E ,39.181°N]	1147.787	62.241	0.942	0.001	0.002	Bwk
53		[106.651°E ,39.197°N]	1165.159	275.323	0.708	0	0.248	Bwk
54	Ningxia	[105.640°E ,38.895°N]	1475.804	236.307	0.936	0.003	0.026	Bwk
55		[105.905°E ,39.115°N]	1604.876	226.444	0.961	0	0.022	Bwk
56		[105.623°E ,38.649°N]	1384.488	73.228	0.963	0	0.037	Bwk
57		[105.646°E ,38.554°N]	1351.366	84.896	0.843	0.121	0.027	Bwk
58		[106.766°E ,38.018°N]	1377.717	764.942	0.767	0.072	0.136	Bsk

59		[106.763°E ,37.963°N]	1384.377	902.332	0.953	0	0.018	Bsk
60		[106.777°E ,37.892°N]	1449.707	463.401	0.896	0	0.061	Bsk
61		[106.654°E ,37.874°N]	1471.936	161.963	0.782	0.001	0.044	Bsk
62		[106.713°E ,37.767°N]	1361.120	129.253	0.996	0	0.004	Bsk
63		[106.423°E ,37.758°N]	1256.759	125.418	0.701	0	0.019	Bsk
64		[105.748°E ,37.651°N]	1281.017	96.753	0.777	0	0.109	Bwk
65		[105.868°E ,37.978°N]	1239.957	148.133	0.973	0	0.006	Bwk
66		[105.442°E ,37.568°N]	1254.590	107.912	0.728	0.021	0.029	Bwk
67		[105.434°E ,37.597°N]	1299.743	118.277	0.804	0.030	0.149	Bwk
68		[107.030°E ,40.185°N]	1204.503	587.481	0.996	0.002	0.001	Bwk
69		[107.076°E ,40.237°N]	1191.950	167.616	0.996	0	0.003	Bwk
70		[106.502°E ,39.548°N]	1258.122	70.162	0.997	0	0	Bwk
71		[108.771°E ,40.456°N]	1131.086	1307.369	0.936	0.001	0.051	Bsk
72		[108.869°E ,40.471°N]	1092.780	270.074	0.770	0	0.182	Bsk
73	Inner Mongolia	[109.689°E ,40.307°N]	1123.532	1418.592	0.909	0.001	0.006	Bsk
74		[106.903°E ,40.402°N]	1050.478	229.910	0.854	0.006	0.040	Bwk
75		[108.502°E ,41.511°N]	1256.935	111.047	0.877	0.035	0.025	Bsk
76		[108.394°E ,41.874°N]	1439.512	90.717	0.878	0.117	0.001	Bwk
77		[108.380°E ,42.027°N]	1336.748	237.140	0.989	0.002	0	Bwk
78		[109.954°E ,41.735°N]	1574.796	125.970	0.914	0.045	0.003	Bsk
79		[94.797°E ,36.331°N]	2916.120	205.142	0.979	0	0.042	Bwk
80		[94.813°E ,36.322°N]	2926.822	86.750	0.994	0	0.007	Bwk
81		[95.444°E ,37.317°N]	3026.202	256.392	0.978	0	0.021	Bwk
82		[95.507°E ,37.291°N]	2965.947	138.903	0.930	0	0.021	Bsk
83	Qinghai	[98.392°E ,37.013°N]	3124.491	254.129	0.909	0.065	0.011	Bsk
84		[98.591°E ,36.856°N]	2984.077	77.852	0.852	0.050	0.011	Bsk
85		[100.441°E ,36.035°N]	3010.218	461.010	0.994	0	0.005	Bsk
86		[100.484°E ,36.035°N]	2963.863	1436.366	0.920	0.034	0.030	Bsk

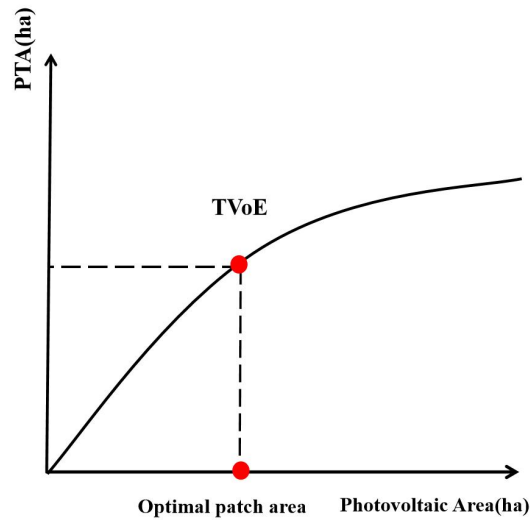
Bsk: Dry Steppe Kaltes; Bwk: Dry Wintertrocken Kaltes

Supplementary Table 3 Different relation between LST and distance under different buffer size

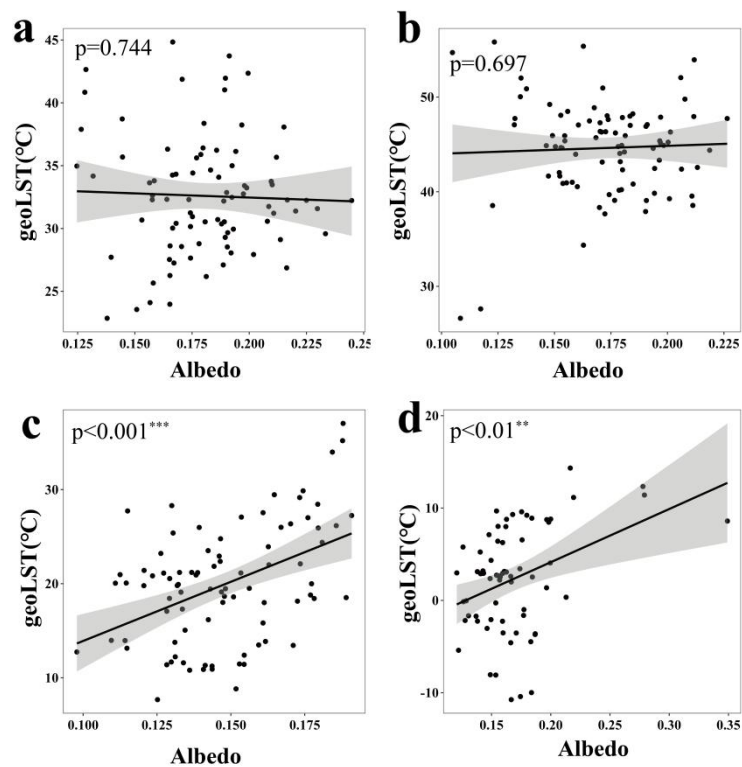
ID	R ² (300)	R ² (600)	R ² (900)	ID	R ² (300)	R ² (600)	R ² (900)
1	0.999	0.990	0.872	44	0.981	0.774	0.903
2	0.999	0.977	0.969	45	0.996	0.854	0.824
3	0.956	0.865	0.891	46	0.978	0.899	0.926
4	0.993	0.960	0.888	47	0.974	0.973	0.960
5	0.981	0.940	0.965	48	0.999	0.998	0.963
6	0.990	0.800	0.935	49	0.988	0.966	0.955
7	0.988	0.961	0.895	50	0.996	0.962	0.908
8	0.999	0.989	0.941	51	0.984	0.962	0.864
9	0.999	0.977	0.928	52	0.989	0.992	0.960
10	0.998	0.998	0.842	53	0.999	0.988	0.945
11	0.998	0.968	0.795	54	0.999	0.957	0.644
12	0.998	0.993	0.896	55	0.992	0.975	0.939

13	0.996	0.962	0.602	56	0.993	0.942	0.952
14	0.996	0.983	0.974	57	0.999	0.997	0.939
15	0.998	0.994	0.877	58	0.999	0.988	0.945
16	0.994	0.983	0.847	59	0.999	0.990	0.978
17	0.999	0.871	0.560	60	0.991	0.974	0.888
18	0.993	0.969	0.729	61	0.997	0.243	0.266
19	0.966	0.943	0.857	62	0.974	0.944	0.913
20	0.960	0.567	0.931	63	0.996	0.971	0.952
21	0.959	0.958	0.881	64	0.994	0.990	0.922
22	0.922	0.921	0.795	65	0.989	0.925	0.589
23	0.992	0.983	0.987	66	0.993	0.942	0.952
24	0.946	0.908	0.609	67	0.996	0.962	0.809
25	0.999	0.998	0.975	68	0.993	0.992	0.958
26	0.970	0.968	0.841	69	0.997	0.908	0.704
27	0.989	0.950	0.855	70	0.999	0.972	0.915
28	0.995	0.986	0.950	71	0.996	0.813	0.688
29	0.999	0.994	0.957	72	0.997	0.984	0.954
30	0.998	0.990	0.954	73	0.997	0.987	0.818
31	0.997	0.992	0.977	74	0.993	0.992	0.958
32	0.998	0.998	0.985	75	0.996	0.813	0.688
33	0.993	0.987	0.936	76	0.998	0.984	0.917
34	0.999	0.998	0.997	77	0.998	0.887	0.913
35	0.993	0.992	0.992	78	0.998	0.982	0.956
36	0.995	0.829	0.875	79	0.999	0.942	0.879
37	0.999	0.998	0.997	80	0.996	0.865	0.945
38	0.998	0.948	0.888	81	0.995	0.985	0.967
39	0.999	0.994	0.964	82	0.993	0.853	0.931
40	0.999	0.980	0.948	83	0.943	0.791	0.734
41	0.999	0.996	0.989	84	0.965	0.918	0.809
42	0.999	0.994	0.951	85	0.986	0.918	0.958
43	0.992	0.905	0.905	86	0.993	0.992	0.907

Supplementary Figure.1 The definition of threshold value of cooling efficiency (TVoE) of the photovoltaic



Supplementary Figure. 2 The Pearson correlation results of albedo and geoLST in a) spring, b) summer, c) autumn, and d) winter.



Site data available:

The data of the photovoltaic sites used in the study has been uploaded to the GEE platform. The detailed content is as follows:

https://code.earthengine.google.com/?asset=users/tanbing0730/PV_location