Supplementary Material: Spatiotemporal Variations of Lake Surface Temperature across the Tibetan Plateau Using MODIS LST Product

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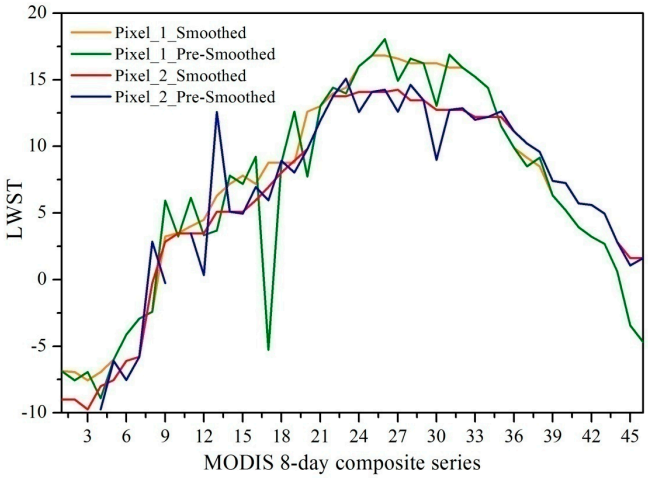

Figure S1. Before and after-filtering of MODIS LST 46 8-day composites from two typical pixels extracted from lake area.

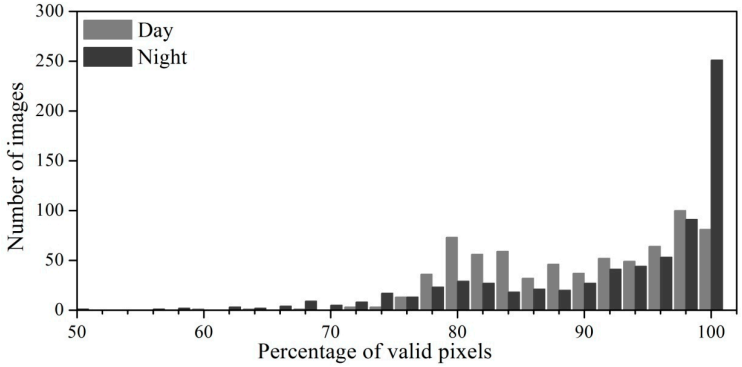

Figure S2. The percentage of valid pixels for day and night time MODIS LST images from 2000 to 2015 (1472 mosaics).

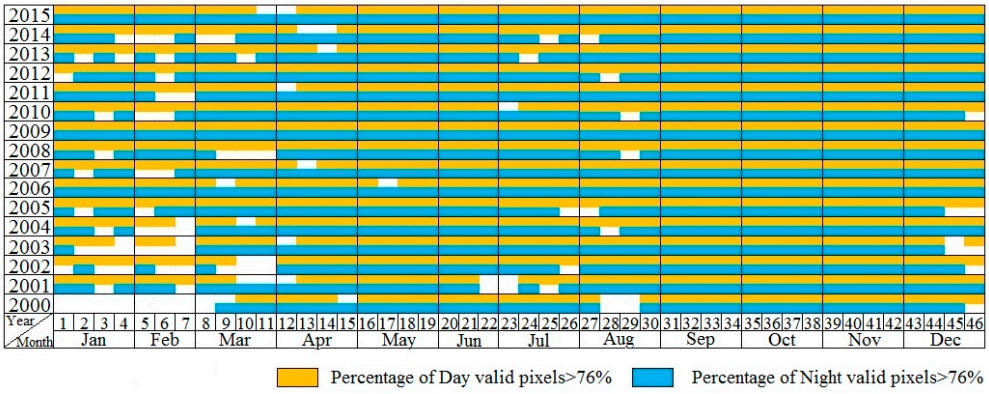

Figure S3. Statistics of effective images for MODIS LST products across the Tibetan Plateau during 2000–2015, where the white gap indicates no MODIS LST data meets the valid pixels greater than 76.

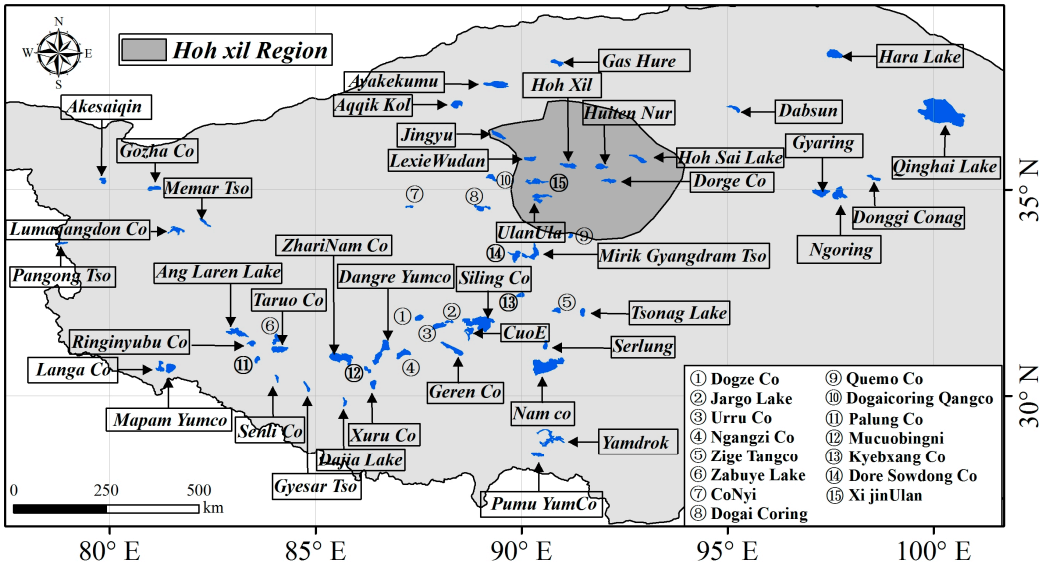

Figure S4. The names and locations of typical lakes concerned across the Tibetan Plateau in this investigation.

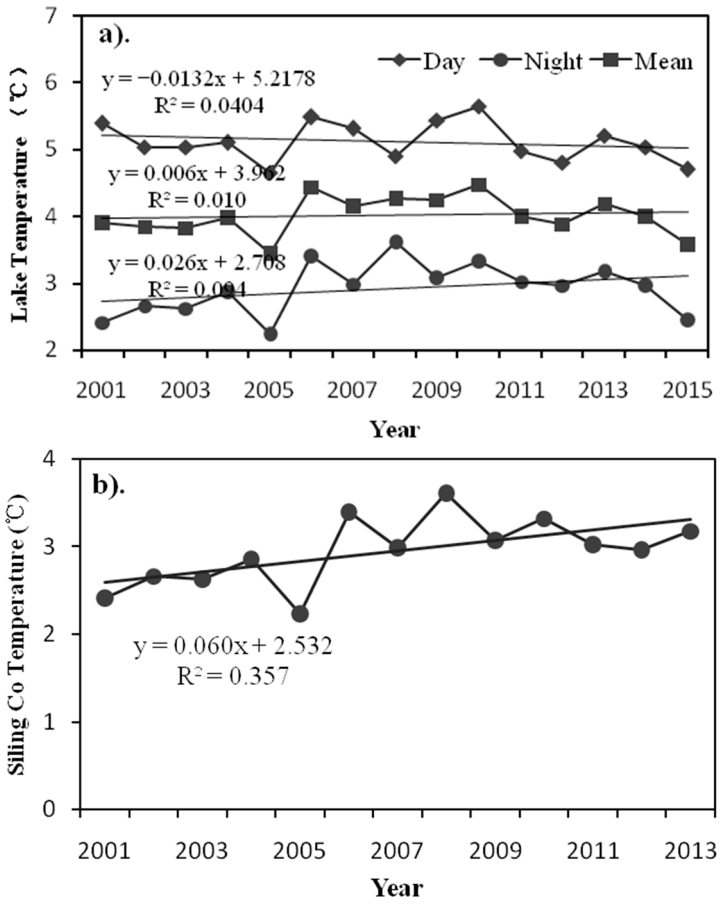

Figure S5. (**a**) Inter-annual changes of lake-averaged annual daytime, nighttime and mean water surface temperature (WST) of Lake Siling Co from 2000 to 2015; and (**b**) nighttime trend from 2001 to 2013.

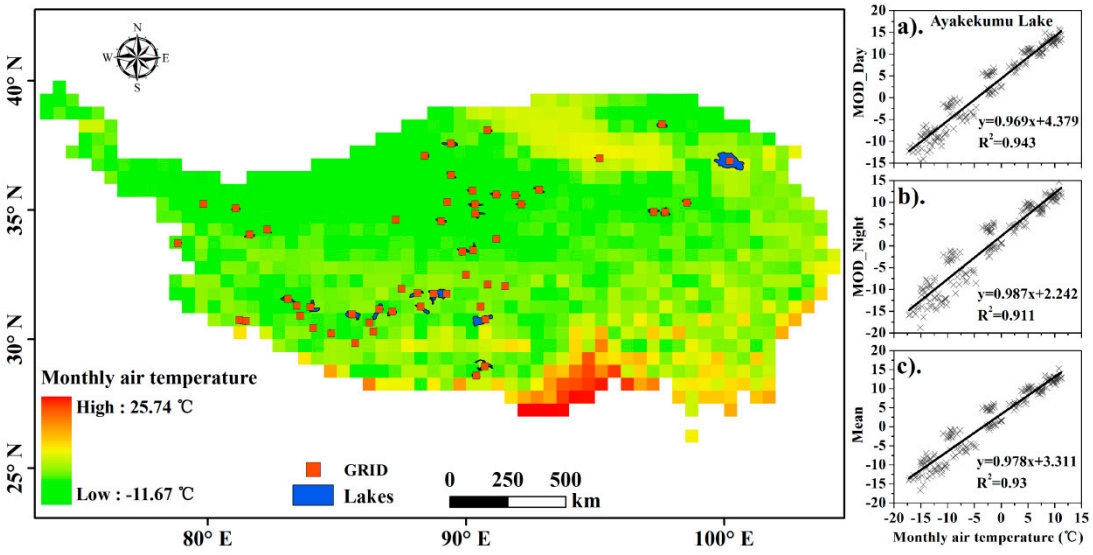

Figure S6. Monthly air temperature product derived from data provided by China Meteorological Administration at a grid resolution of 0.5 degree, lake boundary shape file overlaid to the extracted monthly air temperature product (the left column), and comparison of the extracted air temperature with lake surface temperature derived from MODIS LST product with example from Lake Ayakekumu (right column), (a)–(c) are air temperature versus daytime, nighttime and the average of daytime and nighttime MODIS LST over lake surface.

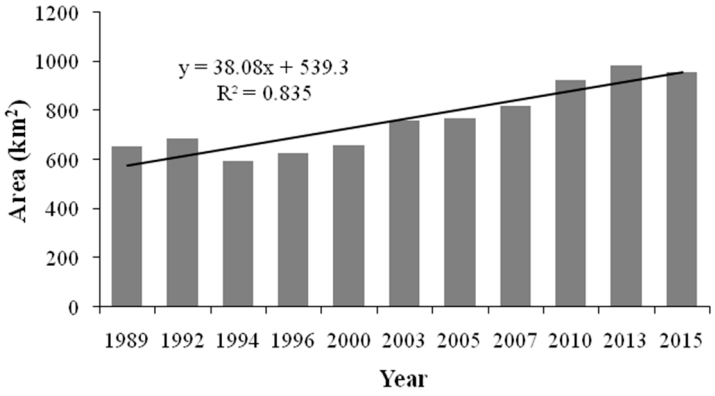

Figure S7. Water surface area variation for Lake Ayakekumu from 1989 to 2015 retrieved with Landsat TM imagery data acquired in August or September for each year with data available.

Table S1. There are 34 lakes match from both studies, and 10 lakes show lake surface temperature increase and 8 show lake surface temperature decrease from both studies; while the rest 16 lakes demonstrate different trend, however, if we narrow the LWST from 2001 to 2012, 8 more lakes show consistent LWST trend, and the remaining 8 lakes show different tend, however, these lakes generally did not show obvious trend according to the determination coefficient (R^2) values.

Lake Name Zhang et al., 2014	Lake Name This Study	Day-Time	R-Square	Night-time	R-square	Night 2001–2012	R-square	Consistency
LWST↑（10）								
Aqqik Kol **	Aqqik Kol *	y = −0.03x + 57.61	0.07	y = 0.05x − 111.34	0.16			Y
Dogze Co	Dogze Co *	y = −0.07x + 150.26	0.42	y = 0.04x − 86.51	0.20			Y
E.Dabsan Lake **	Dabsun **	y = −0.25x + 517.75	0.37	y = 0.17x − 335.51	0.45			Y
Kyebxang Co **	Kyebxang Co **	y = −0.0002x + 5.67	0.00	y = 0.08x − 162.85	0.28			Y
Lumaqangdong Co	Lumaqangdong Co	y = 0.03x − 51.54	0.04	y = 0.05x − 107.94	0.08			Y
Selin Co	Siling Co	y = −0.01x + 31.35	0.04	y = 0.03x − 50.24	0.09			Y
Serlung **	Serlung *	y = −0.004x + 13.04	0.00	y = 0.05x − 94.38	0.16			Y
UlanUl Lake	UlanUla *	y = −0.09x + 181.4	0.36	y = 0.06x − 124.4	0.18			Y
Zige Tangco **	Zige Tangco **	y = 0.01x − 18.73	0.02	y = 0.07x − 145.83	0.29			Y
Dorge Co	Dorge Co	y = −0.02x + 39.69	0.02	y = 0.004x − 13.86	0.00			Y
LWST↓（8）								
Dogaicoring Qangco	Dogaicoring Qangco	y = −0.04x + 83.53	0.15	y = −0.01x + 13.38	0.01			Y
Gozha Co	Gozha Co	y = −0.01x + 30.82	0.01	y = −0.02x + 32.77	0.01			Y
Hoh Xil Lake	Hoh Xil Lake **	y = −0.1x + 185.19	0.37	y = −0.09x + 185.19	0.37			Y
Huiten Nur	Huiten Nur **	y = 0.17x − 348.44	0.45	y = −0.17x + 338.06	0.44			Y
La'nga	Langa Co **	y = −0.10x + 189.21	0.13	y = −0.14x + 270.43	0.30			Y
Lixi'Oidaim Co **	LexieWudan **	y = −0.07x + 149.14	0.27	y = −0.09x + 168.88	0.28			Y
Taro Co **	Taro Co **	y = −0.0003x + 6.72	0.00	y = −0.05x + 112.11	0.19			Y
Xuru Co	Xuru Co **	y = 0.05x − 91.14	0.28	y = −0.05x + 93.7	0.24			
LWST≠（16）								
Mapam Yumco *	Mapam Yumco **	y = −0.06x + 118.7	0.07	y = −0.13x + 269.58	0.19	y = 0.1x − 206.88	0.46	Y
Nam Co	Nam Co	y = −0.002x + 7.44	0.00	y = −0.05x + 94.28	0.08	y = 0.03x − 47.47	0.02	Y
Ngangzi Co	Ngangzi Co	y = −0.04x + 90.83	0.20	y = −0.01x + 22.74	0.00	y = 0.04x − 85.04	0.06	Y
Palung Co	Palung Co	y = −0.04x + 99.38	0.11	y = −0.09x + 169.3	0.20	y = 0.01x − 31.61	0.01	Y
Puma Yumco	Pumu Yumco	y = 0.01x − 23.1	0.02	y = −0.05x + 101.35	0.05	y = 0.01x − 27.83	0.00	Y

Gasin Kol	Gas Hure	y = −0.05x + 108.85	0.34	y = 0.003x − 3.11	0.00	y = −0.01x + 27.8	0.02	Y
Gyaring Lake	Gyaring Lake	y = 0.004x − 5.65	0.00	y = 0.07x − 150.65	0.10	y = −0.02x + 37.2	0.00	Y
Qinghai Lake	Qinghai Lake	y = 0.02x − 29.2	0.04	y = 0.04x − 74.12	0.10	y = −0.04x + 74.23	0.07	Y
Ringinyubu Co	Ringinyubu Co	y = −0.04x + 79	0.18	y = −0.05x + 107.17	0.14	y = −0.03x + 56.9	0.03	N
Tangra Yumco	Dangre Yumco	y = 0.002x + 3.6	0.00	y = −0.03x + 68.41	0.13	y = −0.02x + 53.63	0.04	N
Urru Co	Urru Co	y = 0.02x − 38.72	0.05	y = −0.04x + 76.32	0.13	y = −0.03x + 56.4	0.04	N
Aksayqin Lake	Akesaiqin	y = −0.14x + 284.18	0.63	y = 0.03x − 72.53	0.12	y = 0.05x − 100.33	0.12	N
Ayakkuh Lake	Ayakekumu	y = −0.01x + 17.53	0.01	y = 0.01x − 14.74	0.01	y = 0.01x − 22.52	0.01	N
Dogai Coring	Dogai Coring	y = −0.02x + 40.88	0.03	y = 0.02x − 36.21	0.02	y = 0.02x − 39.38	0.02	N
Ngoring Lake	Ngoring Lake	y = −0.02x + 42.76	0.02	y = 0.08x − 153.43	0.15	y = 0.04x − 77.54	0.02	N
XijirUlan Lake *	XijinUlan	y = −0.08x + 161.88	0.25	y = 0.01x − 31.26	0.01	y = 0.01x − 27.05	0.00	N

Note: the lake names highlight in grey indicate different names are given in reference [20] and this study. * Statistically significant at the 0.05 level; ** statistically significant at the 0.01 level.