

An integrated dataset of daily lake surface water temperature over Tibetan Plateau

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Table S1 Summary of *in-situ* lake surface temperature observation used for validation. The first 4 lakes denoted by * are with relative long sequential observation, while other lakes are observed sporadically and cited from Liu et al. (2021).

LakeID	Lake	Observation date/period	Sources
TPL114	Serling Co*	18/04/2014~30/09/2014	Guo et al. (2016)
TPL041	Ngoring Lake*	01/06/2011~29/11/2011	Li et al. (2015)
TPL012	Bangong Co*	30/07/2012~21/10/2012	Nation Tibetan Plateau Third Pole Environment Data Center
TPL028	Dogze Co*	19/08/2012~30/08/2013	Nation Tibetan Plateau Third Pole Environment Data Center
TPL082	Mapam Yumco	25/09/2009, 04/09/2017	Liu et al. (2021)
TPL031	Tangra yumco	06/09/2009	
TPL101	Pumoyong Co	27/06/2009	
TPL153	Zhari Namco	16/09/2009	
TPL014	Npen Co	01/09/2009	
TPL012	Bangong Co	24/07/2010	
TPL069	Langa Co	14/07/2010, 08/09/2017	
TPL048	Kunggyu Co	18/07/2010	

TPL098	Paiku Co	06/07/2010
TPL121	Taro Co	23/09/2011
TPL029	Co Ngoin	24/07/2012
TPL149	Yunbo Co	12/08/2012
TPL009	Bam Co	21/08/2012
TPL027	Dawa Co	11/08/2012
TPL154	Zhangne Co	17/08/2012, 18/10/2013
TPL046	Gomang Co	17/08/2012
TPL023	Cuo Lake/Co Ngoin1	02/08/2012, 24/06/2017
TPL103	Qagoi Co	19/08/2012
TPL028	Dogze Co	18/08/2012, 26/09/2013
TPL070	Lagkor Co	08/08/2012
TPL012	Bangong Co	28/07/2012
TPL013	Bandao Lake	27/10/2012
TPL003	Amur Co	22/10/2012
TPL146	Yongbo Lake	03/10/2012
TPL077	Longwei Co	25/10/2012
TPL039	Dogaicoring QangCo	08/11/2012
TPL008	Ngangzi Co	18/10/2013
TPL055	Gyado Lake	26/10/2013
TPL017	Bura Co	29/10/2013
TPL030	Tangqung Co	23/09/2013
TPL134	Xuru Co	02/09/2013
TPL088	Monco Bunnyi	22/09/2013
TPL114	Serling Co	07/08/2014
TPL050	Gozha Co	25/09/2015
TPL038	Dogai Coring	07/11/2016

TPL037	Dorsoidong Co/Tu Co	24/10/2016	
TPL122	Nam Co	24/06/2016	
TPL030	Migriggyangzham Co	29/10/2016	
TPL007	Ngangla Ringco	03/08/2017	
TPL067	Gyaring Co	02/07/2017	
TPL157	Serling Co	02/06/2017	

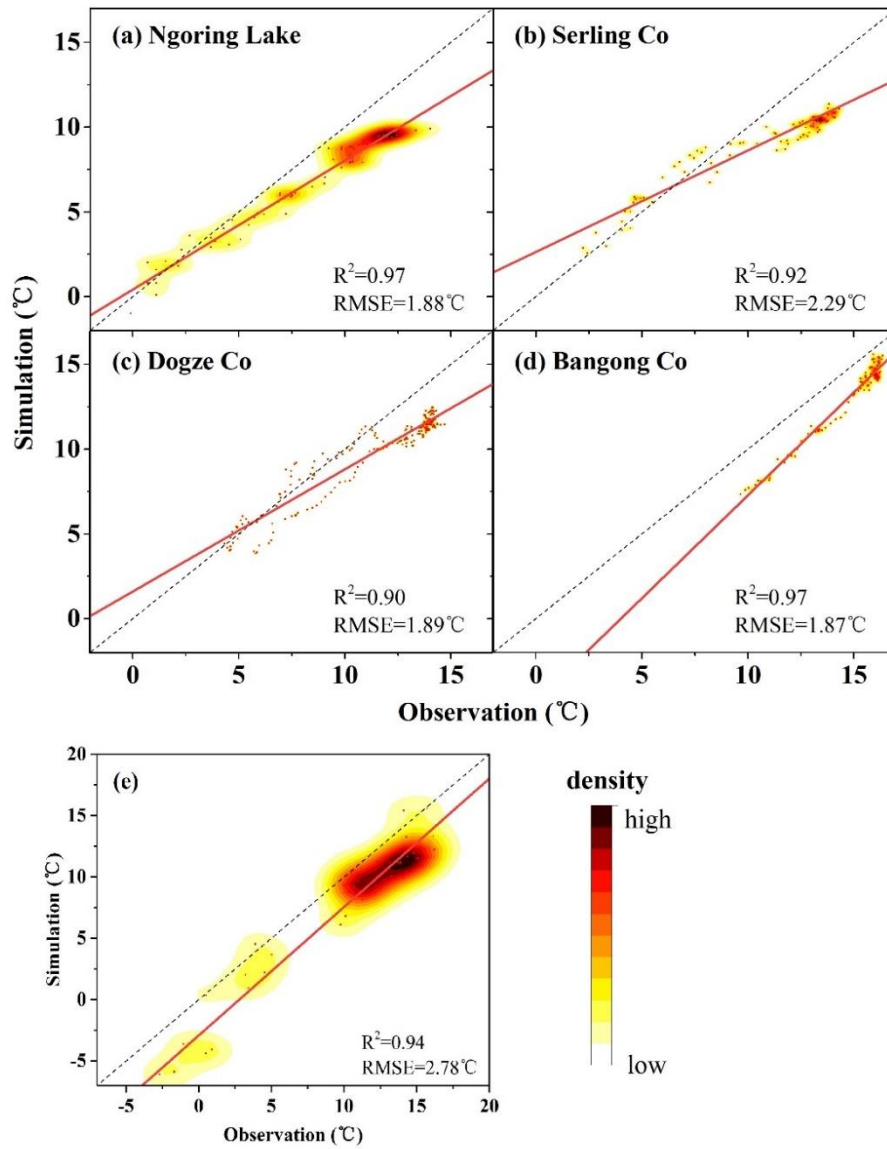


Figure S1 Validation of modeling results against in-situ observation summarized in Table S1: (a)-(d) is the temporal validation respectively for the 4 lakes with sequential observation; (e) is the spatial validation for the 41 lakes with sporadic observation. The solid lines are the regression lines. The dashed lines are the 1:1 lines.

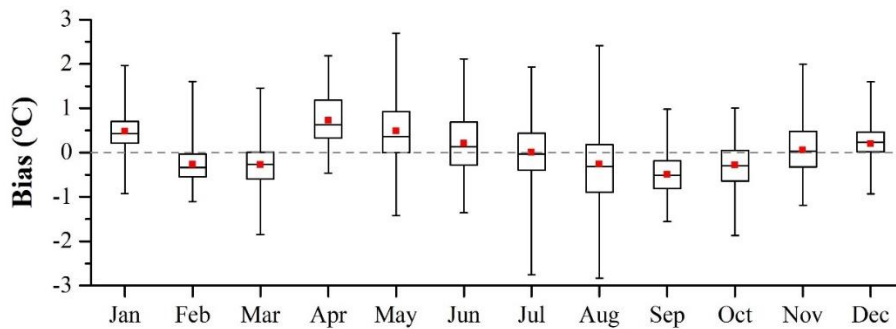


Figure S2: Bias between reconstructed and MODIS-based LSWT in each month.

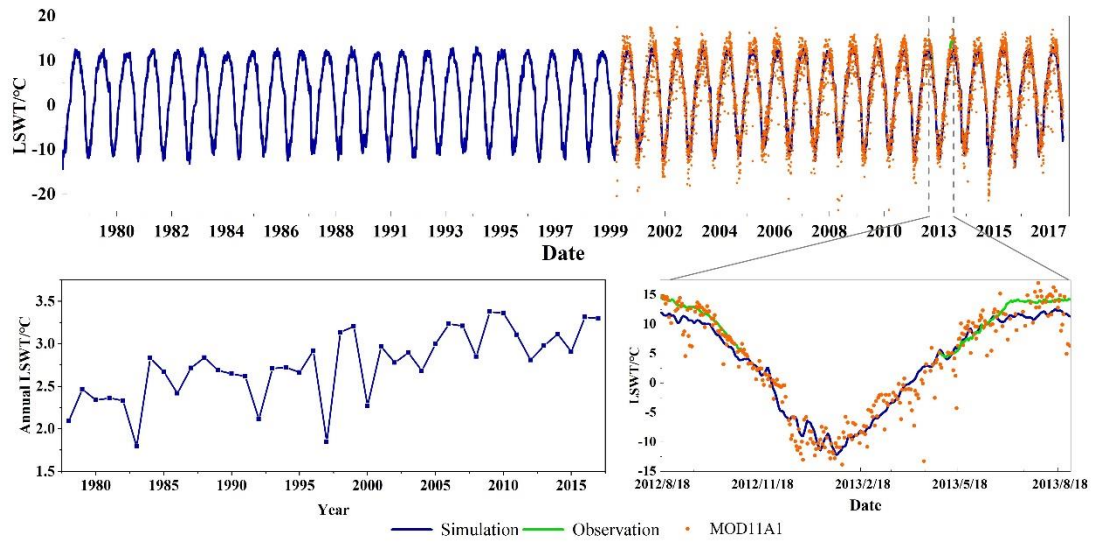


Figure S3: Time series of Dogze Co.

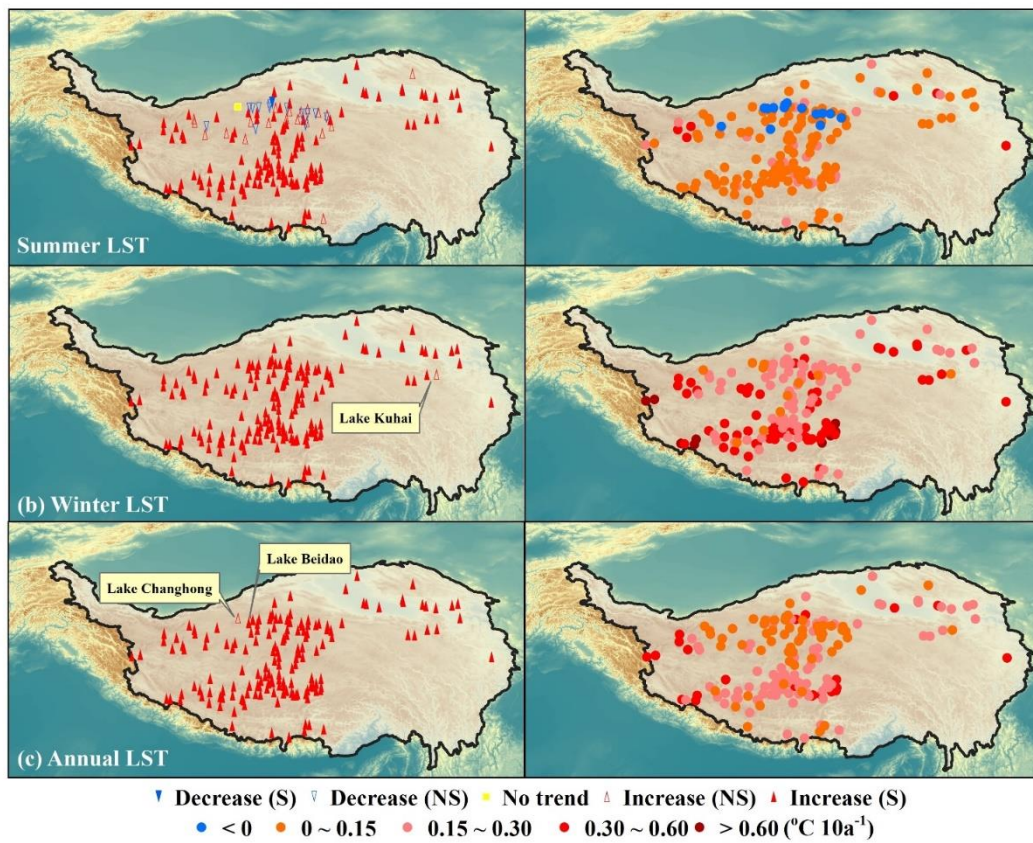


Figure S4: Long-term trends of summer (Jun-Aug), winter (Dec-Feb) and annual LSWT during 1978–2017.

Table S2 Characteristics of satellite-based LSWT datasets for lakes across Tibetan Plateau

Data sources	Data	and	Period	Temporal	Number	Limitations	References
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	methods		resolution	of lakes		
ARC-Lake	ATSR-2/AATSR-based	1995-2012	Daily	112	No data when temperature below 0°C	Layden et al., 2015
TPLakes_Temperature	MOD11A2-based lake-wide mean	2000-2015	8-day	374	Shorter time span and lower temporal resolution	Wan et al., 2017
Tplake_Temp	AVHRR-based with split-window approach	1981-2015	Daily	97	inconsistency due to revisit period and calibration among successive satellites	Liu et al., 2019

References

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