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Supplement of

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

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Supplement

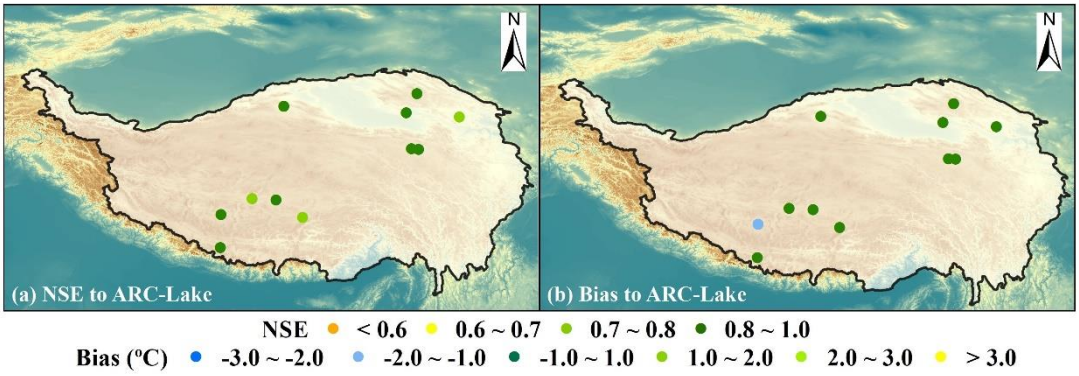

Figure S1: Performance of air2water for the calibration (a, c) and validation (b, d) period as compared against LSWT from ARC-Lake dataset.

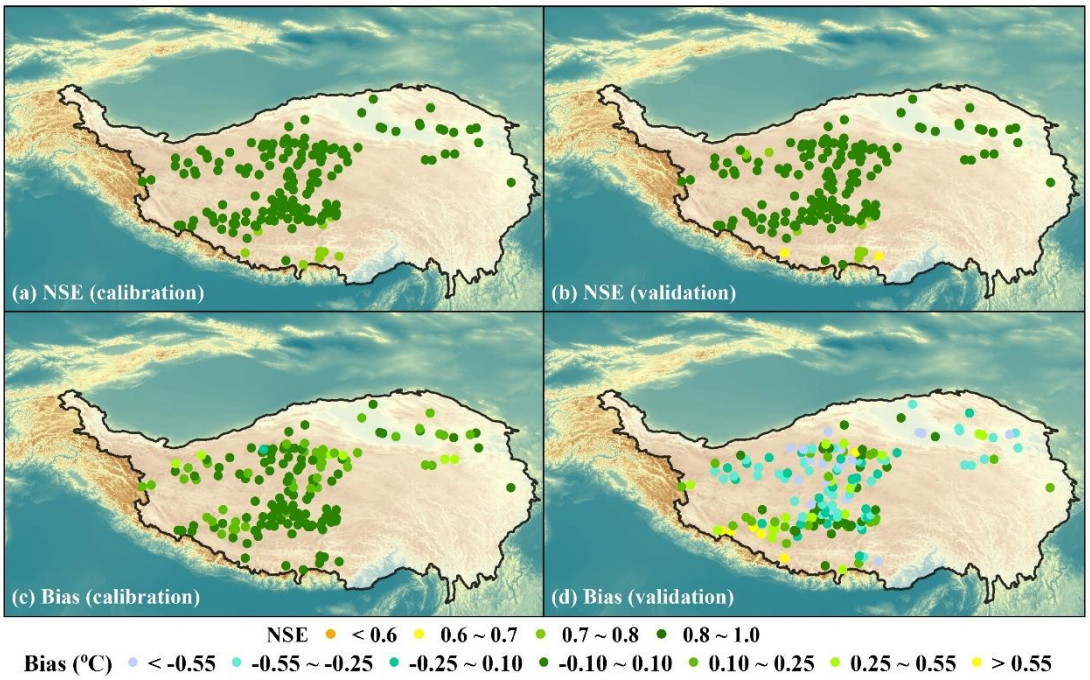

Figure S2: Performance of air2water for the calibration (a, c) and validation (b, d) period as compared against MOD11A1-based LSWT.

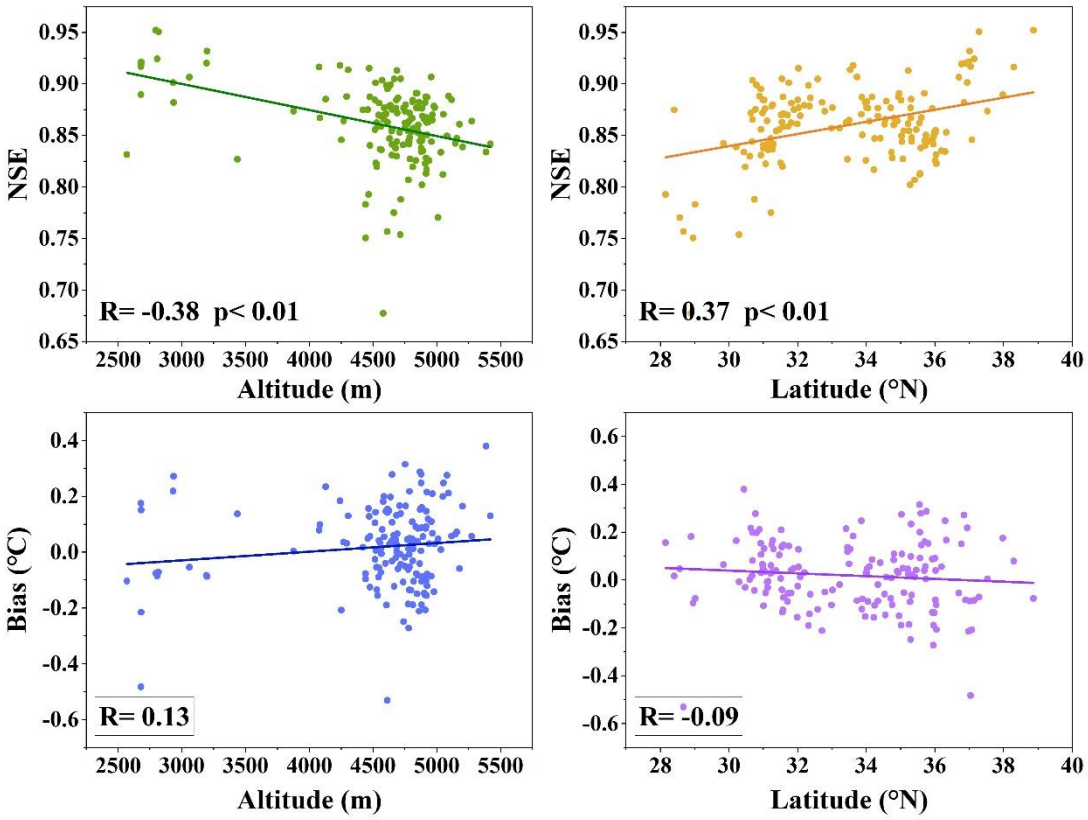

Figure S3: The NSE and bias in relation to the altitude and latitude of the lake

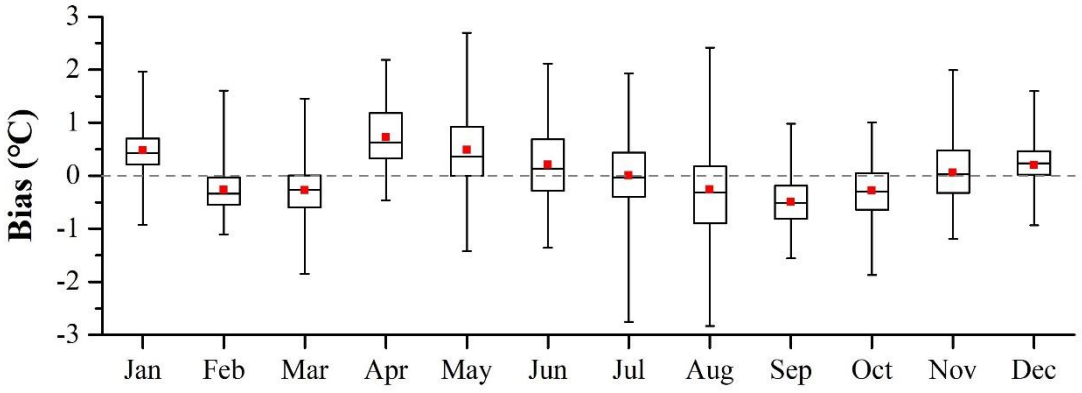

Figure S4: Bias between reconstructed and MODIS-based LSWT in each month.

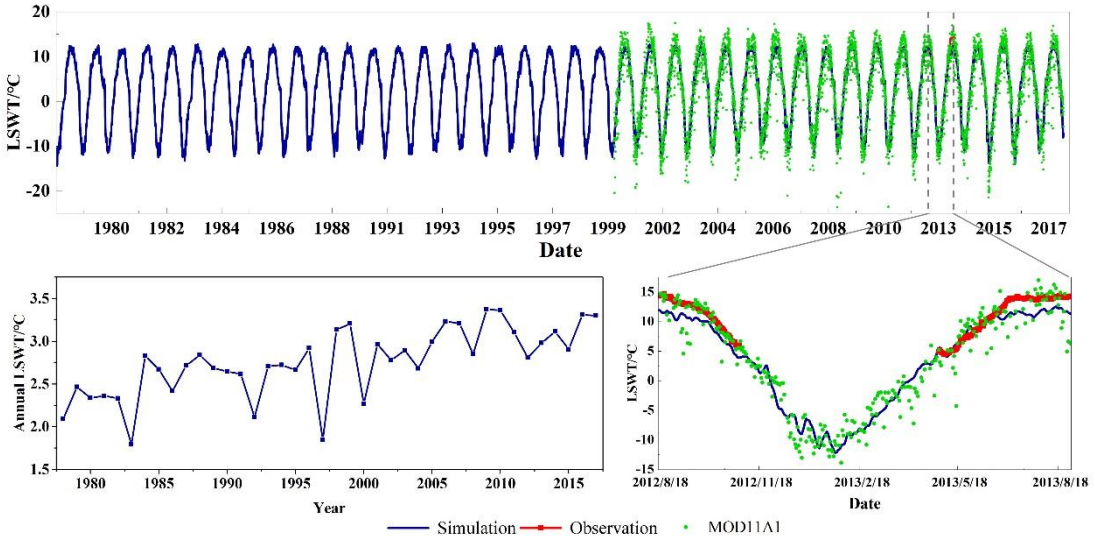

Figure S5: Time series of Dogze Co.

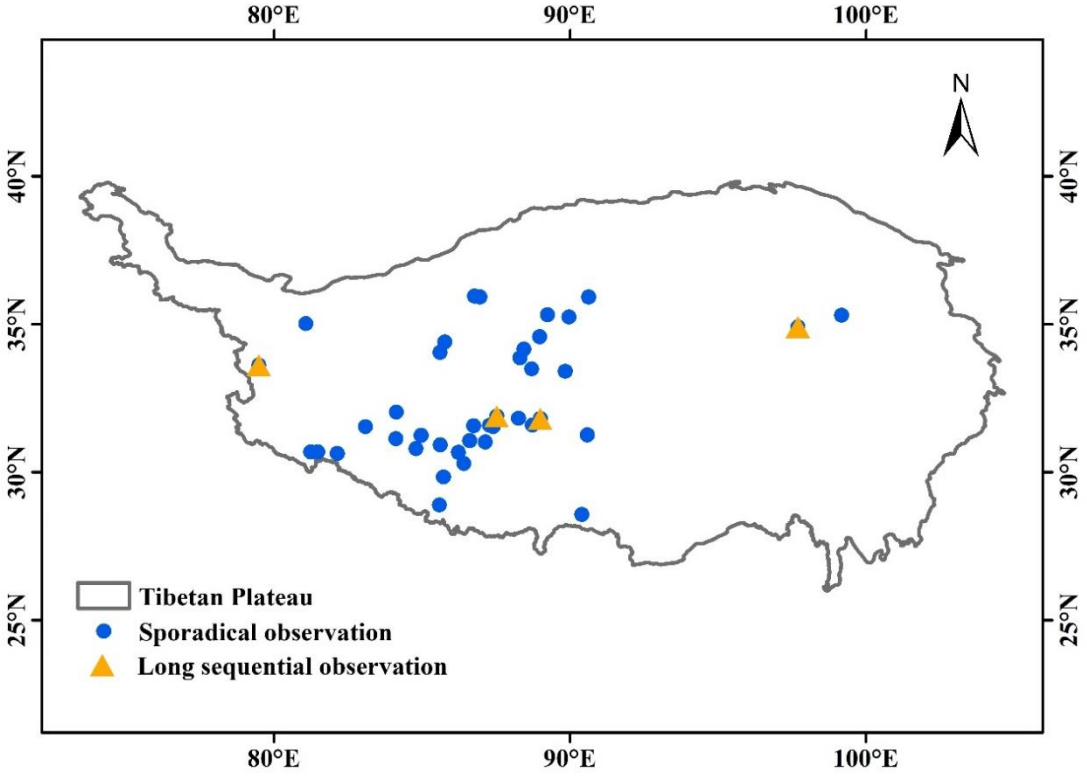

Figure S6 Location of lakes with *in-situ* observation.

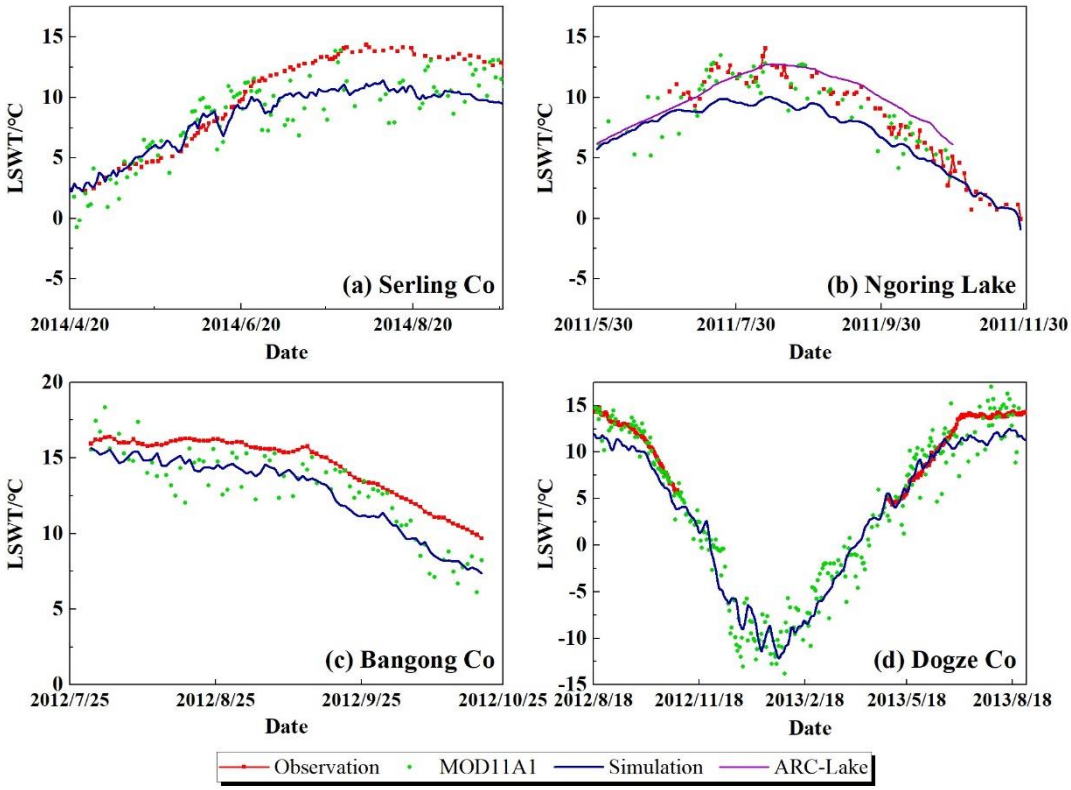

Figure S7 Comparison of Simulation results against *in-situ* observation and remote sensing results (based on MOD11A1 and ARC-Lake respectively) for 4 lakes with sequential observation summarized in Table S1.

Table S1 Summary of *in-situ* lake surface temperature observation used for validation (Location of lakes was shown in Figure S6). 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	Wang and Hou (2018)
TPL028	Dogze Co*	19/08/2012~30/08/2013	Wang and Hou (2018)
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	Cuoe 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	

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

Data sources	Data and methods	Period	Temporal resolution	Number of lakes	Limitations	References
ARC-Lake	ATSR-2/AATSR-based	1995-2012	Daily	112	No data when temperature below 0℃	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

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