Supplement of Geosci. Model Dev. Discuss., 8, 8547–8606, 2015
http://www.geosci-model-dev-discuss.net/8/8547/2015/
doi:10.5194/gmdd-8-8547-2015-supplement

Geoscientific Model Development Discussions

Supplement of

Determining lake surface water temperatures (LSWTs) worldwide using a tuned 1-dimensional lake model (*FLake*, v1)

A. Layden et al.

Correspondence to: A. Layden (aislinglayden99@gmail.com)

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (135 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	Z_d	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{\mathrm{jas}}$ (R^2_{adj})
8	Baikal	53.68	108.98	53.63	108.14	a2	50.0	*κd3*	19	1.00	-4.9	3.1	-0.35	0.30
9	Great bear	65.61	-121.64	65.91	-121.30	a2	35.8	*κd1*	19	0.63	0.6	11.5	1.34	0.50
11	Great slave	62.11	-114.61	62.09	-114.37	a3	20.5	*κd2*	19	0.50	-4.9	-5.5	-0.37	0.57
13	Winnipeg	52.28	-97.73	52.12	-97.25	a2	13.0	*κd4*	19	0.47	-6.2	5.7	-0.18	0.86
16	Ladoga	60.70	31.64	60.84	31.39	a3	26.0	*κd4*	19	0.90	7.2	0.5	0.59	0.52
17	Balkhash	45.96	74.53	45.91	73.95	a4	10.5	*κd5*	19	0.79	-6.1	1.6	-0.40	0.69
18	Onega	62.11	35.86	61.90	35.35	a3	30.0	*κd4*	19	0.50	1.1	-4.0	-0.46	0.62
23	Athabasca	59.30	-110.39	59.10	-109.96	a2	19.5	*κd4*	19	0.50	2.5	0.0	-0.02	0.70
27	Smallwood	54.39	-64.69	54.19	-64.31	a2	12.0	*κd4*	15	0.63	-0.7	-9.3	0.92	0.51
28	Reindeer	57.19	-102.66	57.19	-102.27	a2	12.8	*κd4*	15	0.55	-3.9	-2.1	-0.37	0.64
29	Vanern	58.60	13.36	58.88	13.22	a2	27.0	*κd3*	19	0.90	0.2	-6.5	-1.04	0.77
31	Winnipegosis	52.28	-100.55	52.37	-100.05	a3	10.5	*κd5*	19	0.62	-1.8	-3.7	0.43	0.89
32	Netilling	66.32	-70.31	66.42	-70.28	a4	30.0	*κd1*	8	0.60	2.7	0.3	1.65	0.62
37	Manitoba	50.88	-99.14	50.99	-98.80	a3	9.0	*κd5*	19	0.59	-3.8	0.4	-0.17	0.85
38	Nipigon	49.47	-88.59	49.80	-88.55	a2	27.5	*κd4*	19	0.83	-7.8	4.7	0.39	0.79
41	Qinghai	36.84	100.55	36.89	100.18	a4	25.5	*κd3*	19	0.59	1.1	-4.6	-0.86	0.16

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (135 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	$Inter_{jas}$ (R^2_{adj})	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{jas}$ (R^2_{adj})
44	Lake of the Woods	49.47	-95.63	49.38	-94.91	a3	11.9	*κd5*	19	0.67	-5.1	2.9	0.50	0.94
45	Khanka	44.56	132.89	44.94	132.42	a2	6.8	*κd5*	19	0.75	-1.2	8.4	0.04	0.88
49	Dubawnt	62.81	-101.95	63.13	-101.44	a1	18.6	*κd1*	15	0.75	-2.2	1.2	1.96	0.64
50	Peipus	58.60	27.42	58.41	27.59	a3	10.5	*κd5*	19	0.74	-4.6	0.2	-0.66	0.93
56	Amadjuak	64.91	-71.72	64.99	-71.13	a3	90.0	*κd2*	15	0.82	-9.5	-1.5	0.59	0.30
57	Cedar	52.98	-100.55	53.33	-100.14	a3	12.0	*κd5*	19	0.70	0.2	-1.2	0.40	0.83
58	Alakol	45.96	82.27	46.11	81.75	a3	33.0	*κd5*	8	1.05	-8.9	-3.6	-0.07	0.55
59	Hovsgol	50.88	101.25	51.02	100.48	a2	69.0	*κd5*	19	0.99	-18.5	-5.4	-0.73	0.05
62	Iliamna	59.30	-155.39	59.56	-154.90	a2	44.0	*κd4*	19	0.48	4.7	-1.1	0.45	0.74
68	Wollaston	58.60	-104.06	58.30	-103.33	a2	20.6	*κd5*	15	0.60	3.4	1.3	0.18	0.47
75	Hulun	48.77	118.13	48.97	117.38	a4	7.5	*κd5*	19	1.01	-9.6	-1.5	-0.65	0.76
76	mistassini	50.88	-73.83	50.82	-73.81	a2	30.0	*κd3*	15	0.71	0.1	-0.7	-0.95	0.36
83	Nueltin	60.00	-99.84	60.25	-99.40	a3	16.0	*κd3*	15	0.54	-1.4	-4.5	-0.45	0.63
91	Na-mu	30.53	91.41	30.71	90.66	a3	34.0	*κd2*	19	0.73	-0.7	-11.3	-0.28	0.12
95	Vattern	58.60	14.77	58.33	14.57	a3	39.0	*κd3*	19	1.00	1.8	-4.4	-0.74	0.71
97	Baker	64.21	-95.63	64.13	-95.28	a1	32.9	*κd1*	15	0.55	6.7	7.6	-0.19	0.15

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (135 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	$Inter_{jas}$ (R^2_{adj})	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{jas}$ (R^2_{adj})
100	Martre	63.51	-118.13	63.33	-117.91	a4	13.5	*κd4*	19	0.81	-7.2	0.3	0.56	0.84
105	Se-lin	31.93	89.30	31.77	88.95	a4	24.8	*κd4*	19	0.56	0.1	6.2	0.40	0.11
115	Astray	54.39	-66.80	54.38	-66.32	a2	16.0	*κd1*	8	0.77	3.0	-23.3	0.63	-0.16
121	Hyargas	48.77	93.52	49.13	93.30	a4	45.0	*κd5*	19	1.36	1.1	-3.2	0.25	0.17
124	Kasba	60.00	-102.66	60.34	-102.27	a3	16.0	*κd3*	15	0.55	-4.7	-3.8	0.00	0.71
126	Yathkyed	62.81	-98.44	62.69	-98.07	a1	16.0	*κd1*	15	0.63	-1.1	-0.2	0.44	0.38
127	Ronge	55.09	-105.47	55.11	-104.83	a3	19.0	*κd4*	15	0.56	1.4	-5.9	-0.62	0.84
128	Eau Claire	55.79	-74.53	56.15	-74.40	a2	17.5	*κd1*	15	0.58	-6.7	-12.1	0.00	0.82
130	Rainy	48.77	-93.52	48.61	-92.97	a4	14.8	*κd5*	15	1.00	-2.7	-2.7	-0.33	0.60
136	Vygozero	63.51	35.16	63.54	34.84	a2	11.1	*κd4*	15	0.76	1.4	8.8	0.03	0.51
137	Cree	57.19	-106.88	57.47	-106.64	a2	11.2	*κd5*	15	0.69	0.6	4.4	0.74	0.24
140	Limfjorden	56.49	9.14	56.78	9.17	a2	10.5	*κd4*	15	0.86	0.3	1.1	-0.53	0.91
141	Kaghasuk	60.70	-164.53	60.79	-164.22	a2	7.5	*κd3*	15	0.69	8.0	-1.6	-0.31	0.05
142	Har-us	48.07	92.81	48.06	92.30	a1	16.0	*κd4*	19	1.31	-2.9	-4.2	-0.15	0.70
144	Inari	69.12	28.13	69.04	27.83	a1	14.4	*κd3*	15	0.81	0.4	2.1	-0.45	0.21
145	Becharof	57.89	-156.80	57.85	-156.40	a2	84.0	*κd1*	19	0.79	-0.5	-9.9	-0.15	0.67
147	Lesserslave	55.09	-116.02	55.43	-115.49	a3	17.5	*κd5*	19	0.60	6.7	-7.4	0.02	0.75

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (135 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	Z_d	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{jas}$ (R^2_{adj})
149	Eskimo	69.12	-133.59	69.10	-132.76	a1	16.0	*κd2*	15	0.56	-0.5	13.7	-0.08	0.25
152	Aberdeen	64.21	-99.14	64.55	-98.59	a1	24.0	*κd1*	15	0.53	0.3	10.5	0.08	0.51
155	Bienville	55.09	-73.13	55.05	-72.98	a2	6.5	*κd5*	15	0.78	5.3	-0.9	-0.41	-0.06
157	Paijanne	61.40	25.31	61.71	25.49	a3	17.0	*κd4*	15	0.81	6.0	-2.9	0.06	0.02
158	Saintjean	48.77	-72.42	48.66	-72.02	a3	22.5	*κd4*	19	0.81	-0.6	-6.6	-0.33	0.69
162	Contwoyto	65.61	-111.09	65.59	-110.66	a1	24.0	*κd1*	15	0.44	4.2	13.8	0.50	0.63
163	Malaren	59.30	16.17	59.44	16.19	a3	11.9	*κd5*	15	1.34	1.6	0.9	0.48	0.79
164	Puruvesi	61.40	29.53	61.77	29.02	a2	9.0	*κd5*	15	1.18	4.6	1.8	0.01	-0.04
165	Champlain	44.56	-73.83	44.45	-73.27	a3	22.8	*κd4*	15	1.09	-16.1	-4.5	0.26	0.30
169	Wholdaia	60.70	-104.77	60.69	-104.15	a2	10.0	*κd4*	15	0.64	-1.5	8.1	-0.27	0.03
170	Selawik	66.32	-161.72	66.51	-160.73	a1	6.5	*κd4*	8	1.07	-3.6	-0.3	-0.67	0.84
172	Gods	54.39	-94.92	54.62	-94.21	a2	13.2	*κd4*	15	0.65	1.4	8.7	-0.73	0.49
174	Island	53.68	-94.92	53.85	-94.70	a2	10.1	*κd5*	15	0.89	0.1	8.7	-0.22	0.13
178	Takiyuak	66.32	-113.91	66.28	-113.17	a1	24.0	*κd1*	15	0.52	0.0	7.5	0.76	0.58
179	Terinam	30.53	85.78	30.90	85.61	a1	22.5	*κd5*	19	0.55	-3.6	6.1	-0.03	-0.02
181	Bosten	41.75	87.19	41.98	87.07	a4	19.0	*κd5*	19	0.76	-0.1	-4.1	-0.90	0.09
184	Mackay	64.21	-111.80	63.96	-111.30	a1	15.0	*κd2*	15	0.65	-6.9	4.9	0.07	0.68

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (135 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	Z_d	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{jas}$ (R^2_{adj})
186	Topozero	65.61	32.34	65.62	32.09	a3	24.0	*κd3*	15	0.57	0.9	-2.3	-0.68	0.33
187	Orivesi	62.11	29.53	62.35	29.59	a3	12.8	*κd4*	15	0.78	5.3	-2.7	0.23	0.53
189	Hottah	64.91	-118.83	64.95	-118.44	a1	24.0	*κd3*	15	0.65	-3.1	1.2	0.45	0.39
191	Bras D'or	45.96	-61.17	45.95	-60.83	a2	20.0	*κd2*	15	0.58	7.5	2.2	-0.14	0.82
195	Pielinen	62.81	29.53	63.16	29.71	a2	9.9	*κd5*	15	1.02	-2.2	7.9	-0.01	0.53
198	Nipissing	45.96	-80.16	46.24	-79.92	a3	22.5	*κd4*	19	1.29	3.7	-0.2	-0.03	0.89
211	Nonacho	62.11	-109.69	61.82	-108.92	a3	24.0	*κd4*	15	0.75	-1.5	-2.5	0.04	0.07
213	Playgreen	53.68	-98.44	54.07	-97.75	a3	12.0	*κd4*	15	0.48	1.1	0.4	0.10	0.85
214	Haukivesi	62.11	28.83	62.10	28.52	a2	8.5	*κd5*	15	1.39	-1.0	3.8	-0.84	0.08
215	Tangra	31.23	87.19	31.05	86.59	a3	37.5	*κd4*	19	0.86	4.3	9.7	-0.13	0.05
218	Khantayskoe	68.42	91.41	68.36	91.18	a1	36.5	*κd1*	15	0.58	3.9	6.8	0.05	0.04
222	Peter Pond	55.79	-108.98	55.84	-108.55	a3	13.7	*κd5*	15	0.64	-1.6	-7.1	0.63	0.75
225	South Moose	53.68	-100.55	53.83	-100.04	a3	12.0	*κd4*	19	0.50	-2.1	-1.5	-0.44	0.86
226	Aylmer	64.21	-108.98	64.15	-108.46	a1	24.0	*κd1*	15	0.55	-1.0	5.8	-0.15	0.74
227	Garry	65.61	-99.84	65.95	-99.40	a1	15.0	*κd1*	15	0.52	0.9	11.4	0.53	0.77
228	Segozero	63.51	33.75	63.32	33.76	a3	21.8	*κd4*	19	0.68	-0.3	-3.8	0.89	0.43

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (135 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	Z_d	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{jas}$ (R^2_{adj})
236	Simcoe	44.56	-79.45	44.47	-79.42	a3	22.5	*κd4*	19	1.08	1.5	-4.3	0.25	0.86
246	Kaminak	62.11	-95.63	62.20	-94.90	a4	10.0	*κd2*	15	0.74	-3.0	4.8	-0.09	-0.04
251	Cross	54.39	-97.73	54.71	-97.58	a2	6.1	*κd5*	15	0.97	1.5	7.3	-1.37	-0.02
252	Gras	64.21	-111.09	64.54	-110.38	a1	37.5	*κd2*	15	0.60	-3.8	4.7	-0.04	0.58
253	Guillaumedelisle	56.49	-76.64	56.33	-76.28	a2	10.0	*κd5*	15	0.71	0.2	6.9	0.36	0.23
254	Ennadai	60.70	-101.95	60.96	-101.31	a3	16.0	*κd2*	15	0.55	2.0	-5.1	-0.56	0.66
264	Kamllukuak	62.11	-101.95	62.28	-101.73	a4	16.0	*κd3*	15	0.58	0.5	3.6	0.39	0.74
269	Tulemalu	62.81	-99.84	62.99	-99.48	a1	24.0	*κd1*	15	0.64	-2.9	-1.0	1.39	0.66
270	Evans	50.88	-77.34	50.97	-77.02	a2	7.5	*κd5*	15	0.88	-4.1	7.5	-0.32	0.31
273	Pyazero	66.32	30.94	66.07	30.98	a3	33.0	*κd5*	15	0.65	2.7	-1.4	0.10	0.03
275	Clinton Colden	64.21	-107.58	63.94	-107.45	a1	24.0	*κd1*	15	0.58	-0.7	2.9	-0.08	0.14
280	Big Trout	53.68	-90.70	53.77	-90.02	a3	15.8	*κd4*	15	0.78	-0.5	-7.7	0.53	0.83
281	Dore	54.39	-107.58	54.76	-107.28	a2	16.3	*κd5*	19	0.68	-0.8	7.4	0.19	0.87
282	Sakami	52.98	-77.34	53.22	-76.75	a2	8.0	*κd4*	15	0.73	0.6	6.3	-0.67	0.43
285	Saint Joseph	50.88	-91.41	51.04	-90.81	a3	7.5	*κd5*	15	1.22	-1.8	-4.1	-0.90	0.14
292	Selwyn	60.00	-104.77	60.00	-104.68	a3	16.0	*κd4*	15	0.67	3.9	-4.5	-0.30	-0.04

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (135 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	Z_d	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{jas}$ (R^2_{adj})
299	Buffalo	60.00	-116.02	60.22	-115.49	a3	7.5	*κd4*	19	0.88	-0.2	-2.3	-0.76	0.30
300	ngoring	34.74	98.44	34.93	97.71	a3	17.6	*κd4*	19	0.59	-1.8	3.9	0.76	0.34
302	Har-hu	38.25	97.73	38.31	97.59	a3	15.0	*κd4*	19	0.55	-6.6	-1.8	1.11	0.47
303	North Moose	53.68	-100.55	54.05	-100.16	a3	6.1	*κd5*	15	0.64	-2.4	-0.7	-0.45	0.92
311	Atlin	59.30	-134.30	59.57	-133.75	a2	25.0	*κd5*	8	0.55	-7.3	5.9	0.20	0.74
312	Ayakkum	37.54	90.00	37.55	89.35	a1	12.0	*κd4*	19	0.45	-4.7	-5.6	-0.34	0.56
313	Scott	60.00	-106.17	60.02	-106.07	a2	10.0	*κd3*	15	1.14	-1.7	1.3	0.34	-0.06
316	Tathlina	60.70	-118.13	60.54	-117.64	a3	12.0	*κd4*	19	0.85	-3.4	-1.9	-0.15	0.40
319	Southhenik	61.40	-97.73	61.37	-97.29	a3	16.0	*κd2*	15	0.58	-0.5	3.5	-0.15	0.59
320	Kaminuriak	62.81	-96.33	62.96	-95.79	a1	16.0	*κd1*	15	0.59	0.9	1.5	0.51	0.50
323	Churchill	55.79	-108.98	55.96	-108.29	a3	13.5	*κd5*	19	0.55	0.1	-4.1	0.36	0.83
324	Angikuni	62.11	-100.55	62.27	-100.04	a3	10.0	*κd4*	15	0.66	-0.3	12.4	0.18	-0.07
326	Deschambault	55.09	-104.06	54.78	-103.45	a3	9.3	*κd5*	15	0.64	-5.6	-0.3	-0.06	0.87
333	Black	59.30	-106.17	59.05	-105.73	a3	16.0	*κd4*	15	0.58	-4.7	-6.3	0.57	0.80
334	Artillery	62.81	-108.28	63.17	-107.82	a4	24.0	*κd1*	15	0.53	-1.1	-1.5	0.43	0.61
336	Oling	34.74	97.73	34.92	97.27	a4	15.0	*κd4*	19	0.50	-8.0	3.2	0.04	0.46

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (135 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	Z_d	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{jas}$ (R^2_{adj})
338	nerpichye	56.49	163.83	56.39	162.77	a2	6.6	*κd5*	19	0.79	4.4	-14.4	-0.34	0.73
340	winnebago	43.86	-88.59	44.02	-88.42	a4	12.0	*κd4*	19	0.71	-3.6	2.0	-0.66	0.87
344	krasnoe	64.21	175.08	64.53	174.44	a4	6.0	*κd4*	19	0.93	-4.9	3.3	-0.32	0.76
345	ashuanipi	52.98	-66.09	52.69	-66.14	a2	7.5	*κd5*	15	0.65	1.7	1.2	-0.08	0.11
346	keitele	62.81	26.02	62.89	25.99	a2	7.0	*κd5*	15	1.92	-0.4	-1.6	0.25	-0.05
353	payne	59.30	-73.83	59.40	-73.82	a2	15.0	*κd1*	15	0.49	2.3	-1.1	-0.31	0.43
354	Ang-La Jen	31.23	83.67	31.53	83.09	a1	24.0	*κd4*	15	0.52	4.5	-2.2	-0.52	-0.03
356	sandy	52.98	-93.52	53.00	-93.03	a3	8.0	*κd5*	15	1.04	-1.1	-5.3	-0.54	0.35
363	granville	56.49	-100.55	56.40	-100.21	a3	15.0	*κd5*	15	0.74	6.4	0.2	-1.07	0.44
365	snowbird	60.70	-103.36	60.64	-102.94	a4	24.0	*κd3*	15	0.46	1.0	-3.1	-0.12	0.81
367	trout	60.70	-121.64	60.58	-121.13	a3	16.0	*κd4*	19	0.59	-3.3	-5.8	0.54	0.44
368	manouane	50.88	-71.02	50.76	-70.99	a2	16.0	*κd4*	15	0.80	0.0	-4.1	-0.51	-0.03
373	tebesjuak	63.51	-99.14	63.76	-98.98	a1	24.0	*κd1*	15	0.56	5.5	7.7	0.15	0.68
377	naknek	58.60	-156.09	58.64	-155.67	a3	30.8	*κd4*	15	0.84	-4.4	-5.8	0.39	0.60
382	kyaring	31.23	88.59	31.13	88.32	a4	30.0	*κd4*	19	0.82	-13.9	-2.6	0.88	0.01
395	princessmary	64.21	-97.73	63.93	-97.66	a4	36.0	*κd1*	15	0.44	0.9	25.9	0.68	0.53

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (135 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	Z_d	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{jas}$ (R^2_{adj})
536	Bangong	33.33	80.16	33.61	79.71	a4	18.4	*κd5*	8	0.59	-6.6	7.4	-0.02	0.23
649	Pomo	28.42	90.70	28.55	90.40	a2	22.5	*κd3*	15	0.68	1.9	11.1	-0.08	-0.06
697	Pangong	34.04	78.75	33.82	78.61	a4	30.0	*κd4*	8	0.55	-9.0	-6.9	-0.17	0.63
1240	Pyhajarvi	60.70	22.50	61.00	22.28	a3	15.0	*κd4*	19	0.76	0.7	0.8	-0.44	0.67
1820	Vesijarvi	61.40	25.31	61.09	25.39	a2	9.0	*κd5*	8	1.38	-2.8	5.1	-0.73	0.33

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (25 shallow lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	Z_d	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{jas}$ (R^2_{adj})
53	Uvs	50.18	93.52	50.33	92.81	a4	32.0	κd 5	19	1.06	-5.6	-0.8	-0.02	0.36
85	Syvash	45.96	35.16	45.96	34.74	a2	12.0	κd 6	19	1.08	-3.1	-14.9	-0.13	0.86
120	Tengiz	50.18	68.91	50.44	68.90	a1	28.0	κd 7	19	1.59	1.3	5.9	-0.65	0.76
125	Claire	58.60	-112.50	58.59	-112.08	a3	8.0	κd 4	19	0.96	-3.3	-2.2	-0.56	0.30
146	Saintclair	42.46	-82.97	42.50	-82.73	a4	16.0	κd 3	19	0.89	0.3	-3.1	-0.94	0.90
151	Red	48.07	-95.63	48.04	-95.08	a4	16.0	κd 4	19	0.94	-0.7	-2.5	-0.67	0.92
160	Beloye	60.00	37.97	60.18	37.64	a3	10.4	κd 6	19	0.81	-4.1	-0.3	-0.27	0.71
229	Baruntorey	50.18	116.02	50.07	115.81	a4	10.0	κd 4	19	0.62	0.5	3.2	-0.45	0.48
239	Ulungur	47.37	87.89	47.22	87.30	a3	32.0	κd 5	19	1.20	-5.7	2.3	0.41	0.56
241	Sarykamyshskoye	41.75	57.66	41.88	57.61	a4	19.8	κd 5	19	1.36	5.4	1.0	-1.04	0.81
247	Sasykkol	46.67	81.56	46.58	80.91	a1	13.2	κd 5	8	1.04	0.9	0.5	0.56	0.89
250	Manychgudilo	45.96	42.89	46.26	42.98	a3	14.4	κd 6	19	1.10	-3.3	-1.1	-0.71	0.83
262	Kulundinskoye	52.98	80.16	52.98	79.58	a1	22.0	κd 7	19	1.15	-0.2	2.4	0.08	0.54
271	Seletyteniz	52.98	73.83	53.23	73.18	a1	16.0	κd 7	19	1.26	2.6	7.7	-0.24	0.22
291	Buyr	48.07	118.13	47.81	117.69	a4	20.3	κd 5	19	1.06	-2.1	-1.8	0.28	0.69
294	Har	48.07	93.52	48.05	93.21	a4	25.0	κd 6	19	1.29	0.2	1.8	1.17	0.43

Supplement A Tuned values for LSWT regulating properties and metrics results Seasonally ice covered lakes (25 shallow lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties			tuning period	Tuning metrics				Additional metrics
		Lat	Lon	Lat	Lon	α	Z_d	κ_d	(years)	MAD (°C)	1 °C cooling day (bias)	1 °C warming day (bias)	JAS bias (°C)	$Inter_{\mathrm{jas}}$ (R^2_{adj})
297	Ebi	44.56	83.67	44.86	82.92	a1	12.5	κd 5	8	1.13	0.3	0.3	-0.58	0.77
310	Balaton	46.67	18.28	46.88	17.83	a3	10.0	κd 6	19	1.04	-4.8	-4.4	-0.18	0.72
350	Malheur	43.16	-119.53	43.34	-118.83	a1	7.5	κd 5	15	1.24	0.7	3.1	-0.50	0.23
351	Dauphin	50.88	-99.84	51.27	-99.77	a4	9.6	κd 5	19	0.71	2.7	-1.2	-0.19	0.81
358	Razelm	44.56	28.83	44.83	28.97	a2	7.5	κd 5	19	1.08	0.7	-14.1	-0.89	0.90
366	Millelacs	45.96	-94.22	46.24	-93.65	a4	16.0	κd 4	19	0.83	-8.0	-1.7	-0.16	0.83
425	Ubinskoe	55.09	80.16	55.47	80.05	a1	22.0	κd 6	19	1.35	-6.3	4.8	-0.04	0.34
1029	Evoron	51.58	137.11	51.48	136.51	a3	10.0	κd 4	15	0.95	-5.2	-0.7	-0.75	-0.03
1441	Istada	32.63	68.20	32.48	67.92	a3	3.8	κd 7	15	1.95	3.8	2.8	-1.96	0.09

Supplement A Tuned values for LSWT regulating properties and metrics results Non-seasonally ice covered lakes (86 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties		tuning period	Tuning metrics			Additional metrics	
		Lat	Lon	Lat	Lon	Z_d	κ_d	(years)	MAD (ºC)	$mth_{\max}$ bias (°C)	$mth_{\min}$ bias (°C)	$inter_{\max}$ (R^2_{adj})	$inter_{\min}$ (R^2_{adj})
1	Caspian	41.75	50.63	41.85	50.36	36.0	*kd4*	19	1.27	-0.12	2.15	0.32	0.86
2	Superior	47.37	-88.59	47.72	-88.23	30.0	*kd1*	19	1.68	0.07	-0.40	0.21	0.88
3	Victoria	-1.75	33.75	-1.3	33.23	30.0	*kd2*	19	0.55	-0.15	0.05	0.02	0.12
5	Huron	44.56	-82.27	44.78	-82.21	17.7	*kd2*	19	1.24	0.17	-0.08	0.38	0.93
6	Michigan	43.86	-87.19	43.86	-87.09	25.5	*kd2*	19	1.33	-0.34	-0.24	0.62	0.87
7	Tanganyika	-5.96	29.53	-6.07	29.46	60.0	*kd2*	19	0.49	0.47	0.08	0.32	0.07
10	Malawi	-12.28	34.45	-11.96	34.59	60.0	*kd3*	19	0.63	0.01	0.88	0.23	0.17
12	Erie	42.46	-81.56	42.25	-81.16	19.0	*kd3*	15	0.96	-0.87	0.33	0.24	0.88
15	Ontario	43.86	-78.05	43.85	-77.77	25.8	*kd3*	19	1.54	-0.09	-0.28	0.61	0.73
20	Titicaca	-15.79	-69.61	-15.92	-69.3	21.0	*kd1*	19	0.61	0.04	-0.68	0.21	0.16
21	Nicaragua	11.58	-85.78	11.57	-85.36	13.0	*kd4*	15	0.63	-0.87	0.04	0.40	0.05
22	Turkana	3.16	36.56	3.53	36.08	45.3	*kd8*	15	0.78	-0.19	0.03	0.19	0.25
25	Issykkul	42.46	77.34	42.46	77.25	100.0	*kd6*	8	1.85	-3.09	-0.80	-0.11	-0.06
30	Albert	1.75	30.94	1.67	30.91	62.5	*kd3*	19	0.39	-0.23	0.49	-0.06	-0.04
36	Mweru	-9.47	28.83	-9.01	28.74	10.5	*kd6*	19	0.73	0.16	0.21	0.23	0.19
46	Mirim	-33.33	-53.44	-32.89	-53.25	15.0	*kd2*	19	0.66	-0.33	0.65	0.82	0.60
51	Van	38.25	42.89	38.66	42.98	28.5	*kd4*	19	0.96	-0.45	0.56	0.50	0.70

Supplement A Tuned values for LSWT regulating properties and metrics results Non-seasonally ice covered lakes (86 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties		tuning period	Tuning metrics			Additional metrics	
		Lat	Lon	Lat	Lon	Z_d	κ_d	(years)	MAD (ºC)	$mth_{\max}$ bias (°C)	$mth_{\min}$ bias (°C)	$inter_{\max}$ (R^2_{adj})	$inter_{\min}$ (R^2_{adj})
55	Tana	11.58	37.27	11.95	37.31	8.0	*kd5*	15	1.38	0.11	0.48	0.12	-0.05
66	Tai	31.23	120.94	31.21	120.24	2.9	*kd5*	19	1.63	-1.15	0.25	0.29	0.48
67	Kivu	-2.46	29.53	-2.04	29.23	60.0	*kd3*	19	0.44	-0.53	0.14	-0.06	-0.06
69	Edward	-0.35	29.53	-0.39	29.61	25.5	*kd4*	19	0.49	-0.38	0.27	-0.03	0.00
73	Tapajos	-3.16	-55.55	-2.88	-55.14	5.0	*kd5*	19	0.85	0.44	-0.60	0.15	0.04
84	Chiquita	-31.23	-62.58	-30.74	-62.61	7.3	*kd4*	19	0.95	0.16	-0.26	0.85	0.20
94	Buenosaires	-46.67	-73.13	-46.66	-72.5	146.3	*kd7*	19	0.86	0.02	-0.53	0.47	0.14
99	Kyoga	1.05	33.05	1.5	33.01	9.0	*kd6*	19	0.92	-0.31	0.23	-0.07	0.33
101	Madre	24.21	-97.73	24.64	-97.66	5.0	*kd5*	19	1.13	-0.95	0.17	0.12	0.22
109	Hungtze	33.33	118.83	33.34	118.53	5.0	*kd4*	19	1.23	-1.26	0.74	0.29	0.72
114	Okeeciiobee	27.02	-80.86	26.95	-80.86	7.5	*kd4*	19	0.77	0.12	-0.14	0.52	0.26
117	Argentine	-50.88	-73.13	-50.33	-73.03	75.0	*kd1*	19	0.99	0.64	0.80	0.29	0.33
119	Chishi	-8.77	30.23	-8.71	29.72	10.0	*kd7*	19	0.81	0.35	-0.16	0.19	-0.04
133	Poopo	-19.30	-67.50	-18.81	-67.06	2.3	*kd6*	19	1.32	0.82	-1.42	-0.08	-0.04
134	Xingu	-2.46	-52.73	-2.16	-52.2	5.0	*kd5*	19	0.96	-0.21	-0.19	-0.05	-0.03
135	Sevan	40.35	45.70	40.39	45.29	20.5	*kd4*	19	0.98	-0.01	-0.46	0.50	0.66
150	Toba	2.46	99.14	2.61	98.9	30.0	*kd1*	15	1.48	0.68	1.98	0.10	0.07

Supplement A Tuned values for LSWT regulating properties and metrics results Non-seasonally ice covered lakes (86 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties		tuning period	Tuning metrics			Additional metrics	
		Lat	Lon	Lat	Lon	Z_d	κ_d	(years)	MAD (ºC)	$mth_{\max}$ bias (°C)	$mth_{\min}$ bias (°C)	$inter_{\max}$ (R^2_{adj})	$inter_{\min}$ (R^2_{adj})
153	Chapala	20.00	-103.36	20.21	-103.05	10.8	*kd3*	19	0.67	-0.30	0.12	0.03	0.03
156	Eyasi	-3.86	35.16	-3.58	35.04	3.8	*kd7*	19	1.11	-0.95	0.41	-0.08	0.13
166	Abaya	5.96	37.97	6.3	37.83	17.5	*kd5*	15	0.89	0.28	-0.67	0.14	-0.08
167	Sanmartin	-48.77	-73.13	-48.75	-72.84	85.0	*kd1*	15	0.90	1.33	-0.60	0.46	0.69
171	Viedma*	-50.18	-73.13	-49.59	-72.56	2.5	*kd7*	19	4.08	0.04	-1.72	0.25	0.45
175	Luang	7.37	100.55	7.46	100.38	12.5	*kd4*	15	0.68	0.46	-0.84	0.37	0.22
176	Managua	12.28	-86.48	12.32	-86.35	19.5	*kd3*	15	0.54	0.19	-0.30	0.52	0.00
194	Salton	33.33	-116.02	33.3	-115.83	12.0	*kd5*	19	0.79	-0.09	-0.40	0.46	0.48
197	karabogazgol	41.05	54.14	41.23	53.54	25.0	*kd9*	19	1.78	-2.72	-0.04	0.50	0.14
204	Chilka	19.30	85.78	19.69	85.38	5.0	*kd5*	8	1.15	-1.69	0.43	0.52	-0.06
205	bay	14.39	121.64	14.36	121.26	7.5	*kd4*	15	0.91	0.52	-0.18	0.12	0.40
209	Llanquihue	-41.75	-73.13	-41.14	-72.79	54.6	*kd1*	19	0.52	0.58	-0.29	0.66	0.62
210	Alexandrina	-35.44	139.92	-35.52	139.09	12.5	*kd3*	19	1.02	0.33	-1.39	0.51	0.71
219	Colhuehuapi	-45.96	-68.91	-45.47	-68.76	5.0	*kd4*	19	1.12	-0.61	-0.18	0.12	0.47
231	Mangueira	-33.33	-52.73	-33.16	-52.84	9.9	*kd3*	19	0.62	-0.38	0.66	0.80	0.54
233	Chao	31.23	118.13	31.57	117.57	4.5	*kd4*	19	1.24	-1.42	0.56	0.52	0.19
235	Tamiahua	21.40	-97.73	21.66	-97.57	12.5	*kd3*	19	0.84	-0.57	-0.03	0.33	0.09

* poorly tuned lakes (Lake Viedma and the Dead Sea)

Supplement A Tuned values for LSWT regulating properties and metrics results Non-seasonally ice covered lakes (86 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties		tuning period	Tuning metrics			Additional metrics	
		Lat	Lon	Lat	Lon	Z_d	κ_d	(years)	MAD (ºC)	$mth_{\max}$ bias (°C)	$mth_{\min}$ bias (°C)	$inter_{mx}$ (R^2_{adj})	$inter_{\min}$ (R^2_{adj})
244	Dead sea*	31.23	35.86	31.52	35.49	372.5	*kd4*	19	3.10	-6.46	-0.50	0.15	-0.05
245	Izabal	15.09	-89.30	15.57	-89.11	18.0	*kd4*	15	0.44	-0.26	-0.44	0.59	0.44
255	Tumba	-1.05	18.28	-0.82	17.98	10.0	*kd5*	19	0.67	-0.66	0.46	-0.06	0.05
256	Chilwa	-15.79	35.86	-15.32	35.71	10.0	*kd5*	19	0.80	0.57	-0.58	0.19	-0.02
257	Caratasca	15.09	-84.38	15.35	-83.85	5.0	*kd5*	15	1.01	0.19	-1.22	0.30	0.28
265	Caxuana	-2.46	-52.03	-2.04	-51.5	7.5	*kd4*	19	0.92	-0.12	-0.08	-0.08	0.02
267	Beysehir	37.54	31.64	37.78	31.52	7.5	*kd5*	19	1.70	-1.39	0.09	0.53	0.85
268	Biwa	35.44	136.41	35.25	136.08	20.5	*kd3*	15	0.96	-0.49	-0.18	0.06	0.73
277	Coari	-4.56	-63.28	-4.25	-63.37	5.0	*kd5*	19	0.64	0.22	-0.23	0.09	0.28
284	Coro	11.58	-70.31	11.56	-69.86	24.0	*kd1*	15	0.44	-0.22	0.11	-0.04	0.42
287	Kaoyou	32.63	119.53	32.87	119.31	5.9	*kd4*	19	1.45	-0.61	2.32	0.35	0.47
293	Indianriver	28.42	-80.86	28.24	-80.64	12.5	*kd3*	15	1.61	-0.12	-2.39	0.04	0.77
295	Taupo	-38.95	176.48	-38.81	175.9	45.5	*kd3*	19	0.60	0.35	0.01	0.72	0.74
304	Fagnano	-54.39	-68.20	-54.55	-68.03	70.0	*kd1*	19	0.80	1.18	-0.29	0.31	0.22
305	Ebrie	5.26	-4.22	5.3	-4.26	3.4	*kd7*	15	1.25	0.08	-0.09	-0.09	-0.25
314	Upemba	-8.77	26.72	-8.65	26.4	12.5	*kd8*	19	0.87	0.00	-0.74	0.02	-0.06
321	rogoaguado	-12.98	-66.09	-12.91	-65.73	7.5	*kd3*	19	0.67	-0.44	0.26	0.00	-0.07

* poorly tuned lakes (Lake Viedma and the Dead Sea)

Supplement A Tuned values for LSWT regulating properties and metrics results Non-seasonally ice covered lakes (86 lakes)

ARC-Lake index	lake name	ERA data Co-ordinates		Lake centre Co-ordinates		Tuned values for LSWT regulating properties		tuning period	Tuning metrics			Additional metrics	
		Lat	Lon	Lat	Lon	Z_d	κ_d	(years)	MAD (ºC)	$mth_{\max}$ bias (°C)	$mth_{\min}$ bias (°C)	$inter_{\max}$ (R^2_{adj})	$inter_{\min}$ (R^2_{adj})
325	Kwania	1.75	33.05	1.72	32.65	4.5	*kd7*	15	0.81	-0.18	0.18	0.20	-0.01
327	Geneva	45.96	6.33	46.37	6.25	46.3	*kd6*	19	0.96	-0.82	-1.22	0.20	0.66
332	Towuti	-3.16	122.34	-2.79	121.52	33.8	*kd1*	19	0.91	0.99	-1.04	0.18	0.16
343	Nahuelhuapi	-41.05	-71.72	-40.92	-71.52	47.1	*kd1*	19	1.04	1.11	-1.18	-0.06	0.75
349	Perlas	12.28	-83.67	12.54	-83.67	6.3	*kd6*	15	0.78	0.20	-0.25	0.37	-0.03
352	Constance	47.37	9.14	47.65	9.28	45.0	*kd9*	15	0.91	-1.18	-0.21	0.49	0.70
380	Tahoe	38.95	-120.23	39.09	-120.04	39.0	*kd1*	19	1.19	-1.05	0.38	0.04	-0.05
390	Egridir	38.25	30.94	38.07	30.85	13.5	*kd5*	19	0.86	-0.71	-0.10	0.79	0.87
411	Pyramid	39.65	-120.23	40.03	-119.55	45.0	*kd6*	19	0.93	0.33	0.60	0.48	0.44
418	Aby	5.26	-3.52	5.23	-3.23	1.9	*kd7*	15	1.05	0.64	-0.26	-0.08	0.10
527	Abe	10.88	42.19	11.17	41.79	21.5	*kd8*	15	0.98	-1.00	-0.36	0.36	-0.06
579	Chamo	5.96	37.97	5.83	37.55	20.0	*kd7*	15	1.01	-0.44	-1.30	-0.04	-0.06
723	Enriquillo	18.60	-71.72	18.49	-71.58	2.0	*kd8*	8	1.59	0.16	-2.01	-0.04	-0.06
876	Weishan	34.74	118.13	34.61	117.24	6.3	*kd4*	19	1.20	-1.09	1.01	0.37	0.03
883	Mono	38.25	-119.53	38.01	-118.96	16.5	*kd4*	15	0.88	0.50	0.30	0.26	0.50
1128	Walker	38.95	-119.53	38.7	-118.71	36.0	*kd7*	15	0.84	-0.45	-0.15	0.16	0.06
1188	Clear	38.95	-123.05	39.02	-122.77	16.3	*kd5*	15	0.72	-0.55	0.20	0.05	0.45
1748	Almanor	40.35	-121.64	40.26	-121.19	13.5	*kd4*	15	0.91	0.31	0.00	-0.02	0.24