Lake Lacawac, Bruce R. Hargreaves, Lehigh University (brh0@lehigh.edu, http://www.lehigh.edu/~brh0) 41° 22.5'N 75° 17.3'W elevation 428m

18 Apr 2014, 10:40-11:40am EDT: platform moved to lake center 16Nov 2013: platform move to dock 11:45-13:00 EDT

The water level sensor (referenced to dock) settles for several days after moving platform to lake center and thus underestimates water level during this period.

H310 sensor depth & Lake level are based on differential pressure
sensor with ca 0.1mm resolution & vertical position referenced to bottom of lake.
Sensor PSIG converted to depth using density of water at 4oC (1.43321 psi/m)
Lake level is referenced also to lower frame of dock at SE corner (2003-May2005)
(Actual water level at dock varies seasonally with density of water column and hourly from precip, runoff, evaporation, seepage & outflow. Outflow also varies with status of beaver dam).

5280 ft/mile
1609.3 m/mile

Std pressure at sea level =1 atm=760 mm Hg=29.92" Hg=1013.2 mbars
Std pressure at 428m elevation =724 mm Hg, 29.61 in. Hg, (965.2 mbars)

	Tair avg F	Tair max F	Tair min F		Rain-in	WS-mph	WS max mph					Tw 0.1m F	Tw 0.5m F	Tw 1m F	Tw 2m F	Tw 3m F	Tw 4m F	Tw 5m F	Tw 6m F	Tw 8m F	Tw 10m F	Tw 12m F					
	60.8	84.2	40.8		0.85	3.6	22					69.4	69.2	69.2	68.7	68.0	66.4	60.8	53.2	45.9	44.2	44.0					
Month summary avg Tw	Tair avg-C	Tair Hi-C	Tair Min-C	RHair-%	Rain-mm	WS-m/s	WS Max-m/s	WDIR-deg	Barom-mb	Sum Rad W/m2	Sum PAR uM/m2/s	Tw 0.1m	Tw 0.5m	Tw 1m	Tw 2m	Tw 3m	Tw 4m	Tw 5m	Tw 6m	Tw 8m	Tw11.1m	Tw12.4m	H310_z (m)	Lakelevel-mm (4oC)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc
15.0	16.0	29.0	4.9	80.3	21.6	1.6	9.9	230.5	968.5	478037118	981	20.8	20.7	20.6	20.4	20.0	19.1	16.0	11.8	7.7	6.8	6.7	11.0	-103.5	21.6	12.3	44.4	31.8

month (All)

PAR & PYR Integration period=15min instead of 60min after 11am on 9/11/2013

Data

Location	% records	Date	Day of Yr	Tair avg-C	Tair Hi-C	Tair Min-C	RHair-%	Rain-mm	WS-m/s	WS Max m/s	WDIR-deg	Barom-mb	Sum Rad J/m2	Sum PAR Mol/m2	Tw 0.1m	Tw 0.5m	Tw 1m	Tw 2m	TW3m	TW4m	TW5m	TW6m	TW8m	TW H310-C	TW12m	H310 depth-m (4oC)	Lakelevel-mm (4oC)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc
LC	100%	9/1/2014	244	22.7	27.0	19.3	85.2	0.0	1.0	4.7	260	964.6	13716193	29.3	23.17	22.69	22.62	22.42	22.10	19.94	14.91	11.16	7.58	6.7	6.57	11.1	-70.8	0.000	12.4	39.6	30.1
LC	100%	9/2/2014	245	24.0	29.0	19.6	78.2	0.7	1.8	6.9	254	961.8	19561282	41.1	23.88	23.70	23.14	22.66	22.19	19.99	14.98	11.23	7.59	6.7	6.58	11.0	-72.4	0.700	12.4	40.3	29.7
LC	100%	9/3/2014	246	19.9	24.4	15.6	74.5	0.0	1.8	6.1	295	966.3	20550478	42.3	23.79	23.78	23.82	23.08	22.30	20.02	15.03	11.24	7.62	6.7	6.61	11.0	-75.3	0.700	12.4	41.0	29.8
LC	100%	9/4/2014	247	20.4	26.6	12.6	74.4	0.0	1.3	7.6	232	970.4	20254207	41.9	23.78	23.70	23.70	23.30	22.41	20.11	15.10	11.30	7.63	6.7	6.60	11.0	-78.9	0.700	12.5	39.9	27.4
LC	100%	9/5/2014	248	22.9	26.9	18.6	84.8	0.0	1.6	6.9	225	969.0	18282234	38.3	24.11	23.99	24.02	23.51	22.54	20.16	15.15	11.35	7.61	6.7	6.61	11.0	-81.8	0.700	12.5	41.2	29.6
LC	100%	9/6/2014	249	22.5	28.0	14.9	83.5	4.2	1.9	9.9	269	963.7	16695929	35.3	24.56	24.49	24.55	23.81	22.62	20.20	15.20	11.36	7.65	6.7	6.63	11.0	-83.6	4.900	12.5	42.9	31.3
LC	100%	9/7/2014	250	16.7	21.3	12.7	75.2	0.0	2.0	6.8	250	968.5	23666653	47.8	24.14	24.13	24.21	24.08	22.78	20.21	15.29	11.43	7.65	6.7	6.64	11.0	-83.8	4.900	12.4	42.8	32.1
LC	100%	9/8/2014	251	15.3	20.8	8.8	79.1	0.0	1.7	7.1	176	974.1	18471526	37.5	23.51	23.49	23.59	23.53	22.96	20.26	15.34	11.47	7.67	6.7	6.63	11.0	-88.4	4.900	12.5	41.7	28.2
LC	100%	9/9/2014	252	15.7	18.8	12.7	85.8	0.0	1.7	6.1	120	972.5	13761923	28.2	22.84	22.82	22.93	22.86	22.68	20.33	15.36	11.47	7.68	6.7	6.63	11.0	-92.7	4.900	12.5	42.0	30.6
LC	100%	9/10/2014	253	17.6	21.6	12.6	82.4	0.0	1.1	6.6	195	967.8	14369506	29.5	22.68	22.61	22.60	22.45	22.28	20.42	15.39	11.52	7.67	6.7	6.63	11.0	-95.7	4.900	12.5	42.7	29.8
LC	100%	9/11/2014	254	19.4	24.3	15.2	87.4	0.8	3.0	8.2	255	961.8	7767858	16.8	22.18	22.17	22.26	22.18	22.09	20.64	15.45	11.54	7.69	6.7	6.64	11.0	-97.9	5.700	12.5	43.6	32.4
LC	100%	9/12/2014	255	13.1	16.2	9.2	77.2	0.0	3.1	8.1	299	969.1	18746234	38.4	21.49	21.49	21.59	21.53	21.48	21.03	15.46	11.58	7.67	6.7	6.64	11.0	-102.4	5.700	12.4	45.0	31.4
LC	100%	9/13/2014	256	11.1	14.6	7.1	97.6	11.0	1.4	5.6	230	969.8	2344252	5.4	20.63	20.62	20.72	20.69	20.67	20.69	15.53	11.62	7.70	6.7	6.64	11.0	-101.1	16.700	12.3	42.4	35.0
LC	100%	9/14/2014	257	11.0	16.5	7.4	77.7	0.0	1.9	6.9	268	972.1	21276705	42.2	19.99	19.98	20.01	19.83	19.73	19.69	15.76	11.67	7.72	6.7	6.64	11.0	-97.6	16.700	12.3	44.9	40.1
LC	100%	9/15/2014	258	11.6	19.2	5.0	77.0	0.1	1.0	4.5	258	969.9	21514293	43.3	20.07	19.80	19.72	19.56	19.42	19.33	16.04	11.72	7.75	6.7	6.64	11.0	-100.9	16.800	12.5	44.1	31.8
LC	100%	9/16/2014	259	13.0	15.7	8.8	83.4	1.8	1.5	7.2	262	965.0	10644530	21.7	19.50	19.52	19.61	19.52	19.46	19.28	16.16	11.76	7.73	6.7	6.65	11.0	-102.5	18.600	12.5	44.4	32.4
LC	100%	9/17/2014	260	11.4	18.8	4.9	77.5	0.1	0.9	7.9	264	965.1	18451573	37.1	19.42	19.33	19.27	19.07	18.98	18.95	16.43	11.79	7.76	6.8	6.65	11.0	-104.8	18.700	12.4	44.9	30.2
LC	100%	9/18/2014	261	12.6	18.8	6.0	75.0	0.1	1.4	8.0	267	965.4	17213442	34.7	19.12	19.07	19.09	18.96	18.79	18.74	16.46	11.85	7.75	6.8	6.65	11.0	-107.8	18.800	12.5	44.2	29.7
LC	100%	9/19/2014	262	11.3	16.8	6.3	80.6	0.0	1.6	5.8	181	973.4	16549912	33.2	18.84	18.81	18.84	18.65	18.58	18.57	16.59	11.88	7.79	6.8	6.67	11.0	-110.8	18.800	12.5	44.7	30.6
LC	100%	9/20/2014	263	15.6	20.7	10.9	83.3	0.0	2.5	7.8	209	970.9	10551652	21.6	18.42	18.42	18.50	18.43	18.34	18.33	16.68	11.93	7.79	6.8	6.69	11.0	-113.7	18.800	12.5	44.7	31.9
LC	100%	9/21/2014	264	18.8	24.9	14.1	78.4	1.5	1.8	7.8	218	958.5	18915724	38.7	18.83	18.73	18.69	18.31	18.23	18.22	16.79	11.99	7.79	6.8	6.69	11.0	-115.7	20.300	12.5	46.7	32.7
LC	100%	9/22/2014	265	11.8	15.4	8.1	81.2	1.2	2.7	9.7	305	961.9	11956130	24.2	18.62	18.64	18.72	18.47	18.39	18.27	16.82	12.05	7.80	6.8	6.71	11.0	-116.1	21.500	12.5	47.7	37.1
LC	100%	9/23/2014	266	11.7	18.6	6.1	73.2	0.0	1.4	4.8	290	974.2	20393034	41.9	18.26	18.19	18.15	17.87	17.74	17.71	16.94	12.08	7.80	6.8	6.72	11.0	-119.6	21.500	12.5	46.6	31.6
LC	100%	9/24/2014	267	12.9	18.3	6.8	81.7	0.0	1.5	6.5	179	980.9	15154803	31.0	18.10	18.12	18.17	18.02	17.73	17.61	16.83	12.16	7.81	6.8	6.72	11.0	-121.8	21.500	12.5	46.5	31.9
LC	100%	9/25/2014	268	12.8	15.8	11.0	86.5	0.0	1.4	4.7	119	976.4	5777010	12.6	17.76	17.80	17.91	17.85	17.76	17.65	16.76	12.19	7.80	6.8	6.72	11.0	-124.2	21.500	12.5	46.3	33.1
LC	100%	9/26/2014	269	15.3	22.3	8.4	77.0	0.1	1.3	6.4	194	972.5	20059162	40.6	18.15	18.05	18.00	17.59	17.46	17.46	16.74	12.29	7.81	6.8	6.72	11.0	-125.7	21.600	12.5	47.8	33.0
LC	100%	9/27/2014	270	16.7	25.9	9.3	75.8	0.0	0.8	4.8	210	972.6	19738145	40.5	18.84	18.43	18.19	17.84	17.50	17.43	16.67	12.43	7.86	6.8	6.74	11.0	-127.6	21.600	12.5	48.3	32.7
LC	100%	9/28/2014	271	17.3	25.8	9.8	76.4	0.0	0.8	4.6	241	969.8	17505209	35.7	19.50	18.73	18.57	18.09	17.63	17.48	16.61	12.51	7.85	6.8	6.76	11.0	-129.4	21.600	12.5	48.5	32.4
LC	100%	9/29/2014	272	17.2	22.3	13.3	77.9	0.0	0.6	3.4	212	964.3	8908819	18.4	19.45	19.08	18.90	18.30	17.76	17.54	16.56	12.55	7.86	6.9	6.78	11.0	-131.0	21.600	12.4	47.6	33.0
LC	100%	9/30/2014	273	16.7	22.0	12.1	82.0	0.0	1.3	5.9	182	962.9	15238700	31.6	19.15	19.12	19.13	18.51	17.86	17.57	16.47	12.62	7.89	6.9	6.77	11.0	-132.3	21.600	12.4	48.8	34.1
	0%																														

Lake water & energy budget daily summary from hourly data (negative values: loss from lake; runoff & seepage term is residual after adjusting lake level change for all others)

Ratio of lake watershed to lake area= 2.6176758 Runoff & seepage as % of watershed area precip: 43%

1.000 <=SCALE ADJ (1.0=no adjustment)

4.184 joule/calorie (= joule/degree for 1cm3)

Grand sum/avg	15.96	20.72	20.61	20.61	20.32	19.96	19.09	1.4	478036734	-65838	-63.2	21.6	24.1	-91.0	0.0	0.0	SumTerrevap2=AirVPD,mbar*WS,m/s*s

Nominal diffuse %R from water=7% -59218.9 385356.1 17% 19 18.7 -2.1 -2.4 -17.5

4.184 <=CONVERT HEAT TO DEGREES 4.184 slope

7% 0.9 6000000 cm3/m2 (for 0-4m integrated depth) 6000000 intercept r2

Data

DATE	DOY	AvgTair C	AvgTw 0.1m	\\	Avg Tw1m	Avg Tw2m	Avg Tw3m	Avg Tw4m	AvgWS m/s	CSI	SumRad J/m2	SumH Evap (*0.9=KJ/m2)	Sum Lk_lvl chg (mm)	SumRain mm	Sum Runoff & seepage, mm	SumLake evap (mm)	Sum Terrevap2
9/1/2014	244	22.64	23.14	22.67	22.62	22.41	22.10	19.93	0.9		13716010	-675	-1.127	0.0	0.4	-0.9	0.0
9/2/2014	245	24.11	23.86	23.67	23.12	22.65	22.18	20.01	1.6		19560698	-1460	-1.717	0.7	0.2	-2.0	0.0
9/3/2014	246	20.04	23.80	23.79	23.81	23.06	22.30	20.01	1.6		20550077	-2864	-4.144	0.0	0.4	-4.0	0.0
9/4/2014	247	20.27	23.78	23.70	23.70	23.31	22.40	20.11	1.2		20255737	-2288	-3.278	0.0	0.5	-3.2	0.0
9/5/2014	248	22.90	24.10	23.97	24.01	23.50	22.53	20.16	1.5		18281537	-1303	-2.400	0.0	0.0	-1.8	0.0
9/6/2014	249	22.68	24.56	24.49	24.54	23.80	22.62	20.20	1.8		16695832	-1988	1.823	4.1	1.1	-2.8	0.0
9/7/2014	250	16.81	24.15	24.14	24.23	24.08	22.79	20.22	1.8		23665884	-4194	-4.974	0.1	1.3	-5.8	0.0
9/8/2014	251	15.26	23.53	23.51	23.61	23.56	22.95	20.25	1.5		18473637	-3616	-4.491	0.0	1.1	-5.0	0.0
9/9/2014	252	15.76	22.85	22.84	22.94	22.88	22.70	20.33	1.6		13760707	-3021	-3.812	0.0	1.0	-4.2	0.0
9/10/2014	253	17.47	22.68	22.61	22.61	22.46	22.30	20.42	1.0		14369791	-1939	-2.357	0.0	0.9	-2.7	0.0
9/11/2014	254	19.47	22.19	22.18	22.27	22.20	22.09	20.63	2.8		7767139	-2298	-2.493	0.8	0.5	-3.2	0.0
9/12/2014	255	13.27	21.51	21.52	21.61	21.56	21.51	21.02	2.9		18745938	-5041	-5.547	0.0	2.0	-7.0	0.0
9/13/2014	256	11.02	20.66	20.66	20.76	20.72	20.71	20.72	1.2		2343963	-2343	9.190	11.0	2.0	-3.2	0.0
9/14/2014	257	11.06	20.00	19.99	20.02	19.84	19.75	19.71	1.7		21276838	-3378	-3.739	0.0	1.5	-4.7	0.0
9/15/2014	258	11.45	20.07	19.80	19.72	19.57	19.43	19.35	0.9		21515161	-2406	-3.157	0.1	0.7	-3.3	0.0
9/16/2014	259	13.13	19.52	19.54	19.62	19.53	19.46	19.27	1.4		10643927	-2315	-0.925	1.8	1.1	-3.2	0.0
9/17/2014	260	11.44	19.42	19.33	19.27	19.08	18.99	18.98	0.8		18451373	-2184	-2.881	0.1	0.6	-3.0	0.0
9/18/2014	261	12.53	19.13	19.08	19.10	18.96	18.79	18.74	1.3		17213323	-2415	-3.066	0.1	0.8	-3.3	0.0
9/19/2014	262	11.34	18.85	18.82	18.85	18.66	18.59	18.59	1.4		16551200	-2438	-2.810	0.0	1.2	-3.4	0.0
9/20/2014	263	15.40	18.43	18.43	18.51	18.44	18.35	18.33	2.3		10551556	-1880	-2.638	0.0	0.6	-2.6	0.0
9/21/2014	264	18.82	18.80	18.70	18.66	18.31	18.23	18.22	1.6		18915410	-1098	-0.580	1.5	0.0	-1.5	0.0
9/22/2014	265	12.06	18.66	18.68	18.75	18.48	18.39	18.27	2.5		11955108	-3248	-2.400	1.2	1.5	-4.5	0.0
9/23/2014	266	11.61	18.25	18.18	18.14	17.88	17.75	17.73	1.3		20393592	-2294	-3.157	0.0	0.6	-3.2	0.0
9/24/2014	267	12.83	18.11	18.12	18.17	18.02	17.72	17.60	1.3		15155761	-1776	-2.247	0.0	0.8	-2.4	0.0
9/25/2014	268	12.80	17.77	17.82	17.92	17.86	17.76	17.65	1.4		5776671	-1530	-1.439	0.0	1.3	-2.1	0.0
9/26/2014	269	15.28	18.13	18.02	17.98	17.58	17.46	17.47	1.1		20058455	-1429	-2.084	0.1	0.4	-2.0	0.0
9/27/2014	270	16.69	18.81	18.42	18.18	17.83	17.50	17.43	0.7		19737821	-1112	-1.742	0.0	0.4	-1.5	0.0
9/28/2014	271	17.26	19.48	18.72	18.56	18.08	17.63	17.48	0.7		17505658	-1145	-1.781	0.0	0.4	-1.6	0.0
9/29/2014	272	17.23	19.48	19.08	18.89	18.30	17.76	17.53	0.6		8908965	-874	-1.379	0.0	0.4	-1.2	0.0
9/30/2014	273	16.70	19.14	19.12	19.12	18.50	17.85	17.57	1.1		15239853	-1247	-1.858	0.0	0.5	-1.7	0.0
#N/A	274	15.51	19.39	19.42	19.52	18.75	18.01	17.71	0.8		-890	-40	0.000	0.0	0.0	-0.1	0.0

Solar Heat input (absorbed from solar rad), KJ/m2)	Sum H evap (KJ/m^2)	solar heat absorbed - evap loss (kJ/m^2)	% of absorbed solar heat lost via evap	Solar Heat input (absorbed from solar rad), Tw 0-6m)	starting Tw (0-6m)	ending Tw (0-6m)	actual dTw, 0-6m	RESID1: NON-SOLAR FLUX (Heat flux to offset absorbed solar to match dTw)	evap loss (degC 0-6m)	RESID2: NON-SOLAR FLUX to offset absorbed solar to match dTw LESS EVAP (degC 0-6m)
12756	-607	12149	4.8%	0.51	19.73	19.93	0.20	(0.31)	-0.02	(0.28)
18191	-1314	16877	7.2%	0.72	19.93	20.19	0.26	(0.46)	-0.05	(0.41)
19112	-2577	16534	13.5%	0.76	20.19	20.37	0.18	(0.59)	-0.10	(0.48)
18838	-2060	16778	10.9%	0.75	20.37	20.37	0.01	(0.74)	-0.08	(0.66)
17002	-1173	15829	6.9%	0.68	20.37	20.63	0.26	(0.42)	-0.05	(0.37)
15527	-1789	13738	11.5%	0.62	20.63	20.79	0.16	(0.46)	-0.07	(0.39)
22009	-3774	18235	17.1%	0.88	20.79	20.67	(0.12)	(1.00)	-0.15	(0.84)
17180	-3254	13926	18.9%	0.68	20.67	20.45	(0.22)	(0.90)	-0.13	(0.77)
12797	-2719	10079	21.2%	0.51	20.45	20.09	(0.36)	(0.87)	-0.11	(0.76)
13364	-1745	11619	13.1%	0.53	20.09	20.00	(0.09)	(0.62)	-0.07	(0.55)
7223	-2068	5156	28.6%	0.29	20.00	19.89	(0.11)	(0.39)	-0.08	(0.31)
17434	-4536	12897	26.0%	0.69	19.89	19.51	(0.38)	(1.08)	-0.18	(0.90)
2180	-2109	71	96.7%	0.09	19.51	18.76	(0.76)	(0.84)	-0.08	(0.76)
19787	-3040	16747	15.4%	0.79	18.76	18.47	(0.29)	(1.08)	-0.12	(0.96)
20009	-2165	17844	10.8%	0.80	18.47	18.25	(0.22)	(1.02)	-0.09	(0.93)
9899	-2084	7815	21.1%	0.39	18.25	18.18	(0.07)	(0.46)	-0.08	(0.38)
17160	-1966	15194	11.5%	0.68	18.18	17.97	(0.21)	(0.89)	-0.08	(0.81)
16008	-2174	13835	13.6%	0.64	17.97	17.81	(0.17)	(0.80)	-0.09	(0.72)
15393	-2195	13198	14.3%	0.61	17.81	17.61	(0.20)	(0.81)	-0.09	(0.72)
9813	-1692	8121	17.2%	0.39	17.61	17.48	(0.13)	(0.52)	-0.07	(0.45)
17591	-988	16603	5.6%	0.70	17.48	17.63	0.15	(0.55)	-0.04	(0.52)
11118	-2923	8195	26.3%	0.44	17.63	17.40	(0.22)	(0.67)	-0.12	(0.55)
18966	-2065	16901	10.9%	0.76	17.40	17.14	(0.26)	(1.02)	-0.08	(0.94)
14095	-1599	12496	11.3%	0.56	17.14	17.21	0.07	(0.50)	-0.06	(0.43)
5372	-1377	3995	25.6%	0.21	17.21	16.97	(0.24)	(0.46)	-0.05	(0.40)
18654	-1286	17369	6.9%	0.74	16.97	17.06	0.10	(0.65)	-0.05	(0.60)
18356	-1000	17356	5.4%	0.73	17.06	17.12	0.06	(0.67)	-0.04	(0.63)
16280	-1030	15250	6.3%	0.65	17.12	17.34	0.22	(0.43)	-0.04	(0.39)
8285	-787	7499	9.5%	0.33	17.34	17.45	0.11	(0.22)	-0.03	(0.19)
14173	-1122	13051	7.9%	0.56	17.45	17.60	0.15	(0.41)	-0.04	(0.37)