

Table 9. Concentrations of Al and Si, ion balance analyses, and conductivity

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check analyses for Adirondack study lakes.

Lake name			2			3				4		
			Total	Max.		Ion Balance				Conductivity		
	Sample	Sample	Al	Al	Si	Sum	Sum	Cat.	Pct.			Pct.
Lake name	date	type	ug/L	ueq/L	ug/L	cat.	an.	-an.	err.	Meas.	Calc.	err.
ARBUTUS L.	780530	Int			4.9	223	210	13	3	28.2	28	1
	780629	Int			4.0	228	225	3	1	26.6	28	-5
	780813	Surf			3.4	221	196	25	6	27.5	26	6
	780813	Bot			6.1	341	212	129	23	27.5	28	-2
	790825	Surf	21	0	3.4	225	207	19	4	25.5	27	-6
	790825	LA	30	0	6.1	229	215	14	3	25.5	28	-9
	790825	Int	45	0	4.0	230	230	0	0	28.3	28	0
AVALANCHE L.	780623	Int			3.3	116	138	-21	-8	20.2	21	-3
	780817	Surf			3.9	138	188	-50	-15	21.7	26	-22
	780817	Bot			4.3	390	141	249	47	25.4	37	-45
	790809	Surf	455	34	3.9	179	157	22	7	27.4	25	11
	790809	LA	471	37	4.3	184	162	22	6	24.8	26	-4
	790809	Int	476	35	3.3	180	162	18	5	24.2	25	-3
BEAR P.	780523	Int			1.1	149	170	-21	-7	26.9	25	9
	780712	Int			.4	ID	190	ID	ID	ND	ID	ID
	780810	Surf			.2	160	156	4	1	26.0	24	7
	780810	Bot			.6	169	172	-3	-1	26.1	27	-2
	790823	Surf	96	7	.2	166	156	10	3	24.6	26	-4
	790823	LA	104	7	.6	154	160	-6	-2	24.8	24	3
	790823	Int	104	7	.4	156	152	4	1	25.2	24	6

			2		3				4		
			Total	Max.	Ion Balance				Conductivity		
			Al	Al	Si	Sum	Sum	Cat.	Pct.		
Lake name	Sample date	Sample type	ug/L	ueq/L	ug/L	cat.	an.	-an.	err.	Meas.	Pct. Calc. err.
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BOG P.	780523	Int			1.4	95	69	27	16	14.4	12 15
	780712	Int			.2	ID	73	ID	ID	ND	ID ID
	780810	Surf			.2	85	75	10	6	14.9	12 18
	780810	Bot			3.6	256	104	152	42	14.1	20 -43
	790823	Surf	32	2	.2	75	67	8	6	12.9	10 21
	790823~	LA	33	1	.2	95	107	-12	-6	11.9	13 -11
	790823	Int	34	1	3.6	103	103	0	0	14.9	13 9
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CAT MT. P.	790709	Int			1.8	ID	170	ID	ID	ND	ID ID
	780819	Surf			.3	135	142	-7	-2	22.4	22 1
	780819	Bot			2.6	184	151	33	10	21.8	23 -6
	790817	Surf	126	8	.3	141	148	-7	-3	24.3	22 10
	790817	LA	128	8	2.6	141	127	14	5	21.0	20 3
	790817	Int	130	8	1.8	141	133	8	3	23.3	21 11
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CLEAR P.	780512	Int			3.2	316	309	7	1	36.9	38 -4
	780620	Int			2.9	299	299	0	0	35.8	36 -1
	780809	Surf			2.4	304	294	10	2	43.6	36 17
	780809	Bot			3.1	515	350	166	19	34.3	45 -30
	790807	Surf	7	0	2.4	292	273	19	3	30.0	35 -15
	790807	LA	7	0	3.1	299	270	29	5	34.2	35 -2
	790807	Int	6	0	2.9	307	290	17	3	35.2	36 -2

			2		3				4			
			Total	Max.	Ion Balance				Conductivity			
Sample	Sample		Al	Al	Si	Sum	Sum	Cat.	Pct.		Pct.	
Lake name	date	type	ug/L	ueq/L	ug/L	cat.	an.	-an.	err.	Meas.	Calc.	err.
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COPPERAS P. (F.C.)	780515	Int			3.8	538	ID	ID	ID	43.1	ID	ID
	780608	Int			3.8	502	485	18	2	48.5	54	-10
	780805	Surf			4.8	581	499	82	8	46.9	59	-26
	780805	Bot			3.5	1119	481	637	40	48.6	64	-31
	790827	Surf			5.0	462	462	0	0	31.3	51	-62
	790827	LA			4.0	469	469	0	0	44.6	51	-14
	790827	Int			4.0	477	477	0	0	52.7	52	2
COPPERAS P. (W.N.)	780511	Int			2.7	389	344	45	6	33.9	44	-29
	780614	Int			1.5	340	302	38	6	35.8	38	-7
	780808	Surf			1.1	333	333	0	0	34.4	39	-14
	780808	Bot			4.1	ID	ID	ID	ID	35.9	ID	ID
	790805	Surf	6	0	1.1	296	296	0	0	32.5	36	-10
	790579	LA	7	0	4.1	313	313	0	0	33.4	37	-10
	790805	Int			1.5	314	314	0	0	33.7	37	-10
COWHORN P.	780525	Int			3.4	155	151	4	1	ND	ID	ID
	780709	Int			2.1	171	155	17	5	ND	22	
	780819	Surf			.6	169	150	19	6	23.1	21	10
	780819	Bot			5.3	263	121	142	37	23.1	22	7
	790817	Surf	11	1	.6	179	172	7	2	21.9	23	-4
	790817	LA	53	0	5.3	186	186	0	0	21.8	24	-11
	790817	Int	119	0	2.1	215	215	0	0	30.7	26	14

Lake name	Sample date	Sample type	2		3				4			
			Total	Max.	Ion Balance				Conductivity			
			Al ug/L	Al ueq/L	Si ug/L	Sum cat.	Sum an.	Cat. -an.	Pct. err.	Meas.	Calc.	Pct. err.
CRANE MT. P.	780518	Int			2.8	216	216	0	0	24.1	28	-16
	780616	Int			2.5	195	195	0	0	25.9	25	2
	780801	Surf			1.6	ID	ID	ID	ID	ND	ID	ID
	780801	Bot			1.6	276	253	24	5	25.4	29	-14
	790816	Surf	8	0	1.6	190	193	-3	-1	23.0	25	-10
	790816	LA	56	0	1.6	208	194	15	4	24.2	26	-9
	790816	Int	68	0	2.6	195	200	-5	-1	30.1	26	14
DEEP L.	780527	Int			2.5	123	185	-62	-20	ND	ID	ID
	780628	Int			1.8	113	181	-68	-23	26.4	27	-1
	780807	Surf			1.4	ID	ID	ID	ID	ND	ID	ID
	780807	Bot			2.7	ID	ID	ID	ID	27.3	ID	ID
	790901	Surf	667	58	1.4	203	162	41	11	25.4	28	-9
	790901	LA	611	53	2.7	195	169	26	7	27.9	28	0
	790901	Int	758	65	1.7	213	176	37	9	28.8	29	0
DEER L.	780530	Int			5.1	ID	ID	ID	ID	28.1	ID	ID
	780606	Int			4.2	ID	ID	ID	ID	28.5	ID	ID
	780813	Surf			3.6	ID	ID	ID	ID	30.6	ID	ID
	780813	Bot			3.7	ID	ID	ID	ID	31.2	ID	ID
	790825	Surf	34	0	3.6	270	255	15	3	27.5	32	-16
	790825	LA	28	0	3.7	271	252	19	4	28.1	32	-13
	790825	Int	29	0	4.2	271	259	12	2	31.6	32	-2

Lake name	Sample date	Sample type	2			3				4		
			Total	Max.	Si	Ion Balance		Conductivity				
			Al	Al		Sum	Sum	Cat.	Pct.	Meas.	Calc.	Pct.
ug/L	ueq/L	ug/L	cat.	an.	-an.	err.	err.					
DUNK P.	780517	Int			6.7	ID	ID	ID	ID	41.4		ID
	780622	Int			5.1	443	425	17	2	46.1	51	-11
	780811	Surf			4.2	ID	ID	ID	ID	46.9		ID
	780811	Bot			8.4	ID	ID	ID	ID	45.3	ID	ID
	790828	Surf	34	0	4.2	461	427	34	4	46.4	51	-11
	790828	LA	38	0	8.4	476	475	1	0	46.3	54	-17
	790828	Int	45	0	5.1	549	514	35	3	56.4	60	-6
EAST COPPERAS P.	780515	Int			1.3	108	110	-2	-1	21.5	18	14
	780608	Int			.2	92	114	-22	-11	24.5	17	31
	780805	Surf			0	101	159	-58	-22	31.9	28	12
	780805	Bot			3.1	113	103	10	5	21.4	24	-13
	790827	Surf	49	5	0	113	80	33	17	20.7	22	-9
	790827	LA	54	5	3.1	108	94	14	7	21.6	20	6
	790827	Int	55	5	.2	112	89	23	12	26.4	24	8
FRANK P.	780622	Int			2.5	188	205	-17	-4	26.5	25	4
	780811	Surf			1.9	190	164	26	7	24.4	23	7
	780811	Bot			2.3	231	162	69	17	24.1	22	9
	790828	Surf	26	0	1.9	183	152	31	9	24.3	22	11
	790828	LA	33	0	2.3	187	168	20	6	23.0	23	1
	790828	Int	49	0	2.5	194	170	25	7	23.7	23	2

Lake name	Sample date	Sample type	2		3				4			
			Total	Max.	Ion Balance				Conductivity			
			Al ug/L	Al ueq/L	Si ug/L	Sum cat.	Sum an.	Cat. -an.	Pct. err.	Meas.	Calc.	Pct. err.
GIANTS WASHBOWL	780510	Int			5.7	308	308			34.7	37	-8
	780606	Int			4.2	342	342	0	0	37.8	42	-10
	780808	Surf			.5	316	316	0	0	35.1	38	-9
	780808	Bot			5.4	680	389	290	20	39.3	51	-29
	790804	Surf	57	0	.5	306	297	9	2	30.3	36	-19
	790804	LA	57	0	5.4	251	251	0	0	34.4	30	11
	790804	Int	60	0	4.2	366	347	19	3	37.5	42	-11
GREEN P.	780523	Int			.9	156	161	-5	-2	21.3	21	2
	780712	Int			.1	166	133	33	11	ND	20	ID
	780810	Surf			.2	166	154	12	4	20.9	22	-4
	780810	Bot			0	179	117	62	21	18.7	19	-3
	790823	Surf	13	1	.2	150	131	18	6	ND	19	ID
	790823	LA	16	1	0	150	138	12	4	18.6	19	-2
	790823	Int	15	1	.1	150	144	7	2	19.6	20	0
GULL P.	780512	Int			2.2	333	326	7	1	37.7	38	-1
	780620	Int			.9	301	254	47	9	ND	33	ID
	780809	Surf			.4	307	274	33	6	ND	35	ID
	780809	Bot			3.5	ID	336	ID	ID	38.8	ID	ID
	790807	Surf	7	0	.4	299	283	16	3	33.5	35	-3
	790807	LA	23	0	3.5	354	327	27	4	38.5	40	-3
	790807	Int	32	0	.1	379	379	0	0	39.1	44	-12

			2		3				4			
			Total	Max.	Ion Balance				Conductivity			
Sample Lake	Sample date	Sample type	Al ug/L	Al ueq/L	Si ug/L	Sum cat.	Sum an.	Cat. -an.	Pct. err.	Meas.	Calc.	Pct. err.
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HEART L.	780514	Int			2.2	ID	ID	ID	ID	23.1		ID
	780604	Int			2.0	176	197	-21	-6	21.5	24	-12
	780816	Surf			1.5	173	173	0	0	19.9	22	-12
	780816	Bot			2.9	278	173	105	23	22.7	21	8
	790811	Surf	36	0	1.6	166	152	14	4	20.9	21	1
	790811	LA	44	0	2.9	170	159	11	3	20.2	21	-5
	790811	Int	61	0	2.0	191	191	0	0	22.1	24	-8
HUNTLEY P.	780517	Int			8.1	558	558	0	0	59.2	63	-7
	780812	Surf			5.6	582	582	0	0	60.0	65	-8
	780812	Bot			0.7	1288	606	681	36	65.3	73	-12
	790828	Surf	50	0	5.6	574	574	0	0	57.9	64	-11
	790828	LA	47	0	0.7	612	612	0	0	58.0	68	-17
	790828	Int	47	0	5.6	623	623	0	0	64.9	69	-7
JENKINS P.	780601	Int			5.2	237	188	49	12	ND	ID	ID
	780731	Int			2.8	225	183	43	10	29.2	27	8
	780731	Surf			4.7	219	219	0	0	27.8	28	-3
	790830	Surf	14	0	ND	217	180	37	9	29.1	26	9
	790830	LA	30	0	ND	217	199	18	4	ND	27	0
	790830	Int	38	0	2.8	218	204	14	3	28.8	28	4

			2			3 Ion Balance				Conducti	
			Total	Max.	Si	Sum	Sum	Cat.	Pct.		
Lake name	Sample date	Sample type	Al ug/L	Al ueq/L	ug/L	cat.	an.	-an.	err.	Meas.	
L. ARNOLD	790802	Surf	462	35	ND	167	139	29	9	19.7	23
	790802	LA	470	35	ND	168	133	35	12	ND	22
	790802	Int	479	38	ND	173	130	43	14	21.1	22
L. COLDEN	780623	Int			3.9	131	191	-60	-19	21.3	25
	780817	Surf			4.6	163	151	13	4	ND	25
	780817	Bot			3.8	163	157	6	2	25.0	25
L. TEAR	790802	Surf	673	58	ND	209	166	43	11	19.0	30
OF THE CLOUDS	790802	LA	673	58	ND	209	166	43	11	ND	30
	790802	Int	673	58	ND	203	166	37	10	28.4	28
LITTLE PINE P.	780804	Bot			ND	ID	ID	ID	ID	69.6	ID
	790806	Surf	6	0	ND	600	600	0	0	51.6	67
	790806	LA	5	0	ND	607	607	0	0	64.5	68
	790806	Int	5	0	ND	607	607	0	0	58.6	68

			2		3				Conducti	
			Total	Max.	Ion Balance					
			Al	Al	Si	Sum	Sum	Cat.	Pct.	
Lake name	Sample date	Sample type	ug/L	ueq/L	ug/L	cat.	an.	-an.	err.	Meas.
LITTLE SHALLOW P.	780526	Int			9.6	348	348	0	0	ND ID
	780710	Int			9.4	ID	ID	ID	ID	ND ID
	780820	Surf			9.5	392	370	22	3	43.9 46
	780820	Bot			0.1	572	380	192	20	42.9 45
	7905820	Surf			9.5	371	359	12	2	36.4 43
	790820	LA	18	0	9.4	369	369	0	0	40.8 45
	790820	Int	18	0	0.1	369	369	0	0	49.8 45
LIVINGSTON P.	780624	Int			5.4	171	173	-2	-1	23.7 24
	780817	Surf			5.0	150	179	-30	-9	22.1 23
	780817	Bot			5.3	221	178	43	11	24.3 25
	790809	Surf	128	5	5.0	179	162	17	5	25.4 23
	790809	LA	141	6	5.3	177	157	20	6	23.8 22
	790809	Int	227	9	5.4	189	176	13	4	24.1 24
LONG P.	780601	Int			5.2	195	202	-7	-2	30.6 28
	780731	Surf			3.8	205	190	15	4	26.4 27
	780731	Bot			2.5	ID	ID	ID	ID	ND 26
	790830	Surf	58	2	3.8	209	203	6	1	29.1 27
	790830	LA	58	2	2.5	214	210	5	1	29.0 28
	790830	Int	58	2	5.2	213	189	24	6	27.0 26

Lake name	Sample date	Sample type	2			3				4		
			Total Al	Max. Al	Si	Ion Balance				Conductivity		
			ug/L	ueq/L	ug/L	Sum cat.	Sum an.	Cat. -an.	Pct. err.	Meas.	Calc.	Pct. err.
MOUNTAIN P.	780521	Int			.4	74	64	10	7	14.7	12	16
	780613	Int			.2	74	74	-1	0	14.3	13	6
	780818	Surf			.3	92	92	-1	0	14.0	20	-41
	780818	Bot			.8	83	29	54	48	14.0	12	18
	790822	Surf	15	1	.3	81	53	28	21	13.9	15	-11
	790822	LA	13	1	.8	69	53	16	13	13.2	14	-5
	790822	Int	15	1	.2	69	45	24	21	12.6	10	19
NICK'S P.	780531	Int			2.1	127	117	11	4	24.1	18	24
	780708	Int			.8	129	123	6	2	19.2	18	5
	780814	Surf			.3	139	122	17	6	19.7	20	-2
	780814	Bot			.3	147	145	2	1	20.4	21	-1
	790822	Surf	59	3	.3	130	115	14	6	21.5	17	20
	790822	LA	60	3	.3	131	120	11	4	19.2	18	7
	790822	Int	63	3	.8	130	115	15	6	18.6	17	7
PARCH P.	780627	Int			1.4	185	185			21.2	22	-5
	780806	Surf			1.0	205	193	13	3	ND	24	ID
	780806	Bot			2.6	314	165	148	31	21.6	24	-10
	790808	Surf	18	0	.1	194	190	4	1	18.5	24	-27
	790808	LA	13	0	2.6	200	200	0	0	22.6	24	-5
	790808	Int	26	0	1.4	220	179	41	10	24.2	24	1

Lake name	Sample date	Sample type	2			3				4		
			Total	Max.	Si ug/L	Ion Balance				Conductivity		
			Al ug/L	Al ueq/L		Sum cat.	Sum an.	Cat. -an.	Pct. err.	Meas.	Calc.	Pct. err.
PINE P.	780522	Int			1.1	235	235	0	0	29.4	29	0
	780617	Int			.7	235	230	5	1	32.1	29	9
	780804	Surf			.3	234	218	16	4	ND	28	ID
	780804	Bot			1.1	350	228	122	21	28.1	30	-7
	790806	Surf	27	0	.3	233	233	0	0	24.2	29	-18
	790608	LA	21	0	1.1	233	233	0	0	27.6	29	-6
	790806	Int	21	0	.7	234	208	26	6	25.0	27	-8
ROCK P.	780511	Int			6.7	284	284	0	0	43.6	36	18
	780614	Int			5.8	327	267	59	10	35.8	38	-6
	780803	Surf			5.3	349	250	99	17	37.4	37	0
	780803	Bot			7.8	371	265	106	17	35.5	37	-4
	790805	Surf	29	0	5.3	299	275	24	4	30.3	36	-20
	790805	LA	43	0	7.8	307	307	0	0	35.7	38	-7
	790805	Int	59	0	5.8	319	315	4	1	34.6	39	-13
ROUND P.	780510	Int			5.3	175	167	8	2	21.5	21	1
	780606	Int			5.2	187	187	0	0	29.1	23	20
	780816	Surf			4.3	180	180	0	0	23.0	23	1
	780816	Bot			5.9	336	199	138	26	24.4	26	-7
	790813	Surf	25	0	4.3	187	186	1	0	21.1	23	-10
	790813	LA	31	0	5.5	191	183	8	2	21.3	23	-6
	790813	Int	42	0	5.2	200	190	10	3	23.1	23	0

			2			3				4		
			Total	Max.	Si	Ion Balance				Conductivity		
			Al	Al	ug/L	Sum	Sum	Cat.	Pct.		Pct.	
Lake name	Sample date	Sample type	ug/L	ueq/L	ug/L	cat.	an.	-an.	err.	Meas.	Calc.	err.
UPPER WALLFACE P.	780610	Int			2.8	111	180	-69	-24	22.8	23	-2
	780815	Surf			2.0	100	124	-23	-10	18.5	19	-2
	780815	Bot			2.6	107	114	-6	-3	21.3	19	9
	790812	Surf	192	13	2.0	120	113	7	3	19.8	18	9
	790812	LA	250	17	2.6	132	114	18	7	19.6	19	4
	790812	Int	409	28	2.8	138	115	23	9	19.9	19	7
WASHBOWL P.	780526	Int			.2	107	77	30	16	ND	ND	
	780710	Int			.7	ID	ID	ID	ID	ND	ID	ID
	780820	Surf			.7	126	105	21	9	25.9	29	-11
	780820	Bot			1.3	128	161	-32	-15	31.1	31	0
	790820	Surf	38	4	.7	108	89	19	10	23.3	21	8
	790820	LA	38	4	.7	110	90	20	10	23.5	22	5
	790820	Int	38	4	.7	110	90	20	10	23.1	22	5
WOLF L.	780530	Int			5.1	234	ID	ID	ID	29.1	ID	ID
	780629	Int			4.9	248	244	4	1	29.0	31	-8
	780813	Surf			4.6	260	247	13	3	30.6	32	-4
	780813	Bot			5.1	333	214	118	22	30.7	30	4
	790825	Surf	14	0	4.6	257	233	24	5	30.4	31	0
	790825	LA	19	0	5.1	257	228	29	6	29.1	30	-4
	790825	Int	27	0	4.9	258	256	2	0	31.8	31	2

Footnotes for Table 9

1. Ion balance and conductivity checks were made to assess the overall accuracy of measurements of ions. Differences between calculated and expected values are due primarily to measurement errors and lack of data on concentrations (eq/L) of Al and organic acids. Organic acids and Al can both contribute significantly to the charge balance. Problems due to their omission are greatest in acid lakes and highly colored lakes, respectively. Errors may also result from estimations of HCO_3^- . Major discrepancies in the bottom sample ionic balances probably result because some of the measured elements were in insoluble form, and because ionic forms of Fe and Mn, which can be in high concentrations in anoxic hypolimnia, were not measured. Problems are also caused in checking many of the lakes with developed watersheds. Many of these lakes contain high concentrations of Cl from road salt. There was difficulty in measuring such high concentrations, so there are some significant errors, especially in the conductivity check analyses of these lakes.

ND means no data; ID means insufficient data.

See Tables 5 and 6 for depth of integrated samples.

Surf = surface; LA = lake average; Int = integrated-water-column

2. Methods of calculating maximum possible concentrations (eq/L) of Al are described and discussed in the results section ("Cation-anion balance," p. 21) of the manuscript on the limnology of six lakes. Al was not included in the ion balance or the conductivity check analyses.
3. The ion balances were calculated by summing all measured cations and anions (Table 8) and then subtracting anions from cations. Organic acid and Al were not included. Percent error was determined

as the cation-anion difference divided by the sum of cations plus anions multiplied by 100.

4. The procedure used for conductivity check analysis is described in the results section of the manuscript ("Cation-anion balance," p. 21) on the limnology of six lakes.