Table 2. Codes used to identify the sampling sites for the Alpine Wet Deposition Project and Lake Comparison Project.

Site	Code
Alpine Meadows	AM
Angora Lake	ANG
Crystal Lake	CR
Eastern Brook Lake	EBL
Emerald Lake	EML
Kaiser Pass	KP
Kirkwood Meadows	KM
Lost Lake	LL
Mammoth Mountain	MM, MM1, MM2 (Co-located collectors)
Mineral King	MK
Onion Valley	OV, OV1, OV2 (Co-located collectors)
Pear Lake	PR
Ruby Lake	RB
Sonora Pass	SN
South Lake	SL
Tioga Pass	TG
Topaz Lake	TZ

Table 3. Summary of accuracy data for analysis of snow samples generated at UCSB during 1990-1995 based on comparison with NBS Simulated Rainwater 2694-II (1990-1991) or 2694-I (1992-1995). ACC is the average percent difference for each determination of the NBS control. Percent difference = (measured [ ]-certified [ ] – certified [ ]) x 100; N is the number of measurements. Calcium was not used in this analysis because the calcium concentration in the NBS controls was below the method detection limit for calcium.

	1990		1991		1992		1993		1994-95	
Solute	ACC	N	ACC	N	ACC	N	ACC	N	ACC	N
Chloride	8.3	8	5.8	9	-5.2	8	-2.3	6	-13.4	22
Nitrate	-2.3	8	3.8	9	1.5	8	-4.4	6	0.2	22
Sulfate	0.4	8	5.5	9	8.4	8	5.7	6	8.0	22
Magnesium	-9.5	3	-2.4	3	8.0	3	2.5	3	2.2	8
Sodium	-4.8	3	-5.5	3	0.0	3	0.6	3	-6.4	8
Potassium	2.5	3	3.2	3	17.5	3	0.5	3	1.1	8

Table 4. Summary of accuracy data for analysis of snow samples generated at UCSB during 1990-1993 based on recovery of known additions to actual samples. Accuracy was not determined during 1994 and 1995. ACC is the average recovery (%) of known additions made to samples of snow. Recovery = (final [ ] - initial [ ]) ÷ known addition) x 100; N is the number of measurements.

Measured	1990		1991		1992		1993	
Constituent	ACC	N	ACC	N	ACC	N	ACC	N
Chloride	91	17	100	18	103	14	97	15
Nitrate	102	17	103	18	104	14	99	15
Sulfate	100	17	108	18	108	14	105	15
Acetate	98	11	104	12	125	11	104	11
Formate	83	11	113	12	119	11	107	11
Calcium	103	8	107	9	107	6	89	8
Magnesium	101	8	108	9	112	6	98	8
Sodium	112	8	114	9	111	6	102	8
Potassium	102	8	107	9	106	6	103	8

Table 5. Ion chemistry of deionized rinsewater from Aero Chemetrics collectors deployed for one to two weeks during the Alpine Wet Deposition Project, 1990-1993. When no precipitation occurred during the 1 to 2-week period, the collectors were rinsed with 250 ml of deionized water; this rinse water was analyzed for dissolved constituents. All values are in microequivalents per liter (μEq L^{-1}). Undetectable levels are designated by u and a dash indicates no data. In 1993 colocated collectors (1 and 2) were deployed at Onion Valley and at Mammoth Mountain. No rinses were collected during 1994.

Site & Date	NH_4	Ca	Mg	Na	K	Cl	NO_3	SO_4	OAc	OFm
Onion Valley										
90 08 31	-	2.8	0.4	0.5	0.2	1.5	1.5	1.2	-	-
90 09 11	-	0.3	0.1	0.3	u	u	u	u	-	-
90 10 14	-	3.2	0.5	0.4	0.2	0.1	3.2	0.6	-	-
91 06 26	4.2	3.7	0.5	1.0	0.4	1.0	2.5	1.8	1.0	1.0
91 07 25	4.6	15.0	2.5	3.6	4.0	2.2	5.8	3.9	0.8	0.2
91 08 28	5.4	15.0	1.8	2.4	1.6	1.2	10.7	3.2	0.8	0.8
91 09 23	3.6	7.3	1.0	1.2	1.4	1.2	4.9	1.6	0.5	0.5
91 10 09	22.6	7.1	2.5	4.0	16.0	2.4	23.0	18.3	u	u
91 10 23	0.9	4.4	0.5	0.2	0.2	u	0.1	0.1	0.5	0.5
92 06 05-1	36.2	36.3	8.1	8.4	6.7	2.0	28.0	30.0	0.8	0.3
92 06 05-2	17.5	21.3	4.0	4.6	3.1	2.3	16.0	16.0	0.5	0.3
92 06 21-2	9.5	16.7	2.8	3.1	2.5	2.3	11.4	7.6	0.5	1.5
92 07 10-1	2.8	2.5	0.4	0.8	0.2	0.5	1.4	1.5	0.5	2.0
92 07 10-2	3.9	2.0	0.4	0.9	0.2	0.2	1.0	0.6	1.5	5.5
92 07 29-1	3.3	2.7	0.3	0.9	0.2	0.2	2.6	1.1	0.2	0.1
92 07 29-2	2.6	1.2	0.2	1.1	0.5	0.2	1.2	0.5	0.5	0.1
92 09 14-1	58.5	26.8	5.1	3.2	7.6	2.9	14.5	6.6	0.5	0.5
92 09 14-2	2.0	25.8	0.9	1.4	0.7	0.8	2.6	1.9	0.5	0.1
92 10 02-1	6.6	23.7	4.3	3.8	3.5	1.3	12.5	3.4	1.5	0.5
92 10 02-2	0.2	2.3	0.2	0.9	0.1	u	0.1	u	0.2	0.1
92 10 18-1	14.7	14.1	1.6	1.9	1.7	u	8.0	1.3	0.5	0.3
92 10 18-2	0.7	3.0	0.3	1.0	0.1	u	u	u	0.5	0.1
93 06 19-1	u	1.3	u	0.2	0.1	0.8	u	0.4	u	u
93 06 19-2	4.1	8.4	1.1	2.6	1.3	1.8	3.8	3.8	0.5	0.2
93 07 04-1	u	0.8	0.2	u	0.1	0.2	0.1	0.1	u	u
93 07 04-2	0.6	7.3	0.7	0.6	0.4	1.2	0.2	0.2	1.1	2.0
93 07 19-1	0.5	1.5	0.2	0.4	0.3	1.1	0.1	0.5	u	0.1
93 07 19-2	0.4	4.9	0.4	0.1	0.1	0.2	0.1	0.1	u	u
93 08 02-1	0.4	4.7	0.4	0.1	0.1	0.5	0.1	0.2	1.4	0.1
93 08 02-2	0.2	4.2	0.7	0.7	0.9	0.6	0.6	1.8	0.8	0.1
93 08 24-1	0.3	u	0.4	0.5	0.9	0.6	1.7	0.7	u	u
93 08 24-2	3.7	u	0.4	0.3	0.6	0.3	5.6	0.3	u	u
93 09 07-1	2.5	u	0.4	0.4	0.5	0.4	2.7	2.1	6.0	1.5
93 09 07-2	5.7	5.7	0.9	1.3	1.4	0.9	10.3	6.2	0.5	0.1
93 09 22-1	0.7	1.1	0.1	0.1	0.3	0.6	0.1	0.1	u	u
93 09 22-2	9.2	14.0	2.6	0.9	2.1	2.4	16.8	8.4	0.9	0.2
93 10 06-1	0.8	0.6	u	0.1	0.2	0.3	u	u	u	u
93 10 06-2	0.7	1.7	0.1	0.4	0.3	0.9	u	0.2	0.6	0.5

Table 5 (Continued)

Site & Date	NH_4	Ca	Mg	Na	K	Cl	NO_3	SO_4	OAc	OFm
South Lake										
90 07 02	-	4.3	0.7	0.8	2.4	u	3.3	3.9	-	-
90 08 03	-	26.0	6.4	13.5	11.5	6.6	54.0	45.0	-	-
90 08 31	-	0.9	0.2	0.5	0.1	u	0.4	0.2	-	-
90 09 11	-	0.2	0.1	0.2	0.2	u	0.2	0.2	-	-
90 10 14	-	1.2	0.2	0.4	0.1	0.1	1.9	0.4	-	-
91 07 11	24.0	14.2	3.9	6.6	2.7	4.9	23.5	17.2	1.0	0.5
91 07 25	3.2	2.0	0.6	0.8	0.9	0.5	2.7	1.8	0.5	u
91 08 28	2.0	3.4	0.4	0.6	0.4	0.5	1.4	0.8	u	u
91 09 23	3.6	5.4	1.1	3.6	1.1	2.4	6.6	5.2	0.5	u
91 10 09	1.2	0.5	0.1	0.1	0.1	u	0.5	0.3	u	u
91 10 23	2.9	10.2	1.2	1.5	1.7	1.9	7.8	4.7	2.9	1.1
92 09 14	1.7	0.9	0.1	1.0	1.2	u	u	u	0.2	0.2
92 10 02	2.7	2.0	0.4	0.5	u	0.2	1.4	1.1	0.5	0.3
92 10 18	0.7	0.6	0.1	u	u	0.1	u	0.1	0.2	0.2
93 06 28	0.2	0.7	0.1	0.7	0.1	1.7	u	0.2	0.5	u
93 07 15	2.2	2.6	0.4	0.5	0.5	1.2	0.3	0.7	u	u
93 07 29	u	0.7	0.1	0.3	0.3	0.7	u	0.5	0.6	1.8
93 08 24	0.2	0.4	0.1	0.2	0.3	0.9	0.3	0.3	0.5	u
93 09 22	u	0.5	0.1	0.2	0.1	0.1	u	0.1	u	u
93 10 05	2.0	0.2	0.1	0.1	0.1	u	u	u	0.9	0.5
Eastern Brook Lake										
90 09 13	-	0.3	0.1	0.2	0.2	u	u	u	-	-
90 10 14	-	0.1	u	0.4	u	u	0.2	u	-	-
91 08 28	0.6	0.8	0.2	0.3	0.2	0.5	0.5	0.2	0.2	u
91 10 09	0.7	0.3	0.1	0.1	u	1.4	0.1	0.2	0.5	u
92 09 14	2.1	6.8	1.3	1.7	1.7	0.3	3.6	1.9	0.2	0.1
92 10 02	1.9	10.4	1.4	2.3	1.2	0.8	5.6	2.6	0.5	0.3
92 10 18	4.9	3.0	0.5	1.6	1.5	0.2	3.3	0.9	0.5	0.3
93 06 19	u	0.9	0.2	0.2	0.2	0.5	u	0.2	u	u
93 07 04	0.2	1.4	0.4	0.3	0.5	0.3	0.1	0.2	0.4	0.1
93 07 19	u	u	u	0.1	0.1	0.5	0.1	0.1	3.5	6.0
93 08 04	0.3	u	u	0.2	0.1	1.5	1.9	0.8	2.2	5.0
93 08 24	0.2	0.1	u	0.1	u	u	u	u	u	u
93 09 22	1.3	0.3	0.1	0.3	0.1	0.4	0.6	0.3	0.4	3.0
93 10 05	0.7	1.2	0.1	0.3	0.2	0.3	0.1	u	0.2	0.5
Mammoth Mtn										
90 08 03	-	6.6	2.5	4.6	5.3	3.6	14.8	9.2	-	-
90 09 06	-	14.4	2.9	3.0	1.9	2.9	23.0	4.3	-	-
90 10 12	-	25.0	7.0	9.5	4.0	5.3	36.0	23.4	-	-
91 08 29	1.2	1.3	0.3	0.3	0.1	u	0.7	0.4	0.5	0.2
91 09 26	0.8	0.4	0.1	u	u	u	0.1	0.1	0.5	0.2
91 10 10	-	0.8	0.2	0.1	0.1	u	0.1	0.1	0.8	0.5

Table 5 (Continued)

Site & Date	NH_4	Ca	Mg	Na	K	Cl	NO_3	SO_4	OAc	OFm
Mammoth Mtn (cont.)										
92 05 12	6.3	3.2	0.6	1.5	u	0.5	3.5	6.7	0.2	0.2
92 05 28	4.5	2.0	0.5	0.7	0.2	0.3	1.8	2.0	0.5	0.2
92 07 31-1	0.5	0.7	0.1	u	u	0.4	u	0.1	0.3	u
92 07 31-2	1.3	0.5	u	u	u	0.4	u	0.1	0.3	u
92 10 19-1	2.0	0.6	0.1	0.1	u	u	u	0.1	0.8	0.5
92 10 19-2	1.1	0.8	0.1	0.1	u	u	0.1	0.1	0.5	0.1
93 06 20-1	u	0.5	0.1	0.2	0.1	0.3	0.1	0.3	0.1	0.2
93 06 20-2	0.8	2.5	0.1	0.4	0.3	1.0	0.2	0.6	u	0.1
93 07 06-1	u	0.5	u	0.2	0.1	0.3	0.1	0.1	u	u
93 07 06-2	0.9	0.5	u	0.4	0.1	0.7	0.5	0.5	u	u
93 07 20-1	u	1.1	u	0.2	0.1	0.1	0.1	0.1	0.1	0.2
93 07 20-2	u	2.1	0.1	0.5	0.3	0.7	0.3	0.4	0.4	0.5
93 08 03-1	0.2	0.6	u	0.2	0.1	0.3	0.1	0.1	0.2	u
93 08 03-2	0.2	0.9	0.1	0.2	0.2	0.2	0.1	0.3	u	u
93 08 17-1	0.4	1.2	0.2	3.4	9.9	15.5	0.7	2.1	0.9	0.4
93 08 17-2	4.2	3.4	0.6	1.1	1.0	1.2	8.0	3.4	0.5	0.1
93 08 31-1	0.3	0.7	u	0.1	0.1	u	u	u	2.0	u
93 08 31-2	1.0	1.3	0.2	0.4	0.5	1.0	1.5	0.7	u	u
93 09 15-1	0.5	0.7	0.1	0.6	1.0	2.5	0.1	0.3	0.3	u
93 09 15-2	5.4	5.6	0.9	1.2	0.8	0.9	9.5	1.9	u	
93 09 28-1	0.8	0.7	u	0.1	0.1	0.2	u	u	0.6	0.8
93 09 28-2	0.9	u	0.1	0.2	0.1	0.4	0.5	0.3	3.0	u
93 11 02-1	0.5	u	0.3	0.4	0.4	0.6	0.9	0.7	0.1	u
93 11 02-2	0.7	u	0.2	0.7	0.7	0.5	0.8	0.8	0.1	u
Tioga Pass										
90 08 17	-	9.2	1.6	1.6	1.0	2.5	7.7	4.9	-	-
90 09 02	-	3.7	0.7	0.9	0.4	u	3.9	2.6	-	-
90 09 16	-	0.3	u	0.3	u	u	1.0	u	-	-
92 09 15	0.2	2.1	0.4	0.7	0.6	u	1.1	0.5	0.2	0.1
92 10 19	0.2	0.7	0.2	0.1	0.5	0.2	0.1	0.1	0.2	0.1
93 07 20	0.6	1.4	0.1	0.2	0.3	1.1	0.1	0.2	0.7	2.0
93 08 17	u	1.6	0.2	0.2	0.8	0.4	1.1	0.9	1.0	u
93 08 31	0.9	0.3	0.1	0.1	0.2	0.4	0.2	0.3	1.0	u
93 09 15	3.9	1.2	0.1	0.2	0.2	0.1	0.5	0.3	0.7	u
93 10 03	0.8	0.9	0.1	0.1	0.1	u	u	u	1.3	0.2
Kaiser Pass										
91 07 12	3.3	3.5	1.2	1.5	1.9	1.8	2.5	2.0	1.0	0.2
91 07 29	0.7	1.1	0.2	0.5	0.4	0.2	0.2	0.1	-	-
91 08 09	1.6	2.5	0.4	0.6	0.4	0.5	0.2	0.2	0.8	0.1
91 08 27	-	0.5	0.2	0.3	0.3	0.2	0.2	0.1	u	u
91 08 29	6.7	4.7	1.3	1.6	0.9	2.0	6.2	4.3	u	u
91 09 15	-	12.2	3.0	4.9	4.6	3.1	11.6	9.0	-	-
91 09 24	5.5	1.8	0.5	0.9	0.4	1.0	2.2	1.6	u	u
91 10 10	2.4	2.9	0.5	0.6	0.3	1.3	3.0	1.7	u	u
91 10 24	8.8	19.5	3.1	2.0	1.2	2.6	16.3	12.5	u	u

Table 5 (Continued)

Site & Date	NH_4	Ca	Mg	Na	K	Cl	NO_3	SO_4	OAc	OFm
Kaiser Pass (cont.)										
92 05 22	13.6	11.5	2.7	2.9	3.1	3.8	6.6	6.0	-	-
92 05 26	11.3	12.0	3.8	3.9	4.3	3.2	4.9	6.8	-	-
92 07 08	-	3.6	1.0	1.0	1.2	u	u	1.5	-	-
92 07 20	1.9	1.8	1.5	0.5	2.7	u	u	0.5	0.5	1.0
92 07 27	0.7	1.0	0.2	0.6	u	0.2	0.1	0.1	2.0	0.1
92 08 06	6.8	3.9	0.7	1.9	0.4	2.1	7.4	5.5	-	-
92 08 31	0.8	1.0	0.2	0.2	u	u	0.1	0.1	-	-
Sonora Pass										
90 08 02	-	3.5	1.2	0.8	1.6	u	3.7	1.8	-	-
90 09 01	-	4.5	1.3	0.9	0.8	3.0	3.8	1.6	-	-
90 09 20	-	0.3	0.1	0.3	0.1	u	1.0	u	-	-
90 10 12	-	0.5	0.5	0.1	0.2	0.1	0.6	u	-	-
91 07 12	-	1.9	0.6	0.4	0.8	0.5	0.3	0.4	0.5	0.1
91 08 14	21.0	34.7	7.7	9.0	5.2	6.1	0.2	19.0	2.5	6.3
91 09 24	1.8	0.8	0.2	0.1	0.1	u	u	u	0.5	0.1
91 10 10	1.8	1.3	0.2	0.1	0.1	u	0.4	0.2	0.5	0.5
91 10 24	3.3	6.0	1.9	0.7	1.0	1.5	4.8	3.0	u	u
92 07 31	3.2	0.5	0.2	0.2	u	0.2	0.2	0.1	2.2	1.2
92 08 07	1.4	0.7	0.2	0.1	u	0.1	u	0.1	0.2	0.1
92 09 15	5.6	37.9	6.9	1.3	3.6	1.3	11.0	3.0	1.5	1.0
92 10 19	1.5	2.2	0.3	0.1	u	0.1	0.3	0.1	0.2	0.2
93 07 05	0.4	0.1	0.1	0.2	0.1	0.4	u	0.4	u	u
93 07 20	u	0.9	u	0.1	0.1	0.4	u	0.1	u	u
93 08 03	1.4	1.3	0.5	0.4	0.7	0.6	1.9	1.6	0.7	u
93 08 17	u	u	u	0.1	0.1	0.1	0.1	u	1.4	0.1
93 08 31	u	u	u	0.4	0.7	0.2	0.1	u	0.7	0.5
93 09 15	0.2	u	0.1	0.1	0.6	0.2	0.1	u	1.3	0.3
Alpine Meadows										
90 07 27	-	16.8	1.9	1.2	2.7	3.0	14.3	2.9	-	-
92 07 17	1.0	8.0	0.5	0.6	u	0.1	1.4	10.6	-	-
Lost Lake										
90 09 03	-	0.1	u	u	u	u	u	u	-	-
90 09 17	-	0.1	u	0.1	u	0.4	u	0.2	-	-
90 09 25	-	0.1	u	u	0.1	0.1	u	0.2	-	-
91 07 08	-	1.1	0.5	3.0	0.2	0.5	0.2	0.8	0.2	1.5
91 09 21	0.6	0.5	0.2	0.5	0.1	1.2	0.1	0.1	0.2	0.2
91 10 11	0.3	0.1	u	0.1	u	u	0.1	0.1	u	u
92 08 08	0.5	0.8	0.1	u	u	u	u	u	0.8	0.1
92 08 28	2.2	0.8	0.1	0.2	u	u	0.5	0.1	0.5	1.8
92 09 25	0.8	0.5	0.1	0.4	u	u	0.4	0.1	0.1	0.2
92 09 10	u	1.8	0.4	0.5	u	u	0.5	0.5	0.1	0.6

Table 5 (Continued)

Site & Date	NH_4	Ca	Mg	Na	K	Cl	NO_3	SO_4	OAc	OFm
Lost Lake (cont.)										
93 06 27	u	u	u	0.3	u	u	0.4	0.1	-	-
93 07 06	0.1	u	u	0.6	0.5	0.8	0.5	0.1	u	0.5
93 07 12	0.3	u	0.1	0.5	0.6	0.4	0.3	0.2	u	0.1
93 07 20	u	0.3	0.1	0.2	0.1	u	0.3	u	u	u
93 08 11	0.1	0.2	0.1	0.2	0.1	u	0.1	u	u	u
93 08 18	u	0.3	0.1	0.3	0.2	u	0.3	u	u	u
93 09 06	0.2	0.4	0.2	0.3	0.1	0.4	0.4	0.2	u	u
93 09 14	u	1.0	0.4	0.5	0.1	u	5.4	0.1	0.1	0.1
Mineral King										
91 06 24	1.4	0.4	0.2	0.2	0.1	u	0.2	0.2	0.5	0.1
91 07 09	1.6	3.0	0.4	1.0	0.1	0.5	u	0.5	0.5	0.1
91 07 17	1.0	0.4	0.2	0.1	0.1	u	0.1	u	0.2	0.1
91 07 23	2.2	1.1	0.5	0.3	0.6	0.1	1.3	0.5	0.5	0.2
91 08 08	1.3	0.3	0.2	u	0.1	u	0.4	u	0.5	0.2
91 08 21	1.4	0.2	0.2	0.1	u	u	0.2	0.2	0.5	0.5
91 08 28	1.4	0.7	0.2	0.2	0.1	u	0.2	0.5	0.8	0.8
92 07 08	0.2	3.4	1.0	1.1	1.3	u	u	1.0	0.8	0.5
92 07 30	11.7	11.9	3.7	6.5	3.8	2.7	15.7	17.5	1.5	0.5
92 08 04	u	2.4	0.5	0.9	0.3	0.2	u	0.5	0.5	0.2
92 08 07	2.4	10.0	2.2	1.7	1.4	u	7.6	4.5	0.5	0.5
92 08 28	2.4	11.0	2.2	2.0	1.2	0.2	8.0	3.5	0.5	0.5
92 09 03	0.3	2.3	0.5	0.7	0.3	u	3.0	0.5	0.2	0.2
92 09 14	6.4	8.5	1.7	1.7	1.6	0.3	9.1	2.0	0.5	0.2
92 10 06	0.1	5.6	0.6	0.5	0.3	u	2.4	1.0	0.5	0.2
93 06 24	24.2	28.0	7.7	10.5	24.7	8.4	46.0	47.0	1.0	u
93 07 06	23.5	12.0	5.9	2.9	14.5	3.0	0.1	9.0	2.0	0.5
93 07 15	6.5	8.0	4.3	2.2	11.5	1.9	u	10.3	1.0	0.2
93 07 29	u	3.7	2.8	1.5	0.7	0.8	u	1.5	2.0	1.0
93 08 08	1.6	6.6	3.2	2.5	1.4	1.8	11.8	9.4	u	u
93 08 18	u	u	0.2	0.1	0.4	0.3	0.3	0.7	u	u
93 08 24	0.1	u	u	u	0.1	0.1	0.2	0.3	0.2	u
93 09 02	0.2	u	0.2	0.3	0.4	0.5	1.4	1.3	u	u
93 09 22	0.2	1.3	0.4	0.7	0.4	2.1	u	1.4	0.2	0.2
Emerald Lake										
91 07 24		1.1	0.4	2.9	0.5	1.4	0.2	1.2	90.0	16.5
91 08 13	0.7	0.5	0.3	0.3	0.1	0.2	0.2	0.1	34.5	7.0
91 08 27	1.4	0.3	0.2	0.2	0.1	0.2	0.1	0.1	82.5	13.0
91 09 24	1.4	1.0	0.4	1.0	0.7	0.2	u	0.2	52.5	15.5
92 07 28	1.8	1.6	0.3	1.0	u	0.3	2.2	1.2	0.2	0.2
92 09 06	0.4	1.5	0.2	0.5	u	0.4	u	0.8	5.5	1.8
93 07 05	0.1	0.1	u	u	u	u	u	0.1	0.2	0.3
93 07 20	0.1	0.1	u	u	u	u	u	0.1	0.3	0.2
93 08 23	u	0.1	u	u	u	0.1	u	0.1	0.1	0.4
93 09 07	u	0.1	u	u	u	u	u	0.1	0.2	0.2
93 09 22	0.1				u	u	u	u	0.1	0.3
93 10 07	u	0.1	u	u	u	u	u	0.1	0.3	0.4

Table 6. Comparison of pH and major ion determinations between UCSB and CARB laboratories. Five different subsamples each of lakewater, snowmelt and rainwater were sent to the ARB laboratory in El Monte. Ion levels are tabulated as $\mu Eq\ L^{-1}$.

Sample	Lab	Cl	NO_3	SO_4	Na	K	Mg	Ca	pH
Lakewater									
LL-1	UCSB	7.1	0.2	6.3	17.0	3.9	5.0	27.2	6.18
	El Mte	6.2	<0.6	6.7	14.4	3.3	4.9	28.9	5.99
TZ-61	UCSB	4.7	2.5	9.5	18.8	10.0	7.2	44.4	5.66
	El Mte	4.5	<0.6	8.5	19.6	9.7	6.6	39.4	6.28
CR-119	UCSB	2.4	0.4	7.0	16.2	3.5	4.3	23.7	6.20
	El Mte	2.0	<0.6	7.5	16.5	3.6	4.1	25.0	6.29
RB-107	UCSB	1.8	<0.1	7.8	10.0	4.0	3.1	47.6	6.18
	El Mte	2.3	<0.6	10.4	12.6	4.0	3.3	57.4	6.33
EML-10	UCSB	5.6	0.7	7.5	17.1	4.3	4.2	24.5	6.27
	El Mte	5.6	<0.6	7.5	16.1	3.3	4.1	34.4	6.29
Snowmelt									
PR-7	UCSB	2.5	1.5	2.4	1.7	0.5	0.6	1.3	5.35
	El Mte	2.5	1.6	3.3	1.7	0.5	0.8	9.0	5.87
SN-8	UCSB	1.0	1.3	1.1	0.5	0.2	0.2	0.8	5.46
	El Mte	1.1	1.0	3.3	0.4	0.3	0.8	6.0	5.60
KW-9	UCSB	1.0	2.2	1.6	0.8	0.4	0.4	0.5	5.25
	El Mte	1.4	1.1	4.2	0.4	0.3	0.8	6.0	5.61
LL-2	UCSB	1.0	1.6	1.5	0.8	0.1	0.3	0.5	5.35
	El Mte	1.4	1.5	3.3	0.8	<0.3	0.8	9.0	5.51
Rainwater									
TP10 7-16	UCSB	5.0	21.0	12.4	4.6	2.0	1.4	5.6	4.49
	El Mte	4.5	18.7	13.1	3.5	1.5	1.6	14.0	5.28
SL 7-18	UCSB	4.3	27.0	17.4	5.7	2.6	1.5	8.8	4.41
	El Mte	3.9	24.7	19.2	3.5	1.5	2.5	8.5	4.90
AM 9-24	UCSB	4.3	18.0	9.8	3.1	1.5	2.3	16.8	4.63
	El Mte	3.1	17.9	10.4	3.0	1.0	2.5	17.5	5.39
SN 7-14	UCSB	4.8	27.4	16.7	2.9	1.3	1.6	7.2	4.64
	El Mte	4.2	25.8	18.1	2.6	1.3	1.6	8.5	4.79
MM 7-16	UCSB	6.0	36.2	18.1	1.8	1.4	1.0	3.2	4.41
	El Mte	5.6	33.1	18.2	2.6	1.5	1.6	9.0	4.98

Table 7. LRTAP: COMPARISON OF LABORATORY PERFORMANCE (STUDY 0035), JANUARY 1994. UCSB is L122.

	BIAS	FLAGS
LAB CODE	NUMBER OF PARAMETERS BIASED (%)	NUMBER OF RESULTS FLAGGED (%)
L002	18.75	13.04
L003	46.15	31.67
L005	20.00	13.33
L006	5.56	12.78
L007	44.44	31.40
L010	23.08	18.46
L011	28.57	10.77
L013	0.00	1.92
L013C	11.11	3.95
L014	8.33	13.33
L021	20.00	12.77
L023	23.53	17.29
L024	21.43	4.69
L025	15.00	7.25
L029	22.22	15.98
L030	14.29	7.14
L031	44.44	17.79
L032	40.00	21.74
L033	16.67	6.73
L034	40.00	20.99
L047	50.00	48.53
L049	17.65	26.79
L057	88.89	38.89
L061	0.00	2.13
L063	18.75	7.33
L073	10.00	1.10
L078	0.00	0.00
L081	15.38	7.69
L082	20.00	7.19
L086	0.00	1.82
L088	38.46	23.08
L090	0.00	9.35
L090B	100.00	50.00
L091	6.67	2.84
L093	26.67	12.00
L094	35.71	16.43
L099	53.33	20.15
L102	25.00	15.69
L104	0.00	0.00
L109	11.11	1.16
L112	33.33	36.67
L114	20.00	21.95
L116	23.08	18.55
L119	22.22	10.67
L122	**10.00**	**19.79**

Table 7. (continued)

	BIAS	FLAGS
LAB CODE	NUMBER OF PARAMETERS BIASED (%)	NUMBER OF RESULTS FLAGGED (%)
L126	12.50	5.26
L127	14.29	5.47
L128	22.22	25.75
L078	0.00	0.00
L104	0.00	0.00
L086	0.00	1.82
L013	0.00	1.92
L061	0.00	2.13
L090	0.00	9.35
L091	6.67	2.84
L073	10.00	1.10
L109	11.11	1.16
L006	5.56	7.22
L013C	11.11	3.95
L126	12.50	5.26
L127	14.29	5.47
L030	14.29	7.14
L014	8.33	13.33
L025	15.00	7.25
L081	15.38	7.69
L033	16.67	6.73
L063	18.75	7.33
L024	21.43	4.69
L082	20.00	7.19
L122	10.00	19.79
L002	18.75	13.04
L021	20.00	12.77
L119	22.22	10.67
L005	20.00	13.33
L029	22.22	15.98
L093	26.67	12.00
L011	28.57	10.77
L102	25.00	15.69
L023	23.53	17.29
L010	23.08	18.46
L116	23.08	18.55
L114	20.00	21.95
L049	17.65	26.79
L128	22.22	25.75
L094	35.71	16.43
L034	40.00	20.99
L088	38.46	23.08
L032	40.00	21.74

Table 7. (continued)

LAB CODE	BIAS NUMBER OF PARAMETERS BIASED (%)	FLAGS NUMBER OF RESULTS FLAGGED (%)
L031	44.44	17.79
L112	33.33	36.67
L099	53.33	20.15
L007	44.44	31.40
L003	46.15	31.67
L047	50.00	48.53
L057	88.89	38.89
L090B	100.00	50.00

Table 8. Holding time test for major anions on eight filtered, melted snow samples maintained at 4°C in high density polypropylene bottles. Data are in microequivalents per liter.

Sample	2 days	6 days	33 days	4 months
		Chloride		
EBL 26	1.5	1.5	1.6	1.8
EBL 27	0.9	1.1	1.2	0.9
OV 37	0.4	0.6	0.9	0.5
OV 38	0.9	1.1	1.2	0.9
OV 42	0.6	0.8	1.0	0.7
OV 43	1.8	2.4	2.2	2.1
SL 26	0.7	1.6	0.9	0.7
SL 27	1.5	1.6	2.0	1.8
		Nitrate		
EBL 26	4.9	5.2	5.3	5.6
EBL 27	4.4	4.6	4.7	4.9
OV 37	2.8	2.9	3.0	3.0
OV 38	4.1	4.4	4.6	4.7
OV 42	4.1	4.3	4.4	4.6
OV 43	8.5	8.7	8.9	9.2
SL 26	2.6	2.7	2.7	2.7
SL 27	4.3	4.6	4.7	4.9
		Sulfate		
EBL 26	3.7	3.8	3.8	4.2
EBL 27	2.4	2.3	2.6	2.5
OV 37	2.2	2.1	2.4	2.4
OV 38	5.1	5.3	5.4	5.7
OV 42	2.8	2.8	3.0	3.2
OV 43	6.5	6.6	6.9	7.4
SL 26	1.1	1.3	1.2	1.1
SL 27	2.3	2.3	2.6	2.4

Table 9. Holding time test for major anions on six replicates of a synthetic sample 2.0 microequivalents per liter each in Cl^-, NO_3^-, SO_4^{2-} maintained at 4°C in high density polyethylene bottles.

Sample	0 months	1 month	4 months	5 months	8 months
		Chloride			
mean	1.7	1.9	1.9	2.2	2.6
S.D.	0.1	0.1	0.1	0.1	0.5
		Nitrate			
mean	1.9	1.9	1.9	2.1	2.0
S.D.	0.0	0.0	0.0	0.0	0.1
		Sulfate			
mean	1.9	2.0	2.1	2.5	2.7
S.D.	0.1	0.0	0.1	0.1	0.1

Table 10. Standard deviation (SD) and method detection limit[1] (MDL = 2 SD) of chemical methods at UCSB during 1990. Ammonium, phosphate and silica were determined using colorimetric techniques and pH was measured with an electrode. The remaining cations were analyzed using flame atomic absorption spectroscopy and the remaining anions were determined with ion chromatography. Replicate determinations (N) of deionized water (DIW) or low concentration standards (levels tabulated are theoretical concentrations) were measured on separate days except where indicated (*) when a single trial on one day was used. All units are μEq L^{-1} except for phosphate and silica which are μM.

Constituent	N	Standard	SD	MDL
Ammonium	10	DIW	0.15	0.30
Phosphate	10	DIW	0.03	0.06
Silica	7	DIW	0.20	0.40
Hydrogen (pH)	7	Snowmelt	0.02	0.04
Acetate	8	1.00	0.05	0.10
Formate	8	1.00	0.05	0.10
Nitrate	7*	0.50	0.10	0.20
Chloride	7*	0.50	0.19	0.38
Sulfate	7*	0.75	0.22	0.44
Calcium	4	2.50	0.50	1.00
Magnesium	4	2.06	0.16	0.32
Sodium	6	1.09	0.25	0.50
Potassium	6	0.64	0.22	0.45

[1] Limits of detection for major ions were established in accordance with the Scientific Apparatus Makers Association definition for detection limit: that concentration which yields an absorbance equal to twice the standard deviation of a series of measurements of a solution whose concentration is detectable above, but close to the blank absorbance. Determination of method detection limits for ions by ion chromatography (Dionex 2010i ion chromatograph, 200-μliter sample loop, 3 μS cm^{-1} attenuation) or atomic absorption spectrophotometry necessitated the use of a low-level standards as DIW gave no signal under our routine operating conditions.

Table 11. Volume-weighted precipitation chemistry for Emerald Lake. Units for Specific Conductance (S.C.) are μS/cm. All other concentrations are in μEq L^{-1}. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Snow-water equivalence at Emerald Lake was calculated from depth and density measurements made throughout the watershed. % Collected is the amount of precipitation caught in the rain collector relative to the amount which was measured in a nearby rain gauge (Precip). Acetate and formate were not determined in rain collected during 1990.

Emerald Lake

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	5.29	5.12	5.44	5.16	5.33	5.49	5.55	5.29
H^+	5.1	7.5	3.6	7.0	4.7	3.3	2.8	5.2
S.C.	8.8	10.4	6.8	5.4	2.8	2.2	3.6	2.9
NH_4^+	12.0	41.1	10.3	12.6	4.6	2.9	3.4	2.2
Cl^-	4.1	3.3	2.5	2.5	2.1	1.2	1.7	2.0
NO_3^-	17.8	22.5	12.6	8.8	2.6	1.7	3.0	1.8
SO_4^{2-}	13.1	15.2	9.8	8.1	2.6	1.2	1.9	2.4
Ca^{2+}	10.2	10.1	3.2	2.4	1.3	1.1	2.5	0.9
Mg^{2+}	2.7	3.5	0.8	0.5	0.6	0.4	0.5	0.5
Na^+	6.7	2.9	3.5	1.9	1.8	1.0	0.9	0.9
K^+	6.1	3.8	1.8	1.2	0.5	0.3	0.1	0.3
HCO_2^-	NA	6.5	10.2	2.2	1.0	0.2	0.6	0.6
$CH_2CO_2^-$	NA	11.6	7.3	5.6	0.4	0.3	0.6	0.2
Precip	126	142	239	89	553	916	591	2185
% Collected	76	88	96	91	na	na	na	na
Dates	5-17 to 11-24	6-3 to 11-9	5-20 to 11-4	5-25 to 10-28	3-19	4-8	3-26	4-7

Table 11. Continued

Emerald Lake

	Rain 1994	Snow 1994	Snow 1995
pH	5.33	5.54	5.47
H^+	4.7	2.9	3.4
S.C.	13.2	2.4	2.2
NH_4^+	15.3	3.5	1.8
Cl^-	10.3	2.1	1.0
NO_3^-	17.5	2.7	2.1
SO_4^{2-}	10.7	1.5	1.4
Ca^{2+}	8.8	2.6	1.6
Mg^{2+}	2.4	0.5	0.3
Na^+	8.5	1.4	0.7
K^+	4.1	0.6	0.4
HCO_2^-	2.3	0.0	0.0
$CH_2CO_2^-$	2.6	0.6	0.0
Precip	100	835	2694
% Collected	88	na	na
Dates	5-16 to 10-19	3-31	4-24

Table 12. Volume-weighted precipitation chemistry for Onion Valley. Units for Specific Conductance (S.C.) are μS/cm. All other concentrations are in μEq L^{-1}. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Rain chemistry and amount for 1992 and 1993 is the average from two co-located collectors. % Collected is the percentage of precipitation which was caught in the collector relative to the amount which was measured in a nearby rain gauge (Precip).

Onion Valley

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	4.72	4.74	4.89	4.87	5.15	5.36	5.32	5.33
H^+	19.0	18.0	13.2	13.8	7.0	4.4	4.8	4.7
S.C.	15.1	14.6	13.7	9.0	3.8	3.0	4.0	3.4
NH_4^+	33.0	42.2	40.0	14.6	2.6	3.8	3.0	2.2
Cl^-	4.9	5.9	5.6	3.1	1.4	1.3	0.8	0.9
NO_3^-	22.8	29.4	32.6	20.1	2.3	4.0	5.0	2.4
SO_4^{2-}	20.1	24.0	28.9	15.9	2.0	2.1	4.3	1.6
Ca^{2+}	10.0	20.1	21.4	7.9	4.8	2.4	3.1	1.8
Mg^{2+}	2.0	5.9	4.5	1.4	1.0	0.6	0.7	0.7
Na^+	4.8	5.3	6.0	2.6	1.4	0.8	1.6	0.7
K^+	1.3	1.8	2.1	1.2	2.0	0.4	0.7	0.6
HCO_2^-	7.8	7.0	9.1	2.1	0.4	0.6	0.3	0.6
$CH_2CO_2^-$	13.6	15.3	12.0	3.4	0.3	1.4	0.9	0.1
Precip	83	41	45	38	226	617	487	817
% Collected	98	98	89	87	na	na	na	na
Dates	6-20 to 10-19	5-24 to 10-23	5-1 to 10-27	5-26 to 10-13	3-20	4-8	3-30	4-13

Table 13. Volume-weighted precipitation chemistry for South Lake. Units for Specific Conductance (S.C.) are $\mu S/cm$. All other concentrations are in $\mu Eq\ L^{-1}$. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. % Collected is the percentage of precipitation which was caught in the collector relative to the amount which was measured in a nearby rain gauge (Precip).

South Lake

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	4.72	4.70	4.64	4.60	5.43	5.39	5.43	5.45
H^+	19.2	20.0	23.1	25.3	3.7	4.1	3.7	3.6
S.C.	12.9	11.9	14.5	8.8	2.6	2.0	3.4	2.5
NH_4^+	20.7	22.0	30.9	16.7	2.5	1.1	2.4	1.1
Cl^-	4.4	4.0	2.9	3.1	1.7	0.7	1.2	0.6
NO_3^-	18.5	24.7	30.6	21.8	3.0	1.4	3.9	1.8
SO_4^{2-}	13.5	18.8	24.1	13.8	1.6	1.7	1.7	1.9
Ca^{2+}	8.1	10.4	10.8	7.2	1.2	1.5	1.8	1.2
Mg^{2+}	1.9	3.4	2.8	2.0	0.3	0.4	0.5	0.4
Na^+	3.4	3.1	4.5	3.2	0.6	0.6	0.9	0.5
K^+	1.4	1.1	2.3	3.2	0.5	0.3	0.4	0.3
HCO_2^-	6.6	5.7	9.2	4.2	0.7	0.7	0.4	0.6
$CH_2CO_2^-$	11.0	6.5	9.2	3.0	0.7	0.2	0.8	0.8
Precip	107	55	91	13	331	466	350	1026
% Collected	89	97	93	92	na	na	na	na
Dates	6-20 to 10-19	6-11 to 10-23	5-29 to 10-27	6-14 to 10-13	3-21	4-10	4-6	3-31

Table 14. Volume-weighted precipitation chemistry for Eastern Brook Lake Units for Specific Conductance (S.C.) are $\mu S/cm$. All other concentrations are in $\mu Eq\ L^{-1}$. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. % Collected is the percentage of precipitation which was caught in the collector relative to the amount which was measured in a nearby rain gauge (Precip).

Eastern Brook Lake

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	4.73	4.66	4.67	5.16	5.32	5.30	5.46	5.49
H^+	18.5	22.0	21.5	6.9	4.7	4.0	3.5	3.3
S.C.	14.7	15.5	14.4	5.0	2.6	2.2	3.1	2.7
NH_4^+	22.5	34.5	25.7	8.2	2.4	1.7	2.6	1.0
Cl^-	5.2	4.4	3.3	1.8	1.5	1.1	1.2	1.3
NO_3^-	23.7	28.2	26.7	9.1	2.6	1.5	3.7	1.6
SO_4^{2-}	15.3	19.7	22.6	7.8	1.1	1.3	2.4	1.9
Ca^{2+}	22.5	11.5	12.0	7.1	1.0	1.4	2.5	2.1
Mg^{2+}	3.3	2.0	2.6	1.1	0.2	0.6	2.4	0.7
Na^+	4.5	3.1	4.4	1.6	0.4	0.6	1.2	0.5
K^+	1.2	1.5	1.9	1.1	0.3	0.4	1.0	1.3
HCO_2^-	4.5	9.7	8.4	2.5	0.1	0.3	0.3	0.3
$CH_2CO_2^-$	9.5	13.7	9.1	4.1	0.0	0.7	0.7	0.2
Precip	76	68	93	33	267	336	326	485
% Collected	86	99	80	95	na	na	na	na
Dates	7-08 to 10-19	6-13 to 10-09	5-12 to 10-23	5-27 to 10-18	3-22	4-09	4-1	3-30

Table 14. Continued. Snow chemistry and amount for 1995 are from Ruby Lake. Samples from Eastern Brook Lake were lost due to a freezer malfunction.

Eastern Brook Lake (Ruby Lake)

	Rain 1994	Snow 1994	Snow* 1995
pH	4.94	5.62	5.21
H^+	11.4	2.4	6.2
S.C.	6.4	2.6	2.3
NH_4^+	10.5	3.6	1.7
Cl^-	2.6	0.9	0.6
NO_3^-	9.8	3.8	2.5
SO_4^{2-}	8.9	2.5	1.7
Ca^{2+}	4.0	2.4	1.5
Mg^{2+}	0.8	0.6	0.3
Na^+	1.5	1.2	0.7
K^+	0.6	0.6	0.3
HCO_2^-	2.1	0.4	0.2
$CH_2CO_2^-$	1.8	0.1	0.2
Precip	50	278	1884
% Collected	96	na	na
Dates	5-16 to 10-19	3-28	5-9

Table 15. Volume-weighted precipitation chemistry for Mammoth Mountain Units for Specific Conductance (S.C.) are $\mu S/cm$. All other concentrations are in $\mu Eq\ L^{-1}$. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. % Collected is the percentage of precipitation which was caught in the collector relative to the amount which was measured in a nearby rain gauge (Precip).

Mammoth Mountain

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	4.65	4.75	4.87	5.17	5.26	5.39	5.43	5.42
H^+	22.2	18.0	13.5	6.9	5.9	4.1	3.7	3.8
S.C.	16.2	14.9	9.7	5.1	2.9	2.8	3.1	2.7
NH_4^+	29.3	30.6	23.6	11.8	3.9	3.7	3.1	2.1
Cl^-	5.3	4.9	1.3	1.3	1.3	1.7	1.0	1.2
NO_3^-	30.1	27.8	18.7	8.4	3.0	3.0	3.5	1.9
SO_4^{2-}	16.4	21.8	13.8	8.9	2.2	2.2	2.8	2.5
Ca^{2+}	12.2	16.2	6.0	2.2	1.3	1.6	1.9	1.4
Mg^{2+}	2.3	2.1	1.4	0.5	0.1	0.4	0.5	0.4
Na^+	5.5	9.0	1.9	1.0	1.1	1.3	1.1	1.1
K^+	2.1	1.8	0.8	0.5	0.3	0.4	0.6	0.4
HCO_2^-	7.6	10.4	6.9	1.0	1.1	0.5	0.2	0.4
$CH_2CO_2^-$	15.0	13.8	7.4	2.4	0.3	1.0	0.9	0.2
Precip	59	71	122	118	814	937	892	2173
% Collected	62	86	95	57	na	na	na	na
Dates	6-14 to 10-19	5-14 to 10-25	5-28 to 11-02	5-23 to 11-01	3-23	4-06	4-8	4-03

Table 15. Continued.

Mammoth Mountain

	Rain 1994	Snow 1994	Snow 1995
pH	5.16	5.44	5.20
H^+	6.9	3.6	6.3
S.C.	4.8	3.7	2.8
NH_4^+	8.2	5.8	3.2
Cl^-	1.7	1.8	1.2
NO_3^-	7.3	4.4	3.0
SO_4^{2-}	6.1	2.9	2.6
Ca^{2+}	3.6	2.2	1.4
Mg^{2+}	0.9	1.2	0.5
Na^+	1.7	2.3	1.3
K^+	0.5	0.6	0.4
HCO_2^-	0.7	0.5	0.1
$CH_2CO_2^-$	1.6	1.6	0.1
Precip	154	621	2930
% Collected	67	na	na
Dates	4-22 to 10-18	3-29	5-4

Table 16. Volume-weighted precipitation chemistry for Tioga Pass. Units for Specific Conductance (S.C.) are $\mu S/cm$. All other concentrations are in $\mu Eq\ L^{-1}$. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Snow-water equivalence at Tioga Pass was caculated from depth and density measurements made throughout the Spuller Lake watershed. % Collected is the percentage of precipitation which was caught in the collector relative to the amount which was measured in a nearby rain gauge (Precip).

Tioga Pass (Spuller Lake)

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	4.72	4.59	4.65	4.98	5.25	5.41	5.45	5.50
H^+	19.0	25.9	22.5	10.5	5.6	3.9	3.5	3.1
S.C.	15.9	15.9	12.2	7.3	2.3	2.5	3.2	2.3
NH_4^+	28.8	32.8	19.8	21.6	1.6	2.2	2.7	1.7
Cl^-	7.7	5.6	3.0	1.9	1.3	1.1	1.0	1.1
NO_3^-	31.2	29.9	19.4	16.0	1.5	2.1	3.0	1.4
SO_4^{2-}	19.1	21.9	16.4	11.2	1.3	1.7	2.2	1.7
Ca^{2+}	14.2	15.2	7.1	3.1	0.9	2.0	1.8	1.9
Mg^{2+}	3.4	2.5	1.9	0.9	0.3	0.4	0.6	0.5
Na^+	13.6	4.2	3.3	1.9	0.7	1.0	0.9	0.9
K^+	4.7	1.6	1.3	1.2	0.4	0.7	1.0	0.3
HCO_2^-	20.0	10.5	8.9	2.5	0.3	0.5	0.5	0.8
$CH_2CO_2^-$	12.6	13.3	9.8	4.1	0.2	0.7	0.5	0.1
Precip	104	68	197	33	685	909	698	1961
% Collected	91	84	86	76	na	na	na	na
Dates	5-06 to 10-19	6-18 to 10-24	5-11 to 10-22	6-23 to 10-20	3-26	4-19	4-2	4-15

Table 16. Continued.

Tioga Pass (Spuller Lake)

	Rain 1994	Snow 1994	Snow 1995
pH	5.05	5.46	5.26
H^+	9.0	3.5	5.5
S.C.	7.3	2.8	2.4
NH_4^+	11.0	2.4	1.7
Cl^-	1.7	1.0	1.2
NO_3^-	11.8	2.9	2.3
SO_4^{2-}	8.0	1.8	1.5
Ca^{2+}	13.4	1.3	0.9
Mg^{2+}	1.1	0.3	0.4
Na^+	1.9	0.8	1.0
K^+	0.9	0.2	0.3
HCO_2^-	2.8	0.5	0.2
$CH_2CO_2^-$	5.1	0.16	0.6
Precip	74	818	2800
% Collected	93	na	na
Dates	7-6 to 10-7	4-8	5-18

Table 17. Volume-weighted precipitation chemistry for Sonora Pass. Units for Specific Conductance (S.C.) are μS/cm. All other concentrations are in μEq L^{-1}. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. % Collected is the percentage of precipitation which was caught in the collector relative to the amount which was measured in a nearby rain gauge (Precip).

Sonora Pass

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	4.78	4.46	4.69	4.87	5.19	5.48	5.53	5.52
H^+	16.6	34.8	20.6	13.5	6.4	3.3	2.9	3.0
S.C.	15.7	22.9	12.2	8.8	2.4	2.7	2.6	2.3
NH_4^+	28.9	33.6	19.9	20.0	1.3	2.0	1.9	1.3
Cl^-	5.1	6.4	1.6	3.2	1.0	1.8	0.7	1.0
NO_3^-	23.3	41.2	19.2	22.4	1.6	1.9	2.1	1.5
SO_4^{2-}	16.0	28.5	16.6	15.5	1.0	3.7	1.5	1.8
Ca^{2+}	12.8	19.3	8.2	5.6	1.3	3.3	2.2	1.8
Mg^{2+}	2.5	5.0	2.2	2.2	0.4	1.4	1.0	0.9
Na^+	4.6	5.1	3.7	4.4	0.7	3.1	0.8	0.8
K^+	1.7	4.9	1.3	1.7	0.6	1.0	1.8	0.4
HCO_2^-	7.6	24.4	9.3	4.5	0.5	0.3	0.4	0.3
$CH_2CO_2^-$	16.5	31.1	9.8	3.5	0.1	1.0	0.8	0.3
Precip	104	83	103	23	462	519	456	1042
% Collected	109	71	100	80	na	na	na	na
Dates	6-22 to 10-19	6-28 to 10-24	5-04 to 10-26	6-23 to 10-20	3-24	4-12	4-07	4-06

Table 18. Volume-weighted precipitation chemistry for Alpine Meadows. Units for Specific Conductance (S.C.) are μS/cm. All other concentrations are in μEq L^{-1}. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. % Collected is the percentage of precipitation which was caught in the collector relative to the amount which was measured in a nearby rain gauge (Precip).

Alpine Meadows

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	4.77	4.83	4.83	5.58	5.24	5.40	5.39	5.56
H^+	17.0	14.9	14.9	2.6	5.7	3.9	4.1	2.8
S.C.	11.9	7.2	16.0	6.8	2.3	2.5	3.0	2.3
NH_4^+	18.6	14.0	32.1	9.8	2.0	2.9	2.4	1.7
Cl^-	5.0	4.3	5.1	1.4	1.5	2.3	1.4	1.0
NO_3^-	23.1	19.3	34.5	14.5	1.7	2.9	2.4	1.3
SO_4^{2-}	13.4	10.3	24.5	7.6	1.5	1.8	1.8	1.4
Ca^{2+}	23.7	13.1	13.8	2.3	0.6	1.4	1.1	0.8
Mg^{2+}	4.3	0.5	3.6	0.5	0.3	0.5	0.5	0.5
Na^+	4.2	5.8	7.6	0.9	1.0	1.4	1.2	0.8
K^+2	3.4	3.2	4.1	0.6	0.2	0.6	0.5	0.4
HCO_2^-	16.0	5.9	5.8	0.6	0.8	0.3	0.2	0.4
$CH_2CO_2^-$	2.4	6.6	7.9	0.6	0.2	0.4	0.2	0.1
Precip	48	236	92	98	786	1108	745	1892
% Collected	20	76	89	100	na	na	na	na
Dates	6-21 to 11-1	6-17 to 11-15	5-29 to 10-28	6-28 to 10-16	4-01	4-21	4-07	4-08

Table 18. Continued. Rainfall was not collected at Alpine Meadows in 1994.

Alpine Meadows

	Snow 1994
pH	5.48
H^+	3.3
S.C.	2.3
NH_4^+	1.9
Cl^-	1.3
NO_3^-	1.9
SO_4^{2-}	1.4
Ca^{2+}	1.0
Mg^{2+}	0.5
Na^+	0.8
K^+	0.4
HCO_2^-	0.5
$CH_2CO_2^-$	0.0
Precip	726
% Collected	na
Dates	3-31

Table 19. Volume-weighted precipitation chemistry for Angora Lake. Units for Specific Conductance (S.C.) are $\mu S/cm$. All other concentrations are in $\mu Eq\ L^{-1}$. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Snow chemistry and quantity are from the Lost Lake watershed. % Collected is the percentage of precipitation which was caught in the collector relative to the amount which was measured in a nearby rain gauge (Precip).

Angora Lake (Lost Lake)

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	4.84	4.87	4.86	5.21	5.37	5.48	5.43	5.53
H^+	14.3	13.5	13.7	6.2	4.3	3.3	3.7	2.9
S.C.	12.0	9.5	10.9	11.1	2.6	3.8	3.1	2.5
NH_4^+	21.5	20.2	10.4	23.7	2.4	3.3	1.7	3.3
Cl^-	5.9	4.7	3.6	2.8	2.1	2.1	1.2	2.1
NO_3^-	26.5	19.2	17.9	28.8	2.9	2.5	1.6	2.3
SO_4^{2-}	18.2	13.2	15.0	19.2	2.1	1.9	1.3	2.3
Ca^{2+}	13.2	7.1	8.0	6.7	1.1	1.4	1.3	2.2
Mg^{2+}	4.1	2.5	1.9	2.9	0.5	0.7	0.6	0.3
Na^+	6.2	7.0	4.8	3.3	1.7	1.4	1.3	1.6
K^+	3.2	1.9	1.7	6.8	0.4	0.3	0.5	0.3
HCO_2^-	17.6	12.0	4.8	0.1	0.8	0.6	0.5	0.7
$CH_2CO_2^-$	4.0	9.4	6.1	0.1	0.1	1.0	0.6	0.5
Precip	94	108	157	34	933	954	874	3017
% Collected	92	94	99	89	na	na	na	na
Dates	6-03 to 10-17	6-27 to 10-11	5-02 to 10-21	6-20 to 10-14	4-05	4-22	4-06	3-30

Table 19. Continued. No snow surveys were conducted at Lost Lake or Angora Lake during 1994 or 1995.

Angora Lake

	Rain 1994
pH	4.96
H^+	11.0
S.C.	9.8
NH_4^+	9.2
Cl^-	2.7
NO_3^-	13.3
SO_4^{2-}	10.1
Ca^{2+}	6.1
Mg^{2+}	1.8
Na^+	2.4
K^+	1.9
HCO_2^-	5.0
$CH_2CO_2^-$	3.1
Precip	70
% Collected	76.0
Dates	6-24 to 10-31

Table 20. Volume-weighted precipitation chemistry for Mineral King. Units for Specific Conductance (S.C.) are $\mu S/cm$. All other concentrations are in $\mu Eq\ L^{-1}$. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. % Collected is the percentage of precipitation which was caught in the collector relative to the amount which was measured in a nearby rain gauge (Precip).

Mineral King

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	4.89	5.11	5.12	4.86	5.21	5.42	5.53	5.53
H^+	12.8	7.7	7.6	13.7	6.1	3.8	3.0	3.0
S.C.	19.9	8.4	5.2	15.9	4.8	3.0	4.3	2.2
NH_4^+	60.9	20.7	16.8	32.2	4.6	7.6	7.2	1.6
Cl^-	7.6	3.8	2.2	4.0	2.2	1.4	1.9	1.5
NO_3^-	43.7	23.9	15.3	36.1	3.3	5.5	4.8	1.4
SO_4^{2-}	34.9	16.7	11.2	17.5	2.6	1.7	2.5	1.6
Ca^{2+}	17.7	10.8	5.1	6.1	2.9	1.3	2.8	2.0
Mg^{2+}	6.4	1.9	0.8	1.2	1.8	0.6	0.7	0.4
Na^+	9.2	3.1	2.6	3.4	1.8	1.2	1.4	0.9
K^+	3.7	2.3	1.5	2.0	2.7	0.8	0.7	0.1
HCO_2^-	2.0	0.6	14.2	5.4	2.1	0.5	0.9	0.3
$CH_2CO_2^-$	5.1	1.1	16.2	5.2	1.1	1.5	0.7	0.1
Precip	84	107	202	16	579	559	453	882
% Collected	57	95	83	68	na	na	na	na
Dates	7-12 to 10-20	6-13 to 11-12	6-14 to 11-04	6-08 to 11-08	3-18	4-15	3-17	3-23

Table 20. Continued. No snow survey was conducted in Mineral King during 1995. Snow data for 1995 are from surveys conducted at Topaz Lake. A fire burned all vegetation within the immediate area of the rain collector during 1994. Dust and ash were common in samples after the fire and contributed calcium and acid neutralizing capacity to the samples.

Mineral King (Topaz Lake)

	Rain 1994	Snow 1994	*Snow 1995
pH	5.46	5.49	5.48
H^+	3.4	3.2	3.2
S.C.	28.8	2.7	2.1
NH_4^+	6.8	3.9	1.7
Cl^-	6.5	1.4	0.8
NO_3^-	26.8	3.8	1.9
SO_4^{2-}	26.6	1.8	1.2
ANC	82.3	na	na
Ca^{2+}	105	2.5	0.8
Mg^{2+}	14.2	0.8	0.3
Na^+	10.7	1.1	0.6
K^+	9.9	0.8	0.1
HCO_2^-	1.1	1.2	0.0
$CH_2CO_2^-$	2.0	0.2	0.0
Precip	82	598	1738
% Collected	85	na	na
Dates	6-10 to 10-16	3-27	4-25

Table 21. Volume-weighted precipitation chemistry for Kaiser Pass. Units for Specific Conductance (S.C.) are μS/cm. All other concentrations are in μEq L^{-1}. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. % Collected is the percentage of precipitation which was caught in the collector relative to the amount which was measured in a nearby rain gauge (Precip).

Kaiser Pass

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	na	4.93	5.13	5.27	na	5.51	5.36	5.49
H^+	na	11.7	7.4	5.3	na	3.1	4.4	3.2
S.C.	na	9.9	8.6	15.9	na	2.6	3.3	2.4
NH_4^+	na	27.2	15.9	11.8	na	4.2	2.8	1.5
Cl^-	na	2.6	2.1	3.8	na	1.0	1.2	1.3
NO_3^-	na	12.6	22.9	17.0	na	2.9	2.3	1.1
SO_4^{2-}	na	12.7	17.8	9.7	na	1.5	1.3	1.6
Ca^{2+}	na	7.8	8.9	25.8	na	2.2	1.2	3.4
Mg^{2+}	na	2.6	2.2	2.6	na	0.4	0.5	0.4
Na^+	na	2.8	2.9	3.5	na	1.1	1.1	1.0
K^+	na	5.0	2.8	2.4	na	0.5	0.7	0.3
HCO_2^-	na	5.2	2.4	3.9	na	0.4	0.5	0.1
$CH_2CO_2^-$	na	8.7	3.7	3.8	na	1.7	0.1	0.03
Precip	na	88	173	36	na	873	705	1437
% Collected	na	92.1	95.1	49.4	na	na	na	na
Dates	na	6-25 to 11-03	5-26 to 11-06	6-27 to 11-16	na	4-26	4-01	3-19

Table 21. Continued

Kaiser Pass

	Rain 1994	Snow 1994	Snow 1995
pH	5.20	5.41	5.40
H^+	6.4	3.9	4.0
S.C.	6.9	3.3	2.3
NH_4^+	6.3	2.1	0.8
Cl^-	3.7	2.8	1.4
NO_3^-	11.0	1.9	1.7
SO_4^{2-}	9.7	1.8	1.0
Ca^{2+}	11.2	2.8	1.2
Mg^{2+}	2.7	1.2	0.5
Na^+	2.8	1.8	1.0
K^+	2.7	2.9	0.5
HCO_2^-	1.9	2.5	0.0
$CH_2CO_2^-$	3.2	0.2	0.0
Precip	118	600	1564
% Collected	85	na	na
Dates	6-10 to 10-23	3-22	4-4

Table 22. Volume-weighted mean snow chemistry for snowpits dug prior to and after maximum snow-pack accumulation. Units for Specific Conductance (S.C.) are $\mu S\ cm^{-1}$. All other concentrations are in $\mu Eq\ L^{-1}$. Precip is the amount of snow-water equivalence in millimeters.

Site/Year	Date	pH	S.C.	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$	Precip
AM-1990	24-Feb	5.32	3.0	2.4	1.7	2.4	2.1	1.2	0.3	1.8	0.3	1.2	0.1	718
AM-1991	16-Feb	5.18	5.5	6.4	3.4	8.3	3.6	4.3	1.8	2.7	2.5	0.6	0.2	239
AM-1992	16-Mar	5.45	3.1	3.0	1.2	2.5	1.8	1.3	0.4	1.1	0.7	0.4	0.3	752
AM-1993	10-Mar	5.40	2.9	1.8	1.9	1.9	2.0	0.9	0.6	1.6	0.2	0.4	0.0	1605
EML-1990	07-Feb	5.42	3.1	3.5	3.4	1.6	2.3	2.1	1.4	3.1	0.9	1.3	0.5	550
EML-1991	25-Feb	5.34	4.9	18.5	2.5	12.7	3.3	1.8	0.7	1.9	0.9	0.2	1.7	235
EML-1992	30-Jan	5.53	3.7	8.4	2.2	4.9	3.4	2.1	0.8	1.7	0.6	0.5	0.7	240
EML-1993	03-Feb	5.70	2.9	1.9	4.3	2.2	2.7	6.2	0.8	2.6	0.8	0.8	0.3	1027
EML-1994	03-Mar	5.49	2.2	1.0	1.7	1.4	1.4	1.3	0.4	1.3	0.5	1.5	0.1	877
EML-1994	29-Apr	5.50	2.2	1.9	0.6	1.6	1.2	1.4	0.3	0.6	0.4	0.2	0.0	826
MM-1990	19-Feb	5.34	3.1	2.8	2.0	3.1	2.1	1.7	0.2	1.3	0.5	0.6	0.5	720
MM-1991	10-Feb	5.36	3.6	5.6	1.2	5.5	2.9	4.3	0.7	1.2	0.9	0.5	1.1	84
MM-1991	07-May	5.43	2.9	4.8	1.5	4.2	2.1	2.0	1.1	1.1	1.2	0.6	0.7	702
MM-1992	03-Mar	5.45	3.6	4.8	1.0	3.7	2.7	2.3	0.5	1.2	0.8	0.5	0.6	720
MM-1993	08-Mar	5.40	2.6	1.3	1.6	1.4	2.0	1.0	0.4	0.9	0.4	0.3	0.3	1664
MM-1994	10-Mar	5.52	2.6	2.4	1.3	2.8	2.1	2.2	0.9	2.0	0.5	0.3	0.2	589
OV-1991	20-Feb	5.04	5.9	8.7	1.7	7.8	3.0	5.6	1.5	1.3	2.3	0.6	0.4	151
TG-1995	12-Jul	5.50	1.7	0.4	0.5	0.9	0.5	0.7	0.3	0.4	0.2	0.7	0.0	886

Table 23. Volume-weighted precipitation chemistry for Kirkwood Meadows. Units for Specific Conductance (S.C.) are µS/cm. All other concentrations are in µEq L^{-1}. Precip is the amount of collected precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum.

Kirkwood Meadows

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
pH	na	na	na	na	5.19	na	na	na
H^+	na	na	na	na	6.4	na	na	na
S.C.	na	na	na	na	3.2	na	na	na
NH_4^+	na	na	na	na	2.1	na	na	na
Cl^-	na	na	na	na	1.4	na	na	na
NO_3^-	na	na	na	na	1.8	na	na	na
SO_4^{2-}	na	na	na	na	1.4	na	na	na
Ca^{2+}	na	na	na	na	1.0	na	na	na
Mg^{2+}	na	na	na	na	0.7	na	na	na
Na^+	na	na	na	na	0.9	na	na	na
K^+	na	na	na	na	0.8	na	na	na
HCO_2^-	na	na	na	na	0.8	na	na	na
$CH_2CO_2^-$	na	na	na	na	0.3	na	na	na
Precip	na	na	na	na	737	na	na	na
Dates	na	na	na	na	3-31	na	na	na

Table 24. Summary of statistical analyses of snow chemistry from 1990 through 1993. Data used in the tests were volume-weighted mean concentration for snowpits. For each station, data from all years were combined for the analyses. The Kruskal-Wallis one-way ANOVA and Dunns multiple-comparsion tests were used to detect significant differences ($P < 0.05$) among stations. Data from 1994 and 1995 was not included because of changes in the number and location of snow survey sites.

1. Snow Chemistry 1990-1993

A Tests for differences in snow chemistry among stations:

1. SULFATE

a. MM > KP
b. MM > AM
c. MM > SN
d. MM > EBL
e. MM > TG
f. MM > SL
g. MM > ANG
h. OV > KP

2. SPECIFIC CONDUCTANCE

a. OV > AM
b. OV > SN
c. OV > TG

3. FORMATE

a. OV > KP

4. ACETATE

a. ANG > EBL
b. MK > EBL
c. TG > EBL

5. NITRATE

a. MK > SN
b. MK > SL
c. MK > EBL
d. MK > TG
e. MM > SN
f. MM > SL
h. EML > SN
h. EML > SL
i. OV > SN

6. AMMONIUM

a. OV > SN
b. OV > TG
c. MK > SN
d. MK > TG

Table 24. (continued)

7. MAGNESIUM

a. SN > SL
b. SN > MM
c. SN > TG
d. OV > SL
e. OV > MM

8. SODIUM

a. EBL < MM
b. EBL < ANG
c. EBL < MK
d. ANG > TG
e. SL < MM
f. SL < AM
g. SL < EML
h. SL < KP
i. SL < OV
j. SL < SN
k. SL < ANG
l. SL < MK

9. POTASSIUM

a. OV > EML
b. SN > EML
c. MK > EML

10. HYDROGEN (pH)

NONE

11. CHLORIDE

a. MK > SL
b. MK > SN
c. ANG > SL
d EML > SL

12. CALCIUM

a. OV > AM
b. OV > EML
c. OV > ANG
d. OV > SL
e. SN > AM
f. MK > AM

Table 24. (continued)

B. Summary of ranks:

<u>GREATER THAN OCCURENCES</u>

OV	15
MK	11
MM	8
SN	5
EML	3
ANG	3

<u>LESS THAN OCCURANCES</u>

SL	18
SN	10
EBL	8
AM	6
MM	6
EML	5
KP	4
ANG	3
MK	2
OV	1

<u>NET OCCURANCES</u>

OV	+14
MK	+9
MM	+2
ANG	0
EML	-2
KP	-4
SN	-5
AM	-6
EBL	-8
SN	-10
SL	-18

Table 25. Summary of statistical analyses of snow chemistry from 1990 through 1993. Data used in the tests were volume-weighted mean concentration for snowpits. For each year, data from all stations were combined for the analyses. The Kruskal-Wallis one-way ANOVA and Dunns multiple-comparsion tests were used to detect significant differences ($P < 0.05$ and $P < 0.10$ when indicated) among years. Data from 1994 and 1995 was not included due to changes in the number and location of snow survey sites.

1. Snow Chemistry 1990-1993

A. Tests for differences in snow chemistry among years:

1. SULFATE

NONE

2. SPECIFIC CONDUCTANCE

a. 1992 > 1990
b. 1992 > 1991
c. 1992 > 1993

3. FORMATE

a. 1990 > 1991
b. 1990 > 1992
c. 1990 > 1993

4. ACETATE

NONE

5. NITRATE

a. 1993 < 1990
b. 1993 < 1991
c. 1993 < 1992

6. SODIUM

a. 1992 > 1993

7. AMMONIUM

a. 1992 > 1990
b. 1992 > 1991
c. 1992 > 1993
d. 1993 < 1990
e. 1993 < 1991
f. 1993 < 1992

Table 25. (continued)

8. MAGNESIUM

   a. 1992 > 1990
   b. 1992 > 1993
   c. 1992 > 1991 AT 90% CONFIDENCE LEVEL

9. POTASSIUM

   a. 1992 > 1993

10. HYDROGEN

   a. 1990 > 1991
   b. 1990 > 1992
   c. 1990 > 1993

11. CHLORIDE

   a. 1990 > 1992
   b. 1990 > 1993
   c. 1990 > 1991 AT 90% CONFIDENCE LEVEL

12. CALCIUM

   a. 1992 > 1990
   b. 1992 > 1993
   c. 1992 > 1991 AT 90 % CONFIDENCE LEVEL

Table 26. Solute loading for Emerald Lake. All loadings are in Equivalents per hectare. Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Snow-water equivalence at Emerald Lake was calculated from depth and density measurements made throughout the watershed. Acetate and formate were not determined in rain collected during 1990. Duration is the number of days the rain collector was operated during each year.

Emerald Lake

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	6.4	10.7	8.7	6.2	25.9	30.3	16.8	113
NH_4^+	15.1	58.4	24.6	11.2	25.4	26.4	20.3	47.9
Cl^-	5.1	4.6	6.0	2.2	11.9	10.6	10.0	42.6
NO_3^-	22.4	31.9	30.1	7.8	14.2	15.6	17.7	38.4
SO_4^{2-}	16.5	21.5	23.4	7.2	14.3	10.6	11.5	51.3
Ca^{2+}	12.8	14.3	7.7	2.1	7.0	10.1	14.7	18.8
Mg^{2+}	3.4	5.0	1.8	0.5	3.2	3.4	2.8	11.2
Na^+	8.4	4.1	8.4	1.7	10.1	9.1	5.5	20.1
K^+	7.7	5.3	4.3	1.1	2.6	2.5	0.8	5.8
HCO_2^-	NA	9.3	24.5	1.9	5.7	2.0	3.5	13.0
$CH_2CO_2^-$	NA	16.4	17.6	4.9	2.4	2.7	3.3	5.0
Duration	192	160	169	157	na	na	na	na
Precip	126	142	239	89	553	916	591	2185
Dates	5-17 to 11-24	6-3 to 11-9	5-20 to 11-4	5-25 to 10-28	3-19	4-8	3-26	4-7

Table 26. Continued.

Emerald Lake

	Rain 1994	Snow 1994	Snow 1995
H^+	4.7	24.3	92.1
NH_4^+	15.2	29.6	48.0
Cl^-	10.2	17.2	27.7
NO_3^-	17.4	22.3	57.8
SO_4^{2-}	10.6	12.5	37.6
Ca^{2+}	8.8	22.1	43.3
Mg^{2+}	2.4	4.3	6.7
Na^+	8.5	11.5	19.8
K^+	4.1	5.4	10.5
HCO_2^-	2.3	0.0	0.0
$CH_2CO_2^-$	2.6	4.8	0.0
Duration	157	na	na
Precip	100	835	2694
Dates	5-16 to 10-19	3-31	4-24

Table 27. Solute loading for Onion Valley. All loadings are in Equivalents per hectare. Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Rain chemistry for 1992 and 1993 is the average from two co-located collectors. Duration is the number of days the rain collector was operated during each year.

Onion Valley

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	15.8	7.3	5.8	5.2	15.9	26.9	23.5	38.3
NH_4^+	27.4	17.1	17.8	5.5	5.9	23.3	14.7	17.6
Cl^-	4.0	2.4	2.5	1.1	3.2	8.0	4.1	7.6
NO_3^-	18.9	11.9	14.5	7.5	5.3	24.7	24.3	19.8
SO_4^{2-}	16.7	9.8	12.9	6.0	4.6	12.8	20.7	13.4
Ca^{2+}	8.3	8.2	9.5	2.9	10.8	14.6	15.2	14.9
Mg^{2+}	1.7	2.4	2.0	0.5	2.1	3.7	3.5	5.6
Na^+	4.0	2.1	2.7	1.0	3.2	4.9	7.6	5.7
K^+	1.1	0.7	0.9	0.5	4.5	2.6	3.3	5.0
HCO_2^-	6.5	2.8	4.0	0.8	0.9	3.6	1.3	4.8
$CH_2CO_2^-$	11.3	6.2	5.3	1.3	0.7	8.9	4.3	0.9
Duration	122	153	180	141	na	na	na	na
Precip	83	41	45	38	226	617	487	817
Dates	6-20 to 10-19	5-24 to 10-23	5-1 to 10-27	5-26 to 10-13	3-20	4-8	3-26	4-7

Table 28. Solute loading for South Lake. All loadings are in Equivalents per hectare. Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Duration is the number of days the rain collector was operated during each year.

South Lake

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	20.6	11.0	21.0	3.3	12.2	19.1	13.0	36.5
NH_4^+	22.2	12.1	28.0	2.2	8.2	5.3	8.2	11.1
Cl^-	4.7	2.2	2.6	0.4	5.6	3.5	4.2	6.1
NO_3^-	19.9	13.6	27.7	2.8	10.0	6.7	13.4	18.8
SO_4^{2-}	14.5	10.3	21.8	1.8	5.4	8.0	5.9	19.8
Ca^{2+}	8.7	5.7	9.8	0.9	4.0	6.9	6.4	12.2
Mg^{2+}	2.1	1.9	2.5	0.3	1.0	2.1	1.7	3.8
Na^+	3.6	1.7	4.1	0.4	2.0	2.7	3.2	5.0
K^+	1.5	0.6	2.1	0.4	1.5	1.3	1.5	2.7
HCO_2^-	7.1	3.2	8.4	0.6	2.4	3.0	1.3	5.6
$CH_2CO_2^-$	11.8	3.6	8.3	0.4	2.3	1.1	2.6	7.7
Duration	122	135	152	122	na	na	na	na
Precip	107	55	91	13.0	331	466	350	1026
Dates	6-20 to 10-19	6-11 to 10-23	5-29 to 10-27	6-14 to 10-13	3-21	4-10	4-6	3-31

Table 29. Solute loading for Eastern Brook Lake All loadings are in Equivalents per hectare. Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Duration is the number of days the rain collector was operated during each year.

Eastern Brook Lake

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	14.1	14.9	19.9	2.3	12.6	16.7	11.3	15.8
NH_4^+	17.2	23.4	23.9	2.7	6.4	5.7	8.6	5.1
Cl^-	4.0	3.0	3.1	0.6	4.0	3.6	3.8	6.2
NO_3^-	18.1	19.1	24.8	3.0	6.9	5.0	12.1	7.5
SO_4^{2-}	11.7	13.4	21.0	2.6	3.0	4.4	7.9	9.0
Ca^{2+}	17.2	7.8	11.2	2.3	2.7	4.8	8.2	9.9
Mg^{2+}	2.5	1.4	2.5	0.4	0.6	1.9	7.7	3.5
Na^+	3.5	2.1	4.1	0.5	1.2	2.0	4.0	2.6
K^+	0.9	1.0	1.8	0.4	0.8	1.3	3.3	6.2
HCO_2^-	3.5	6.6	7.8	0.8	0.2	0.9	1.0	1.2
$CH_2CO_2^-$	7.3	9.3	8.5	1.3	0.0	2.2	2.3	1.1
Duration	104	119	165	145	na	na	na	na
Precip	76	68	93	33	267	336	326	485
Dates	7-08 to 10-19	6-13 to 10-09	5-12 to 10-23	5-27 to 10-18	3-22	4-09	4-1	3-30

Table 29. Continued. Snow loading for 1995 are from Ruby Lake. Samples from Eastern Brook Lake were lost due to a freezer malfunction.

Eastern Brook Lake

	Rain 1994	Snow 1994	Snow 1995
H^+	5.9	6.7	117
NH_4^+	5.4	10.0	31.6
Cl^-	1.4	2.5	11.3
NO_3^-	5.1	10.6	46.2
SO_4^{2-}	4.6	6.9	31.5
Ca^{2+}	2.1	6.6	28.1
Mg^{2+}	0.4	1.6	6.1
Na^+	0.8	3.4	13.9
K^+	0.3	1.7	6.3
HCO_2^-	1.1	1.0	3.8
$CH_2CO_2^-$	1.1	0.3	3.8
Duration	130	na	na
Precip	50	278	1884
Dates	5-31 to 10-7	3-28	5-9

Table 30. Solute loading for Mammoth Mountain. All loadings are in Equivalents per hectare. Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Duration is the number of days the rain collector was operated during each year.

Mammoth Mountain

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	13.0	12.0	16.4	8.1	48.4	38.7	33.0	81.8
NH_4^+	17.2	21.8	29.6	13.9	31.7	34.5	27.5	46.3
Cl^-	3.1	3.5	1.6	1.5	10.9	15.9	9.1	27.0
NO_3^-	17.6	19.8	22.7	9.8	24.7	28.1	31.2	40.5
SO_4^{2-}	9.6	15.5	16.9	10.5	17.9	20.7	25.0	53.5
Ca^{2+}	7.1	11.5	7.1	2.6	10.6	14.9	16.9	30.9
Mg^{2+}	1.4	1.5	1.6	0.6	0.9	3.9	4.9	8.6
Na^+	3.2	6.4	2.4	1.2	8.7	12.0	10.2	24.3
K^+	1.2	1.3	1.0	0.5	2.6	3.4	5.7	8.8
HCO_2^-	4.5	7.4	8.2	1.2	8.7	4.7	2.1	8.4
$CH_2CO_2^-$	8.8	9.9	8.6	2.8	2.7	9.6	7.7	4.8
Duration	128	165	159	163	na	na	na	na
Precip	59	71	122	118	814	937	892	2173
Dates	6-14 to 10-19	5-14 to 10-25	5-28 to 11-02	5-23 to 11-01	3-23	4-06	4-8	4-03

Table 30. Continued.

Mammoth Mountain

	Rain 1994	Snow 1994	Snow 1995
H^+	16.1	22.4	183
NH_4^+	19.0	35.9	95.0
Cl^-	4.0	11.5	34.4
NO_3^-	17.0	27.4	87.8
SO_4^{2-}	14.1	18.0	75.4
Ca^{2+}	8.4	13.6	41.0
Mg^{2+}	2.0	7.5	14.1
Na^+	4.0	14.3	37.2
K^+	1.2	4.0	11.9
HCO_2^-	1.6	3.2	2.9
$CH_2CO_2^-$	3.7	9.9	2.9
Duration	180	na	na
Precip	154	621	2930
Dates	4-22 to 10-18	3-29	5-4

Table 31. Solute loading for Tioga Pass. All loadings are in Equivalents per hectare Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Snow-water equivalence at Tioga Pass was caculated from depth and density measurements made throughout the Spuller Lake watershed. Duration is the number of days the rain collector was operated during each year.

Tioga Pass (Spuller Lake)

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	19.9	17.6	44.2	3.5	38.3	37.0	24.5	61.6
NH_4^+	29.9	22.4	38.9	7.1	10.7	21.0	19.2	32.5
Cl^-	8.0	3.8	5.9	0.6	8.9	10.3	7.0	21.8
NO_3^-	32.4	20.4	38.1	5.3	10.4	19.6	21.0	27.3
SO_4^{2-}	19.8	14.9	32.3	3.7	8.7	16.1	15.2	33.6
Ca^{2+}	14.7	10.3	14.0	1.0	6.4	18.8	12.5	37.7
Mg^{2+}	3.5	1.7	3.8	0.3	2.3	4.2	3.9	8.9
Na^+	14.1	2.9	6.5	0.6	4.7	9.5	6.1	17.3
K^+	4.9	1.1	2.5	0.4	3.0	7.1	7.2	6.3
HCO_2^-	20.7	7.2	17.5	0.8	2.2	4.6	3.5	15.3
$CH_2CO_2^-$	13.0	9.1	19.3	1.3	1.6	7.0	3.5	1.9
Duration	167	129	165	120	na	na	na	na
Precip	104	68	197	33.0	685	909	698	1961
Dates	5-06 to 10-19	6-18 to 10-24	5-11 to 10-22	6-23 to 10-20	3-26	4-19	4-2	4-15

Table 31. Continued.

Tioga Pass (Spuller Lake)

	Rain 1994	Snow 1994	Snow 1995
H^+	7.1	28.4	155
NH_4^+	8.7	19.3	48.7
Cl^-	1.4	8.5	32.3
NO_3^-	9.3	23.4	63.7
SO_4^{2-}	6.3	14.5	41.2
Ca^{2+}	10.6	10.6	24.4
Mg^{2+}	0.9	2.6	10.4
Na^+	1.5	6.7	26.8
K^+	0.7	2.0	8.5
HCO_2^-	2.2	1.7	5.6
$CH_2CO_2^-$	4.0	0.6	16.8
Duration	94	na	na
Precip	74	818	2800
Dates	7-6 to 10-7	4-8	5-18

Table 32. Solute loading for Sonora Pass. All loadings are in Equivalents per hectare Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Duration is the number of days the rain collector was operated during each year.

Sonora Pass

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	17.3	28.8	21.3	3.1	29.8	17.2	13.4	31.2
NH_4^+	30.1	27.8	20.5	4.5	6.1	10.4	8.9	13.7
Cl^-	5.3	5.3	1.6	0.7	4.8	9.2	3.0	10.9
NO_3^-	24.2	34.2	19.8	5.1	7.3	10.1	9.7	15.8
SO_4^{2-}	16.6	23.6	17.2	3.5	4.8	19.1	6.9	18.9
Ca^{2+}	13.3	16.0	8.5	1.3	5.8	17.0	9.9	18.3
Mg^{2+}	2.6	4.1	2.2	0.5	2.0	7.3	4.6	8.9
Na^+	4.7	4.3	3.8	1.0	3.0	16.0	3.7	8.0
K^+	1.8	4.0	1.4	0.4	2.5	5.4	8.1	4.0
HCO_2^-	7.9	20.2	9.6	1.0	2.4	1.6	1.7	3.0
$CH_2CO_2^-$	17.1	25.8	10.1	0.8	0.4	5.4	3.7	3.3
Duration	120	119	176	120	na	na	na	na
Precip	104	83	103	23.0	462	519	456	1042
Dates	6-22 to 10-19	6-28 to 10-24	5-04 to 10-26	6-23 to 10-20	3-24	4-12	4-07	4-06

Table 33. Solute loading for Alpine Meadows. All loadings are in Equivalents per hectare Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Duration is the number of days the rain collector was operated during each year.

Alpine Meadows

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	8.2	35.1	13.7	2.6	44.8	43.7	30.6	52.0
NH_4^+	9.0	33.0	29.4	9.6	15.3	31.7	17.8	31.3
Cl^-	2.4	10.0	4.7	1.4	12.0	25.6	10.2	19.2
NO_3^-	11.2	45.7	31.6	14.1	13.3	31.6	17.8	25.2
SO_4^{2-}	6.5	24.2	22.4	7.5	12.0	19.8	13.2	26.3
Ca^{2+}	11.5	30.8	12.6	2.2	4.4	15.7	8.3	15.3
Mg^{2+}	2.1	1.2	3.3	0.5	2.4	5.9	3.8	9.0
Na^+	2.0	13.7	7.0	0.9	8.1	15.2	9.1	15.8
K^+	1.6	7.5	3.8	0.6	1.8	6.8	3.6	7.3
HCO_2^-	7.7	13.8	5.3	0.6	6.4	3.6	1.8	6.8
$CH_2CO_2^-$	1.2	15.7	7.2	0.6	1.9	4.1	1.7	2.6
Duration	134	152	153	111	na	na	na	na
Precip	48	236	92	98	786	1108	745	1892
Dates	6-21 to 11-1	6-17 to 11-15	5-29 to 10-28	6-28 to 10-16	4-01	4-21	4-07	4-08

Table 33. Continued.

Alpine Meadows

	Snow 1994
H^+	23.8
NH_4^+	13.5
Cl^-	9.6
NO_3^-	14.1
SO_4^{2-}	9.9
Ca^{2+}	7.5
Mg^{2+}	3.4
Na^+	5.6
K^+	3.1
HCO_2^-	3.8
$CH_2CO_2^-$	0.0
Duration	na
Precip	726
Dates	3-31

Table 34. Solute loading for Angora Lake. All loadings are in Equivalents per hectare. Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Snow chemistry and quantity are from the Lost Lake watershed. Duration is the number of days the rain collector was operated during each year.

Angora Lake (Lost Lake)

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	12.8	14.6	21.5	2.1	39.9	31.9	32.4	88.5
NH_4^+	20.2	21.8	16.3	7.9	22.0	31.5	15.2	99.8
Cl^-	5.5	5.1	5.6	0.9	19.5	20.3	10.1	62.9
NO_3^-	24.9	20.7	28.0	9.7	26.6	23.8	14.0	68.3
SO_4^{2-}	17.1	14.2	23.5	6.5	19.4	18.2	11.2	68.6
Ca^{2+}	12.4	7.7	12.5	2.3	10.6	13.5	11.4	66.0
Mg^{2+}	3.9	2.7	2.9	1.0	4.3	7.0	4.9	8.8
Na^+	5.8	7.5	7.6	1.1	15.5	13.4	11.6	49.0
K^+	3.0	2.1	2.6	2.3	3.8	2.5	4.0	10.0
HCO_2^-	16.5	13.0	7.6	0.03	7.2	6.2	4.1	22.4
$CH_2CO_2^-$	3.8	10.1	9.6	0.03	1.1	9.7	5.2	14.0
Duration	137	107	173	117	na	na	na	na
Precip	94	108	157	34	933	954	874	3017
Dates	6-03 to 10-17	6-27 to 10-11	5-02 to 10-21	6-20 to 10-14	4-05	4-22	4-06	3-30

Table 34. Continued.

Angora Lake

	Rain 1994
H^+	7.8
NH_4^+	6.5
Cl^-	1.9
NO_3^-	9.3
SO_4^{2-}	7.1
Ca^{2+}	4.3
Mg^{2+}	1.3
Na^+	1.7
K^+	1.3
HCO_2^-	3.5
$CH_2CO_2^-$	2.2
Duration	112
Precip	70
Dates	6-24 to 10-31

Table 35. Solute loading for Mineral King. All loadings are in Equivalents per hectare. Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Duration is the number of days the rain collector was operated during each year.

Mineral King

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	10.7	8.3	15.2	2.2	35.4	21.2	13.5	26.0
NH_4^+	51.2	22.3	33.9	5.2	26.6	42.5	32.7	13.9
Cl^-	6.4	4.0	4.5	0.6	12.9	8.1	8.8	13.3
NO_3^-	36.7	25.7	30.8	5.8	19.2	30.7	21.9	12.0
SO_4^{2-}	29.3	17.9	22.6	2.8	15.1	9.8	11.1	14.4
Ca^{2+}	14.8	11.6	10.3	1.0	16.8	7.2	12.6	17.9
Mg^{2+}	5.4	2.1	1.6	0.2	10.2	3.4	3.1	3.5
Na^+	7.8	3.4	5.3	0.5	10.3	7.0	6.1	8.1
K^+	3.1	2.4	3.1	0.3	15.5	4.7	2.9	0.8
HCO_2^-	1.7	0.7	28.5	0.9	12.2	2.6	3.9	2.5
$CH_2CO_2^-$	4.3	1.1	32.7	0.8	6.6	8.3	3.1	0.9
Duration	101	153	144	154	na	na	na	na
Precip	84	107	202	16	579	559	453	882
Dates	7-12 to 10-20	6-13 to 11-12	6-14 to 11-04	6-08 to 11-08	3-18	4-15	3-17	3-23

Table 35. Continued. No snow survey was conducted in Mineral King during 1995. Snow data for 1995 are from surveys conducted at Topaz Lake.

Mineral King (Topaz Lake)

	Rain 1994	Snow 1994	Snow 1995
H^+	2.8	19.2	55.7
NH_4^+	5.6	23.3	29.5
Cl^-	5.3	8.2	14.2
NO_3^-	21.9	22.8	32.7
SO_4^{2-}	21.8	10.7	21.1
A.N.C.	67.3	na	na
Ca^{2+}	85.9	14.7	14.2
Mg^{2+}	11.6	5.0	5.4
Na^+	8.8	6.7	10.8
K^+	8.1	4.7	2.1
HCO_2^-	0.9	7.4	0.0
$CH_2CO_2^-$	1.6	1.2	0.0
Duration	129	na	na
Precip	82	621	1738
Dates	6-10 to 10-16	3-29	4-25

Table 36. Solute loading for Kaiser Pass. All loadings are in Equivalents per hectare. Precip is the amount of measured precipitation or snow-water equivalence in millimeters. Snow chemistry is from samples collected from snowpits dug in late March or early April when the snowpack was at or near maximum. Duration is the number of days the rain collector was operated during each year.

Kaiser Pass

	Rain 1990	Rain 1991	Rain 1992	Rain 1993	Snow 1990	Snow 1991	Snow 1992	Snow 1993
H^+	na	10.4	12.8	1.9	na	26.9	31.0	46.2
NH_4^+	na	24.0	27.5	4.3	na	36.6	19.8	22.2
Cl^-	na	2.3	3.6	1.4	na	8.8	8.5	18.8
NO_3^-	na	11.2	39.7	6.1	na	25.1	16.0	15.2
SO_4^{2-}	na	11.2	30.9	3.5	na	12.9	9.2	22.4
Ca^{2+}	na	6.9	15.4	9.3	na	19.0	8.2	48.3
Mg^{2+}	na	2.3	3.8	0.9	na	3.4	3.5	5.9
Na^+	na	2.5	5.0	1.2	na	9.6	7.7	14.2
K^+	na	4.4	4.8	0.9	na	4.0	4.7	4.7
HCO_2^-	na	4.6	4.1	1.4	na	3.5	3.8	1.7
$CH_2CO_2^-$	na	7.7	6.4	1.4	na	15.0	0.5	0.5
Duration	na	132	165	143	na	na	na	na
Precip	na	88	173	36	na	873	705	1437
Dates		6-25 to 11-03	5-26 to 11-06	6-27 to 11-16	na	4-26	4-01	3-19

Table 36. Continued.

Kaiser Pass

	Rain 1994	Snow 1994	Snow 1995
H^+	7.5	23.4	61.9
NH_4^+	7.4	12.5	13.3
Cl^-	4.3	17.0	21.1
NO_3^-	13.0	11.3	26.5
SO_4^{2-}	11.5	10.9	16.4
Ca^{2+}	13.2	17.0	18.3
Mg^{2+}	3.1	7.0	7.4
Na^+	3.3	10.5	15.0
K^+	3.2	17.6	8.1
HCO_2^-	2.2	15.0	0.0
$CH_2CO_2^-$	3.7	0.9	0.0
Duration	136	na	na
Precip	118	600	1564
Dates	6-10 to 10-23	3-22	4-4

Table 37. Annual solute loading by site for the period of 1990 through 1994. Each year's total is the sum of snowpack loading and loading by precipitation from late spring through late autumn. Units are equivalents per hectare (eq ha^{-1}). Also shown is the average annual deposition for each site. Precip is the amount of annual precipitation (snow and rain) in millimeters. For 1994, data are only presented for stations where both winter and non-winter precipitation were measured.

Site/Year	H^+	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$	Precip
AM-90	53.0	24.3	14.4	24.5	18.5	15.9	4.5	10.1	3.4	14.1	3.1	833
AM-91	78.4	64.4	35.4	76.9	43.8	46.4	7.0	28.8	14.3	17.4	19.7	1333
AM-92	43.5	46.7	14.7	48.9	35.3	20.7	6.9	15.8	7.3	7.0	8.9	819
AM-93	50.1	38.2	18.9	37.1	31.5	16.2	8.8	15.3	7.3	6.9	3.0	1827
AM-AVG	56.3	43.4	20.8	46.9	32.3	24.8	6.8	17.5	8.1	11.3	8.7	1203
ANG-90	52.7	41.1	24.8	50.3	35.6	22.4	7.9	21.0	6.6	22.9	4.7	1022
ANG-91	46.5	53.4	25.4	44.5	32.5	21.1	9.6	20.9	4.6	19.1	19.8	1061
ANG-92	53.9	31.5	15.7	42.1	34.7	23.8	7.8	19.1	6.7	11.7	14.7	1031
ANG-93	90.6	107.8	63.8	78.0	75.1	68.2	9.8	50.1	12.3	22.5	14.0	3051
ANG-AVG	60.9	58.4	32.4	53.7	44.5	33.9	8.8	27.8	7.5	19.1	13.3	1541
EBL-90	26.8	23.5	8.0	24.9	14.7	19.8	3.1	4.6	1.7	3.6	7.3	343
EBL-91	31.6	29.1	6.6	24.1	17.7	12.6	3.3	4.1	2.4	7.5	11.5	403
EBL-92	31.3	32.5	6.9	36.9	28.8	19.3	10.1	8.1	5.0	8.8	10.7	419
EBL-93	18.1	7.8	6.8	10.5	11.5	12.3	3.9	3.1	6.6	2.0	2.5	518
EBL-94	12.6	15.4	3.9	15.7	11.5	8.7	2.0	4.2	2.0	2.1	1.2	328
EBL-AVG	24.1	21.6	6.4	22.4	16.9	14.6	4.5	4.8	3.5	4.8	6.6	402
EML-90	32.4	40.5	17.0	36.6	30.8	19.9	6.6	18.5	10.4	NA	NA	679
EML-91	40.9	84.8	15.3	47.5	32.1	24.5	8.4	13.2	7.8	11.3	19.1	1058
EML-92	25.4	44.9	16.0	47.8	34.9	22.4	4.6	13.9	5.0	28.0	20.8	830
EML-93	118.9	59.1	44.8	46.2	58.5	20.9	11.6	21.8	6.8	14.9	10.0	2273
EML-94	28.9	44.7	27.4	39.8	23.1	30.9	6.7	20.0	9.5	2.2	7.4	935
EML-AVG	49.3	54.8	24.1	43.6	35.9	23.7	7.6	17.5	7.9	NA	NA	1155
KP-91	37.3	60.6	11.0	36.3	24.1	25.9	5.7	12.0	8.4	8.0	22.7	961
KP-92	43.8	47.3	12.1	55.7	40.1	23.6	7.3	12.7	9.5	7.9	6.9	878
KP-93	48.1	26.4	20.1	21.3	25.9	57.6	6.8	15.4	5.5	3.1	1.8	1473
KP-94	31.0	19.9	21.4	24.3	22.4	30.2	10.2	13.8	20.8	17.2	4.6	718
KP-AVG	40.0	38.6	16.2	34.4	28.1	34.3	7.5	13.5	11.0	9.1	9.0	1008
MK-90	46.1	77.8	19.3	55.9	44.4	31.7	15.5	18.1	18.7	13.9	10.9	663
MK-91	29.5	64.8	12.1	56.3	27.7	18.8	5.4	10.4	7.1	3.3	9.5	666
MK-92	28.8	66.5	13.2	52.7	33.7	23.0	4.8	11.4	6.0	32.4	35.8	655
MK-93	28.2	19.1	14.0	17.8	17.2	18.9	3.7	8.7	1.1	3.3	1.7	898
MK-94	22.1	28.9	13.6	44.7	32.5	100.7	16.6	15.4	12.8	8.3	2.8	680
MK-AVG	30.9	51.4	14.4	45.5	31.1	38.6	9.2	12.8	9.1	12.2	12.1	712
MM-90	61.4	48.8	14.0	42.4	27.6	17.8	2.3	11.9	3.9	13.2	11.5	873
MM-91	51.5	56.3	19.4	47.9	36.2	26.4	5.4	18.4	4.7	12.2	19.4	1008
MM-92	49.4	56.5	10.7	54.0	41.9	23.9	6.5	12.5	6.7	10.3	16.4	1014
MM-93	89.9	60.2	28.4	50.3	64.0	33.5	9.2	25.5	9.3	9.6	7.6	2291
MM-94	38.5	54.9	15.5	44.4	32.1	22.0	9.5	18.3	5.2	4.8	13.6	776
MM-AVG	58.1	55.4	17.6	47.8	40.4	24.7	6.6	17.4	6.0	10.0	13.7	1192
OV-90	31.6	33.3	7.2	24.2	21.3	19.1	3.8	7.2	5.6	7.4	12.0	309
OV-91	34.2	40.4	10.4	36.7	22.6	22.8	6.1	7.0	3.3	6.5	15.2	657
OV-92	29.3	32.5	6.6	38.8	33.6	24.7	5.5	10.2	4.3	5.4	9.6	532
OV-93	43.4	23.1	8.7	26.9	19.3	17.8	6.1	6.7	5.5	5.5	2.1	854
OV-AVG	34.6	32.3	8.2	31.6	24.2	21.1	5.4	7.8	4.7	6.2	9.7	588
SL-90	32.8	30.4	10.4	29.8	19.9	12.8	3.0	5.6	3.0	9.5	14.0	438
SL-91	30.1	17.4	5.7	20.2	18.3	12.6	3.9	4.4	1.9	6.2	4.7	520
SL-92	33.9	36.2	6.8	41.2	27.8	16.2	4.2	7.4	3.6	9.7	11.0	440
SL-93	39.7	13.3	6.5	21.6	21.6	13.2	4.1	5.4	3.1	6.2	8.1	1039
SL-AVG	34.1	24.3	7.3	28.2	21.9	13.7	3.8	5.7	2.9	7.9	9.4	609

Table 37. Continued.

Site/Year	H^+	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$	Precip
SN-90	47.1	36.2	10.1	31.6	21.4	19.1	4.7	7.8	4.3	10.4	17.5	566
SN-91	46.1	38.2	14.4	44.2	42.7	33.0	11.4	20.2	9.4	21.9	31.3	602
SN-92	34.6	29.4	4.6	29.5	24.1	18.4	6.9	7.5	9.5	11.2	13.8	559
SN-93	34.2	18.2	11.6	20.9	22.4	19.5	9.4	9.0	4.4	4.1	4.1	1064
SN-AVG	40.5	30.5	10.2	31.6	27.6	22.5	8.1	11.1	6.9	11.9	16.7	698
TG-90	57.9	40.5	16.9	42.8	28.5	21.2	5.8	18.8	7.9	22.8	14.7	789
TG-91	54.6	43.4	14.2	39.9	31.0	29.1	5.9	12.3	8.2	11.8	16.1	977
TG-92	68.7	58.0	12.9	59.0	47.5	26.5	7.6	12.6	9.7	21.0	22.8	895
TG-93	65.1	39.6	22.4	32.6	37.3	38.7	9.2	17.9	6.7	16.1	3.2	1994
TG-94	35.5	28.0	9.9	32.7	20.8	21.2	3.5	8.2	2.7	3.9	4.6	891
TG-AVG	56.4	41.9	15.3	41.4	33.0	27.3	6.4	14.0	7.0	15.1	12.3	1109

Table 38. Percent of annual solute loading contributed by non-winter precipitation by site for the period of 1990 through 1994. Also shown is the average loading fraction for all sites by year. Data from the Lake Comparison watersheds is also included. Precip is the ratio of non-winter precipitation to annual precipitation.

Site/Year	H^+	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$	Precip
AM-90	15%	37%	17%	46%	35%	72%	47%	20%	46%	55%	39%	6%
ANG-90	24%	47%	21%	47%	46%	53%	46%	26%	43%	69%	76%	9%
CR-90	37%	54%	25%	53%	45%	41%	31%	22%	20%	41%	65%	11%
EBL-90	53%	73%	50%	72%	79%	87%	80%	74%	53%	95%	100%	22%
EML-90	20%	37%	30%	61%	53%	65%	51%	46%	74%	NA	NA	19%
MK-90	23%	66%	33%	66%	66%	47%	34%	43%	17%	12%	40%	13%
MM-90	21%	35%	22%	42%	35%	40%	60%	27%	32%	34%	76%	7%
OV-90	50%	82%	56%	78%	78%	43%	44%	55%	20%	87%	94%	27%
PR-90	18%	35%	26%	60%	48%	65%	49%	42%	79%	NA	NA	16%
RB-90	38%	67%	48%	59%	54%	66%	53%	42%	38%	43%	69%	14%
SL-90	63%	73%	46%	67%	73%	68%	68%	64%	49%	75%	84%	25%
SN-90	37%	83%	53%	77%	78%	70%	56%	61%	41%	76%	98%	18%
TG-90	34%	74%	47%	76%	69%	70%	60%	75%	62%	91%	89%	13%
TZ-90	16%	36%	24%	53%	46%	68%	51%	40%	66%	NA	NA	13%
1990-AVG	32.1%	57.1%	35.5%	61.1%	57.6%	61.0%	52.3%	45.6%	45.8%	61.6%	75.4%	15.1%
AM-91	45%	51%	28%	59%	55%	66%	17%	48%	53%	80%	79%	18%
ANG-91	31%	41%	20%	47%	44%	36%	28%	36%	46%	68%	51%	10%
CR-91	36%	36%	20%	38%	48%	28%	19%	31%	15%	57%	60%	9%
EBL-91	47%	80%	45%	79%	75%	62%	42%	50%	44%	88%	81%	17%
EML-91	26%	69%	30%	67%	67%	59%	60%	31%	68%	82%	86%	13%
KP-91	28%	40%	21%	31%	47%	27%	40%	20%	53%	57%	34%	9%
MK-91	28%	34%	33%	46%	65%	62%	38%	33%	34%	20%	12%	16%
MM-91	25%	39%	18%	41%	43%	44%	28%	35%	28%	61%	51%	7%
OV-91	21%	42%	23%	33%	43%	36%	39%	30%	22%	44%	41%	6%
PR-91	26%	63%	34%	59%	59%	55%	57%	33%	71%	70%	64%	14%
RB-91	53%	64%	49%	69%	65%	39%	46%	44%	55%	77%	57%	12%
SL-91	37%	70%	39%	67%	56%	45%	48%	39%	33%	51%	77%	11%
SN-91	63%	73%	37%	77%	55%	48%	36%	21%	43%	93%	83%	14%
TG-91	32%	52%	27%	51%	48%	35%	29%	23%	13%	61%	57%	7%
TZ-91	25%	78%	50%	70%	68%	36%	64%	36%	79%	66%	71%	15%
1991-AVG	34.8%	55.5%	31.6%	55.6%	56.0%	45.2%	39.4%	34.0%	43.8%	64.8%	60.3%	11.9%
AM-92	31%	63%	32%	65%	64%	61%	47%	44%	52%	75%	81%	11%
ANG-92	40%	52%	36%	67%	68%	52%	37%	40%	39%	65%	65%	15%
CR-92	37%	50%	16%	49%	43%	20%	14%	23%	6%	71%	61%	14%
EBL-92	64%	74%	44%	67%	73%	58%	24%	50%	35%	89%	79%	22%
EML-92	34%	55%	37%	63%	67%	34%	39%	60%	85%	87%	84%	29%
KP-92	29%	58%	30%	71%	77%	65%	52%	39%	50%	52%	93%	20%
MK-92	53%	51%	34%	58%	67%	45%	34%	47%	51%	88%	91%	31%
MM-92	33%	51%	15%	42%	40%	30%	25%	19%	15%	80%	53%	12%
OV-92	20%	55%	38%	37%	38%	38%	37%	26%	22%	75%	55%	8%
PR-92	32%	54%	48%	65%	69%	50%	45%	58%	83%	94%	81%	30%
RB-92	51%	68%	47%	67%	68%	52%	55%	42%	61%	80%	79%	15%
SL-92	62%	77%	39%	67%	79%	60%	59%	56%	57%	86%	76%	21%
SN-92	61%	70%	35%	67%	71%	46%	32%	51%	14%	85%	73%	18%
TG-92	64%	67%	46%	64%	68%	53%	49%	51%	26%	83%	85%	22%
TZ-92	32%	64%	44%	69%	72%	51%	44%	74%	41%	96%	91%	31%
1992-AVG	43.0%	60.5%	36.1%	61.3%	64.3%	47.7%	39.6%	45.3%	42.5%	80.4%	76.5%	20.0%
AM-93	5%	25%	7%	38%	24%	14%	6%	6%	8%	9%	20%	5%
ANG-93	2%	7%	1%	12%	9%	3%	10%	2%	19%	0%	0%	1%
CR-93	11%	31%	10%	27%	24%	9%	7%	7%	11%	15%	49%	6%
EBL-93	13%	35%	9%	28%	22%	19%	10%	17%	6%	42%	54%	6%
EML-93	5%	19%	5%	17%	12%	10%	4%	8%	15%	13%	50%	4%
KP-93	4%	16%	7%	29%	13%	16%	14%	8%	16%	45%	75%	2%
MK-93	8%	27%	5%	33%	16%	5%	5%	6%	28%	26%	48%	2%
MM-93	9%	23%	5%	19%	16%	8%	7%	5%	6%	12%	37%	5%
OV-93	12%	24%	13%	28%	31%	16%	8%	14%	8%	14%	60%	4%
PR-93	9%	22%	6%	20%	15%	9%	5%	6%	15%	13%	55%	4%
RB-93	4%	14%	5%	12%	9%	11%	9%	5%	11%	11%	35%	2%
SL-93	8%	16%	6%	13%	8%	7%	6%	8%	13%	9%	5%	1%
SN-93	9%	25%	6%	24%	16%	7%	5%	11%	9%	25%	20%	2%
TG-93	5%	18%	3%	16%	10%	3%	3%	3%	6%	5%	42%	2%
TZ-93	17%	31%	9%	30%	22%	3%	9%	7%	22%	26%	55%	7%
1993-AVG	8.1%	22.2%	6.4%	23.2%	16.5%	9.4%	7.2%	7.6%	12.8%	17.8%	40.3%	3.7%

Table 38. Continued.

Site/Year	H^+	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$	Precip
CR-94	43%	40%	17%	45%	53%	38%	34%	36%	16%	58%	82%	16%
EBL-94	47%	35%	36%	32%	40%	24%	20%	19%	15%	53%	76%	15%
EML-94	16%	34%	37%	44%	46%	28%	35%	42%	43%	100%	35%	11%
KP-94	24%	37%	20%	53%	51%	44%	31%	24%	16%	13%	81%	16%
MK-94	13%	19%	39%	49%	67%	85%	70%	57%	63%	11%	58%	12%
MM-94	42%	35%	26%	38%	44%	38%	21%	22%	23%	33%	27%	20%
RB-94	47%	46%	39%	48%	54%	42%	45%	41%	33%	20%	95%	22%
TG-94	20%	31%	14%	28%	30%	50%	25%	18%	26%	57%	86%	8%
TZ-94	17%	64%	58%	57%	50%	43%	45%	58%	55%	38%	100%	12%
1994-AVG	29.9%	38.0%	31.9%	43.9%	48.4%	43.7%	36.3%	35.3%	32.2%	42.5%	71.2%	14.7%

Table 39. **1990 WATER YEAR SNOW WATER EQUIVALENCE PEAK ACCUMULATION FROM CCSS SNOW COURSES**

Latitude Interval		Elevation Range > 2000 m	> 2500 m	> 3000 m
39°00'—40°00'	$\overline{SWE}$ (cm)	50	71	NA
	$\hat{\sigma}_{SWE}$ (cm)	19.8	NA	NA
	n	26	1	0
38°30'—39°00'	$\overline{SWE}$ (cm)	41	45	NA
	$\hat{\sigma}_{SWE}$ (cm)	16.0	14.9	NA
	n	25	3	0
38°00'—38°30'	$\overline{SWE}$ (cm)	37 / 39*	52	NA
	$\hat{\sigma}_{SWE}$ (cm)	23.0 / 22.3*	24.8	NA
	n	35 / 34*	13	0
37°00'—38°00'	$\overline{SWE}$ (cm)	34 / 36*	36 / 37*	33
	$\hat{\sigma}_{SWE}$ (cm)	15.6 / 14.0*	15.0 / 14.2*	10.1
	n	66 / 63*	47 / 46*	13
36°00'—37°00'	$\overline{SWE}$ (cm)	22	23	21
	$\hat{\sigma}_{SWE}$ (cm)	14.1	15.1	11.8
	n	34	28	13
35°15'—36°00'	$\overline{SWE}$ (cm)	16	25	NA
	$\hat{\sigma}_{SWE}$ (cm)	12.8	NA	NA
	n	2	1	0
35°15'—37°00'	$\overline{SWE}$ (cm)	22	23	NA
	$\hat{\sigma}_{SWE}$ (cm)	13.9	14.8	NA
	n	36	29	0

* second value represents statistic with snow courses that have no snow during survey period removed from sample population.

Table 40. **1991 WATER YEAR SNOW WATER EQUIVALENCE PEAK ACCUMULATION FROM CCSS SNOW COURSES**

Latitude Interval		Elevation Range > 2000 m	> 2500 m	> 3000 m
39°00'—40°00'	$\overline{SWE}$ (cm)	63	73	NA
	$\hat{\sigma}_{SWE}$ (cm)	21.0	NA	NA
	n	25	1	0
38°30'—39°00'	$\overline{SWE}$ (cm)	63	81	NA
	$\hat{\sigma}_{SWE}$ (cm)	18.6	18.8	NA
	n	24	3	0
38°00'—38°30'	$\overline{SWE}$ (cm)	59	61	NA
	$\hat{\sigma}_{SWE}$ (cm)	17.6	23.8	NA
	n	33	13	0
37°00'—38°00'	$\overline{SWE}$ (cm)	58	58	55
	$\hat{\sigma}_{SWE}$ (cm)	15.5	15.7	12.9
	n	63	46	13
36°00'—37°00'	$\overline{SWE}$ (cm)	49	51	49
	$\hat{\sigma}_{SWE}$ (cm)	15.1	15.1	12.3
	n	37	30	14
35°15'—36°00'	$\overline{SWE}$ (cm)	55	62	NA
	$\hat{\sigma}_{SWE}$ (cm)	9.5	NA	NA
	n	2	1	0
35°15'—37°00'	$\overline{SWE}$ (cm)	49	51	NA
	$\hat{\sigma}_{SWE}$ (cm)	14.8	15.0	NA
	n	39	31	0

Table 41. **1992 WATER YEAR SNOW WATER EQUIVALENCE PEAK ACCUMULATION FROM CCSS SNOW COURSES**

Latitude Interval		Elevation Range > 2000 m	> 2500 m	> 3000 m
39°00'—40°00'	$\overline{SWE}$ (cm)	47	60	NA
	$\hat{\sigma}_{SWE}$ (cm)	21.6	NA	NA
	n	24	1	0
38°30'—39°00'	$\overline{SWE}$ (cm)	50	67	NA
	$\hat{\sigma}_{SWE}$ (cm)	21.1	21.4	NA
	n	22	3	0
38°00'—38°30'	$\overline{SWE}$ (cm)	47	56	NA
	$\hat{\sigma}_{SWE}$ (cm)	19.7	24.5	NA
	n	32	12	0
37°00'—38°00'	$\overline{SWE}$ (cm)	45	45	43
	$\hat{\sigma}_{SWE}$ (cm)	15.5	14.4	11.5
	n	63	46	13
36°00'—37°00'	$\overline{SWE}$ (cm)	33	36	34
	$\hat{\sigma}_{SWE}$ (cm)	12.5	11.8	8.4
	n	36	29	13
35°15'—36°00'	$\overline{SWE}$ (cm)	34	52	NA
	$\hat{\sigma}_{SWE}$ (cm)	25.1	NA	NA
	n	2	1	0
35°15'—37°00'	$\overline{SWE}$ (cm)	33	36	NA
	$\hat{\sigma}_{SWE}$ (cm)	12.8	12.0	NA
	n	38	30	0

Table 42. **1993 WATER YEAR SNOW WATER EQUIVALENCE PEAK ACCUMULATION FROM CCSS SNOW COURSES**

Latitude Interval		Elevation Range > 2000 m	> 2500 m	> 3000 m
39°00'—40°00'	$\overline{SWE}$ (cm)	142	168	NA
	$\hat{\sigma}_{SWE}$ (cm)	39.0	NA	NA
	n	26	1	0
38°30'—39°00'	$\overline{SWE}$ (cm)	127	166	NA
	$\hat{\sigma}_{SWE}$ (cm)	41.3	38.1	NA
	n	24	3	0
38°00'—38°30'	$\overline{SWE}$ (cm)	122	127	NA
	$\hat{\sigma}_{SWE}$ (cm)	42.2	53.8	NA
	n	33	13	0
37°00'—38°00'	$\overline{SWE}$ (cm)	119	117	105
	$\hat{\sigma}_{SWE}$ (cm)	34.0	34.4	27.6
	n	63	46	13
36°00'—37°00'	$\overline{SWE}$ (cm)	83	86	81
	$\hat{\sigma}_{SWE}$ (cm)	33.4	34.5	31.6
	n	34	27	12
35°15'—36°00'	$\overline{SWE}$ (cm)	79	104	NA
	$\hat{\sigma}_{SWE}$ (cm)	35.9	NA	NA
	n	2	1	0
35°15'—37°00'	$\overline{SWE}$ (cm)	83	87	NA
	$\hat{\sigma}_{SWE}$ (cm)	33.0	34.0	NA
	n	36	28	0

Table 43.

Snow courses used in snow water equivalence analysis. Latitude interval 39°00' to 40°00' and base elevation of 6500 feet (~2000 m). Listed by decreasing latitude.

Snow Course Number	Course Name	Drainage Basin	Elevation (ft)	Latitude	Longitude
359	GRIZZLY	FEATHER	6900	39:55	120:38.7
388	PILOT PEAK	FEATHER	6800	39:47.2	121:52.3
279	EUREKA BOWL	FEATHER	6800	39:45.3	120:43.2
75	CHURCH MDWS	FEATHER	6700	39:40.9	120:37.4
74	YUBA PASS	YUBA	6700	39:37	120:29.5
72	HAYPRESS VALLEY	YUBA	6800	39:32.6	120:31.2
91	INDEPENDENCE CREEK	TRUCKEE	6500	39:29.5	120:16.9
89	WEBBER LAKE	TRUCKEE	7000	39:29.1	120:25.5
64	WEBBER PEAK	TRUCKEE	7800	39:29	120:26.4
78	FINDLEY PEAK	YUBA	6500	39:28.2	120:34.3
88	INDEPENDENCE CAMP	TRUCKEE	7000	39:27	120:17.5
68	ENGLISH MTN	YUBA	7100	39:26.2	120:31.5
86	INDEPENDENCE LAKE	TRUCKEE	8450	39:25.5	120:19
66	MDW LAKE	YUBA	7200	39:25	120:30.5
90	SAGE HEN CREEK	TRUCKEE	6500	39:22.5	120:14
77	LAKE FORDYCE	YUBA	6500	39:21.6	120:30
76	FURNACE FLAT	YUBA	6700	39:21.3	120:30.2
65	CASTLE CREEK 5	YUBA	7400	39:21.2	120:21.2
70	LAKE STERLING	YUBA	7100	39:21	120:29.5
67	RED MTN	YUBA	7200	39:20.6	120:30.5
71	SAWMILL FLAT	YUBA	7100	39:20.5	120:30.1
73	SODA SPRINGS	YUBA	6750	39:19	120:23
69	DONNER SUMMIT	YUBA	6900	39:18.6	120:20.3
115	HUYSINK	AMERICAN	6600	39:16.9	120:31.6
385	BROCKWAY SUMMIT	LAKE TAHOE	7100	39:15.7	120:04.3
318	SQUAW VALLEY 2	TRUCKEE	7700	39:11.3	120:14.9
317	SQUAW VALLEY 1	TRUCKEE	7500	39:11.1	120:14.7
400	TAHOE CITY CROSS	LAKE TAHOE	6750	39:10.1	120:09.2
332	MARLETTE LAKE	LAKE TAHOE	8000	39:09.5	119:54
101	WARD CREEK	LAKE TAHOE	7000	39:08.5	120:13.5
376	WARD CREEK 3	LAKE TAHOE	6750	39:08	120:14
338	LOST CORNER MTN	AMERICAN	7500	39:01	120:12.9
102	RUBICON PEAK NO 3	LAKE TAHOE	6700	39:00.5	120:08
99	RUBICON PEAK 2	LAKE TAHOE	7500	39:00	120:08

Table 44.

Snow courses used in snow water equivalence analysis. Latitude interval 38°30' to 39°00' and base elevation of 6500 feet (~2000 m). Listed by decreasing latitude.

Snow Course Number	Course Name	Drainage Basin	Elevation (ft)	Latitude	Longitude
97	RUBICON PEAK 1	LAKE TAHOE	8100	38:59.5	120:08.5
337	DAGGETTS PASS	LAKE TAHOE	7350	38:59	119:53
375	HEAVENLY VALLEY	LAKE TAHOE	8850	38:56	119:14
103	RICHARDSONS 2	LAKE TAHOE	6500	38:55	120:03
96	LAKE LUCILLE	LAKE TAHOE	8200	38:51.6	120:06.7
98	HAGANS MDW	LAKE TAHOE	8000	38:51	119:55.8
405	ECHO PEAK (NEVADA) 5	LAKE TAHOE	7800	38:51	120:04
100	FREEL BENCH	LAKE TAHOE	7300	38:51	119:57
316	WRIGHTS LAKE	AMERICAN	6900	38:50.8	120:14
108	ECHO SUMMIT	AMERICAN	7450	38:49.7	120:02.2
111	DARRINGTON	AMERICAN	7100	38:49.5	120:03.2
110	LAKE AUDRAIN	AMERICAN	7300	38:49.2	120:02.2
113	PHILLIPS	AMERICAN	6800	38:49.1	120:04.3
320	LYONS CREEK	AMERICAN	6700	38:48.7	120:14.6
289	TAMARACK FLAT	AMERICAN	6550	38:48.4	120:06.2
365	ALPHA	AMERICAN	7600	38:48.3	120:12.9
107	CAPLES LAKE	AMERICAN	8000	38:42.6	120:02.5
106	UPPER CARSON PASS	AMERICAN	8500	38:41.7	119:59
331	LOWER CARSON PASS	AMERICAN	8400	38:41.6	119:59.9
109	SILVER LAKE	AMERICAN	7100	38:40.7	120:7.1
297	EMIGRANT VALLEY	AMERICAN	8400	38:40.3	120:02.8
130	TRAGEDY SPRINGS	MOKELUMNE	7900	38:38.3	120:09
364	TRAGEDY CREEK	MOKELUMNE	8150	38:37.5	120:38
133	CORRAL FLAT	MOKELUMNE	7200	38:37.5	120:13.1
134	BEAR VALLEY RIDGE 1	MOKELUMNE	6700	38:37.1	120:13.7
403	WET MDWS LAKE	CARSON	8100	38:36.6	119:51.7
129	BLUE LAKES	MOKELUMNE	8000	38:36.5	119:55.3
363	PODESTA	MOKELUMNE	7200	38:36.3	120:13.7
135	LUMBERYARD	MOKELUMNE	6500	38:32.7	120:18.3
339	BEAR VALLEY RIDGE 2	MOKELUMNE	6600	38:31.6	120:13.7
131	WHEELER LAKE	MOKELUMNE	7800	38:31.1	119:59.1
132	PACIFIC VALLEY	MOKELUMNE	7500	38:31	119:54
330	POISON FLAT	CARSON	7900	38:30.5	119:37.5
384	STANISLAUS MDW	STANISLAUS	7750	38:30	119:56.2

Table 45.

Snow courses used in snow water equivalence analysis. Latitude interval 38°00' to 38°30' and base elevation of 6500 feet (~2000 m). Listed by decreasing latitude.

Snow Course Number	Course Name	Drainage Basin	Elevation (ft)	Latitude	Longitude
323	HIGHLAND MDW	MOKELUMNE	8800	38:29.4	119:48.1
141	LAKE ALPINE	STANISLAUS	7550	38:28.8	120:00.8
416	BLOODS CREEK	STANISLAUS	7200	38:27	120:02
373	HELLS KITCHEN	STANISLAUS	6550	38:25	120:06
146	BIG MDW	STANISLAUS	6550	38:25	120:06.7
415	GARDNER MDW	STANISLAUS	6800	38:24.5	120:02.2
144	SPICERS	STANISLAUS	6600	38:24.1	119:59.6
430	CORRAL MDW	STANISLAUS	6650	38:23.9	120:02.4
386	BLACK SPRING	STANISLAUS	6500	38:22.5	120:12.2
344	CLARK FORK MDW	STANISLAUS	8900	38:21.7	119:40.8
406	EBBETTS PASS	CARSON	8700	38:20.4	119:45.7
345	DEADMAN CREEK	STANISLAUS	9250	38:19.9	119:39.2
156	LEAVITT MDW	WALKER	7200	38:19.7	119:33.5
145	NIAGARA FLAT	STANISLAUS	6500	38:19.6	119:54.7
152	SONORA PASS	WALKER	8800	38:18.8	119:36.4
140	EAGLE MDW	STANISLAUS	7500	38:17.3	119:49.9
143	RELIEF DAM	STANISLAUS	7250	38:16.8	119:43.8
154	WILLOW FLAT	WALKER	8250	38:16.5	119:27
139	SODA CREEK FLAT	STANISLAUS	7800	38:16.2	119:40.7
421	LEAVITT LAKE	WALKER	9400	38:16	119:17
138	LOWER RELIEF VALLEY	STANISLAUS	8100	38:14.6	119:45.5
142	HERRING CREEK	STANISLAUS	7300	38:14.5	119:56.5
427	GIANELLI MDW	STANISLAUS	8400	38:12.4	119:53.5
379	DODGE RIDGE	TUOLUMNE	8150	38:11.4	119:55.6
155	BUCKEYE ROUGHS	WALKER	7900	38:11.3	119:26.5
422	SAWMILL RIDGE	WALKER	8750	38:11	119:21
159	BOND PASS	TUOLUMNE	9300	38:10.7	119:37.4
348	KERRICK CORRAL	TUOLUMNE	7000	38:10.6	119:57.6
153	BUCKEYE FORKS	WALKER	8500	38:10.2	119:29
172	BELL MDW	TUOLUMNE	6500	38:10	119:56.5
162	HORSE MDW	TUOLUMNE	8400	38:09.5	119:39.7
368	NEW GRACE MDW	TUOLUMNE	8900	38:09	119:37
160	GRACE MDW	TUOLUMNE	8900	38:09	119:37
151	CENTER MTN	WALKER	9400	38:09	119:28
166	HUCKLEBERRY LAKE	TUOLUMNE	7800	38:06.1	119:44.7
164	SPOTTED FAWN	TUOLUMNE	7800	38:05.5	119:45.5
165	SACHSE SPRINGS	TUOLUMNE	7900	38:05.1	119:50.2
377	VIRGINIA LAKES RIDGE	WALKER	9200	38:05	119:14
163	WILMER LAKE	TUOLUMNE	8000	38:05	119:38
150	VIRGINIA LAKES	WALKER	9500	38:05	119:15
167	PARADISE	TUOLUMNE	7700	38:02.8	119:40
173	LOWER KIBBIE RIDGE	TUOLUMNE	6700	38:02.7	119:52.8
168	UPPER KIBBIE RIDGE	TUOLUMNE	6700	38:02.6	119:53.2
169	VERNON LAKE	TUOLUMNE	6700	38:01	119:43

Table 46.

Snow courses used in snow water equivalence analysis. Latitude interval 37°00' to 38°00' and base elevation of 6500 feet (~2000 m). Listed by decreasing latitude.

Snow Course Number	Course Name	Drainage Basin	Elevation (ft)	Latitude	Longitude
171	BEEHIVE MDW	TUOLUMNE	6500	37:59.7	119:46.8
287	SADDLEBAG LAKE	MONO LAKE	9750	37:57.4	119:16
286	ELLERY LAKE	MONO LAKE	9600	37:56.3	119:14.9
181	TIOGA PASS	MONO LAKE	9800	37:55	119:15.2
170	SMITH MDWS	TUOLUMNE	6600	37:55	119:45
157	DANA MDWS	TUOLUMNE	9850	37:53.9	119:15.4
161	TUOLUMNE MDWS	TUOLUMNE	8600	37:52.4	119:21
178	LAKE TENAYA	MERCED	8150	37:50.3	119:26.9
158	RAFFERTY MDWS	TUOLUMNE	9400	37:50.2	119:19.5
176	SNOW FLAT	MERCED	8700	37:49.6	119:29.8
175	FLETCHER LAKE	MERCED	10300	37:47.8	119:20.6
281	GEM PASS	MONO LAKE	10400	37:46.8	119:10.2
179	GIN FLAT	MERCED	7000	37:45.9	119:46.4
282	GEM LAKE	MONO LAKE	9150	37:45.1	119:09.7
189	AGNEW PASS	SAN JOAQUIN	9450	37:43.6	119:08.5
180	PEREGOY MDWS	MERCED	7000	37:40	119:37.5
206	MINARETS 2	OWENS	9000	37:39.8	119:01
367	MINARETS 3	OWENS	8200	37:39.2	118:59.5
207	MINARETS NO 1	OWENS	8300	37:39	118:59.7
424	LONG VALLEY NORTH	OWENS	7200	37:38.2	118:48.7
177	OSTRANDER LAKE	MERCED	8200	37:38.2	119:33
208	MAMMOTH	OWENS	8300	37:37.2	118:59.5
205	MAMMOTH PASS	OWENS	9500	37:36.6	119:02
193	CORA LAKES	SAN JOAQUIN	8400	37:35.9	119:16
425	LONG VALLEY SOUTH	OWENS	7300	37:34.4	118:40.1
381	JOHNSON LAKE	MERCED	8500	37:34.1	119:31
200	CLOVER MDW	SAN JOAQUIN	7000	37:31.7	119:16.5
202	CHIQUITO CREEK	SAN JOAQUIN	6800	37:29.9	119:24.5
407	CAMPITO MTN	OWENS	10200	37:29.8	118:10.4
201	JACKASS MDW	SAN JOAQUIN	6950	37:29.8	119:19.8
211	ROCK CREEK 1	OWENS	8700	37:29.5	118:43
210	ROCK CREEK 2	OWENS	9050	37:28.4	118:43
276	PIONEER BASIN	SAN JOAQUIN	10400	37:27.4	118:47.7
209	ROCK CREEK 3	OWENS	10000	37:27	118:44.5
203	BEASORE MDWS	SAN JOAQUIN	6800	37:26.5	119:28.8
182	MONO PASS	SAN JOAQUIN	11450	37:26.3	118:46.4
197	CHILKOOT MDW	SAN JOAQUIN	7150	37:24.6	119:29.4
196	CHILKOOT LAKE	SAN JOAQUIN	7450	37:24.5	119:28.8
204	POISON MDW	SAN JOAQUIN	6800	37:23.8	119:31.1
186	VOLCANIC KNOB	SAN JOAQUIN	10100	37:23.3	118:54.2
195	VERMILLION VALLEY	SAN JOAQUIN	7500	37:23.1	118:58.3
324	LAKE THOMAS A EDISON	SAN JOAQUIN	7800	37:22.9	119:01.2
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Table 46.

CONTINUED — Latitude interval 37°00' to 38°00' and base elevation of 6500 feet (~2000 m). Listed by decreasing latitude.

Snow Course Number	Course Name	Drainage Basin	Elevation (ft)	Latitude	Longitude
357	NUCLEAR 1	OWENS	7800	37:22.4	118:42
358	NUCLEAR 2	OWENS	9500	37:22.2	118:42.9
187	ROSE MARIE	SAN JOAQUIN	10000	37:19.2	118:52.3
190	KAISER PASS	SAN JOAQUIN	9100	37:17.7	119:06.1
198	FLORENCE LAKE	SAN JOAQUIN	7200	37:16.6	118:57.7
185	HEART LAKE	SAN JOAQUIN	10100	37:16.3	118:52.6
346	BADGER FLAT	SAN JOAQUIN	8300	37:15.9	119:06.5
191	DUTCH LAKE	SAN JOAQUIN	9100	37:15.5	118:59.8
194	NELLIE LAKE	SAN JOAQUIN	8000	37:15.4	119:13.5
183	PIUTE PASS	SAN JOAQUIN	11300	37:14.4	118:41.2
216	BISHOP PARK	OWENS	8400	37:14.3	118:35.8
212	EAST PIUTE PASS	OWENS	10800	37:14.1	118:41.2
214	NORTH LAKE	OWENS	9300	37:13.7	118:37.2
199	HUNTINGTON LAKE	SAN JOAQUIN	7000	37:13.7	119:13.3
192	COYOTE LAKE	SAN JOAQUIN	8850	37:12.5	119:04.4
215	SOUTH FORK	OWENS	8850	37:12.3	118:34.2
224	UPPER BURNT CORRAL MDW	KINGS	9700	37:11	118:56.2
184	EMERALD LAKE	SAN JOAQUIN	10600	37:11	118:45.7
347	TAMARACK CREEK	SAN JOAQUIN	7250	37:10.7	119:12.3
188	COLBY MDW	SAN JOAQUIN	9700	37:10.7	118:43.2
213	SAWMILL	OWENS	10300	37:09.5	118:33.7
228	SWAMP MDW	KINGS	9000	37:08.1	119:04.5
232	LONG MDW	KINGS	8500	37:07.8	118:55.2
218	BIG PINE CREEK 3	OWENS	9800	37:07.7	118:28.5
219	BIG PINE CREEK 2	OWENS	9700	37:07.6	118:28.2
217	BIG PINE CREEK 1	OWENS	10000	37:07.5	118:29
284	BISHOP LAKE	OWENS	11300	37:07.4	118:32.6
234	POST CORRAL MDW	KINGS	8200	37:07.3	118:53.7
230	HELMS MDW	KINGS	8250	37:07.3	119:00.3
225	BEARD MDW	KINGS	9800	37:06.8	118:50.2
222	BISHOP PASS	KINGS	11200	37:06	118:33.4
235	SAND MDW	KINGS	8050	37:05.9	118:58
308	DODSONS MDW	KINGS	8050	37:05.5	118:57.5
426	COURTRIGHT	KINGS	8350	37:04.3	118:57.9
223	BLACKCAP BASIN	KINGS	10300	37:04	118:46.2
341	UPPER WOODCHUCK MDW	KINGS	9100	37:02.3	118:54.2
238	BEAR RIDGE	KINGS	7400	37:02.2	119:05.2
227	WOODCHUCK MDW	KINGS	8800	37:01.5	118:54.5
239	FRED MDW	KINGS	6950	37:01.4	119:04.8

Table 47.

Snow courses used in snow water equivalence analysis. Latitude interval 36°00' to 37°00' and base elevation of 6500 feet (~2000 m). Listed by decreasing latitude.

Snow Course Number	Course Name	Drainage Basin	Elevation (ft)	Latitude	Longitude
229	ROUND CORRAL	KINGS	9000	36:59.6	118:54.1
396	RATTLESNAKE CREEK BASIN	KINGS	9900	36:58.9	118:43.2
398	BENCH LAKE	KINGS	10600	36:57.5	118:26.7
233	STATUM MDW	KINGS	8300	36:56.6	118:54.8
408	FLOWER LAKE 2	OWENS	10660	36:46.2	118:21.6
307	BULLFROG LAKE	KINGS	10650	36:46.2	118:23.9
299	CHARLOTTE RIDGE	KINGS	10700	36:46.2	118:24.9
380	KENNEDY MDWS	KINGS	7600	36:46.1	118:50
309	VIDETTE MDW	KINGS	9500	36:45.5	118:24.6
231	JUNCTION MDW	KINGS	8250	36:45.3	118:26.3
237	HORSE CORRAL MDW	KINGS	7600	36:45.1	118:45
240	GRANT GROVE	KINGS	6600	36:44.5	118:57.8
382	MORAINE MDWS	KINGS	8400	36:43.2	118:34.3
226	ROWELL MDW	KINGS	8850	36:43	118:44.2
236	BIG MDWS	KINGS	7600	36:42.9	118:50.5
397	SCENIC MDW	KINGS	9650	36:41.1	118:35.8
255	TYNDALL CREEK	KERN	10650	36:37.9	118:23.5
250	BIGHORN PLATEAU	KERN	11350	36:36.9	118:22.6
243	PANTHER MDW	KAWEAH	8600	36:35.3	118:43
275	SANDY MDWS	KERN	10650	36:34.3	118:22
253	CRABTREE MDW	KERN	10700	36:33.8	118:20.7
254	GUYOT FLAT	KERN	10650	36:31.4	118:20.9
256	ROCK CREEK	KERN	9600	36:29.8	118:20
221	COTTONWOOD LAKES 1	OWENS	10200	36:29.5	118:11
220	COTTONWOOD LAKES 2	OWENS	11100	36:29	118:13
252	SIBERIAN PASS	KERN	10900	36:28.4	118:16
251	COTTONWOOD PASS	KERN	11050	36:27	118:13
257	BIG WHITNEY MDW	KERN	9750	36:26.4	118:15.3
245	MINERAL KING	KAWEAH	8000	36:26.2	118:35.2
374	WHITE CHIEF	KAWEAH	9200	36:25.3	118:35.5
292	FAREWELL GAP	KAWEAH	9500	36:24.7	118:35
244	HOCKETT MDWS	KAWEAH	8500	36:22.9	118:39.3
260	LITTLE WHITNEY MDW	KERN	8500	36:22.7	118:20.8
259	RAMSHAW MDWS	KERN	8700	36:21.1	118:15.9
423	TRAILHEAD	OWENS	9100	36:20.2	118:09.3
264	QUINN RANGER STATION	KERN	8350	36:19.7	118:34.4
248	OLD ENTERPRISE MILL	TULE	6600	36:14.6	118:40.7
263	MONACHE MDWS	KERN	8000	36:12	118:10.3
262	CASA VIEJA MDWS	KERN	8400	36:12	118:16.3
265	BEACH MDWS	KERN	7650	36:07.3	118:17.6
247	QUAKING ASPEN	TULE	7000	36:07.3	118:32.7
261	BONITA MDWS	KERN	8300	36:02.3	118:19.7

Table 48.

Snow courses used in snow water equivalence analysis. Latitude interval 35°15' to 36°00' and base elevation of 6500 feet (~2000 m). Listed by decreasing latitude.

Snow Course Number	Course Name	Drainage Basin	Elevation (ft)	Latitude	Longitude
258	ROUND MDW	KERN	9000	35:57.9	118:21.6
249	DEAD HORSE MDW	DEER CREEK	7300	35:52.4	118:35.2
383	CANNELL MDW	KERN	7500	35:50	118:22.3

Table 49. Snowpack solute-loading by region for 1990. Loadings were calculated using snow-water equivalence (SWE) data from the California Cooperative Snow Survey. Snow chemistry used in the estimates was from the 12 study sites plus snow chemistry from Pear Lake, Topaz Lake, Ruby Lake and Crystal Lake. The regions used in the analysis were constrained by elevation and latitude. The data for snow chemistry and SWE are from the Sierra snowpack on or near April 1. Units are equivalents per hectare (eq ha^{-1}). Precip is the amount of SWE in centimeters. Elevations are meters.

Region	Elevation	H^+	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$	Precip
40°00'-	>2000 M	28.5	9.8	7.6	8.4	7.6	2.8	1.5	5.1	1.2	4.1	1.2	50
39°00'	>2500 M	40.5	13.9	10.8	12.0	10.8	4.0	2.2	7.3	1.7	5.8	1.7	71
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
39°00'-	>2000 M	22.0	9.2	7.2	9.5	7.2	4.4	2.5	5.2	2.4	3.1	0.9	41
38°30'	>2500 M	24.1	10.1	7.9	10.4	7.9	4.8	2.7	5.7	2.6	3.4	1.0	45
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
38°30'-	>2000 M	25.1	5.2	4.1	6.2	4.0	4.9	1.7	2.6	2.1	2.1	0.4	39
38°00'	>2500 M	33.5	6.9	5.4	8.3	5.4	6.5	2.3	3.4	2.9	2.7	0.5	52
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
38°00'-	>2000 M	17.9	9.2	5.3	9.7	6.6	5.2	1.3	3.7	1.7	2.7	1.8	36
37°00'	>2500 M	18.4	9.4	5.4	10.0	6.7	5.3	1.3	3.8	1.8	2.8	1.8	37
	>3000 M	16.4	8.4	4.8	8.9	6.0	4.7	1.2	3.4	1.6	2.5	1.6	33
37°00'-	>2000 M	11.5	8.4	4.4	5.7	5.4	4.7	1.9	3.6	2.6	2.4	1.4	22
36°00'	>2500 M	12.0	8.8	4.6	5.9	5.6	4.9	1.9	3.8	2.7	2.5	1.4	23
	>3000 M	11.0	8.0	4.2	5.4	5.1	4.5	1.8	3.5	2.5	2.3	1.3	21
36°00'-	>2000 M	8.3	6.1	3.2	4.1	3.9	3.4	1.3	2.6	1.9	1.7	1.0	16
35°15'	>2500 M	13.0	9.6	4.9	6.4	6.1	5.4	2.1	4.1	3.0	2.7	1.6	25
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
37°00'-	>2000 M	11.5	8.4	4.4	5.7	5.4	4.7	1.9	3.6	2.6	2.4	1.4	22
35°15'	>2500 M	12.0	8.8	4.6	5.9	5.6	4.9	1.9	3.8	2.7	2.5	1.4	23
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 50. Snowpack solute-loading by region for 1991. Loadings were calculated using snow-water equivalence (SWE) data from the California Cooperative Snow Survey. Snow chemistry used in the estimates was from the 12 study sites plus snow chemistry from Pear Lake, Topaz Lake, Ruby Lake and Crystal Lake. The regions used in the analysis were constrained by elevation and latitude. The data for snow chemistry and SWE are from the Sierra snowpack on or near April 1. Units are equivalents per hectare (eq ha^{-1}). Precip is the amount of SWE in centimeters. Elevations are meters.

Region	Elevation	H^+	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$	Precip
40°00'-	>2000 M	24.9	18.0	14.5	18.0	11.2	8.9	3.3	8.6	3.9	2.0	2.3	63
39°00'	>2500 M	28.8	20.9	16.9	20.8	13.0	10.4	3.9	10.0	4.5	2.4	2.7	73
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
39°00'-	>2000 M	21.1	20.8	13.4	15.7	12.0	8.9	4.6	8.8	1.6	4.1	6.4	63
38°30'	>2500 M	27.1	26.8	17.3	20.2	15.5	11.4	5.9	11.4	2.1	5.2	8.2	81
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
38°30'-	>2000 M	19.6	11.8	10.4	11.5	21.7	19.4	8.3	18.2	6.2	1.8	6.2	59
38°00'	>2500 M	20.2	12.2	10.8	11.9	22.4	20.0	8.5	18.8	6.4	1.9	6.4	61
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
38°00'-	>2000 M	21.7	17.5	6.8	14.1	10.1	12.6	2.9	5.9	2.8	2.9	5.5	58
37°00'	>2500 M	21.7	17.5	6.8	14.1	10.1	12.6	2.9	5.9	2.8	2.9	5.5	58
	>3000 M	20.5	16.6	6.5	13.4	9.6	12.0	2.7	5.6	2.7	2.8	5.2	55
37°00'-	>2000 M	18.6	19.8	5.4	15.2	7.8	9.0	2.3	4.8	1.9	2.3	5.0	49
36°00'	>2500 M	19.3	20.6	5.7	15.8	8.1	9.4	2.4	5.0	2.0	2.4	5.2	51
	>3000 M	18.6	19.8	5.4	15.2	7.8	9.0	2.3	4.8	1.9	2.3	5.0	49
36°00'-	>2000 M	20.8	22.2	6.1	17.0	8.7	10.1	2.6	5.4	2.1	2.6	5.6	55
35°15'	>2500 M	23.5	25.1	6.9	19.2	9.9	11.4	2.9	6.1	2.4	2.9	6.4	62
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
37°00'-	>2000 M	18.6	19.8	5.4	15.2	7.8	9.0	2.3	4.8	1.9	2.3	5.0	49
35°15'	>2500 M	19.3	20.6	5.7	15.8	8.1	9.4	2.4	5.0	2.0	2.4	5.2	51
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 51. Snowpack solute-loading by region for 1992. Loadings were calculated using snow-water equivalence (SWE) data from the California Cooperative Snow Survey. Snow chemistry used in the estimates was from the 12 study sites plus snow chemistry from Pear Lake, Topaz Lake, Ruby Lake and Crystal Lake. The regions used in the analysis were constrained by elevation and latitude. The data for snow chemistry and SWE are from the Sierra snowpack on or near April 1. Units are equivalents per hectare (eq ha^{-1}). Precip is the amount of SWE in centimeters. Elevations are meters.

Region	Elevation	H^+	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$	Precip
40°00'-	>2000 M	19.3	11.2	6.4	11.2	8.3	5.2	2.4	5.7	2.3	1.1	1.1	47
39°00'	>2500 M	24.6	14.3	8.2	14.3	10.6	6.7	3.0	7.3	2.9	1.5	1.4	60
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
39°00'-	>2000 M	18.5	8.7	5.8	8.0	6.4	6.5	2.8	6.6	2.3	2.4	2.9	50
38°30'	>2500 M	24.8	11.7	7.7	10.7	8.6	8.7	3.8	8.9	3.1	3.2	3.9	67
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
38°30'-	>2000 M	13.8	9.1	3.1	10.0	7.1	10.3	4.8	3.8	8.4	1.7	3.8	47
38°00'	>2500 M	16.4	10.9	3.7	11.9	8.5	12.2	5.7	4.5	10.0	2.0	4.6	56
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
38°00'-	>2000 M	16.8	12.7	4.7	14.0	9.9	9.7	4.0	4.8	4.0	1.8	2.6	45
37°00'	>2500 M	16.8	12.7	4.7	14.0	9.9	9.7	4.0	4.8	4.0	1.8	2.6	45
	>3000 M	16.1	12.1	4.5	13.4	9.4	9.3	3.8	4.6	3.8	1.7	2.5	43
37°00'-	>2000 M	11.5	13.3	4.6	12.0	8.1	7.4	1.8	3.6	1.8	1.5	2.1	33
36°00'	>2500 M	12.5	14.5	5.1	13.1	8.8	8.0	1.9	3.9	2.0	1.6	2.3	36
	>3000 M	11.8	13.7	4.8	12.4	8.3	7.6	1.8	3.7	1.9	1.5	2.2	34
36°00'-	>2000 M	11.8	13.7	4.8	12.4	8.3	7.6	1.8	3.7	1.9	1.5	2.2	34
35°15'	>2500 M	18.1	20.9	7.3	18.9	12.7	11.6	2.8	5.7	2.9	2.3	3.3	52
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
37°00'-	>2000 M	11.5	13.3	4.6	12.0	8.1	7.4	1.8	3.6	1.8	1.5	2.1	33
35°15'	>2500 M	12.5	14.5	5.1	13.1	8.8	8.0	1.9	3.9	2.0	1.6	2.3	36
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 52. Snowpack solute-loading by region for 1993. Loadings were calculated using snow-water equivalence (SWE) data from the California Cooperative Snow Survey. Snow chemistry used in the estimates was from the 12 study sites plus snow chemistry from Pear Lake, Topaz Lake, Ruby Lake and Crystal Lake. The regions used in the analysis were constrained by elevation and latitude. The data for snow chemistry and SWE are from the Sierra snowpack on or near April 1. Units are equivalents per hectare (eq ha^{-1}). Precip is the amount of SWE in centimeters. Elevations are meters.

Region	Elevation	H^+	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$	Precip
40°00'-	>2000 M	39.0	23.5	14.4	18.9	19.7	11.5	6.8	11.9	5.5	5.1	2.0	142
39°00'	>2500 M	46.2	27.8	17.1	22.3	23.4	13.6	8.0	14.1	6.5	6.1	2.3	168
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
39°00'-	>2000 M	37.3	42.0	26.5	28.8	28.9	27.8	3.7	20.6	4.2	9.4	5.9	127
38°30'	>2500 M	48.7	54.9	34.6	37.6	37.8	36.3	4.9	27.0	5.5	12.3	7.7	166
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
38°30'-	>2000 M	36.5	16.0	12.7	18.5	22.1	21.4	10.5	9.4	4.7	3.5	3.8	122
38°00'	>2500 M	38.0	16.7	13.3	19.3	23.0	22.3	10.9	9.8	4.9	3.7	4.0	127
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
38°00'-	>2000 M	41.1	17.6	12.1	18.1	22.3	21.8	5.3	9.5	5.2	5.0	2.8	119
37°00'	>2500 M	40.4	17.3	11.9	17.8	21.9	21.4	5.2	9.3	5.1	4.9	2.8	117
	>3000 M	36.3	15.5	10.7	16.0	19.7	19.2	4.7	8.4	4.6	4.4	2.5	105
37°00'-	>2000 M	30.7	16.6	14.9	14.3	16.3	18.0	4.0	10.5	2.6	4.2	1.6	83
36°00'	>2500 M	31.8	17.2	15.4	14.9	16.9	18.6	4.1	10.9	2.7	4.3	1.7	86
	>3000 M	30.0	16.2	14.5	14.0	15.9	17.5	3.9	10.2	2.6	4.1	1.6	81
36°00'-	>2000 M	29.3	15.8	14.1	13.7	15.5	17.1	3.8	10.0	2.5	4.0	1.5	79
35°15'	>2500 M	38.5	20.7	18.6	18.0	20.4	22.5	5.0	13.1	3.3	5.3	2.0	104
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
37°00'-	>2000 M	30.7	16.6	14.9	14.3	16.3	18.0	4.0	10.5	2.6	4.2	1.6	83
35°15'	>2500 M	32.2	17.4	15.6	15.0	17.1	18.8	4.2	11.0	2.8	4.4	1.7	87
	>3000 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 53. Average chemistry of no-precipitation bucket-rinses by site for the period of 1990 through 1993. Bucket rinses were collected when no precipitation occurred during the weekly or biweekly installation interval. Bucket rinses were done with 250 ml of deionized water. Duration is the average number of days the bucket was installed prior to being rinsed. All concentrations are in $\mu Eq\ L^{-1}$. MM2 and OV2 were co-located rain collectors installed at Mammoth Mountain and Onion Valley respectively. No bucket rinses were obtained in 1994.

Site/Year	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$	Duration
AM-90	NA	3.0	14.3	2.9	16.8	1.9	1.2	2.7	NA	NA	NA
ANG-90	NA	0.2	0.0	0.1	0.1	0.0	0.0	0.0	NA	NA	8.0
ANG-91	0.5	0.6	0.1	0.3	0.6	0.2	1.2	0.7	0.1	0.6	10.0
ANG-92	0.9	0.0	0.4	0.2	1.0	0.2	0.3	0.0	0.4	0.7	10.3
ANG-93	0.1	0.2	1.0	0.1	0.3	0.1	0.4	0.2	0.0	0.1	7.4
ANG-AVG	0.5	0.2	0.4	0.2	0.5	0.1	0.5	0.2	0.2	0.4	8.9
EBL-90	NA	0.0	0.1	0.0	0.2	0.1	0.3	0.1	NA	NA	12.5
EBL-91	0.7	1.0	0.3	0.2	0.6	0.2	0.2	0.1	0.4	0.0	13.0
EBL-92	3.0	0.3	4.2	2.5	6.6	1.1	1.7	1.5	0.4	0.2	14.3
EBL-93	0.4	0.5	0.4	0.2	0.6	0.1	0.2	0.2	1.0	2.1	13.9
EBL-AVG	1.3	0.4	1.2	0.7	2.0	0.3	0.6	0.5	0.6	0.8	13.4
EML-91	1.3	0.6	0.1	0.5	0.8	0.3	1.4	0.4	75.0	15.0	12.7
EML-92	1.1	0.4	1.1	1.0	1.0	0.9	0.6	0.3	2.9	1.0	17.0
EML-93	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	17.0
EML-AVG	0.8	0.4	0.4	0.5	0.6	0.4	0.7	0.2	NA	NA	15.6
KP-91	2.0	1.0	2.9	2.2	3.6	0.9	1.4	1.2	0.8	0.1	8.8
KP-92	2.8	0.7	1.0	1.8	3.9	1.3	1.2	1.6	0.5	0.2	6.2
KP-AVG	2.4	0.8	2.0	2.0	3.8	1.1	1.3	1.4	0.7	0.2	7.5
MK-91	1.5	0.0	0.4	0.2	0.5	0.3	0.1	0.2	0.5	0.4	6.8
MK-92	2.9	0.4	5.7	3.8	6.9	1.4	1.9	1.3	0.0	0.0	8.5
MK-93	1.2	0.9	0.3	2.5	1.3	0.5	0.5	2.1	0.6	0.2	10.8
MK-AVG	1.9	0.4	2.2	2.2	2.9	0.7	0.8	1.2	0.4	0.2	8.7
MM2-92	1.2	0.2	0.1	0.1	0.7	0.1	0.1	0.1	0.4	0.0	15.0
MM2-93	1.5	0.7	2.4	1.0	1.8	0.3	0.6	0.5	0.4	0.1	14.2
MM2-AVG	1.4	0.5	1.2	0.5	1.2	0.2	0.3	0.3	0.4	0.0	14.6
MM1-90	NA	3.9	24.6	12.3	15.3	4.1	5.7	3.7	NA	NA	16.3
MM1-91	1.0	0.2	0.2	0.2	0.8	0.2	0.1	0.1	0.6	0.3	19.3
MM1-92	2.3	0.2	0.6	0.7	1.1	0.2	0.3	0.1	0.5	0.2	15.3
MM1-93	0.3	2.2	0.2	0.4	0.7	0.3	0.6	1.3	0.5	0.2	14.2
MM1-AVG	1.2	1.7	6.4	3.4	4.5	1.2	1.7	1.3	0.5	0.2	16.3
OV2-92	5.2	0.8	4.6	3.8	7.5	1.3	1.9	1.0	0.6	0.9	14.3
OV2-93	1.2	0.9	0.9	1.2	5.3	0.6	0.9	0.6	0.6	0.6	13.6
OV2-AVG	3.2	0.9	2.8	2.5	6.4	0.9	1.4	0.8	0.6	0.7	13.9
OV1-90	NA	0.5	1.6	0.6	2.1	0.3	0.4	0.1	NA	NA	12.3
OV1-91	3.0	1.1	3.6	1.9	8.9	1.3	1.7	1.9	0.6	0.4	14.7
OV1-92	5.9	1.0	7.8	2.8	14.0	2.3	2.1	2.6	0.6	0.7	14.8
OV1-93	0.3	0.6	0.1	0.2	1.8	0.2	0.2	0.2	0.3	0.0	13.6
OV1-AVG	3.1	0.8	3.3	1.4	6.7	1.0	1.1	1.2	0.5	0.4	13.9
SL-90	NA	0.0	1.5	1.2	1.7	0.3	0.5	0.7	NA	NA	12.3
SL-91	2.1	1.0	4.2	2.5	5.4	0.7	0.8	0.9	1.5	0.6	13.5
SL-92	1.7	0.1	0.5	0.4	1.2	0.2	0.5	0.4	0.3	0.2	14.3
SL-93	0.4	0.8	0.1	0.3	0.9	0.2	0.3	0.2	0.4	0.4	12.3
SL-AVG	1.4	0.5	1.5	1.1	2.3	0.3	0.5	0.6	0.7	0.4	13.1
SN-90	NA	0.8	2.3	0.9	2.2	0.8	0.5	0.7	NA	NA	10.0
SN-91	2.0	0.5	1.4	0.9	2.5	0.7	0.3	0.5	0.4	0.2	14.0
SN-92	2.0	0.1	0.2	0.1	1.1	0.2	0.1	0.0	0.9	0.5	12.0
SN-93	0.1	0.3	0.1	0.1	0.2	0.0	0.2	0.3	0.7	0.2	14.4
SN-AVG	1.4	0.4	1.0	0.5	1.5	0.4	0.3	0.4	0.6	0.3	12.6
TG-90	NA	0.8	4.2	2.5	4.4	0.8	0.9	0.5	NA	NA	11.3
TG-92	0.2	0.1	0.6	0.3	1.4	0.3	0.4	0.6	0.0	0.0	15.0
TG-93	1.2	0.4	0.4	0.3	1.1	0.1	0.2	0.3	0.9	0.4	14.6
TG-AVG	0.7	0.4	1.7	1.0	2.3	0.4	0.5	0.4	0.5	0.2	13.6

Table 54. Summary of statistical analyses of No-Precipitation Bucket Rinse (NPBR) samples from 1990 through 1993. For each station, data from the entire study were combined for the analyses. The Kruskal-Wallis one-way ANOVA and Dunns multiple-comparsion tests were used to detect significant differences ($P < 0.05$) among stations. No bucket rinses were obtained in 1994.

1. NO-PRECIPITATION BUCKET RINSE CHEMISTRY 1990-1993

A. Tests for differences in chemistry among sites:

1. SULFATE

   a. MK > ANG

3. FORMATE

   NONE

4. ACETATE

   a. ANG < EML
   b. ANG < TG

5. NITRATE

   NONE

6. AMMONIUM

   NONE

7. MAGNESIUM

   a. KP > ANG
   b. OV2 > ANG

8. SODIUM

   NONE

9. POTASSIUM

   NONE

10. CHLORIDE

   NONE

Table 54. (continued)

11. CALCIUM

a.	OV2	>	EML
b.	OV2	>	ANG
c.	OV2	>	EBL
d.	OV1	>	EML
e.	OV1	>	ANG

12. BUCKET DURATION

a.	ANG	<	MM1
b.	ANG	<	MM2
c.	ANG	<	EML
d.	ANG	<	TG
e.	ANG	<	OV2
f.	ANG	<	OV1
a.	KP	<	MM1
b.	KP	<	MM2
c.	KP	<	EML
d.	KP	<	TG
e.	KP	<	OV2
f.	KP	<	OV1
a.	MK	<	MM1
b.	MK	<	MM2
c.	MK	<	EML
d.	MK	<	TG
e.	MK	<	OV2
f.	MK	<	OV1

Table 55. Summary of statistical analyses of No-Precipitation Bucket Rinse (NPBR) samples from 1990 through 1993. For each station, data from all station were combined for the analyses. The Kruskal-Wallis one-way ANOVA and Dunns multiple-comparsion tests were used to detect significant differences ($P < 0.05$) among years. No bucket rinses were obtained in 1994.

1. NO-PRECIPITATION BUCKET RINSE CHEMISTRY 1990-1993

   A. Tests for differences in chemistry among years:

      1. SULFATE

         a. 1992 > 1993

      3. FORMATE

         a. 1991 > 1993

      4. ACETATE

         NONE

      5. NITRATE

         a. 1993 < 1990
         b. 1993 < 1992

      6. SODIUM

         a. 1992 > 1993

      7. AMMONIUM

         a. 1993 < 1991
         b. 1993 < 1992 NOTE: NO NH_4^+ IN 1990

      8. MAGNESIUM

         a. 1993 < 1990
         b. 1993 < 1991
         c. 1993 < 1992

      9. POTASSIUM

         NONE

      10. CHLORIDE

         a. 1993 > 1992

      11. CALCIUM

         a. 1992 < 1993

      12. BUCKET DURATION

         NONE

Table 56. Average contamination rate of buckets by site for the period of 1990 through 1993. The contamination rate was calculated from no-precipitation bucket-rinse chemistry and bucket duration. Units are expressed in milliequivalents per hectare per day (mEq ha^{-1} d^{-1}). These units were chosen to simplify comparisons between bucket-contamination rates and solute-loading rates. No bucket rinses were collected in 1994.

Site/Year	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$
ANG-90	NA	0.8	0.0	0.6	0.5	0.0	0.2	0.0	0.0	0.0
ANG-91	1.8	2.2	0.5	1.3	2.2	0.9	4.6	2.7	0.5	2.2
ANG-92	3.2	0.0	1.3	0.6	3.6	0.6	1.0	0.0	1.4	2.5
ANG-93	0.5	1.0	5.0	0.5	1.4	0.6	1.9	1.1	0.1	0.5
ANG-AVG	1.8	1.0	1.7	0.7	1.9	0.5	1.9	0.9	0.7	1.7
EBL-90	NA	0.0	0.3	0.0	0.6	0.2	0.9	0.3	0.0	0.0
EBL-91	1.9	2.8	0.9	0.6	1.6	0.4	0.6	0.3	1.0	0.0
EBL-92	7.9	0.7	11.0	6.5	17.4	2.8	4.4	3.9	1.1	0.6
EBL-93	1.1	1.4	1.1	0.6	1.5	0.3	0.6	0.5	2.6	5.7
EBL-AVG	3.6	1.2	3.3	1.9	5.3	0.9	1.6	1.2	1.6	2.1
EML-91	3.8	1.8	0.3	1.5	2.4	1.0	4.1	1.3	225.0	45.0
EML-92	2.5	0.8	2.5	2.2	2.2	2.0	1.3	0.6	6.4	2.2
EML-93	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.6
EML-AVG	2.1	0.9	0.9	1.2	1.5	1.0	1.8	0.7	NA	NA
KP-91	8.5	4.3	12.4	9.5	15.6	3.7	6.2	5.3	0.7	0.1
KP-92	17.0	4.2	6.3	11.0	23.8	8.2	7.6	10.1	3.1	1.3
KP-AVG	12.8	4.2	9.3	10.3	19.7	6.0	6.9	7.7	1.9	0.7
MK-91	8.2	0.1	2.5	1.3	3.0	1.5	0.8	1.0	2.8	2.0
MK-92	13.1	1.9	25.6	17.0	30.8	6.4	8.4	5.7	0.0	0.0
MK-93	4.1	3.2	1.1	8.8	4.5	1.6	1.6	7.4	2.0	0.8
MK-AVG	8.5	1.7	9.7	9.1	12.8	3.2	3.6	4.7	1.6	0.9
MM2-92	3.0	0.5	0.1	0.3	1.6	0.1	0.1	0.1	1.0	0.0
MM2-93	4.1	2.0	6.4	2.6	4.8	0.7	1.5	1.2	1.2	0.2
MM2-AVG	3.6	1.2	3.3	1.4	3.2	0.4	0.8	0.7	1.1	0.1
MM1-90	NA	9.2	57.2	28.6	35.7	9.6	13.3	8.7	0.0	0.0
MM1-91	2.0	0.5	0.4	0.5	1.6	0.4	0.3	0.1	1.2	0.6
MM1-92	5.8	0.6	1.5	1.7	2.7	0.6	0.7	0.2	1.3	0.6
MM1-93	0.8	5.9	0.6	1.1	1.8	0.7	1.6	3.5	1.3	0.5
MM1-AVG	2.8	4.0	14.9	8.0	10.5	2.8	3.9	3.1	1.3	0.5
OV2-92	13.8	2.2	12.3	10.1	19.9	3.3	4.9	2.7	1.6	2.4
OV2-93	3.4	2.6	2.6	3.4	14.8	1.7	2.5	1.7	1.7	1.6
OV2-AVG	8.6	2.4	7.5	6.8	17.3	2.5	3.7	2.2	1.6	2.0
OV1-90	NA	1.6	4.8	1.8	6.5	1.0	1.2	0.4	0.0	0.0
OV1-91	7.9	2.9	9.3	4.8	23.1	3.5	4.3	4.8	1.6	1.0
OV1-92	15.1	2.5	20.0	7.1	35.8	6.0	5.4	6.8	1.6	1.7
OV1-93	1.0	1.6	0.2	0.7	5.0	0.4	0.4	0.4	0.8	0.1
OV1-AVG	8.0	2.2	8.6	3.6	17.6	2.7	2.9	3.1	1.3	0.9
SL-90	NA	0.1	4.5	3.6	5.1	0.9	1.5	2.2	0.0	0.0
SL-91	5.8	2.7	11.7	7.0	15.1	1.8	2.3	2.5	4.1	1.5
SL-92	4.5	0.3	1.2	1.1	3.1	0.5	1.3	1.1	0.8	0.6
SL-93	1.3	2.4	0.3	0.9	2.6	0.5	1.0	0.7	1.3	1.2
SL-AVG	3.9	1.3	4.4	3.2	6.5	0.9	1.5	1.6	2.1	1.1
SN-90	NA	2.9	8.6	3.2	8.4	2.9	2.0	2.6	0.0	0.0
SN-91	5.4	1.4	3.7	2.4	6.8	2.0	0.9	1.4	1.0	0.5
SN-92	6.4	0.4	0.5	0.3	3.6	0.7	0.4	0.0	2.7	1.6
SN-93	0.3	0.7	0.2	0.3	0.5	0.1	0.5	0.8	1.8	0.5
SN-AVG	4.0	1.4	3.3	1.6	4.8	1.4	0.9	1.2	1.9	0.8
TG-90	NA	2.8	14.1	8.4	14.8	2.6	3.1	1.6	0.0	0.0
TG-92	0.5	0.3	1.5	0.8	3.5	0.8	1.0	1.4	0.0	0.0
TG-93	3.2	1.0	1.0	0.9	2.8	0.3	0.4	0.8	2.4	1.1
TG-AVG	1.9	1.4	5.5	3.3	7.0	1.2	1.5	1.3	1.2	0.6

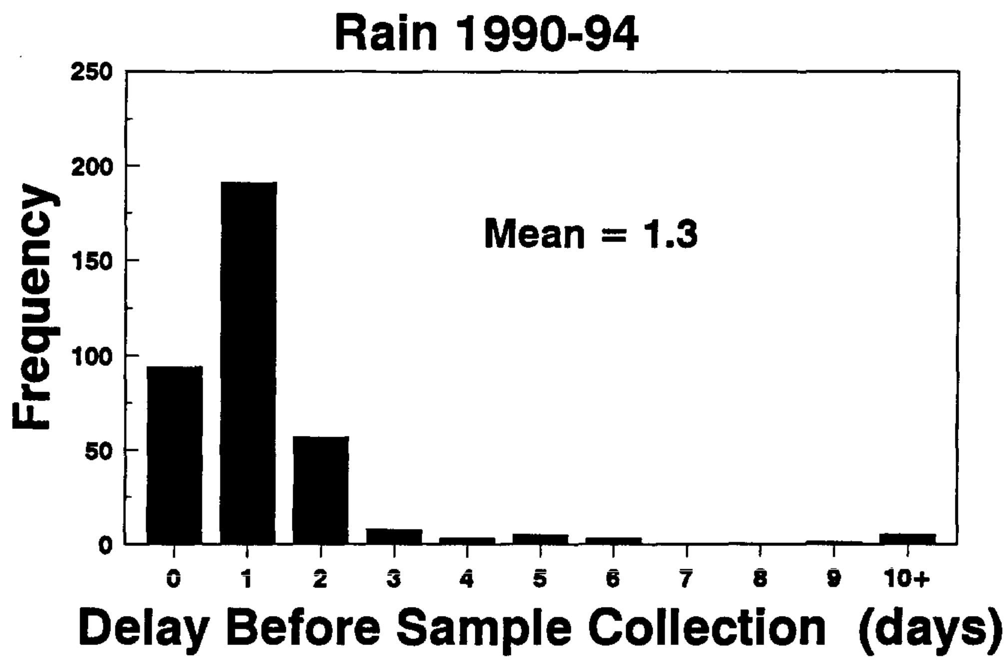
Table 57. Contamination loading by site for the non-winter periods of 1990 through 1993. This loading was calculated from the average contamination rate at each site and the number of days buckets were installed when there was a rain event sampled:

Contamination Rate ÷ 1000 x Installation Interval = Contamination Loading
($mEq\ ha^{-1}\ day^{-1}$) (days) ($Eq\ ha^{-1}$)

Site/Year	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$
ANG-1990	NA	0.07	0.00	0.06	0.04	0.00	0.01	0.00	0.00	0.00
ANG-1991	0.56	0.00	0.22	0.11	0.63	0.11	0.18	0.00	0.24	0.43
ANG-1991	0.07	0.09	0.02	0.05	0.09	0.04	0.19	0.11	0.02	0.09
ANG-1993	0.01	0.03	0.15	0.01	0.04	0.02	0.06	0.03	0.00	0.01
ANG-AVG	0.22	0.05	0.10	0.06	0.20	0.04	0.11	0.04	0.07	0.13
EBL-1990	NA	0.00	0.02	0.00	0.03	0.01	0.05	0.02	0.00	0.00
EBL-1991	0.20	0.29	0.09	0.06	0.17	0.05	0.06	0.03	0.11	0.00
EBL-1992	1.30	0.12	1.82	1.08	2.87	0.47	0.73	0.64	0.17	0.10
EBL-1993	0.03	0.03	0.03	0.02	0.04	0.01	0.01	0.01	0.07	0.14
EBL-AVG	0.51	0.11	0.49	0.29	0.78	0.13	0.21	0.18	0.09	0.06
EML-1991	0.34	0.16	0.03	0.13	0.21	0.09	0.36	0.12	20.03	4.01
EML-1992	0.42	0.13	0.42	0.38	0.38	0.34	0.23	0.09	1.08	0.38
EML-1993	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03
EML-AVG	0.25	0.10	0.15	0.17	0.20	0.14	0.20	0.07	NA	NA
KP-1991	0.58	0.30	0.86	0.66	1.08	0.26	0.43	0.36	0.05	0.01
KP-1992	2.81	0.69	1.03	1.82	3.92	1.36	1.25	1.66	0.51	0.22
KP-AVG	1.70	0.49	0.94	1.24	2.50	0.81	0.84	1.01	0.28	0.11
MK-1991	0.67	0.01	0.20	0.11	0.25	0.12	0.06	0.08	0.23	0.16
MK-1992	1.89	0.27	3.69	2.45	4.43	0.92	1.22	0.82	0.00	0.00
MK-1993	0.16	0.12	0.04	0.33	0.17	0.06	0.06	0.28	0.08	0.03
MK-AVG	0.91	0.13	1.31	0.97	1.62	0.37	0.45	0.40	0.10	0.07
MM1-1990	NA	0.58	3.61	1.80	2.25	0.61	0.84	0.55	0.00	0.00
MM1-1991	0.21	0.05	0.04	0.05	0.18	0.04	0.03	0.01	0.13	0.06
MM1-1992	0.92	0.09	0.24	0.28	0.43	0.09	0.11	0.03	0.21	0.09
MM1-1993	0.03	0.19	0.02	0.04	0.06	0.02	0.05	0.11	0.04	0.02
MM1-AVG	0.39	0.23	0.98	0.54	0.73	0.19	0.26	0.18	0.09	0.04
MM2-1992	0.36	0.06	0.01	0.03	0.19	0.01	0.01	0.01	0.12	0.00
MM2-1993	0.13	0.06	0.20	0.08	0.15	0.02	0.05	0.04	0.04	0.01
MM2-AVG	0.24	0.06	0.11	0.06	0.17	0.02	0.03	0.03	0.08	0.00
OV1-1990	NA	0.08	0.23	0.09	0.31	0.05	0.06	0.02	0.00	0.00
OV1-1991	0.43	0.16	0.51	0.27	1.27	0.19	0.24	0.27	0.09	0.06
OV1-1992	2.72	0.45	3.60	1.28	6.45	1.08	0.98	1.22	0.30	0.31
OV1-1993	0.02	0.04	0.00	0.02	0.13	0.01	0.01	0.01	0.02	0.00
OV1-AVG	1.06	0.18	1.09	0.41	2.04	0.33	0.32	0.38	0.10	0.09
OV2-1992	2.49	0.40	2.21	1.82	3.58	0.60	0.89	0.49	0.29	0.43
OV2-1993	0.09	0.07	0.07	0.09	0.39	0.04	0.06	0.04	0.04	0.04
OV2-AVG	1.29	0.23	1.14	0.95	1.98	0.32	0.48	0.27	0.17	0.24
SL-1990	NA	0.00	0.27	0.22	0.31	0.06	0.09	0.13	0.00	0.00
SL-1991	0.34	0.16	0.69	0.42	0.89	0.11	0.13	0.15	0.24	0.09
SL-1992	0.69	0.04	0.19	0.16	0.47	0.08	0.20	0.16	0.12	0.09
SL-1993	0.06	0.11	0.01	0.04	0.12	0.02	0.05	0.03	0.06	0.05
SL-AVG	0.36	0.08	0.29	0.21	0.45	0.07	0.12	0.12	0.11	0.06
SP-1990	NA	0.19	0.56	0.21	0.54	0.19	0.13	0.17	0.00	0.00
SP-1991	0.28	0.07	0.19	0.13	0.35	0.10	0.05	0.07	0.05	0.02
SP-1992	1.13	0.07	0.09	0.06	0.63	0.13	0.07	0.00	0.48	0.28
SP-1993	0.01	0.03	0.01	0.01	0.02	0.00	0.02	0.03	0.07	0.02
SP-AVG	0.47	0.09	0.21	0.10	0.39	0.11	0.07	0.07	0.15	0.08
TG-1990	NA	0.23	1.18	0.70	1.24	0.22	0.26	0.13	0.00	0.00
TG-1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TG-1992	0.08	0.04	0.25	0.13	0.59	0.13	0.17	0.23	0.00	0.00
TG-1993	0.10	0.03	0.03	0.03	0.09	0.01	0.01	0.03	0.08	0.04
TG-AVG	0.09	0.10	0.49	0.29	0.64	0.12	0.15	0.13	0.03	0.01

Table 58. Percent of non-winter solute loading contributed by contamination loading by site for the period of 1990 through 1993. Also shown is the average loading fraction for all sites by year.

Site/Year	NH_4^+	Cl^-	NO_3^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	K^+	HCO_2^-	$CH_2CO_2^-$
ANG-1991	2.6%	0.0%	1.1%	0.8%	8.1%	4.2%	2.3%	0.0%	1.9%	4.3%
ANG-1991	0.5%	1.6%	0.1%	0.2%	0.7%	1.3%	2.5%	4.2%	0.3%	0.9%
ANG-1993	0.2%	3.4%	1.6%	0.2%	2.0%	2.0%	5.2%	1.5%	5.9%	41.6%
EBL-1990		0.0%	0.1%	0.0%	0.2%	0.3%	1.5%	1.9%	0.0%	0.0%
EBL-1991	0.8%	9.6%	0.5%	0.5%	2.1%	3.3%	2.9%	2.9%	1.6%	0.0%
EBL-1992	5.4%	3.8%	7.3%	5.2%	25.7%	19.0%	17.8%	36.2%	2.2%	1.2%
EBL-1993	1.0%	5.8%	0.9%	0.6%	1.6%	2.1%	2.7%	3.2%	7.8%	10.7%
EML-1991	0.6%	3.5%	0.1%	0.6%	1.5%	1.8%	9.0%	2.2%		
EML-1992	1.7%	2.2%	1.4%	1.6%	4.9%	18.8%	2.7%	2.2%	4.4%	2.2%
EML-1993	0.0%	0.5%	0.0%	0.0%	0.0%	0.5%	0.0%	0.6%	1.1%	2.4%
KP-1991	2.4%	13.2%	7.7%	5.8%	15.7%	11.1%	17.4%	8.2%	1.0%	0.1%
KP-1992	10.2%	19.0%	2.6%	5.9%	25.5%	35.9%	25.3%	34.8%	12.3%	3.5%
MK-1991	3.0%	0.2%	0.8%	0.6%	2.1%	5.8%	1.9%	3.4%	35.2%	14.4%
MK-1992	5.6%	6.1%	12.0%	10.9%	42.9%	56.7%	22.8%	26.6%	0.0%	0.0%
MK-1993	3.0%	18.8%	0.7%	11.8%	17.3%	32.2%	11.1%	87.5%	8.7%	3.7%
MM1-1991	1.0%	1.4%	0.2%	0.3%	1.5%	2.9%	0.4%	1.1%	1.7%	0.7%
MM1-1992	2.5%	4.7%	0.8%	1.3%	5.6%	4.7%	3.6%	2.0%	2.2%	1.0%
MM1-1993	0.2%	11.7%	0.2%	0.3%	2.2%	4.1%	4.1%	20.9%	2.2%	0.5%
MM2-1992	1.7%	4.8%	0.1%	0.2%	3.1%	1.1%	0.8%	2.0%	1.7%	0.0%
MM2-1993	1.0%	4.8%	2.1%	0.8%	5.9%	3.4%	4.2%	7.6%	6.7%	0.3%
OV1-1990		2.0%	1.2%	0.5%	3.7%	2.9%	1.5%	1.8%	0.0%	0.0%
OV1-1991	2.5%	6.7%	4.3%	2.7%	15.5%	7.9%	11.1%	36.0%	3.0%	0.9%
OV1-1992	13.4%	16.1%	22.5%	9.3%	62.4%	48.6%	32.6%	114.9%	5.9%	4.8%
OV1-1993	0.5%	3.4%	0.1%	0.3%	4.3%	2.3%	1.2%	2.7%	2.7%	0.2%
OV2-1992	16.3%	18.4%	17.1%	15.3%	41.2%	33.7%	38.7%	62.3%	9.4%	10.1%
OV2-1993	1.5%	6.5%	0.9%	1.5%	13.4%	8.8%	6.6%	9.2%	5.5%	3.1%
SL-1990		0.1%	1.4%	1.5%	3.5%	2.7%	2.5%	8.9%	0.0%	0.0%
SL-1991	2.8%	7.1%	5.1%	4.0%	15.5%	5.8%	7.8%	24.3%	7.6%	2.5%
SL-1992	2.4%	1.5%	0.7%	0.7%	4.8%	3.2%	4.9%	7.9%	1.4%	1.1%
SL-1993	2.8%	26.8%	0.5%	2.4%	12.9%	8.2%	11.3%	8.1%	10.7%	14.1%
SP-1990		3.6%	2.3%	1.3%	4.1%	7.3%	2.7%	9.5%	0.0%	0.0%
SP-1991	1.0%	1.3%	0.6%	0.5%	2.2%	2.5%	1.1%	1.8%	0.3%	0.1%
SP-1992	5.5%	4.6%	0.5%	0.3%	7.5%	5.8%	1.9%	0.0%	5.0%	2.8%
SP-1993	0.3%	3.7%	0.1%	0.3%	1.6%	0.9%	1.9%	8.9%	7.0%	2.4%
TG-1990		2.9%	3.7%	3.6%	8.4%	6.2%	1.9%	2.7%	0.0%	0.0%
TG-1992	0.2%	0.7%	0.7%	0.4%	4.2%	3.3%	2.6%	9.1%	0.0%	0.0%
TG-1993	1.4%	5.3%	0.6%	0.7%	8.5%	3.3%	2.1%	6.7%	9.3%	2.7%
1990-AVG	2.9%	6.1%	2.8%	2.5%	10.3%	9.8%	7.3%	15.2%	4.7%	3.7%
1991-AVG	1.5%	5.2%	1.9%	1.5%	5.6%	4.8%	6.5%	8.3%	6.1%	2.4%
1992-AVG	5.9%	7.5%	6.0%	4.6%	20.7%	21.0%	14.0%	27.1%	4.1%	2.4%
1993-AVG	1.1%	8.2%	0.7%	1.7%	6.3%	6.2%	4.6%	14.3%	6.1%	7.2%
1990-93-AVG	2.9%	6.8%	2.8%	2.6%	10.7%	10.5%	8.1%	16.2%	5.2%	3.9%



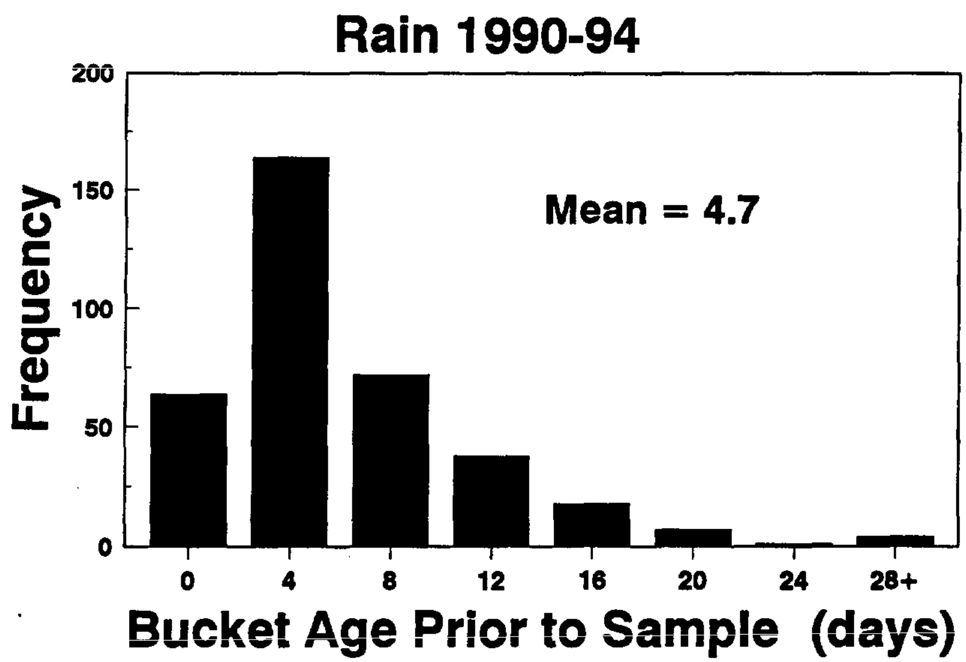


Figure 1. Frequency diagrams of delay before sample collection and bucket age prior to precipitation event.

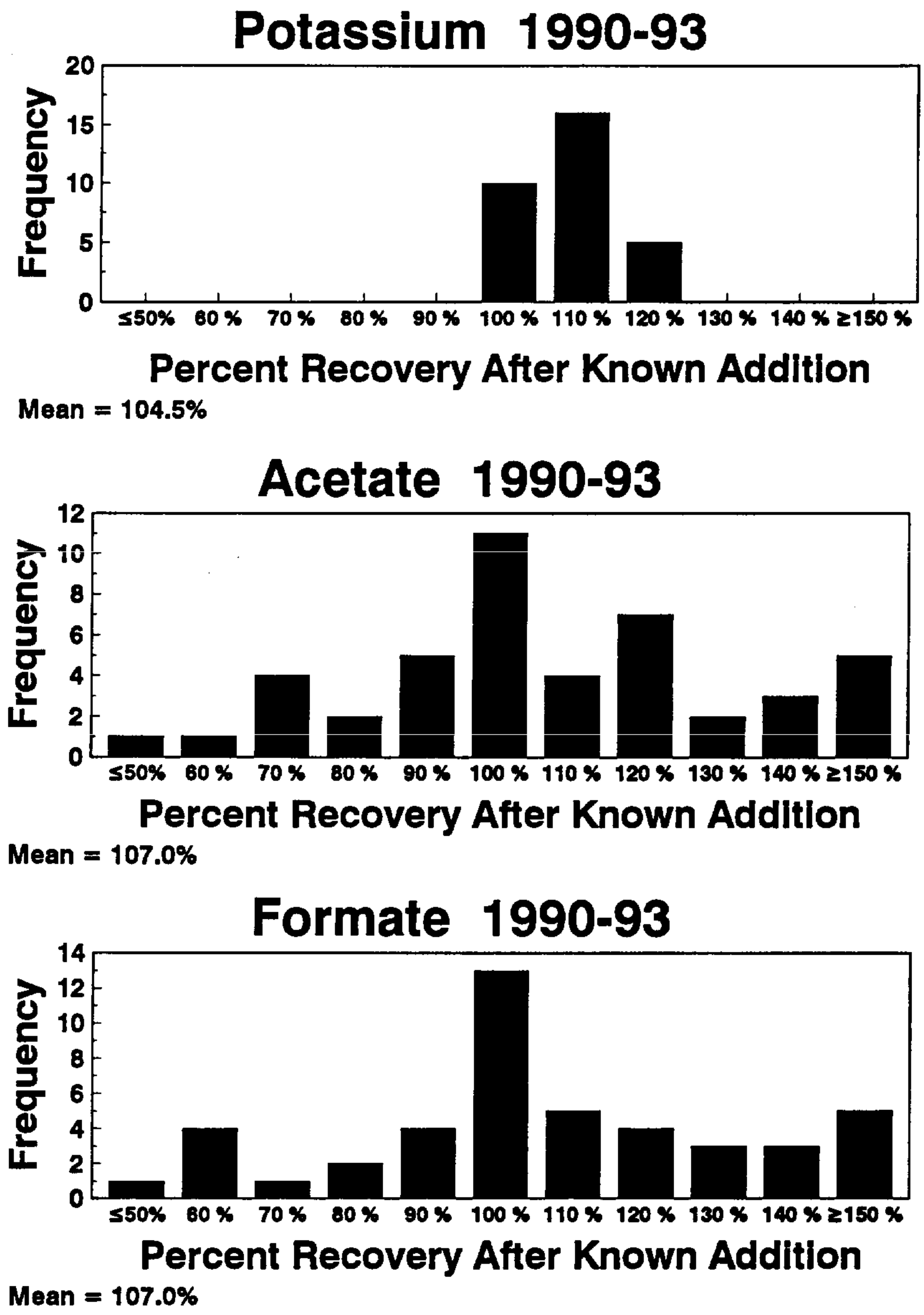


Figure 2. Accuracy for assays of potassium, acetate and formate during 1990-93. Accuracy was not determined during 1994-95.

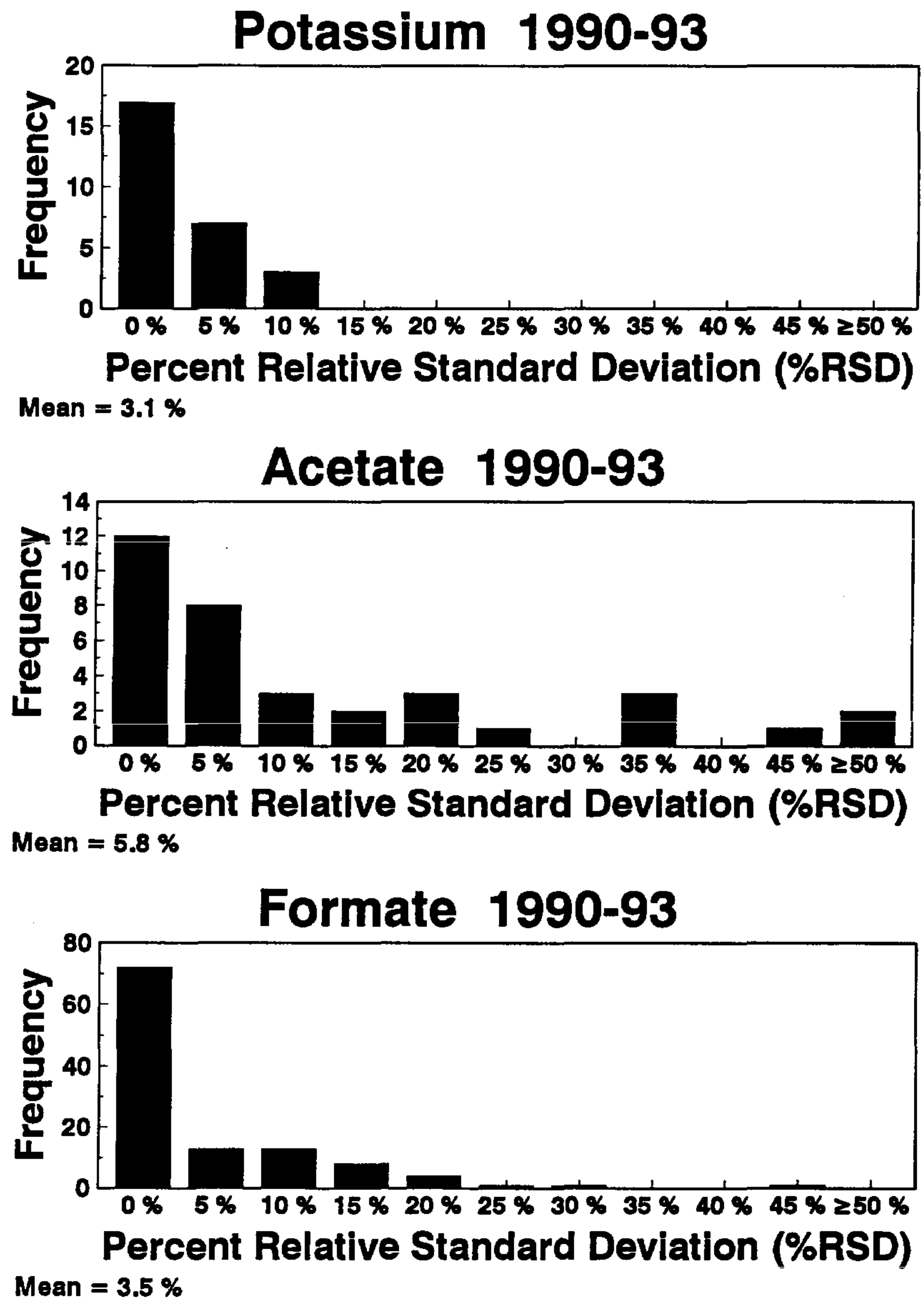


Figure 3. Precision for assays of potassium, acetate and formate during 1990-93. Precision was not determined during 1994-95.

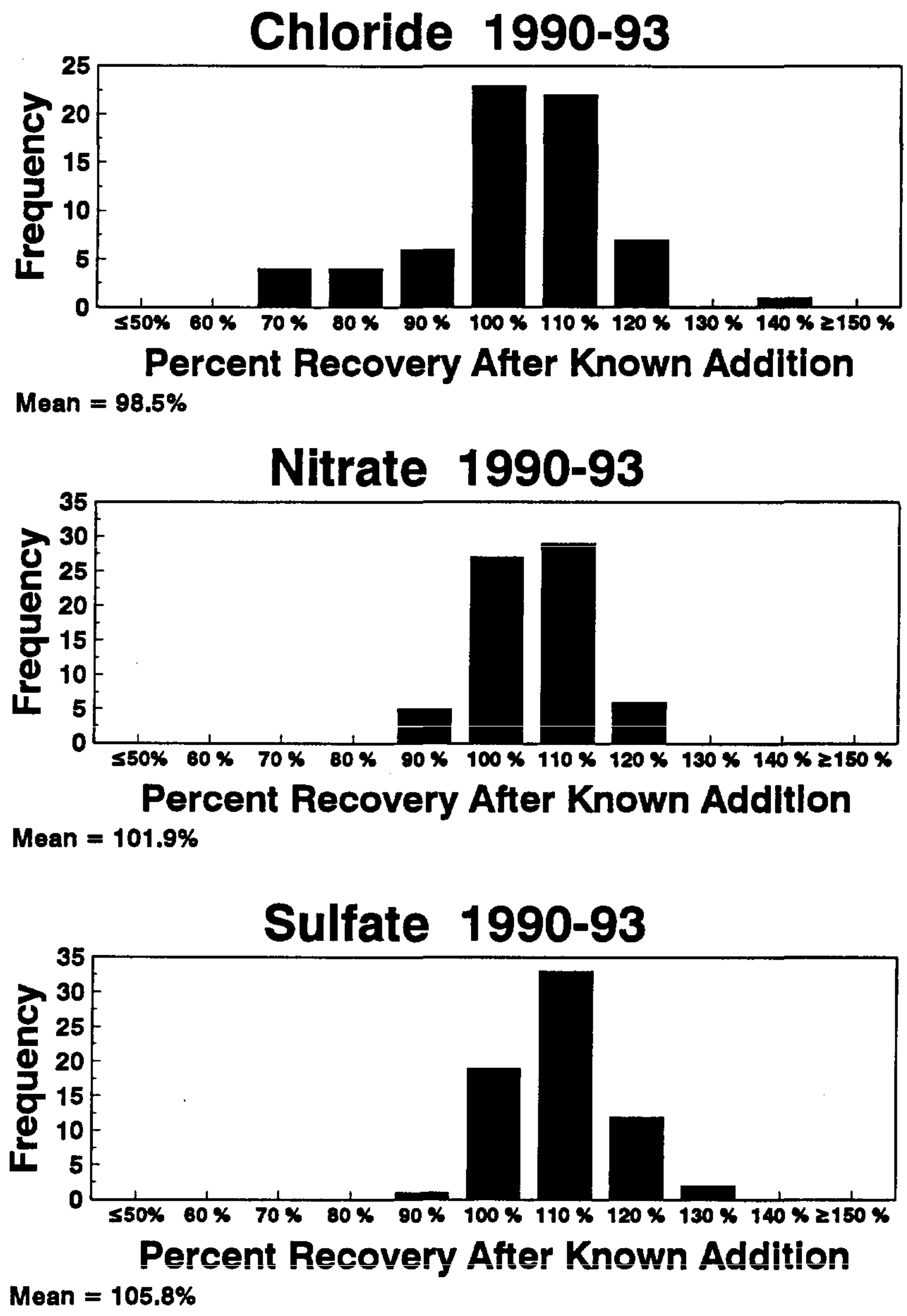
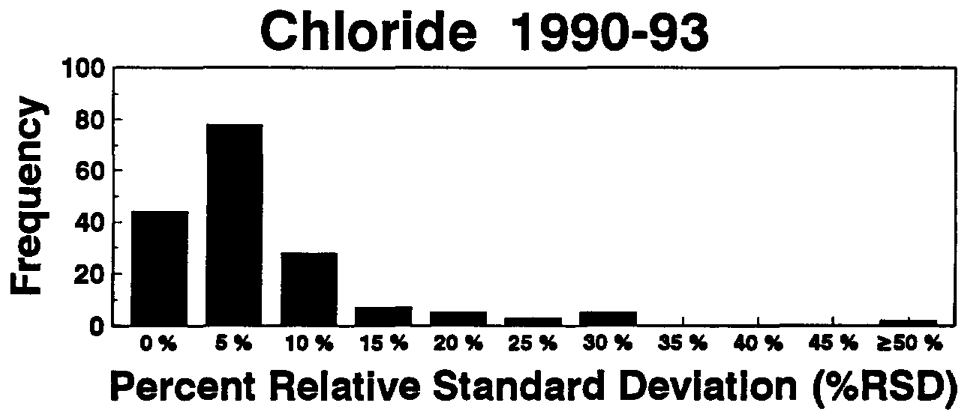
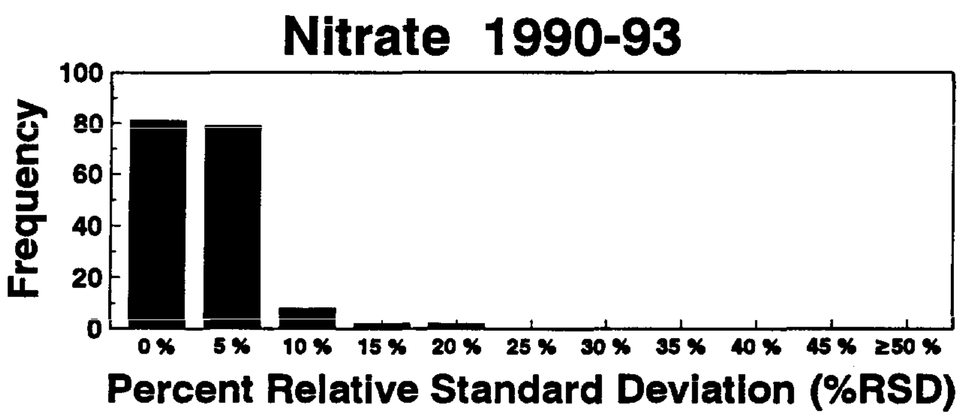


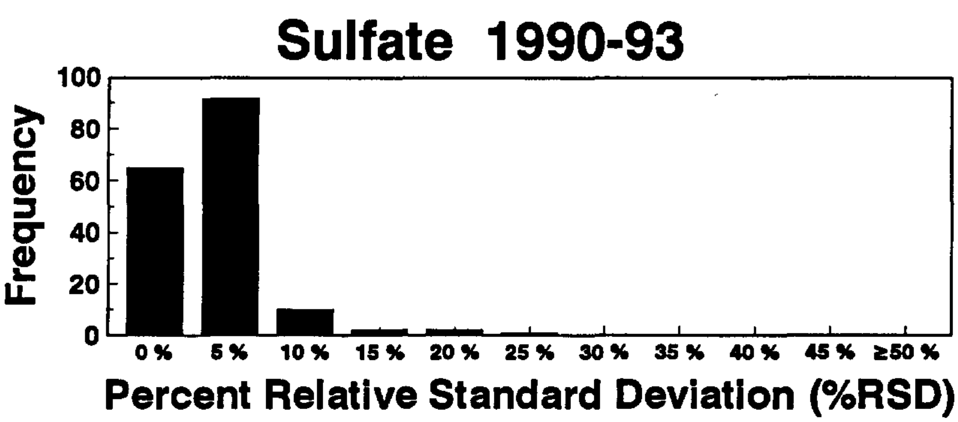
Figure 4. Accuracy for assays of chloride, nitrate and sulfate during 1990-93. Accuracy was not determined during 1994-95.



Mean = 5.9 %

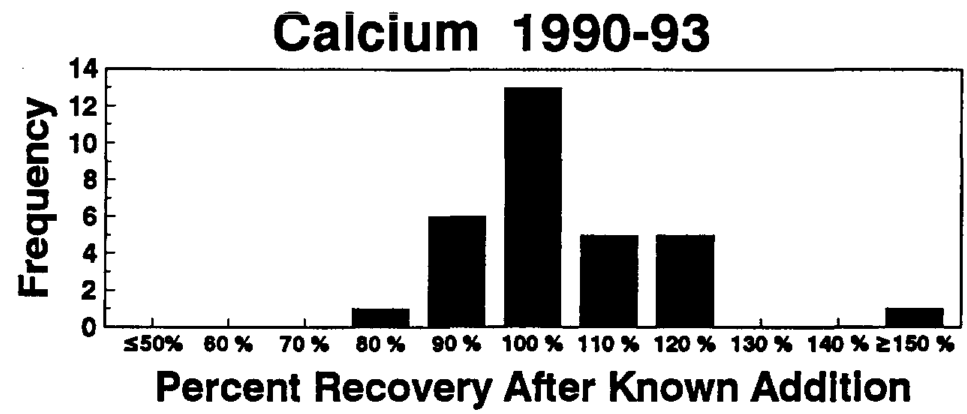


Mean = 1.5 %

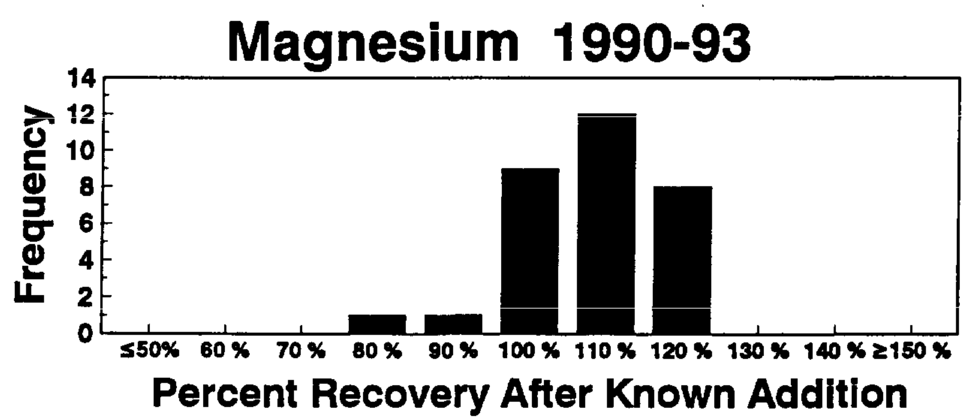


Mean = 2.0 %

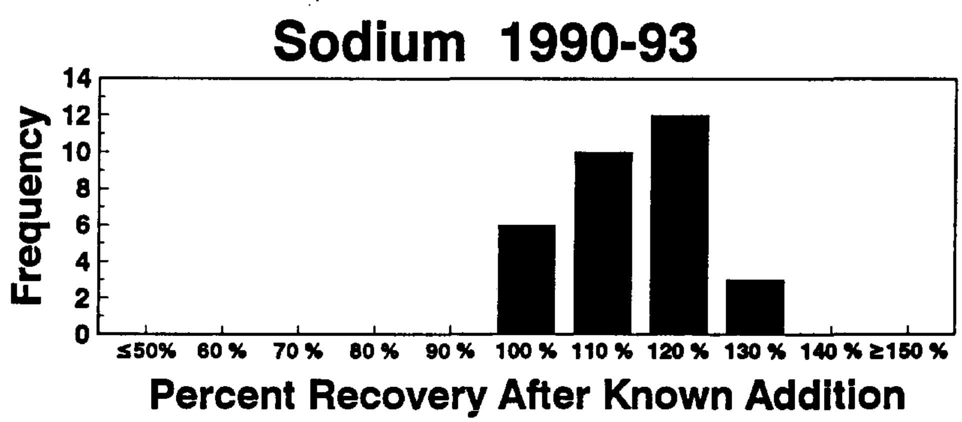
Figure 5. Precision for assays of chloride, nitrate and sulfate during 1990-93. Precision was not determined during 1994-95.



Mean = 101.0%



Mean = 104.1%



Mean = 110.4%

Figure 6. Accuracy for assays of calcium, magnesium and sodium during 1990-93. Accuracy was not determined during 1994-95.

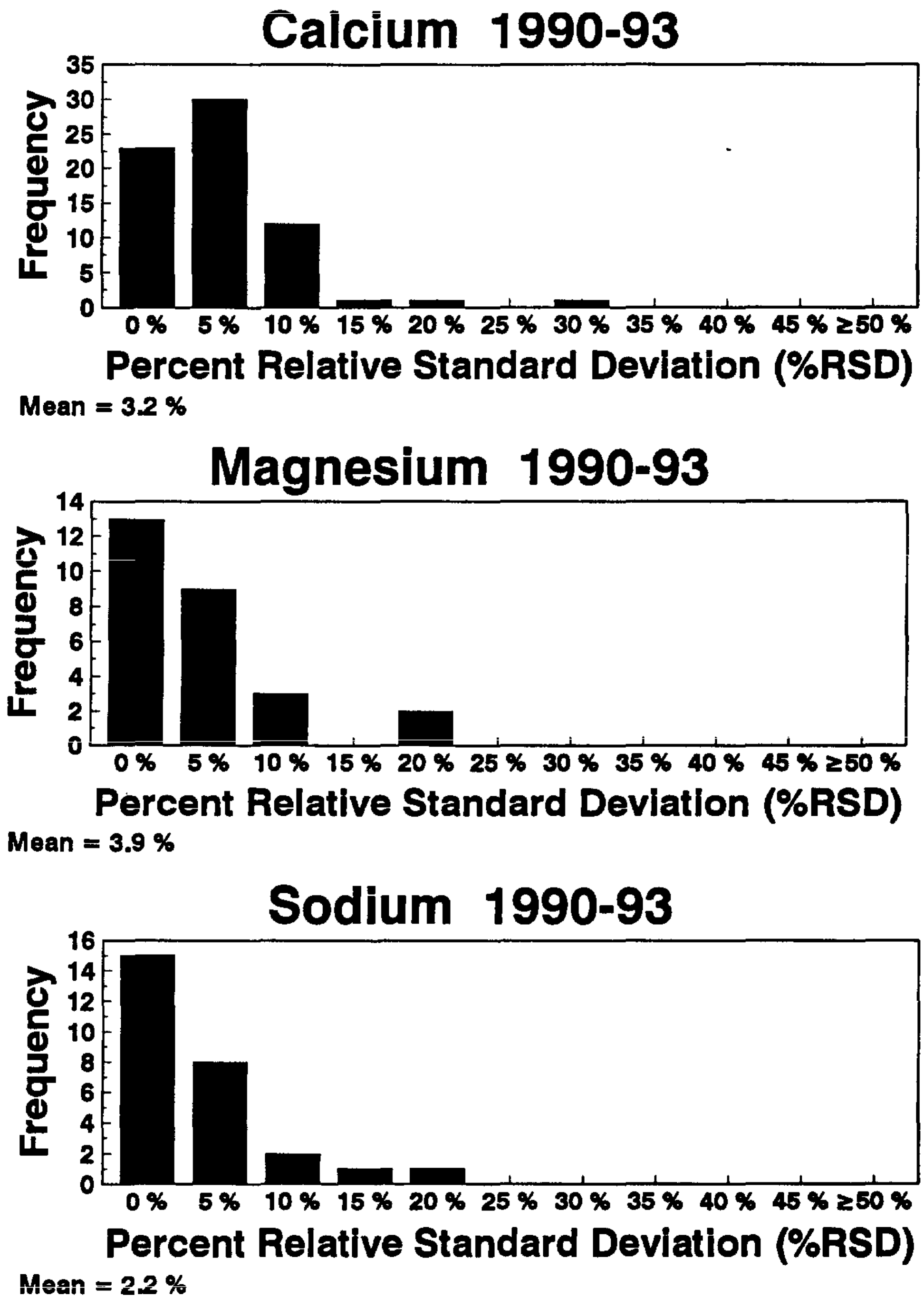
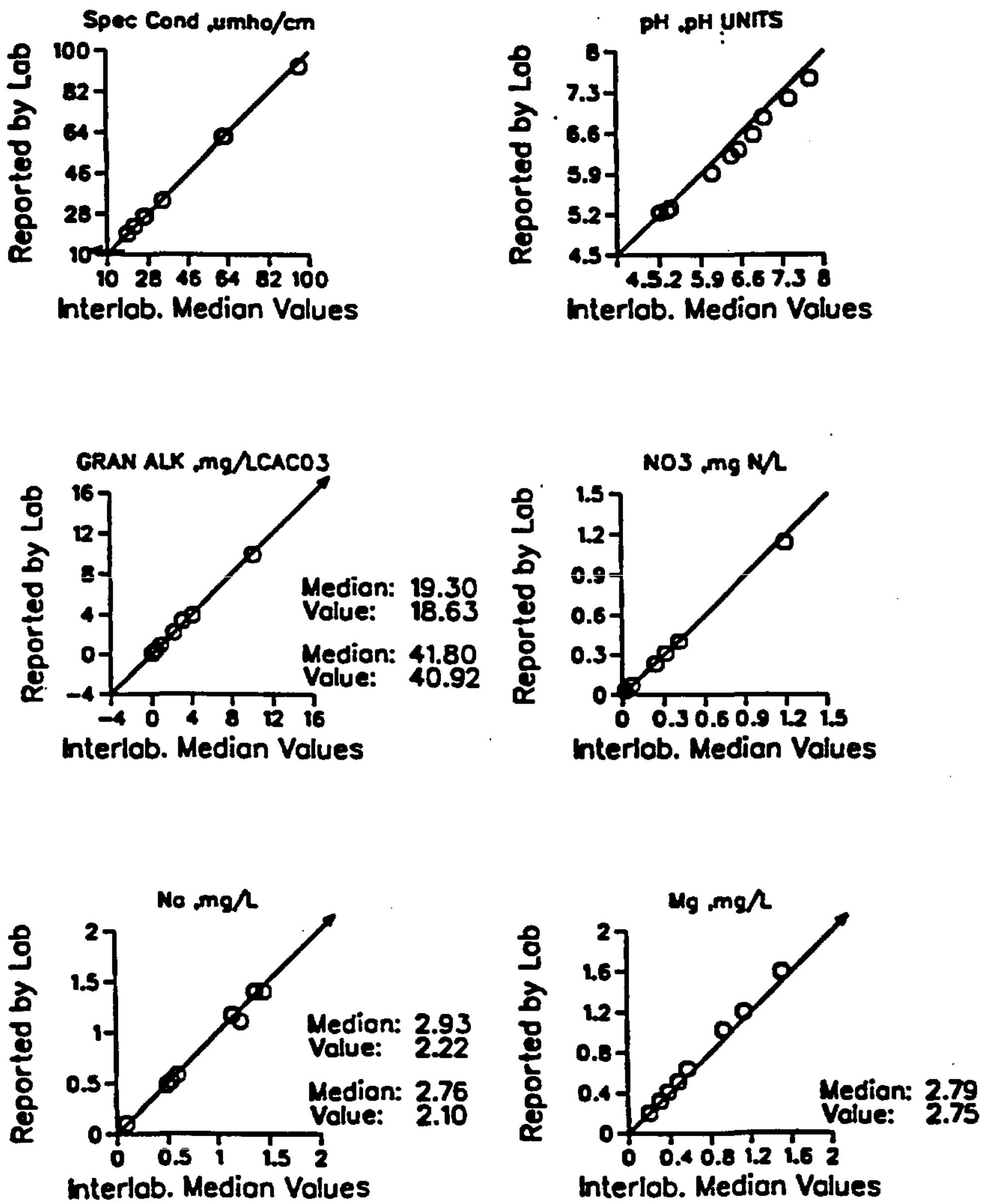


Figure 7. Precision for assays of calcium, magnesium and sodium during 1990-93. Precision was not determined during 1994-95.

Program: LRTAP Study: 0035

Laboratory: L122

Comparison of Results Reported versus the Interlaboratory Median values



Study Date: 21-JAN-94

Lab Code: L122

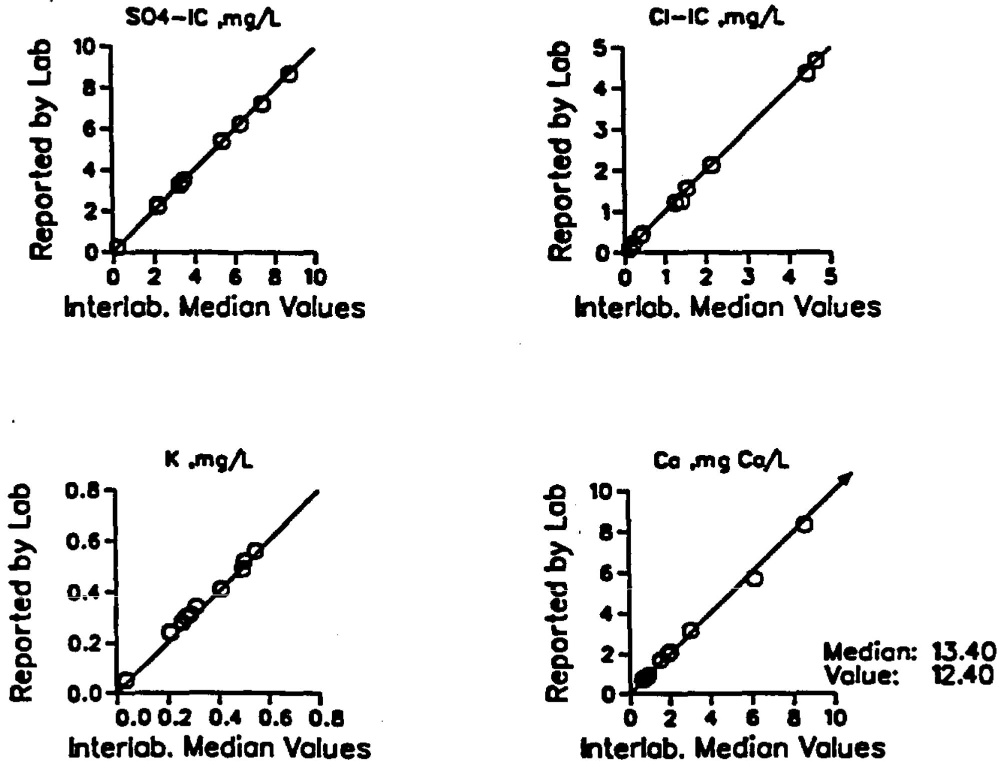
Note: arrows indicate data off scale

- Figure 8 -

Program: LRTAP Study: 0035

Laboratory: L122

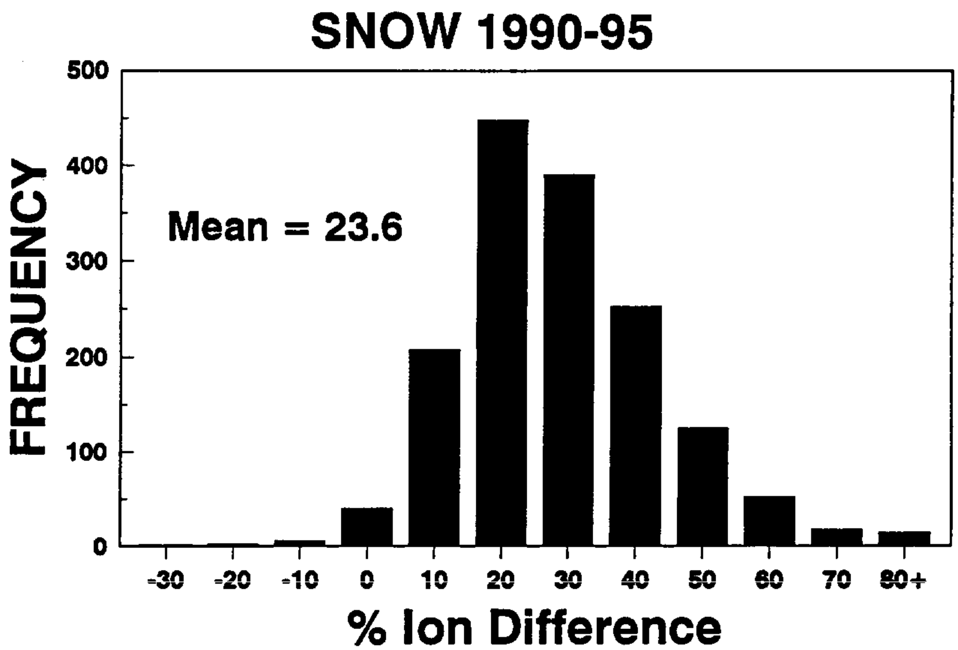
Comparison of Results Reported versus the Interlaboratory Median values



Study Date: 21-JAN-94 Lab Code: L122

Note: arrows indicate data off scale

- Figure 8 - (continued)



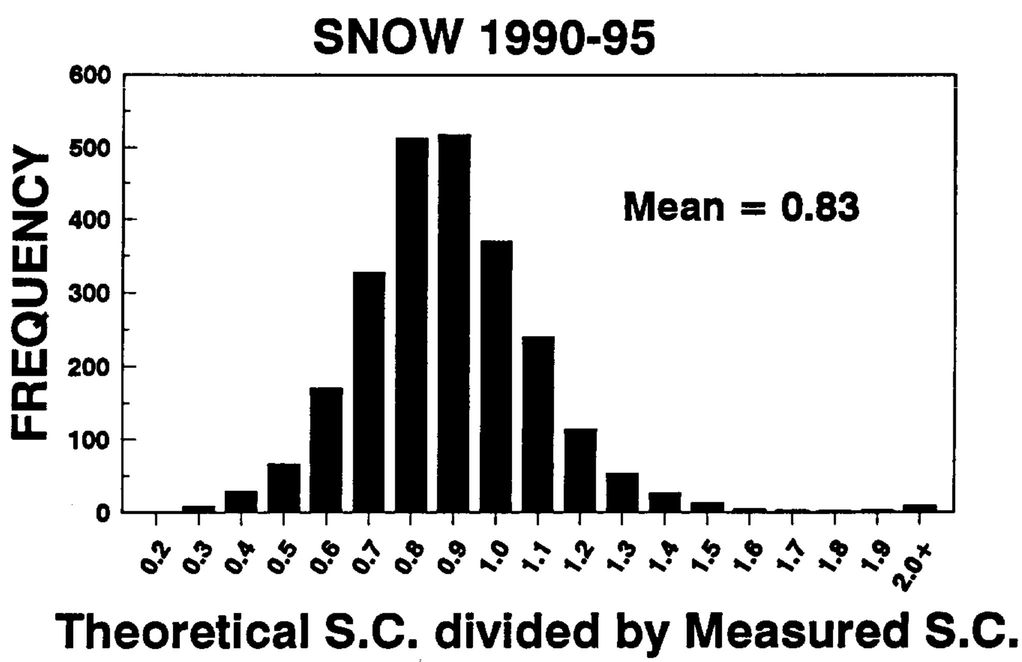


Figure 9. Charge and conductance balances for snow samples during 1990-95. S.C.=specific conductance.

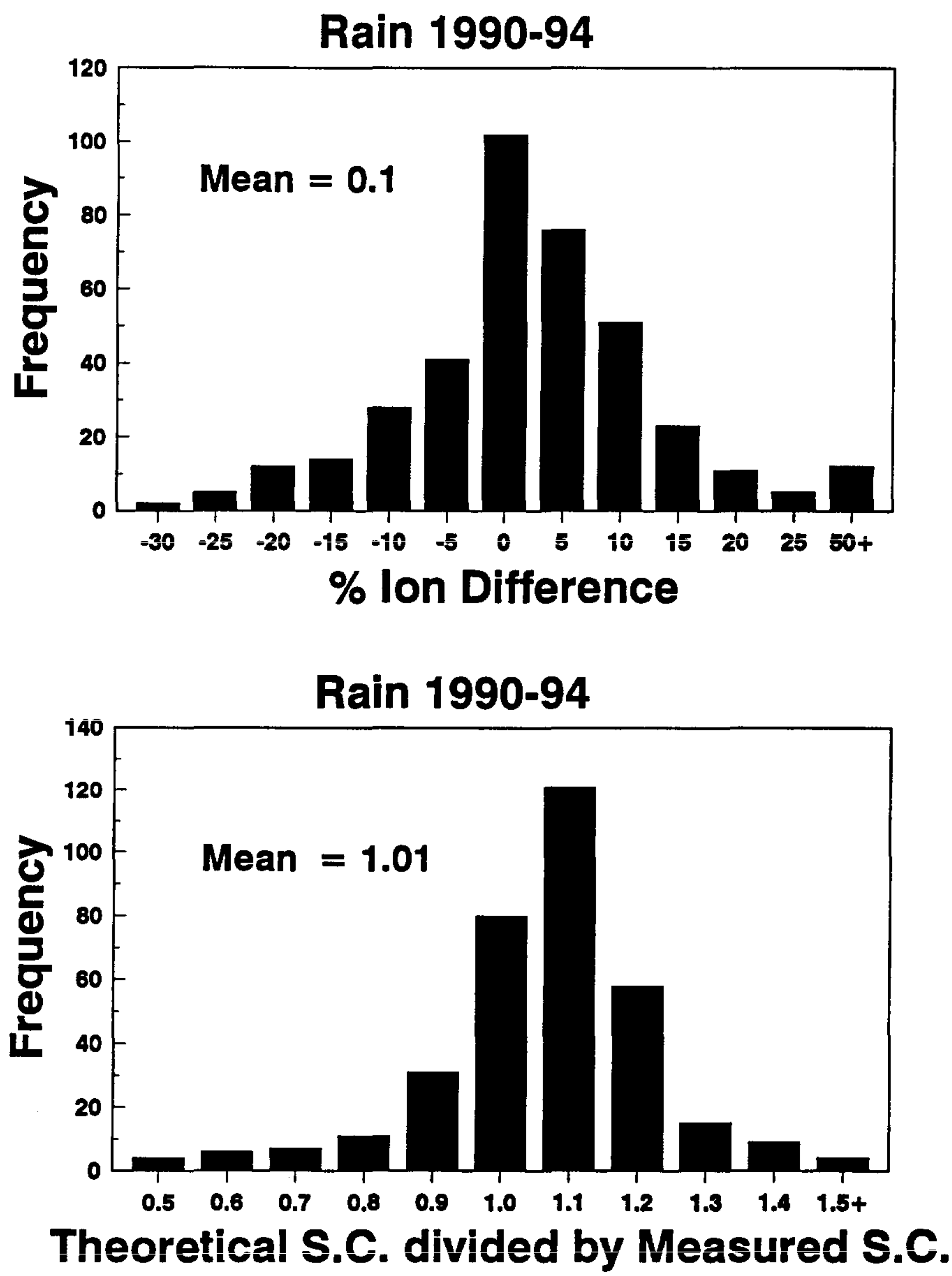


Figure 10. Charge and conductance balances for rain samples during 1990-94. S.C.=specific conductance.

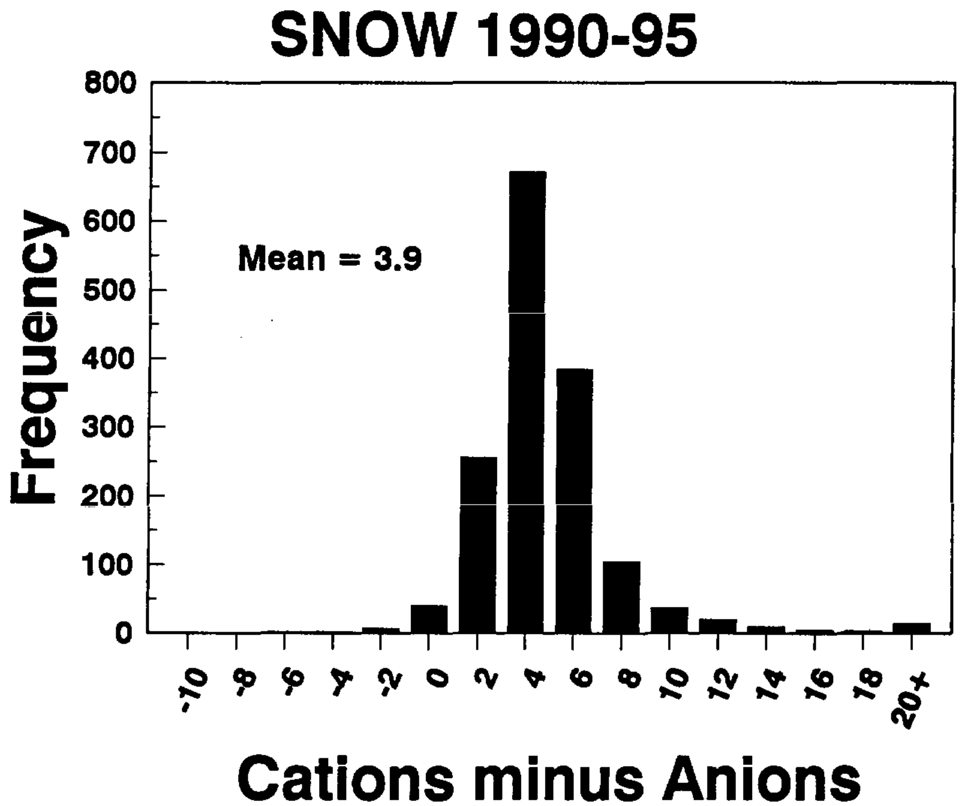


Figure 11. Frequency diagram for the difference between measured cations and anions in snow samples during 1990-95.

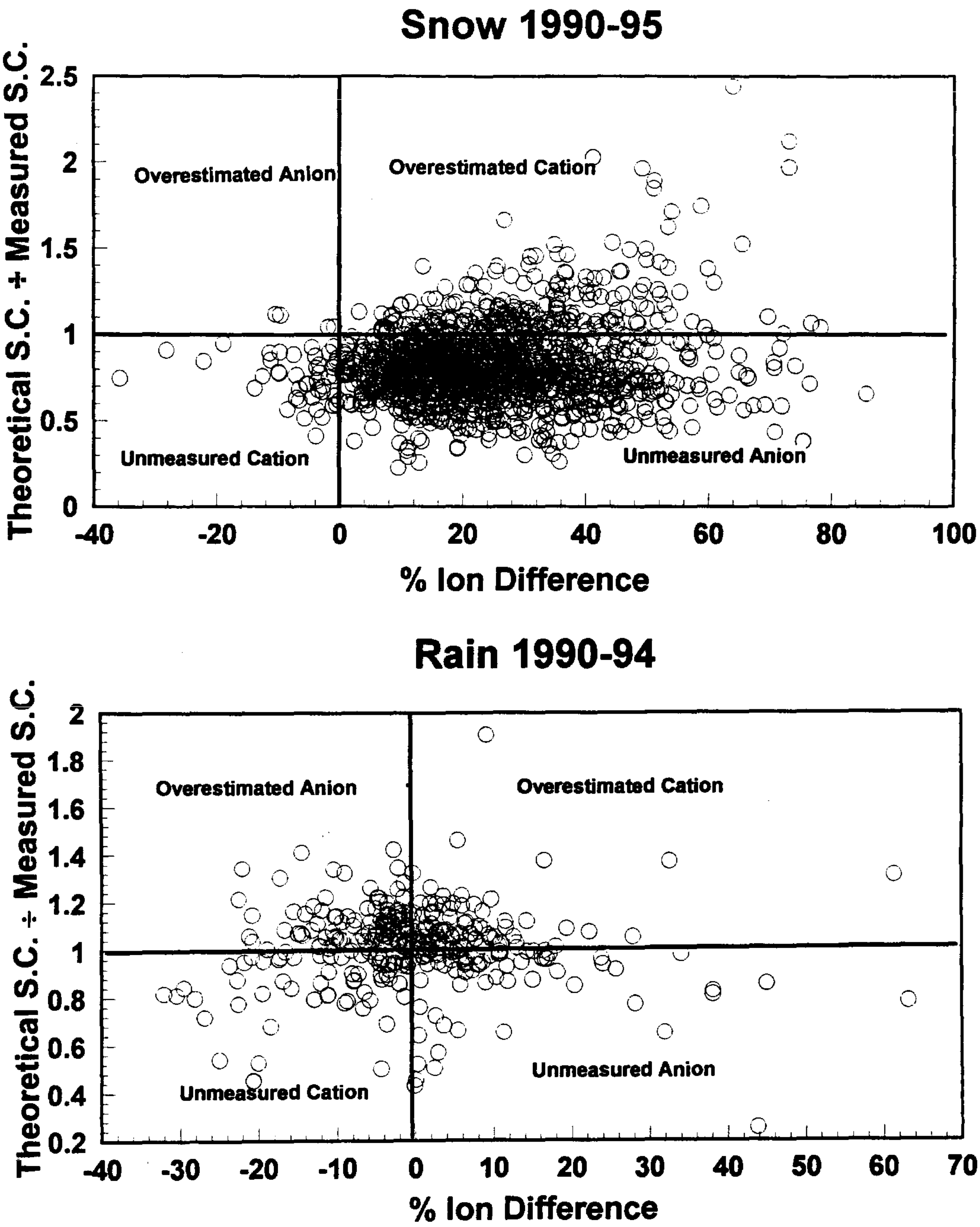


Figure 12. Relationship between charge and conductance balance in rain and snow samples.

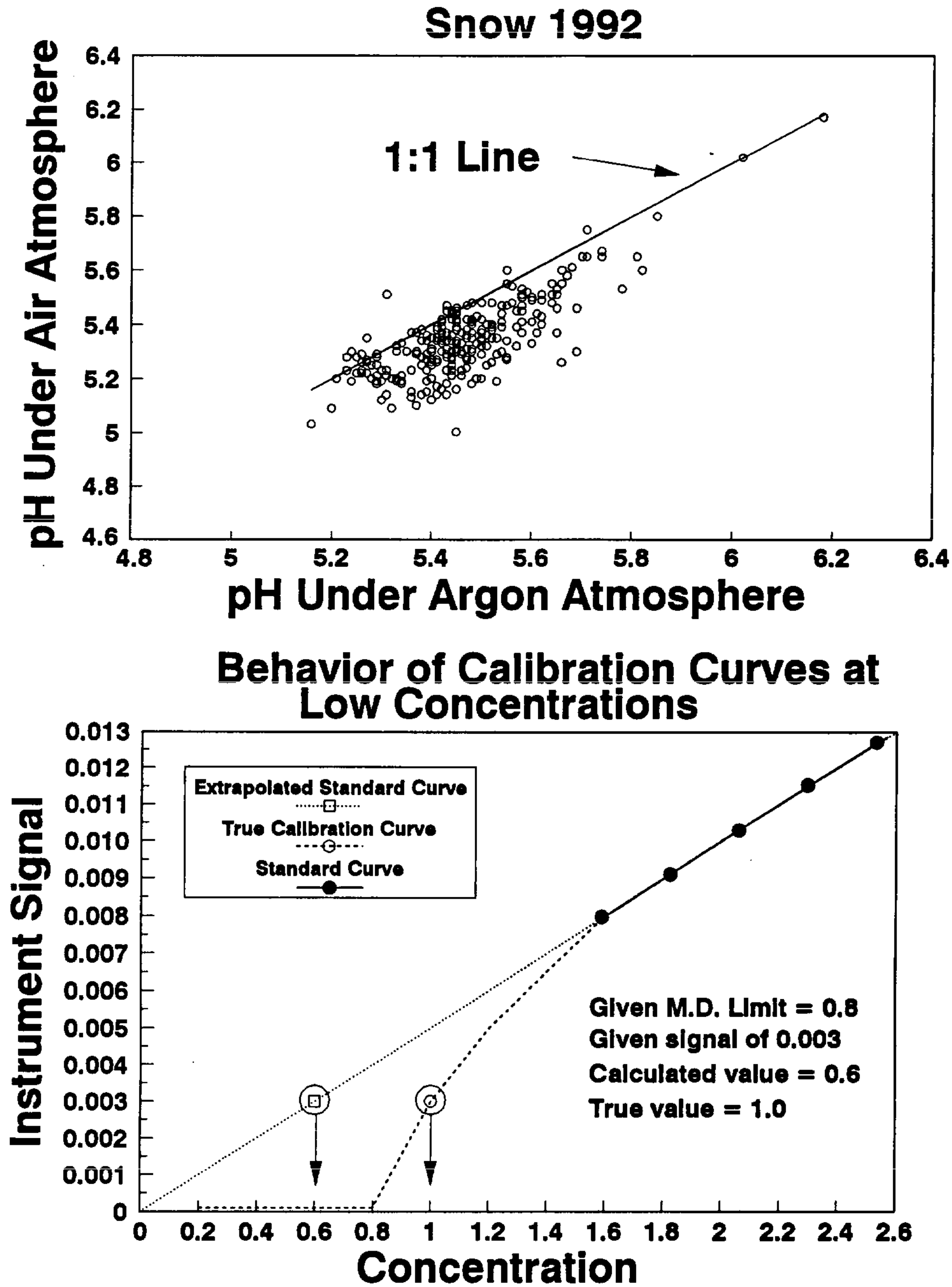
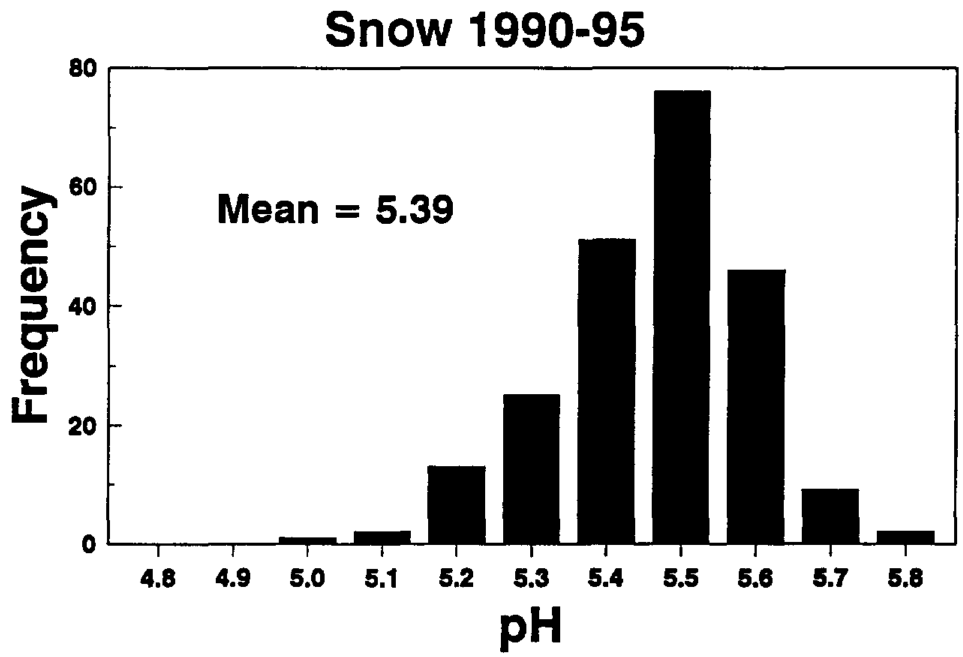


Figure 13. Comparison of pH measured under air and argon atmospheres. Second panel: behavior of calibration curves below the method detection limit.



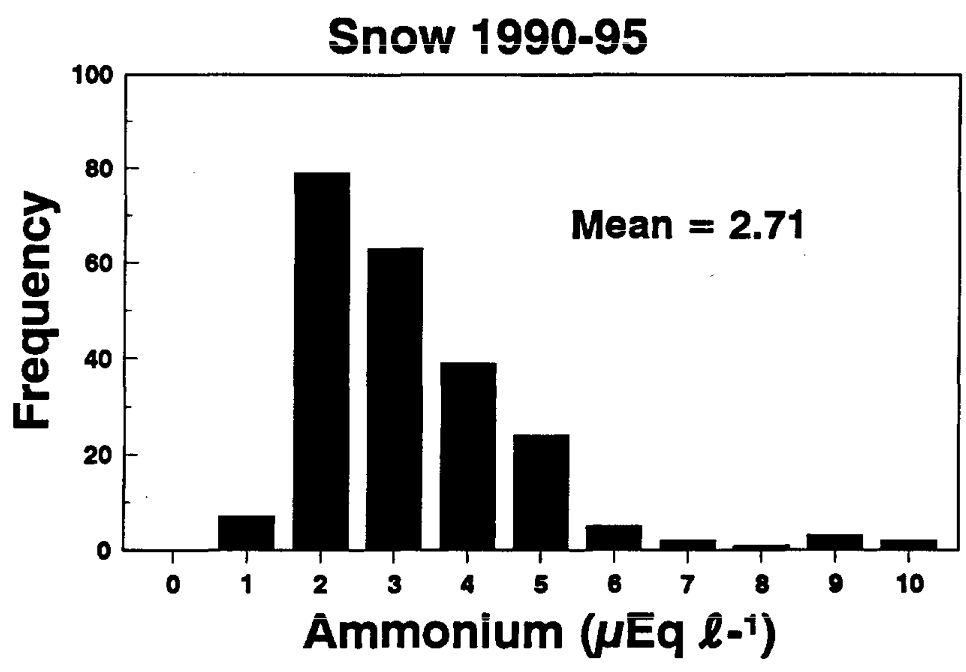


Figure 14. Frequency diagrams of pH and ammonium in snowpits, 1990-1995.

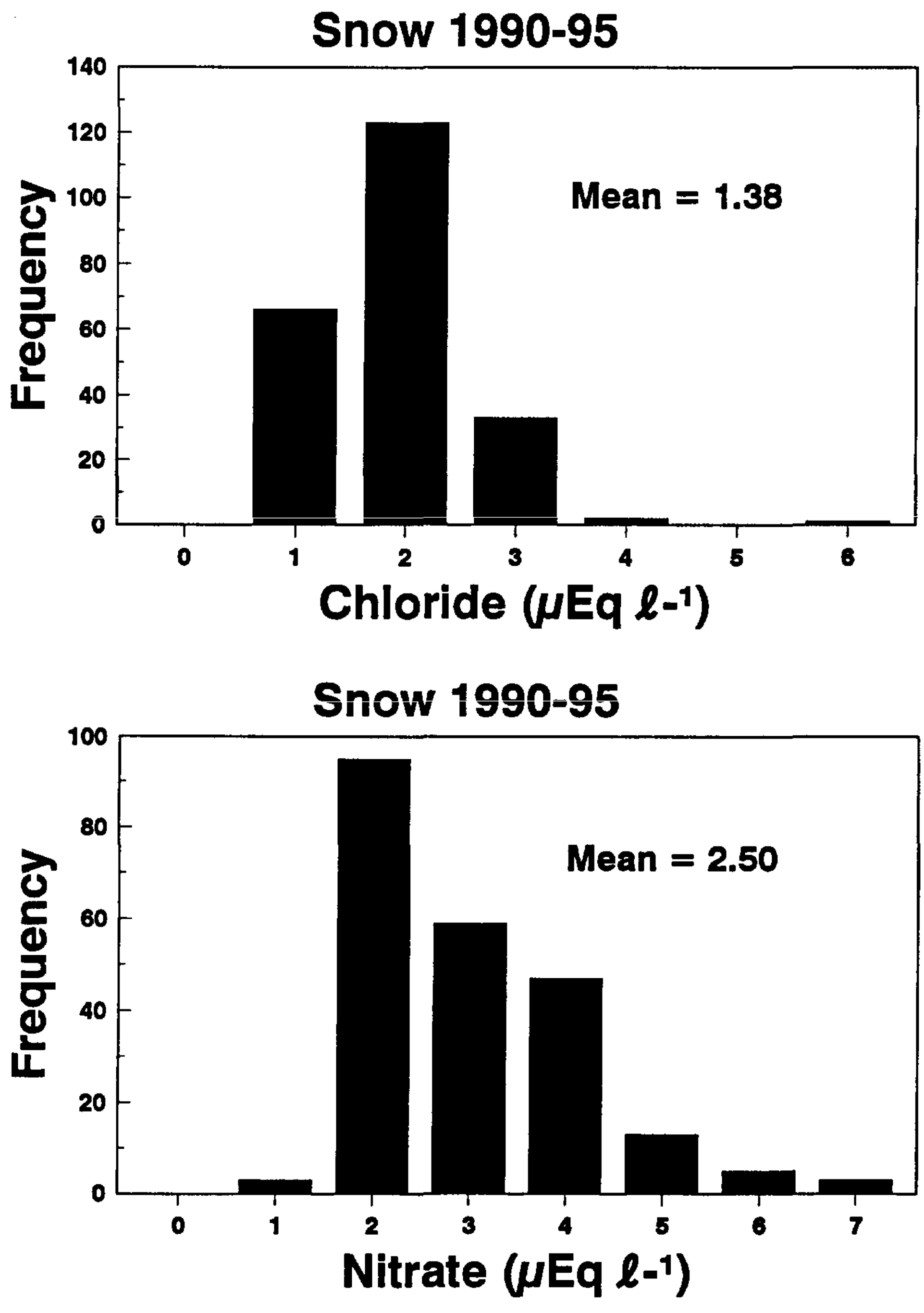
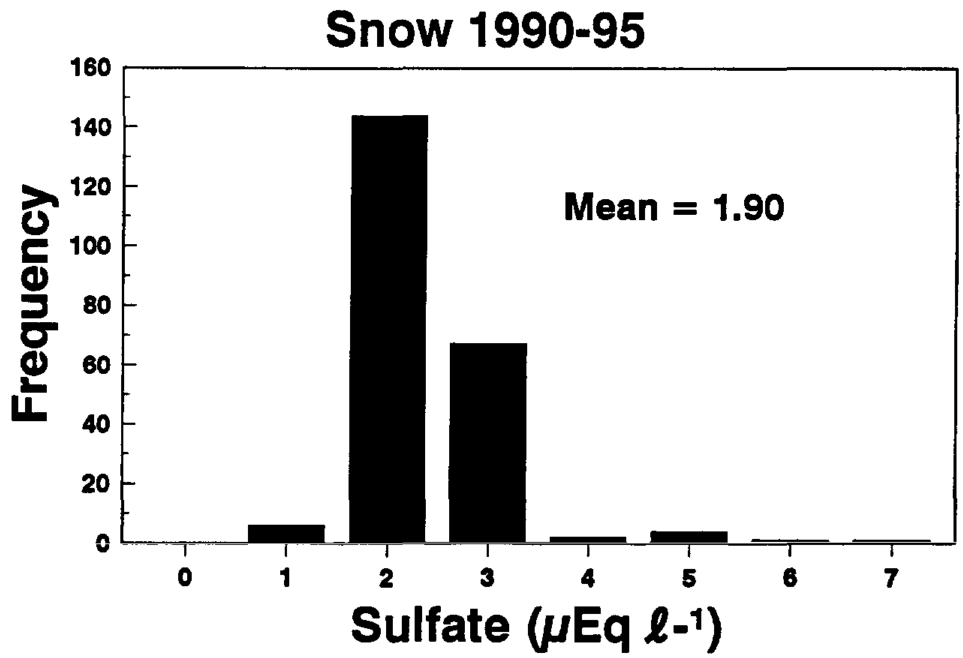


Figure 15. Frequency diagrams of chloride and nitrate in snowpits, 1990-1995.



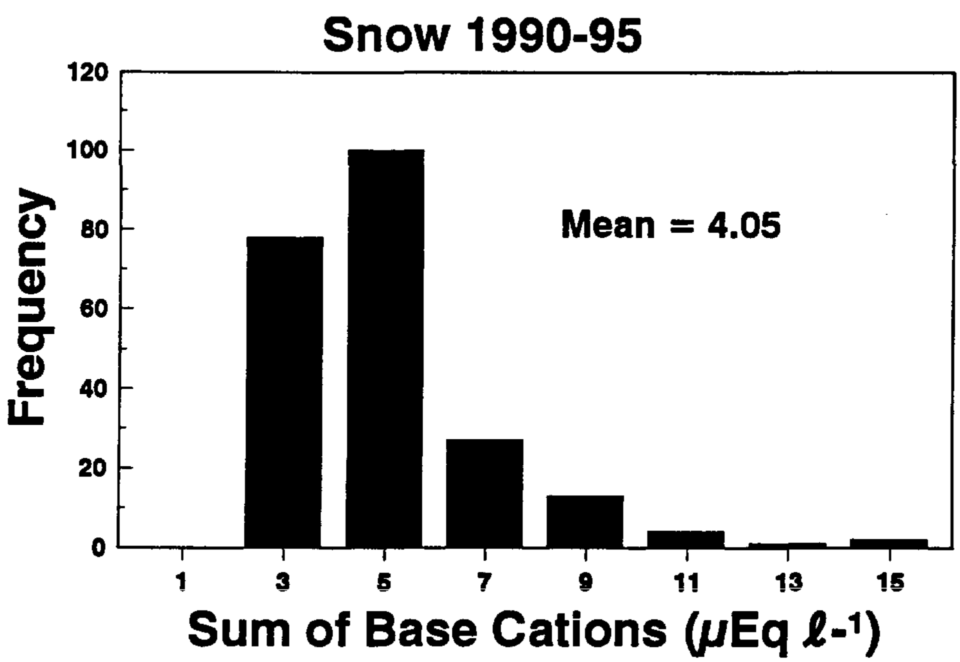


Figure 16. Frequency diagrams of sulfate and base cations (calcium, magnesium, sodium and potassium) in snowpits, 1990-1995.

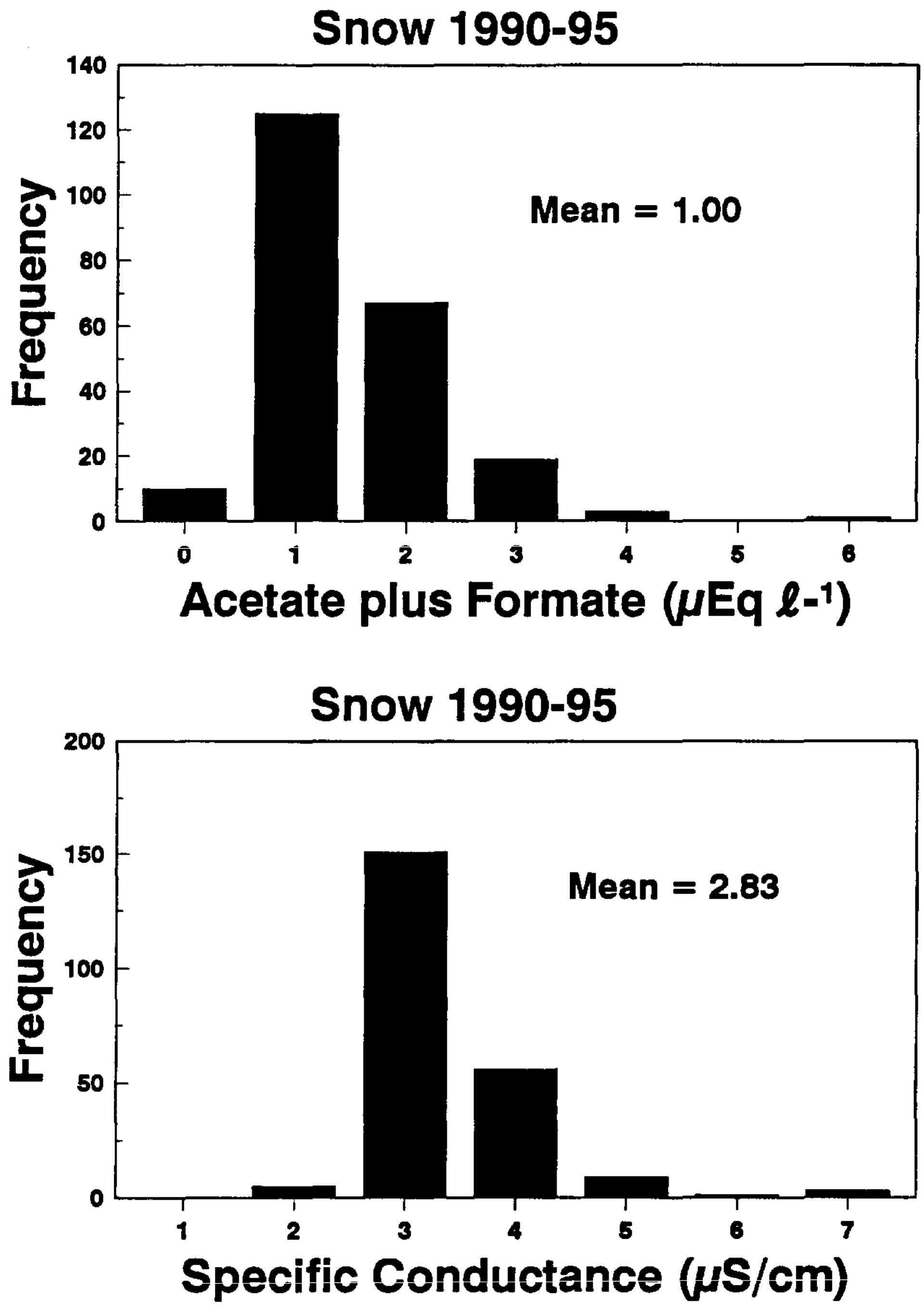


Figure 17. Frequency diagrams of acetate plus formate and specific conductance in snowpits, 1990-1995.

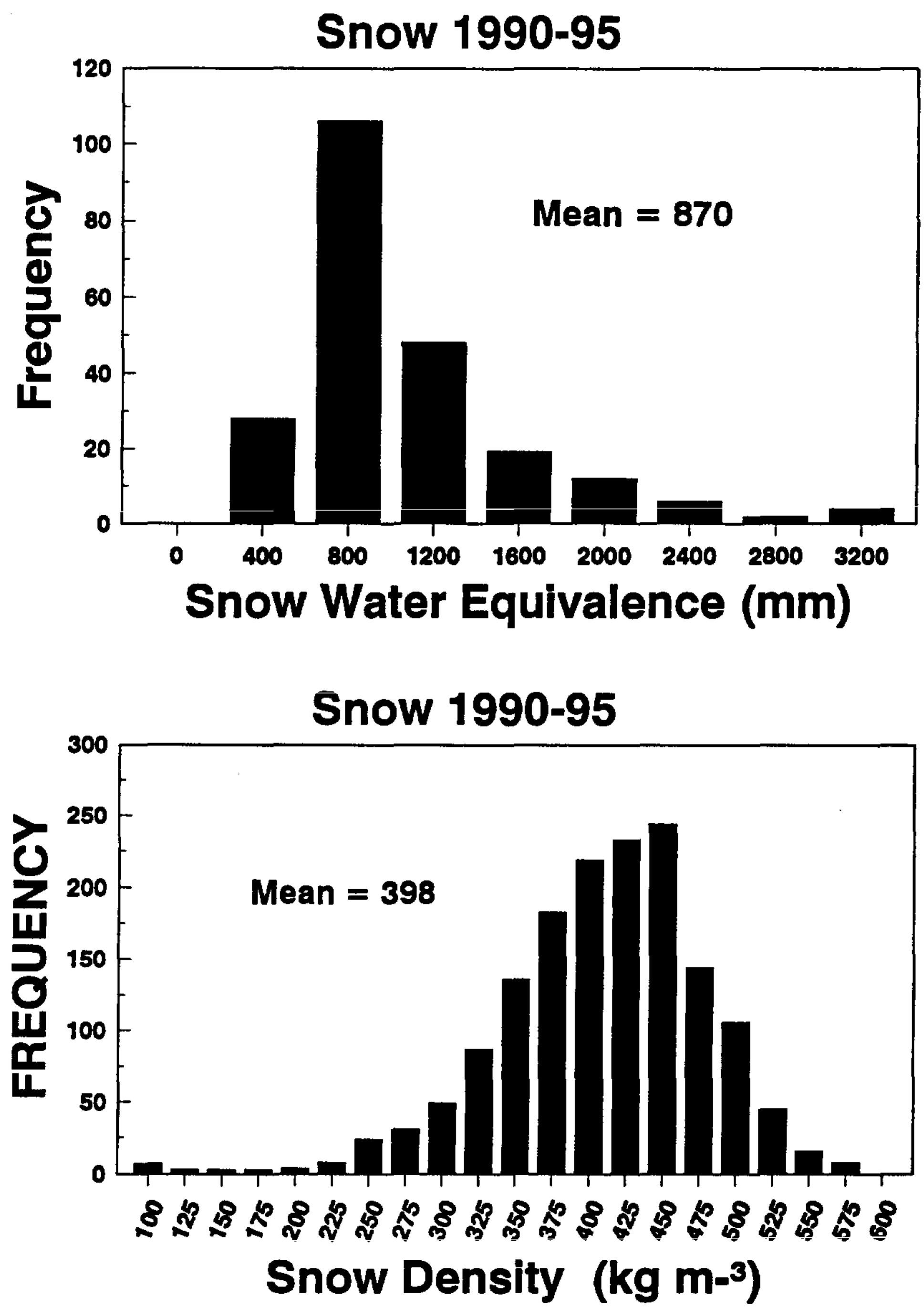


Figure 18. Frequency diagrams of snow water equivalence and snow density in snowpits, 1990-1995.

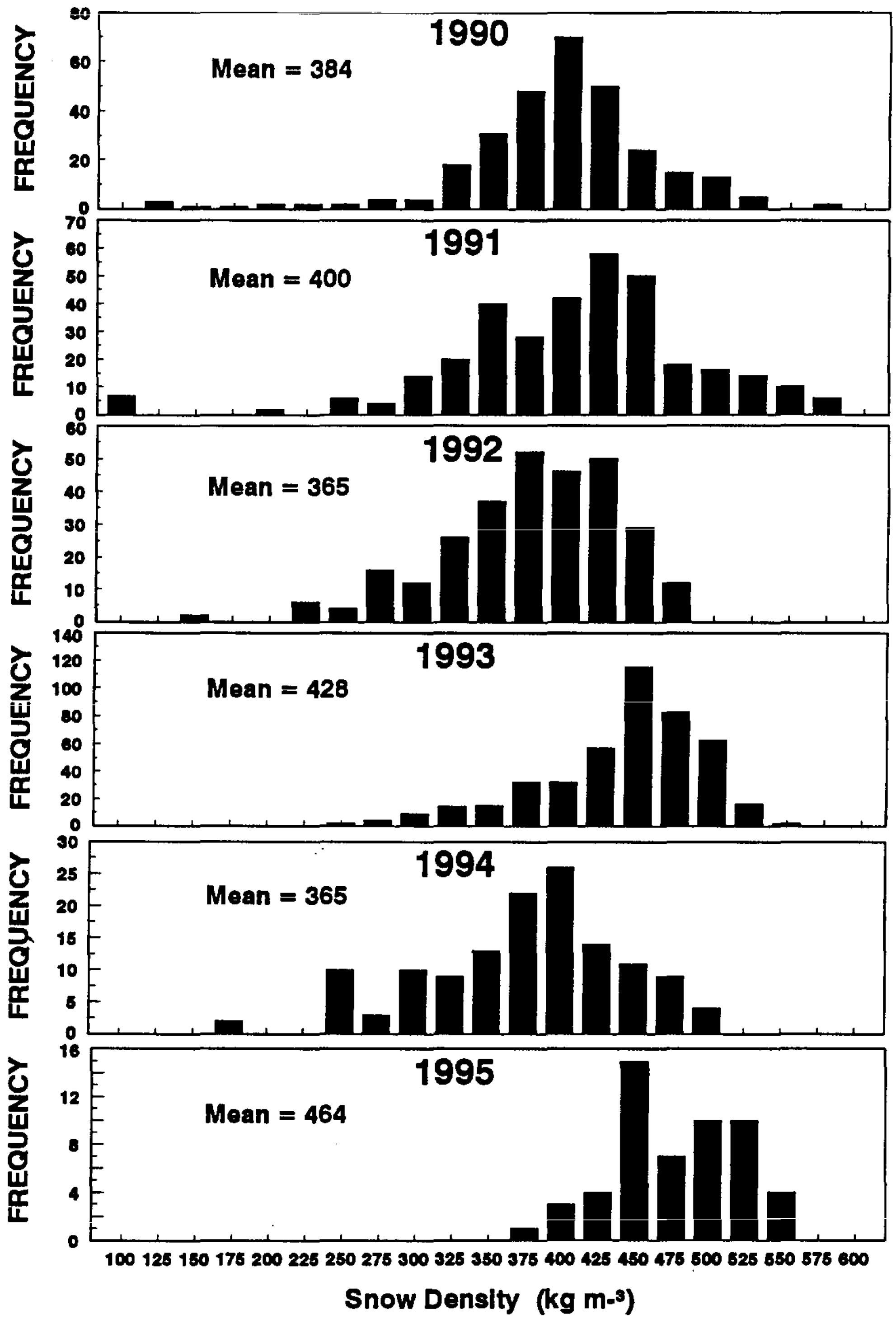


Figure 19. Frequency diagrams for snow density, 1990-95.

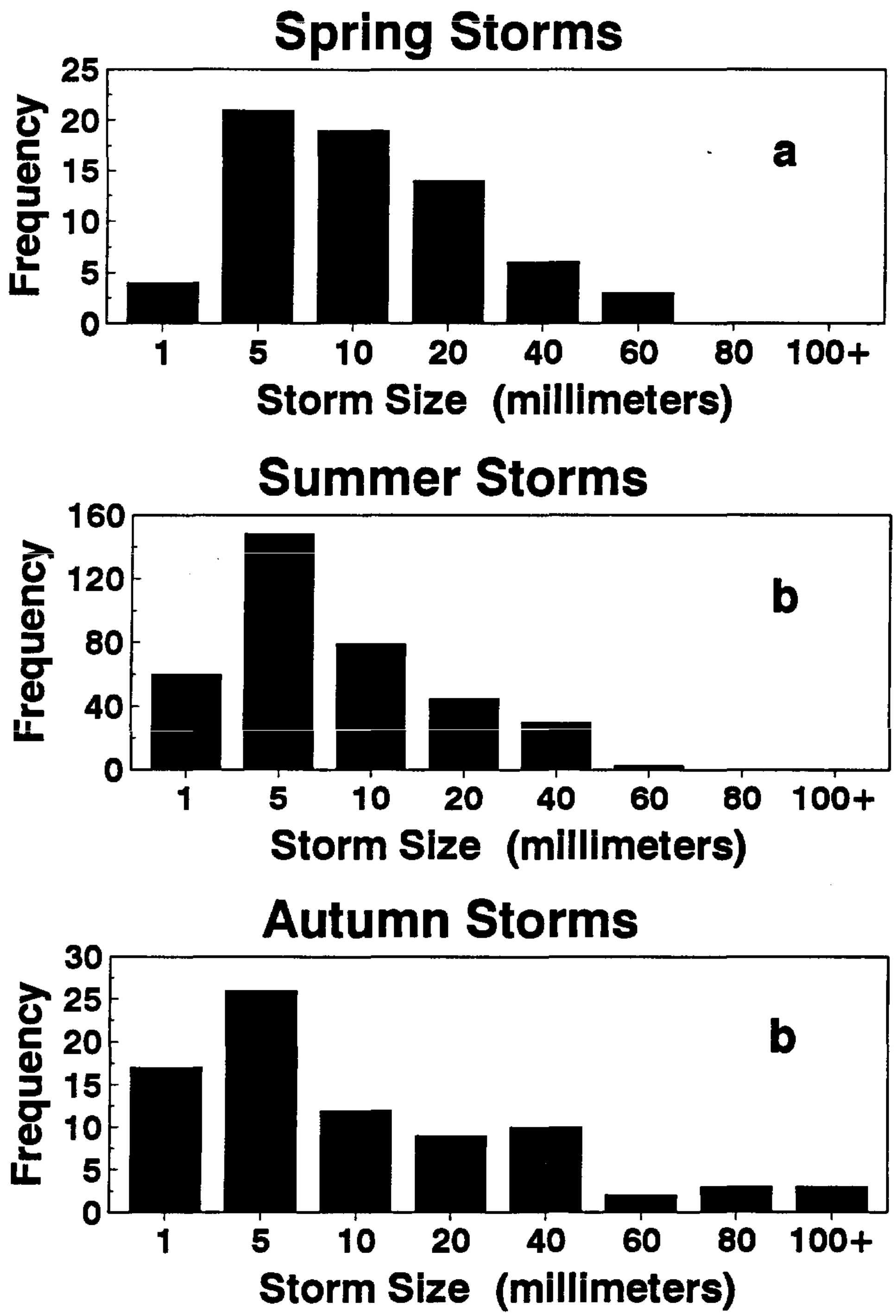


Figure 20. Histograms of storm size for non-winter precipitation, 1990-94. Letters indicate significant ($p<0.01$) difference among storm types. Storms with the same letter are not significantly different.

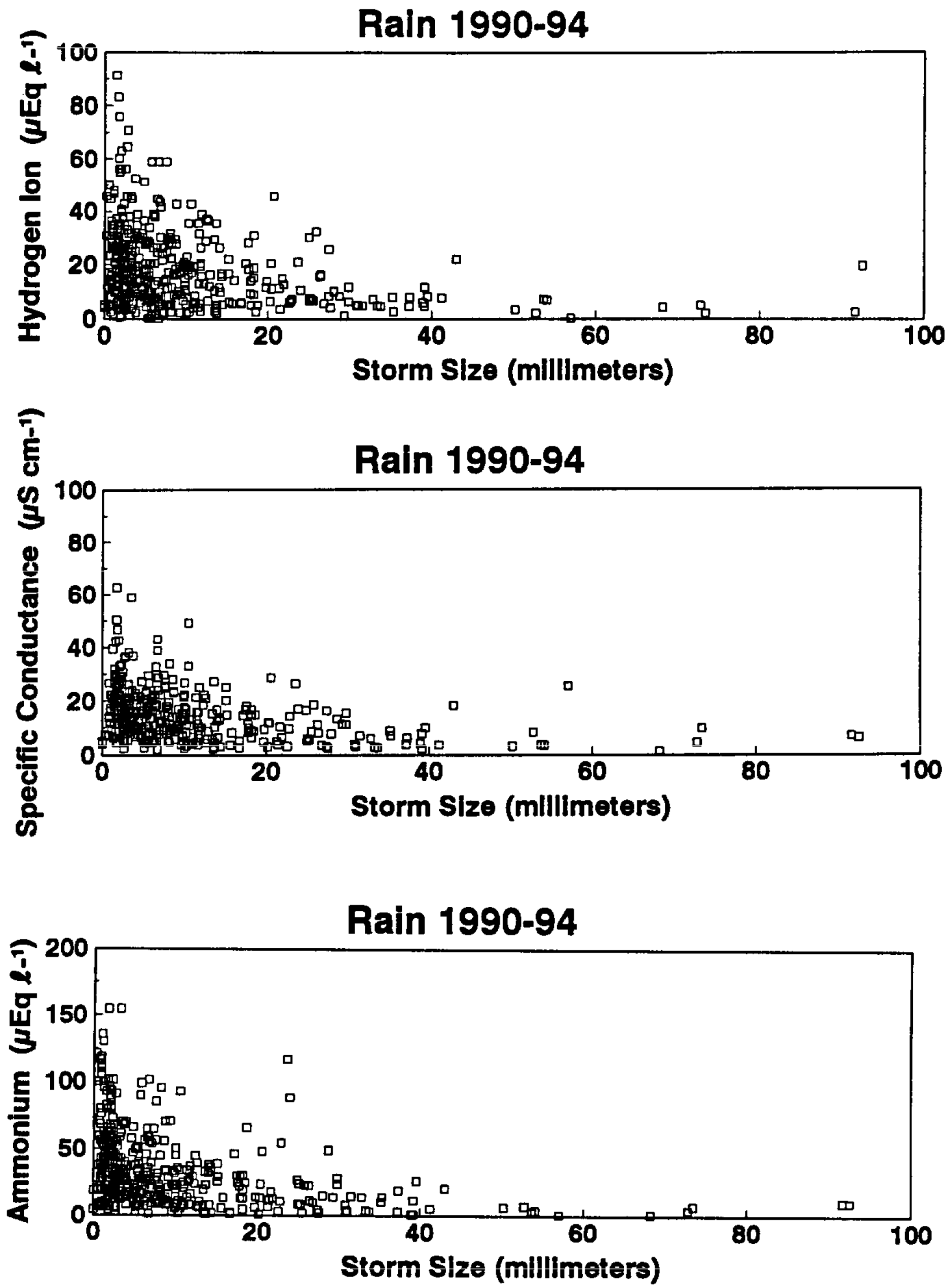


Figure 21. Scatterplots of the relationship between storm size and solute concentrations in non-winter precipitation; 1990-1994.

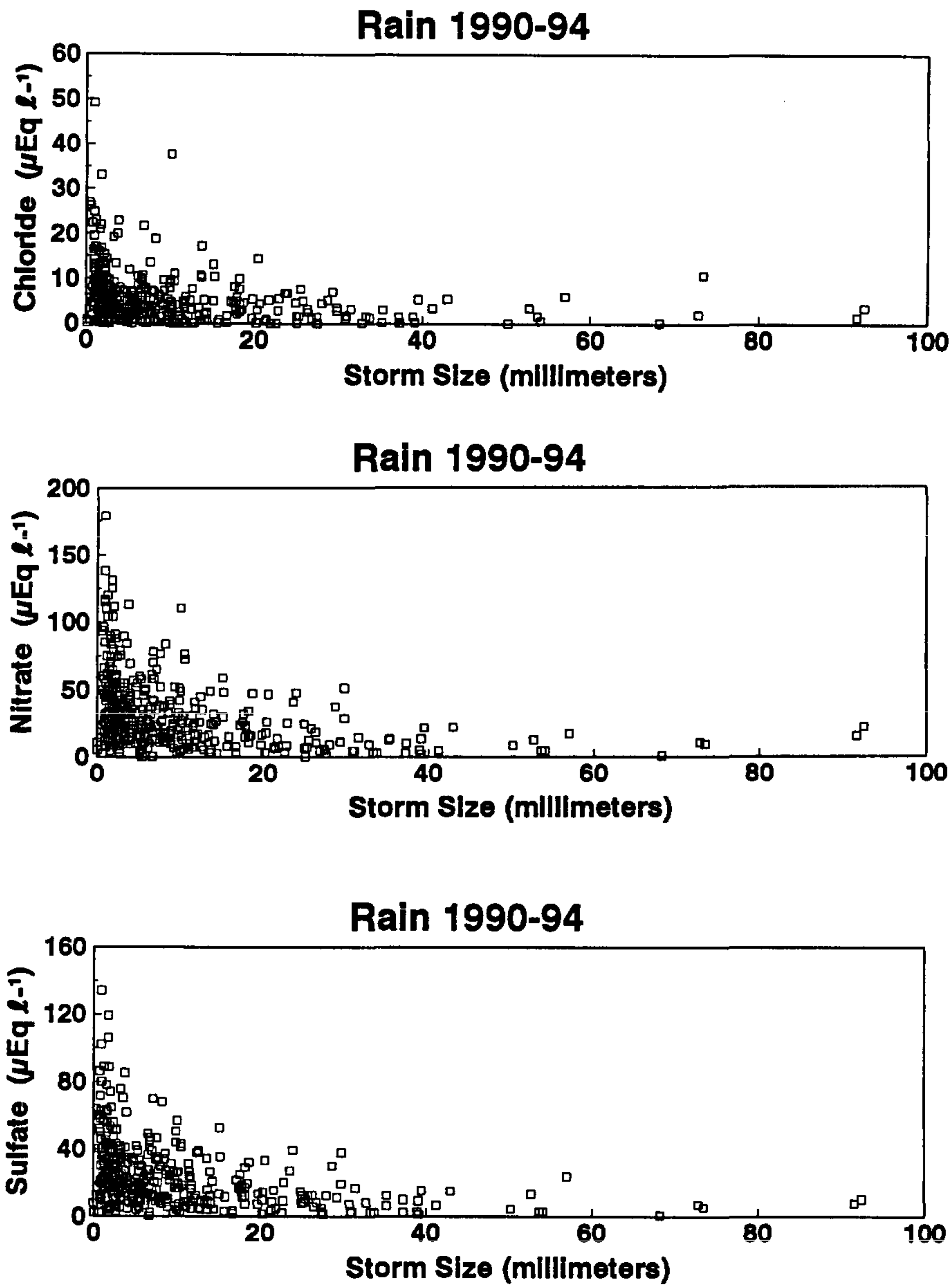


Figure 22. Scatterplots of the relationship between storm size and solute concentrations in non-winter precipitation; 1990-1994.

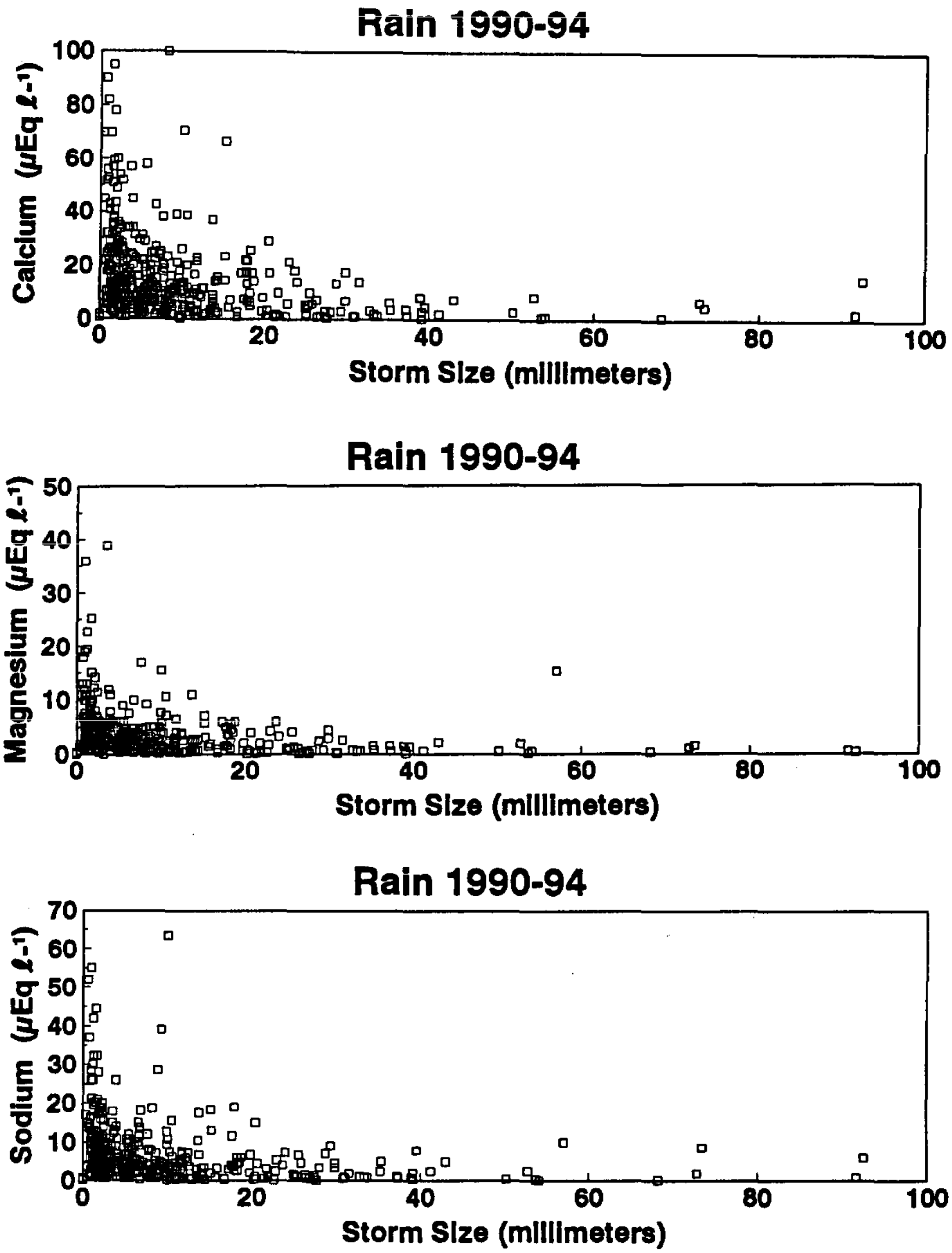


Figure 23. Scatterplots of the relationship between storm size and solute concentrations in non-winter precipitation; 1990-1994.

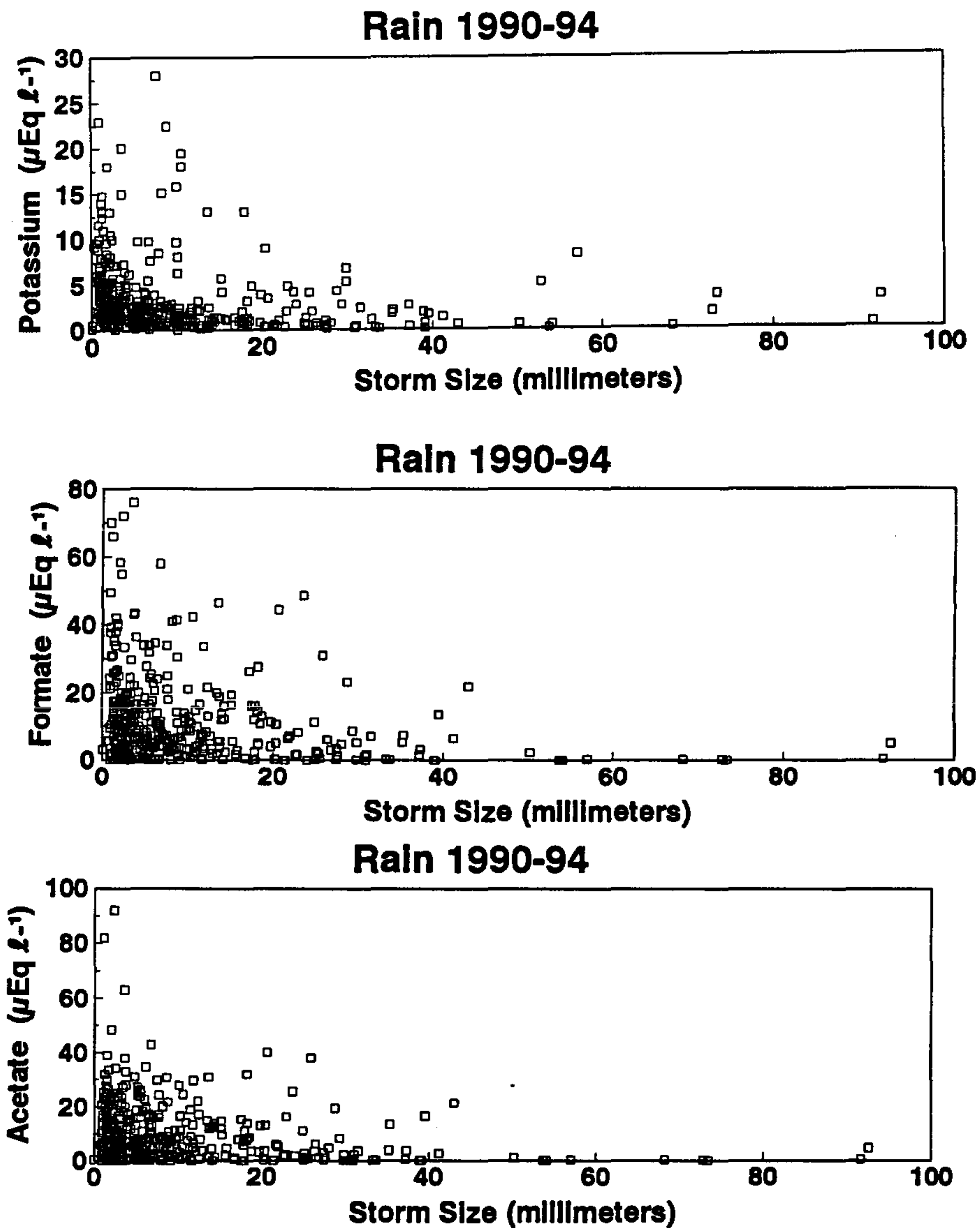


Figure 24. Scatterplots of the relationship between storm size and solute concentrations in non-winter precipitation; 1990-1994.

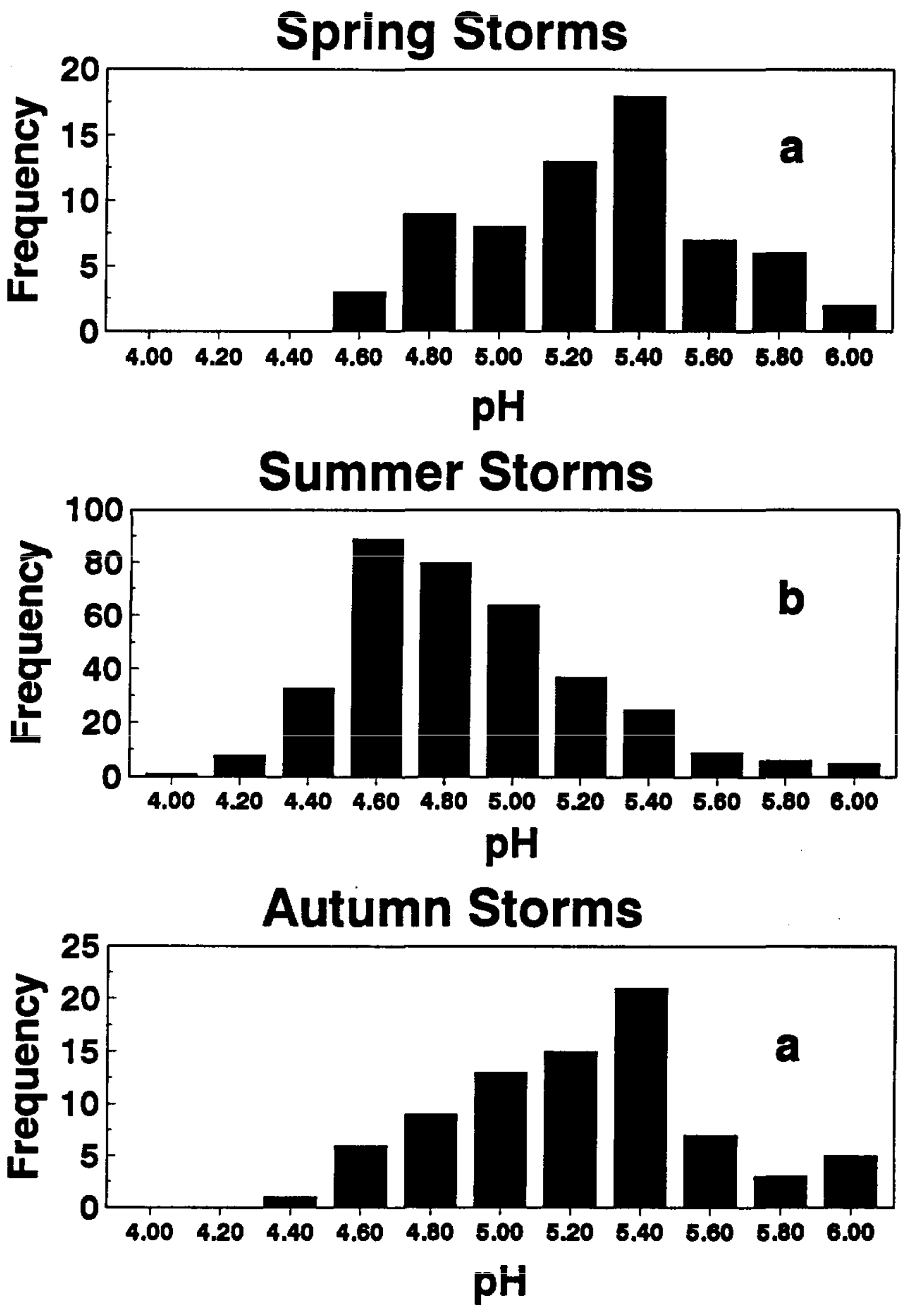


Figure 25. Histograms of pH for non-winter precipitation, 1990-94. Letters indicate significant ($p<0.01$) difference among storm types. Storms with the same letter are not significantly different.

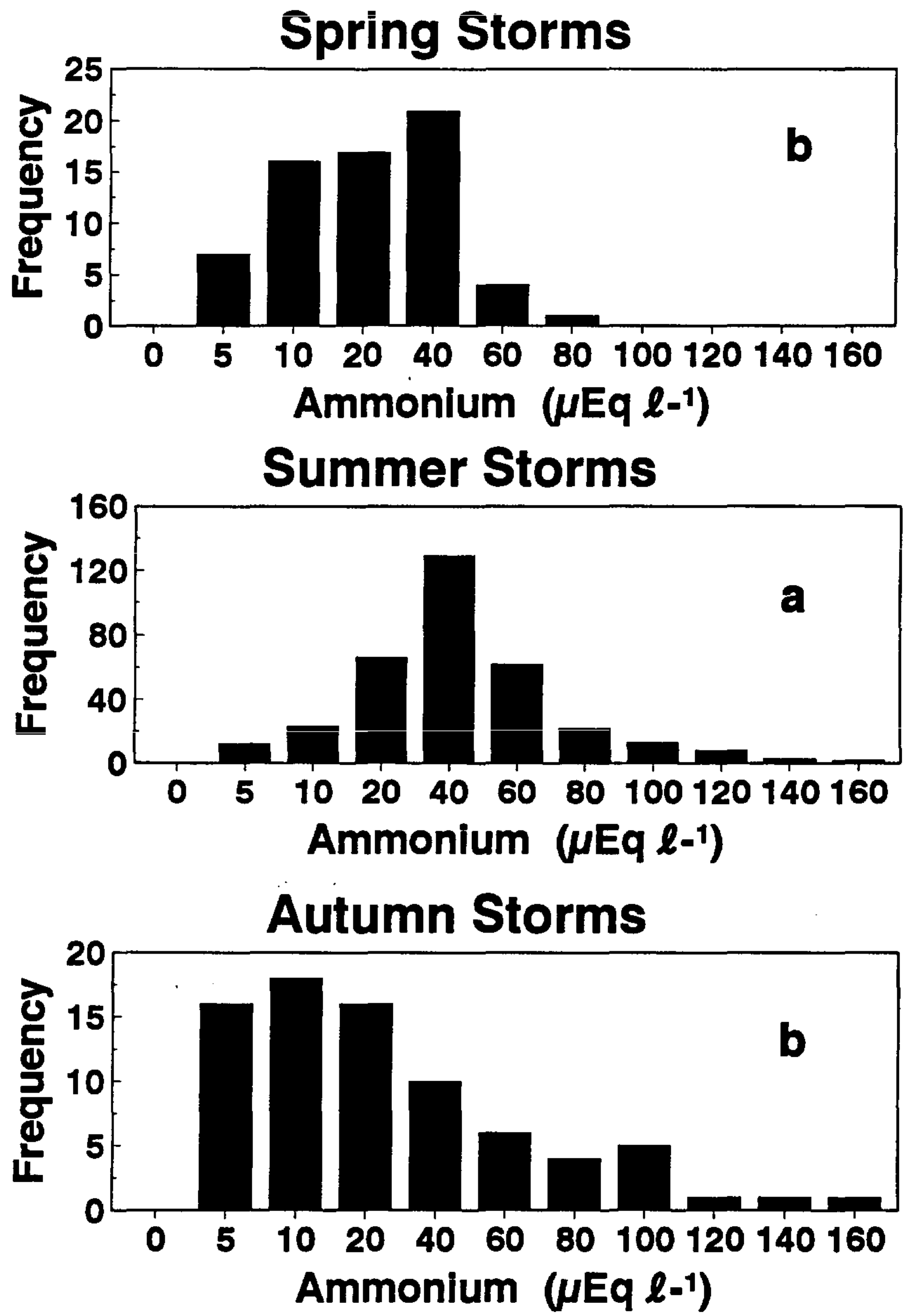


Figure 26. Histograms of ammonium for non-winter precipitation, 1990-94. Letters indicate significant ($p<0.01$) difference among storm types. Storms with the same letter are not significantly different.

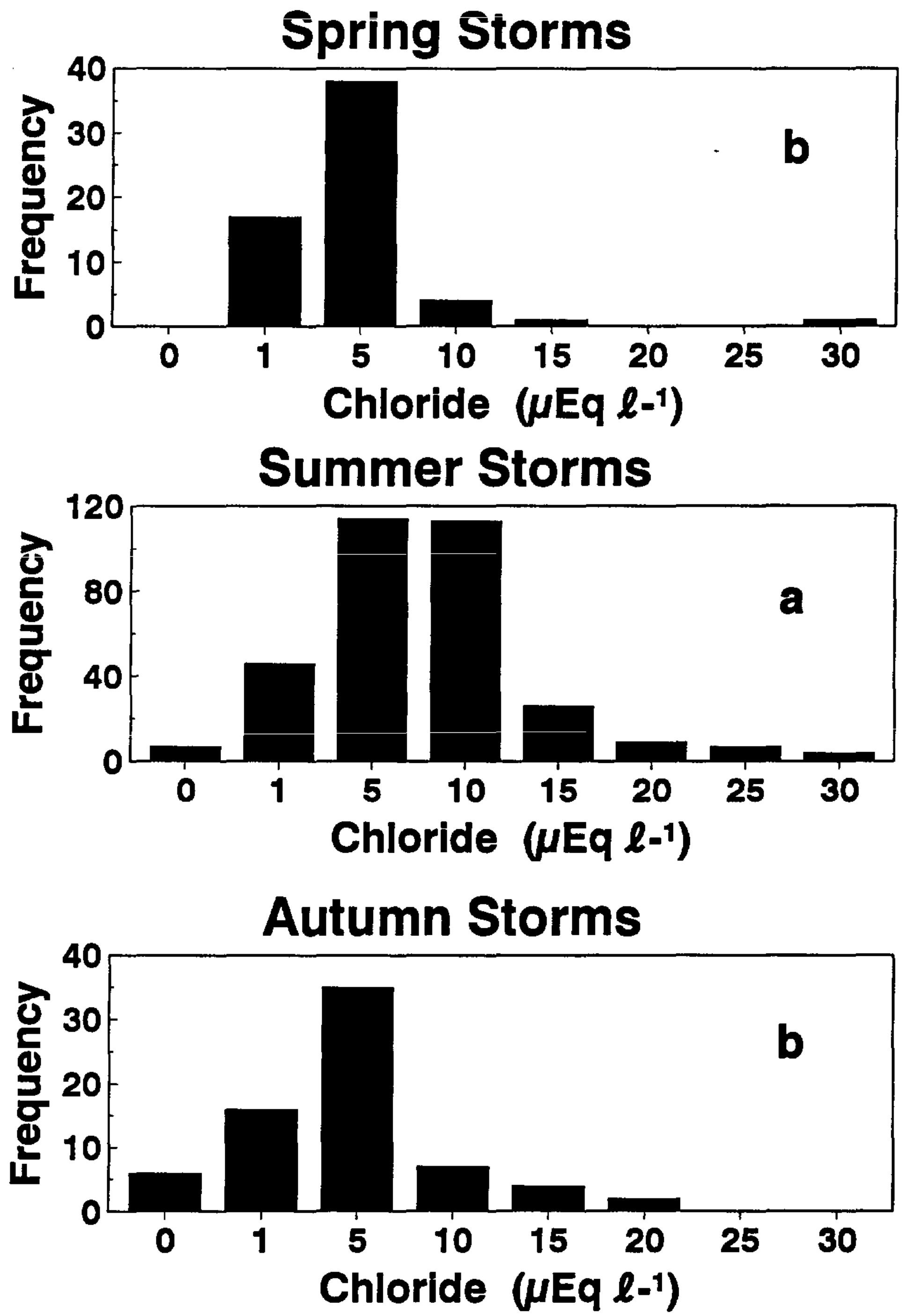


Figure 27. Histograms of chloride for non-winter precipitation, 1990-94. Letters indicate significant ($p<0.01$) difference among storm types. Storms with the same letter are not significantly different.

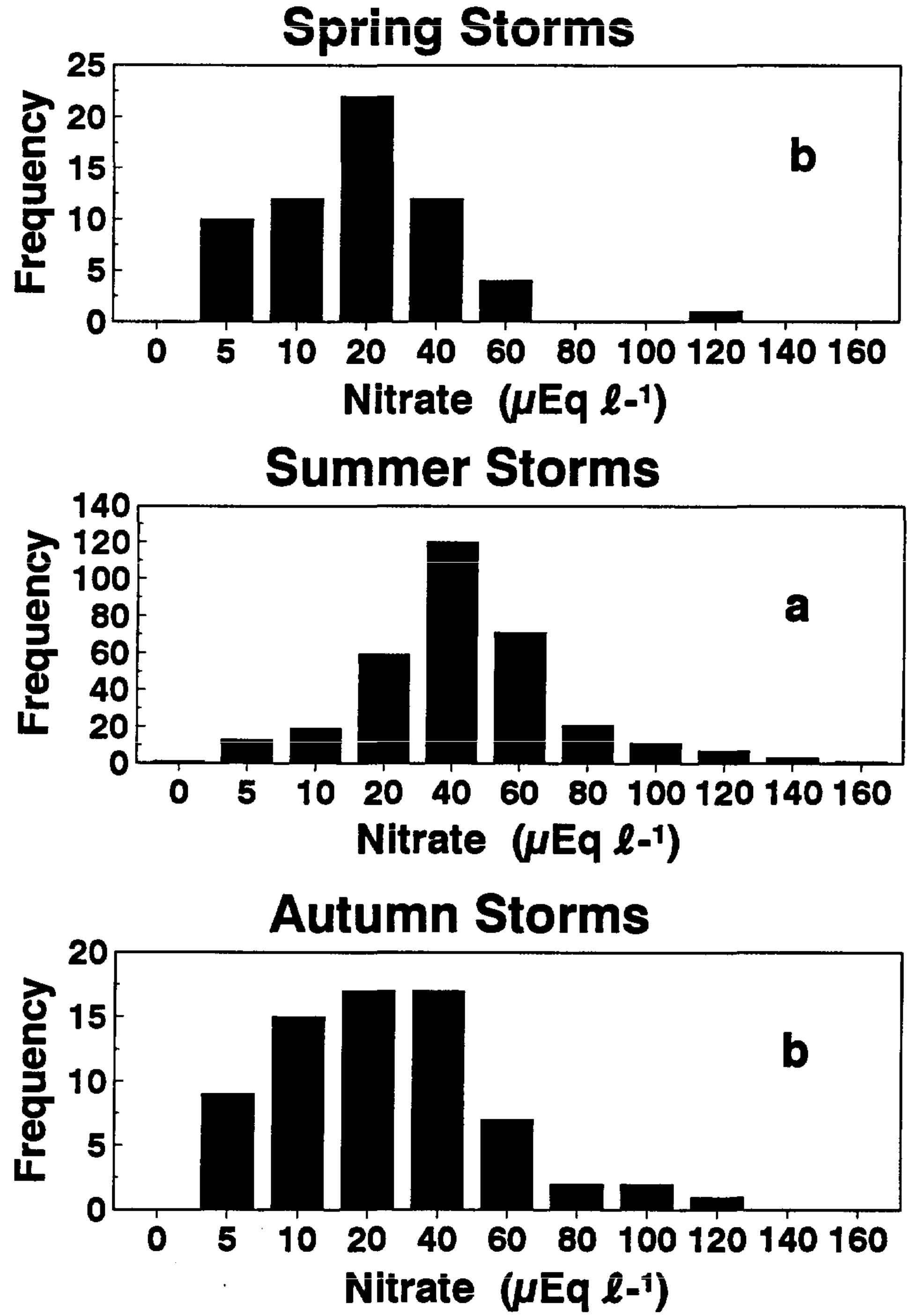


Figure 28. Histograms of nitrate for non-winter precipitation, 1990-94. Letters indicate significant ($p<0.01$) difference among storm types. Storms with the same letter are not significantly different.

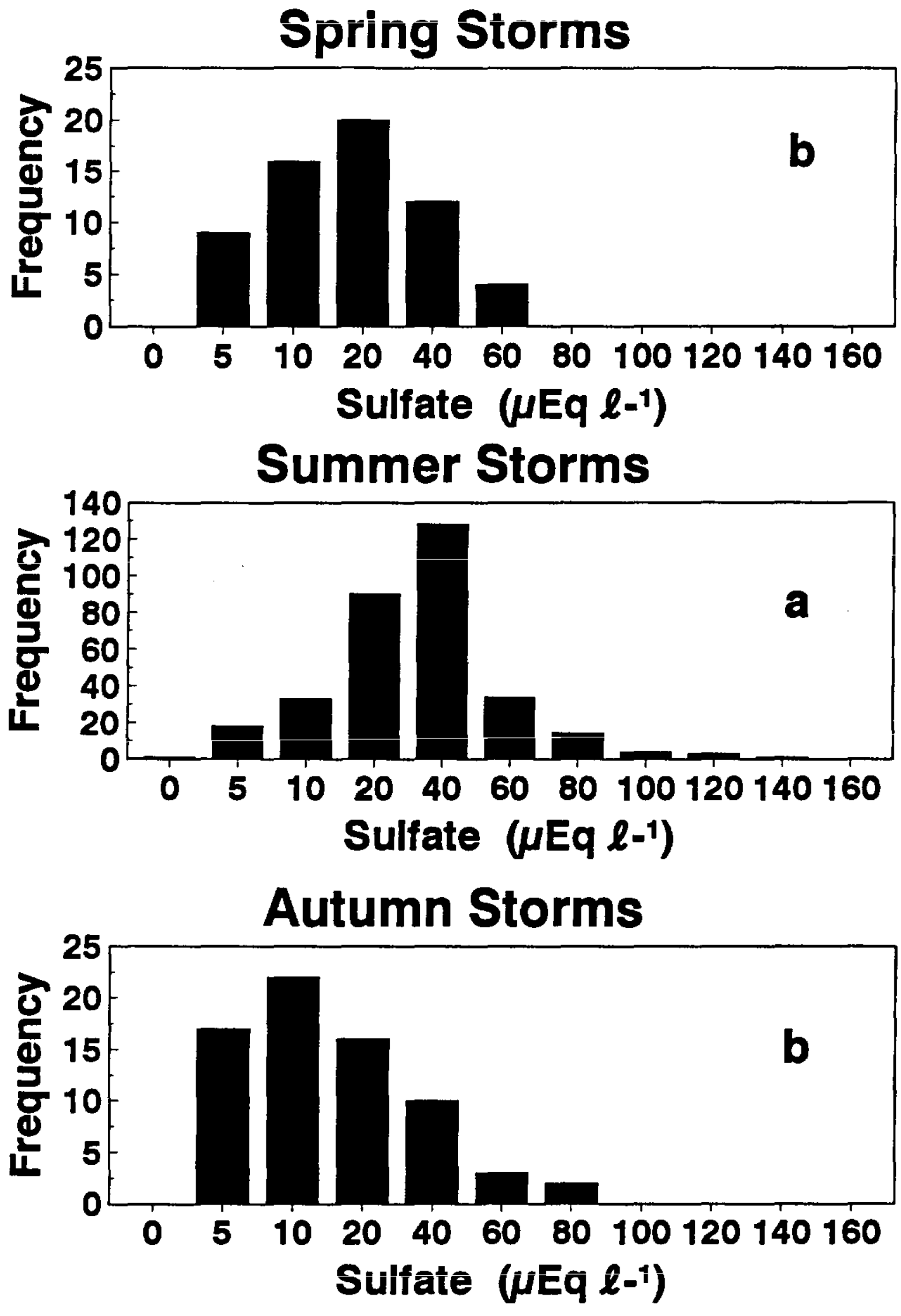


Figure 29. Histograms of sulfate for non-winter precipitation, 1990-94. Letters indicate significant ($p<0.01$) difference among storm types. Storms with the same letter are not significantly different.

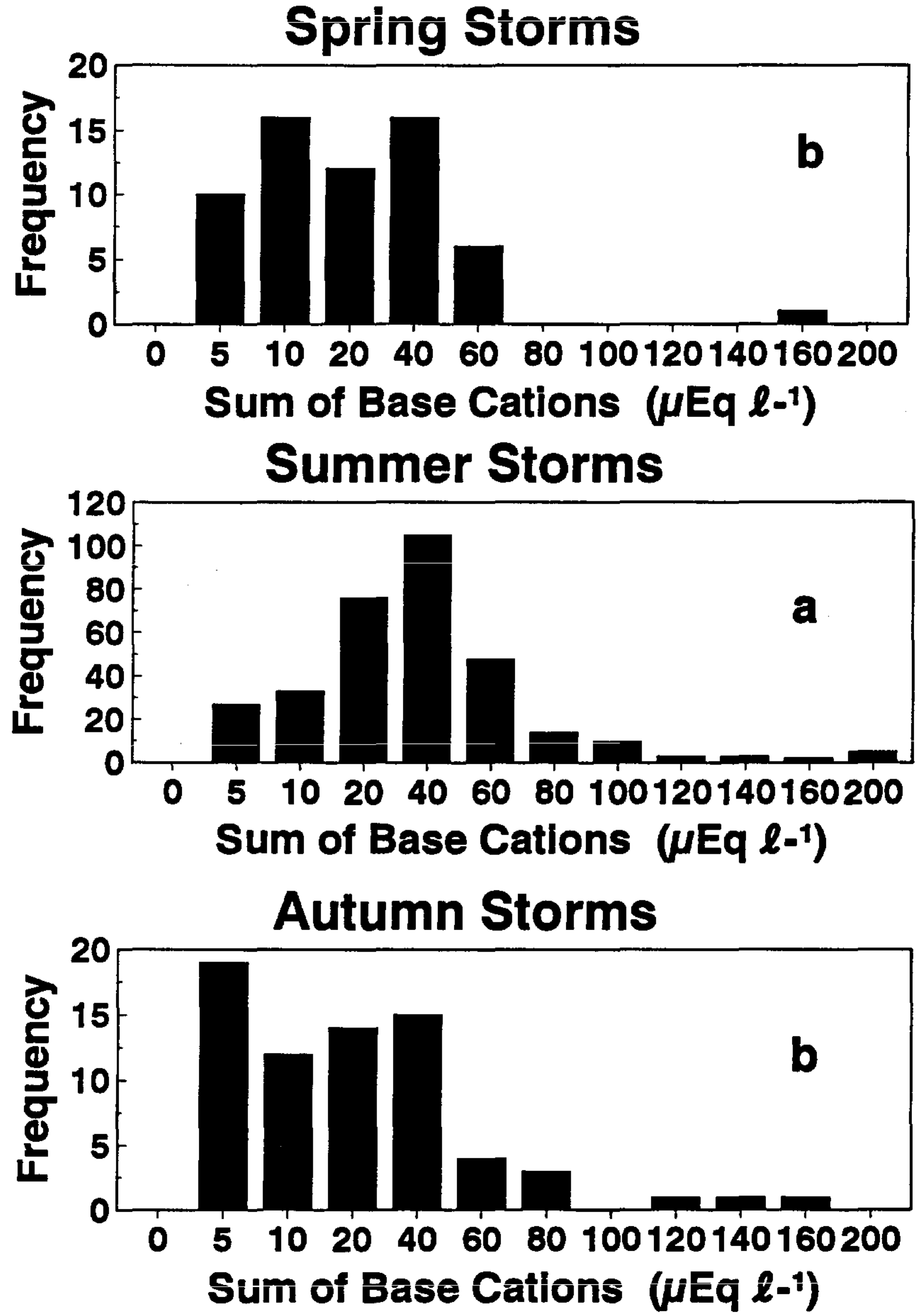


Figure 30. Histograms of the sum of base cations (calcium, magnesium, sodium, potassium) for non-winter precipitation, 1990-94. Letters indicate significant ($p<0.01$) differences among storm types.
Storms with the same letter are not significantly different.

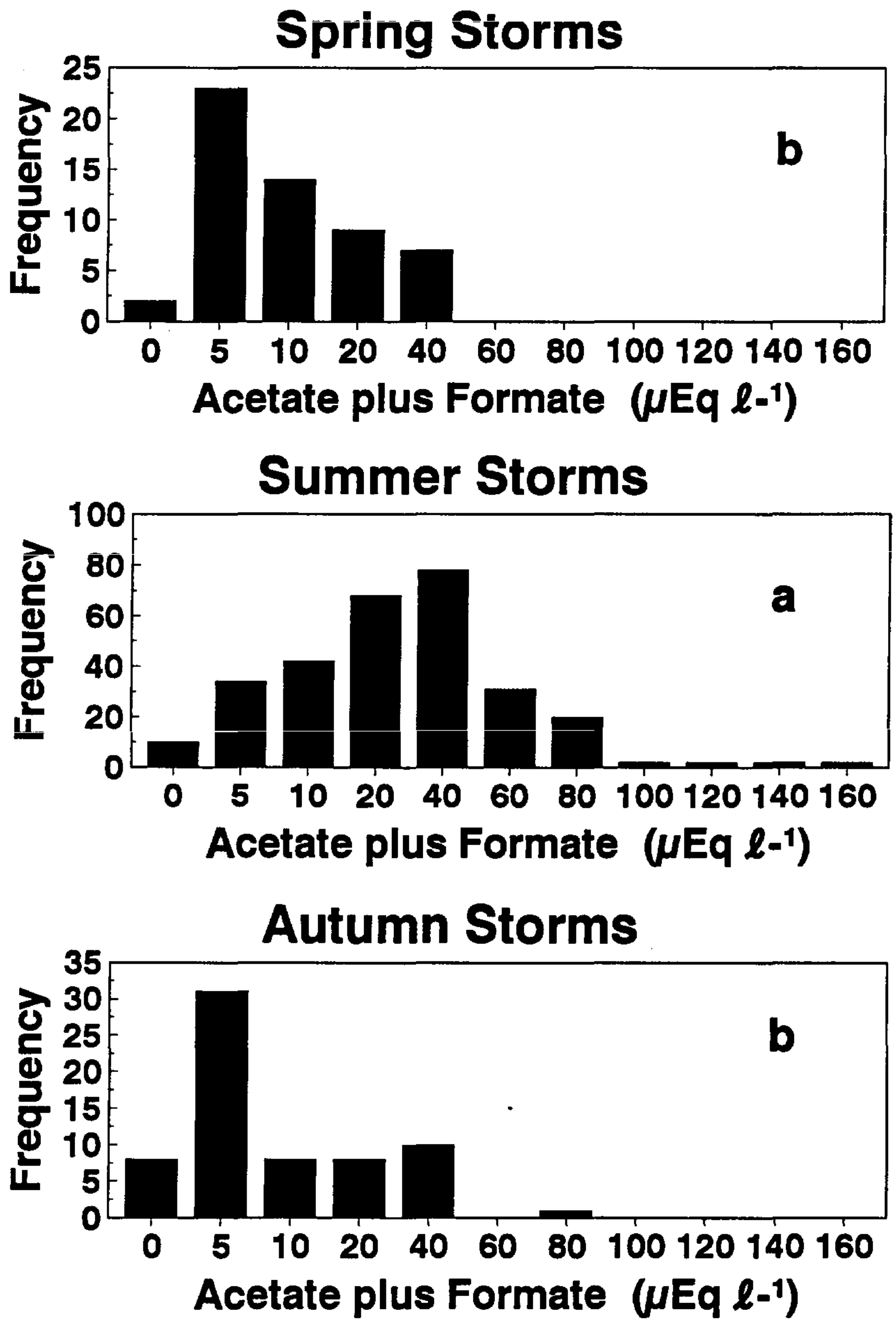


Figure 31. Histograms of the sum acetate and formate for non-winter precipitation, 1990-94. Letters indicate significant ($p<0.01$) differences among storm types. Storms with the same letter are not significantly different.

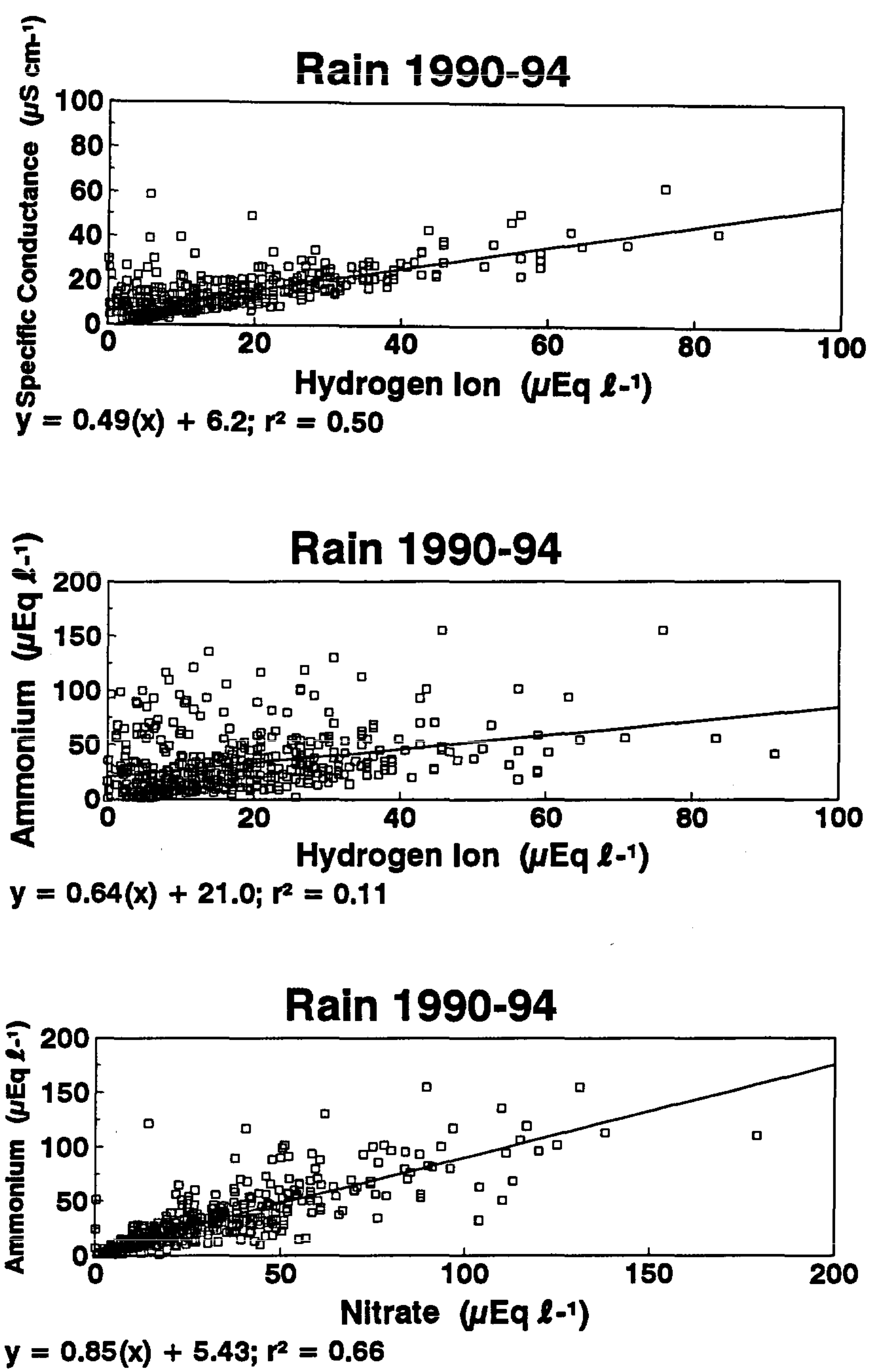
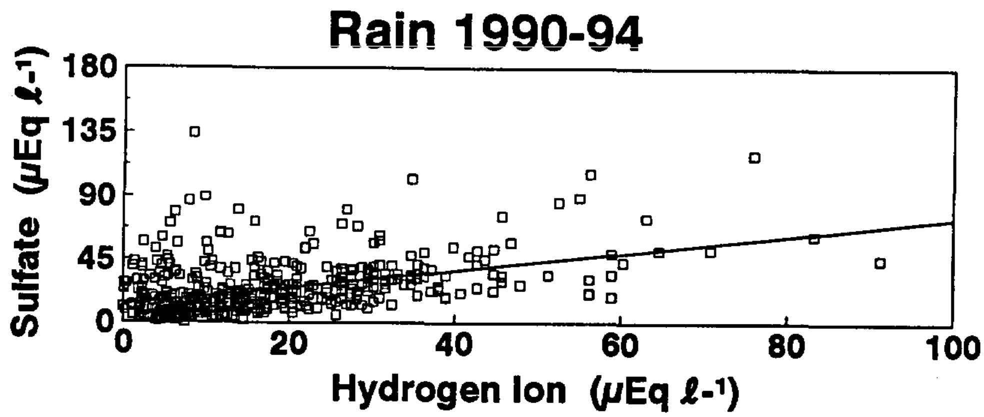
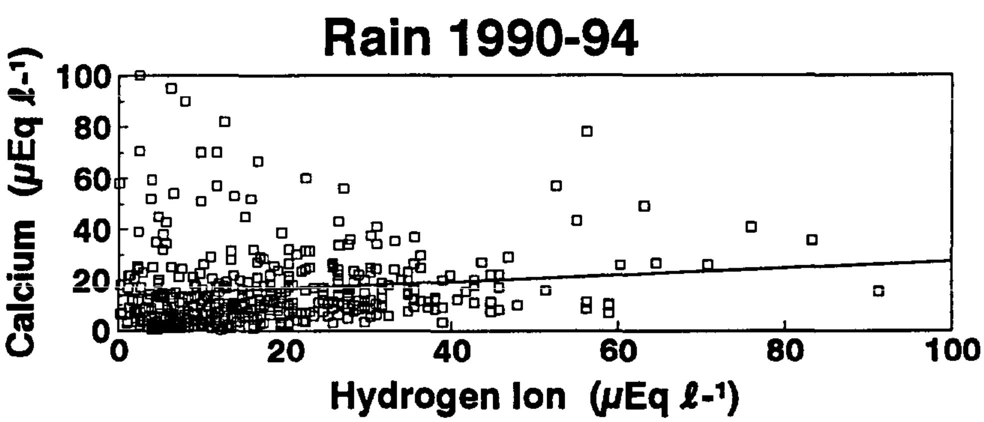


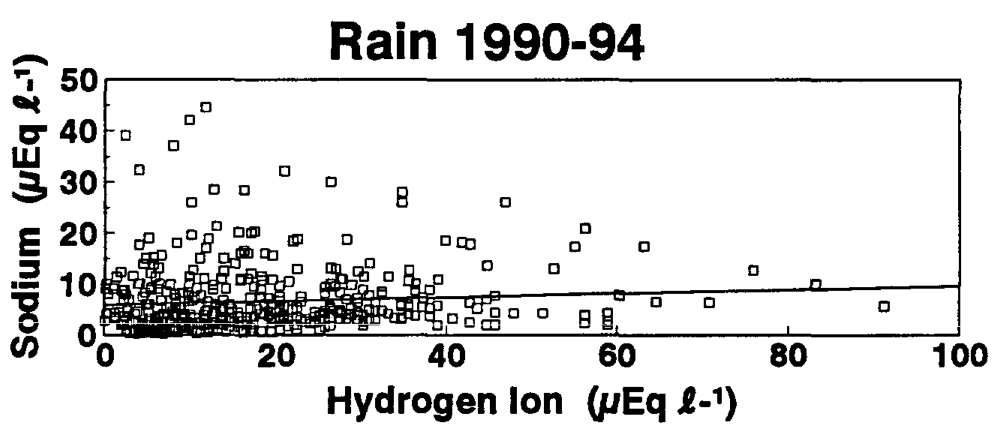
Figure 32. Scatterplots of the relationship among solute concentrations in non-winter precipitation. The best-fit linear regression is also shown.



$y = 0.61(x) + 12.6; r^2 = 0.21$

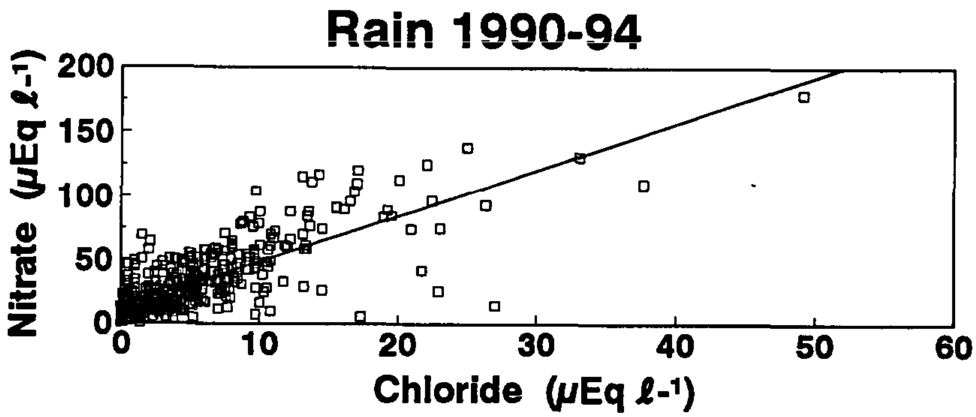


$y = 0.14(x) + 13.9; r^2 = 0.01$

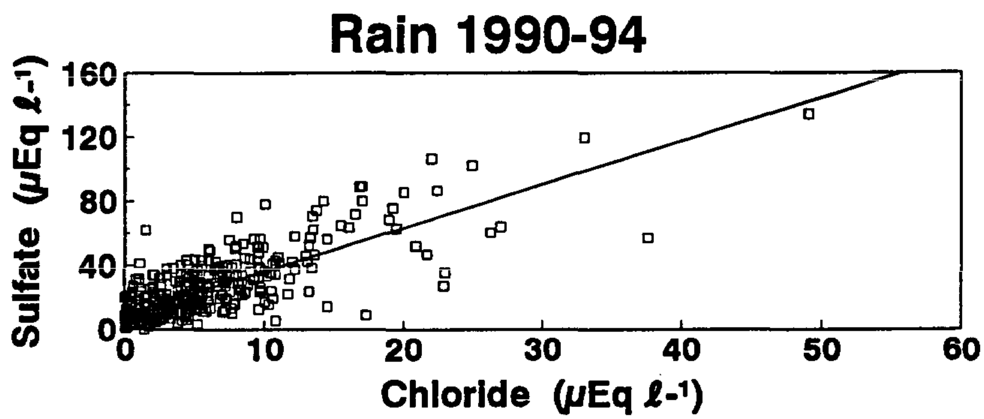


$y = 0.037(x) + 5.86; r^2 = 0.004$

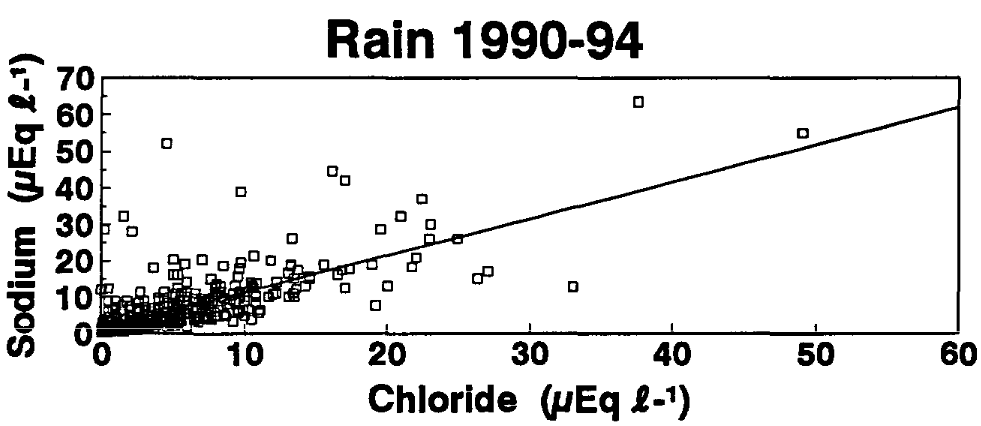
Figure 33. Scatterplots of the relationship among solute concentrations in non-winter precipitation. The best-fit linear regression is also shown.



y = 3.61(x) + 12.7; r^2 = 0.60

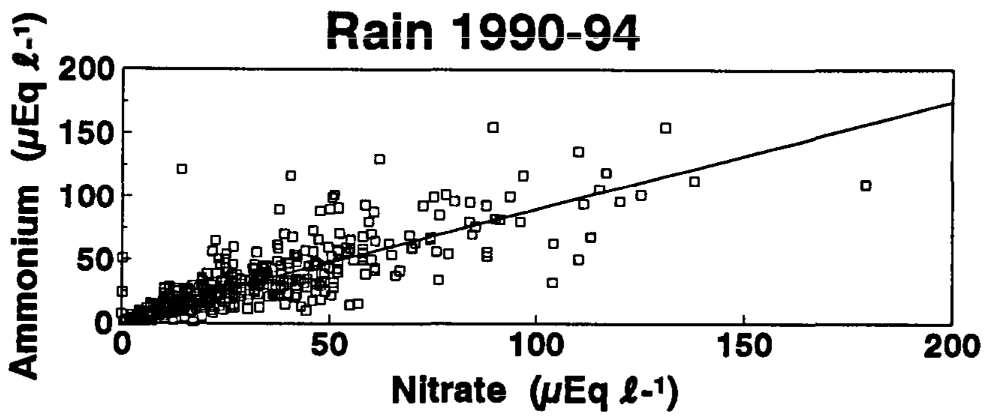


y = 2.70(x) + 9.24; r^2 = 0.62

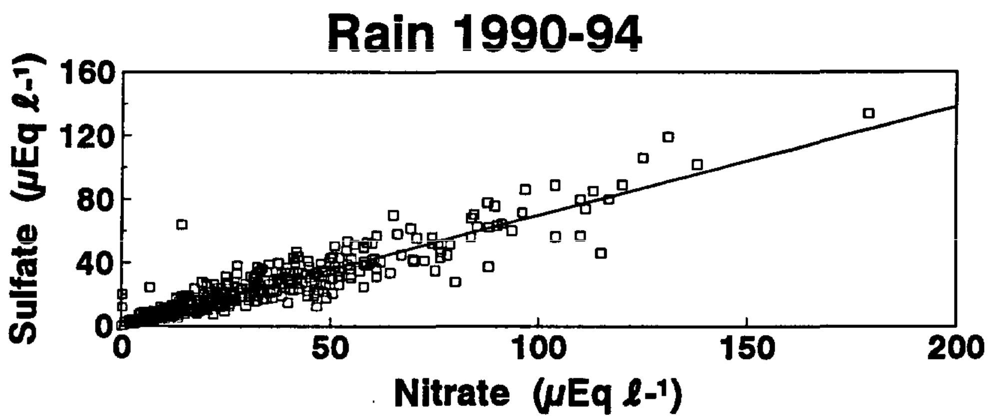


y = 1.01(x) + 1.21; r^2 = 0.53

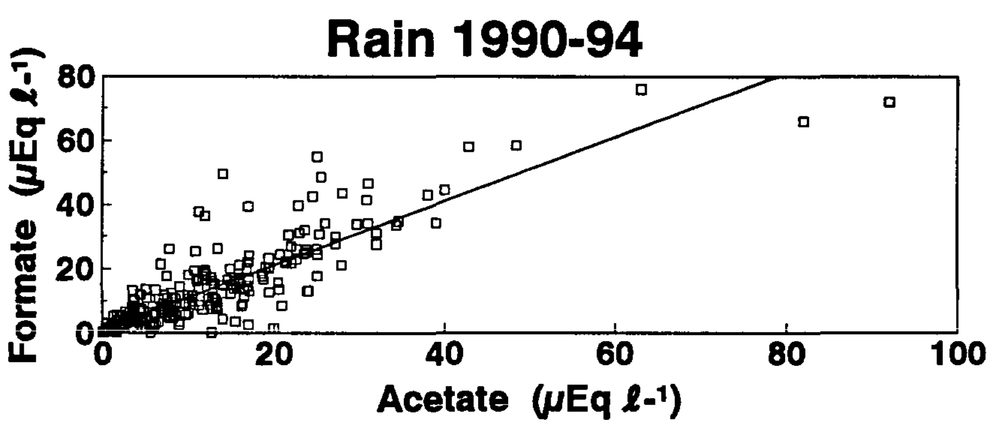
Figure 34. Scatterplots of the relationship among solute concentrations in non-winter precipitation. The best-fit linear regression is also shown.



y = 0.85(x) +5.43; r^2 = 0.66



y = 0.68(x) + 1.80; r^2 = 0.86



y = 1.00(x) + 1.17; r^2 = 0.77

Figure 35. Scatterplots of the relationship among solute concentrations in non-winter precipitation. The best-fit linear regression is also shown.

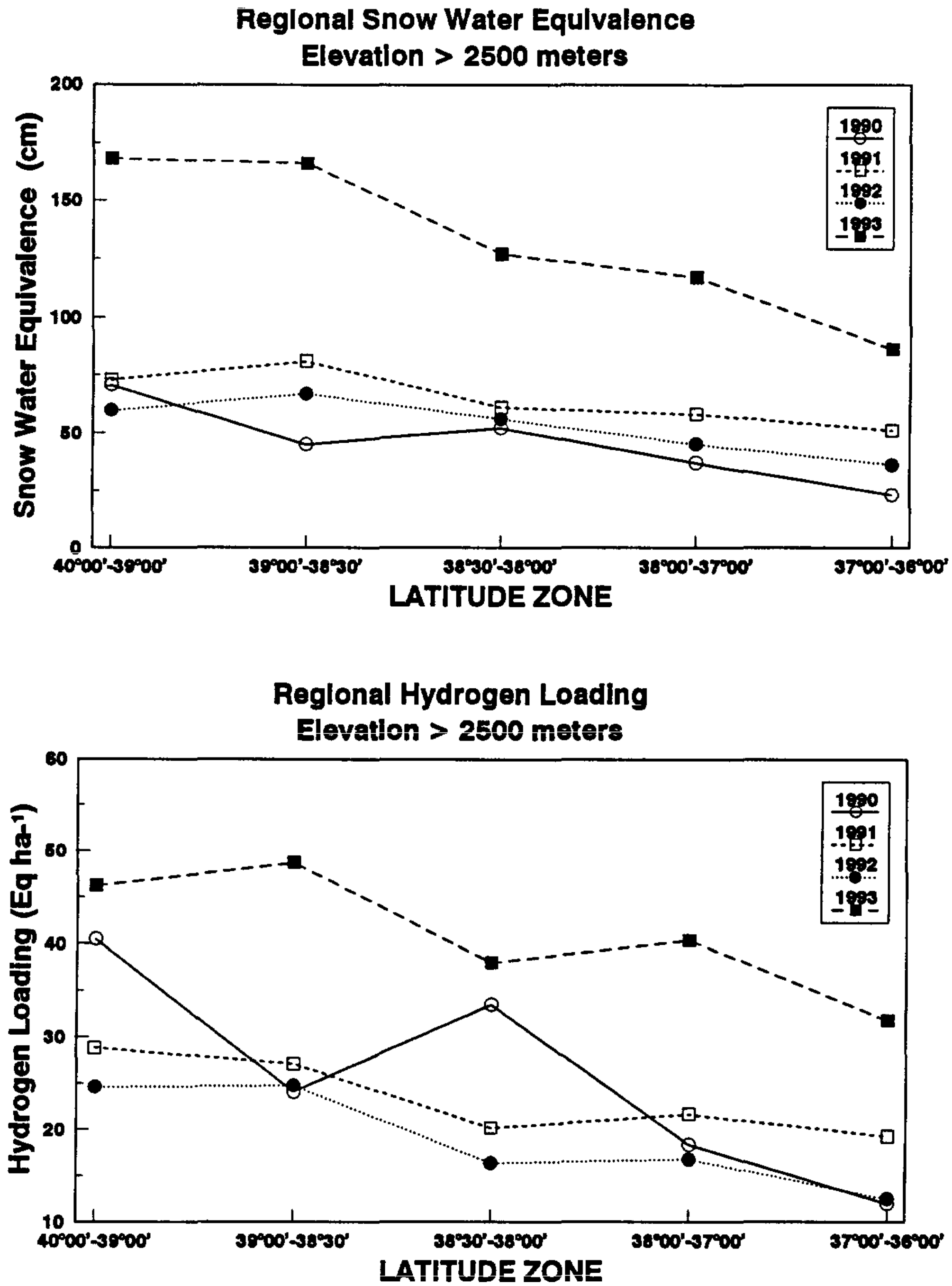
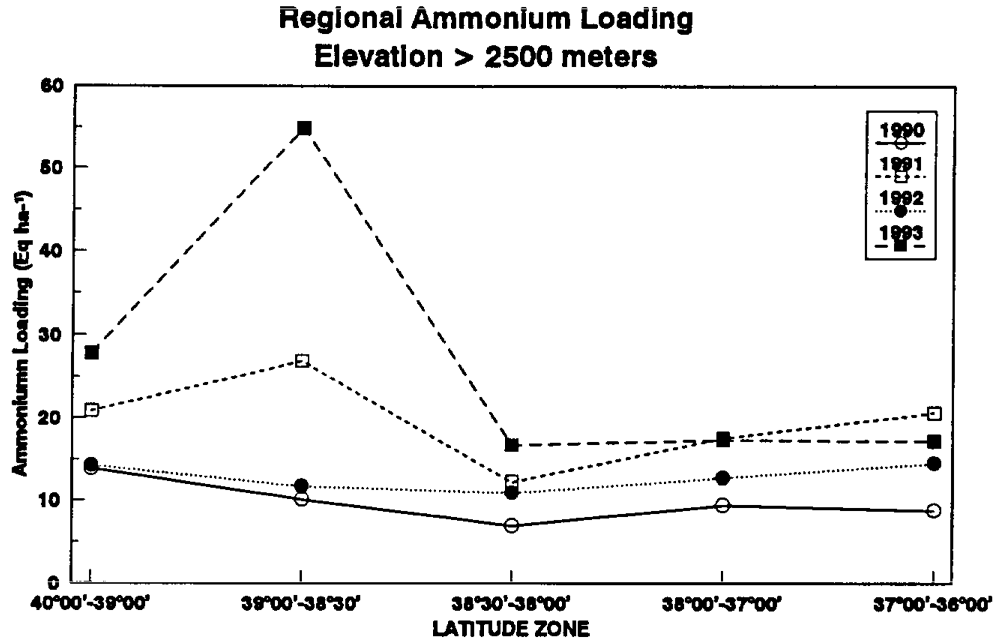


Figure 36. Regional distribution of SWE and hydrogen loading in the Sierra Nevada above 2500 m elevation; 1990-1993.



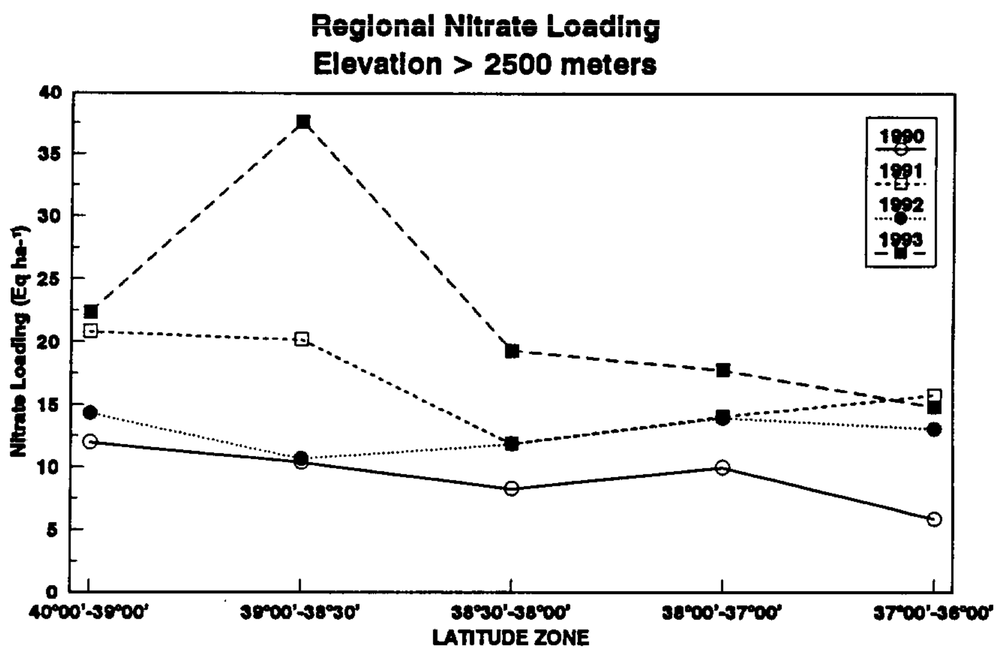
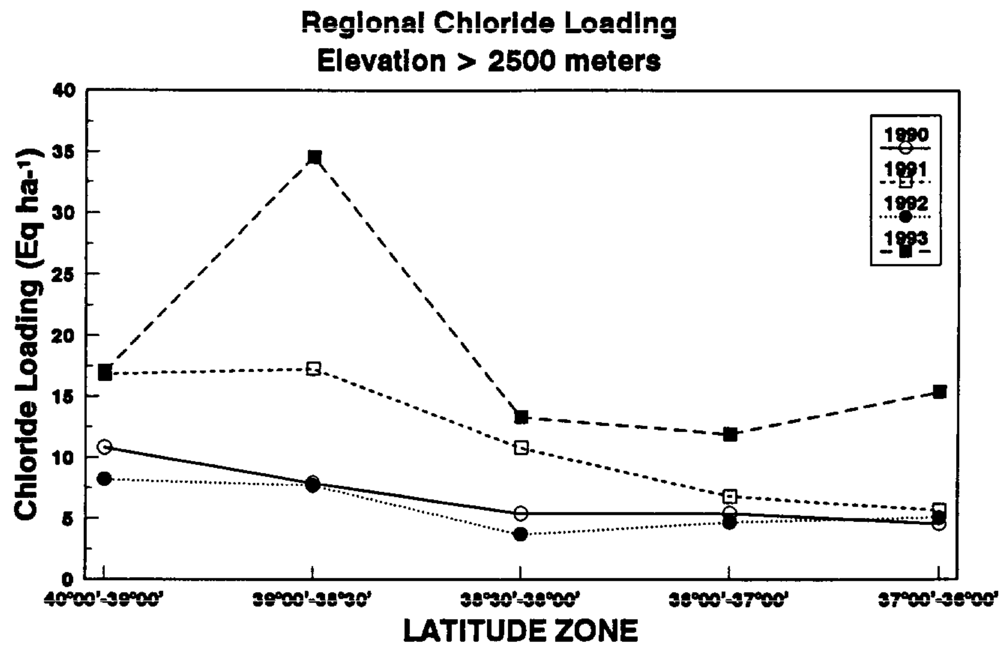


Figure 37. Regional distribution of ammonium and nitrate loading in the Sierra Nevada above 2500 m elevation; 1990-1993.



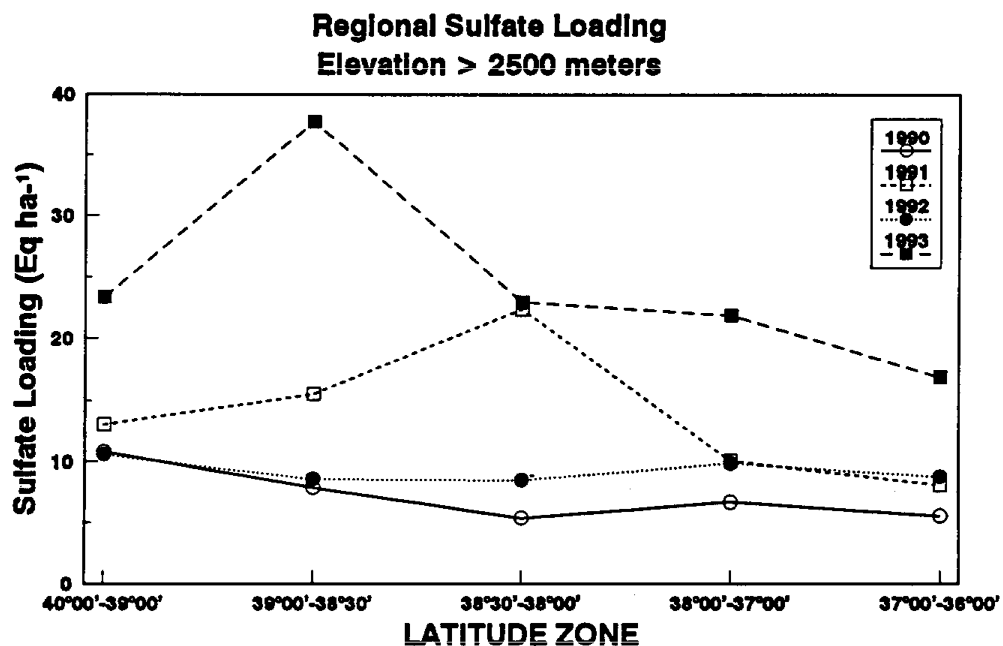
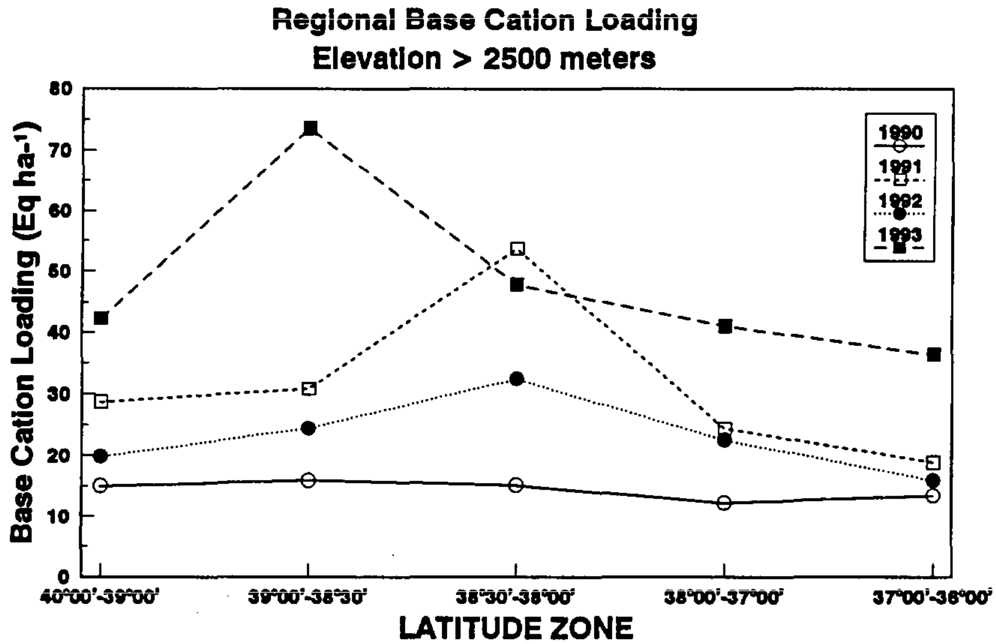


Figure 38. Regional distribution of chloride and sulfate loading in the Sierra Nevada above 2500 m elevation; 1990-1993.



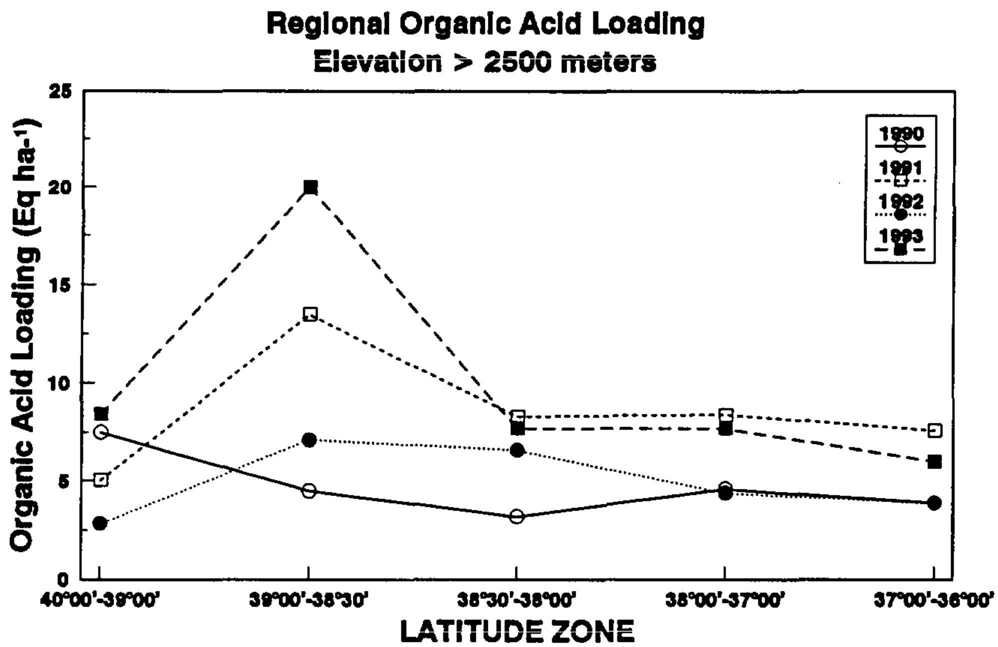
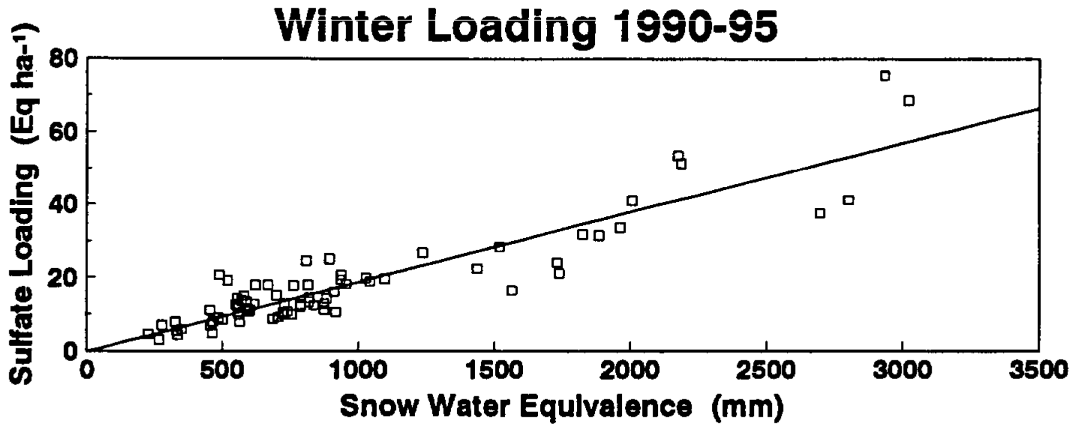
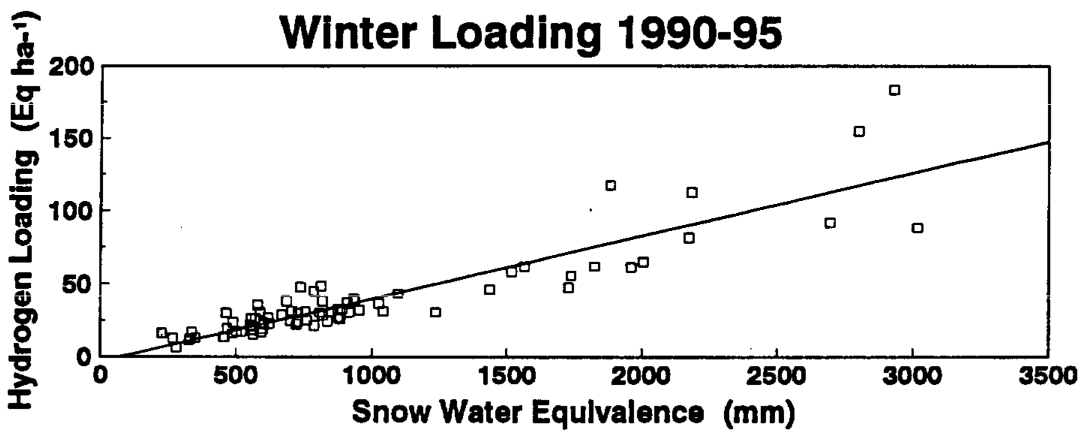


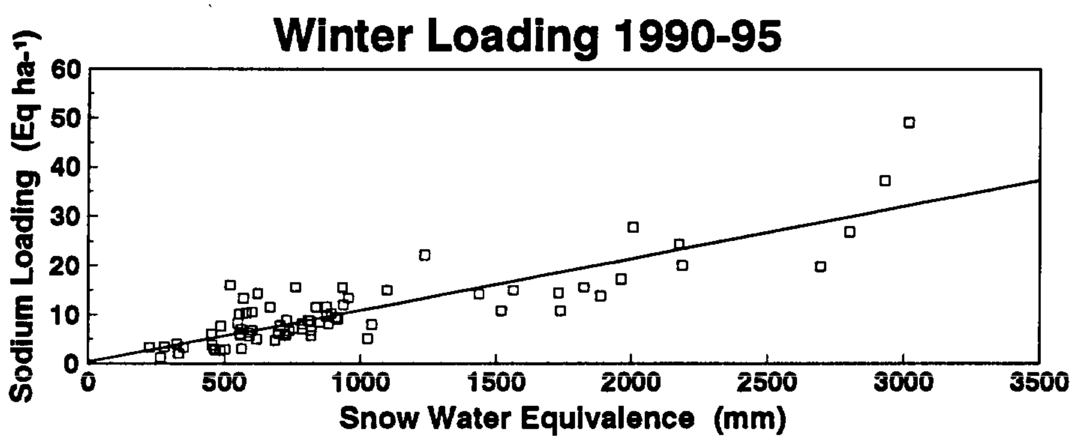
Figure 39. Regional distribution of base cation and organic anion loading in the Sierra Nevada above 2500 m elevation; 1990-1993.



$y = 0.019(x) - 0.15; r^2 = 0.83$

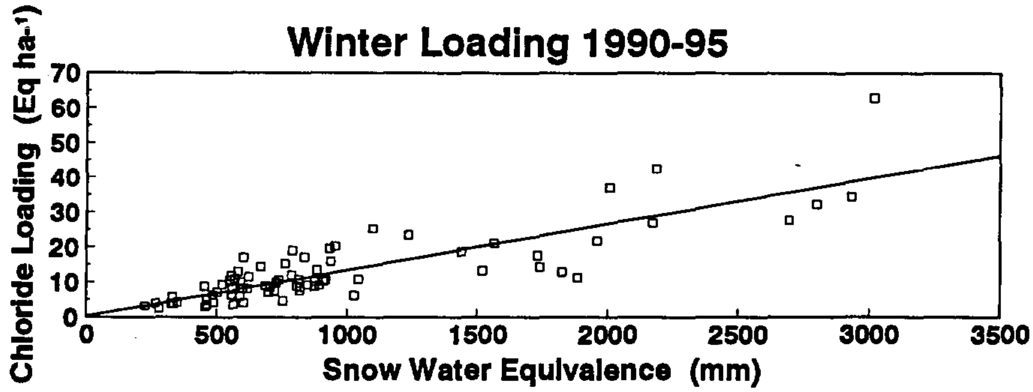


$y = 0.042(x) - 3.08; r^2 = 0.81$

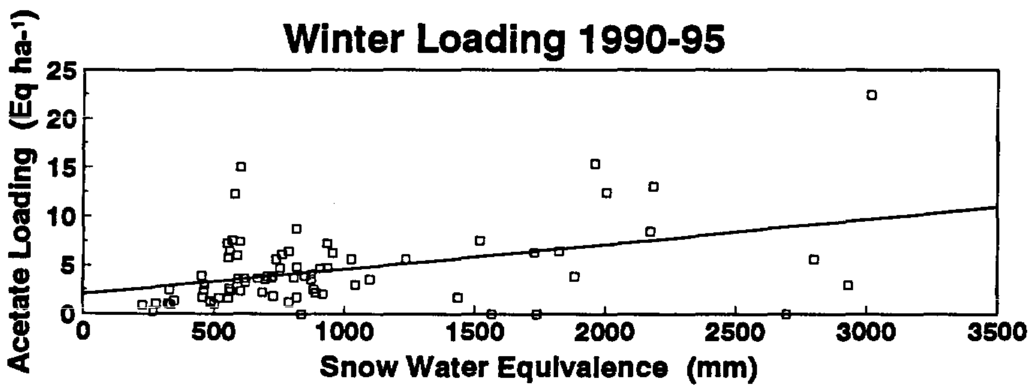


$y = 0.011(x) + 0.39; r^2 = 0.73$

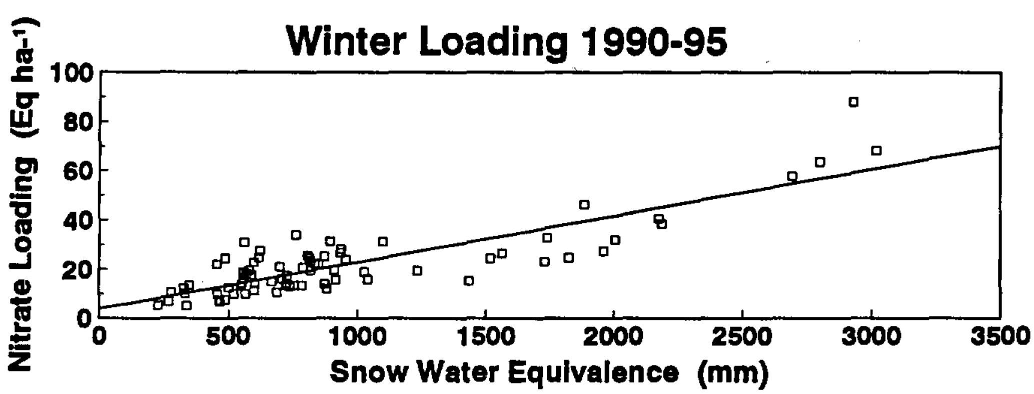
Figure 40. Scatterplots of the relationship between SWE and solute loading in winter precipitation; 1990-1995. The best-fit linear regression is shown.



$y = 0.013(x) + 0.34$; $r^2 = 0.70$



$y = 0.0025(x) + 2.04$; $r^2 = 0.18$



$y = 0.018(x) + 3.95$; $r^2 = 0.73$

Figure 41. Scatterplots of the relationship between SWE and solute loading in winter precipitation; 1990-1995. The best-fit linear regression is shown.

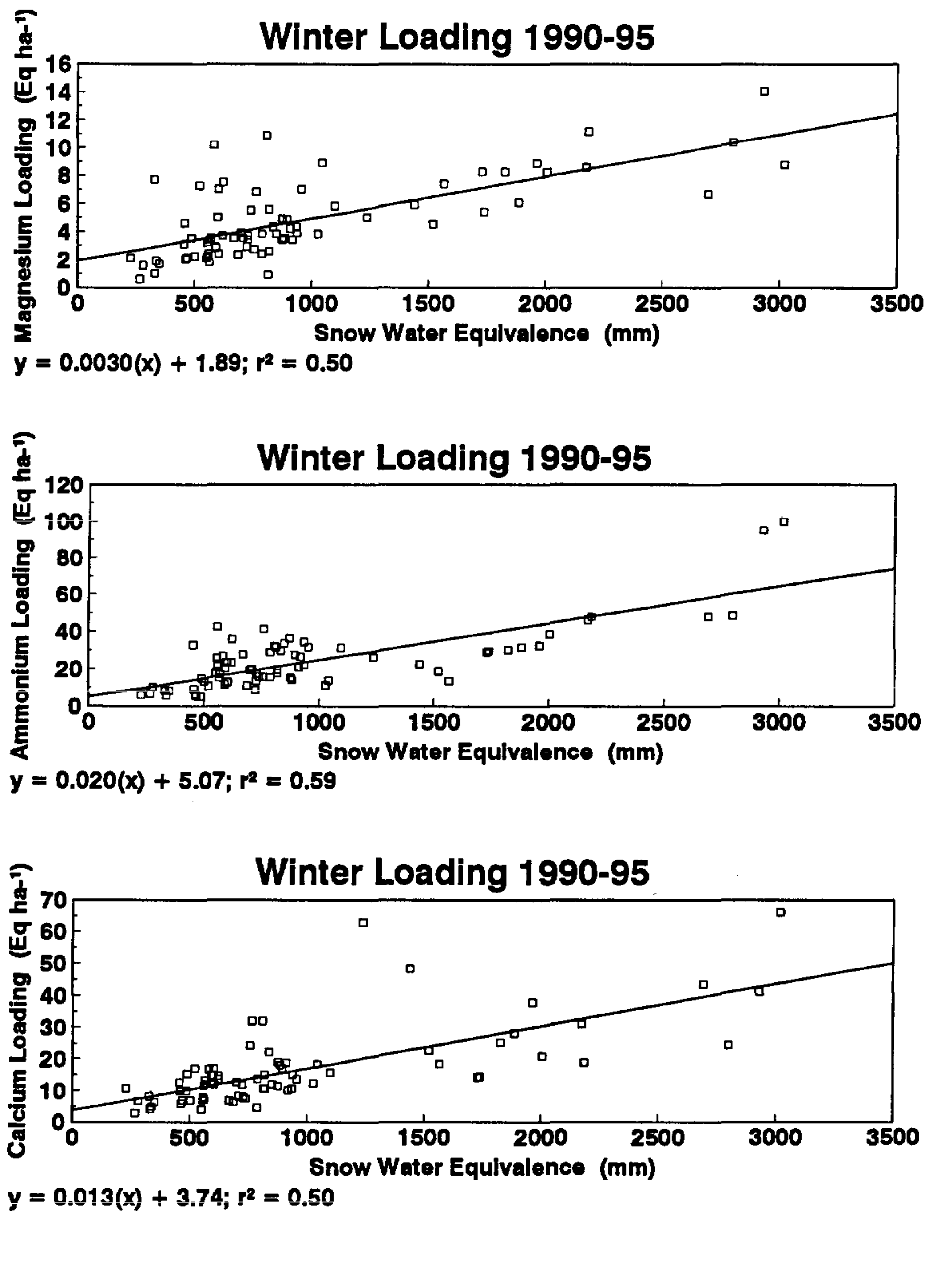


Figure 42. Scatterplots of the relationship between SWE and solute loading in winter precipitation; 1990-1995. The best-fit linear regression is shown.

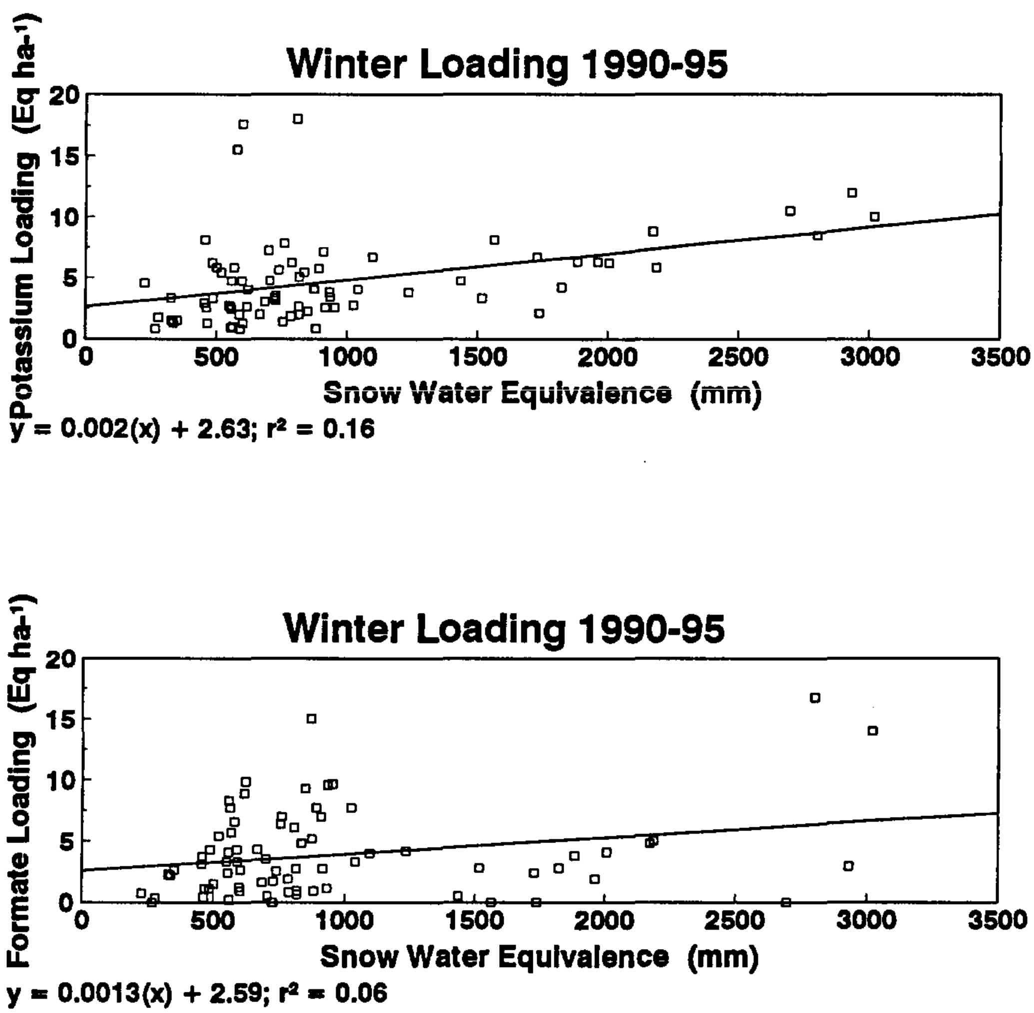


Figure 43. Scatterplots of the relationship between SWE and solute loading in winter precipitation; 1990-1995. The best-fit linear regression is shown.