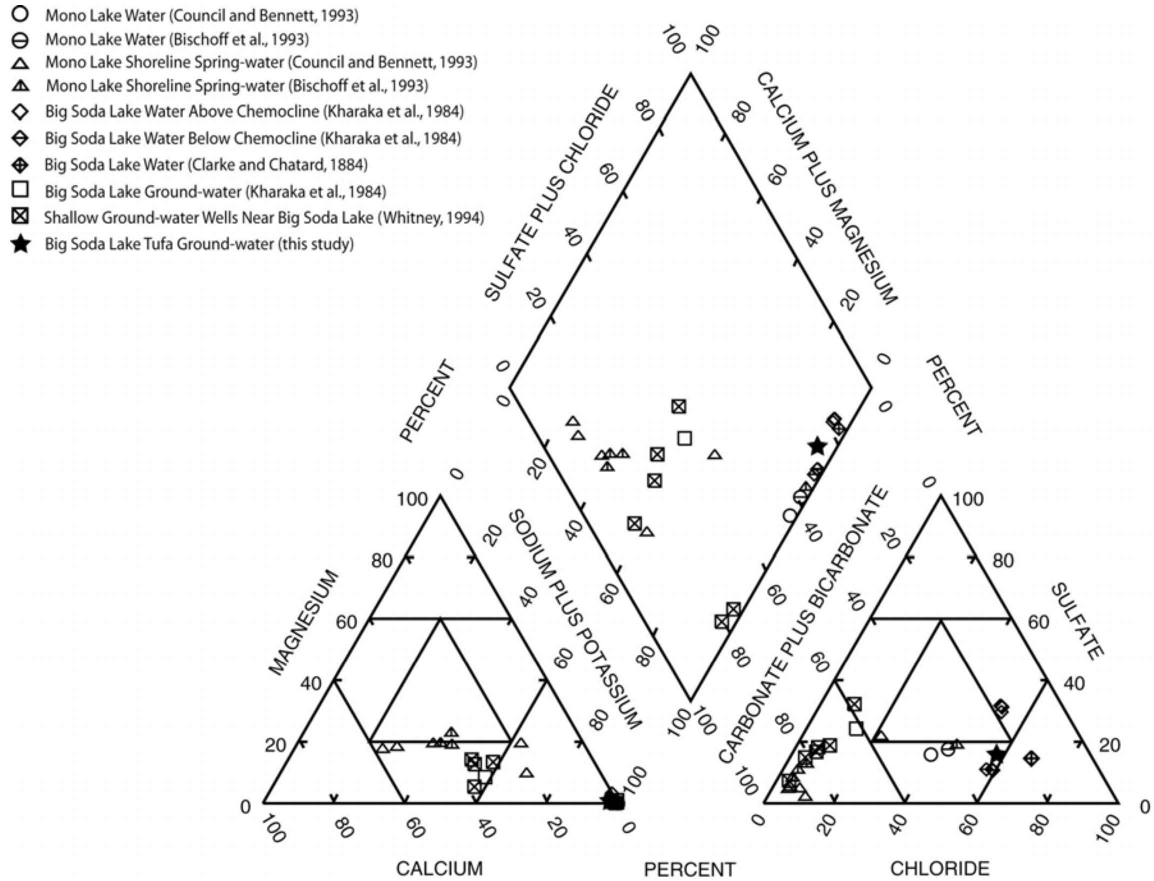

Figure DR1. Piper plot of the chemical composition of Big Soda Lake, regional ground water, and water discharging from the tufa mounds, compared to the water chemistry of Mono Lake and Mono Lake ground water.

References for figure:

Bischoff, J.L., Stine, S., Rosenbauer, R.J., Fitzpatrick, J.A., and Stafford, T.W., Jr., 1993, Ikaite precipitation by mixing of shoreline springs and lake water, Mono Lake, California, USA: Geochimica et Cosmochimica Acta, v. 57, p. 3855-3865.

Clarke, F.W., and Chatard, T.M., 1884, A report of work done in the Washington Laboratory during the fiscal year 1883-'84, Bulletin No. 9 of the United States Geological Survey: Washington, Government Printing Office, p. 39.

Council, T.C., and Bennett, P.C., 1993, Geochemistry of ikaite formation at Mono Lake, California: Implications for the origin of tufa mounds: Geology, v. 21, p. 971-974.

Kharaka, Y.K., Robinson, S.W., Law, L.M., and Carothers, W.W., 1984, Hydrogeochemistry of Big Soda Lake, Nevada; an alkaline meromictic desert lake: Geochimica et Cosmochimica Acta, v. 48, p. 823-835.

Whitney, R., 1994, Data on ground-water quality in the Carson River Basin, western Nevada and eastern California, 1987-90, U.S. Geological Survey Open-File Report 94-39, p. 139.

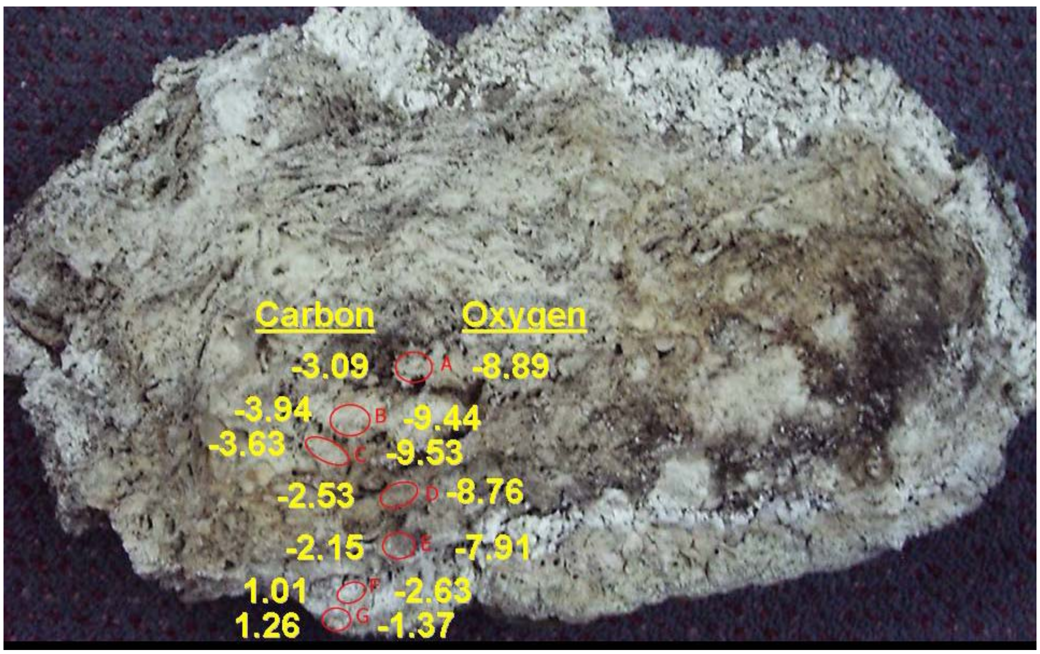

Figure DR2. Photograph of S1 showing the oxygen and carbon isotope values from the center to the outside of the tufa mound. Values at site E are an average of two samples. The sample is approximately 0.2 m in diameter.

Table DR1. Water chemistry data for Mono Lake, Big Soda Lake and Big Soda Lake ground water. Data in milliequivalents per liter

Location	Ca	Mg	Na+K	Cl	HCO_3	SO_4
Mono Lake from Council and Bennett, 1993[1].						
Mono Lake	0.05	2.64	1462	685	618	277
Nearshore spring ML S1	6.90	3.50	8.09	1.07	14.90	2.33
Nearshore spring ML S2	2.33	1.49	2.73	0.30	6.40	0.60
Nearshore spring ML S3	7.74	3.72	7.75	0.85	16.60	2.11
Mono Lake from Bischoff et al., 1993[2].						
Mono Lake	0.20	2.71	1377	518	593	208
Nearshore spring ML S1B	6.74	2.06	2.93	0.51	9.41	0.54
Nearshore spring ML S2B	5.54	1.89	2.99	0.48	9.28	0.46
Nearshore spring ML S3B	6.69	3.04	6.05	1.24	13.85	0.75
Nearshore spring ML S4B	8.43	3.87	27.97	8.35	20.98	8.06
Nearshore spring ML S4	0.05	2.49	1109	509	407	214
Thermal Spring NBHS	6.24	6.83	22.27	3.84	30.99	0.71
Big Soda Lake from Kharaka et al., 1984[3].						
Surface	0.25	12.17	361.8	194.6	66.5	121.0
10 meters below surface	0.25	12.26	361.8	199.1	66.5	121.4
20 meters below surface	0.24	12.17	359.5	199.7	66.5	120.1
30 meters below surface	0.23	12.01	368.4	204.2	70.8	115.8
35 meters below surface	0.04	1.08	1284.7	705.2	390.1	135.1
40 meters below surface	0.04	0.46	1204.6	772.9	395.0	145.5
50 meters below surface	0.04	0.45	1195.7	784.1	395.0	142.2
60 meters below surface	0.04	0.47	1196.2	778.5	395.0	139.5
Surface water data from Clarke and Chatard, 1884[4].	No Data	22.2	2058.4	1288.7	333.2	269.8
Tufa spring water (USGS unpublished data)	0.19	0.12	15.2	9.0	4.0	2.3
Regional ground water from Big Soda Lake area (number is USGS well ID) from Whitney, 1994[5] and Allander et al, 2001[6].						
392903118524401	3.54	1.48	5.37	0.99	6.03	3.33
392926118533001	2.64	0.99	4.15	0.71	5.41	1.42
393004118511301	0.14	0.05	8.91	0.39	7.31	1.35
393004118514201	0.92	0.43	1.88	0.38	9.51	0.78
393006118515101	0.03	0.01	4.17	0.25	3.00	0.72

393038118512201	3.34	0.49	5.04	0.54	6.23	1.35
No well ID: analysis from Kharaka et al., 1984.	1.35	0.35	2.37	0.50	2.18	0.85

[1]Council, T.C., and Bennett, P.C., 1993, Geochemistry of ikaite formation at Mono Lake, California: Implications for the origin of tufa mounds: Geology, v. 21, p. 971-974.

[2]Bischoff, J.L., Stine, S., Rosenbauer, R.J., Fitzpatrick, J.A., and Stafford, T.W., Jr., 1993, Ikaite precipitation by mixing of shoreline springs and lake water, Mono Lake, California, USA: Geochimica et Cosmochimica Acta, v. 57, p. 3855-3865.

[3]Kharaka, Y.K., Robinson, S.W., Law, L.M., and Carothers, W.W., 1984, Hydrogeochemistry of Big Soda Lake, Nevada; an alkaline meromictic desert lake: Geochimica et Cosmochimica Acta, v. 48, p. 823-835.

[4]Clarke, F.W., and Chatard, T.M., 1884, A report of work done in the Washington Laboratory during the fiscal year 1883-'84, Bulletin No. 9 of the United States Geological Survey: Washington, Government Printing Office, 39 p.

[5]Whitney, R., 1994, Data on ground-water quality in the Carson River Basin, western Nevada and eastern California, 1987-90, U.S. Geological Survey Open-File Report 94-39, p. 139.

[6]Allander, K., Gortsema, G., Hutchinson, D., and Schwartzenberger, J., 2001, Water resources data -- Nevada -- Water year 2000, U.S. Geological Survey Water Data Report NV-00-1, 570 p.

Table DR2. Stable isotope analyses and mineral identification

Sample No	Height above lake sediment (meters)	Distance from outside of tufa (centimeters)	Minerals present (XRD)	$\delta^{13}C$ uncorrected	$\delta^{13}C$ Fractionation corrected[1] (15°C)	$\delta^{18}O$, VPDB uncorrected	$\delta^{18}O$, VSMOW uncorrected	$\delta^{18}O$, VSMOW fractionation corrected[2] (15°C)
S-1-A	Subaerial	10	calcite	-3.09	-5.13	-8.89	21.68	-8.91
S-1-B	Subaerial	8		-3.94	-5.98	-9.44	21.10	-9.49
S-1-C	Subaerial	7.5	calcite, trace plagioclase	-3.63	-5.67	-9.53	21.00	-9.59
S-1-D	Subaerial	5		-2.53	-4.57	-8.76	21.81	-8.78
S-1-E1	Subaerial	3	calcite, trace plagioclase	-2.17	-4.21	-7.93	22.67	-7.92
S-1-E2	Subaerial	3	calcite, trace plagioclase	-2.12	-4.16	-7.89	22.71	-7.88
S-1-F	Subaerial	1		1.01	-1.03	-2.63	28.18	-2.41
S-1-G	Subaerial	0	Monohydrocalcite, trace quartz, possible archerite	1.26	-0.78	-1.37	29.49	-1.1
S-2-A	Subaerial	20	calcite, trace aragonite	-2.66	-4.70	-8.85	21.71	-8.88
S-2-B1	Subaerial	15		-4.03	-6.07	-10.74	19.75	-10.84
S-2-B2	Subaerial	15		-3.69	-5.73	-10.11	20.41	-10.18
S-2-C1	Subaerial	11	calcite	-4.25	-6.29	-10.49	20.01	-10.58
S-2-C2	Subaerial	11	calcite	-3.63	-5.67	-9.84	20.69	-9.9
S-2-D	Subaerial	9		-4.29	-6.33	-10.21	20.30	-10.29
S-2-E	Subaerial	3		-3.39	-5.43	-9.50	21.04	-9.55
S-2-F	Subaerial	1	calcite, trace	-3.68	-5.72	-10.04	20.48	-10.11
S-2-G	Subaerial	0	monohydrocalcite, trace quartz	0.76	-1.28	-2.20	28.62	-1.97
S3-1	0.61	0		0.57	-1.47	-2.52	28.29	-2.3
S3-2A1	0.98	2	calcite, minor monohydrocalcite, trace quartz	0.04	-2.00	-6.52	24.13	-6.46
S3-2A2	0.98	2	calcite, minor monohydrocalcite, trace quartz	0.00	-2.04	-6.95	23.68	-6.91
S3-2B	0.98	0		1.06	-0.98	-1.90	28.94	-1.65
S3-3A	1.71	2		0.40	-1.64	-5.75	24.94	-5.65

S3-3B	1.71	0		1.15	-0.89	-0.86	30.02	-0.57
S3-4A1	2.07	2		-0.25	-2.29	-6.28	24.39	-6.2
S3-4A2	2.07	2		-0.59	-2.63	-7.05	23.58	-7.01
S3-4B1	2.07	0		1.11	-0.93	-2.04	28.79	-1.8
S3-4B2	2.07	0		1.39	-0.65	-1.79	29.05	-1.54
S4-1A	0.76	3		0.66	-1.38	-6.51	24.14	-6.45
S4-1B1	0.76	2		1.06	-0.98	-5.40	25.30	-5.29
S4-1B2	0.76	2		1.14	-0.90	-5.26	25.45	-5.14
S4-1C	0.76	0		1.28	-0.76	-1.19	29.67	-0.92
S4-2A1	1.22	2		1.07	-0.97	-4.32	26.42	-4.17
S4-2A2	1.22	2		1.45	-0.59	-3.95	26.81	-3.78
S4-2B	1.22	0		1.49	-0.55	-1.79	29.05	-1.54
S4-3A	1.92	3	calcite, minor aragonite, trace monohydrocalcite	--	--	--	--	--
S4-3B	1.92	2	calcite, minor monohydrocalcite	--	--	--	--	--
S4-3C	1.92	0	monohydrocalcite, trace quartz	--	--	--	--	--
S4-4A	2.8	3		0.72	-1.32	-6.05	24.62	-5.97
S4-4B	2.8	2		0.44	-1.6	-6.35	24.31	-6.28
S4-4C	2.8	0		1.00	-1.04	-1.88	28.96	-1.63

[1]Fractionation factor for carbon from Deines et al, 1974.

[2]Fractionation factor for oxygen from O'Neil et al, 1969.