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Analytical Results for 30 Water Samples from
Mineral Mountains, Utah

By

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ABSTRACT

Thirty water samples were collected from the Mineral Mountains, west-central Utah, during the summer of 1978, as a part of a hydrogeochemical study of the area. The water samples were analyzed for calcium, magnesium, sodium, potassium, lithium, silica, alkalinity, sulfate, chloride, fluoride, zinc, copper, molybdenum, arsenic, and uranium. Temperature, specific conductance, and pH were also measured. The results of the sample analyses are presented in this report.

INTRODUCTION

Thirty water samples were collected from twenty-one springs, five wells, three surface streams, and one mine adit during June of 1978, in the Mineral Mountains, Utah. The Mineral Mountains are in west-central Utah. Figure 1 is an index map of the study area.

Temperatures were measured at the sample site. The pH was measured on the day of collection, but not at the sample site. The remaining analyses were completed at the U.S. Geological Survey laboratory in Denver, Colorado. The results of the analyses are given in this report.

The data in this report were used for interpretation in the preparation of an earlier report (Miller and others, 1979).

SAMPLE COLLECTION TECHNIQUE

Samples were collected using acid-rinsed polyethylene bottles. At each locality, a 60-mL sample was collected, filtered through a 0.45- μ m membrane filter, and acidified with reagent-grade concentrated nitric acid to pH<2. An untreated 0.5-L sample was also taken.

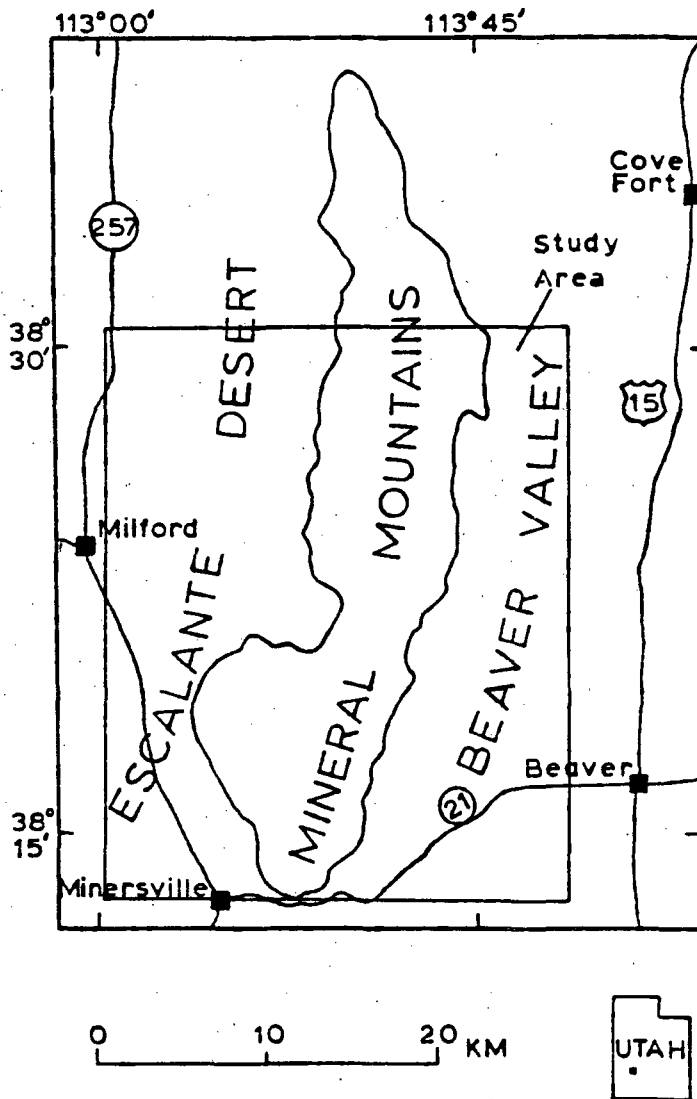


Figure 1.-- Index map of Mineral Mountains, Utah

ANALYTICAL TECHNIQUES

Water temperature was measured at the sample site. The pH was measured on the day of collection, but not at the sample site. The remaining analyses were carried out in the laboratory of the U.S. Geological Survey in Denver, Colorado. Alaklinity, sulfate, chloride, fluoride, and specific conductance were determined using the untreated sample. Calcium, magnesium, sodium, potassium, lithium, silica, zinc, copper, molybdenum, arsenic, and uranium were determined using the 0.45- μ m filtered and acidified sample.

Specific conductance and pH were measured using standard instrumental methods. Alkalinity was determined by Gran's plot potentiometric titration (Orion Research, 1978). Sulfate, chloride, and fluoride were analyzed by ion chromatography (Smee and Hall, 1978, p. 245). Calcium, magnesium, sodium, potassium, lithium, silica, and zinc were analyzed by flame atomic absorption spectrophotometry (Perkin-Elmer Corp., 1976). Copper, molybdenum, and arsenic were analyzed by flameless atomic spectrophotometry (Perkin-Elmer Corp., 1977). Uranium was analyzed by a fluorometric method (McHugh, 1979).

RESULTS

Sample locality numbers and sample sources are shown in table 1. Table 2 shows analytical data for each sample locality, as well as the locality's latitude and longitude in degrees, minutes, and seconds. Table 3 is a summary of the chemical analyses for the 30 Mineral Mountain water samples showing each variable with its minimum and maximum values, mean, geometric mean, standard deviation, and geometric deviation.

Table 1.--Sample locality numbers and sample sources of 30 water samples,
Mineral Mountains, Utah

Sample no.	Source of sample
72	Spring, near Shearing Corral Spring
263	Salt Spring
509	Spring, near Boulder Spring
547	Porcupine Canyon Creek
548	Solomons Hollow Creek
569	Right fork of Cherry Creek
570	Granite Spring
587	Mud Spring
590	Rock Corral Spring
875	Spring
1329	Flowing water from mine adit
1331	Guyo Spring
1333	Oak Spring
1334	North Spring
1335	Dripping Spring
1337	Poleline Spring
1339	Griffith Spring
1342	Kirk Spring
1349	Willow Spring
1354	Spring, near Jackrabbit Spring
1356	Hawks Nest Spring
1360	Carlyle Spring
1361	Well
1368	Fourmile Spring
1369	Cowboy Spring
1372	Well
1381	Well
1382	Well
1383	Well
1607	Spring

Table 2. --- WATER ANALYSES FROM MINERAL MOUNTAINS, UTAH

sample	LATITUDE	LONGITUD	CA(mg/L)	MG(mg/L)	NA(mg/L)	K(mg/L)	LI(ug/L)	SI02(mg/L)	ALK(mg/L)	S04(mg/L)	CL(mg/L)
72	38 16 49	112 55 38	78	32	10	3	20	30	200	70.0	130.0
263	38 30 27	112 51 8	120	25	1,623	257	21,000	46	298	7.8	3,636.0
509	38 24 16	112 48 12	23	3	8	1	4	16	53	6.0	14.0
547	38 22 32	112 47 17	18	3	8	1	4	20	51	6.0	10.0
548	38 21 53	112 47 32	18	4	10	1	10	22	70	4.8	9.1
569	38 18 42	112 50 29	28	6	10	1	9	22	108	7.9	14.0
570	38 17 58	112 50 2	95	51	30	1	20	20	311	181.0	80.0
587	38 20 38	112 47 27	58	8	30	1	26	24	195	31.0	65.0
590	38 22 19	112 49 57	13	3	8	1	4	20	41	3.6	7.3
875	38 13 2	112 50 8	38	12	38	5	14	36	191	40.0	43.0
1329	38 15 56	112 53 22	128	46	23	3	17	22	195	371.0	54.0
1331	38 17 22	112 53 50	125	58	43	2	25	20	388	156.0	39.0
1333	38 16 39	112 54 53	68	27	18	3	12	20	245	61.0	50.0
1334	38 16 19	112 55 46	65	33	20	3	11	16	233	91.0	50.0
1335	38 16 34	112 52 5	123	43	30	1	18	10	312	184.0	54.0
1337	38 17 15	112 51 43	110	22	15	2	8	12	335	18.0	34.0
1339	38 20 38	112 53 21	75	19	20	2	5	16	263	13.0	21.0
1342	38 25 35	112 50 34	50	9	33	4	30	30	201	16.0	41.0
1349	38 29 30	112 45 13	58	10	33	4	30	30	231	15.0	38.0
1354	38 28 10	112 47 2	28	5	18	7	10	30	131	6.6	16.0
1356	38 28 6	112 42 13	25	4	5	1	6	14	55	6.2	10.0
1360	38 28 50	112 44 58	50	9	38	8	20	44	231	8.5	53.0
1361	38 28 32	112 42 44	43	8	13	3	11	18	162	16.0	16.0
1368	38 28 22	112 40 1	40	6	10	2	5	22	82	9.1	57.0
1369	38 29 1	112 41 47	93	19	33	1	25	14	391	20.0	65.0
1372	38 29 41	112 40 6	100	14	23	1	14	32	277	21.0	125.0
1381	38 21 13	112 59 43	120	45	48	4	31	30	140	161.0	282.0
1382	38 19 1	112 59 27	125	33	33	5	24	30	161	107.0	212.0
1383	38 16 49	112 59 28	83	14	28	5	15	30	245	60.0	62.0
1607	38 14 44	112 52 30	285	100	85	3	40	20	255	952.0	142.0

Table 2. --- WATER ANALYSES FROM MINERAL MOUNTAINS, UTAH --- continued

sample	F(mg/L)	ZN(ug/L)	CU(ug/L)	MO(ug/L)	AS(ug/L)	U(ug/L)	SP.COND. umhos/cm	pH	TEMP. (C)
72	.46	8.8	.7	8.6	4.9	8.6	715	8.25	12.0
263	2.50	24.0	13.0	3.0	740.0	<.2	10,000	6.05	24.0
509	.21	5.0	.8	<1.0	.2	.3	141	6.80	7.0
547	.51	2.9	1.0	<1.0	.4	.5	130	7.90	10.5
548	.43	1.5	2.0	<1.0	.3	1.0	169	6.90	7.5
569	1.10	3.3	<1.0	3.9	.3	8.4	260	8.10	19.0
570	.64	3.3	1.1	7.1	1.0	2.9	1,040	7.55	12.0
587	1.80	3.9	1.2	93.0	1.5	740.0	540	7.10	12.5
590	.11	2.6	1.0	1.2	.4	<.2	120	7.65	9.5
875	1.00	1.4	1.0	3.5	4.5	7.6	455	7.85	11.5
1329	.50	43.0	3.0	4.5	4.1	6.1	980	7.95	12.5
1331	.06	4.6	1.6	1.7	2.5	.6	1,120	7.55	14.0
1333	.21	35.0	<1.0	10.8	3.6	15.0	620	7.05	12.5
1334	.45	1.7	1.4	8.1	2.5	10.0	650	8.25	11.5
1335	.17	4.5	1.1	3.1	.9	.9	950	7.45	12.0
1337	.10	2.3	.8	<1.0	5.0	.2	730	7.45	11.5
1339	1.30	2.4	1.2	3.7	.3	7.6	584	7.50	10.5
1342	.80	2.7	1.7	3.7	2.3	6.4	465	7.20	13.5
1349	.79	3.9	1.7	1.7	1.1	47.0	460	7.60	10.0
1354	.25	6.3	1.4	1.0	1.1	.5	270	7.20	11.0
1356	.12	3.0	1.5	1.0	2.1	.2	125	7.20	15.0
1360	.49	3.1	1.1	<1.0	2.0	3.8	500	7.35	9.0
1361	.24	2.9	1.1	2.0	.3	7.8	355	8.00	11.5
1368	.10	4.4	1.5	<1.0	1.0	.4	320	7.70	7.0
1369	.14	2.4	2.3	2.5	.9	11.2	680	7.95	11.5
1372	.20	4.4	1.6	<1.0	1.8	1.6	710	7.60	17.5
1381	.45	4.4	3.8	2.4	5.4	3.5	1,160	8.00	18.0
1382	.25	4.0	1.5	1.2	3.6	4.2	1,080	8.25	14.5
1383	.30	24.0	3.0	1.1	3.0	12.0	630	7.80	13.0
1607	.22	2.0	3.8	4.4	1.4	2.6	2,150	7.30	12.0

Table 3.--Summary of chemical analyses of 30 water samples, Mineral Mountains, Utah

Variable	Minimum	Maximum	Mean	Geometric mean	Standard deviation	Geometric deviation
Ca (mg/L)	13.	285.	76.1	60.0	54.6	2.08
Mg (mg/L)	3.0	100.	22.4	14.3	21.8	2.71
Na (mg/L)	2.3	1,623.	77.4	21.7	292.	3.06
K (mg/L)	1.0	257.	11.2	2.54	46.5	3.03
Li (μg/L)	4.0	21,000.	7,016.	18.2	3,834.	6.62
SiO ₂ (mg/L)	10.	46.	23.9	22.4	8.76	1.44
Alkalinity (mg/L)	41.	391.	202.	172.	99.2	1.90
SO ₄ (mg/L)	3.6	952.	88.4	28.5	182.	4.31
Cl (mg/L)	7.3	3,636.	181.	47.0	655.	3.49
F (mg/L)	.06	2.5	.530	.350	.549	2.51
Zn (μg/L)	1.4	43.	7.26	4.35	10.2	2.41
Cu (μg/L)	.7	13.	2.03	1.58	2.31	1.83
Mo (μg/L)	1.0	93.	7.53	3.32	18.8	2.75
As (μg/L)	.2	740.	26.6	1.66	135.	4.56
Specific conductance (μmhos/cm)	120.	10,000.	937.	542.	1,764.	2.51
pH	6.05	8.25	7.55	--	.491	--
Temp. (C°)	7.0	24.	12.5	12.0	3.58	1.31

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