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Analyses and description
of
geochemical samples
PETERS MOUNTAIN WILDERNESS STUDY AREA
Giles County, Virginia
by
Norma Rait and Frank G. Lesure

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This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards and nomenclature.

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Abstract

Semiquantitative emission spectrographic analyses for 64 elements on 43 stream sediment and 73 rock samples from Peters Mountain Wilderness Study area, Giles County, Virginia, are reported here in detail. Locations for all samples are in Universal Transverse Mercator (UTM) coordinates. Brief descriptions of rock samples are also included. Rocks analysed are mostly sandstone. Samples of hematitic sandstone of the Rose Hill Formation and limonite-cemented sandstone of the Rocky Gap Sandstone contain high values of iron; these rocks are submarginal iron resources. Some of the same iron-rich samples have a little more barium, copper, cobalt, lead, silver, and/or zinc than average sandstone, but they do not suggest the presence of economic deposits of these metals. No other obviously anomalous values related to mineralized rock are present in the data.

Introduction

The analyses reported in this open-file report are on samples from the Peters Mountain Wilderness Study area and vicinity, Giles County, Virginia, collected by M.P. Foose, F.G., Lesure, D.R. McQueen, P.L. Weis, and Helmuth Wedow in April 1975. The samples include 43 stream sediments from the study area and vicinity and 73 rock samples. The rock samples, which are described briefly, are for the most part chip samples of representative materials collected from outcrop or road cut. A few are composite samples of representative float material. Some of the rock is partly weathered, but the freshest material available was generally sampled.

Sample locations and discussion of the results of the analytical work are given by Lesure, Williams, and Dunn (1978).

Rock samples

<u>Sample No.</u>	<u>Description</u>
VPM 001	Chip sample, 0.6 m, pale grayish-orange, friable, fine- to coarse-grained sandstone; Keefer Sandstone.
VPM 002	Chip sample, 1 m, grayish-red, hematitic sandstone; Rose Hill Formation. Sp. G. 2.9.
VPM 003	Chip sample, reddish-brown, limonite-cemented, friable, porous sandstone; Rocky Gap Sandstone.
VPM 004	Chip sample, limonite-cemented, friable sandstone; Rocky Gap Sandstone.
VPM 006	Chip sample, 1.2 m, light-gray, very fine-grained sandstone; Tuscarora Quartzite.

VPM 007	Chip sample, 0.6 m, blackish-red, very fine-grained sandstone, contains reddish clay galls; lower Rose Hill Formation. Sp. G. 2.85.
VPM 009	Chip sample, white, stained red, poorly sorted, fine- to coarse-grained sandstone; Keefer Sandstone.
VPM 010	Chip sample, 2 m, white, quartz-pebble conglomerate; basal Tuscarora Quartzite.
VPM 011	Chip sample, 0.3 m, dark grayish-red, hematitic sandstone, contains pale-red clay seams; lower Rose Hill Formation. Sp. G. 3.02.
VPM 012	Chip sample, 0.6 m, grayish-red, hematitic sandstone; upper Rose Hill Formation. Sp. G. 2.85.
VPM 013	Chip sample, 0.6 m, quartz-pebble conglomerate, fine- to coarse-grained sandy matrix; Tuscarora Quartzite.
VPM 014	Chip sample, 1 m, light grayish-red, very fine-grained sandstone; Juniata Formation.
VPM 015	Chip sample, grayish-orange, fine- to medium-grained quartzite; Keefer Sandstone.
VPM 015	Chip sample, grayish-orange, fine- to medium-grained quartzite; Keefer Sandstone.
VPM 016	Chip sample, grayish-red, very fine-grained, hematitic sandstone, upper Rose Hill Formation. Sp. G. 2.91.
VPM 017	Chip sample, 1 m, dark grayish-red, fine-grained, hematitic sandstone; Rose Hill Formation. Sp. G. 2.94.
VPM 019	Chip sample, blackish-red, very fine- to fine-grained hematitic sandstone; lower Rose Hill Formation. Sp. G. 2.93.
VPM 020	Chip sample, interbedded reddish shale and sandstone; Juniata Formation.
VPM 021	Chip sample, 2 m, very light-gray, very fine-grained sandstone; Tuscarora Quartzite.
VPM 022	Chip sample, 0.6 m, grayish-red hematitic sandstone, Rose Hill Formation. Sp. G. 2.9.
VPM 024	Chip sample, brownish-gray, very fine-grained, iron-stained sandstone; Tuscarora Quartzite.
VPM 027	Chip sample, light-gray; massive, very fine-grained sandstone; Tuscarora Quartzite.

VPM 028	Chip sample, 0.2 m, brown, porous, limonite-cemented sandstone; Rocky Gap Sandstone. Sp. G. 2.60.
VPM 029	Composite of float, fine- to coarse-grained, iron-stained sandstone; Keefer Sandstone.
VPM 030	Chip sample, 0.6 m, blackish-red, very fine-grained, hematitic sandstone, Rose Hill Formation. Sp. G. 2.96.
VPM 031	Chip sample, yellow-gray, very fine-grained, iron-stained sandstone; Tuscarora Quartzite.
VPM 032	Chip sample, 0.3 m, very light-gray sandstone, minor iron oxides along seams; Tuscarora Quartzite.
VPM 033	Chip sample, 2 m, limonite-cemented sandstone; Rocky Gap Sandstone.
VPM 103	Chip sample, 2 m, light-gray, very fine- to coarse- grained, iron-stained sandstone; Tuscarora Sandstone.
VPM 104	Chip sample, 3 m, grayish-red, fine-grained, hematitic sandstone; Rose Hill Formation. Sp. G. 2.79.
VPM 107	Chip sample, 1 m, light-pinkish-gray, fine- to medium-grained sandstone; Keefer Sandstone.
VPM 108	Chip sample, 1.5 m, grayish-red, very fine-grained sandstone; Juniata Formation.
VPM 109	Chip sample, 7 m, reddish-brown, porous, limonite-cemented sandstone; Rocky Gap Sandstone.
VPM 110	Composite sample of float; white, weathered, iron-cemented chert; Huntersville Chert.
VPM 111	Chip sample, 0.3 m, dark-brown limonite probably replacing thin-layered limestone in Tonoloway Limestone.
VPM 113	Chip sample, 3 m, light gray, quartz-pebble conglomerate, very coarse sandstone matrix; Tuscarora Quartz.
VPM 114	Chip sample, 3 m, white, fine-grained sandstone; Tuscarora Quartzite.
VPM 115	Chip sample, 2 m, iron-stained sandstone; Tuscarora Quartzite.
VPM 116	Chip sample, 2 m, grayish-red, interlayered very fine-grained and coarse-grained, hematitic sandstone; Rose Hill Formation. Sp. G. 2.94.

VPM 118	Chip sample, 2 m, tan, medium-grained, limonite-cemented sandstone; Rocky Gap Sandstone.
VPM 119	Composite sample of float, white, iron-stained, weathered chert; Huntersville Chert.
VPM 120	Chip sample, 2 m, yellow-gray, very fine-grained sandstone; Keefer Sandstone.
VPM 124	Chip sample, 2 m, grayish-red, very fine- to fine-grained hematitic sandstone; Rose Hill Formation. Sp. G. 2.99.
VPM 125	Chip sample, 1 m, grayish-red, slabby, cross-bedded, coarse-grained hematitic sandstone, minor pale-red clay seams; Rose Hill Formation. Sp. G. 2.96.
VPM 126	Chip sample, 0.6 m, iron-cemented, cream-colored, weathered, brecciated chert; Huntersville Chert.
VPM 127	Chip sample, 1 m, grayish-red, limonite-cemented, porous, friable sandstone; Rocky Gap Sandstone.
VPM 202	Chip sample, 2 m, white to light-brown, medium- to coarse-grained, limonite-stained, porous sandstone; Keefer Sandstone.
VPM 203	Chip sample, 4 m, brown, medium-grained, limonite-cemented sandstone; Rocky Gap Sandstone.
VPM 204	Brown, limonite-cemented sandstone, some limonite cavity fillings; Rocky gap sandstone.
VPM 205	Composite from dump, porous, limonite-cemented sandstone; Keefer Sandstone (?).
VPM 213	Composite, black shale; Millboro Shale.
VPM 215	Chip sample, 3 m, grayish-red, very fine- to medium-grained, hematitic sandstone; Rose Hill Formation. Sp. G. 2.87.
VPM 216	Chip sample, light-gray, quartzose, conglomeratic sandstone; Tuscarora Quartzite.
VPM 217	Grab sample, grayish-red, medium-grained, hematitic sandstone, minor white and pale-red clay galls, Rose Hill Formation. Sp. G. 2.93.
VPM 220	Chip sample, 7 m, grayish-red, hematitic sandstone, pale-red clay seams; Rose Hill Formation. Sp. G. 2.89.
VPM 400	Grayish-red, very fine- to fine-grained, hematitic sandstone; Rose Hill Formation. Sp. G. 2.95.

VPM 401	Dark-grayish-red, very fine- to fine-grained, hematitic sandstone, minor light-colored clay granules; Rose Hill Formation. Sp. G. 2.89.
VPM 402	White, fine- to medium-grained sandstone; Keefer Sandstone.
VPM 403	Quartz-pebble conglomerate; Tuscarora Quartzite.
VPM 404	Grayish-red, hematitic sandstone, pale-red clay seams; Rose Hill Formation. Sp. G. 2.84.
VPM 405	White, iron-stained, vitreous quartzite; Keefer Sandstone.
VPM 406	Reddish-brown sandstone; Juniata Formation.
VPM 407	Grayish-red mudstone and very fine- to fine-grained sandstone; Juniata Formation.
VPM 408	Light gray, very coarse-grained sandstone and conglomeratic sandstone; Tuscarora Quartzite.
VPM 412	Grayish-red, hematitic sandstone, pale-red clay seams; Rose Hill Formation. Sp. G. 2.90.
VPM 413	White, iron-stained, fine- to coarse-grained sandstone; Keefer Sandstone.
VPM 414	Bluish-gray, fine- to medium-grained, well sorted sandstone, minor dark minerals; Keefer Sandstone.
VPM 415	Grayish-orange, iron-stained, fine- to medium-grained sandstone; Tuscarora Quartzite.
VPM 417	White, medium-grained, poorly sorted sandstone; Keefer Sandstone.
VPM 418	Pale-red, very fine-grained sandstone; Juniata Formation.
VPM 420	White, fine-grained quartz pebble conglomerate; Tuscarora Quartzite.
VPM 421	Shaly sandstone; Tuscarora Quartzite.
VPM 423	Composite of float, grayish-red, hematitic sandstone, minor pale-red clay galls; Rose Hill Formation. Sp. G. 2.87.

Analytical techniques

The stream sediment samples were dried and sieved in the laboratory; the minus 80-mesh fraction was pulverized and used for analyses. The rock samples were crushed and split.

The semiquantitative emission spectrographic analyses were made using computerized equipment. This method permits a rapid electronic recording on magnetic tape of the optical transmissions of all lines in a spectrogram. The tape is read by a computer which has been programmed to determine the concentrations to 64 elements. The standard deviation of any single answer should be taken as plus 50 percent and minus 33 percent. The third significant figure, when reported, appears solely for programming convenience and should not be used in publications.

All the samples were also tested for gold by a combined fire assay-atomic absorption method in the U.S. Geological Survey laboratories, Reston, Va., by Herbert Kirschenbaum and B.A. McCall. No gold was detected at a limit of detection of 0.05 parts per million (ppm) Au.

Explanation of table

The X and Y coordinates are Universal Transverse Mercator (UTM) grid, zone 17. The X coordinate is the easting value; the Y is the northing. Symbols used include: S, semiquantitative spectrographic analysis, <, less than lower limit; >, greater than upper limit; .0 interference for an element which cannot be resolved by any routine method. The limits apply under ideal conditions, and in some cases interferences will narrow the limits. All data are in parts per million (ppm) except where indicated in percent (%). Elements looked for but not found and the lower limit of determination: in rock--Ag (<0.46) except VPM 004--0.88, VPM 009--0.49, VPM 204--0.49; As (<68); Au (<10); Bi (<4.6); Cd (<10); Pd (<0.68); Pt (<6.8); Sb (<68); Sn (<14); Te (<464); U (<464) except VPM 114--148, VPM 117--180; W (<10); Ge (<3.1) except VPM 217--3.2; In (<4.6); Re (<10); Ta (<464); Tl (<4.6); Tb (<10); Dy (<6.8) except VPM 010--87, VPM 213--69, VPM 403--104; Tm (<3.1) except VPM 010--6.2, VPM 403--7.3; Ir (<6.8); Os (<6.8); Rh (<0.68 and <3.1); and Ru (<0.68, <1). In stream sediments--Ag (<0.46) except VPM 026--0.64, VPM 106--0.63; As (<68); Au (<10); Bi (<4.6); Cd (<10); Mo (<1.4) except VPM 112--1.6, VPM 211--2.8, VPM 416--1.4; Pd (<0.68); Pt (<6.8); Sb (<68); Sn (<14); Te (<464); U (<147) except VPM 210--168; W (<10); Ge (<3.1); Hf (<21); In (<4.6); Re (<10); Ta (<464); Tl (<4.6); Tb (<10); Dy (<6.8) except VPM 026--9.8, VPM 102--7.6, VPM 225--10, VPM 410--8.6; Ho (<3.1); Tm (<3.1) except VPM 112--3.3; Lu (<3.1) except VPM 224--3.2; Ir (<6.8); Os (<6.8, <21), Rh (<0.68, <3.1); and Ru (<0.68).

Reference Cited

Lesure, F.G., Williams, B.B., and Dunn, M.L., Jr., 1978, Mineral resources of the Mill Creek, Mountain Lake, and Peters Mountain Wilderness Study Areas, Craig and Giles Counties, Virginia, and Monroe County, West Virginia: U.S. Geol. Survey Open-File Report, OF 78-1076.

Rocks

sample	X-COORD.	Y-COORD.	S-FEX	S-MGX	S-CAX	S-TIX	S-MN	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
VP#001	536,090	4,142,700	.5830	.0100	.0082	.0503	35.8	54.5	18.40	<1.00	<1.00	6.04	<1.00
VP#002	536,240	4,143,150	23.8000	.0421	.0402	.1520	123.0	105.0	244.00	2.49	<1.00	32.10	<1.00
VP#003	536,230	4,143,560	>23.5000	.0148	.1020	.0072	583.0	54.0	1,350.00	6.02	41.10	42.90	87.00
VP#004	535,650	4,143,580	>23.5000	.0023	.1200	.0191	4,100.0	<14.7	706.00	1.09	23.30	41.10	17.20
VP#006	535,140	4,144,220	.4830	.0374	.0128	.1210	69.5	97.0	31.00	<1.00	<1.00	14.70	<1.00
VP#007	535,170	4,144,220	15.6000	.1450	.1660	.1950	272.0	110.0	178.00	2.30	3.89	25.00	<1.00
VP#009	535,820	4,143,100	1.7400	.0394	.0189	.3200	29.7	114.0	55.10	2.26	<1.00	11.10	<1.00
VP#010	531,440	4,141,680	.8450	.0592	.0374	.0767	57.2	156.0	151.00	1.48	<1.00	17.10	33.70
VP#011	532,360	4,142,600	>23.5000	.2760	1.0400	.1320	69.0	69.0	158.00	2.92	4.47	49.20	<1.00
VP#012	532,930	4,142,760	>23.5000	.0457	.5150	.1590	89.1	76.0	86.40	2.56	1.21	24.50	<1.00
VP#013	532,760	4,142,220	.2740	.0204	.0189	.0498	58.1	69.6	152.00	<1.00	<1.00	12.20	<1.00
VP#014	533,090	4,141,860	2.1700	.1490	.0372	.3250	87.2	81.6	103.00	<1.00	1.35	23.00	5.72
VP#015	533,040	4,141,950	.8670	.0310	.0228	.1010	46.1	59.0	59.30	<1.00	<1.00	13.90	2.31
VP#016	533,240	4,142,110	19.2000	.1400	.5290	.1550	117.0	74.5	176.00	2.81	4.25	40.40	<1.00
VP#017	533,420	4,141,160	>23.5000	.0721	.0907	.1290	73.9	82.0	172.00	2.96	1.68	30.40	<1.00
VP#019	530,090	4,139,060	25.5000	.1270	1.1400	.1840	260.0	84.9	113.00	2.87	3.60	45.30	<1.00
VP#020	530,240	4,139,170	5.0200	.8820	.1170	.3470	381.0	191.0	282.00	2.74	13.60	45.00	3.74
VP#021	530,210	4,138,990	.2210	.0150	.0424	.0656	38.7	71.1	44.00	<1.00	<1.00	10.20	<1.00
VP#022	532,640	4,140,650	>23.5000	.0895	.0663	.1750	159.0	72.0	131.00	4.18	4.60	26.30	6.00
VP#024	532,340	4,140,430	.5060	.0247	.0391	.0354	39.1	65.4	75.80	<1.00	<1.00	4.96	<1.00
VP#027	534,170	4,141,140	.2930	.0103	.0331	.0312	1,620.0	18.1	54.90	<1.00	24.90	5.18	27.50
VP#028	536,720	4,141,990	25.8000	.0133	.0496	.0145	154.0	<14.7	54.90	10.90	23.10	14.30	51.10
VP#029	536,780	4,142,780	1.6600	.0275	.0266	.0847	88.7	87.6	54.20	<1.00	<1.00	14.30	2.55
VP#030	536,700	4,142,980	20.1000	.0284	.0420	.1010	38.2	87.5	85.20	2.22	<1.00	23.30	<1.00
VP#031	536,370	4,143,400	.5810	.0153	.0122	.0671	77.6	59.3	20.90	<1.00	<1.00	7.89	<1.00
VP#032	535,820	4,142,640	.1710	.0161	.0139	.0751	125.0	36.4	48.10	<1.00	<1.00	5.21	<1.00
VP#033	536,140	4,142,150	>23.5000	.0051	.0262	.0206	47.2	<14.7	56.20	4.80	1.09	78.50	46.50
VP#034	535,510	4,143,130	.1950	.0040	.0043	.0314	59.1	23.9	41.90	<1.00	<1.00	4.23	<1.00
VP#036	535,703	4,143,090	16.9000	.0571	.2210	.2080	135.0	55.0	262.00	2.04	2.90	33.80	<1.00
VP#037	534,250	4,142,980	.5840	.0068	.0046	.0441	41.5	42.4	34.00	<1.00	<1.00	3.57	<1.00
VP#038	535,350	4,142,780	.9600	.0531	.0287	.1440	52.5	44.6	296.00	<1.00	<1.00	10.20	11.60
VP#039	535,470	4,142,250	21.3000	.0056	.0182	.0123	100.0	<14.7	81.30	4.05	1.36	13.40	47.90
VP#040	535,500	4,142,200	18.1000	.0444	.0453	.0454	186.0	<14.7	697.00	2.44	4.15	40.20	51.60
VP#041	535,550	4,142,070	>23.5000	.1300	.0181	.0356	1,770.0	<14.7	251.00	21.30	18.30	37.50	41.00
VP#043	531,060	4,141,510	.2110	.0060	.0141	.0184	40.4	38.1	55.50	<1.00	<1.00	12.40	1.59
VP#044	531,060	4,141,510	.1240	.0172	.0224	.0380	37.6	96.4	58.40	<1.00	<1.00	8.85	<1.00
VP#045	529,630	4,140,680	.5360	.0076	.0307	.0266	27.7	52.3	86.70	<1.00	<1.00	7.80	1.03
VP#046	529,590	4,140,270	>23.5000	.0663	.0734	.1220	114.0	65.0	137.00	4.59	1.77	25.10	<1.00
VP#047	529,890	4,140,120	1.0700	.0176	.0259	.0677	53.8	105.0	38.40	<1.00	<1.00	5.85	<1.00
VP#048	529,800	4,139,430	7.6800	.0101	.1990	.0181	172.0	<14.7	68.10	6.20	18.00	9.92	54.50
VP#049	529,770	4,139,550	4.2700	.0854	.0701	.0659	153.0	44.3	323.00	2.81	8.97	24.90	3.73
VP#050	529,900	4,139,290	.3390	.0168	.0184	.0390	45.9	53.8	35.60	<1.00	<1.00	19.90	<1.00
VP#051	529,860	4,138,840	18.8000	.0813	.0640	.0964	67.1	67.1	51.30	<1.00	1.91	24.90	<1.00
VP#052	530,720	4,140,280	25.2000	.0250	.8280	.1520	411.0	70.2	395.00	2.75	2.23	40.30	<1.00
VP#053	534,860	4,141,790	13.9000	.0280	.0209	.0428	298.0	16.3	151.00	2.13	9.95	11.80	82.30

sample	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SR	S-V	S-Y	S-ZN	S-ZR	S-SIX	S-ALX
VP#001	<4.64	<1.47	<10.0	2.38	<6.81	1.26	4.35	4.28	10.30	<14.7	258.0	>34.30	<260
VP#002	51.00	<1.47	10.9	9.21	14.30	11.60	144.00	78.50	77.50	20.5	1,030.0	>34.30	<7880
VP#003	<4.64	<4.64	<10.0	323.00	31.20	7.99	77.50	55.90	23.90	2,080.0	18.7	>34.30	<9210
VP#004	<4.64	<1.47	<10.0	68.90	20.90	9.97	6.42	52.50	10.40	289.0	335.0	>34.30	<1960
VP#006	14.90	<1.47	<10.0	6.99	<6.81	<1.00	6.85	9.64	18.00	<14.7	1,270.0	>34.30	<6540
VP#007	39.20	<1.47	16.7	11.80	14.90	10.60	103.00	72.40	92.80	21.6	1,700.0	>34.30	1,3900
VP#009	38.20	1.59	15.9	2.23	24.80	3.91	17.00	20.70	54.20	<14.7	>2,150.0	>34.30	<9490
VP#010	107.00	<1.47	<10.0	4.00	<6.81	5.04	18.10	21.50	295.00	<14.7	>2,150.0	>34.30	1,2600
VP#011	<4.64	2.80	10.1	16.30	20.60	12.70	211.00	105.00	61.50	53.6	437.0	>34.30	2,2200
VP#012	58.60	<1.47	16.6	6.47	15.10	12.10	85.60	104.00	124.00	24.7	1,860.0	>34.30	<6990
VP#013	95.30	<1.47	<10.0	1.82	<6.81	1.52	6.08	7.71	6.39	<14.7	625.0	>34.30	<1400
VP#014	28.70	<1.47	10.3	8.45	<6.81	5.18	39.40	37.40	18.80	<14.7	616.0	>34.30	2,5500
VP#015	31.00	<1.47	<10.0	6.30	65.00	2.30	12.40	10.90	25.20	19.0	320.0	>34.30	<5130
VP#016	51.10	<1.47	11.1	14.60	14.80	12.00	152.00	83.50	70.50	20.8	1,090.0	>34.30	1,3000
VP#017	61.50	7.20	13.3	8.84	18.90	12.30	85.60	96.70	99.30	42.5	1,530.0	>34.30	<8310
VP#019	101.00	<1.47	12.9	16.10	19.50	15.90	157.00	105.00	95.50	39.9	1,830.0	>34.30	1,3500
VP#020	45.40	<1.47	<10.0	38.60	10.30	9.80	102.00	58.80	31.20	24.9	292.0	>34.30	5,3600
VP#021	42.90	<1.47	<10.0	4.18	<6.81	1.14	9.52	4.50	12.00	<14.7	634.0	>34.30	<2130
VP#022	69.60	<1.47	12.5	22.00	17.50	12.10	81.10	90.30	88.80	48.3	1,170.0	>34.30	1,2000
VP#024	5.24	<1.47	<10.0	2.87	<6.81	<1.00	4.92	4.27	6.34	21.5	260.0	>34.30	<2880
VP#027	4.76	<1.47	<10.0	66.60	<6.81	<1.00	3.80	4.87	6.35	108.0	115.0	>34.30	<0737
VP#028	<4.64	<1.47	<10.0	186.00	18.80	3.45	6.03	53.60	14.30	1,110.0	385.0	>34.30	<7020
VP#029	16.10	2.11	<10.0	5.20	17.70	2.84	9.47	12.20	21.90	27.4	>2,150.0	>34.30	<4490
VP#030	77.90	<1.47	12.9	5.14	13.00	11.10	123.00	93.70	67.10	24.5	1,670.0	>34.30	<6100
VP#031	7.13	<1.47	<10.0	2.10	<6.81	1.50	3.83	8.18	12.20	<14.7	502.0	>34.30	<2720
VP#032	10.70	<1.47	<10.0	1.46	<6.81	1.27	5.05	5.49	4.90	<14.7	195.0	>34.30	<2820
VP#033	<4.64	7.50	<10.0	22.80	20.30	34.20	5.44	407.00	8.56	214.0	25.5	>34.30	<9380
VP#103	4.71	<1.47	<10.0	2.38	<6.81	<1.00	2.23	3.21	9.77	<14.7	730.0	>34.30	<0316
VP#104	81.50	<1.47	10.7	10.00	16.70	11.30	172.00	84.00	64.90	29.8	>2,150.0	>34.30	<9820
VP#107	10.20	<1.47	<10.0	2.31	<6.81	1.23	3.37	3.20	3.68	<14.7	129.0	>34.30	<0316
VP#108	20.40	<1.47	11.0	4.81	<6.81	1.82	23.00	17.60	37.30	<14.7	502.0	>34.30	<6160
VP#109	<4.64	<1.47	<10.0	26.30	34.20	6.59	6.20	50.20	5.07	259.0	51.7	>34.30	<6820
VP#110	<4.64	<1.47	<10.0	34.00	75.00	8.16	75.60	287.00	8.71	295.0	42.5	>34.30	1,4700
VP#111	<4.64	7.35	<10.0	179.00	42.90	10.40	5.09	19.00	13.10	1,380.0	313.0	>34.30	<9620
VP#113	7.88	<1.47	<10.0	4.78	<6.81	<1.00	3.14	3.05	3.22	<14.7	190.0	>34.30	<0360
VP#114	7.53	<1.47	<10.0	4.64	<6.81	<1.00	4.04	4.03	7.06	<14.7	231.0	>34.30	<2350
VP#115	<4.64	<1.47	<10.0	4.19	<6.81	<1.00	3.15	3.45	2.59	<14.7	91.2	>34.30	<0574
VP#116	67.30	10.70	12.2	9.79	19.70	15.60	130.00	102.00	83.90	55.9	946.0	>34.30	1,2900
VP#117	11.40	1.96	<10.0	3.03	<6.81	1.42	6.85	6.05	8.71	<14.7	558.0	>34.30	<1730
VP#118	<4.64	<1.47	<10.0	209.00	11.30	2.95	11.50	20.90	9.06	550.0	44.2	>34.30	<6320
VP#119	20.00	<1.47	<10.0	92.10	15.20	5.16	19.50	49.00	20.90	312.0	172.0	>34.30	1,1000
VP#120	<4.64	<1.47	<10.0	9.55	<6.81	1.08	2.92	3.94	2.15	<14.7	103.0	>34.30	<1630
VP#124	56.30	<1.47	10.7	9.24	<6.81	10.00	86.10	65.30	55.00	76.4	966.0	>34.30	<8770
VP#125	<4.64	<1.47	10.7	9.44	22.60	9.97	112.00	72.50	40.50	42.0	504.0	>34.30	1,6500
VP#126	<4.64	<1.47	<10.0	83.30	27.50	2.77	9.74	28.60	6.51	630.0	29.9	>34.30	<3030

sample	S-NAZ	S-KX	S-PX	S-CE	S-GA	S-HF	S-TH	S-YB	S-PR	S-ND	S-SM	S-EU	S-GD	S-HO	S-ER	S-LU
VPM001	<.0046	<.0681	<.0681	<43.0	<2.15	<21.5	<21.5	.87	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM002	<.0046	<.4320	<.0681	226.0	9.02	<21.5	56.9	4.06	10.90	<68.1	8.95	1.13	<14.70	<3.16	13.70	<3.16
VPM003	<.0046	<.1470	1.2400	<43.0	15.00	<21.5	118.0	1.93	7.05	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM004	<.0046	<.1470	<.5540	<43.0	8.17	25.0	<21.5	5.96	5.88	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM006	<.0046	<.2980	<.0681	50.7	<2.15	<21.5	<21.5	1.68	<3.16	<68.1	5.34	<1.00	<14.70	<10.00	<4.64	<3.16
VPM007	<.0046	<.5660	<.3160	164.0	6.98	53.2	51.3	4.33	9.04	<68.1	8.38	<1.00	17.90	<10.00	14.00	<3.16
VPM009	<.0046	<.1830	<.0691	.0	3.21	<21.5	<21.5	6.67	4.42	<68.1	<31.60	1.02	<14.70	<10.00	<4.64	4.15
VPM010	<.0058	<.7110	<.0907	.0	2.87	<21.5	40.8	35.80	21.00	195.0	71.00	12.00	61.10	14.50	64.50	3.29
VPM011	<.0062	<.1470	<.5720	<43.0	14.70	27.5	<21.5	5.65	13.10	<68.1	7.51	2.51	<14.70	<3.16	15.10	<3.16
VPM012	<.0046	<.1470	<.5740	221.0	9.47	<21.5	<21.5	4.47	14.20	<68.1	11.70	1.18	23.80	10.60	19.20	<3.16
VPM013	<.0046	<.0681	<.0743	273.0	<2.15	<21.5	<21.5	.75	21.90	142.0	16.90	5.68	16.30	<3.16	<4.64	<3.16
VPM014	<.0192	1.0000	<.0681	52.8	4.82	<21.5	<21.5	2.69	4.30	<68.1	<4.64	<1.00	<14.70	<3.16	<4.64	<3.16
VPM015	<.0046	<.1090	<.0681	78.5	<2.15	<21.5	<21.5	1.51	6.80	<68.1	6.12	1.12	4.78	<3.16	<4.64	<3.16
VPM016	<.0046	<.6500	<.4090	194.0	10.10	<21.5	<21.5	4.67	11.10	<68.1	8.84	2.05	<14.70	<3.16	12.20	<3.16
VPM017	<.0046	<.1470	<.0681	239.0	11.10	<21.5	100.0	4.49	13.30	<68.1	10.60	1.75	<14.70	15.40	14.40	<3.16
VPM019	<.0046	<.4390	<.5470	350.0	11.20	<21.5	105.0	7.50	20.20	<68.1	16.80	4.97	<14.70	12.80	19.80	<3.16
VPM020	<.1480	>1.4700	<.0681	113.0	15.00	<21.5	<21.5	4.34	7.74	<68.1	6.38	1.11	<14.70	<3.16	<4.64	<3.16
VPM021	<.0046	<.0949	<.0681	69.8	<2.15	<21.5	<21.5	.86	5.22	<68.1	6.41	<1.00	<4.64	<3.16	<4.64	<3.16
VPM022	<.0046	<.1470	<.6810	239.0	10.60	28.3	<21.5	4.64	17.50	<68.1	11.60	3.21	<14.70	<3.16	14.10	<3.16
VPM024	<.0046	<.0681	<.0681	<43.0	<2.15	<21.5	<21.5	.70	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM027	<.0046	<.0681	<.0681	<43.0	<2.15	<21.5	<21.5	.65	<3.16	97.7	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM028	<.0046	<.0681	<.0720	<43.0	7.82	<21.5	<21.5	1.62	7.35	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM029	<.0046	<.1110	<.0681	.0	2.21	<21.5	27.1	2.19	<3.16	<68.1	<31.60	<1.00	<4.64	<3.16	<4.64	<3.16
VPM030	<.0046	<.2680	<.0681	280.0	8.23	<21.5	<21.5	3.94	17.80	<68.1	12.70	1.98	<14.70	<10.00	13.40	<3.16
VPM031	<.0046	<.0681	<.0681	41.4	<2.15	<21.5	<21.5	2.20	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM032	<.0046	<.1770	<.0681	<43.0	<2.15	<21.5	<21.5	.46	<3.16	110.0	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM033	<.0046	<.0681	<.1780	<43.0	11.80	<21.5	<21.5	1.13	6.68	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM034	<.0046	<.5810	<.0681	.0	11.50	<21.5	<21.5	5.83	16.60	<68.1	57.20	3.58	<14.70	13.50	<4.64	<3.16
VPM107	<.0046	<.0681	<.0681	<43.0	<2.15	<21.5	<21.5	.20	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM108	<.0046	<.2860	<.0701	49.9	<2.15	<21.5	25.8	1.69	<3.16	<68.1	<4.64	1.37	<14.70	<3.16	<4.64	<3.16
VPM109	<.0046	<.0681	<.0681	<43.0	10.40	<21.5	<21.5	1.18	6.71	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM110	<.0046	<.1290	<.070	<43.0	8.28	<21.5	<21.5	1.34	4.53	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM111	<.0046	<.1470	<.6950	<43.0	12.90	<21.5	95.0	1.61	7.31	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM113	<.0046	<.0883	<.0681	<43.0	<2.15	<21.5	<21.5	.29	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM114	<.0046	<.1070	<.0681	<43.0	<2.15	<21.5	<21.5	.84	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM115	<.0046	<.0681	<.0681	<43.0	<2.15	<21.5	<21.5	.33	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM116	<.0046	<.0681	<.0681	266.0	14.80	<21.5	124.0	4.56	14.70	<68.1	11.50	2.16	<14.70	<3.16	16.50	<3.16
VPM117	<.0046	<.0681	<.0681	<43.0	<2.15	<21.5	<21.5	1.22	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM118	<.0046	<.0681	<.2240	<43.0	2.94	<21.5	29.6	1.47	3.45	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM119	<.0062	<.4080	<.1220	43.6	3.76	<21.5	<21.5	1.39	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM120	<.0046	<.0681	<.0681	<43.0	<2.15	<21.5	<21.5	.22	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VPM124	<.0046	<.4620	<.0681	217.0	8.69	<21.5	85.0	6.16	13.30	<68.1	9.88	2.45	13.50	<3.16	12.20	<3.16
VPM125	<.0055	<.7780	<.4930	63.2	14.90	<21.5	<21.5	10.00	11.10	<68.1	7.55	3.43	<14.70	<3.16	<4.64	<3.16
VPM126	<.0099	<.1180	<.3290	<63.2	6.67	<21.5	48.6	.77	4.11	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16

Rocks--continued

sample	X-COORD.	Y-COORD.	S-FEX	S-MGX	S-CAX	S-TIX	S-MN	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
VP4127	535,070	4,142,040	13,9000	.0149	.0554	.0266	304.0	<14.7	21.90	<1.00	1.25	11.70	25.30
VP4202	536,240	4,142,280	.3970	.0248	.0067	.0470	277.0	111.0	46.00	<1.00	8.05	6.37	<1.00
VP4203	535,660	4,142,390	17,3000	.0049	.0170	.0241	248.0	<14.7	171.00	1.99	1.40	20.90	24.80
VP4204	535,570	4,142,100	>23,5000	.0088	.0270	.0162	128.0	<14.7	214.00	16.30	6.50	<14.70	24.50
VP4205	535,770	4,142,090	23,3000	.0918	.0175	.0508	2,320.0	20.5	167.00	20.10	35.60	21.60	101.00
VP4213	538,570	4,141,770	3,7600	.6250	3,2300	.3450	129.0	155.0	1,440.00	5.47	2.62	102.00	65.70
VP4215	531,600	4,140,810	18,6000	.1730	.0821	.1680	110.0	114.0	135.00	2.97	3.90	47.10	<1.00
VP4216	531,630	4,140,750	.8530	.0282	.0215	.0406	127.0	43.7	35.70	<1.00	1.85	7.62	28.10
VP4217	531,360	4,140,930	25,8000	.1520	.9390	.1810	322.0	143.0	239.00	4.65	4.17	39.50	<1.00
VP4220	531,280	4,139,800	18,2000	.1260	.5150	.1380	130.0	80.8	.81.30	4.63	6.66	35.20	<1.00
VP4400	534,690	4,143,650	20,4000	.0934	.0936	.0766	107.0	45.0	167.00	1.87	2.26	13.40	7.04
VP4401	533,840	4,143,480	14,7000	.1050	.1990	.1860	81.1	113.0	97.20	2.89	3.99	26.00	1.20
VP4402	533,530	4,143,120	.1790	.0094	.0049	.0383	21.2	93.2	8.90	<1.00	<1.00	8.55	<1.00
VP4403	533,470	4,142,920	.5930	.0162	.0091	.0419	270.0	50.4	34.40	<1.00	<1.00	12.30	25.60
VP4404	533,530	4,142,550	16,1000	.2380	.0639	.2230	75.2	120.0	95.00	3.93	3.79	37.70	3.72
VP4405	533,620	4,142,490	.6140	.0184	.0097	.0604	49.9	167.0	8.92	<1.00	<1.00	11.10	<1.00
VP4406	533,720	4,142,140	1,0600	.0791	.0402	.1980	49.3	95.7	49.70	<1.00	<1.00	17.50	2.57
VP4407	533,840	4,142,000	1,3000	.0756	.0149	.2530	582.0	55.9	57.70	<1.00	14.00	12.90	32.90
VP4408	533,900	4,141,990	.0641	.0141	.0117	.0737	12.6	83.4	29.40	<1.00	<1.00	4.61	6.19
VP4412	532,100	4,142,110	25,1000	.1550	.0495	.1690	84.2	67.4	91.50	2.93	5.07	33.90	1.05
VP4413	532,360	4,141,820	.6710	.0284	.0248	.0329	111.0	61.0	30.90	<1.00	1.27	31.90	<1.00
VP4414	532,460	4,141,680	.8880	.0598	.0190	.0931	117.0	62.6	40.30	<1.00	<1.00	13.20	<1.00
VP4415	532,540	4,141,940	.6460	.0482	.0216	.0684	26.2	135.0	140.00	<1.00	<1.00	23.50	<1.00
VP4417	532,820	4,141,540	.1120	.0154	.0089	.0559	29.0	64.0	11.50	<1.00	<1.00	4.70	<1.00
VP4418	532,870	4,141,430	1,4200	.1910	.0167	.1610	167.0	64.8	158.00	<1.00	3.40	15.60	7.79
VP4420	533,110	4,141,140	.8560	.1010	.1070	.0958	198.0	54.8	55.50	<1.00	1.80	8.23	9.85
VP4421	533,130	4,141,020	3,5500	.8420	.1480	.4860	124.0	179.0	311.00	2.28	11.90	34.60	32.70
VP4423	533,160	4,140,870	>23,5000	.1520	.0646	.0615	372.0	41.0	242.00	3.67	4.73	27.00	<1.00

sample	S-LA	S-MO	S-NB	S-NI	S-PB	S-SC	S-SR	S-V	S-Y	S-ZN	S-ZR	S-SIX	S-ALX
VP#127	<4.64	<1.47	<10.0	12.60	21.30	4.70	3.34	28.10	5.72	112.0	235.0	>34.30	.7260
VP#212	<4.64	<1.47	<10.0	9.33	<6.81	<1.00	3.76	4.35	3.53	18.5	220.0	>34.30	.1530
VP#213	<4.64	<1.47	<10.0	15.10	11.10	3.32	6.51	25.10	5.61	262.0	141.0	31.20	.3940
VP#204	90.10	29.00	<10.0	97.70	33.80	16.90	15.30	117.00	18.50	1,100.0	525.0	16.90	.5140
VP#235	<4.64	<1.47	<10.0	111.00	136.00	10.90	6.03	117.00	6.06	1,590.0	36.0	14.00	1.0300
VP#213	213.00	1.65	<10.0	16.80	37.30	22.50	324.00	255.00	199.00	23.8	425.0	28.20	6.4400
VP#215	<4.64	<1.47	10.6	14.60	14.90	10.30	155.00	71.90	52.50	31.8	799.0	>34.30	1.7700
VP#216	<4.64	<1.47	<10.0	2.60	<6.81	1.65	5.54	7.56	5.06	<14.7	506.0	>34.30	.4690
VP#217	<4.64	<1.47	10.2	11.00	18.10	17.80	277.00	94.10	164.00	37.5	>2,150.0	>34.30	2.0300
VP#220	46.00	<1.47	<10.0	26.60	12.90	10.10	114.00	70.30	62.10	30.7	1,290.0	34.20	1.2800
VP#400	<4.64	2.38	<10.0	6.33	15.80	6.72	79.00	75.90	31.40	74.5	431.0	>34.30	.7330
VP#401	58.70	<1.47	13.9	51.30	12.20	9.83	192.00	65.20	63.50	<14.7	1,280.0	>34.30	.9460
VP#402	<4.64	<1.47	<10.0	3.39	<6.81	1.12	2.22	3.30	5.81	<14.7	324.0	>34.30	<.0316
VP#403	21.90	<1.47	<10.0	16.40	<6.81	3.82	5.57	10.50	540.00	<14.7	2,060.0	>34.30	.3740
VP#404	50.30	1.58	10.0	18.00	11.50	12.20	95.80	85.50	54.20	33.2	442.0	>34.30	2.1300
VP#405	<4.64	<1.47	<10.0	4.74	<6.81	<1.00	4.08	6.97	5.63	<14.7	807.0	>34.30	<.0316
VP#406	12.70	<1.47	<10.0	4.06	7.55	2.29	10.50	15.00	15.50	<14.7	1,450.0	>34.30	1.1600
VP#407	13.80	<1.47	11.8	12.40	<6.81	2.73	11.20	19.90	17.50	<14.7	775.0	>34.30	1.1500
VP#408	8.55	<1.47	<10.0	1.89	<6.81	1.15	5.62	4.27	21.70	<14.7	1,860.0	>34.30	.1610
VP#412	45.60	<1.47	16.3	20.10	16.60	12.40	75.00	106.00	47.40	44.1	817.0	>34.30	1.3400
VP#413	<4.64	<1.47	<10.0	13.50	7.48	1.01	4.40	2.84	4.38	<14.7	879.0	>34.30	.1310
VP#414	<4.64	<1.47	<10.0	2.75	<6.81	2.13	6.83	14.40	9.84	<14.7	552.0	>34.30	1.0000
VP#415	12.80	<1.47	<10.0	7.16	13.50	2.15	14.60	9.52	17.80	<14.7	1,690.0	>34.30	.4490
VP#417	5.51	<1.47	<10.0	1.75	<6.81	<1.00	4.58	3.27	4.85	<14.7	168.0	>34.30	.1880
VP#418	12.70	<1.47	<10.0	11.20	<6.81	2.56	18.30	20.10	13.80	<14.7	220.0	>34.30	1.5000
VP#420	21.50	<1.47	<10.0	5.83	<6.81	1.52	9.61	10.00	19.40	15.8	402.0	>34.30	.7050
VP#421	46.20	<1.47	15.1	32.40	8.42	10.60	114.00	65.40	36.20	14.9	613.0	>34.30	5.6000
VP#423	74.90	<1.47	10.9	14.50	15.90	10.60	227.00	108.00	50.40	94.3	353.0	>34.30	1.3600

sample	S-MAX	S-KX	S-PX	S-CE	S-GA	S-HF	S-TM	S-YB	S-PR	S-ND	S-SM	S-EU	S-GD	S-HO	S-ER	S-LU
VP4127	<.0046	<.0681	<.0681	<43.0	6.25	<21.5	22.6	1.00	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VP4202	<.0046	<.0681	-.0727	<43.0	<2.15	<21.5	<21.5	.27	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VP4203	<.0046	<.0681	<.0681	<43.0	2.15	<21.5	<21.5	1.10	4.26	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VP4214	<.0046	.1560	<.0681	349.0	13.40	<21.5	<21.5	2.17	16.80	<68.1	10.50	1.85	8.59	<3.16	<4.64	<3.16
VP4205	<.0046	.5350	.7080	<43.0	8.42	<21.5	<21.5	1.28	3.84	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VP4213	.1820	3.4100	1.3100	390.0	22.30	<21.5	<21.5	12.90	60.90	129.0	28.30	27.00	90.30	10.80	47.80	<3.16
VP4215	<.0046	>.6810	<.0681	<43.0	12.60	<21.5	<21.5	5.16	9.50	<68.1	7.06	2.05	<14.70	<3.16	8.12	<3.16
VP4216	<.0046	.2760	<.0681	<43.0	2.20	<21.5	<21.5	1.25	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VP4217	.0100	>.6810	.6390	.0	17.40	<21.5	84.5	19.20	13.30	<68.1	<31.60	7.87	<14.70	15.00	34.40	4.88
VP4223	<.0046	>.6810	.3770	202.0	9.21	<21.5	<21.5	6.09	9.98	<68.1	9.30	1.85	<14.70	10.00	14.50	<3.16
VP4400	<.0046	.2740	<.0681	<63.2	8.79	<21.5	<21.5	3.97	8.88	<68.1	6.24	1.17	8.68	<3.16	<4.64	<3.16
VP4401	<.0046	.4420	.3380	223.0	8.78	24.1	<21.5	4.20	13.10	<68.1	9.92	2.08	<14.70	<10.00	15.30	<3.16
VP4402	<.0046	<.0681	.0829	<43.0	<2.15	<21.5	<21.5	.77	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VP4403	<.0046	.1720	.1010	<43.0	<2.15	<21.5	<21.5	33.90	<3.16	<68.1	5.34	7.99	68.80	22.60	74.50	<3.16
VP4404	.0160	>.6810	<.0681	230.0	12.10	<21.5	<21.5	4.36	11.80	<68.1	7.78	1.08	<14.70	<3.16	10.20	<3.16
VP4405	<.0046	<.0681	<.0681	58.0	<2.15	<21.5	<21.5	.68	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VP4406	<.0046	.3310	<.0681	49.2	3.29	<21.5	<21.5	1.60	<3.16	<68.1	5.79	<1.00	16.00	<10.00	<4.64	<3.16
VP4407	<.0046	.3420	.0728	45.8	3.16	<21.5	<21.5	1.70	<3.16	<68.1	4.88	<1.00	<14.70	<3.16	<4.64	3.29
VP4408	<.0046	.0721	<.0681	84.9	<2.15	<21.5	<21.5	3.37	<3.16	93.5	7.25	<1.00	<4.64	<10.00	<4.64	<3.16
VP4412	<.0046	.6440	<.0681	214.0	<2.15	<21.5	<21.5	2.80	10.90	<68.1	8.59	<1.00	<14.70	<3.16	<4.64	<3.16
VP4413	<.0046	<.0681	<.0681	<43.0	<2.15	<21.5	<21.5	.80	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VP4414	<.0046	.3300	.0995	<43.0	3.48	<21.5	<21.5	1.24	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	<3.16
VP4415	<.0046	.1060	<.0681	50.6	<2.15	<21.5	22.8	2.59	<3.16	120.0	6.28	1.00	<4.64	<10.00	<4.64	<3.16
VP4417	<.0046	.0929	<.0681	<43.0	<2.15	<21.5	<21.5	1.02	<3.16	<68.1	<4.64	<1.00	<4.64	<3.16	<4.64	3.19
VP4418	.0005	.6430	<.0681	<43.0	3.32	<21.5	<21.5	1.27	<3.16	<68.1	<4.64	<1.00	<14.70	<3.16	<4.64	<3.16
VP4420	<.0046	.2580	<.0681	43.5	<2.15	<21.5	<21.5	1.12	<3.16	<68.1	5.82	<2.15	<4.64	<3.16	<4.64	<3.16
VP4421	.1290	>1.4700	.1060	88.4	12.50	<21.5	30.6	4.40	4.72	<68.1	6.12	<1.00	<14.70	<3.16	6.00	4.10
VP4423	<.0046	<.0681	<.0681	247.0	13.00	<21.5	99.2	3.88	17.10	226.0	11.70	2.49	<14.70	<3.16	9.93	<3.16

Stream Sediments

sample	X-COORD.	Y-COORD.	S-FEX	S-MGZ	S-CAZ	S-TIX	S-MN	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
VP4105	535,140	4,143,740	.397	.0196	.0397	.0548	10.6	91.0	57.4	<1.00	<1.00	3.52	55.70
VP4106	536,240	4,144,090	.728	.0186	.0223	.0483	175.0	95.2	96.5	<1.00	8.41	3.68	<1.00
VP4108	535,780	4,141,040	6.070	.1160	.0355	.1750	510.0	90.3	134.0	3.57	12.80	18.10	90.50
VP4123	532,320	4,141,060	2.820	.1380	.1150	.1500	861.0	48.5	359.0	5.17	14.50	19.50	15.40
VP4125	532,410	4,140,400	14.100	.0483	.0493	.1570	2,100.0	68.9	292.0	4.78	23.30	23.20	50.40
VP4126	532,090	4,140,100	2.000	.2510	.9200	.1640	4,130.0	46.4	357.0	7.28	13.10	24.60	30.60
VP4101	535,920	4,143,080	.982	.0904	.0509	.0792	941.0	79.3	203.0	5.31	48.60	17.50	16.00
VP4102	535,800	4,142,960	.829	.0355	.0222	.0542	163.0	56.8	69.8	<1.00	9.25	7.98	1.18
VP4104	535,740	4,142,980	1.060	.1210	.0489	.0864	2,440.0	50.3	234.0	9.00	43.60	17.80	33.60
VP4105	534,990	4,143,580	.256	.0100	.0085	.0409	14.8	44.0	20.3	<1.00	<1.00	2.53	<1.00
VP4106	535,060	4,143,610	.896	.0319	.0212	.0502	16.5	148.0	35.1	<1.00	<1.00	5.06	1.25
VP4112	535,170	4,141,750	1.730	.1110	.0586	.0935	582.0	38.9	367.0	3.55	15.60	15.10	22.70
VP4121	529,940	4,139,740	.358	.0437	.0856	.0744	30.0	93.1	66.6	<1.00	<1.00	7.29	1.98
VP4122	530,040	4,139,800	5.220	.2290	.2010	.1320	676.0	89.3	213.0	3.26	19.30	24.90	15.90
VP4123	530,530	4,139,430	1.310	.0428	.1000	.1120	168.0	62.8	66.3	1.34	4.04	6.36	2.41
VP4200	536,340	4,142,500	1.300	.0958	.0218	.1350	148.0	81.7	114.0	1.57	4.16	18.30	2.53
VP4201	536,220	4,142,410	1.040	.0381	.0159	.0603	139.0	83.7	29.2	1.15	8.50	4.71	1.60
VP4206	535,720	4,142,170	1.620	.1390	.0445	.1400	457.0	49.3	329.0	1.94	18.80	20.90	17.00
VP4207	535,670	4,141,320	4.080	.1390	.0560	.1020	2,030.0	56.4	232.0	4.22	21.20	15.10	25.00
VP4208	535,750	4,141,260	.891	.0367	.0201	.1410	247.0	67.4	51.1	1.23	3.34	6.45	1.50
VP4209	536,290	4,141,370	3.190	.0653	.0323	.0847	311.0	50.4	117.0	1.88	12.00	19.80	4.85
VP4210	536,560	4,141,950	.449	.0204	.0097	.0509	107.0	59.9	26.0	<1.00	1.93	8.52	<1.00
VP4211	536,730	4,141,530	1.320	.1060	.0370	.0724	106.0	66.6	165.0	1.33	6.96	15.90	24.20
VP4212	538,090	4,141,790	.861	.0729	.0172	.1050	81.3	45.7	92.7	<1.00	1.65	9.62	2.00
VP4214	531,520	4,141,160	.924	.0499	.0279	.0425	215.0	111.0	74.2	<1.00	10.40	6.23	1.26
VP4213	531,710	4,140,350	2.080	.1230	.0744	.1310	137.0	105.0	108.0	1.54	6.13	14.40	5.19
VP4217	531,650	4,140,380	.636	.0350	.0357	.0742	98.4	74.1	37.5	<1.00	2.22	4.74	<1.00
VP4221	531,200	4,139,910	1.990	.0858	.1120	.1170	480.0	71.8	104.0	1.24	8.64	18.50	3.16
VP4222	531,050	4,139,860	2.660	.1100	.1010	.0855	340.0	77.2	124.0	3.03	6.51	17.10	6.17
VP4223	531,000	4,140,030	.673	.0244	.0162	.0357	26.5	106.0	31.3	<1.00	<1.00	4.96	<1.00
VP4224	526,280	4,140,630	4.070	.7720	.1940	.5970	816.0	105.0	388.0	2.58	19.10	48.90	29.00
VP4225	527,800	4,141,640	2.420	.6410	.3680	.6250	1,360.0	71.3	440.0	3.32	15.60	33.40	22.40
VP4226	529,360	4,143,300	3.770	.5870	.2580	.3560	1,690.0	55.9	307.0	2.72	12.60	30.10	16.30
VP4227	532,670	4,142,840	2.660	.6760	.4770	.2870	485.0	100.0	291.0	2.98	10.30	23.30	31.50
VP4228	533,200	4,144,940	1.940	.4070	.1490	.3490	353.0	85.6	246.0	2.22	9.21	21.90	13.10
VP4229	534,780	4,145,660	2.390	.8850	.2900	.2910	535.0	75.1	232.0	2.11	11.70	22.00	23.70
VP4230	529,900	4,138,630	1.960	.0914	.1860	.2000	406.0	62.0	170.0	4.00	11.00	14.90	11.50
VP4409	534,260	4,142,240	1.460	.0674	.0361	.0743	656.0	64.3	302	3.02	22.80	16.80	7.10
VP4410	534,180	4,142,220	2.670	.0852	.0852	.2850	926.0	84.6	319.0	4.66	142.00	24.20	28.60
VP4411	534,480	4,141,860	1.660	.0838	.0794	.1040	351.0	108.0	156.0	2.50	15.70	15.60	30.60
VP4416	532,560	4,141,940	1.470	.1160	.0427	.1520	207.0	46.2	157.0	2.33	33.90	<14.70	8.39
VP4419	535,060	4,141,230	1.430	.1160	.0700	.1160	712.0	63.5	172.0	5.43	45.50	16.10	13.80
VP4422	533,160	4,140,870	2.680	.1950	.1720	.1990	2,590.0	58.5	413.0	8.28	41.40	24.90	15.70

Stream Sediments

sample	S-LA	S-NB	S-NI	S-PB	S-SC	S-SR	S-V	S-Y	S-ZN	S-ZR	S-SIX	S-ALZ	S-NAZ	S-KZ
VP#005	20.20	<10.0	2.13	8.57	1.85	5.57	8.61	27.90	<14.7	>2,150	>34.3	.1980	<.0046	<.0681
VP#008	11.60	<10.0	2.16	<6.81	2.26	6.00	9.39	46.00	<14.7	733	>34.3	.1660	<.0046	<.0681
VP#018	36.60	16.5	15.00	11.80	9.49	24.80	68.70	49.10	<14.7	>2,150	>34.3	1.1600	.0091	.5700
VP#J23	24.60	<10.0	12.20	17.70	8.36	104.00	61.10	25.80	<14.7	250	>34.3	2.1300	.0405	.7160
VP#J25	45.20	18.1	25.90	65.50	11.20	86.30	85.30	51.80	77.2	856	>34.3	1.3500	<.0046	.4360
VP#J26	38.20	<10.0	49.70	57.00	7.22	133.00	52.60	51.70	60.3	173	26.1	2.6500	.0580	.5700
VP#100	35.50	<10.0	13.40	84.30	2.54	12.80	23.50	31.90	88.0	176	27.2	1.2400	.0309	.4310
VP#101	12.60	<10.0	2.30	10.50	2.25	7.37	15.70	36.00	15.0	768	>34.3	.4010	<.0046	.0744
VP#102	45.20	<10.0	43.70	22.80	6.53	14.70	38.80	60.70	118.0	151	23.1	2.2200	.0365	.5440
VP#105	<4.64	<10.0	1.39	<6.81	1.13	2.92	3.62	7.80	<14.7	119	>34.3	.0665	<.0046	<.0681
VP#106	10.20	<10.0	1.34	7.62	1.60	11.40	9.37	21.70	<14.7	565	>34.3	.2600	<.0046	<.0681
VP#112	21.50	<10.0	15.10	73.10	4.50	29.00	41.60	24.30	87.5	142	>34.3	1.6100	.0308	.5070
VP#121	9.82	<10.0	3.69	11.70	2.13	9.66	14.40	21.10	<14.7	628	>34.3	.5640	<.0046	.1110
VP#122	20.30	<10.0	22.60	60.20	5.66	86.40	59.10	17.30	32.6	276	>34.3	2.2600	.0335	.9760
VP#123	15.60	<10.0	6.89	19.70	2.58	9.79	17.20	28.60	<14.7	807	>34.3	.4140	<.0046	.1070
VP#1200	15.70	10.1	4.93	17.70	3.88	17.20	24.90	23.40	<14.7	>2,150	>34.3	1.3400	.0158	.3210
VP#1201	<4.64	<10.0	2.91	10.20	1.72	5.48	11.40	22.00	<14.7	>2,150	>34.3	.2350	<.0046	<.0681
VP#1206	19.70	<10.0	8.94	53.70	4.00	32.90	41.90	20.60	<14.7	185	>34.3	1.8800	.0335	.5170
VP#1207	<4.64	<10.0	81.80	141.00	4.02	16.30	24.60	15.50	69.0	517	>34.3	1.1800	<.0046	.5090
VP#1208	<4.64	<10.0	5.16	14.10	2.35	6.16	19.70	20.50	42.8	>2,150	>34.3	.2860	<.0046	.0763
VP#1209	16.40	<10.0	21.70	32.20	3.69	13.70	38.00	20.20	91.5	1,430	>34.3	.7340	<.0046	.1940
VP#1210	<4.64	<10.0	1.73	<6.81	<1.00	5.23	7.13	4.99	<14.7	266	>34.3	.2740	<.0046	<.0681
VP#211	11.20	<10.0	7.19	29.10	3.25	24.90	35.20	15.80	31.8	455	>34.3	1.5600	.0117	.3420
VP#1212	6.85	<10.0	4.28	12.70	2.18	10.40	21.90	9.61	<14.7	838	>34.3	1.0100	<.0046	.1570
VP#1214	<4.64	<10.0	5.22	<6.81	1.71	12.50	11.30	12.50	<14.7	115	>34.3	.7260	<.0046	.0980
VP#1218	13.00	<10.0	9.23	11.50	3.69	27.00	22.50	24.00	<14.7	617	>34.3	1.5400	.0158	.5450
VP#1219	7.22	<10.0	2.48	<6.81	1.77	7.97	8.48	20.20	<14.7	459	>34.3	.4510	<.0046	<.0681
VP#1221	12.00	<10.0	9.03	20.20	2.69	22.90	19.80	17.70	<14.7	258	>34.3	1.3900	.0084	.3490
VP#1222	15.90	<10.0	10.60	8.72	3.04	24.00	29.80	15.00	27.9	258	>34.3	1.3000	.0110	.4010
VP#1223	<4.64	<10.0	1.43	7.00	1.94	6.41	7.36	14.30	<14.7	498	>34.3	.1900	<.0046	<.0681
VP#1224	44.20	18.2	29.30	22.00	12.10	114.00	82.20	33.00	27.9	426	>34.3	5.6000	.2660	>1.4700
VP#1225	48.80	17.5	29.80	25.60	9.95	81.50	72.30	36.80	19.4	454	>34.3	4.7300	.1590	>1.4700
VP#1226	28.10	15.2	22.20	18.70	8.79	76.00	65.80	24.40	<14.7	303	>34.3	3.0100	.1390	>1.4700
VP#1227	35.80	12.9	21.10	25.50	9.73	134.00	55.60	31.20	90.0	306	>34.3	2.5700	.1910	1.2300
VP#1228	29.30	15.4	15.10	18.00	7.26	31.20	53.10	28.60	42.4	416	>34.3	3.8000	.1790	1.3100
VP#1229	30.40	10.6	18.50	16.10	7.65	76.20	48.70	22.40	21.4	315	>34.3	2.8900	.1710	1.0400
VP#1230	23.40	13.2	19.30	38.50	5.40	15.50	41.00	34.30	32.0	828	>34.3	1.7700	.0203	.3590
VP#1239	16.90	<10.0	8.99	11.70	3.33	11.80	26.40	17.90	30.4	467	>34.3	1.4500	.0172	.4680
VP#1240	43.10	14.1	25.00	8.55	12.90	106.00	84.10	50.40	47.4	349	>34.3	3.7200	.0813	1.1100
VP#1241	14.60	<10.0	10.60	16.50	2.98	11.80	28.50	21.10	<14.7	303	>34.3	1.5400	.0140	.3700
VP#1246	20.50	<10.0	7.67	7.24	3.95	21.90	33.00	19.00	<14.7	401	>34.3	1.8000	.0206	.5490
VP#1249	18.60	<10.0	13.40	9.73	4.69	15.40	36.70	24.90	<14.7	663	>34.3	1.8100	.0290	.6080
VP#1252	32.30	11.8	21.70	16.90	9.73	105.00	68.80	28.70	15.7	288	>34.3	3.8600	.0575	1.0100

Stream Sediments

sample	S-PX	S-CE	S-GA	S-TH	S-YB	S-PR	S-ND	S-SH	S-EU	S-GD	S-ER
VP4005	.0725	79.8	<2.15	34.6	1.61	<3.16	<8.1	<31.60	<1.00	5.02	<4.64
VP4008	.0699	58.1	<2.15	37.0	3.26	<3.16	<8.1	<31.60	<1.00	4.80	<4.64
VP4018	.1450	158.0	5.10	39.6	1.77	6.85	<8.1	<31.60	<1.00	<14.70	6.52
VP4023	.0819	63.7	5.30	<21.5	1.67	5.14	<8.1	4.66	1.03	<14.70	<4.64
VP4025	<.0681	175.0	7.10	<21.5	2.40	7.78	<8.1	8.82	<1.00	<14.70	7.59
VP4026	.0829	70.5	4.33	<21.5	5.27	5.60	<8.1	4.70	<1.00	14.10	<4.64
VP4103	<.0681	<43.0	2.26	<21.5	1.66	4.17	<8.1	<4.64	<1.00	5.71	<4.64
VP4101	<.0681	49.6	<2.15	46.2	1.77	<3.16	<8.1	<4.64	<1.00	6.00	<4.64
VP4102	.0757	52.1	2.90	<21.5	5.14	6.19	<8.1	<4.64	2.34	12.50	6.82
VP4105	.0707	<43.0	<2.15	<21.5	1.52	<3.16	<8.1	<4.64	<1.00	<4.64	<4.64
VP4106	<.0681	44.0	<2.15	<21.5	3.24	3.91	122.0	<4.64	1.58	5.56	<4.64
VP4112	.0736	<43.0	4.77	<21.5	2.68	4.39	<8.1	<4.64	<1.00	6.14	<4.64
VP4121	<.0681	<43.0	<2.15	29.4	2.19	<3.16	<8.1	<4.64	<1.00	<4.64	<4.64
VP4122	<.0681	61.5	7.27	37.6	3.24	<3.16	<8.1	<4.64	<1.00	<14.70	<4.64
VP4123	.0725	46.3	<2.15	<21.5	3.53	<3.16	<8.1	5.07	<1.00	<14.70	<4.64
VP4203	<.0681	67.5	2.92	<21.5	3.18	<3.16	<8.1	<31.60	<1.00	<14.70	<4.64
VP4201	.0754	<43.0	<2.15	<21.5	4.05	<3.16	<8.1	<3.16	1.00	<4.64	<4.64
VP4206	.0792	<43.0	3.98	48.3	3.04	<3.16	<8.1	<4.64	1.27	<14.70	<4.64
VP4207	.0817	49.3	3.95	<21.5	1.75	<3.16	118.0	<4.64	<1.00	<14.70	<4.64
VP4208	.0712	76.2	<2.15	<21.5	2.94	<3.16	102.0	<31.60	<1.00	<14.70	<4.64
VP4209	.0847	62.6	2.74	<21.5	1.62	<3.16	<8.1	<31.60	<1.00	<4.64	<4.64
VP4210	<.0681	<43.0	<2.15	<21.5	.75	<3.16	<8.1	<4.64	<1.00	4.69	<4.64
VP4211	<.0681	<43.0	2.74	<21.5	3.30	<3.16	<8.1	<4.64	<1.00	<4.64	<4.64
VP4212	<.0681	56.9	<2.15	<21.5	1.62	<3.16	<8.1	<4.64	<1.00	<14.70	<4.64
VP4214	<.0681	<43.0	<2.15	<21.5	1.69	<3.16	<8.1	<4.64	<1.00	<4.64	<4.64
VP4218	<.0681	51.1	3.72	<21.5	4.82	<3.16	<8.1	<4.64	1.14	<14.70	<4.64
VP4219	<.0681	<43.0	<2.15	<21.5	3.02	<3.16	<8.1	<4.64	<1.00	<4.64	<4.64
VP4221	<.0681	<43.0	3.34	23.7	2.13	<3.16	<8.1	<4.64	<1.00	<14.70	<4.64
VP4222	<.0681	<43.0	3.57	26.3	1.74	<3.16	<8.1	<4.64	<1.00	<4.64	<4.64
VP4223	<.0681	62.3	<2.15	<21.5	1.56	<3.16	124.0	<4.64	<1.00	<4.64	<4.64
VP4224	.0908	91.8	15.50	29.2	5.08	6.88	<8.1	6.02	<1.00	<14.70	<4.64
VP4225	.1070	100.0	9.29	36.9	4.11	9.60	<8.1	6.68	<1.00	<14.70	11.30
VP4226	.0935	66.2	8.82	<21.5	2.09	4.15	81.4	<4.64	<1.00	<14.70	<4.64
VP4227	.1440	80.5	7.44	47.3	2.48	5.79	116.0	5.58	<1.00	<14.70	<4.64
VP4228	.0765	61.8	6.30	<21.5	4.11	5.77	113.0	5.58	<1.00	<14.70	<4.64
VP4229	.0812	77.0	6.29	<21.5	2.44	<3.16	<8.1	4.86	<1.00	<14.70	7.76
VP4230	<.0681	64.5	3.61	<21.5	2.66	4.27	<8.1	5.46	<1.00	<14.70	<4.64
VP4239	<.0681	54.1	2.76	43.5	1.81	3.65	169.0	5.55	<1.00	<4.64	<4.64
VP4410	.0765	111.0	10.50	<21.5	2.58	8.85	<8.1	6.54	<1.00	<14.70	7.52
VP4411	.0779	48.5	3.90	<21.5	1.69	4.20	<8.1	<4.64	<1.00	<14.70	<4.64
VP4416	<.0681	50.1	3.56	<21.5	2.10	<3.16	<8.1	<4.64	<1.00	<14.70	<4.64
VP4419	<.0681	54.0	3.96	24.9	3.62	<3.16	<8.1	6.02	<1.00	<14.70	<4.64
VP4422	.0839	85.4	6.73	<21.5	2.44	5.38	124.0	5.31	<1.00	<14.70	<4.64