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SAMPLES COLLECTED IN THE CIRCLE MINING DISTRICT, JUNE 1993**

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GEOCHEMICAL MAJOR-OXIDE AND TRACE ELEMENT DATA FOR ROCK SAMPLES COLLECTED IN THE CIRCLE MINING DISTRICT, JUNE, 1993

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Rainer J. Newberry¹, Milton A. Wiltse², L. Katherine Queen¹, and DeAnne S. Pinney²

INTRODUCTION

In June, 1993, the Alaska Division of Geological and Geophysical Surveys initiated a geological and geophysical survey of the central part of the Circle mining district. During that survey 28 igneous rock samples were collected for chemical analysis. The location of these samples is shown on Plate 1. An abbreviated description and location data for each sample are tabulated in Table 1. The major-oxide and petrogenetically important trace element data are tabulated for each sample in Table 2.

ANALYTICAL METHODS

Major oxides

Major-oxide analyses were performed by Bondar-Clegg & Company, Ltd. Samples were reduced to minus-10 mesh, split, and a representative fraction pulverized to minus-200 mesh using an agate swing mill. A 0.1-g aliquot of the pulverized sample was fused with lithium metaborate and subsequently dissolved in an HNO₃ solution. The major-element content of the solution was determined using a Jarrell Ash ICP-emission spectrometer. The FeO content of the rocks was determined by titration procedures, and the total iron content of the rock was then corrected to provide both FeO and Fe₂O₃ data. Loss on ignition (LOI) values were determined on 1-g aliquots using a heating time of 4 hours and temperature of 850 °C.

Trace elements

Trace element analyses were performed by Rainer J. Newberry in the University of Alaska X-ray fluorescence spectrometer laboratory. Approximately 7 g of minus-200-mesh sample material was pressed into flat disks for analysis by a Rigaku® wave-length-dispersive X-ray spectrometer using procedures developed by the Alaska Division of Geological and Geophysical Surveys for data acquisition and correction. Three analyses of each pressed-powder disk were conducted and the estimated errors due to counting statistics are noted in the column headings of Table 2.

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Table-2. Concentration of major oxides and trace elements in Circle mining district rock samples collected in June 1993.

Sample	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	FeO %	MnO %	MgO %	CaO %	Na ₂ O %	K ₂ O %	P ₂ O ₅ %	LOI %	Total %
1077A	66.00	.64	14.95	1.29	3.44	.09	1.84	4.44	2.38	3.15	.16	.88	99.26
1077B	69.84	.41	14.82	.81	2.73	.08	.89	2.48	2.86	4.69	.08	.63	100.32
1082	74.89	.06	12.92	.76	.78	.03	.11	.80	3.18	5.45	-.03	.61	99.56
1097	75.45	.11	13.40	.88	.32	.02	.13	.59	2.75	5.17	.06	.37	99.25
1758A	68.83	.45	14.97	2.72	.32	.05	.53	2.61	2.58	3.62	.14	3.90	100.72
1758B	65.46	.44	15.13	2.16	.78	.07	.73	3.37	2.85	3.82	.14	4.68	99.63
1775A	76.66	.05	12.69	.32	.13	.01	.09	.94	2.91	5.59	.01	.34	99.74
1775B	74.96	.03	13.69	.15	.13	.01	.07	.86	3.38	5.65	-.03	.49	99.39
1776A	69.20	.34	14.70	.82	2.01	.09	.82	2.81	2.78	4.29	.14	1.09	99.09
1776B	71.07	.31	15.09	.75	1.95	.09	.80	2.73	2.90	4.38	.06	.74	100.87
1782	73.15	.28	13.42	.87	1.05	.04	.76	1.32	2.97	4.86	.10	.96	99.78
1783A	67.57	.53	14.78	.92	2.27	.05	1.26	2.19	3.18	4.07	.22	1.00	98.04
1783B	68.14	.54	15.12	.77	2.54	.04	1.30	2.22	3.68	3.03	.14	1.30	98.82
1795A	75.47	.04	13.04	.59	.39	.01	.06	.62	3.16	5.15	.05	.52	99.10
1795B	75.11	.04	13.92	.61	.33	.01	.03	.56	3.58	5.01	.05	.49	99.74
1797A	70.87	.43	13.21	.74	2.14	.07	.36	1.38	2.70	5.30	.11	1.50	98.81
1797B	73.49	.38	12.64	.56	2.08	.07	.31	.97	2.71	5.29	.07	1.22	99.79
1798A	74.79	.16	12.83	.71	1.04	.03	.11	1.09	3.15	5.46	.05	.67	100.09
1798B	74.94	.12	12.29	.46	1.04	.03	.08	.83	3.08	5.23	-.03	.58	98.65
1806	44.89	1.85	15.84	1.49	8.10	.17	5.94	9.18	2.22	.73	.30	7.27	97.98
1828	65.23	.80	16.34	1.42	2.53	.06	1.11	4.16	3.38	3.50	.22	.78	99.53
4342	69.67	.33	14.53	.94	1.30	.05	.76	2.25	3.32	3.80	.10	1.33	98.38
4343	71.56	.19	13.96	.79	1.56	.05	.34	2.85	2.80	3.71	.02	.93	98.76
4345	71.05	.19	13.87	.70	1.75	.05	.33	2.81	2.79	3.73	.02	.88	98.17
4346	71.45	.19	13.95	.62	1.88	.05	.32	2.83	2.78	3.68	.04	1.08	98.87
4348	67.75	.34	15.21	.56	2.27	.07	.74	3.15	2.80	4.53	.15	.65	98.22
4576	69.14	.30	14.64	.61	1.49	.05	.71	2.31	3.43	4.17	.09	1.14	98.08
4577	48.33	2.31	15.35	1.63	8.79	.24	6.27	8.29	2.67	1.42	.44	2.76	98.50
4578	47.86	2.09	15.31	1.37	8.10	.18	6.24	9.61	2.47	.24	.32	3.55	97.34
4579A	65.00	.86	16.05	1.29	2.79	.06	1.36	4.33	2.96	3.17	.24	1.70	99.81
4580	70.81	.28	14.44	.44	1.69	.06	.65	1.93	3.36	5.02	.11	1.63	100.42
4582	73.87	.21	12.87	1.47	.58	.03	.16	1.00	2.73	5.42	.04	.99	99.37
4583	73.05	.24	13.22	.92	.97	.04	.19	.47	2.47	6.17	.10	1.14	98.98
4585	66.50	.63	15.08	.88	3.50	.09	1.81	4.33	2.51	3.29	.17	.60	99.39
4596	43.86	3.40	14.91	2.26	11.19	.19	5.43	6.39	3.97	1.27	.59	5.45	98.91
4599	69.08	.48	14.83	1.22	1.62	.05	1.18	2.64	3.71	3.17	.09	1.86	99.93
4603	71.28	.44	14.20	1.14	1.69	.06	.56	1.60	3.22	4.79	.13	.64	99.75
4607	71.44	.45	13.46	1.17	1.43	.06	.54	1.64	3.02	4.96	.14	.50	98.81
4608	72.52	.34	13.88	1.04	1.30	.06	.39	1.44	3.21	5.30	.10	.54	99.92
933RNO9	66.20	.73	16.56	.85	2.73	.06	.90	3.93	3.36	3.67	.19	.87	100.05
933MR60	73.27	.13	12.64	.10	1.75	.03	.10	1.03	3.17	5.09	-.03	.91	98.23

Sample numbers with "A" and "B" suffix indicate duplicate sample aliquots; ppm=parts per million. ± number in column heading is one standard deviation (n=3).

Table-2. Concentration of major oxides and trace elements in Circle mining district rock samples collected in June 1993.

Sample	Sc ±5 ppm	V ±3 ppm	Cl ±20 ppm	F +200 ppm	S +20 ppm
1077A	18	67	64	490	85
1077B					
1082	6	5	108	2458	30
1097	7	3	13	644	44
1758A					
1758B					
1775A	3	2	19	228	34
1775B					
1776A	11	36	56	770	18
1776B					
1782	9	17	36	824	85
1783A	9	35	98	416	18
1783B					
1795A					
1795B					
1797A	10	4	141	1625	108
1797B					
1798A	3	7	246	2241	30
1798B					
1806	29	116	10	581	533
1828	14	73	113	499	65
4342	8	23	52	585	34
4343	7	8	56	622	11
4345	10	11	48	563	31
4346					
4348	8	26	87	634	16
4576	7	22	66	253	21
4577	22	63	118	729	232
4578	24	121	35	823	302
4579A	16	78	119	732	72
4580	5	28	38	578	30
4582	5	4	203	2109	26
4583	6	2	170	2300	19
4585	15	63	89	534	44
4596	31	193	120	912	197
4599	10	44	64	610	26
4603	4	9	126	1700	16
4607			107	1800	20
4608	3	3	165	2029	22
93BR09					
93BR60	9	14	31	500	18

Sample numbers with "A" and "B" suffix indicate duplicate sample aliquots; ppm=parts per million; ± number in column heading is one standard deviation (n=3).