

SUPPLEMENTAL MATERIAL—SAMPLES AND MINERAL CHEMISTRY

APPENDIX 1. SAMPLES AND PRESSURE-TEMPERATURE ESTIMATES

Sample No.	Batholith*	Longitude	Latitude	P (kbar)	T (°C)	Sample Collector
SC-69-1b	PRB	242.4783	33.8503	2.0	690	Armstrong and Suppe (1973)
SC-69-40	PRB	243.2350	33.7039	4.4	710	Armstrong and Suppe (1973)
SC-69-41	PRB	243.2814	33.7008	4.7	695	Armstrong and Suppe (1973)
SC-69-43a	PRB	243.4047	33.5672	4.7	720	Armstrong and Suppe (1973)
SC-69-46	PRB	243.5639	33.5831	5.6	745	Armstrong and Suppe (1973)
SC-69-47	PRB	243.7022	33.7161	6.6	760	Armstrong and Suppe (1973)
SC-69-153	PRB	243.7842	33.5681	6.1	690	Armstrong and Suppe (1973)
1011-34	SNB	241.4083	36.1542	2.4	690	Ague and Brimhall (1988a, 1988b)
1011-49	SNB	241.3250	35.2667	5.4	715	Ague and Brimhall (1988a, 1988b)
1011-60	SNB	240.6125	37.8500	2.4	730	Ague and Brimhall (1988a, 1988b)
1011-62	SNB	240.5250	37.8167	1.6	700	Ague and Brimhall (1988a, 1988b)
1011-175	SG	241.9542	34.2875	7.1	765	Ague and Brimhall (1988a, 1988b)
1011-188	SG	242.1542	34.2833	5.1	720	Ague and Brimhall (1988a, 1988b)
1011-263	SNB	240.6667	38.2167	1.2	665	Ague and Brimhall (1988a, 1988b)
1011-311	SNB	240.4917	37.1375	3.9	745	Ague and Brimhall (1988a, 1988b)
1011-376	SNB	241.0958	36.7250	2.9	745	Ague and Brimhall (1988a, 1988b)
1011-385	SNB	241.2417	36.2042	4.3	740	Ague and Brimhall (1988a, 1988b)
1011-415	SNB	241.6750	35.4333	5.2	740	Ague and Brimhall (1988a, 1988b)
GC-33	SNB	241.000§	34.890§	7.4	735	Pickett and Saleeby (1993)

Note: Format for longitude and latitude is degrees.decimal degrees.

*SNB = Sierra Nevada batholith; PRB = Peninsular Ranges batholith;

SG = San Gabriel mountains.

§Estimated from Figure 2 in Pickett and Saleeby (1993).

APPENDIX 2. HORNBLENDE ANALYSES (wt. %)

	Ref.*	SiO ₂	TiO ₂	Al ₂ O ₃	FeO	MgO	MnO	CaO	Na ₂ O	K ₂ O	F	Cl	Total
SC-69-1b	1	49.94	0.81	4.96	14.72	14.32	0.24	11.68	0.86	0.43	0.11	0.13	98.20
SC-69-40	1	43.72	1.16	9.80	20.28	8.64	0.34	11.57	1.08	1.13	0.17	0.07	97.96
SC-69-41	1	43.99	0.90	9.86	20.26	8.72	0.34	11.60	1.07	1.06	0.15	0.07	98.02
SC-69-43A	1	43.90	1.24	10.26	19.14	9.49	0.34	11.60	1.08	1.21	0.14	0.10	98.50
SC-69-46	1	42.93	0.88	11.11	19.62	9.40	0.40	11.63	1.16	1.22	0.14	0.10	98.59
SC-69-47	1	40.81	0.77	12.43	21.17	8.12	0.32	11.67	1.39	1.45	0.12	0.09	98.34
SC-69-153	1	42.14	0.44	12.52	19.56	8.36	0.37	11.35	1.43	1.31	0.14	0.06	97.68
1011-34	2	44.77	1.30	7.60	23.55	7.08	0.64	11.49	1.00	0.88	0.20	0.16	98.67
1011-49	2	45.06	1.26	10.64	16.65	10.92	0.37	11.76	1.23	0.75	0.04	0.07	98.75
1011-60†	2,4	47.54	1.05	6.21	14.58	13.44	0.88	11.75	1.28	0.63	0.34	0.05	97.75
1011-62	2	50.05	0.64	5.07	14.33	14.55	0.92	11.74	1.07	0.45	0.18	0.01	99.01
1011-175	2	39.79	0.84	12.36	22.16	6.97	1.26	11.59	1.53	1.58	0.18	0.15	98.41
1011-188	2	44.23	0.84	9.14	20.56	9.22	0.63	11.64	1.35	0.98	0.08	0.02	98.69
1011-263	2	50.74	0.58	4.38	12.58	15.28	0.57	12.29	0.75	0.41	0.29	0.03	97.90
1011-311	2	43.95	1.27	9.42	19.34	9.82	0.50	11.96	1.19	1.07	0.09	0.07	98.68
1011-376	2	45.91	1.11	7.26	19.05	10.58	0.59	11.56	1.11	0.74	0.13	0.09	98.13
1011-385	2	45.77	1.31	7.58	18.32	10.93	0.51	11.42	1.29	0.71	0.10	0.12	98.06
1011-415	2	42.23	1.78	9.97	23.41	6.53	0.50	11.41	1.35	1.39	0.22	0.11	98.90
GC-33	3	39.69	1.41	13.74	22.42	5.70	0.54	11.42	1.38	1.93	N.D.	N.D.	98.23

Notes : All Fe as FeO. N.D. = not determined. Mineral compositions measured in this study were determined using the JEOL JXA-8600 electron microprobe at Yale University, employing wavelength dispersive spectrometers, natural and synthetic standards, off-peak and fluorescence-corrected mean atomic number background corrections, and $\phi(\rho z)$ matrix corrections.

*Analysis reference: 1 = Ague and Brandon (1992); 2 = Ague and Brimhall (1988a, 1988b); 3 = Pickett and Saleeby, (1993) 4 = This study.

†Redetermined in this study to avoid chloritic areas.

APPENDIX 3. BIOTITE ANALYSES (wt. %)

	Ref.*	SiO ₂	TiO ₂	Al ₂ O ₃	FeO	MgO	MnO	CaO	BaO	Na ₂ O	K ₂ O	F	Cl	Total
SC-69-1b	2	36.51	4.50	12.80	20.63	11.25	0.21	N.D.	0.03	0.10	9.16	0.22	0.32	95.73
SC-69-40	2	35.81	4.12	15.09	22.01	8.49	0.23	N.D.	0.40	0.09	8.99	0.18	0.04	95.45
SC-69-41	2	36.06	4.04	15.13	22.64	8.40	0.25	N.D.	0.50	0.11	9.05	0.22	0.07	96.47
SC-69-43A	2	36.07	4.32	14.90	21.80	9.67	0.31	N.D.	0.18	0.03	9.05	0.15	0.11	96.59
SC-69-46	2	36.56	3.28	15.23	21.09	9.85	0.33	N.D.	0.17	0.09	9.08	0.15	0.07	95.90
SC-69-47	2	35.89	2.94	15.05	21.22	10.10	0.33	N.D.	0.10	0.08	9.17	0.25	0.05	95.18
SC-69-153	2	36.79	4.23	15.93	19.60	9.36	0.41	N.D.	0.07	0.05	9.52	0.14	0.04	96.14
1011-34	1	35.36	3.40	14.55	24.11	7.78	0.35	0.01	N.D.	0.07	8.87	0.46	0.23	95.19
1011-49	1	36.81	2.74	16.67	18.14	11.54	0.14	0.01	N.D.	0.16	9.49	0.10	0.05	95.85
1011-60†	1,2	38.11	2.55	13.50	16.87	13.50	0.76	N.D.	B.D.	0.09	9.20	0.88	0.01	95.47
1011-62	1	37.12	2.94	13.51	17.61	13.30	0.57	B.D.	N.D.	0.09	9.46	0.48	0.03	95.11
1011-175†	1,2	36.61	2.39	15.28	21.50	9.16	1.00	N.D.	0.09	0.08	9.21	0.27	0.11	95.70
1011-188	1	35.80	2.81	15.22	23.09	9.87	0.42	0.03	0.31	0.09	9.27	0.18	0.02	97.11
1011-263	1	37.67	1.55	15.42	16.57	13.93	0.44	B.D.	0.22	0.06	9.63	0.75	0.03	96.27
1011-311	1	36.57	3.25	15.54	20.68	10.40	0.31	0.03	0.19	0.08	9.72	0.18	0.02	96.97
1011-376	1	36.09	4.23	14.43	21.99	9.85	0.36	0.02	0.20	0.09	9.50	0.24	0.13	97.13
1011-385	1	36.43	3.56	14.89	21.59	10.04	0.37	0.02	0.41	0.07	9.37	0.18	0.08	97.01
1011-415†	1,2	35.45	3.62	15.35	24.67	6.82	0.31	N.D.	0.19	0.08	9.27	0.24	0.05	96.05
GC-33	2	35.14	4.19	14.71	24.35	7.04	0.34	N.D.	0.38	0.07	9.10	0.08	0.22	95.62

Notes : All Fe as FeO. B.D. = below detection; N.D.=not determined. Mineral compositions measured in this study were determined using the JEOL JXA-8600 electron microprobe at Yale University, employing wavelength dispersive spectrometers, natural and synthetic standards, off-peak and fluorescence-corrected mean atomic number background corrections, and $\phi(\rho z)$ matrix corrections.

*Analysis reference: 1 = Ague and Brimhall (1988a, 1988b); 2 = This study.

†Redetermined in this study to avoid low-Ti, low-Ba areas.

APPENDIX 4. PLAGIOCLASE ANALYSES (wt. %)

	SiO ₂	Al ₂ O ₃	FeO	CaO	BaO	Na ₂ O	K ₂ O	Total	X _{Ab}	X _{An}	X _{Or}
SC-69-1b	60.06	24.71	0.17	6.50	B.D.	7.83	0.09	99.36	0.682	0.313	0.005
SC-69-40	59.04	25.35	0.07	7.25	0.05	7.26	0.19	99.20	0.638	0.352	0.011
SC-69-41	61.03	25.25	0.08	6.80	0.03	7.74	0.22	101.14	0.665	0.323	0.013
SC-69-43A	59.43	26.12	0.10	7.87	0.04	7.11	0.19	100.85	0.614	0.376	0.011
SC-69-46	58.47	25.77	0.10	7.68	0.09	7.26	0.13	99.51	0.626	0.366	0.008
SC-69-47	60.78	25.13	0.23	6.57	0.05	7.94	0.20	100.90	0.679	0.310	0.011
SC-69-153	59.95	24.72	0.08	6.44	0.04	7.80	0.14	99.17	0.681	0.311	0.008
1011-34	63.38	23.21	0.06	4.57	0.02	9.08	0.16	100.49	0.775	0.216	0.009
1011-49	59.55	26.70	0.11	8.31	0.05	7.08	0.09	101.89	0.603	0.391	0.005
1011-60	61.67	24.37	0.11	5.85	0.04	8.29	0.16	100.49	0.713	0.278	0.009
1011-62	62.25	23.62	0.14	5.55	0.04	8.07	0.18	99.86	0.717	0.273	0.011
1011-175	63.00	23.61	0.06	4.98	0.02	8.77	0.16	100.59	0.755	0.237	0.009
1011-188	62.47	23.94	0.14	5.23	0.04	8.66	0.22	100.69	0.741	0.247	0.012
1011-263	62.78	23.61	0.14	5.08	0.05	8.31	0.70	100.67	0.717	0.242	0.040
1011-311	60.29	24.92	0.10	6.64	0.04	7.82	0.18	99.99	0.674	0.316	0.010
1011-376	60.57	25.04	0.13	6.64	0.03	7.76	0.16	100.33	0.673	0.318	0.009
1011-385	61.60	24.62	0.11	6.17	0.03	8.09	0.16	100.78	0.697	0.294	0.009
1011-415	60.55	25.15	0.42	6.78	0.09	7.56	0.22	100.77	0.707	0.279	0.014
GC-33	60.06	25.00	0.05	6.60	0.13	7.44	0.75	100.02	0.642	0.315	0.043

Notes : All Fe as FeO. B.D. = below detection. All compositions determined in this study using the JEOL JXA-8600 electron microprobe at Yale University, employing wavelength dispersive spectrometers, natural and synthetic standards, off-peak and fluorescence-corrected mean atomic number background corrections, and $\phi(\rho z)$ matrix corrections.

APPENDIX 5. K-FELDSPAR ACTIVITY-COMPOSITION RELATIONS

As discussed in the text, the activity of KAlSi_3O_8 in K-feldspar was set to 0.8 for the calculations. Care needs to be exercised when doing calculations with the TWEEQU software of Berman (1991; version 1.02) that involve K-feldspar. Normally, the program uses the Or component of plagioclase to compute the activity of KAlSi_3O_8 , regardless of whether or not the activity was set to the fixed value of 0.8. To get around this difficulty, one can add a “new” phase to the Berman data base that has exactly the same composition and thermodynamic properties as K-feldspar. Give this “new” phase a name other than K-feldspar, K-feldspar (high), or K-feldspar (low). This “new” phase can then be used in the calculations, and its activity can be fixed at the desired value.

REFERENCES CITED IN SUPPLEMENTAL MATERIAL

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