Table A1. Modal compositions of the porphyritic finegrained tonalite (PFT) and clinopyroxene quartz diorite (CQD). Abbreviations: Qz, quartz; Pl, plagioclase; Kfs, Kfeldspar; Cpx, clinopyroxene; Opx, orthopyroxene; Bt, biotite; Hb, hornblende; Opq. Opaque; Chl, chlorite; Cal, calcite; and DPl, dusty-zoned plagioclase.

Type	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT
No	18050509	19062209	19070102	19070204	19070401	19070404	19070409	19070411B	19070413	19070415	20040301
LOI	1.270	1.263	1.333	1.223	1.399	1.077	1.394	1.250	1.326	1.453	1.076
Count (point)											
Qz	344	410	340	376	360	372	377	383	345	335	336
Pl	1257	1329	1258	1316	1309	1329	1317	1315	1305	1323	1291
Kfs	0	0	0	0	0	0	0	0	0	0	0
Cpx	0	21	0	0	0	0	0	0	0	0	13
Opx	0	0	0	0	0	0	0	0	0	0	0
Bt	178	100	129	107	100	137	86	103	146	124	190
Hb	212	130	249	171	223	151	208	188	193	188	149
Opq	9	10	24	30	8	11	12	11	11	14	21
Chl	0	0	0	0	0	0	0	0	0	0	0
Cal	0	0	0	0	0	0	0	0	0	16	0
Total	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Modal value (%)											
Qz	17.2	20.5	17.0	18.8	18.0	18.6	18.9	19.2	17.3	16.8	16.8
Pl	62.9	66.5	62.9	65.8	65.5	66.5	65.9	65.8	65.3	66.2	64.6
Kfs	0	0	0	0	0	0	0	0	0	0	0
Cpx	0	1.1	0	0	0	0	0	0	0	0	0.7
Opx	0	0	0	0	0	0	0	0	0	0	0
Bt	8.9	5.0	6.5	5.4	5.0	6.9	4.3	5.2	7.3	6.2	9.5
Hb	10.6	6.5	12.5	8.6	11.2	7.6	10.4	9.4	9.7	9.4	7.5
Opq	0.5	0.5	1.2	1.5	0.4	0.6	0.6	0.6	0.6	0.7	1.1
Chl	0	0	0	0	0	0	0	0	0	0	0
Cal	0	0	0	0	0	0	0	0	0	0.8	0
Total	100	100	100	100	100	100	100	100	100	100	100

Type	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT
No	20040401	20040402	18050511	19062207	19070104	19070105	19062206	20040202	20040205	20040206	20040207
LOI	0.847	1.014	1.655	3.092	1.867	2.143	2.731	2.374	2.084	1.682	2.123
Count (point)											
Qz	360	343	400	389	363	336	414	373	363	384	421
Pl	1246	1246	1224	1333	1198	1242	1289	1255	1264	1272	1309
Kfs	0	0	0	0	0	0		0	0	0	0
Cpx	0	0	0	0	0	0	0	0	0	0	0
Opx	0	0	0	0	0	0	0	0	0	0	0
Bt	141	118	168	148	153	190	151	168	116	148	96
Hb	240	284	200	119	274	215	120	194	236	182	161
Opq	13	9	8	11	12	17	26	10	21	14	13
Chl	0	0	0	0	0	0	0	0	0	0	0
Cal	0	0	0	0	0	0	0	0	0	0	0
Total	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Modal value (%)											
Qz	18.0	17.2	20.0	19.5	18.2	16.8	20.7	18.7	18.2	19.2	21.1
Pl	62.3	62.3	61.2	66.7	59.9	62.1	64.45	62.8	63.2	63.6	65.5
Kfs	0	0	0	0	0	0		0	0	0	0
Cpx	0	0	0	0	0	0	0	0	0	0	0
Opx	0	0	0	0	0	0	0	0	0	0	0
Bt	7.1	5.9	8.4	7.4	7.7	9.5	7.55	8.4	5.8	7.4	4.8
Hb	12.0	14.2	10.0	6.0	13.7	10.8	6	9.7	11.8	9.1	8.1
Opq	0.7	0.5	0.4	0.6	0.6	0.9	1.3	0.5	1.1	0.7	0.7
Chl	0	0	0	0	0	0	0	0	0	0	0
Cal	0	0	0	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	100	100	100	100

Continued…

Type	CQD	CQD	CQD	CQD	CQD	CQD	CQD	CQD	CQD	CQD	CQD
No	18050512	18050513	18050514	20040302	20040303	20040305	20040306	20040307	20040310	20040403	20040404
Count (point)											
Qz	180	174	145	154	177	182	141	133	199	101	159
Pl	1238	1256	1251	1098	1129	987	1189	1271	1176	1081	1166
Kfs	0	0	0	0	3	5	0	0	0	0	0
Cpx	272	267	289	352	352	472	326	258	349	412	332
Opx	0	0	0	6	0	0	0	12	1	0	1
Bt	297	290	256	369	311	281	321	302	250	378	320
Hb	0	0	29	0	0	0	0	0	0	0	0
Opq	11	8	13	16	15	18	11	17	8	15	17
Chl	2	5	17	5	13	49	12	7	17	13	5
Cal	0	0	0	0	0	6	0	0	0	0	0
Total	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Modal value (%)											
Qz	9.0	8.7	7.3	7.7	8.9	9.1	7.1	6.7	10.0	5.1	8.0
Pl	61.9	62.8	62.6	54.9	56.5	49.4	59.5	63.6	58.8	54.1	58.3
Kfs	0	0	0	0	0.2	0.3	0	0	0	0	0
Cpx	13.6	13.4	14.5	17.6	17.6	23.6	16.3	12.9	17.5	20.6	16.6
Opx	0	0	0	0.3	0	0	0	0.6	0.1	0	0.1
Bt	14.9	14.5	12.8	18.5	15.6	14.1	16.1	15.1	12.5	18.9	16.0
Hb	0	0	1.5	0	0	0	0	0	0	0	0
Opq	0.6	0.4	0.7	0.8	0.8	0.9	0.6	0.9	0.4	0.8	0.9
Chl	0.1	0.3	0.9	0.3	0.7	2.5	0.6	0.4	0.9	0.7	0.3
Cal	0	0	0	0	0	0.3	0	0	0	0	0
Total	100	100	100	100	100	100	100	100	100	100	100
Pl–dusty-Pl ratio (grain)											
Pl	938	822	946	950	971	957	845	908	899	996	863
dusty-Pl	62	178	54	50	29	43	155	92	101	4	137
DPl/Pl)*100	6.61	21.65	5.71	5.26	2.99	4.49	18.34	10.13	11.23	0.40	15.87

Type	CQD	CQD	CQD	CQD	CQD
No	20040405	20040406	20040407	20040408	20040602
Count (point)					
Qz	60	143	191	92	61
Pl	1132	1083	1128	1115	1140
Kfs	0	0	0	0	0
Cpx	376	372	305	404	409
Opx	25	14	0	8	0
Bt	384	364	347	353	371
Hb	0	0	0	0	0
Opq	18	16	18	12	12
Chl	5	8	11	16	7
Cal	0	0	0	0	0
Total	2000	2000	2000	2000	2000
Modal value (%)					
Qz	3.0	7.2	9.6	4.6	3.1
Pl	56.6	54.2	56.4	55.8	57.0
Kfs	0	0	0	0	0
Cpx	18.8	18.6	15.3	20.2	20.5
Opx	1.3	0.7	0	0.4	0
Bt	19.2	18.2	17.4	17.7	18.6
Hb	0	0	0	0	0
Opq	0.9	0.8	0.9	0.6	0.6
Chl	0.3	0.4	0.6	0.8	0.4
Cal	0	0	0	0	0
Total	100	100	100	100	100
Pl–dusty-Pl ratio (grain)					
Pl	990	967	880	975	941
dusty-Pl	10	33	120	25	59
DPl/Pl)*100	1.01	3.41	13.04	2.56	6.27

Table A2. Major (wt%) and trace element (ppm) concentrations of the porphyritic fine-grained tonalite (PFT) and clinopyroxene quartz diorite (CQD). Total Fe reported as Fe3+; LOI is loss on ignition.

Type	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT
No	20040202	20040206	20040204	19070505	20040301	20040207	20040203	20040402	19062209	18050502
(wt%)										
SiO_2	63.17	63.40	63.41	63.41	63.45	63.71	63.76	63.80	63.80	63.88
TiO_2	0.65	0.67	0.68	0.68	0.68	0.64	0.65	0.64	0.66	0.67
Al_2O_3	15.92	16.01	16.03	15.94	15.69	15.96	15.84	15.78	16.17	16.41
Fe_2O_3	5.60	5.81	5.85	6.39	6.09	5.52	5.70	5.82	5.95	5.74
MnO	0.12	0.13	0.11	0.12	0.12	0.11	0.11	0.13	0.12	0.12
MgO	2.27	2.29	2.63	2.45	3.18	2.26	2.37	2.41	2.48	2.31
CaO	4.39	4.94	3.95	4.07	3.88	4.55	4.87	4.84	4.66	4.12
Na_2O	3.93	3.35	3.61	4.71	3.10	3.54	3.36	3.53	3.39	3.56
K_2O	2.76	2.52	2.61	2.15	2.84	2.76	2.33	2.40	2.85	3.17
P_2O_5	0.19	0.19	0.19	0.18	0.19	0.18	0.18	0.18	0.18	0.18
LOI	2.37	1.68	3.69	4.21	1.08	2.12	3.72	1.01	1.26	2.10
Total	98.98	99.30	99.07	100.09	99.21	99.22	99.17	99.52	100.27	100.17
(ppm)										
Ba	596	483	572	630	587	595	500	543	614	647
Cr	28	32	33	48	43	30	33	36	43	36
Nb	12	12	13	12	12	12	12	13	14	14
Ni	13	14	13	14	17	13	14	14	16	14
Rb	79	*ICP-MS*	*ICP-MS*	62	*ICP-MS*	80	70	*ICP-MS*	*ICP-MS*	95
Sr	501	*ICP-MS*	*ICP-MS*	536	*ICP-MS*	440	360	*ICP-MS*	*ICP-MS*	528
V	117	124	120	128	129	117	119	124	125	122
Y	21	21	22	21	22	21	19	22	22	24
Zn	74	81	86	75	77	72	74	75	76	84
Zr	174	169	160	179	169	170	153	170	183	176
ICP-MS (ppm)										
Rb	–	75.0	82.0	–	95.0	–	–	85.0	78.0	–
Sr	–	407.0	345.0	–	391.0	–	–	447.0	464.0	–
La	–	25.4	24.5	–	22.6	–	–	24.1	23.3	–
Ce	–	48.1	47.3	–	44.6	–	–	46.2	44.7	–
Pr	–	5.4	5.2	–	5.0	–	–	5.1	5.1	–
Nd	–	21.3	20.4	–	19.4	–	–	19.8	19.9	–
Sm	–	4.4	4.1	–	4.1	–	–	4.2	4.0	–
Eu	–	1.2	1.2	–	1.1	–	–	1.1	1.1	–
Gd	–	3.8	3.6	–	3.5	–	–	3.6	3.5	–
Tb	–	0.5	0.5	–	0.5	–	–	0.5	0.5	–
Dy	–	3.1	3.0	–	2.9	–	–	3.0	3.0	–
Ho	–	0.6	0.6	–	0.6	–	–	0.6	0.6	–
Er	–	1.7	1.7	–	1.6	–	–	1.6	1.6	–
Yb	–	1.7	1.7	–	1.6	–	–	1.6	1.5	–
Lu	–	0.3	0.3	–	0.3	–	–	0.3	0.2	–
Ta	–	1.1	1.1	–	1.0	–	–	1.1	1.1	–
Hf	–	3.5	3.3	–	3.1	–	–	3.1	3.3	–
Th	–	8.1	8.1	–	7.8	–	–	8.0	8.1	–
Pb	–	13.0	12.0	–	11.0	–	–	12.0	11.0	–

Continued…

Type	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT
No	19070106	20040401	18050501	19070404	19070403	19070413	19070411B	19070204	19062208	19062211
(wt%)										
SiO_2	63.91	63.91	63.94	63.94	63.96	63.98	64.01	64.02	64.03	64.03
TiO_2	0.67	0.62	0.66	0.67	0.66	0.66	0.64	0.65	0.67	0.65
Al_2O_3	15.97	15.93	16.07	16.04	15.89	16.03	16.15	16.13	15.94	16.40
Fe_2O_3	6.04	5.53	5.69	5.71	5.86	5.90	5.54	5.63	5.97	5.67
MnO	0.12	0.12	0.10	0.17	0.11	0.13	0.11	0.13	0.12	0.12
MgO	2.53	2.34	2.25	2.31	2.35	2.43	2.27	2.37	2.46	2.54
CaO	4.41	4.50	4.54	4.79	4.36	4.23	4.76	4.32	4.35	4.23
Na_2O	3.53	3.33	3.37	3.32	3.75	3.83	3.47	3.50	3.32	3.51
K_2O	3.00	2.96	3.08	2.92	2.76	2.80	2.87	2.95	3.02	2.97
P_2O_5	0.18	0.18	0.18	0.18	0.19	0.19	0.18	0.18	0.19	0.18
LOI	1.73	0.85	1.60	1.08	2.90	1.33	1.25	1.22	1.96	4.33
Total	100.36	99.41	99.88	100.05	99.85	100.18	100.00	99.88	100.06	100.30
(ppm)										
Ba	576	652	640	581	655	559	579	610	616	641
Cr	43	35	36	31	33	36	32	37	35	35
Nb	14	11	13	13	13	13	12	12	13	14
Ni	15	15	14	12	15	15	13	14	13	15
Rb	83	93	93	83	74	77	89	*ICP-MS*	*ICP-MS*	92
Sr	560	478	509	484	508	560	470	*ICP-MS*	*ICP-MS*	465
V	126	116	122	119	124	121	116	121	129	118
Y	23	23	26	21	22	22	22	23	25	24
Zn	75	84	62	96	71	78	70	76	81	70
Zr	188	170	177	178	176	182	175	186	178	175
ICP-MS (ppm)										
Rb	–	–	–	–	–	–	–	89.0	101.0	–
Sr	–	–	–	–	–	–	–	552.0	515.0	–
La	–	–	–	–	–	–	–	23.7	25.5	–
Ce	–	–	–	–	–	–	–	45.6	49.3	–
Pr	–	–	–	–	–	–	–	5.2	5.6	–
Nd	–	–	–	–	–	–	–	19.8	21.8	–
Sm	–	–	–	–	–	–	–	4.2	4.4	–
Eu	–	–	–	–	–	–	–	1.2	1.2	–
Gd	–	–	–	–	–	–	–	3.6	3.9	–
Tb	–	–	–	–	–	–	–	0.5	0.6	–
Dy	–	–	–	–	–	–	–	3.1	3.3	–
Ho	–	–	–	–	–	–	–	0.6	0.6	–
Er	–	–	–	–	–	–	–	1.6	1.8	–
Yb	–	–	–	–	–	–	–	1.5	1.9	–
Lu	–	–	–	–	–	–	–	0.2	0.3	–
Ta	–	–	–	–	–	–	–	1.1	1.2	–
Hf	–	–	–	–	–	–	–	3.8	3.5	–
Th	–	–	–	–	–	–	–	8.2	8.4	–
Pb	–	–	–	–	–	–	–	10.0	16.0	–

Continued…

Type	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT
No	19070405	19070109	19070502	19070104	18050508	19070401	20040205	18050503	18050511	19070504
(wt%)										
SiO_2	64.04	64.05	64.07	64.08	64.10	64.13	64.14	64.15	64.20	64.20
TiO_2	0.65	0.69	0.65	0.65	0.66	0.64	0.66	0.66	0.65	0.67
Al_2O_3	16.13	16.20	16.11	16.25	16.33	16.07	16.15	16.05	15.78	15.94
Fe_2O_3	5.88	6.11	5.86	5.79	5.75	5.60	5.69	5.78	5.80	5.99
MnO	0.12	0.15	0.11	0.12	0.13	0.12	0.13	0.12	0.11	0.12
MgO	2.37	2.67	2.27	2.44	2.34	2.34	2.41	2.33	2.35	2.42
CaO	4.71	4.24	4.05	3.92	4.66	4.28	3.79	4.62	5.09	4.89
Na_2O	3.77	3.61	4.58	3.76	3.48	3.55	3.78	4.03	2.92	2.71
K_2O	2.05	2.29	2.04	3.04	2.67	3.13	2.52	2.17	3.08	2.81
P_2O_5	0.18	0.19	0.18	0.18	0.19	0.18	0.18	0.18	0.19	0.19
LOI	4.13	3.86	4.31	1.87	1.17	1.40	2.08	4.73	1.66	5.75
Total	99.90	100.18	99.92	100.22	100.30	100.04	99.42	100.09	100.16	99.93
(ppm)										
Ba	472	685	462	636	500	630	682	398	705	667
Cr	35	41	37	45	36	32	39	33	45	33
Nb	12	13	12	13	14	12	11	13	13	13
Ni	14	12	12	14	15	15	15	12	14	14
Rb	71	*ICP-MS*	69	78	91	98	60	76	94	*ICP-MS*
Sr	565	*ICP-MS*	579	669	486	566	637	517	471	*ICP-MS*
V	117	126	124	125	123	119	122	121	122	119
Y	20	21	21	22	24	25	19	21	23	26
Zn	73	96	61	73	79	75	80	70	75	77
Zr	184	184	189	201	179	182	191	180	171	168
ICP-MS (ppm)										
Rb	–	70.0	–	–	–	–	–	–	–	85.0
Sr	–	465.0	–	–	–	–	–	–	–	387.0
La	–	23.1	–	–	–	–	–	–	–	29.2
Ce	–	45.7	–	–	–	–	–	–	–	45.0
Pr	–	5.1	–	–	–	–	–	–	–	6.1
Nd	–	19.8	–	–	–	–	–	–	–	23.8
Sm	–	4.0	–	–	–	–	–	–	–	4.8
Eu	–	1.1	–	–	–	–	–	–	–	1.4
Gd	–	3.5	–	–	–	–	–	–	–	4.5
Tb	–	0.5	–	–	–	–	–	–	–	0.6
Dy	–	3.0	–	–	–	–	–	–	–	3.4
Ho	–	0.6	–	–	–	–	–	–	–	0.7
Er	–	1.6	–	–	–	–	–	–	–	1.9
Yb	–	1.6	–	–	–	–	–	–	–	1.7
Lu	–	0.3	–	–	–	–	–	–	–	0.3
Ta	–	0.9	–	–	–	–	–	–	–	0.9
Hf	–	3.3	–	–	–	–	–	–	–	3.2
Th	–	7.8	–	–	–	–	–	–	–	7.8
Pb	–	16.0	–	–	–	–	–	–	–	11.0

Continued…

Type	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT
No	19070506	19070414	19070110	19070415	19070107	18050509	19070102	19062207	19070201	19070202A
(wt%)										
SiO_2	64.22	64.23	64.24	64.27	64.28	64.35	64.40	64.41	64.46	64.50
TiO_2	0.66	0.68	0.66	0.64	0.66	0.64	0.62	0.65	0.63	0.68
Al_2O_3	16.01	16.10	16.19	16.07	16.08	16.13	16.24	16.25	16.02	16.41
Fe_2O_3	5.80	5.84	5.76	5.78	5.68	5.69	5.49	5.70	5.62	5.60
MnO	0.11	0.09	0.12	0.13	0.12	0.13	0.11	0.11	0.12	0.12
MgO	2.35	2.60	2.33	2.38	2.29	2.30	2.31	2.45	2.25	2.51
CaO	3.82	4.32	4.07	4.76	3.67	4.82	4.27	4.34	3.61	3.13
Na_2O	4.54	2.73	4.75	3.33	4.20	3.38	3.76	3.13	4.48	3.83
K_2O	2.33	3.31	1.85	2.58	2.94	2.54	3.00	2.99	2.42	3.04
P_2O_5	0.18	0.19	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
LOI	3.89	1.98	4.68	1.45	3.26	1.27	1.33	3.09	2.32	1.88
Total	100.04	100.08	100.15	100.12	100.09	100.17	100.38	100.21	99.78	99.99
(ppm)										
Ba	613	692	624	604	652	614	582	665	705	632
Cr	37	36	37	37	37	36	36	43	38	41
Nb	13	13	14	12	13	13	14	14	12	13
Ni	13	13	13	13	14	14	15	18	13	15
Rb	61	*ICP-MS*	67	64	73	77	95	93	53	101
Sr	559	*ICP-MS*	611	535	569	452	502	460	646	472
V	122	123	123	123	120	121	115	122	119	117
Y	21	24	21	20	27	21	24	25	21	26
Zn	76	76	75	94	73	82	70	76	76	83
Zr	189	181	190	185	185	166	176	168	198	176
ICP-MS (ppm)										
Rb	–	104.0	–	–	–	–	–	–	–	–
Sr	–	408.0	–	–	–	–	–	–	–	–
La	–	23.3	–	–	–	–	–	–	–	–
Ce	–	45.2	–	–	–	–	–	–	–	–
Pr	–	5.1	–	–	–	–	–	–	–	–
Nd	–	20.1	–	–	–	–	–	–	–	–
Sm	–	4.2	–	–	–	–	–	–	–	–
Eu	–	1.2	–	–	–	–	–	–	–	–
Gd	–	3.5	–	–	–	–	–	–	–	–
Tb	–	0.6	–	–	–	–	–	–	–	–
Dy	–	3.1	–	–	–	–	–	–	–	–
Ho	–	0.6	–	–	–	–	–	–	–	–
Er	–	1.6	–	–	–	–	–	–	–	–
Yb	–	1.5	–	–	–	–	–	–	–	–
Lu	–	0.2	–	–	–	–	–	–	–	–
Ta	–	1.1	–	–	–	–	–	–	–	–
Hf	–	3.5	–	–	–	–	–	–	–	–
Th	–	8.0	–	–	–	–	–	–	–	–
Pb	–	10.0	–	–	–	–	–	–	–	–

Continued…

Type	PFT	PFT	PFT	PFT	PFT	PFT	PFT	PFT	CQD	CQD
No	18050507	19070103	19062210	19070409	19070503	19070108	19062206	18050505	20040403	20040405
(wt%)										
SiO_2	64.53	64.55	64.68	64.69	64.70	64.71	64.79	65.09	55.69	55.69
TiO_2	0.63	0.66	0.64	0.61	0.67	0.66	0.63	0.66	0.97	1.05
Al_2O_3	16.19	16.12	16.13	16.04	16.17	16.17	16.06	16.56	17.15	16.95
Fe_2O_3	5.54	5.87	5.62	5.31	5.85	5.73	5.63	5.87	8.75	9.15
MnO	0.11	0.12	0.11	0.11	0.10	0.11	0.10	0.09	0.15	0.15
MgO	2.45	2.51	2.24	2.17	2.43	2.52	2.32	2.26	4.52	4.19
CaO	4.00	4.16	3.37	4.38	3.26	3.86	4.61	4.22	7.05	7.26
Na_2O	3.53	3.70	4.71	3.47	3.90	4.09	3.03	1.95	3.13	3.10
K_2O	3.08	2.34	2.39	3.01	2.85	2.13	2.82	3.32	1.71	1.67
P_2O_5	0.18	0.18	0.18	0.18	0.19	0.18	0.18	0.19	0.19	0.21
LOI	2.76	2.51	3.38	1.39	3.99	4.81	2.73	5.68	1.43	0.39
Total	100.23	100.20	100.07	99.97	100.11	100.16	100.17	100.20	99.30	99.41
(ppm)										
Ba	639	593	709	572	608	449	599	573	367	289
Cr	63	40	44	32	33	39	36	33	86	64
Nb	12	13	13	12	13	14	13	13	8	9
Ni	33	16	15	13	13	15	15	13	46	40
Rb	95	*ICP-MS*	*ICP-MS*	*ICP-MS*	97	77	80	*ICP-MS*	*ICP-MS*	*ICP-MS*
Sr	534	*ICP-MS*	*ICP-MS*	*ICP-MS*	427	418	497	*ICP-MS*	*ICP-MS*	*ICP-MS*
V	118	124	117	111	124	122	118	120	188	198
Y	24	19	21	24	24	23	22	25	18	20
Zn	75	75	71	71	73	77	77	83	96	91
Zr	177	182	186	172	168	173	175	149	141	152
ICP-MS (ppm)										
Rb	–	63.0	67.0	97.0	–	–	–	108.0	66.0	60.0
Sr	–	545.0	516.0	465.0	–	–	–	247.0	434.0	368.0
La	–	25.4	23.9	23.1	–	–	–	22.4	18.5	19.0
Ce	–	49.6	45.4	44.2	–	–	–	43.5	39.0	40.4
Pr	–	5.5	5.0	5.0	–	–	–	4.8	4.7	4.9
Nd	–	21.7	19.3	19.1	–	–	–	18.9	19.7	20.4
Sm	–	4.4	3.9	3.9	–	–	–	3.9	4.4	4.6
Eu	–	1.2	1.1	1.1	–	–	–	1.0	1.3	1.3
Gd	–	3.9	3.4	3.4	–	–	–	3.4	4.3	4.6
Tb	–	0.6	0.5	0.5	–	–	–	0.5	0.6	0.7
Dy	–	3.2	2.8	2.9	–	–	–	2.8	3.7	4.3
Ho	–	0.6	0.5	0.5	–	–	–	0.5	0.7	0.8
Er	–	1.7	1.5	1.5	–	–	–	1.5	2.1	2.4
Yb	–	1.9	1.6	1.4	–	–	–	1.5	2.1	2.3
Lu	–	0.3	0.2	0.2	–	–	–	0.2	0.3	0.4
Ta	–	1.1	1.0	1.1	–	–	–	0.8	0.8	0.7
Hf	–	3.8	3.2	3.6	–	–	–	2.9	3.1	3.3
Th	–	8.6	8.0	8.2	–	–	–	7.7	5.3	6.3
Pb	–	15.0	12.0	12.0	–	–	–	6.0	10.0	10.0

Continued…

Type	CQD	CQD	CQD	CQD	CQD	CQD	CQD	CQD	CQD	CQD
No	20040408	20040303	20040302	20040305	20040406	20040602	18050514	18050513	20040306	20040404
(wt%)										
SiO_2	55.99	56.99	57.07	57.15	57.16	57.65	57.87	58.54	58.57	58.62
TiO_2	1.12	1.05	1.01	0.93	1.03	1.04	1.03	0.94	0.93	0.98
Al_2O_3	17.33	16.57	16.51	16.74	16.50	16.83	16.91	17.11	16.81	17.05
Fe_2O_3	9.01	8.44	8.14	8.43	8.31	7.88	8.57	7.79	7.49	7.70
MnO	0.14	0.14	0.12	0.14	0.13	0.12	0.14	0.13	0.12	0.10
MgO	3.78	3.87	4.12	3.96	3.80	3.54	4.04	3.62	3.40	3.26
CaO	7.14	6.58	6.84	6.28	6.68	6.71	6.62	6.49	6.25	6.11
Na_2O	3.32	2.77	3.20	3.00	3.23	3.29	2.99	3.42	3.45	3.27
K_2O	1.44	2.39	1.72	2.39	1.88	1.83	1.80	1.81	1.86	2.05
P_2O_5	0.23	0.20	0.19	0.20	0.23	0.21	0.21	0.21	0.21	0.20
LOI	0.70	1.22	0.72	1.55	0.49	0.26	1.19	1.14	0.42	0.97
Total	99.49	98.98	98.93	99.23	98.94	99.11	100.17	100.07	99.08	99.35
(ppm)										
Ba	273	468	325	395	351	326	403	400	342	372
Cr	57	62	136	74	80	65	79	55	51	44
Nb	12	10	9	9	11	11	12	11	10	11
Ni	28	30	42	24	32	24	34	28	27	25
Rb	*ICP-MS*	79	*ICP-MS*	82	*ICP-MS*	*ICP-MS*	*ICP-MS*	*ICP-MS*	56	*ICP-MS*
Sr	*ICP-MS*	380	*ICP-MS*	399	*ICP-MS*	*ICP-MS*	*ICP-MS*	*ICP-MS*	420	*ICP-MS*
V	180	184	172	172	177	162	179	162	160	170
Y	18	23	19	24	20	19	22	20	19	24
Zn	98	87	92	90	93	92	79	91	90	87
Zr	177	174	157	123	178	162	163	159	164	179
ICP-MS (ppm)										
Rb	47.0	–	55.0	–	58.0	61.0	60.0	61.0	–	70.0
Sr	390.0	–	348.0	–	358.0	369.0	363.0	403.0	–	352.0
La	20.1	–	21.0	–	21.6	21.2	20.1	20.0	–	22.0
Ce	42.3	–	44.0	–	45.2	44.7	41.7	41.4	–	46.6
Pr	5.1	–	5.2	–	5.4	5.2	5.0	5.1	–	5.4
Nd	21.0	–	21.4	–	22.5	20.9	20.4	20.2	–	21.5
Sm	4.6	–	4.7	–	4.8	4.8	4.7	4.5	–	4.8
Eu	1.3	–	1.3	–	1.3	1.2	1.3	1.2	–	1.3
Gd	4.6	–	4.6	–	4.7	4.5	4.5	4.1	–	4.6
Tb	0.7	–	0.7	–	0.7	0.6	0.7	0.7	–	0.7
Dy	4.0	–	3.9	–	4.0	3.6	4.1	3.7	–	4.1
Ho	0.8	–	0.7	–	0.8	0.7	0.8	0.7	–	0.8
Er	2.1	–	2.1	–	2.2	1.8	2.3	1.9	–	2.2
Yb	1.9	–	1.9	–	2.1	1.6	2.0	1.7	–	2.1
Lu	0.3	–	0.3	–	0.3	0.2	0.3	0.3	–	0.3
Ta	0.9	–	0.8	–	0.7	0.8	0.8	0.8	–	0.8
Hf	3.7	–	3.4	–	3.8	3.2	3.8	3.3	–	4.0
Th	4.6	–	6.9	–	6.3	7.2	6.2	5.7	–	7.9
Pb	10.0	–	10.0	–	10.0	10.0	8.0	9.0	–	12.0

Continued…

Type	CQD	CQD	CQD	CQD
No	20040310	20040407	20040307	18050512
(wt%)				
SiO_2	58.63	59.14	60.03	60.89
TiO_2	1.08	1.05	0.86	0.87
Al_2O_3	16.41	16.45	16.48	16.79
Fe_2O_3	8.15	7.72	7.07	7.09
MnO	0.13	0.11	0.12	0.11
MgO	4.07	3.20	2.98	2.98
CaO	3.64	5.97	5.80	5.76
Na_2O	3.79	3.23	3.41	3.40
K_2O	2.88	2.12	2.18	2.13
P_2O_5	0.20	0.22	0.19	0.19
LOI	3.41	1.03	0.27	0.78
Total	98.98	99.21	99.10	100.20
(ppm)				
Ba	531	380	349	370
Cr	84	63	48	46
Nb	12	11	10	12
Ni	27	26	21	25
Rb	*ICP-MS*	*ICP-MS*	71	*ICP-MS*
Sr	*ICP-MS*	*ICP-MS*	362	*ICP-MS*
V	174	155	147	149
Y	28	20	23	24
Zn	92	91	85	90
Zr	217	184	173	187
ICP-MS (ppm)				
Rb	106.0	67.0	–	70.0
Sr	368.0	352.0	–	333.0
La	23.5	24.1	–	22.9
Ce	50.5	50.9	–	47.2
Pr	6.0	5.9	–	5.6
Nd	24.2	23.7	–	22.0
Sm	5.3	5.2	–	4.7
Eu	1.1	1.3	–	1.2
Gd	5.1	4.8	–	4.4
Tb	0.8	0.7	–	0.7
Dy	4.5	3.8	–	4.1
Ho	0.9	0.7	–	0.8
Er	2.4	1.9	–	2.2
Yb	2.3	1.7	–	2.0
Lu	0.3	0.3	–	0.3
Ta	0.8	0.9	–	1.0
Hf	4.8	4.3	–	4.1
Th	9.0	9.1	–	8.9
Pb	13.0	10.0	–	12.0

Table A3. Representative chemical analyses of the porphyritic fine-grained tonalite.

Mineral	Plagioclase				
	unaltered			altered	
Position	rim	core	core	core	core
SiO_2	59.32	57.83	57.05	55.66	56.86
TiO_2	0.02	0	0.03	0.03	0.00
Al_2O_3	25.02	26.35	26.91	27.27	26.67
FeO	0.87	0.11	0.24	0.20	0.12
MnO	0.04	0.05	0	0.02	0
MgO	0.91	0	0	0	0
CaO	6.43	8.45	8.97	9.66	8.78
Na_2O	6.75	6.58	6.07	6.03	6.09
K_2O	0.35	0.11	0.15	0.15	0.18
Total	99.74	99.48	99.44	99.02	98.75
O	8	8	8	8	8
Si	2.655	2.601	2.571	2.529	2.578
Ti	0.001	0	0.001	0.001	0
Al	1.320	1.397	1.429	1.460	1.425
Fe	0.032	0.004	0.009	0.008	0.005
Mn	0.001	0.002	0	0.001	0
Mg	0.061	0	0	0	0
Ca	0.308	0.407	0.433	0.470	0.426
Na	0.586	0.573	0.531	0.531	0.535
K	0.020	0.006	0.009	0.009	0.011
Total	4.987	4.991	4.983	5.009	4.982
An	33.71	41.25	44.52	46.58	43.86
Ab	64.09	58.10	54.58	52.58	55.04
Or	2.19	0.64	0.90	0.85	1.09

Mineral	Hornblende				
	unaltered			altered	
Position	core	core	core	core	core
SiO_2	43.74	43.30	43.44	43.22	44.06
TiO_2	1.33	1.39	1.69	1.48	1.36
Al_2O_3	8.88	9.37	9.31	9.17	8.80
FeO	16.36	15.72	15.42	15.02	15.06
MnO	0.47	0.42	0.51	0.37	0.44
MgO	11.40	11.51	11.86	12.02	12.49
CaO	11.20	11.13	10.99	11.13	11.35
Na_2O	1.19	1.39	1.48	1.36	1.23
K_2O	0.87	0.94	0.99	1.00	0.81
Total	95.76	95.43	95.96	95.18	95.91
O	23	23	23	23	23
Si	6.707	6.648	6.628	6.645	6.703
Ti	0.153	0.160	0.194	0.171	0.156
Al	1.606	1.696	1.674	1.662	1.578
Fe	2.099	2.019	1.968	1.931	1.916
Mn	0.061	0.055	0.065	0.048	0.056
Mg	2.605	2.633	2.697	2.754	2.831
Ca	1.840	1.831	1.796	1.833	1.850
Na	0.353	0.413	0.438	0.406	0.363
K	0.171	0.183	0.192	0.197	0.156
Total	15.597	15.641	15.655	15.651	15.611
XMg	0.55	0.57	0.58	0.59	0.60
XFe	0.45	0.43	0.42	0.41	0.40

Mineral	Biotite				
	unaltered			altered	
position	core	core	core	core	core
SiO_2	34.80	33.58	35.27	35.62	35.34
TiO_2	3.38	7.18	3.67	4.67	4.20
Al_2O_3	14.69	13.46	14.56	14.61	14.11
FeO	20.58	20.29	19.04	16.61	18.70
MnO	0.30	0.66	0.34	0.30	0.33
MgO	10.16	10.28	11.58	11.98	11.30
CaO	0	0	0.00	1.44	0.00
Na_2O	0.02	0.12	0.07	0.07	0.13
K_2O	10.36	9.47	10.17	9.29	10.12
Total	95.16	96.00	95.80	95.56	95.26
O	22	22	22	22	22
Si	5.472	5.248	5.470	5.455	5.502
Ti	0.399	0.843	0.428	0.538	0.492
Al	2.721	2.480	2.661	2.637	2.589
Fe	2.706	2.653	2.469	2.127	2.434
Mn	0.040	0.087	0.045	0.039	0.044
Mg	2.381	2.394	2.677	2.734	2.622
Ca	0	0	0.001	0.237	0
Na	0.006	0.036	0.022	0.021	0.038
K	2.079	1.888	2.011	1.815	2.011
Total	15.808	15.631	15.787	15.606	15.735
XMg	0.47	0.47	0.52	0.56	0.52
XFe	0.53	0.53	0.48	0.44	0.48

Mineral	Ilmenite (unaltered sample)			
SiO_2	0.06	0.85	0.43	1.82
TiO_2	50.98	51.51	51.58	49.86
Al_2O_3	0.02	0.02	0.02	0.03
Cr_2O_3	0.00	0	0	0.02
FeO	39.91	41.29	41.24	42.10
MnO	5.89	5.25	5.44	4.46
MgO	0.10	0.11	0.14	0.01
CaO	0.56	1.23	0.81	0.20
Na_2O	0.02	0	0.02	0.02
K_2O	0.08	0.03	0.03	0.00
Total	98.36	100.29	99.71	99.30
O	6	6	6	6
Si	0.003	0.043	0.022	0.092
Ti	1.983	1.942	1.961	1.908
Al	0.001	0.001	0.001	0.002
Cr	0.000	0	0	0.001
Fe	1.726	1.731	1.744	1.791
Mn	0.258	0.223	0.233	0.192
Mg	0.008	0.009	0.011	0.001
Ca	0.031	0.066	0.044	0.011
Na	0.002	0	0.001	0.002
K	0.006	0.002	0.002	0.000
Total	4.017	4.016	4.018	4.000

Table A4. Representative chemical analyses of the clinopyroxene quartz diorite. WR: whole-rock.

Table

Mineral	Plagioclase										
WR SiO_2wt%	55.7 wt%		57.9 wt%			58.5 wt%			60.9wt%		
Position	core	rim	core	rim	dusty zone	core	rim	dusty zone	core	rim	dusty zone
SiO_2	55.07	55.38	55.37	55.58	55.63	55.32	55.35	54.56	56.81	58.03	53.52
TiO_2	0.06	0	0.07	0.08	0.04	0.03	0.02	0.02	0.02	0.03	0.04
Al_2O_3	27.64	27.56	27.07	27.55	27.92	28.38	28.18	28.02	24.73	26.65	28.64
FeO	0.21	0.21	0.30	0.31	0.31	0.23	0.31	0.17	0.15	0.12	0.30
MnO	0	0	0	0.01	0.02	0	0.01	0	0	0	0
MgO	0	0	0.01	0.01	0.02	0	0	0	0	0.01	0
CaO	12.19	9.74	9.87	9.07	11.39	9.36	7.17	12.11	8.86	6.04	12.34
Na_2O	4.47	5.84	6.24	7.03	4.82	5.76	7.64	4.79	9.34	8.14	4.90
K_2O	0.24	0.26	0.37	0.42	0.21	0.31	0.36	0.21	0.44	0.52	0.10
Total	99.87	99.00	99.30	100.07	100.37	99.43	99.06	99.91	100.40	99.57	99.85
O	8	8	8	8	8	8	8	8	8	8	8
Si	2.492	2.518	2.519	2.511	2.500	2.501	2.514	2.471	2.577	2.607	2.432
Ti	0.002	0	0.003	0.003	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Al	1.474	1.477	1.452	1.467	1.479	1.513	1.508	1.496	1.322	1.411	1.534
Fe	0.008	0.008	0.011	0.012	0.012	0.009	0.012	0.006	0.006	0.005	0.011
Mn	0	0	0	0	0.001	0	0	0	0	0	0
Mg	0	0	0	0	0.001	0.002	0	0	0	0.001	0
Ca	0.591	0.474	0.481	0.439	0.549	0.454	0.349	0.588	0.431	0.291	0.601
Na	0.392	0.514	0.551	0.616	0.420	0.505	0.673	0.421	0.821	0.709	0.432
K	0.014	0.015	0.021	0.024	0.012	0.018	0.021	0.012	0.025	0.030	0.006
Total	4.972	5.008	5.038	5.072	4.975	5.002	5.078	4.996	5.184	5.056	5.018
An	59.3	47.3	45.7	40.7	56.0	46.5	33.4	57.6	33.7	28.2	57.9
Ab	39.3	51.3	52.3	57.1	42.8	51.7	64.6	41.2	64.3	68.9	41.6
Or	1.4	1.5	2.0	2.2	1.2	1.8	2.0	1.2	2.0	2.9	0.6

Mineral	Plagioclase			
WR SiO_2wt%	57.9 wt% Autolith			
Type	inner zone		granoblastic zone	
Position	core	rim	core	rim
SiO_2	57.09	57.10	55.89	55.12
TiO_2	0.01	0	0.05	0.02
Al_2O_3	27.41	27.63	27.38	27.61
FeO	0.29	0.22	0.21	0.25
MnO	0	0	0	0
MgO	0.01	0	0	0
CaO	6.14	5.01	9.27	8.93
Na_2O	8.23	9.09	6.09	6.97
K_2O	0.61	0.67	0.28	0.31
Total	99.79	99.72	99.17	99.21
O	8	8	8	8
Si	2.568	2.568	2.534	2.508
Ti	0	0	0.002	0.001
Al	1.453	1.465	1.463	1.481
Fe	0.011	0.008	0.008	0.009
Mn	0	0	0	0
Mg	0	0	0	0
Ca	0.296	0.241	0.450	0.436
Na	0.718	0.793	0.535	0.615
K	0.035	0.039	0.016	0.018
Total	5.082	5.115	5.008	5.067
An	28.2	22.5	44.9	40.8
Ab	68.5	73.9	53.4	57.5
Or	3.3	3.6	1.6	1.7

WR: whole-rock.

Mineral	Clinopyroxene	
Position	core	rim
SiO_2	52.95	53.21
TiO_2	0.20	0.38
Al_2O_3	0.75	0.80
FeO	9.41	26.06
MnO	0.28	0.80
MgO	13.57	17.51
CaO	21.28	1.14
Na_2O	0.46	0.06
K_2O	0	0
Total	98.89	99.96
O	6	6
Si	1.997	2.018
Ti	0.006	0.011
Al	0.033	0.036
Fe	0.297	0.826
Mn	0.009	0.026
Mg	0.762	0.989
Ca	0.860	0.046
Na	0.034	0.004
K	0	0
Total	3.997	3.956
Wo	44.80	2.50
En	39.73	53.13
Fs	15.47	44.37
Mg#	71.97	54.49

Mineral	Biotite	
Position	core	rim
SiO_2	36.94	38.12
TiO_2	5.12	4.46
Al_2O_3	12.07	11.73
Cr_2O_3	0.08	0.03
FeO	20.94	17.04
MnO	0.17	0.09
MgO	9.27	12.76
CaO	0.04	0.03
Na_2O	0.13	0.07
K_2O	11.28	10.59
Total	96.02	94.92
O	22	22
Si	5.730	5.827
Ti	0.597	0.513
Al	2.206	2.113
Cr	0.009	0.003
Fe	2.717	2.178
Mn	0.023	0.012
Mg	2.143	2.908
Ca	0.006	0.005
Na	0.038	0.020
K	2.232	2.065
Total	15.700	15.645
X_{Mg}	0.44	0.57
X_{Fe}	0.56	0.43

Table A5. Results of mass balance calculations using the major element contents from whole-rock (WR) and mineral analyses of the clinopyroxene quartz diorite (CQD) and porphyritic fine-grained tonalite (PFT).

CQD	Initial magma	Final magma	Subtracted phases			
			Pl n=30	Cpx n=18	Bt n=2	Ilm n=5
Sample No.	20040602	18050512	18050514	18050514	18050514	18050514
			WR SiO_2 57.9	WR SiO_2 57.9	WR SiO_2 57.9	WR SiO_2 57.9
SiO_2 (wt%)	57.65	60.89	55.51	51.93	36.92	0.03
TiO_2	1.04	0.87	0.04	0.48	5.16	50.68
Al_2O_3	16.83	16.79	27.50	2.81	12.00	0.01
FeO*	7.09	6.38	0.33	15.82	20.74	45.70
MnO	0.12	0.11	0.01	0.49	0.19	2.29
MgO	3.54	2.98	0.02	12.78	9.40	0.08
CaO	6.71	5.76	8.96	14.89	0.03	0.08
NaO	3.29	3.4	6.70	0.64	0.14	0.01
K_2O	1.83	2.13	0.40	0.22	11.35	0
P_2O_5	0.21	0.19	0	0	0	0
Calculated result (%)		73.49	14.27	8.64	3.08	0.52
Degree of crystallization, 26.51%						
Fractionated proportions (%)			53.82	32.59	11.62	1.97
Sum of squares, 0.626						

CQD (+Opx)	Initial magma	Final magma	Subtracted phases					
			Pl n=30	Cpx n=18	Opx n=21	Bt n=2	Ilm n=5	
Sample No.	20040602	18050512	18050514	18050514	20040405	18050514	18050514	Calc cum
			WR SiO_2 57.9	WR SiO_2 57.9	WR SiO_2 55.7	WR SiO_2 57.9	WR SiO_2 57.9	
SiO_2 (wt%)	57.65	60.89	55.51	51.93	53.43	36.92	0.03	51.75
TiO_2	1.04	0.87	0.04	0.48	0.32	5.16	50.68	1.39
Al_2O_3	16.83	16.79	27.50	2.81	0.95	12.00	0.01	16.58
FeO*	7.09	6.38	0.33	15.82	24.18	20.74	45.70	9.93
MnO	0.12	0.11	0.01	0.49	0.59	0.19	2.29	0.22
MgO	3.54	2.98	0.02	12.78	18.95	9.40	0.08	6.32
CaO	6.71	5.76	8.96	14.89	1.45	0.03	0.08	8.17
NaO	3.29	3.4	6.70	0.64	0.03	0.14	0.01	3.47
K_2O	1.83	2.13	0.40	0.22	0	11.35	0	1.37
P_2O_5	0.21	0.19	0	0	0	0	0	0.08
Calculated result (%)		72.33	15.37	7.90	1.30	2.53	0.57	
Degree of crystallization, 27.67%								
Fractionated proportions (%)			55.54	28.55	4.71	9.12	2.07	
Sum of squares, 0.396								

PFT	Initial magma	Final magma	Subtracted phases		
(Low-SiO_2→High-SiO_2)			Pl n=12	Bt n=31	Ilm n=6
Sample No.	20040402	18050505	20040402	20040402	20040402
			WR SiO_2 63.8	WR SiO_2 63.8	WR SiO_2 63.8
SiO_2 (wt%)	63.8	65.09	57.83	33.58	0.85
TiO_2	0.64	0.66	0.00	7.18	51.51
Al_2O_3	15.78	16.56	26.35	13.46	0.02
FeO*	5.82	5.87	0.11	20.29	41.29
MnO	0.13	0.09	0.05	0.66	5.25
MgO	2.41	2.26	0.00	10.28	0.11
CaO	4.84	4.22	8.45	0.00	1.23
NaO	3.53	1.95	6.58	0.12	0.00
K_2O	2.4	3.32	0.11	9.47	0.03
P_2O_5	0.18	0.19	0.00	0.00	0.00
Calculated result (%)		95.20	5.06	1.25	-1.50
Degree of crystallization, 4.80%					
Fractionated proportions (%)			105.29	26.00	-31.29
Sum of squares, 3.868					

WR: whole-rock, CQD: clinopyroxene quartz diorite, PFT: porphyritic fine-grained tonalite.

Table A6. Partition coefficients used in the Rayleigh fractionation modeling. Abbreviations: PFT, porphyritic finegrained tonalite; CQD, clinopyroxene quartz diorite; Fc, fractional crystallization; and Ac, accumulation.

CQD Fc　Partition coefficent

element	plagiocalase	ref	clinopyroxene	ref	biotite	ref	ilmenite	ref
Rb	0.197	a	0.0414	a	5.367	d	0.00034	h
Ba	0.0705	a	0.0129	a	3.2	d	–	–
Th	0.004	c	0.007	j	0.997	d	0.00055	h
Ta	0.03	f	0.0022	j	1.567	d	1.7	h
Nb	1.3	g	0.0012	j	4	d	2	h
La	0.21	c	0.23	c	2	d	0.000029	h
Ce	0.18	c	0.36	c	2	d	0.000054	h
Sr	1.83	a	0.0648	a	0.447	d	–	–
Nd	0.16	c	0.645	a	2.56	d	0.00048	h
Sm	0.1	c	1.3	c	2.117	d	0.00059	h
Eu	0.73	c	1.2	c	2.02	d	0.0011	h
Dy	0.293	b	1.9	c	1.72	d	0.01	h
Y	0.066	g	2.4	g	1	d	–	–
Yb	0.033	b	1.3	b	1.4	d	0.17	h
Lu	0.1	c	1.4	c	1.617	d	0.084	h

CQD Ac　Partition coefficent

element	plagiocalase	ref	clinopyroxene	ref	orthopyroxene	ref	biotite	ref	ilmenite	ref
Rb	0.197	a	0.0414	a	0.0036	j	5.6	d	0.00034	h
Ba	0.24	g	0.03	f	0.0042	j	4.1	d	–	–
Th	0.19	c	0.16	c	0.0007	j	2	d	0.00055	h
Ta	0.05	d	0.57	d	0.001	j	1.9	d	6.6	e
Nb	0.27	g	0.0012	j	0.0007	j	4.5	d	2	h
La	0.21	c	0.23	c	0.0006	j	7.2	d	0.000029	h
Ce	0.18	c	0.36	c	0.0017	j	7.5	d	0.000054	h
Sr	1.83	a	0.0648	a	0.0019	j	0.447	d	–	–
Nd	0.24	b	0.645	b	0.004	j	5.7	d	0.00048	h
Sm	0.1	c	1.3	c	0.011	j	4.3	d	0.00059	h
Eu	0.73	c	1.2	c	0.03	i	2.02	d	0.0011	h
Dy	0.293	b	1.9	c	0.077	i	3.4	d	0.01	h
Y	0.51	g	2.4	g	0.046	j	1.4	d	5.09	g
Yb	0.1	f	2	f	0.077	j	3	d	4.1	d
Lu	0.241	b	2	f	0.09	j	3.4	d	3.6	d

References

a: Philpotts and Schnetzler, 1970
b: Schnetzler and Philpotts, 1970
c: Luhr and Carmichael, 1980
d: Nash and Crecraft, 1985
e: Green and Pearson, 1987
f: Bacon and Druitt, 1988
g: Ewart and Griffin, 1994
h: Zack and Brumn, 1998
i: Green et al., 2000
j: Adam and Green, 2006

PFT: porphyritic fine-grained tonalite, CQD: clinopyroxene quartz diorite, Fc: fractional crystallization, Ac: accumulation.

引用文献

Adam, J. and Green, T., 2006, Trace element partitioning between mica- and amphibole-bearing garnet lherzolite and hydrous basanitic melt: 1. Experimental results and the investigation of controls on partitioning behavior. *Contrib. Mineral. Petrol.*, **152**, 1–17.

Bacon, C. R. and Druitt, T. H., 1988, Compositional evolution of the zoned calcalkaline magma chamber of Mount-Mazama, Crater Lake, Oregon. *Contrib. Mineral. Petrol.*, **98**, 224–256.

Ewart, A. and Griffin, W. L., 1994, Application of proton-microprobe data to trace-element partitioning in volcanic rocks. *Chem. Geol*., **117**, 251–284.

Green, T. H., Blundy, J. D., Adam, J. and Yaxley, G. M., 2000, SIMS determination of trace element partition coefficients between garnet, clinopyroxene and hydrous basaltic liquids at 2–7.5 GPa and 1080–1200°C. *Lithos*, **53**, 165–187.

Green, T. H. and Pearson, N. J., 1987, An experimental study of Nb and Ta partitioning between Ti-rich minerals and silicate liquids at high pressure and temperature. *Geochim. Cosmochim. Acta,* **51**, 55–62.

Luhr, J. F. and Carmichael, I. S. E., 1980, The Colima volcanic complex, Mexico. I: post-caldera andesites from Volcano Colima. *Contrib. Mineral. Petrol*., **71**, 343–372.

Nash, W. P. and Crecraft, H. R., 1985, Partition coefficients for trace elements in silicic magmas. *Geochim. Cosmochim. Acta,* **49**, 2309–2322.

Philpotts, J. A. and Schnetzler, C. C., 1970, Phenocryst-matrix partition coefficients for K, Rb, Sr and Ba, with applications to anorthosite and basalt genesis. *Geochim. Cosmochim. Acta,* **34**, 307–322.

Schnetzler, C. C. and Philpotts, J. A., 1970, Partition coefficients of rare-earth elements between igneous matrix material and rock-forming mineral phenocrysts: II. *Geochim. Cosmochim. Acta*, **34**, 331–340.

Zack, T. and Brumm, R., 1998, Ilmenite/liquid partition coefficients of 26 trace elements determined through ilmenite/clinopyroxene partitioning in garnet pyroxene. *In* Gurney, J. J., Gurney, J. L., Pascoe, M. D. and Richardson, S. H., eds., *7th International Kimberlite Conference*, Red Roof Design, Cape Town, 986–988.