D.R.M. Patterson Ph.D. thesis tabulated analyses

APPENDIX III

Reference: Patterson, D.R.M. (1985) Petrogenesis of pelitic rocks in the Ballachulish thermal aureole. Unpubl. thesis, U. Edinburgh, 590 pp. *

MICROPROBE ANALYSES

Instrument and operating conditions

Microprobe analyses were obtained using a Cambridge Instruments Microscan 5 with two crystal spectrometers and a Link Systems energy dispersive system. Take off angle was 75° and accelerating potential was 20 kV. For wavelength dispersive spectrometry (WDS), probe current (measured at a Faraday cage) was 30 nA, while for energy dispersive spectrometry (EDS), the probe current was 6 nA.

All analyses were performed with a focussed electron beam of 1-2 um diameter, penetrating to a depth of about 3 um. 40 second counting times on peaks of standards and unknowns were used, with 20 second counting times on the initial analysis of each new mineral.

Standards and correction procedure

The elemental standards used in this study are listed in Table AIII.1.

The vast majority of analyses were made using WDS. For WDS analysis, the raw X-ray counts are collected and run through on on-line computer program for ZAF corrections (after Sweatman & Long (1969), using the absorption co-efficients of Heinrich (1966)). The number of X-rays for an element in an unknown is related to the number of X-rays in that element's standard, which is read at least once in the same probe session to account for system variations.

For EDS analyslis, an X-ray spectrum is collected in 100 livetime seconds, followed by the same on-line ZAF correction procedure described above. The abundance of each element is related to an overall element calibration by a secondary cobalt standard, which is read several times throughout a given session to account for system variations.

* Note: these analyses are also referenced in:
Patterson, D.R.M. (1987) Variations in Mg/Fe+Mg, F and (Fe,Mg) Si = 2 Al in pelitic minerals in the Ballachulish Thermal aureole, Scotland. Am. Mineral. 72, 255-272.
These analyses are deposited in the Am. Mineral. archives.

Table AIII.1 Element standards used in this study

Element	Z	Standard	Typical counts sec^{-1} wt-$\%^{-1}$
F	9	MgF_2	19
Na	11	$NaAlSi_2O_6$	120
Mg	12	MgO	230
Al	13	Al_2O_3	260
Si	14	$CaSiO_3$	180
K	19	$KAlSi_3O_8$	62
Ca	20	$CaSiO_3$	130
Ti	22	TiO_2	170
Cr	24	metal	170
Mn	25	metal	165
Fe	26	metal	140
Zn	30	metal	70
Ba	56	$BaSO_4$	35

All radiation is $K\alpha$, except for Zn which is $L\alpha$. Zn and all elements up to Si were analysed using a quartz crystal; all other elements were analysed using an RAP crystal. All mineral standards are natural; all metals are synthetic. In general, lower counts sec^{-1} wt-$\%^{-1}$ indicate poorer detection limits.

Precision on analyses

Listed below are the elements analysed in each mineral.

Mineral	Elements analysed
Chlorite	Si, Ti, Al, Fe, Mn, Mg, Ca, Na, K
Muscovite	Si, Ti, Al, Fe, Mn, Mg, Ca, Na, K
Biotite	Si, Ti, Al, Fe, Mn, Mg, Ca, Na, K, F
Garnet	Si, Ti, Al, Cr, Fe, Mn, Mg, Ca
Cordierite	Si, Ti, Al, Fe, Mn, Mg, Ca, Na, K
K-feldspar	Si, Al, Fe, Mg, Ca, K, Na
Plagioclase	Si, Al, Fe, Mg, Ca, K, Na
Spinel	Si, Ti, Al, Cr, Fe, Mn, Mg, Ca, Zn
Orthopyroxene	Si, Ti, Al, Cr, Fe, Mn, Mg, Ca, Na
Quartz, Aluminosilicate, Corundum	Si, Ti, Al, Fe, Mg, Ca, K, Na

Table AIII.2 lists the detection limits and two different types of precision calculation for typical analyses of each mineral for WDS analysis. The detection limit calculation and the first precision calculation measure the best possible analytical precision of the microprobe, based on the following formulae:

1) Detection limit $= \frac{3}{m}\sqrt{\frac{R_b}{T_b}}$

2 Precision $= 2 \times \left[\frac{1}{\sqrt{T_p}} \times \frac{1}{\sqrt{R_p} - \sqrt{R_b}}\right] \times$ (Wt%)

where m = counts (above background) sec^{-1} $(wt\%)^{-1}$

R_b = background count rate (counts sec^{-1})

T_b = time on background (sec)

R_p = peak count rate (counts sec^{-1})

T_p = time on peak (sec)

Table AIII.2 Precision and detection limits for typical WDS analysis. Reprod. - Reproducability

A. CHLORITE D182

Oxide	Mean Wt %	Theoretical precision ±2σ	Detection limit	Reprod. ± 2σ (n=5)
SiO_2	25.80	0.20	0.04	0.34
TiO_2	0.07	0.03	0.03	0.01
Al_2O_3	20.92	0.15	0.03	0.35
FeO	18.11	0.15	0.03	0.30
MnO	0.22	0.02	0.03	0.02
MgO	20.47	0.14	0.02	0.20
TOTAL	85.60			0.83

B. MUSCOVITE D608-1

Oxide	Mean Wt %	Theoretical precision ±2σ	Detection limit	Reprod. ± 2σ (n=5)
SiO_2	45.15	0.27	0.04	0.79
TiO_2	0.07	0.03	0.03	0.03
Al_2O_3	34.53	0.17	0.02	0.72
FeO	2.16	0.07	0.03	0.37
MnO	0.01	0.03	0.03	0.01
MgO	0.73	0.03	0.02	0.29
Na_2O	0.51	0.17	0.02	0.06
K_2O	10.73	0.13	0.03	0.20
TOTAL	93.91			0.66

C. BIOTITE D63b

Oxide	Mean Wt %	Theoretical precision ±2σ	Detection limit	Reprod. ± 2σ (n=5)
SiO_2	37.79	0.25	0.04	0.87
TiO_2	2.34	0.07	0.03	0.12
Al_2O_3	19.31	0.14	0.02	0.62
FeO	7.0	0.11	0.04	0.6
MnO	0.10	0.03	0.03	0.01
MgO	16.84	0.13	0.02	0.40
CaO	0.01	0.02	0.02	0.01
Na_2O	0.25	0.03	0.02	0.02
K_2O	9.95	0.13	0.02	0.20
F	1.14	0.22	0.10	0.21
TOTAL	95.54			0.95

D. GARNET D568

Oxide	Mean Wt %	Theoretical precision ±2σ	Detection limit	Reprod. ± 2σ (n=5)
SiO_2	37.53	0.25	0.04	0.41
TiO_2	0.04	0.03	0.03	0.01
Al_2O_3	21.34	0.14	0.02	0.09
Cr_2O_3	0.08	0.03	0.03	0.01
FeO	34.60	0.22	0.04	0.27
MnO	1.54	0.06	0.03	0.04
MgO	4.41	0.08	0.02	0.04
CaO	1.24	0.05	0.02	0.02
TOTAL	100.81			0.67

E. CORDIERITE D568

Oxide	Mean Wt %	Theoretical precision ±2σ	Detection limit	Reprod. ± 2σ (n=5)
SiO_2	47.76	0.28	0.04	0.41
TiO_2	0.01	0.03	0.03	0.01
Al_2O_3	32.31	0.17	0.02	0.41
FeO	11.09	0.13	0.04	0.10
MnO	0.20	0.03	0.03	0.01
MgO	6.69	0.08	0.02	0.05
CaO	0.01	0.01	0.02	0.01
Na_2O	0.18	0.03	0.02	0.02
K_2O	0.01	0.02	0.02	0.01
TOTAL	98.28			0.40

F. K-FELDSPAR D608-1

Oxide	Mean Wt %	Theoretical precision ±2σ	Detection limit	Reprod. ± 2σ (n=5)
SiO_2	64.65	0.30	0.04	1.07
Al_2O_3	18.81	0.13	0.02	0.12
FeO	0.02	0.03	0.03	0.02
Ba	0.41	0.07	0.06	0.04
MgO	0.02	0.02	0.02	0.01
CaO	0.05	0.03	0.02	0.02
Na_2O	2.92	0.07	0.02	0.47
K_2O	13.05	0.14	0.02	0.79
TOTAL	99.95			1.09

G. PLAGIOCLASE D568

Oxide	Mean Wt %	Theoretical precision ±2σ	Detection limit	Reprod. ± 2σ (n=5)
SiO_2	59.44	0.30	0.04	0.95
TiO_2	0.01	0.03	0.03	0.01
Al_2O_3	25.51	0.15	0.02	0.51
FeO	0.07	0.03	0.03	0.02
MgO	0.02	0.02	0.02	0.01
CaO	7.50	0.11	0.02	0.38
Na_2O	7.53	0.11	0.02	0.24
K_2O	0.26	0.03	0.02	0.04
TOTAL	100.35			0.79

H. SPINEL D608-1

Oxide	Mean Wt %	Theoretical precision ±2σ	Detection limit	Reprod. ± 2σ (n=5)
SiO_2	0.02	0.04	0.04	0.02
TiO_2	0.07	0.03	0.03	0.02
Al_2O_3	56.12	0.19	0.03	0.41
Cr_2O_3	0.04	0.03	0.03	0.01
FeO	41.38	0.23	0.04	0.17
MnO	0.51	0.04	0.03	0.03
MgO	2.38	0.06	0.02	0.04
CaO	0.01	0.02	0.02	0.01
ZnO	0.27	0.07	0.05	0.03
TOTAL	100.82			0.51

I. ORTHOPYROXENE D568

Oxide	Mean Wt %	Theoretical precision ±2σ	Detection limit	Reprod. ± 2σ (n=5)
SiO_2	48.72	0.27	0.04	0.65
TiO_2	0.15	0.06	0.03	0.02
Al_2O_3	2.18	0.06	0.02	0.12
Cr_2O_3	0.05	0.03	0.03	0.01
FeO	37.56	0.23	0.04	0.16
MnO	0.64	0.04	0.03	0.05
MgO	11.30	0.12	0.02	0.03
CaO	0.16	0.03	0.02	0.03
Na_2O	0.01	0.01	0.01	0.01

The second precision calculation is a measure of the reproducability of several consecutive analyses within a small area (~100 um^2); in general (but not always) it gives a higher 2σ than that based on the counting statistics. In a sense, this calculation is probably a better estimate of the practical, or "user", precision of the microprobe; during the course of a probe session, slight fluctuations in the vacuum, beam current, and/or peak positions may influence the quality of analyses. These effects are impossible to quantify.

The minerals with the poorest reproducability are muscovite, biotite and K-feldspar. It is possible that these minerals may not have been homogeneous on the scale of 100 um^2.

Explanation of tables

In the following tables, mineral spot analyses are listed that are closest to the average value of the good analyses of a particular mineral in a given rock. Allowance is made for core-rim variation. The analyses are grouped together by rock, which are ordered numerically.

The following abbreviations are used:

n.d.:	not detected
CHL:	primary chlorite
CHL-2:	secondary chlorite, not specific
CHL-2(GT):	chlorite that is an alteration of garnet
MU:	primary muscovite
MU-2	secondary muscovite; not specific
BI:	primary biotite. May be regional or contact metamorphic
BI-R:	schistosity-parallel (regional) biotite, as opposed to late, cross-cutting biotite
BI-L:	late biotite. May be with respect to regional <u>or</u> contact metamorphic specimens; in both cases, the biotite texturally appears to post date the dominant texture.

BI-A:	biotite in medium and high grade rocks involved in the retrograde assemblage Mu-Chl-Bi.
BI-MZ:	biotite in the leucosome (melt zone) of heterogeneous migmatites.
BI-S:	biotite in the selvage of partially melted rocks.
BI-M:	biotite in the mesosome or in the middle of disrupted bedding fragments (i.e. well away from the selvage).
BI-MS:	biotite midway between the selvage and the unaffected mesosome.
CD:	cordierite.
CD-C:	cordierite core.
CD-R:	cordierite rim.
CD-A:	pinitized cordierite.
CD(+AS):	cordierite in a layer containing andalusite.
CD-MZ:	cordierite in the leucosome (melt zone) of heterogeneous migmatites.
CD-S:	cordierite in the selvage
CD-M:	cordierite in the mesosome or in the middle of disrupted bedding fragments (well away from the selvage).
CD-MS:	cordierite midway between the selvage and mesosome.
GT-C:	garnet core.
GT-R:	garnet rim.
KF:	K-feldspar.
KF-C:	K-feldspr core.
KF-R	K-feldspr rim.
PL-A:	plagioclase (albite)
PL-O:	plagioclase (oligoclase)
SP:	spinel
HY:	hypersthene
EP:	primary epidote (in regional rocks).
EP-2:	secondary (alteration epidote).
SIL:	sillimanite.
AND:	andalusite.
COR:	corundum.

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	1	2	3	4	5	6	7	8
SiO2	34.13	47.32	22.98	44.94	59.96	35.74	33.77	47.03
TiO2	2.40	nd	0.20	0.45	nd	nd	3.82	nd
Al2O3	19.09	32.15	21.43	34.53	24.81	61.42	18.65	32.29
FeO	23.44	11.55	34.51	3.09	0.13	0.83	24.13	11.52
MnO	0.14	0.29	0.26	0.01	nd	nd	0.11	0.22
MgO	6.48	5.71	8.03	0.51	0.01	0.03	5.63	5.50
CaO	0.04	0.02	0.01	nd	6.19	nd	nd	nd
Na2O	0.30	0.47	0.01	0.69	7.96	nd	0.22	0.54
K2O	9.06	nd	0.01	9.91	0.19	0.03	9.58	nd
total=	95.08	97.51	87.44	94.13	99.25	98.05	95.91	97.10
F	0.21	nd	nd	nd	nd	nd	0.28	nd
Si	2.66	5.00	2.57	3.05	2.69	0.99	2.63	4.99
Ti	0.14	-	0.02	0.02	-	-	0.22	-
Al	1.75	4.00	2.82	2.76	1.31	2.00	1.71	4.04
Fe2	1.53	1.02	3.23	0.18	-	0.02	1.57	1.02
Mn	-	0.03	0.02	-	-	-	-	0.02
Mg	0.75	0.90	1.34	0.05	-	-	0.65	0.87
Ca	-	-	-	-	0.30	-	-	-
Na	0.05	0.10	-	0.09	0.69	-	0.03	0.11
K	0.90	-	-	0.86	0.01	-	0.95	-
total=	7.79	11.05	10.00	7.02	5.01	3.01	7.78	11.05
oxygens=	[11]	[18]	[14]	[11]	[8]	[5]	[11]	[18]

1 D1-BI
2 D1-CD
3 D1-CHL-2
4 D1-MU2
5 D1-PL-O
6 D1-SIL
7 D2-BI
8 D2-CD

	9	10	11	12	13	14	15	16
SiO2	23.70	63.24	45.77	60.58	36.25	35.59	47.71	25.02
TiO2	0.08	0.01	0.31	0.01	2.27	2.30	nd	0.09
Al2O3	21.05	18.89	34.36	24.55	18.50	17.81	32.09	20.55
FeO	30.49	0.03	2.86	nd	17.37	17.49	8.40	25.39
MnO	0.34	nd	0.02	nd	0.10	0.18	0.50	0.26
MgO	11.04	0.03	0.62	0.02	10.18	11.52	7.89	14.87
CaO	nd	0.12	nd	5.98	0.03	nd	0.01	0.02
Na2O	0.01	1.98	0.58	8.04	0.16	0.21	0.20	0.01
K2O	0.03	13.43	10.43	0.20	9.30	9.25	0.01	0.03
total=	86.74	97.73	94.95	99.38	94.16	94.35	96.81	86.24
F	nd	nd	nd	nd	0.56	1.24	nd	nd
Si	2.61	2.97	3.08	2.71	2.76	2.72	5.01	2.69
Ti	-	-	0.02	-	0.13	0.13	-	-
Al	2.73	1.04	2.73	1.29	1.66	1.60	3.97	2.60
Fe2	2.81	-	0.16	-	1.11	1.12	0.74	2.28
Mn	0.03	-	-	-	-	0.01	0.04	0.02
Mg	1.81	-	0.06	-	1.15	1.31	1.23	2.38
Ca	-	-	-	0.29	-	-	-	-
Na	-	0.18	0.08	0.70	0.02	0.03	0.04	-
K	-	0.80	0.90	0.01	0.90	0.90	-	-
total=	10.02	5.00	7.02	5.00	7.74	7.82	11.03	10.00
oxygens=	[14]	[8]	[11]	[8]	[11]	[11]	[18]	[14]

9 D2-CHL-2
10 D2-KF
11 D2-MU-2
12 D2-PL-O
13 D7-BI
14 D7-BI-A
15 D7-CD
16 D7-CHL-2

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	17	18	19	20	21	22	23	24
SiO2	64.41	45.78	60.72	35.38	35.54	48.78	26.06	37.66
TiO2	0.06	0.18	nd	3.38	3.09	0.03	0.04	0.03
Al2O3	18.56	33.12	24.57	17.95	18.76	32.87	20.03	23.03
FeO	0.28	3.53	0.02	16.36	15.38	5.69	21.94	11.95
MnO	nd	0.03	nd	0.17	0.24	0.35	0.30	0.06
MgO	0.03	1.11	0.01	11.06	11.71	9.79	18.12	0.15
CaO	0.11	nd	5.97	nd	nd	0.03	0.03	22.72
Na2O	2.01	0.55	8.01	0.22	0.21	0.29	0.01	0.03
K2O	13.64	10.60	0.15	9.86	9.98	0.06	0.05	nd
total=	99.10	94.90	99.45	94.38	94.91	97.89	86.58	95.63
F	nd	nd	nd	0.17	0.43	nd	nd	nd
Si	2.98	3.10	2.71	2.70	2.68	5.00	2.74	6.06
Ti	-	-	-	0.19	0.18	-	-	-
Al	1.01	2.65	1.29	1.61	1.67	3.97	2.48	4.36
Fe3	-	-	-	-	-	-	-	1.52
Fe2	0.01	0.20	-	1.04	0.97	0.49	1.93	0.08
Mn	-	-	-	0.01	0.02	0.03	0.03	-
Mg	-	0.11	-	1.26	1.32	1.49	2.84	0.04
Ca	-	-	0.29	-	-	-	-	3.91
Na	0.18	0.07	0.69	0.03	0.03	0.06	-	-
K	0.81	0.92	-	0.96	0.96	-	-	-
total=	5.00	7.06	4.99	7.80	7.81	11.05	10.02	16.00
oxygens=	[8]	[11]	[8]	[11]	[11]	[18]	[14]	[25]

17 D7-KF
18 D7-MU-2
19 D7-PL-O
20 D8-BI
21 D8-BI-A
22 D8-CD
23 D8-CHL-2
24 D8-EP-2

	25	26	27	28	29	30	31	32
SiO2	63.51	46.38	56.92	34.56	47.92	24.07	45.18	64.52
TiO2	0.06	0.08	0.01	4.77	0.03	0.05	0.31	nd
Al2O3	18.58	33.43	26.26	18.33	32.52	22.16	35.24	22.20
FeO	0.09	2.93	0.12	20.57	9.90	25.91	1.94	0.02
MnO	nd	0.03	nd	0.11	0.30	0.18	0.02	nd
MgO	0.01	1.36	0.02	8.09	7.20	14.26	1.35	0.02
CaO	0.02	nd	8.08	nd	nd	nd	nd	2.55
Na2O	2.33	0.47	7.06	0.19	0.13	nd	0.96	10.07
K2O	13.29	10.49	0.05	9.05	nd	nd	9.49	0.22
total=	97.89	95.17	98.52	95.67	98.00	86.63	94.49	99.60
F	nd	nd	nd	0.29	nd	0.10	nd	nd
Si	2.97	3.12	2.59	2.64	4.99	2.58	3.03	2.85
Ti	-	-	-	0.27	-	-	0.02	-
Al	1.03	2.65	1.41	1.65	3.99	2.80	2.79	1.16
Fe2	-	0.16	-	1.31	0.86	2.33	0.11	-
Mn	-	-	-	-	0.03	0.02	-	-
Mg	-	0.14	-	0.92	1.12	2.28	0.14	-
Ca	-	-	0.39	-	-	-	-	0.12
Na	0.21	0.06	0.62	0.03	0.03	-	0.13	0.86
K	0.79	0.90	-	0.88	-	-	0.81	0.01
total=	5.01	7.03	5.02	7.72	11.02	10.01	7.02	5.01
oxygens=	[8]	[11]	[8]	[11]	[18]	[14]	[11]	[8]

25 D8-KF
26 D8-MU-2
27 D8-PL-O
28 D14B-BI
29 D14B-CD
30 D14B-CHL-2
31 D14B-MU-2
32 D14B-PL-A

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	33	34	35	36	37	38	39	40
SiO2	58.07	37.38	25.72	49.53	34.92	48.47	47.42	45.80
TiO2	nd	1.94	0.05	0.55	2.65	0.03	nd	1.17
Al2O3	25.87	16.14	20.54	28.62	19.88	32.50	32.36	34.91
FeO	0.14	18.38	23.89	2.66	19.68	9.68	10.36	1.64
MnO	nd	0.09	0.09	0.01	0.02	0.08	0.05	nd
MgO	nd	11.24	15.48	2.69	8.12	7.43	7.08	0.93
CaO	6.73	0.10	0.06	nd	nd	nd	nd	nd
Na2O	7.48	0.08	0.11	0.37	0.17	0.21	0.21	0.58
K2O	0.20	7.68	0.05	9.99	9.57	0.05	0.04	9.95
total=	98.49	93.03	85.99	94.42	95.01	98.45	97.52	94.98
F	nd	0.58	nd	nd	nd	nd	nd	nd
Si	2.63	2.87	2.75	3.33	2.67	5.02	4.98	3.06
Ti	-	0.11	-	0.03	0.15	-	-	0.06
Al	1.38	1.46	2.58	2.27	1.79	3.96	4.00	2.75
Fe2	-	1.18	2.13	0.15	1.26	0.84	0.91	0.09
Mg	-	1.28	2.46	0.27	0.93	1.15	1.11	0.09
Ca	0.33	-	-	-	-	-	-	-
Na	0.66	0.01	0.02	0.05	0.03	0.04	0.04	0.08
K	0.01	0.75	-	0.86	0.93	-	-	0.85
total=	5.01	7.68	9.97	6.96	7.76	11.02	11.05	6.97
oxygens=	[8]	[11]	[14]	[11]	[11]	[18]	[18]	[11]

33 D14B-PL-O
34 D16-BI
35 D16-CHL
36 D16-MU
37 D24-BI
38 D24-CD-C
39 D24-CD-R
40 D24-MU

	41	42	43	44	45	46	47	48
SiO2	66.71	36.41	46.81	36.22	36.95	48.92	62.66	53.10
TiO2	nd	3.09	0.38	0.06	1.42	0.14	nd	0.83
Al2O3	21.41	19.62	35.51	63.02	19.96	33.24	21.42	29.05
FeO	0.12	17.32	0.89	0.13	10.39	4.78	0.48	0.76
MnO	nd	0.04	nd	nd	0.02	0.01	0.01	nd
MgO	0.01	9.55	0.83	0.07	15.35	9.48	0.85	1.57
CaO	2.09	nd	nd	nd	nd	nd	nd	nd
Na2O	9.92	0.16	0.61	0.02	0.26	0.48	1.64	0.73
K2O	1.17	9.65	10.15	nd	9.77	0.52	13.21	11.01
total=	101.43	95.84	95.18	99.52	94.12	97.57	100.27	97.05
F	nd	nd	nd	nd	1.39	nd	nd	nd
Si	2.90	2.72	3.10	0.98	2.72	5.01	2.87	3.45
Ti	-	0.17	0.02	-	0.08	0.01	-	0.04
Al	1.10	1.73	2.77	2.02	1.73	4.01	1.15	2.22
Fe2	-	1.08	0.05	-	0.64	0.41	0.02	0.04
Mg	-	1.06	0.08	-	1.68	1.45	0.06	0.15
Ca	0.10	-	-	-	-	-	-	-
Na	0.84	0.02	0.08	-	0.04	0.10	0.15	0.09
K	0.06	0.92	0.86	-	0.92	0.07	0.77	0.91
total=	5.00	7.71	6.96	3.01	7.81	11.05	5.01	6.90
oxygens=	[8]	[11]	[11]	[5]	[11]	[18]	[8]	[11]

41 D24-PL-O
42 D25-BI
43 D25-MU
44 D25A-AND
45 D25A-BI
46 D25A-CD
47 D25A-KF
48 D25A-MU

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	49	50	51	52	53	54	55	56
SiO2	68.75	35.94	35.96	48.00	65.35	70.46	63.14	38.02
TiO2	nd	nd	3.53	nd	nd	nd	nd	2.80
Al2O3	20.54	63.09	18.66	32.52	18.44	20.11	22.99	17.07
FeO	0.05	0.21	15.37	6.44	0.06	0.07	0.12	10.76
MnO	nd	nd	0.15	0.35	nd	nd	nd	0.02
MgO	0.02	0.21	11.49	9.02	0.02	nd	nd	15.20
CaO	0.18	nd	nd	0.02	0.03	0.37	3.91	nd
Na2O	11.16	0.04	0.17	0.27	2.00	11.02	9.41	0.11
K2O	0.53	0.34	9.33	0.19	13.67	0.15	0.23	9.35
BaO	nd	nd	nd	nd	0.31	nd	nd	nd
total=	101.23	99.83	94.66	96.81	99.88	102.18	99.80	93.33
F	nd	nd	0.21	nd	nd	nd	nd	0.55
Si	2.97	0.98	2.70	4.99	3.00	3.00	2.80	2.82
Ti	-	-	0.20	-	-	-	-	0.16
Al	1.05	2.02	1.65	3.99	1.00	1.01	1.20	1.49
Fe2	-	-	0.97	0.56	-	-	-	0.67
Mn	-	-	-	0.03	-	-	-	-
Mg	-	-	1.29	1.40	-	-	-	1.68
Ca	-	-	-	-	-	0.02	0.19	-
Na	0.93	-	0.02	0.05	0.18	0.91	0.81	0.02
K	0.03	0.01	0.89	0.03	0.80	-	0.01	0.89
total=	4.99	3.02	7.73	11.05	4.99	4.95	5.01	7.72
oxygens=	[8]	[5]	[11]	[18]	[8]	[8]	[8]	[11]

49 D25A-PL-A
50 D25A-SIL
51 D26-BI
52 D26-CD
53 D26-KF
54 D26-PL-A
55 D26-PL-O
56 D33-BI

	57	58	59	60	61	62	63	64
SiO2	48.20	64.65	68.40	33.33	33.85	48.39	48.00	64.24
TiO2	0.05	nd	0.03	2.93	1.49	0.08	0.03	nd
Al2O3	32.99	18.68	20.02	20.09	21.10	32.96	32.71	18.65
FeO	4.87	0.22	0.17	20.21	22.19	10.50	11.37	0.09
MnO	0.03	nd	nd	0.01	0.02	0.05	0.07	nd
MgO	10.49	0.03	0.01	7.84	6.90	7.03	6.40	0.01
CaO	nd	nd	0.53	nd	nd	0.02	0.01	nd
Na2O	0.22	1.38	11.25	0.14	0.13	0.25	0.23	2.11
K2O	0.15	14.69	0.20	9.12	8.95	0.04	0.02	13.74
BaO	nd	0.77	nd	nd	nd	nd	nd	0.16
total=	97.00	100.42	100.61	93.67	94.63	99.32	98.84	99.00
F	nd	nd	nd	0.11	0.04	nd	nd	nd
Si	4.96	2.98	2.97	2.60	2.62	4.98	4.99	2.98
Ti	-	-	-	0.17	0.09	-	-	-
Al	4.00	1.01	1.03	1.85	1.93	4.00	4.01	1.02
Fe2	0.42	-	-	1.32	1.44	0.90	0.99	-
Mg	1.61	-	-	0.91	0.80	1.08	0.99	-
Ca	-	-	0.02	-	-	-	-	-
Na	0.04	0.12	0.95	0.02	0.02	0.05	0.05	0.19
K	0.02	0.86	0.01	0.91	0.88	-	-	0.81
Ba	-	0.01	-	-	-	-	-	-
total=	11.06	5.01	4.99	7.77	7.78	11.04	11.03	5.01
oxygens=	[18]	[8]	[8]	[11]	[11]	[18]	[18]	[8]

57 D33-CD
58 D33-KF
59 D33-PL-A
60 D34-BI
61 D34-BI(+AS)
62 D34-CD
63 D34-CD(+AS)
64 D34-KF

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	65	66	67	68	69	70	71	72
SiO2	45.97	67.38	34.35	48.98	64.03	45.96	67.28	34.37
TiO2	0.30	nd	3.07	0.14	nd	0.69	0.01	3.57
Al2O3	36.17	20.71	19.58	32.58	18.64	35.35	21.14	18.51
FeO	1.17	0.39	18.38	9.75	0.21	0.95	0.19	19.14
MnO	nd	nd	0.06	0.07	nd	nd	nd	0.02
MgO	0.61	0.19	8.69	7.03	0.06	0.73	0.01	8.60
CaO	nd	0.48	nd	nd	0.04	nd	1.43	0.02
Na2O	0.60	11.18	0.18	0.17	1.53	0.70	10.02	0.17
K2O	10.40	0.48	9.14	0.02	14.14	10.11	0.12	9.53
BaO	nd	nd	nd	nd	0.30	nd	nd	nd
total=	95.22	100.81	93.45	98.74	98.95	94.49	100.20	93.93
F	nd	nd	0.59	nd	nd	nd	nd	0.41
Si	3.06	2.94	2.66	5.05	2.98	3.07	2.93	2.66
Ti	0.02	-	0.18	0.01	-	0.03	-	0.21
Al	2.83	1.06	1.78	3.96	1.02	2.79	1.09	1.69
Fe2	0.07	0.01	1.19	0.84	-	0.05	-	1.24
Mg	0.06	0.01	1.00	1.08	-	0.07	-	0.99
Ca	-	0.02	-	-	-	-	0.07	-
Na	0.08	0.94	0.03	0.03	0.14	0.09	0.85	0.03
K	0.88	0.03	0.90	-	0.84	0.86	-	0.94
total=	6.99	5.02	7.74	10.98	5.00	6.97	4.95	7.77
oxygens=	[11]	[8]	[11]	[18]	[8]	[11]	[8]	[11]

65 D34-MU-2
66 D34-PL-A
67 D37-BI
68 D37-CD
69 D37-KF
70 D37-MU-2
71 D37-PL
72 D38-BI

	73	74	75	76	77	78	79	80
SiO2	48.85	64.60	61.45	34.01	47.28	64.89	45.92	68.72
TiO2	nd	0.02	nd	3.67	0.02	0.01	0.46	nd
Al2O3	32.06	18.50	23.81	20.28	33.37	18.56	35.02	21.31
FeO	8.12	0.16	0.10	18.38	8.73	0.01	0.75	0.09
MnO	0.07	nd	nd	0.07	0.10	nd	nd	nd
MgO	8.33	0.01	nd	8.78	7.56	0.02	0.88	u.02
CaO	0.01	0.03	5.41	nd	0.02	nd	nd	0.62
Na2O	0.19	2.37	8.35	0.12	0.30	1.47	0.41	8.67
K2O	0.03	13.81	0.20	9.33	0.01	14.49	10.26	0.16
total=	97.66	99.50	99.32	94.64	97.39	99.45	93.70	99.59
F	nd	nd	nd	0.26	nd	nd	0.13	nd
Si	5.06	2.98	2.74	2.60	4.93	3.00	3.09	2.98
Ti	-	-	-	0.21	-	-	0.02	-
Al	3.91	1.01	1.25	1.83	4.10	1.01	2.78	1.09
Fe2	0.70	-	-	1.17	0.76	-	0.04	-
Mg	1.29	-	-	1.00	1.18	-	0.09	-
Ca	-	-	0.26	-	-	-	-	0.03
Na	0.04	0.21	0.72	0.02	0.06	0.13	0.05	0.73
K	-	0.81	0.01	0.91	-	0.85	0.88	-
total=	11.01	5.03	5.00	7.74	11.05	4.99	6.96	4.84
oxygens=	[18]	[8]	[8]	[11]	[18]	[8]	[11]	[8]

73 D38-CD
74 D38-KF
75 D38-PL-O
76 D44-BI
77 D44-CD
78 D44-KF
79 D44-MU-2
80 D44-PL-A

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	81	82	83	84	85	86	87	88
SiO2	62.36	36.31	35.00	35.01	47.67	0.15	64.35	45.67
TiO2	nd	0.24	3.17	2.16	0.03	1.59	nd	0.84
Al2O3	22.63	61.46	20.04	20.42	33.07	97.75	18.96	35.58
FeO	0.03	0.13	18.51	18.22	9.31	0.17	0.17	1.16
MnO	nd	nd	0.10	0.12	0.15	nd	nd	nd
MgO	nd	0.05	8.94	9.58	7.38	0.04	0.06	0.73
CaO	3.23	nd	0.04	0.03	0.05	nd	0.02	nd
Na2O	9.54	0.21	0.18	0.14	0.23	0.02	1.98	0.57
K2O	0.18	0.38	9.46	9.59	nd	0.01	14.02	10.14
total=	97.97	98.78	95.44	95.27	97.89	99.73	99.56	94.69
F	nd	nd	0.25	0.10	nd	0.01	nd	nd
Si	2.81	1.00	2.65	2.65	4.96	-	2.97	3.05
Ti	-	-	0.18	0.12	-	0.02	-	0.04
Al	1.20	1.99	1.79	1.82	4.05	1.97	1.03	2.80
Fe2	-	-	1.17	1.15	0.81	-	-	0.06
Mn	-	-	-	-	0.01	-	-	-
Mg	-	-	1.01	1.08	1.14	-	-	0.07
Ca	0.16	-	-	-	-	-	-	-
Na	0.83	0.01	0.03	0.02	0.05	-	0.18	0.07
K	0.01	0.01	0.91	0.93	-	-	0.83	0.86
total=	5.01	3.02	7.75	7.79	11.03	1.99	5.02	6.97
oxygens=	[8]	[5]	[11]	[11]	[18]	[3]	[8]	[11]

81 D44-PL-D
82 D49A-AND
83 D49A-BI
84 D49A-BI-A
85 D49A-CD
86 D49A-COR
87 D49A-KF
88 D49A-MU-2

	89	90	91	92	93	94	95	96
SiO2	67.06	32.89	23.92	63.06	43.52	61.72	35.93	23.95
TiO2	nd	2.77	0.31	0.01	0.68	0.02	2.28	0.11
Al2O3	19.74	19.36	17.55	18.75	34.83	23.35	17.62	21.44
FeO	0.07	22.13	30.89	0.08	2.65	0.15	21.71	29.01
MnO	nd	0.36	0.37	nd	nd	0.01	0.22	0.40
MgO	nd	7.82	10.34	nd	0.38	nd	7.71	11.80
CaO	0.35	0.04	0.07	0.02	nd	4.25	0.02	nd
Na2O	11.16	0.17	0.03	1.63	0.72	9.12	0.13	0.01
K2O	0.05	9.58	0.05	14.22	10.32	0.10	7.93	0.03
total=	98.43	95.12	83.53	97.77	93.10	98.72	93.55	86.75
F	nd	0.33	0.21	nd	nd	0.02	0.28	nd
Si	2.98	2.57	2.77	2.97	3.00	2.77	2.79	2.62
Ti	-	0.16	0.03	-	0.04	-	0.13	-
Al	1.03	1.78	2.39	1.04	2.83	1.23	1.61	2.76
Fe2	-	1.44	2.99	-	0.15	-	1.41	2.65
Mn	-	0.02	0.04	-	-	-	0.01	0.04
Mg	-	0.91	1.78	-	0.04	-	0.89	1.92
Ca	0.02	-	-	-	-	0.20	-	-
Na	0.96	0.03	-	0.15	0.10	0.79	0.02	-
K	-	0.95	-	0.85	0.91	-	0.79	-
total=	4.99	7.87	10.02	5.01	7.05	5.01	7.67	10.00
oxygens=	[8]	[11]	[14]	[8]	[11]	[8]	[11]	[14]

89 D49A-PL-A
90 D49C-BI
91 D49C-CH-2
92 D49C-KF
93 D49C-MU-2
94 D49C-PL-O
95 D53-BI
96 D53-CHL-2

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	97	98	99	100	101	102	103	104
SiO2	37.46	36.94	48.73	68.65	34.69	48.38	65.71	45.08
TiO2	0.14	0.09	0.35	0.03	2.36	nd	nd	1.34
Al2O3	20.96	20.90	31.02	20.84	17.51	31.89	18.07	29.60
Cr2O3	0.02	0.02	nd	nd	nd	nd	nd	nd
FeO	24.09	27.46	2.71	0.34	16.06	7.47	0.11	2.99
MnO	10.03	6.71	0.01	nd	0.03	0.04	nd	0.01
MgO	0.73	1.00	1.74	0.08	12.17	8.86	0.06	1.39
CaO	7.41	6.91	nd	0.12	nd	0.03	0.05	0.04
Na2O	nd	nd	0.51	10.87	0.18	0.24	2.47	0.36
K2O	nd	nd	9.46	0.86	9.39	0.05	13.29	9.94
BaO	nd	nd	nd	nd	nd	nd	0.19	nd
total=	100.84	100.03	94.53	101.79	92.39	96.96	99.95	90.75
F	nd	nd	nd	nd	1.20	nd	nd	nd
Si	3.00	2.98	3.26	2.96	2.69	5.04	3.01	3.18
Ti	-	-	0.02	-	0.14	-	-	0.07
Al	1.98	1.99	2.45	1.06	1.60	3.91	0.98	2.46
Fe3	-	0.04	-	-	-	-	-	-
Fe2	1.60	1.81	0.15	0.01	1.04	0.65	-	0.18
Mn	0.68	0.46	-	-	-	-	-	-
Mg	0.09	0.12	0.17	-	1.41	1.37	-	0.15
Ca	0.64	0.60	-	-	-	-	-	-
Na	-	-	0.07	0.91	0.03	0.05	0.22	0.05
K	-	-	0.81	0.05	0.93	-	0.78	0.90
total=	8.00	8.00	6.93	4.99	7.85	11.04	5.00	6.99
oxygens=	[12]	[12]	[11]	[8]	[11]	[18]	[8]	[11]

97 D53-GT-C
98 D53-GT-R
99 D53-MU
100 D53-PL-A
101 D59-BI
102 D59-CD
103 D59-KF
104 D59-MU

	105	106	107	108	109	110	111	112
SiO2	34.48	34.64	35.86	36.36	48.55	26.71	65.39	45.72
TiO2	3.65	3.18	3.49	3.43	0.02	0.30	nd	0.76
Al2O3	19.05	19.17	16.50	18.46	33.15	19.11	18.82	34.51
FeO	20.18	18.56	16.66	16.96	8.90	28.29	0.18	3.00
MnO	0.05	0.06	0.04	0.05	0.03	0.07	nd	nd
MgO	7.91	8.82	11.60	9.72	7.55	12.15	0.04	0.59
CaO	0.01	0.04	0.01	0.02	nd	0.03	0.05	nd
Na2O	0.17	0.15	0.13	0.18	0.29	0.02	2.04	0.68
K2O	9.46	9.31	9.30	9.51	0.04	0.24	13.33	10.16
BaO	nd	nd	nd	nd	nd	nd	0.30	nd
total=	94.96	93.93	93.59	94.69	98.53	86.92	100.15	95.42
F	0.34	0.47	0.66	0.55	nd	nd	nd	nd
Si	2.65	2.67	2.75	2.75	5.00	2.88	2.99	3.06
Ti	0.21	0.18	0.20	0.20	-	0.02	-	0.04
Al	1.73	1.74	1.49	1.64	4.02	2.43	1.01	2.73
Fe2	1.30	1.20	1.07	1.07	0.77	2.55	-	0.17
Mg	0.91	1.01	1.33	1.10	1.16	1.95	-	0.06
Na	0.03	0.02	0.02	0.03	0.06	-	0.18	0.09
K	0.93	0.91	0.91	0.92	-	0.03	0.78	0.87
total=	7.75	7.75	7.77	7.71	11.02	9.90	4.98	7.01
oxygens=	[11]	[11]	[11]	[11]	[18]	[14]	[8]	[11]

105 D60-BI
106 D60-BI-MS
107 D60-BI-MZ
108 D60-BI-S
109 D60-CD
110 D60-CHL-2
111 D60-KF
112 D60-MU-2

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	113	114	115	116	117	118	119	120
SiO2	64.73	35.24	47.82	64.67	43.60	65.70	35.95	36.84
TiO2	0.08	2.40	0.02	nd	0.52	nd	0.50	1.92
Al2O3	23.05	18.55	33.15	18.88	33.77	21.41	61.31	19.14
FeO	0.50	16.35	6.84	0.15	2.73	0.04	1.01	8.14
MnO	nd	0.05	0.05	nd	0.01	nd	nd	0.04
MgO	0.03	12.26	9.29	0.04	0.73	0.03	0.04	16.60
CaO	0.07	nd	nd	0.02	nd	1.90	nd	nd
Na2O	9.29	0.16	0.21	2.34	0.54	10.54	nd	0.25
K2O	2.40	9.58	0.03	13.69	10.59	0.30	0.03	9.87
BaO	nd	nd	nd	0.24	nd	nd	nd	nd
total=	100.15	94.59	97.41	100.03	92.49	99.92	98.84	92.80
F	nd	0.32	nd	nd	nd	nd	nd	1.45
Si	2.85	2.67	4.94	2.97	3.03	2.89	0.99	2.73
Ti	-	0.14	-	-	0.03	-	0.01	0.11
Al	1.20	1.66	4.04	1.02	2.76	1.11	1.99	1.67
Fe2	0.02	1.04	0.59	-	0.16	-	0.02	0.50
Mg	-	1.38	1.43	-	0.08	-	-	1.83
Ca	-	-	-	-	-	0.09	-	-
Na	0.79	0.02	0.04	0.21	0.07	0.90	-	0.04
K	0.14	0.93	-	0.80	0.94	0.02	-	0.93
total=	5.01	7.84	11.06	5.02	7.07	5.01	3.01	7.81
oxygens=	[8]	[11]	[18]	[8]	[11]	[8]	[5]	[11]

113 D60-PL-A
114 D61-BI
115 D61-CD
116 D61-KF
117 D61-MU-2
118 D61-PL
119 D61-SIL
120 D63B-BI

	121	122	123	124	125	126	127	128
SiO2	48.96	64.80	63.85	34.53	34.84	34.87	48.07	48.02
TiO2	nd	0.04	nd	1.60	3.32	2.95	nd	nd
Al2O3	33.42	18.57	21.91	19.56	18.95	19.39	32.89	32.75
FeO	3.99	0.12	0.07	19.49	20.47	21.51	9.58	10.64
MnO	0.18	nd	nd	0.06	0.06	0.06	0.05	0.06
MgO	10.31	0.04	0.02	9.41	7.77	7.40	7.14	6.50
CaO	nd	0.06	3.02	nd	0.02	0.01	nd	nd
Na2O	nd	2.15	9.43	0.17	0.16	0.17	0.25	0.27
K2O	nd	13.45	0.26	9.27	9.30	9.29	0.02	0.03
total=	96.86	99.23	98.56	94.09	94.89	95.65	98.00	98.27
F	nd	nd	nd	0.27	0.34	0.16	nd	nd
Si	5.01	2.99	2.85	2.67	2.68	2.67	4.99	5.00
Ti	-	-	-	0.09	0.19	0.17	-	-
Al	4.03	1.01	1.15	1.78	1.72	1.75	4.03	4.02
Fe2	0.34	-	-	1.26	1.32	1.38	0.83	0.93
Mn	0.02	-	-	-	-	-	-	-
Mg	1.57	-	-	1.08	0.89	0.84	1.11	1.01
Ca	-	-	0.14	-	-	-	-	-
Na	-	0.19	0.82	0.03	0.02	0.03	0.05	0.05
K	-	0.79	0.01	0.91	0.91	0.91	-	-
total=	10.97	5.00	4.99	7.82	7.74	7.75	11.02	11.02
oxygens=	[18]	[8]	[8]	[11]	[11]	[11]	[18]	[18]

121 D63B-CD
122 D63B-KF
123 D63B-PL
124 D65-BI-A
125 D65-BI-MZ
126 D65-BI-S
127 D65-CD
128 D65-CD-S

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	129	130	131	132	133	134	135	136
SiO2	64.32	65.62	45.31	67.83	66.01	35.23	48.17	65.24
TiO2	0.04	nd	0.36	0.02	0.02	3.64	nd	nd
Al2O3	18.89	18.83	34.51	19.84	21.81	17.09	32.71	18.88
FeO	0.49	0.17	3.04	0.17	0.30	16.38	7.04	nd
MnO	nd	nd	nd	nd	nd	0.23	0.55	nd
MgO	0.09	0.01	0.58	0.01	nd	11.36	8.49	0.05
CaO	0.05	0.04	nd	0.23	2.17	nd	nd	0.23
Na2O	1.63	2.67	0.68	11.48	10.26	0.19	0.44	2.56
K2O	13.97	12.54	9.99	0.20	0.27	9.49	nd	13.26
BaO	nd	0.27	nd	nd	nd	nd	nd	0.30
total=	99.48	100.15	94.47	99.78	100.84	93.61	97.40	100.52
F	nd	nd	nd	nd	nd	0.31	nd	nd
Si	2.97	2.99	3.07	2.97	2.88	2.71	4.99	2.98
Ti	-	-	0.02	-	-	0.21	-	-
Al	1.03	1.01	2.75	1.03	1.12	1.55	4.00	1.02
Fe2	0.02	-	0.17	-	0.01	1.05	0.61	-
Mn	-	-	-	-	-	0.01	0.05	-
Mg	-	-	0.06	-	-	1.30	1.31	-
Ca	-	-	-	0.01	0.10	-	-	0.01
Na	0.15	0.24	0.09	0.98	0.87	0.03	0.09	0.23
K	0.82	0.73	0.86	0.01	0.02	0.93	-	0.77
total=	5.00	4.98	7.02	5.01	5.00	7.79	11.05	5.01
oxygens=	[8]	[8]	[11]	[8]	[8]	[11]	[18]	[8]

129 D65-KF
130 D65-KF-M
131 D65-MU-2
132 D65-PL-A
133 D65-PL-O
134 D68-BI
135 D68-CD
136 D68-KF-C

	137	138	139	140	141	142	143	144
SiO2	64.60	45.79	60.40	25.05	33.51	47.13	64.49	45.47
TiO2	nd	nd	0.02	0.07	2.68	nd	nd	0.67
Al2O3	18.50	34.75	25.36	20.78	20.32	32.64	18.07	36.30
FeO	0.06	1.49	0.12	22.69	22.29	11.20	1.94	1.24
MnO	nd	nd	nd	0.26	0.13	0.53	nd	0.02
MgO	0.05	1.57	nd	16.13	6.46	6.21	0.33	0.48
CaO	0.31	nd	6.33	nd	nd	0.03	0.29	nd
Na2O	1.37	0.32	7.39	nd	0.13	0.27	2.23	0.63
K2O	14.72	9.93	0.16	nd	8.99	0.02	12.00	10.30
BaO	0.15	nd	nd	nd	nd	nd	0.49	nd
total=	99.76	93.85	99.78	84.98	94.51	98.03	99.84	95.11
F	nd	nd	nd	0.03	0.21	nd	nd	nd
Si	2.98	3.09	2.69	2.69	2.61	4.95	2.98	3.03
Ti	-	-	-	-	0.16	-	-	0.03
Al	1.01	2.76	1.33	2.63	1.87	4.04	0.98	2.85
Fe2	-	0.08	-	2.04	1.45	0.98	0.07	0.07
Mn	-	-	-	0.02	-	0.05	-	-
Mg	-	0.16	-	2.59	0.75	0.97	0.02	0.05
Ca	0.02	-	0.30	-	-	-	0.01	-
Na	0.12	0.04	0.64	-	0.02	0.05	0.20	0.08
K	0.87	0.85	-	-	0.89	-	0.71	0.88
total=	5.01	6.98	4.97	9.98	7.76	11.06	4.99	6.99
oxygens=	[8]	[11]	[8]	[14]	[11]	[18]	[8]	[11]

137 D68-KF-R
138 D68-MU-2
139 D68-PL-O
140 D68CHL-2
141 D78-BI
142 D78-CD
143 D78-KF
144 D78-MU-2

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	145	146	147	148	149	150	151	152
SiO2	66.61	62.88	36.29	48.15	25.59	47.01	61.68	35.03
TiO2	0.03	0.03	3.56	0.03	0.05	0.26	nd	4.87
Al2O3	21.41	23.40	18.08	32.76	22.91	35.13	23.81	16.88
FeO	0.25	0.25	18.20	8.18	21.44	1.32	0.72	22.20
MnO	nd	nd	0.12	0.21	0.26	nd	nd	0.27
MgO	0.07	0.02	10.11	8.12	17.26	1.10	0.43	7.56
CaO	1.80	4.36	nd	0.02	nd	nd	4.37	nd
Na2O	10.17	8.90	0.21	0.18	0.02	0.86	8.06	0.09
K2O	0.11	0.18	9.21	nd	0.01	9.82	0.46	9.67
total=	100.45	100.02	95.78	97.65	87.54	95.50	99.53	96.57
F	nd	nd	0.46	nd	nd	nd	nd	nd
Si	2.91	2.78	2.73	4.99	2.64	3.11	2.75	2.68
Ti	-	-	0.20	-	-	0.01	-	0.28
Al	1.10	1.22	1.60	4.00	2.79	2.74	1.25	1.52
Fe2	-	-	1.14	0.71	1.85	0.07	0.03	1.42
Mn	-	-	-	0.02	0.02	-	-	0.02
Mg	-	-	1.13	1.26	2.65	0.11	0.03	0.86
Ca	0.08	0.21	-	-	-	-	0.21	-
Na	0.86	0.76	0.03	0.04	-	0.11	0.70	0.01
K	-	0.01	0.88	-	-	0.83	0.03	0.95
total=	4.97	4.99	7.73	11.02	9.96	6.98	4.99	7.75
oxygens=	[8]	[8]	[11]	[18]	[14]	[11]	[8]	[11]

145 D78-PL-A
146 D78-PL-O
147 D81A-BI
148 D81A-CD
149 D81A-CHL-2
150 D81A-MU-2
151 D81A-PL-O
152 D83A(2)-BI-A

	153	154	155	156	157	158	159	160
SiO2	46.83	47.63	24.95	45.41	61.98	34.68	35.30	34.83
TiO2	nd	nd	0.17	0.12	nd	3.84	3.86	3.70
Al2O3	31.77	32.28	20.53	34.77	22.99	17.59	17.57	17.75
FeO	10.55	9.82	30.38	2.05	0.12	22.53	21.43	23.04
MnO	0.44	0.46	0.32	0.03	nd	0.25	0.17	0.18
MgO	5.99	6.80	11.79	0.72	nd	7.50	8.14	6.88
CaO	nd	nd	nd	nd	4.26	0.02	0.01	0.03
Na2O	0.60	0.31	0.01	0.57	8.92	0.21	0.20	0.24
K2O	nd	nd	0.05	10.63	0.10	9.39	9.47	9.27
total=	96.18	97.30	88.20	94.30	98.37	96.01	96.15	95.92
F	nd	nd	nd	nd	nd	0.26	0.28	0.17
Si	5.00	5.00	2.69	3.07	2.79	2.67	2.70	2.69
Ti	-	-	0.01	-	-	0.22	0.22	0.21
Al	4.00	4.00	2.61	2.77	1.22	1.60	1.58	1.62
Fe2	0.94	0.86	2.74	0.12	-	1.45	1.37	1.49
Mn	0.04	0.04	0.03	-	-	0.02	0.01	0.01
Mg	0.95	1.06	1.90	0.07	-	0.86	0.93	0.79
Ca	-	-	-	-	0.21	-	-	-
Na	0.12	0.06	-	0.07	0.78	0.03	0.03	0.04
K	-	-	-	0.92	-	0.92	0.92	0.91
total=	11.06	11.03	9.99	7.03	5.00	7.78	7.77	7.76
oxygens=	[18]	[18]	[14]	[11]	[8]	[11]	[11]	[11]

153 D83A(2)-CD-M
154 D83A(2)-CD-S
155 D83A(2)-CHL-2
156 D83A(2)-MU-2
157 D83A(2)-PL-O
158 D83A-BI(1) ← fragment (1)
159 D83A-BI(3) ← fragment (3)
160 D83A-BI-(2) ← fragment (2)

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	161	162	163	164	165	166	167	168
SiO2	47.79	47.48	47.66	64.40	62.76	0.03	36.61	35.25
TiO2	0.05	0.03	0.03	nd	0.01	0.10	3.24	3.86
Al2O3	32.62	32.53	32.71	19.23	23.52	54.06	17.99	17.53
Cr2O3	nd	nd	nd	nd	nd	0.05	nd	nd
FeO	11.63	10.89	10.95	0.02	0.04	41.43	17.71	16.65
MnO	0.46	0.46	0.44	nd	nd	0.53	0.11	0.09
MgO	6.01	6.48	6.20	0.05	0.02	2.29	11.07	11.68
CaO	0.04	0.02	0.02	0.02	4.63	nd	nd	nd
Na2O	0.32	0.24	0.36	2.23	8.73	nd	0.16	0.18
K2O	nd	0.02	0.01	13.44	0.20	nd	9.94	9.57
BaO	nd	nd	nd	0.32	nd	nd	nd	nd
total=	98.92	98.15	98.38	99.71	99.91	98.49	96.83	94.81
F	nd	nd	nd	nd	nd	nd	nd	0.40
Si	4.98	4.97	4.98	2.96	2.78	-	2.72	2.67
Ti	-	-	-	-	-	-	0.18	0.22
Al	4.01	4.01	4.03	1.04	1.23	1.87	1.58	1.57
Fe3	-	-	-	-	-	0.13	-	-
Fe2	1.01	0.95	0.96	-	-	0.89	1.10	1.06
Mn	0.04	0.04	0.04	-	-	0.01	-	-
Mg	0.93	1.01	0.97	-	-	0.10	1.23	1.32
Ca	-	-	-	-	0.22	-	-	-
Na	0.06	0.05	0.07	0.20	0.75	-	0.02	0.03
K	-	-	-	0.79	0.01	-	0.94	0.93
total=	11.05	11.05	11.04	5.01	4.99	3.00	7.79	7.80
oxygens=	[18]	[18]	[18]	[8]	[8]	[4]	[11]	[11]

161 D83A-CD(2) - fragment 2
162 D83A-CD(3) - " 3
163 D83A-CD-(1) - " 1
164 D83A-KF1
165 D83A-PL-O
166 D83A-SP(3) - fragment 3
167 D83B-BI-A
168 D83B-BI-M

	169	170	171	172	173	174	175	176
SiO2	35.22	48.30	48.38	48.93	26.03	64.40	46.82	69.01
TiO2	4.31	0.03	nd	nd	0.04	nd	0.25	0.04
Al2O3	17.17	33.03	33.24	33.37	20.04	18.94	33.92	20.14
FeO	17.12	8.94	7.43	6.10	21.20	0.07	2.15	nd
MnO	0.08	0.09	0.19	0.19	0.14	nd	0.03	nd
MgO	11.01	7.88	8.79	9.47	17.85	0.03	0.98	0.01
CaO	nd	0.01	0.02	0.03	nd	0.09	nd	0.33
Na2O	0.15	0.26	0.23	0.19	nd	1.60	0.41	10.80
K2O	9.52	0.02	0.02	nd	nd	13.92	10.37	0.24
BaO	nd	nd	nd	nd	nd	0.72	nd	nd
total=	94.58	98.56	98.30	98.28	86.10	99.77	94.93	100.57
F	0.36	nd	nd	nd	nd	nd	nd	nd
Si	2.69	4.98	4.97	4.99	2.73	2.97	3.14	2.99
Ti	0.25	-	-	-	-	-	0.01	-
Al	1.54	4.01	4.02	4.01	2.58	1.03	2.68	1.03
Fe2	1.09	0.77	0.64	0.52	1.86	-	0.12	-
Mn	-	-	0.02	0.02	0.01	-	-	-
Mg	1.25	1.21	1.35	1.44	2.79	-	0.10	-
Ca	-	-	-	-	-	-	-	0.02
Na	0.02	0.05	0.05	0.04	-	0.14	0.05	0.91
K	0.93	-	-	-	-	0.82	0.89	0.01
Ba	-	-	-	-	-	0.01	-	-
total=	7.77	11.04	11.04	11.02	9.98	4.99	6.98	4.96
oxygens=	[11]	[18]	[18]	[18]	[14]	[8]	[11]	[8]

169 D83B-BI-S
170 D83B-CD-M
171 D83B-CD-MS
172 D83B-CD-S
173 D83B-CHL-2
174 D83B-KF
175 D83B-MU
176 D83B-PL-A

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	177	178	179	180	181	182	183	184
SiO2	61.03	35.92	34.95	35.79	47.82	47.90	48.48	24.50
TiO2	0.02	4.82	4.48	4.32	0.02	0.02	nd	0.06
Al2O3	24.55	16.55	17.03	16.82	32.37	32.66	33.16	21.21
FeO	0.11	17.25	17.77	16.97	8.49	7.23	6.39	27.64
MnO	nd	0.12	0.10	0.12	0.09	0.17	0.20	0.18
MgO	0.01	10.66	11.12	11.94	7.90	8.76	9.35	13.03
CaO	6.04	nd	0.06	nd	0.02	0.02	0.03	0.01
Na2O	8.10	0.18	0.15	0.17	0.20	0.22	0.22	nd
K2O	0.26	9.44	8.89	9.54	nd	nd	nd	0.01
total=	100.12	94.94	94.55	95.67	96.91	96.98	97.83	86.64
F	nd	0.28	0.31	0.42	nd	nd	nd	nd
Si	2.71	2.73	2.67	2.69	5.00	4.98	4.98	2.65
Ti	-	0.28	0.26	0.24	-	-	-	-
Al	1.29	1.48	1.53	1.49	3.99	4.00	4.01	2.71
Fe2	-	1.09	1.13	1.07	0.74	0.63	0.55	2.50
Mn	-	-	-	-	-	0.01	0.02	0.02
Mg	-	1.21	1.26	1.34	1.23	1.36	1.43	2.10
Ca	0.29	-	-	-	-	-	-	-
Na	0.70	0.03	0.02	0.02	0.04	0.04	0.04	-
K	0.01	0.91	0.87	0.92	-	-	-	-
total=	5.00	7.73	7.75	7.79	11.02	11.04	11.04	9.99
oxygens=	[8]	[11]	[11]	[11]	[18]	[18]	[18]	[14]

177 D83B-PL-O
178 D83C-BI-A
179 D83C-BI-MS
180 D83C-BI-S
181 D83C-CD-M
182 D83C-CD-MS
183 D83C-CD-S
184 D83C-CHL-2

	185	186	187	188	189	190	191	192
SiO2	64.65	45.04	59.43	39.36	27.56	48.90	47.75	36.33
TiO2	nd	0.45	0.04	1.39	0.02	0.69	0.12	0.74
Al2O3	18.82	32.98	24.91	15.84	20.53	28.99	32.54	20.54
FeO	0.02	2.65	0.07	12.14	13.70	3.47	3.45	14.90
MnO	nd	0.03	nd	0.05	0.08	0.01	0.01	0.05
MgO	0.05	1.40	0.01	16.72	23.31	2.75	1.59	12.85
CaO	0.06	nd	6.59	nd	0.04	nd	0.01	nd
Na2O	2.14	0.45	7.84	0.06	0.01	0.18	0.52	0.24
K2O	13.56	10.42	0.17	9.52	0.06	10.07	10.15	8.52
BaO	0.44	nd	nd	nd	nd	nd	nd	nd
total=	99.74	93.42	99.06	95.08	85.31	95.06	96.14	94.17
F	nd	nd	nd	0.27	nd	nd	nd	0.86
Si	2.98	3.09	2.67	2.89	2.80	3.29	3.17	2.71
Ti	-	0.02	-	0.08	-	0.03	-	0.04
Al	1.02	2.66	1.32	1.37	2.46	2.30	2.55	1.81
Fe2	-	0.15	-	0.74	1.16	0.20	0.19	0.93
Mg	-	0.14	-	1.83	3.53	0.28	0.16	1.43
Ca	-	-	0.32	-	-	-	-	-
Na	0.19	0.06	0.68	-	-	0.02	0.07	0.03
K	0.80	0.91	-	0.89	-	0.86	0.86	0.81
total=	5.00	7.04	5.01	7.80	9.97	6.97	7.01	7.77
oxygens=	[8]	[11]	[8]	[11]	[14]	[11]	[11]	[11]

185 D83C-KF
186 D83C-MU-2
187 D83C-PL
188 D92B-BI
189 D92B-CHL
190 D92B-MU-1
191 D92B-MU-2
192 D116-BI

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	193	194	195	196	197	198	199	200
SiO2	47.92	34.85	37.26	47.45	47.52	68.20	36.19	47.62
TiO2	0.30	0.41	1.62	0.03	0.41	nd	1.56	0.60
Al2O3	33.50	20.95	18.15	32.84	29.83	19.41	18.58	31.09
FeO	1.19	17.09	17.51	7.98	2.12	0.30	15.17	2.35
MnO	nd	0.05	0.03	0.15	nd	nd	0.05	0.01
MgO	1.68	11.20	11.71	8.50	2.47	0.02	11.91	2.13
CaO	nd	nd	nd	0.05	nd	0.06	nd	nd
Na2O	0.58	0.24	0.22	0.28	0.48	11.74	0.16	0.39
K2O	9.45	8.53	8.35	0.10	9.77	0.07	8.62	10.06
total=	94.62	93.32	94.85	97.38	92.60	99.80	92.24	94.25
F	nd	0.30	0.25	nd	nd	nd	0.36	nd
Si	3.18	2.66	2.79	4.94	3.26	2.99	2.77	3.21
Ti	0.01	0.02	0.09	-	0.02	-	0.09	0.03
Al	2.62	1.89	1.60	4.03	2.41	1.00	1.68	2.47
Fe2	0.07	1.09	1.10	0.69	0.12	0.01	0.97	0.13
Mn	-	-	-	0.01	-	-	-	-
Mg	0.17	1.27	1.31	1.32	0.25	-	1.36	0.21
Na	0.07	0.04	0.03	0.06	0.06	1.00	0.02	0.05
K	0.80	0.83	0.80	0.01	0.85	-	0.84	0.87
total=	6.93	7.81	7.73	11.08	6.98	5.01	7.73	6.98
oxygens=	[11]	[11]	[11]	[18]	[11]	[8]	[11]	[11]

193 D116-MU
194 D126-BI - contact metamorphic
195 D126-BI-R - regional
196 D126-CD
197 D126-MU
198 D126-PL-A
199 D133-BI
200 D133-MU

	201	202	203	204	205	206	207	208
SiO2	36.71	47.92	45.61	34.55	24.24	47.10	39.96	24.40
TiO2	1.93	0.02	0.40	1.39	0.34	0.38	0.18	0.05
Al2O3	18.55	32.39	31.45	19.84	22.30	33.83	30.12	22.46
FeO	18.28	8.48	3.02	22.21	28.39	2.40	9.79	26.41
MnO	0.09	0.28	0.01	0.15	0.24	nd	0.09	0.32
MgO	10.30	7.81	2.10	7.11	11.05	1.13	4.17	13.10
CaO	0.02	0.03	nd	0.01	0.06	nd	nd	nd
Na2O	0.25	0.25	0.55	nd	nd	0.60	0.43	0.02
K2O	8.08	0.03	9.55	6.05	0.27	8.73	6.38	0.17
total=	94.21	97.21	92.69	91.31	86.89	94.17	91.12	86.93
F	0.21	nd	nd	nd	nd	nd	nd	nd
Si	2.78	5.00	3.14	2.73	2.63	3.15	2.88	2.62
Ti	0.11	-	0.02	0.08	0.03	0.02	-	-
Al	1.66	3.99	2.55	1.84	2.85	2.67	2.56	2.84
Fe2	1.16	0.74	0.17	1.47	2.58	0.13	0.59	2.37
Mn	-	0.02	-	0.01	0.02	-	-	0.03
Mg	1.16	1.22	0.22	0.84	1.79	0.11	0.45	2.09
Na	0.04	0.05	0.07	-	-	0.08	0.06	-
K	0.78	-	0.84	0.61	0.04	0.75	0.59	0.02
total=	7.69	11.03	7.02	7.57	9.94	6.91	7.15	9.98
oxygens=	[11]	[18]	[11]	[11]	[14]	[11]	[11]	[14]

201 D134A-BI
202 D134A-CD
203 D134A-MU
204 D137-BI
205 D137-CHL
206 D137-MU
207 D141-BI
208 D141-CH

	209	210	211	212	213	214	215	216
SiO2	47.00	39.07	49.02	47.17	32.56	46.47	34.88	32.62
TiO2	0.46	1.63	0.66	0.46	1.96	0.52	0.66	0.08
Al2O3	34.05	18.45	31.08	34.41	20.44	35.02	19.06	21.44
FeO	2.01	10.22	0.90	0.69	20.47	1.62	16.08	16.62
MnO	0.02	0.03	0.01	nd	0.01	nd	0.13	0.15
MgO	1.17	15.36	2.32	1.53	9.00	1.11	12.56	12.67
CaO	nd	nd	nd	nd	nd	nd	0.01	nd
Na2O	0.68	0.16	0.33	0.42	0.20	0.58	0.16	0.14
K2O	9.61	9.19	10.44	10.09	7.73	9.53	9.67	9.07
total=	95.00	94.11	94.76	94.77	92.37	94.85	93.21	92.79
F	nd	0.33	nd	nd	0.37	nd	0.30	0.13
Si	3.13	2.85	3.26	3.13	2.56	3.09	2.68	2.53
Ti	0.02	0.09	0.03	0.02	0.12	0.03	0.04	-
Al	2.67	1.59	2.44	2.69	1.89	2.75	1.73	1.96
Fe2	0.11	0.62	0.05	0.04	1.35	0.09	1.03	1.08
Mg	0.12	1.67	0.23	0.15	1.05	0.11	1.44	1.46
Na	0.09	0.02	0.04	0.05	0.03	0.07	0.02	0.02
K	0.82	0.86	0.89	0.86	0.78	0.81	0.95	0.90
total=	6.96	7.70	6.95	6.95	7.78	6.95	7.90	7.95
oxygens=	[11]	[11]	[11]	[11]	[11]	[11]	[11]	[11]

209 D141-MU
210 D142-BI
211 D142-MU-1
212 D142-MU-2
213 D145-BI
214 D145-MU
215 D151-BI-A
216 D151-BI-L

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	217	218	219	220	221	222	223	224
SiO2	48.01	23.78	37.12	46.07	69.56	24.23	23.24	37.24
TiO2	0.57	0.10	nd	0.33	nd	0.24	0.08	0.12
Al2O3	27.99	21.29	23.34	30.80	19.23	20.21	21.00	20.72
FeO	4.67	30.56	10.89	3.67	0.29	37.48	35.06	27.33
MnO	0.03	0.18	0.32	0.01	0.14	0.19	0.25	5.56
MgO	2.44	11.22	0.29	1.37	nd	5.93	8.27	0.53
CaO	nd	nd	21.05	nd	0.32	nd	0.02	8.59
Na2O	0.19	nd	0.45	0.68	11.47	nd	nd	nd
K2O	10.67	0.04	nd	9.78	nd	0.02	0.01	nd
total=	94.57	87.17	93.46	92.71	101.01	88.30	87.93	100.09
Si	3.28	2.60	6.07	3.19	3.01	2.72	2.59	3.00
Ti	0.03	-	-	0.02	-	0.02	-	-
Al	2.26	2.75	4.50	2.51	0.98	2.67	2.76	1.97
Fe3	-	-	1.51	-	-	-	-	0.02
Fe2	0.27	2.80	-0.02	0.21	0.01	3.51	3.27	1.82
Mn	-	0.02	0.04	-	-	0.02	0.02	0.38
Mg	0.25	1.83	0.07	0.14	-	0.99	1.37	0.06
Ca	-	-	3.69	-	0.01	-	-	0.74
Na	0.03	-	0.14	0.09	0.96	-	-	-
K	0.93	-	-	0.86	-	-	-	-
total=	7.04	10.02	16.00	7.02	4.98	9.93	10.02	8.00
oxygens=	[11]	[14]	[25]	[11]	[8]	[14]	[14]	[12]

217 D151-MU
218 D157-CHL
219 D157-EP
220 D157-MU
221 D157-PL-A
222 D160-CHL-2(BI)
223 D160-CHL-2(GT)
224 D160-GT-C

	225	226	227	228	229	230	231	232
SiO2	37.22	47.09	34.27	23.91	37.64	37.53	46.75	67.72
TiO2	0.08	0.28	2.05	0.06	0.14	0.10	0.38	nd
Al2O3	20.89	33.04	17.44	21.46	21.18	20.94	32.67	19.53
FeO	31.49	2.70	22.72	28.98	25.63	28.60	2.40	0.22
MnO	2.88	0.01	0.20	0.26	6.66	4.21	0.03	nd
MgO	0.75	1.17	7.72	11.50	0.78	1.00	1.38	nd
CaO	7.28	nd	0.01	0.01	8.88	7.76	nd	0.20
Na2O	nd	0.48	0.05	nd	nd	nd	0.49	11.39
K2O	nd	10.09	8.45	0.06	nd	nd	9.92	0.08
total=	100.59	94.86	92.91	86.24	100.91	100.14	94.02	99.14
F	nd	nd	0.24	nd	nd	nd	nd	nd
Si	2.99	3.16	2.72	2.63	3.00	3.02	3.16	2.99
Ti	-	0.01	0.12	-	-	-	0.02	-
Al	1.98	2.61	1.63	2.78	1.99	1.98	2.60	1.01
Fe3	0.03	-	-	-	-	-0.03	-	-
Fe2	2.08	0.15	1.51	2.66	1.71	1.95	0.14	-
Mn	0.20	-	0.01	0.02	0.45	0.29	-	-
Mg	0.09	0.12	0.91	1.88	0.09	0.12	0.14	-
Ca	0.63	-	-	-	0.76	0.67	-	-
Na	-	0.06	-	-	-	-	0.06	0.97
K	-	0.86	0.86	-	-	-	0.86	-
total=	8.00	6.98	7.77	9.99	8.00	8.00	6.98	5.00
oxygens=	[12]	[11]	[11]	[14]	[12]	[12]	[11]	[8]

225 D160-GT-A
226 D160-MU
227 D161-BI
228 D161-CHL
229 D161-GT-C
230 D161-GT-A
231 D161-MU
232 D161-PL-A

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	233	234	235	236	237	238	239	240
SiO2	34.57	47.41	24.50	48.15	38.63	27.86	46.75	36.57
TiO2	1.06	0.03	0.04	0.29	1.18	0.10	0.46	1.15
Al2O3	20.08	31.61	21.83	33.13	15.30	18.44	27.75	19.98
FeO	17.50	7.38	22.70	1.09	11.61	15.23	4.46	15.96
MnO	0.11	0.34	0.14	nd	0.10	0.20	0.09	0.08
MgO	10.85	7.87	15.92	1.08	17.67	24.01	3.39	12.36
CaO	nd	0.02	nd	nd	0.09	nd	0.02	nd
Na2O	0.23	0.86	0.01	0.76	0.08	nd	0.33	0.27
K2O	8.07	0.05	0.02	9.07	8.40	0.04	9.91	7.84
total=	92.47	95.57	85.16	93.57	93.06	85.88	93.16	94.21
F	0.38	nd	nd	nd	0.70	nd	nd	0.46
Si	2.67	5.03	2.63	3.22	2.88	2.84	3.24	2.73
Ti	0.06	-	-	0.01	0.07	-	0.02	0.06
Al	1.83	3.95	2.76	2.61	1.34	2.22	2.27	1.76
Fe2	1.13	0.65	2.04	0.06	0.72	1.30	0.26	1.00
Mn	-	0.03	0.01	-	-	0.02	-	-
Mg	1.25	1.24	2.55	0.11	1.96	3.65	0.35	1.38
Na	0.03	0.18	-	0.10	0.01	-	0.04	0.04
K	0.79	-	-	0.77	0.80	-	0.88	0.75
total=	7.77	11.09	9.99	6.89	7.79	10.04	7.06	7.72
oxygens=	[11]	[18]	[14]	[11]	[11]	[14]	[11]	[11]

233 D163-BI
234 D163-CO
235 D163-CHL-2
236 D163-MU
237 D168-BI
238 D168-CHL
239 D168-MU
240 D175-BI

	241	242	243	244	245	246	247	248
SiO2	47.99	46.50	36.68	39.95	25.57	48.92	25.88	37.13
TiO2	0.02	0.51	1.20	0.05	0.10	0.26	0.05	0.11
Al2O3	32.75	32.04	19.77	34.58	21.91	33.24	20.63	22.82
FeO	6.91	2.82	14.82	5.05	19.05	1.36	17.97	12.29
MnO	0.31	0.01	0.12	0.15	0.22	nd	0.22	0.27
MgO	8.75	2.39	12.73	4.68	18.43	1.77	20.09	0.03
CaO	0.02	0.01	0.04	0.08	0.02	nd	0.01	22.65
Na2O	0.41	1.11	0.25	0.09	0.02	0.63	nd	0.02
K2O	0.03	8.56	7.85	0.61	0.08	9.17	0.03	nd
total=	97.19	93.95	93.46	85.24	85.40	95.35	84.88	95.32
Si	4.98	3.14	2.75	4.70	2.68	3.22	2.71	6.00
Ti	-	0.03	0.07	-	-	0.01	-	0.01
Al	4.01	2.55	1.75	4.79	2.70	2.58	2.55	4.35
Fe3	-	-	-	-	-	-	-	1.63
Fe2	0.60	0.16	0.93	0.50	1.67	0.07	1.58	0.04
Mn	0.03	-	-	0.01	0.02	-	0.02	0.04
Mg	1.35	0.24	1.42	0.82	2.88	0.17	3.14	-
Ca	-	-	-	0.01	-	-	-	3.92
Na	0.08	0.15	0.04	0.02	-	0.08	-	-
K	-	0.74	0.75	0.09	0.01	0.77	-	-
total=	11.06	7.00	7.71	10.95	9.97	6.91	10.01	16.00
oxygens=	[18]	[11]	[11]	[18]	[14]	[11]	[14]	[25]

241 D175-CO
242 D175-MU
243 D176-BI
244 D176-CO-A
245 D176-CHL
246 D176-MU
247 D182-CHL
248 D182-EP

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	249	250	251	252	253	254	255	256
SiO2	49.27	70.65	34.85	65.88	45.47	64.88	33.09	26.75
TiO2	0.49	0.01	0.93	nd	0.20	nd	1.50	0.51
Al2O3	28.44	19.84	20.88	18.55	35.35	22.93	19.51	18.42
FeO	4.03	0.06	17.58	0.03	2.29	0.02	26.47	32.80
MnO	nd	nd	0.16	nd	0.01	nd	0.11	0.14
MgO	2.16	nd	10.49	0.01	0.43	0.01	5.09	9.10
CaO	nd	0.10	nd	nd	nd	3.96	0.02	0.02
Na2O	0.42	11.49	0.15	1.58	0.61	9.05	0.12	0.03
K2O	10.07	0.07	9.70	14.48	10.25	0.21	8.26	0.93
BaO	nd	nd	nd	0.31	nd	nd	nd	nd
total=	94.88	102.22	94.74	100.84	94.61	101.06	94.17	88.70
F	nd	nd	0.21	nd	nd	nd	0.10	nd
Si	3.33	3.01	2.65	3.00	3.06	2.83	2.63	2.91
Ti	0.02	-	0.05	-	0.01	-	0.09	0.04
Al	2.26	1.00	1.87	1.00	2.80	1.18	1.83	2.36
Fe2	0.23	-	1.12	-	0.13	-	1.76	2.99
Mn	-	-	0.01	-	-	-	-	0.01
Mg	0.22	-	1.19	-	0.04	-	0.60	1.48
Ca	-	-	-	-	-	0.18	-	-
Na	0.05	0.95	0.02	0.14	0.08	0.77	0.02	-
K	0.87	-	0.94	0.84	0.88	0.01	0.84	0.13
total=	6.98	4.97	7.85	4.99	7.01	4.97	7.79	9.93
oxygens=	[11]	[8]	[11]	[8]	[11]	[8]	[11]	[14]

249 D182-MU
250 D182-PL-A
251 D230-BI
252 D230-KF
253 D230-MU-2
254 D230-PL-O
255 D244-BI
256 D244-CHL

	257	258	259	260	261	262	263	264
SiO2	37.25	37.45	47.42	69.32	34.00	46.62	43.97	34.78
TiO2	0.10	0.09	0.25	nd	3.16	nd	0.99	2.03
Al2O3	21.01	21.04	34.09	19.75	18.71	31.86	32.73	19.79
Cr2O3	0.04	0.02	nd	nd	nd	nd	nd	nd
FeO	31.22	32.42	2.49	0.10	22.13	10.92	3.85	19.63
MnO	4.27	3.18	0.03	nd	0.16	0.34	0.02	0.02
MgO	0.77	0.84	0.97	nd	6.72	6.23	0.73	9.01
CaO	6.24	5.82	nd	0.04	0.01	0.04	nd	nd
Na2O	nd	nd	0.86	11.25	0.23	0.38	0.69	0.15
K2O	nd	nd	9.30	0.07	9.17	nd	10.00	8.92
total=	100.90	100.86	95.41	100.53	94.29	96.39	92.98	94.33
F	nd	nd	nd	nd	0.34	nd	nd	0.47
Si	2.99	3.01	3.15	3.00	2.66	4.97	3.05	2.67
Ti	-	-	0.01	-	0.19	-	0.05	0.12
Al	1.99	1.99	2.67	1.01	1.73	4.01	2.67	1.79
Fe3	0.02	-0.02	-	-	-	-	-	-
Fe2	2.08	2.20	0.14	-	1.45	0.97	0.22	1.26
Mn	0.29	0.22	-	-	0.01	0.03	-	-
Mg	0.09	0.10	0.10	-	0.78	0.99	0.08	1.03
Ca	0.54	0.50	-	-	-	-	-	-
Na	-	-	0.11	0.95	0.03	0.08	0.09	0.02
K	-	-	0.79	-	0.92	-	0.88	0.87
total=	8.00	8.00	6.96	4.97	7.77	11.06	7.05	7.77
oxygens=	[12]	[12]	[11]	[8]	[11]	[18]	[11]	[11]

257 D244-GT-C
258 D244-GT-R
259 D244-MU
260 D244-PL-A
261 D250-BI
262 D250-CO
263 D250-MU
264 D266-BI

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	265	266	267	268	269	270	271	272
SiO2	47.16	47.76	46.56	35.00	47.44	47.48	45.93	68.19
TiO2	nd	nd	0.44	2.02	0.03	0.09	0.48	nd
Al2O3	33.16	32.92	34.36	19.75	32.77	32.13	33.91	19.43
FeO	10.61	10.40	1.06	19.26	8.33	9.41	3.02	0.13
MnO	0.03	0.03	nd	0.05	0.22	0.26	0.01	nd
MgO	6.92	7.19	1.08	9.40	7.39	7.74	1.71	nd
CaO	nd	nd	nd	nd	0.12	0.03	0.04	0.27
Na2O	0.35	0.22	0.49	0.24	0.51	0.29	1.10	11.58
K2O	0.02	0.05	10.11	7.72	0.24	0.30	8.44	0.05
total=	98.25	98.57	94.10	93.44	97.05	97.73	94.64	99.65
F	nd	nd	nd	0.50	nd	nd	nd	nd
Si	4.92	4.96	3.12	2.69	4.97	4.97	3.08	2.99
Ti	-	-	0.02	0.12	-	-	0.02	-
Al	4.08	4.03	2.72	1.79	4.05	3.96	2.68	1.00
Fe2	0.93	0.90	0.06	1.24	0.73	0.82	0.17	-
Mn	-	-	-	-	0.02	0.02	-	-
Mg	1.08	1.11	0.11	1.08	1.15	1.21	0.17	-
Ca	-	-	-	-	0.01	-	-	0.01
Na	0.07	0.04	0.06	0.04	0.10	0.06	0.14	0.98
K	-	-	0.87	0.76	0.03	0.04	0.72	-
total=	11.08	11.05	6.96	7.70	11.07	11.09	6.99	5.00
oxygens=	[18]	[18]	[11]	[11]	[18]	[18]	[11]	[8]

265 D266-CD-C
266 D266-CD-A
267 D266-MU
268 D269-BI
269 D269-CD-C
270 D269-CD-A
271 D269-MU
272 D269-PL

	273	274	275	276	277	278	279	280
SiO2	35.80	48.77	47.36	34.43	48.12	65.09	45.60	63.49
TiO2	2.36	0.04	0.51	2.65	0.02	nd	0.83	nd
Al2O3	19.17	32.45	31.70	19.20	32.68	18.68	34.54	23.00
FeO	18.30	9.16	2.32	20.00	9.95	nd	3.05	J.06
MnO	0.06	0.27	0.02	0.15	0.25	nd	nd	nd
MgO	9.59	7.24	1.55	8.49	7.23	0.02	0.57	nd
CaO	nd	nd	0.12	nd	0.01	nd	0.01	3.76
Na2O	0.14	0.30	1.80	0.12	0.18	2.17	0.65	9.39
K2O	8.81	0.02	8.21	9.08	nd	13.58	10.06	0.21
BaO	nd	nd	nd	nd	nd	0.21	nd	nd
total=	94.23	98.25	93.59	94.12	98.44	99.75	95.31	99.91
F	0.79	nd	nd	0.04	nd	nd	nd	nd
Si	2.73	5.05	3.20	2.66	4.99	2.99	3.06	2.81
Ti	0.14	-	0.03	0.15	-	-	0.04	-
Al	1.72	3.96	2.52	1.75	4.00	1.01	2.73	1.20
Fe2	1.17	0.79	0.13	1.29	0.86	-	0.17	-
Mn	-	0.02	-	-	0.02	-	-	-
Mg	1.09	1.12	0.16	0.98	1.12	-	0.06	-
Ca	-	-	-	-	-	-	-	0.18
Na	0.02	0.06	0.24	0.02	0.04	0.19	0.08	0.80
K	0.86	-	0.71	0.90	-	0.80	0.86	0.01
total=	7.72	11.00	6.99	7.76	11.03	5.00	7.01	5.00
oxygens=	[11]	[18]	[11]	[11]	[18]	[8]	[11]	[8]

273 D272-BI
274 D272-CD
275 D272-MU
276 D279-BI
277 D279-CD
278 D279-KF
279 D279-MU-2
280 D279-PL-O

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	281	282	283	284	285	286	287	288
SiO2	34.65	47.23	64.02	45.67	65.08	63.67	36.11	48.39
TiO2	3.23	nd	nd	0.24	0.13	0.02	2.60	nd
Al2O3	19.59	32.11	18.70	35.56	20.08	22.99	18.95	33.43
FeO	21.56	11.18	0.19	1.91	0.91	0.08	15.71	5.92
MnO	0.03	0.11	nd	nd	nd	nd	0.05	0.08
MgO	6.60	6.42	0.02	0.61	0.34	0.02	11.83	9.82
CaO	nd	nd	nd	nd	0.85	3.70	nd	nd
Na2O	0.15	0.18	1.78	0.59	10.44	9.11	0.18	0.19
K2O	9.60	nd	14.12	10.12	0.53	0.25	9.65	nd
BaO	nd	nd	0.20	nd	nd	nd	nd	nd
total=	95.41	97.23	99.03	94.70	98.36	99.84	95.08	97.83
F	0.45	nd	nd	nd	nd	nd	0.40	nd
Si	2.67	4.99	2.98	3.06	2.92	2.81	2.71	4.96
Ti	0.19	-	-	0.01	-	-	0.15	-
Al	1.78	4.00	1.02	2.81	1.06	1.20	1.67	4.04
Fe2	1.39	0.99	-	0.11	0.03	-	0.98	0.51
Mg	0.76	1.01	-	0.06	0.02	-	1.32	1.50
Ca	-	-	-	-	0.04	0.18	-	-
Na	0.02	0.04	0.16	0.08	0.91	0.78	0.03	0.04
K	0.94	-	0.84	0.87	0.03	0.01	0.92	-
total=	7.74	11.03	5.01	6.99	5.02	4.98	7.78	11.04
oxygens=	[11]	[18]	[8]	[11]	[8]	[8]	[11]	[18]

281 D280-BI
282 D280-CD
283 D280-KF
284 D280-MU-2
285 D280-PL-A
286 D280-PL-O
287 D286-BI
288 D286-CD

	289	290	291	292	293	294	295	296
SiO2	64.42	45.12	63.17	33.34	63.95	56.93	33.97	34.16
TiO2	nd	0.49	nd	3.93	nd	0.21	1.52	3.63
Al2O3	18.88	33.89	22.43	19.87	18.88	25.71	20.66	19.86
FeO	0.13	3.43	0.10	20.57	0.09	1.12	24.55	24.23
MnO	nd	0.01	nd	0.15	nd	nd	0.06	0.08
MgO	0.03	0.84	0.01	8.45	0.03	0.48	5.58	5.08
CaO	nd	nd	3.06	0.03	0.08	7.10	0.02	nd
Na2O	2.09	0.63	9.69	0.15	1.35	6.66	0.16	0.20
K2O	13.72	10.36	0.26	9.57	15.03	0.73	9.43	9.37
BaO	0.28	nd	nd	nd	0.42	nd	nd	nd
total=	99.55	94.77	98.72	96.06	99.83	98.94	95.95	96.61
F	nd	nd	nd	0.17	nd	nd	0.37	0.31
Si	2.97	3.06	2.82	2.55	2.97	2.59	2.63	2.63
Ti	-	0.02	-	0.23	-	-	0.09	0.21
Al	1.03	2.71	1.18	1.79	1.03	1.38	1.89	1.80
Fe2	-	0.19	-	1.31	-	0.04	1.59	1.56
Mg	-	0.08	-	0.96	-	0.03	0.65	0.58
Ca	-	-	0.15	-	-	0.35	-	-
Na	0.19	0.08	0.84	0.02	0.12	0.59	0.02	0.03
K	0.81	0.90	0.01	0.93	0.89	0.04	0.93	0.92
total=	5.01	7.05	5.01	7.81	5.02	5.03	7.81	7.74
oxygens=	[8]	[11]	[8]	[11]	[8]	[8]	[11]	[11]

289 D286-KF
290 D286-MU-2
291 D286-PL-O
292 D304-BI
293 D304-KF
294 D304-PL-O
295 D311-BI-M
296 D311-BI-S

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	297	298	299	300	301	302	303	304
SiO2	47.40	47.28	23.77	64.07	46.20	69.24	61.94	33.73
TiO2	0.01	0.05	0.01	nd	0.23	nd	0.01	2.57
Al2O3	32.33	32.45	21.46	19.68	36.12	20.01	23.75	19.58
FeO	14.15	13.73	32.81	1.09	1.28	0.14	0.25	24.19
MnO	0.19	0.18	0.34	nd	0.01	nd	nd	0.07
MgO	4.56	4.69	8.35	0.13	0.52	nd	0.01	5.80
CaO	nd	0.02	nd	0.16	nd	0.31	4.63	0.01
Na2O	0.16	0.18	0.01	3.08	0.59	10.89	8.54	0.29
K2O	nd	nd	0.04	11.70	10.21	0.16	0.20	8.67
BaO	nd	nd	nd	0.61	nd	nd	nd	nd
total=	98.80	98.58	86.79	100.52	95.16	100.75	99.33	94.91
F	nd	nd	nd	nd	nd	nd	nd	0.07
Si	4.99	4.98	2.65	2.93	3.07	2.99	2.76	2.64
Ti	-	-	-	-	0.01	-	-	0.15
Al	4.01	4.03	2.82	1.06	2.83	1.02	1.25	1.80
Fe2	1.25	1.21	3.06	0.04	0.07	-	-	1.58
Mn	0.02	0.02	0.03	-	-	-	-	-
Mg	0.72	0.74	1.39	-	0.05	-	-	0.68
Ca	-	-	-	-	-	0.01	0.22	-
Na	0.03	0.04	-	0.27	0.08	0.91	0.74	0.04
K	-	-	-	0.68	0.87	-	0.01	0.86
Ba	-	-	-	0.01	-	-	-	-
total=	11.02	11.02	9.95	5.02	6.97	4.96	4.99	7.76
oxygens=	[18]	[18]	[14]	[8]	[11]	[8]	[8]	[11]

297 D311-CD
298 D311-CD-S
299 D311-CHL-2
300 D311-KF
301 D311-MU-2
302 D311-PL-A
303 D311-PL-O
304 D315-BI

	305	306	307	308	309	310	311	312
SiO2	46.64	46.58	47.72	35.53	25.70	38.49	38.10	48.31
TiO2	nd	nd	0.37	2.25	0.16	0.23	0.13	0.37
Al2O3	31.86	32.33	33.13	19.49	19.49	20.97	20.75	30.85
FeO	11.68	11.88	2.35	21.96	29.91	23.78	26.63	3.21
MnO	0.37	0.35	0.01	0.19	0.34	8.04	5.04	0.04
MgO	5.74	5.60	0.93	6.57	10.69	0.56	0.69	1.61
CaO	nd	0.04	nd	nd	0.15	9.42	8.88	0.01
Na2O	0.27	0.37	0.88	0.16	0.01	nd	nd	0.47
K2O	0.03	0.04	9.30	9.16	0.21	nd	nd	9.90
total=	96.59	97.19	94.69	95.31	86.66	101.49	100.22	94.77
F	nd	nd	nd	0.12	nd	nd	nd	nd
Si	4.98	4.95	3.19	2.73	2.82	3.05	3.06	3.25
Ti	-	-	0.02	0.13	0.01	0.01	-	0.02
Al	4.01	4.05	2.61	1.76	2.52	1.96	1.96	2.44
Fe2	1.04	1.06	0.13	1.41	2.74	1.66	1.88	0.18
Mn	0.03	0.03	-	0.01	0.03	0.54	0.34	-
Mg	0.91	0.89	0.09	0.75	1.75	0.07	0.08	0.16
Ca	-	-	-	-	0.02	0.80	0.76	-
Na	0.06	0.08	0.11	0.02	-	-	-	J.06
K	-	-	0.79	0.90	0.03	-	-	0.85
total=	11.04	11.06	6.94	7.72	9.92	8.00	8.00	6.97
oxygens=	[18]	[18]	[11]	[11]	[14]	[12]	[12]	[11]

305 D315-CD-C
306 D315-CD-R
307 D315-MU
308 D372-BI
309 D372-CHL
310 D372-GT-C
311 D372-GT-R
312 D372-MU

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	313	314	315	316	317	318	319	320
SiO2	68.56	33.98	47.64	45.72	68.14	34.69	48.31	64.13
TiO2	nd	1.13	nd	0.36	nd	2.36	0.03	nd
Al2O3	19.43	20.71	32.59	34.39	19.35	20.10	32.81	18.56
FeO	0.02	23.61	10.90	1.36	0.13	14.77	6.82	0.04
MnO	nd	0.19	0.40	nd	nd	0.03	0.04	nd
MgO	nd	7.81	5.96	0.68	nd	11.93	9.13	0.02
CaO	0.18	nd	nd	nd	0.18	nd	0.01	0.04
Na2O	11.42	nd	0.40	0.84	11.54	0.20	0.31	2.32
K2O	0.12	7.77	0.08	9.12	nd	9.55	0.03	13.36
BaO	nd	nd	nd	nd	nd	nd	nd	0.27
total=	99.73	95.20	97.97	92.47	99.34	93.63	97.49	98.74
F	nd	nd	nd	nd	nd	0.48	nd	nd
Si	3.00	2.62	5.00	3.11	3.00	2.63	4.99	2.98
Ti	-	0.07	-	0.02	-	0.13	-	-
Al	1.00	1.88	4.03	2.76	1.00	1.80	3.99	1.02
Fe2	-	1.52	0.96	0.08	-	0.94	0.59	-
Mn	-	0.01	0.04	-	-	-	-	-
Mg	-	0.90	0.93	0.07	-	1.35	1.40	-
Na	0.97	-	0.08	0.11	0.98	0.03	0.06	0.21
K	-	0.76	0.01	0.79	-	0.92	-	0.79
total=	4.99	7.76	11.04	6.94	4.99	7.81	11.05	5.01
oxygens=	[8]	[11]	[18]	[11]	[8]	[11]	[18]	[8]

313 D372-PL-A
314 D377-BI
315 D377-CD
316 D377-MU
317 D377-PL-A
318 D391-BI
319 D391-CD
320 D391-KF

	321	322	323	324	325	326	327	328
SiO2	45.93	64.11	35.07	47.34	66.67	44.73	66.23	61.99
TiO2	1.13	nd	2.71	nd	nd	0.70	nd	0.03
Al2O3	34.37	21.26	19.36	32.28	18.60	34.88	20.66	21.91
FeO	0.74	0.08	21.29	11.30	0.32	1.02	0.09	0.06
MnO	nd	nd	0.05	0.21	nd	0.04	nd	nd
MgO	0.82	nd	7.45	6.31	0.06	0.72	0.05	0.01
CaO	nd	2.28	nd	nd	nd	0.04	1.24	2.90
Na2O	0.56	10.16	0.14	0.17	2.08	0.56	10.86	9.80
K2O	10.35	0.24	8.79	nd	13.10	10.26	0.36	0.26
BaO	nd	nd	nd	nd	0.47	nd	nd	nd
total=	93.90	98.13	94.86	97.61	101.30	92.95	99.49	96.96
F	nd	nd	0.61	nd	nd	nd	nd	nd
Si	3.09	2.88	2.70	4.98	3.01	3.05	2.92	2.82
Ti	0.06	-	0.16	-	-	0.04	-	-
Al	2.73	1.12	1.75	4.01	0.99	2.80	1.07	1.18
Fe2	0.04	-	1.37	1.00	0.01	0.06	-	-
Mn	-	-	-	0.02	-	-	-	-
Mg	0.08	-	0.85	0.99	-	0.07	-	-
Ca	-	0.11	-	-	-	-	0.06	0.14
Na	0.07	0.88	0.02	0.03	0.18	0.07	0.93	0.87
K	0.89	0.01	0.86	-	0.75	0.89	0.02	0.02
total=	6.97	5.01	7.71	11.03	4.96	6.99	5.01	5.03
oxygens=	[11]	[8]	[11]	[18]	[8]	[11]	[8]	[8]

321 D391-MU
322 D391-PL-O
323 D427-BI
324 D427-CD
325 D427-KF
326 D427-MU
327 D427-PL-A
328 D427-PL-O

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	329	330	331	332	333	334	335	336
SiO2	35.48	35.17	47.72	65.44	59.77	0.07	34.52	24.66
TiO2	2.95	4.10	nd	nd	0.01	0.13	3.09	0.11
Al2O3	19.73	17.99	32.18	18.78	24.84	58.81	18.93	20.86
FeO	20.39	20.56	11.53	0.07	0.04	32.78	21.33	28.03
MnO	0.07	0.09	0.22	nd	nd	0.15	0.29	0.55
MgO	6.58	7.64	6.15	0.02	0.02	2.25	7.43	12.68
CaO	0.11	nd	0.01	0.04	6.14	nd	nd	nd
Na2O	0.33	0.13	0.14	3.78	7.75	nd	0.19	0.01
K2O	9.10	9.29	0.01	12.02	0.24	nd	9.66	0.03
BaO	nd	nd	nd	0.34	nd	nd	nd	nd
ZnO	nd	nd	nd	nd	nd	6.25	nd	nd
total=	94.74	94.97	97.96	100.49	98.81	100.44	95.44	86.93
F	0.33	0.50	nd	nd	nd	nd	nd	nd
Si	2.72	2.71	5.01	2.98	2.69	-	2.66	2.67
Ti	0.17	0.24	-	-	-	-	0.18	-
Al	1.78	1.63	3.98	1.01	1.32	1.98	1.72	2.66
Fe2	1.31	1.32	1.01	-	-	0.77	1.38	2.54
Mn	-	-	0.02	-	-	-	0.02	0.05
Mg	0.75	0.88	0.96	-	-	0.10	0.85	2.05
Ca	-	-	-	-	0.30	-	-	-
Na	0.05	0.02	0.03	0.33	0.68	-	0.03	-
K	0.89	0.91	-	0.70	0.01	-	0.95	-
Zn	-	-	-	-	-	0.13	-	-
total=	7.69	7.71	11.02	5.03	5.00	3.00	7.79	9.99
oxygens=	[11]	[11]	[18]	[8]	[8]	[4]	[11]	[14]

329 D433-BI
330 D433-BI-MZ
331 D433-CD
332 D433-KF
333 D433-PL-O
334 D433-SP
335 D440-BI
336 D440-CHL

	337	338	339	340	341	342	343	344
SiO2	45.57	34.04	47.87	64.49	68.18	64.90	nd	35.40
TiO2	nd	4.93	nd	nd	0.03	0.03	0.11	1.22
Al2O3	35.45	17.22	31.96	18.81	19.42	22.09	58.79	21.47
Cr2O3	nd	nd	nd	nd	nd	nd	0.09	nd
FeO	1.56	22.39	11.87	0.13	0.08	0.19	37.89	13.53
MnO	nd	0.10	0.24	nd	nd	nd	0.25	0.17
MgO	0.65	6.38	5.97	0.03	0.02	0.04	2.43	12.75
CaO	nd	nd	nd	0.11	0.29	2.95	0.02	nd
Na2O	0.68	0.15	0.12	2.04	11.38	9.82	0.06	nd
K2O	10.48	9.35	0.02	13.58	0.26	0.30	nd	9.90
BaO	nd	nd	nd	0.62	nd	nd	nd	nd
total=	94.39	94.56	98.05	99.81	99.66	100.32	99.64	94.44
F	nd	0.35	nd	nd	nd	nd	nd	nd
Si	3.07	2.67	5.03	2.98	2.99	2.85	-	2.64
Ti	-	0.29	-	-	-	-	-	0.07
Al	2.81	1.59	3.96	1.02	1.00	1.14	1.98	1.89
Fe3	-	-	-	-	-	-	0.02	-
Fe2	0.09	1.47	1.04	-	-	-	0.89	0.84
Mn	-	-	0.02	-	-	-	-	0.01
Mg	0.07	0.75	0.93	-	-	-	0.10	1.42
Ca	-	-	-	-	0.01	0.14	-	-
Na	0.09	0.02	0.02	0.18	0.97	0.84	-	-
K	0.90	0.93	-	0.80	0.01	0.02	-	0.94
Ba	-	-	-	0.01	-	-	-	-
total=	7.02	7.73	11.01	5.00	5.00	5.00	3.00	7.82
oxygens=	[11]	[11]	[18]	[8]	[8]	[8]	[4]	[11]

337 D440-MU-2
338 D441-BI
339 D441-CD
340 D441-KF
341 D441-PL-A
342 D441-PL-O
343 D441-SP
344 D450A-BI

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	345	346	347	348	349	350	351	352
SiO2	55.89	nd	35.92	63.82	61.10	0.07	33.52	46.88
TiO2	nd	nd	2.71	nd	nd	0.07	2.13	nd
Al2O3	27.05	59.54	21.35	19.25	23.71	63.72	20.31	31.82
Cr2O3	nd	0.20	nd	nd	nd	0.15	nd	nd
FeO	nd	28.09	10.53	0.02	0.09	23.61	22.82	13.14
MnO	nd	0.54	0.08	nd	nd	0.43	0.10	0.20
MgO	nd	5.37	13.67	0.01	nd	12.32	6.18	5.23
CaO	8.87	0.11	nd	0.08	5.57	0.06	nd	nd
Na2O	6.25	nd	0.26	2.29	8.13	nd	0.21	0.30
K2O	0.19	nd	10.16	13.19	0.14	nd	9.27	nd
BaO	nd	nd	nd	0.76	nd	nd	nd	nd
ZnO	nd	7.54	nd	nd	nd	nd	nd	nd
total=	98.25	101.39	94.68	99.42	98.74	100.43	94.54	97.57
F	nd	nd	0.06	nd	nd	nd	0.48	nd
Si	2.55	-	2.64	2.96	2.74	-	2.62	4.99
Ti	-	-	0.15	-	-	-	0.13	-
Al	1.46	1.95	1.85	1.05	1.26	1.98	1.87	3.99
Fe3	-	0.05	-	-	-	0.01	-	-
Fe2	-	0.61	0.65	-	-	0.51	1.49	1.17
Mn	-	0.01	-	-	-	-	-	0.02
Mg	-	0.22	1.50	-	-	0.48	0.72	0.83
Ca	0.43	-	-	-	0.27	-	-	-
Na	0.55	-	0.04	0.21	0.71	-	0.03	0.06
K	0.01	-	0.95	0.78	-	-	0.92	-
Ba	-	-	-	0.01	-	-	-	-
Zn	-	0.15	-	-	-	-	-	-
total=	5.00	3.00	7.78	5.01	4.99	3.00	7.80	11.05
oxygens=	[8]	[4]	[11]	[8]	[8]	[4]	[11]	[18]

345 D450A-PL-O
346 D450A-SP
347 D450C-BI
348 D450C-KF
349 D450C-PL-O
350 D450C-SP
351 D451-BI
352 D451-CD

	353	354	355	356	357	358	359	360
SiO2	64.01	67.23	60.80	35.78	24.37	37.50	37.82	47.54
TiO2	0.03	0.18	0.01	1.98	0.04	0.16	0.13	0.33
Al2O3	18.90	19.70	23.69	18.30	21.36	20.72	20.99	31.97
FeO	0.13	0.32	0.05	22.60	30.13	25.86	28.05	2.91
MnO	nd	nd	nd	0.16	0.27	6.99	5.07	0.04
MgO	nd	0.11	0.03	7.23	11.05	0.65	0.79	1.43
CaO	0.05	0.45	5.46	nd	nd	8.61	7.86	nd
Na2O	3.12	11.16	8.56	0.21	0.01	nd	nd	0.63
K2O	12.37	0.65	0.18	8.19	0.02	nd	nd	9.63
total=	98.61	99.80	98.78	94.45	87.25	100.49	100.71	94.48
F	nd	nd	nd	0.09	nd	nd	nd	nd
Si	2.97	2.96	2.73	2.77	2.66	3.01	3.03	3.20
Ti	-	-	-	0.12	-	-	-	0.02
Al	1.03	1.02	1.26	1.67	2.74	1.96	1.98	2.54
Fe2	-	0.01	-	1.46	2.75	1.72	1.92	0.16
Mn	-	-	-	0.01	0.02	0.47	0.34	-
Mg	-	-	-	0.83	1.79	0.08	0.09	0.14
Ca	-	0.02	0.26	-	-	0.74	0.67	-
Na	0.28	0.95	0.75	0.03	-	-	-	0.08
K	0.73	0.04	0.01	0.81	-	-	-	0.83
total=	5.02	5.02	5.02	7.70	9.97	8.00	8.00	6.97
oxygens=	[8]	[8]	[8]	[11]	[14]	[12]	[12]	[11]

353 D451-KF
354 D451-PL-A
355 D451-PL-O
356 D478-BI
357 D478-CHL
358 D478-GT-C
359 D478-GT-R
360 D478-MU-1

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	361	362	363	364	365	366	367	368
SiO2	45.82	68.10	38.49	48.91	64.95	73.51	34.73	48.22
TiO2	0.89	nd	2.24	0.17	0.05	0.02	2.72	0.06
Al2O3	34.82	19.34	18.18	31.89	17.96	17.74	18.42	32.95
FeO	1.28	0.20	14.16	6.93	0.09	0.01	17.14	6.64
MnO	nd	nd	0.03	0.12	nd	nd	0.02	0.06
MgO	0.90	nd	12.46	9.09	0.01	nd	11.32	9.02
CaO	nd	0.06	0.01	nd	nd	2.05	nd	0.01
Na2O	0.52	11.57	0.15	0.15	1.14	9.49	0.21	0.29
K2O	10.87	0.07	10.02	0.05	15.26	0.17	9.65	0.18
total=	95.10	99.34	95.74	97.31	99.46	102.99	94.21	97.43
F	nd	nd	nd	nd	nd	nd	1.09	nd
Si	3.07	3.00	2.83	5.06	3.01	3.10	2.66	4.98
Ti	0.04	-	0.12	0.01	-	-	0.16	-
Al	2.75	1.00	1.58	3.89	0.98	0.88	1.66	4.01
Fe2	0.07	-	0.87	0.60	-	-	1.10	0.57
Mn	-	-	-	0.01	-	-	-	-
Mg	0.09	-	1.37	1.40	-	-	1.29	1.39
Ca	-	-	-	-	-	0.09	-	-
Na	0.07	0.99	0.02	0.03	0.10	0.78	0.03	0.06
K	0.93	-	0.94	-	0.90	-	0.94	0.02
total=	7.01	5.00	7.74	11.00	5.00	4.85	7.84	11.05
oxygens=	[11]	[8]	[11]	[18]	[8]	[8]	[11]	[18]

361 D478-MU-2
362 D478-PL-A
363 D497-BI
364 D497-CD
365 D497-KF
366 D497-PL-O
367 D514-BI
368 D514-CD

	369	370	371	372	373	374	375	376
SiO2	64.40	44.60	65.87	35.64	47.41	65.17	67.75	35.08
TiO2	nd	1.52	nd	2.77	nd	nd	0.01	2.50
Al2O3	18.86	33.16	21.00	18.67	32.93	19.14	20.11	18.91
FeO	0.26	3.35	0.15	19.35	9.49	0.12	0.10	16.45
MnO	nd	nd	nd	0.05	0.07	nd	nd	nd
MgO	0.04	0.91	0.04	9.14	7.59	0.02	0.02	10.96
CaO	0.05	nd	1.41	nd	nd	0.03	0.27	nd
Na2O	2.18	0.61	10.84	0.17	0.17	2.11	11.37	0.19
K2O	13.50	10.28	0.14	9.40	0.02	13.60	0.36	9.54
BaO	0.37	nd	nd	nd	nd	0.23	nd	nd
total=	99.66	94.43	99.45	95.19	97.68	100.42	99.99	93.63
F	nd	nd	nd	0.82	nd	nd	nd	1.58
Si	2.97	3.04	2.91	2.71	4.95	2.98	2.97	2.69
Ti	-	0.08	-	0.16	-	-	-	0.14
Al	1.03	2.66	1.09	1.68	4.05	1.03	1.04	1.71
Fe2	0.01	0.19	-	1.23	0.83	-	-	1.05
Mg	-	0.09	-	1.04	1.18	-	-	1.25
Ca	-	-	0.07	-	-	-	0.01	-
Na	0.20	0.08	0.93	0.03	0.03	0.19	0.97	0.03
K	0.79	0.89	-	0.91	-	0.79	0.02	0.93
total=	5.01	7.04	5.01	7.76	11.05	5.00	5.01	7.80
oxygens=	[8]	[11]	[8]	[11]	[18]	[8]	[8]	[11]

369 D514-KF
370 D514-MU
371 D514-PL
372 D515-BI
373 D515-CD
374 D515-KF
375 D515-PL-A
376 D516-BI

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	377	378	379	380	381	382	383	384
SiO2	47.94	64.66	65.97	61.00	23.98	46.44	58.60	35.80
TiO2	0.06	nd	0.02	0.03	0.05	2.45	nd	5.35
Al2O3	33.29	19.18	21.30	24.23	21.16	32.19	25.30	17.08
FeO	8.87	0.09	0.34	0.05	19.88	1.56	0.13	20.64
MnO	0.01	nd	nd	nd	0.17	0.01	nd	0.06
MgO	8.09	0.03	0.10	0.03	17.33	1.76	0.06	7.03
CaO	nd	0.04	1.51	5.04	nd	nd	0.05	nd
Na2O	0.18	2.07	10.76	8.44	0.01	0.60	15.74	0.18
K2O	0.04	13.74	0.20	0.50	0.03	9.20	nd	9.34
BaO	nd	0.12	nd	nd	nd	nd	nd	nd
total=	98.48	99.93	100.20	99.32	82.61	94.21	99.88	95.48
F	nd	nd	nd	nd	nd	nd	nd	0.14
Si	4.94	2.97	2.90	2.73	2.62	3.12	2.64	2.74
Ti	-	-	-	-	-	0.12	-	0.31
Al	4.05	1.04	1.10	1.28	2.73	2.55	1.34	1.54
Fe2	0.77	-	0.01	-	1.82	0.09	-	1.32
Mn	-	-	-	-	0.02	-	-	-
Mg	1.24	-	-	-	2.82	0.18	-	0.80
Ca	-	-	0.07	0.24	-	-	-	-
Na	0.04	0.18	0.92	0.73	-	0.08	1.38	0.03
K	-	0.80	0.01	0.03	-	0.79	-	0.91
total=	11.05	5.01	5.02	5.01	10.01	6.92	5.37	7.65
oxygens=	[18]	[8]	[8]	[8]	[14]	[11]	[8]	[11]

377 D516-CD
378 D516-KF
379 D516-PL-A
380 D516-PL-O
381 D564-CHL
382 D564-MU
383 D564-PL-A
384 D567-BI

	385	386	387	388	389	390	391	392
SiO2	34.85	35.02	36.76	25.47	37.18	37.63	46.90	58.73
TiO2	1.57	6.43	0.14	nd	0.05	0.04	0.18	0.01
Al2O3	19.86	16.18	21.18	21.42	21.59	21.31	35.98	27.06
Cr2O3	nd	nd	nd	nd	0.01	0.12	nd	nd
FeO	19.72	19.55	34.68	26.11	35.10	35.90	1.07	0.09
MnO	0.09	0.06	1.33	0.02	1.13	1.13	nd	nd
MgO	8.70	9.25	4.01	12.84	4.12	2.46	0.67	0.01
CaO	nd	0.01	1.24	nd	1.06	1.25	nd	8.37
Na2O	0.15	0.47	nd	0.02	nd	nd	0.38	6.46
K2O	8.77	8.91	0.02	0.05	nd	nd	9.63	0.17
total=	93.71	95.88	99.36	85.93	100.24	99.84	94.81	100.90
F	0.15	0.17	nd	nd	nd	nd	nd	nd
Si	2.69	2.66	4.45	2.75	2.97	3.05	3.11	2.60
Ti	0.09	0.37	0.01	-	-	-	-	-
Al	1.81	1.45	3.02	2.72	2.03	2.03	2.81	1.41
Fe3	-	-	-	-	0.03	-0.14	-	-
Fe2	1.27	1.24	3.51	2.35	2.31	2.57	0.06	-
Mn	-	-	0.14	-	0.08	0.08	-	-
Mg	1.00	1.05	0.72	2.06	0.49	0.30	0.07	-
Ca	-	-	0.16	-	0.09	0.11	-	0.40
Na	0.02	0.07	-	-	-	-	0.05	0.55
K	0.86	0.86	-	-	-	-	0.81	-
total=	7.76	7.71	12.03	9.90	8.00	8.00	6.91	4.98
oxygens=	[11]	[11]	[18]	[14]	[12]	[12]	[11]	[8]

385 D567-BI-A
386 D567-BI-INCL(GT)
387 D567-CD-A
388 D567-CHL-2
389 D567-GT-C
390 D567-GT-R
391 D567-MU-2
392 D567-PL-O

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	393	394	395	396	397	398	399	400
SiO2	35.00	47.44	37.78	37.99	48.07	59.24	34.93	34.78
TiO2	5.11	nd	0.04	0.06	0.18	0.01	5.35	5.56
Al2O3	15.83	32.26	21.50	21.61	2.41	24.91	16.30	15.49
Cr2O3	nd	nd	0.09	nd	0.06	nd	nd	nd
FeO	23.11	10.98	34.67	35.53	37.91	1.89	22.25	20.94
MnO	0.07	0.20	1.49	1.99	0.68	nd	0.09	0.03
MgO	7.59	6.60	4.30	3.58	11.16	0.27	7.62	9.39
CaO	nd	nd	1.26	1.23	0.20	6.32	0.02	nd
Na2O	0.29	0.17	nd	0.02	0.02	6.50	0.22	0.33
K2O	8.78	nd	nd	0.02	nd	0.55	9.37	8.78
total=	95.78	97.65	101.13	102.03	100.69	99.69	96.15	95.30
F	0.06	nd	nd	nd	nd	nd	0.06	0.27
Si	2.71	4.99	2.99	2.99	1.92	2.66	2.69	2.68
Ti	0.30	-	-	-	-	-	0.31	0.32
Al	1.44	4.00	2.00	2.01	0.11	1.32	1.48	1.41
Fe3	-	-	0.02	0.01	0.04	-	-	-
Fe2	1.49	0.97	2.27	2.33	1.22	0.07	1.43	1.35
Mn	-	0.02	0.10	0.13	0.02	-	-	-
Mg	0.87	1.03	0.51	0.42	0.66	0.02	0.87	1.08
Ca	-	-	0.11	0.10	-	0.30	-	-
Na	0.04	0.03	-	-	-	0.57	0.03	0.05
K	0.87	-	-	-	-	0.03	0.92	0.86
total=	7.73	11.03	8.00	8.00	4.00	4.98	7.74	7.75
oxygens=	[11]	[18]	[12]	[12]	[6]	[8]	[11]	[11]

393 D568-BI
394 D568-CO
395 D568-GT-C
396 D568-GT-R
397 D568-HY
398 D568-PL-O
399 D568B-BI
400 D568B-BI-INCL(GT)

	401	402	403	404	405	406	407	408
SiO2	42.49	37.51	37.11	35.35	34.71	34.93	46.78	47.47
TiO2	0.04	0.09	0.01	3.36	3.87	5.15	0.02	0.03
Al2O3	27.57	21.49	21.58	19.25	18.36	17.78	32.79	32.78
Cr2O3	nd	0.04	0.05	nd	nd	nd	nd	nd
FeO	11.55	34.69	35.12	20.24	22.79	21.67	12.16	10.97
MnO	0.11	1.71	1.84	0.31	0.17	0.19	0.28	0.36
MgO	5.06	4.15	3.50	7.39	6.74	6.88	5.74	6.65
CaO	0.13	1.26	1.10	nd	nd	nd	nd	nd
Na2O	0.14	nd	nd	0.26	0.17	0.17	0.23	0.26
K2O	5.13	nd	nd	9.60	9.56	9.39	0.04	0.02
total=	92.22	100.94	100.31	95.76	96.37	96.16	98.04	98.54
F	nd	nd	nd	0.35	0.38	0.42	nd	nd
Si	4.95	2.97	2.97	2.69	2.67	2.67	4.93	4.95
Ti	-	-	-	0.19	0.22	0.30	-	-
Al	3.78	2.01	2.04	1.73	1.66	1.60	4.07	4.03
Fe3	-	0.03	0.02	-	-	-	-	-
Fe2	1.12	2.27	2.34	1.29	1.46	1.39	1.07	0.96
Mn	0.01	0.11	0.12	0.02	0.01	0.01	0.02	0.03
Mg	0.88	0.49	0.42	0.84	0.77	0.78	0.90	1.03
Ca	0.02	0.11	0.09	-	-	-	-	-
Na	0.03	-	-	0.04	0.03	0.03	0.05	0.05
K	0.76	-	-	0.93	0.94	0.92	-	-
total=	11.56	8.00	8.00	7.74	7.76	7.70	11.06	11.06
oxygens=	[18]	[12]	[12]	[11]	[11]	[11]	[18]	[18]

401 D568B-CO-A
402 D568B-GT-C
403 D568B-GT-R
404 D608-1-BI-A
405 D608-1-BI-M
406 D608-BI-MZ
407 D608-1-CO-MS
408 D608-1-CO-MZ

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	409	410	411	412	413	414	415	416
SiO2	46.96	25.65	64.55	46.32	60.98	nd	35.87	34.76
TiO2	nd	0.21	nd	nd	0.03	0.10	3.92	4.13
Al2O3	32.72	20.30	19.47	35.51	24.18	56.89	19.09	19.56
Cr2O3	nd	nd	nd	nd	nd	0.03	nd	nd
FeO	11.99	30.91	0.20	1.38	0.11	41.51	12.68	14.48
MnO	0.30	0.26	nd	0.01	nd	0.55	0.09	0.18
MgO	5.87	9.78	0.09	0.69	0.01	2.43	12.69	11.96
CaO	nd	nd	0.24	nd	5.38	nd	0.03	0.02
Na2O	0.27	nd	4.06	0.87	8.62	0.02	0.21	0.20
K2O	nd	0.19	10.67	10.05	0.15	nd	9.68	9.49
BaO	nd	nd	0.43	nd	nd	nd	nd	nd
total=	98.11	87.30	99.71	94.83	99.46	101.53	94.26	94.78
F	nd	nd	nd	nd	nd	nd	0.39	0.17
Si	4.94	2.80	2.95	3.09	2.72	-	2.68	2.61
Ti	-	0.02	-	-	-	-	0.22	0.23
Al	4.06	2.61	1.05	2.79	1.27	1.90	1.68	1.73
Fe3	-	-	-	-	-	0.10	-	-
Fe2	1.06	2.82	-	0.08	-	0.88	0.79	0.91
Mn	0.03	0.02	-	-	-	0.01	-	0.01
Mg	0.92	1.59	-	0.07	-	0.10	1.41	1.34
Ca	-	-	0.01	-	0.26	-	-	-
Na	0.06	-	0.36	0.11	0.75	-	0.03	0.03
K	-	0.03	0.62	0.86	-	-	0.92	0.91
total=	11.06	9.89	5.02	7.00	5.02	3.00	7.74	7.76
oxygens=	[18]	[14]	[8]	[11]	[8]	[4]	[11]	[11]

409 D608-1-CO-S
410 D608-1-CHL-2
411 D608-1-KF
412 D608-1-MU-2
413 D608-1-PL-O
414 D608-1-SP
415 D611-BI-MZ
416 D611-BI-S

	417	418	419	420	421	422	423	424
SiO2	49.10	48.38	65.38	63.35	34.24	46.82	63.07	46.00
TiO2	nd	0.04	nd	0.01	2.99	0.04	0.03	1.06
Al2O3	33.03	33.03	18.64	22.85	18.65	32.40	18.55	31.02
FeO	4.35	6.02	0.04	0.03	19.23	7.40	0.27	2.68
MnO	0.21	0.04	nd	nd	0.07	0.04	0.02	0.03
MgO	10.32	9.24	0.06	nd	10.12	8.97	0.01	1.37
CaO	nd	nd	nd	3.81	0.02	nd	0.04	nd
Na2O	0.57	0.50	2.01	9.06	0.20	0.31	3.20	0.54
K2O	nd	0.21	13.68	0.21	9.46	nd	12.17	10.29
BaO	nd	nd	0.10	nd	nd	nd	nd	nd
total=	97.58	97.46	99.91	99.32	94.98	95.98	97.36	92.99
F	nd	nd	nd	nd	0.50	nd	nd	nd
Si	5.01	4.99	3.00	2.81	2.63	4.93	2.97	3.17
Ti	-	-	-	-	0.17	-	-	0.05
Al	3.97	4.01	1.01	1.20	1.69	4.02	1.03	2.52
Fe2	0.37	0.52	-	-	1.23	0.65	0.01	0.15
Mn	0.02	-	-	-	-	-	-	-
Mg	1.57	1.42	-	-	1.16*	1.41	-	0.14
Ca	-	-	-	0.18	-	-	-	-
Na	0.11	0.10	0.18	0.78	0.03	0.06	0.29	0.07
K	-	0.03	0.80	0.01	0.93	-	0.73	0.90
total=	11.06	11.07	4.99	4.98	7.84	11.09	5.03	7.01
oxygens=	[18]	[18]	[8]	[8]	[11]	[18]	[8]	[11]

417 D611-CO-MZ
418 D611-CO-S
419 D611-KF
420 D611-PL-O
421 D620-BI
422 D620-CO
423 D620-KF
424 D620-MU

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

Bt Crd Kfs Mu

	425	426	427	428	429	430	431	432
SiO2	34.69	47.47	64.36	45.08	65.66	34.86	47.53	44.21
TiO2	1.67	nd	0.29	0.47	nd	2.29	nd	0.45
Al2O3	19.83	32.04	18.98	35.12	21.91	20.74	32.36	34.39
FeO	20.90	11.53	0.27	1.56	0.09	14.96	7.07	1.36
MnO	0.05	0.20	nd	nd	nd	0.05	0.01	nd
MgO	8.18	6.15	0.06	0.94	nd	11.89	9.18	1.36
CaO	0.02	nd	nd	nd	2.15	nd	nd	nd
Na2O	0.10	0.17	2.27	0.58	10.05	0.21	0.28	0.71
K2O	8.60	0.01	12.94	9.99	0.33	9.58	0.11	10.06
total=	94.04	97.57	99.17	93.74	100.19	94.58	96.54	92.54
F	0.61	nd	nd	nd	nd	0.67	nd	nd
Si	2.68	5.00	2.97	3.05	2.88	2.62	4.97	3.04
Ti	0.10	-	0.01	0.02	-	0.13	-	0.02
Al	1.81	3.98	1.03	2.80	1.13	1.84	3.99	2.78
Fe2	1.35	1.02	0.01	0.09	-	0.94	0.62	0.08
Mn	-	0.02	-	-	-	-	-	-
Mg	0.94	0.97	-	0.09	-	1.33	1.43	0.14
Ca	-	-	-	-	0.10	-	-	-
Na	0.01	0.03	0.20	0.08	0.85	0.03	0.06	0.09
K	0.85	-	0.76	0.86	0.02	0.92	0.01	0.88
total=	7.75	11.02	4.99	7.00	4.99	7.81	11.07	7.04
oxygens=	[11]	[18]	[8]	[11]	[8]	[11]	[18]	[11]

425 D627-BI
426 D627-CO
427 D627-KF
428 D627-MU
429 D627-PL-O
430 D646-BI
431 D646-CO
432 D646-MU

	433	434	435	436	437	438	439	440
SiO2	37.84	25.28	47.76	34.16	47.57	24.32	37.39	37.09
TiO2	1.83	0.06	0.48	3.61	0.07	0.13	0.06	0.08
Al2O3	16.56	20.68	28.76	18.12	32.45	21.68	21.31	21.06
Cr2O3	nd	nd	nd	nd	nd	nd	0.15	0.09
FeO	19.91	25.36	5.20	24.24	11.09	30.39	35.10	35.07
MnO	0.14	0.23	0.01	0.11	0.47	0.15	2.32	4.32
MgO	10.38	15.21	2.44	6.37	6.32	10.60	3.54	2.11
CaO	0.01	nd	nd	nd	nd	0.01	0.93	0.89
Na2O	0.20	nd	0.49	0.23	0.18	0.01	nd	nd
K2O	9.37	0.04	10.27	9.62	0.02	0.04	nd	nd
total=	96.24	86.86	95.41	96.46	98.17	87.33	100.80	100.71
F	nd	nd	nd	0.36	nd	nd	nd	nd
Si	2.85	2.70	3.24	2.65	4.98	2.65	2.98	2.99
Ti	0.10	-	0.02	0.21	-	0.01	-	-
Al	1.47	2.60	2.30	1.65	4.00	2.78	2.00	2.00
Fe3	-	-	-	-	-	-	0.01	-
Fe2	1.25	2.26	0.30	1.57	0.97	2.77	2.33	2.37
Mn	-	0.02	-	-	0.04	0.01	0.16	0.30
Mg	1.16	2.42	0.25	0.74	0.99	1.72	0.42	0.25
Ca	-	-	-	-	-	-	0.08	0.08
Na	0.03	-	0.06	0.03	0.04	-	-	-
K	0.90	-	0.89	0.95	-	-	-	-
total=	7.78	10.00	7.06	7.81	11.03	9.95	8.00	8.00
oxygens=	[11]	[14]	[11]	[11]	[18]	[14]	[12]	[12]

433 D670-BI
434 D670-CHL
435 D670-MU
436 SW2A-BI
437 SW2A-CO
438 SW2A-CHL-2
439 SW2A-GT-C
440 SW2A-GT-R

ANALYSES OF PELITIC MINERALS IN THE BALLACHULISH AUREOLE

	441	442	443	444	445	446	447	448
SiO2	64.51	45.63	66.97	60.78	34.72	47.42	25.37	37.68
TiO2	0.03	0.11	nd	nd	3.79	nd	0.35	0.13
Al2O3	18.58	35.12	20.86	24.01	18.09	32.15	20.86	21.30
Cr2O3	nd	nd	nd	nd	nd	nd	nd	0.08
FeO	0.05	2.30	0.03	0.02	23.05	10.72	27.23	35.19
MnO	nd	0.02	nd	nd	0.11	0.33	0.36	2.23
MgO	0.03	0.88	nd	0.01	6.47	6.55	12.27	3.96
CaO	0.06	nd	1.62	5.40	nd	0.02	nd	0.80
Na2O	1.92	0.80	10.94	8.51	0.19	0.19	0.01	nd
K2O	14.45	9.97	0.23	0.31	9.66	0.02	0.24	nd
total=	99.63	94.83	100.65	99.04	96.08	97.40	86.69	101.37
F	nd	nd	nd	nd	0.26	nd	nd	nd
Si	2.98	3.06	2.92	2.73	2.68	4.99	2.74	2.98
Ti	-	-	-	-	0.22	-	0.03	-
Al	1.01	2.78	1.07	1.27	1.65	3.99	2.65	1.99
Fe3	-	-	-	-	-	-	-	0.02
Fe2	-	0.13	-	-	1.49	0.94	2.46	2.31
Mn	-	-	-	-	-	0.03	0.03	0.15
Mg	-	0.09	-	-	0.74	1.03	1.97	0.47
Ca	-	-	0.08	0.26	-	-	-	0.07
Na	0.17	0.10	0.93	0.74	0.03	0.04	-	-
K	0.85	0.85	0.01	0.02	0.95	-	0.03	-
total=	5.02	7.02	5.01	5.02	7.77	11.03	9.92	8.00
oxygens=	[8]	[11]	[8]	[8]	[11]	[18]	[14]	[12]

441 SW2A-KF
442 SW2A-MU-2
443 SW2A-PL-A
444 SW2A-PL-O
445 SW2B-BI
446 SW2B-CO
447 SW2B-CHL-2
448 SW2B-GT-C

	449	450	451	452
SiO2	37.67	65.15	45.90	61.55
TiO2	0.10	0.03	nd	0.01
Al2O3	20.96	18.52	34.93	24.23
Cr2O3	0.14	nd	nd	nd
FeO	35.03	0.05	2.14	0.07
MnO	3.83	nd	0.01	nd
MgO	2.73	0.02	0.89	0.01
CaO	0.93	0.01	nd	5.54
Na2O	nd	2.55	0.58	8.39
K2O	nd	13.48	10.57	0.21
total=	101.39	99.81	95.02	100.01
Si	3.01	2.99	3.08	2.73
Al	1.97	1.00	2.76	1.27
Fe2	2.35	-	0.12	-
Mn	0.26	-	-	-
Mg	0.32	-	0.09	-
Ca	0.08	-	-	0.26
Na	-	0.23	0.08	0.72
K	-	0.79	0.90	0.01
total=	8.00	5.01	7.03	5.00
oxygens=	[12]	[8]	[11]	[8]

449 SW2B-GT-R
450 SW2B-KF
451 SW2B-MU-2
452 SW2B-PL-O