

DEPARTMENT OF THE INTERIOR

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Chemical Analyses of Rocks and Glass Separates from
Crater Lake National Park and Vicinity, Oregon

by

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This report is preliminary and has not been reviewed for conformity with
U.S. Geological Survey editorial standards (and stratigraphic nomenclature).

¹Menlo Park, California

²Reston, Virginia

³Lakewood, Colorado

Introduction

This report contains chemical analyses of rocks and glass separates from lava flows, domes, and pyroclastic deposits from Crater Lake National Park and vicinity, Oregon. Included are all analyzed samples collected by C. R. Bacon and assistants (W. A. Bartling [1979, 1980], S. W. Novak [1981], M. H. Moench [1982], C. A. Michelsen [1983], and M. M. Hirshmann [1984, 1985]) that are either (1) from units believed to be related to the climactic magma chamber that was responsible for the caldera-forming eruption about 6850 B.P. or (2) from monogenetic vents and small basaltic to andesitic shield volcanoes in the vicinity of Mount Mazama, regardless of age. This report is intended to accompany papers in preparation by C. R. Bacon and T. H. Druitt.

Analytical Methods

Approximately 350 samples (Table 1) have been analyzed for major elements in this study, and the majority also for trace elements. Most samples were ground in an alumina shatterbox. Some glass separates were ground in an agate mortar. A few samples were ground in tungsten carbide; Co and Ta are not reported for these rocks because of contamination during grinding. All chemical analyses were made in USGS laboratories.

Major elements in whole-rock and some glass samples were determined by x-ray fluorescence (XRF) in Lakewood, Colorado, by K. Stewart, J. Baker, A. Bartel, J. Taggart, J. S. Wahlberg. Major element analyses of glass in dense rock samples and partially-melted granitoids were made by C. R. Bacon with an ARL SEMQ microprobe in Menlo Park, California, using 9 wavelength-dispersive spectrometers. Na₂O and K₂O were measured by flame photometry on approximately half of the whole-rock samples, and F, Cl, H₂O⁺, and FeO on a smaller number (H₂O and FeO are not reported here), by P. R. Klock, L. F. Espos, S. T. Neil, and D. V. Vivit in Menlo Park. Rb, Sr, Y, Zr, and Ba were determined by energy-dispersive x-ray fluorescence by P. E. Bruggman in Menlo Park. Nb analyses were made by spectrophotometry in Reston, Virginia, by P. Aruscavage and E. Campbell. Emission spectrographic values for Be, Cu, Ga, Ni, and V were obtained by T. L. Fries and R. W. Lerner (Menlo Park), and instrumental neutron activation analyses (INAA) for Co, Cr, Cs, Hf, Sb, Ta, Th, U, Zn, Sc, La, Ce, Nd, Sm, Eu, Gd, Tb, Tm, Yb, and Lu were made by L. J. Schwarz, G. A. Wandless, J. S. Mee, and J. N. Grossman (Reston).

Precision and Accuracy

Precision was measured by repeated analysis of internal standards. Means and standard deviations for repeated determinations of concentrations of each element in representative silicic and mafic rock standards are given in Table 2. For INAA and emission spectrographic analyses we report data for USGS standards RGM and DNC; XRF data are for rhyodacite pumice 322 and andesite scoria 336; microprobe analyses are for microlite-free obsidian RLS132 obtained from R. L. Smith. Precision of wet chemical determinations was not monitored by this method; the data are reported to a number of significant figures justified by experience with the particular technique employed and concentration range encountered. Results for Gd and Tm are significantly less precise than for other REE.

Accuracy is difficult to assess. Trace element concentrations for USGS standards generally agree with accepted values to within limits of measured precision. Comparison of XRF major-element whole-rock analyses with other laboratories' analyses of the same powders or of rocks collected from the same

localities shows that the XRF values are probably accurate to within the measured precision, with the exception of Na₂O. Flame photometric (FP) Na₂O values are consistently 5% (relative) higher than XRF. To correct for this bias (presumably due to calibration of the XRF facility) we have used FP values for Na₂O and K₂O where available, and have multiplied all remaining (XRF) Na₂O concentrations by 1.05. Many data for samples analyzed by flame photometry can be recognized by K₂O reported to 3 decimal places; however, not all flame photometric values are so reported. Microprobe analyses of the obsidian agree well with wet chemical analysis. However, we are not convinced that the microprobe and XRF major element data are exactly comparable.

KEY TO SYMBOLS

Materials

AGL	Agglutinate from cinder cone
BMB	Bomb from cinder cone
CDB	Diabasic xenolith, climactic deposits (mostly veneer)
CFP	Pumice, climactic pumice fall
CFS	Scoria, climactic pumice fall
CGR	Granitoid block, climactic deposits (mostly in veneer, but also in pumice fall and ignimbrite)
CIP	Pumice, ring-vent phase ignimbrite (valley fill)
CIS	Scoria, ring-vent phase ignimbrite (valley fill)
CLP	Pumice, lag breccia (proximal ring-vent phase ignimbrite)
CVO	Obsidian, veneer (proximal ring-vent phase ignimbrite above CLP)
CVS	Scoria, veneer (proximal ring-vent phase ignimbrite above CLP)
CWP	Pumice, Wineglass Welded Tuff
CWV	Vitrophyre, Wineglass Welded Tuff
INC	Inclusion in lava flow
INT	Dike or volcanic neck
LAV	Lava from lava flow
PCB	Postcaldera lava block (dredge samples)
PCL	Postcaldera lava
PDO	Preclimactic dike, obsidian selvage
PHF	Preclimactic Holocene felsite
PHG	Preclimactic Holocene hydrated vitrophyre
PHI	Inclusion in preclimactic Holocene rhyodacite
PHO	Preclimactic Holocene obsidian
PHP	Preclimactic Holocene pumice
PLP	Preclimactic Holocene pumice, lower pumice fall (Llao source)
PPG	Preclimactic Pleistocene hydrated vitrophyre
PPI	Inclusion in preclimactic Pleistocene rhyodacite
PPO	Preclimactic Pleistocene obsidian
PPP	Preclimactic Pleistocene pumice

Lower case suffixes indicate the following units:

- b Rhyodacite of Steel Bay (hill 7352')
- c Cleetwood flow and pumice
- g Grouse Hill flow and dome
- l Llao Rock flow and pumice
- r Redcloud Cliff flow and pumice
- s Sharp Peak domes

¹Microprobe analysis

²Microscopically heterogeneous (mixed) sample

Localities

AC	Annie Creek, west fork
AF	Annie Falls
AG	Applegate Peak
AP	Arant Point
AS	Anderson Springs
BB	Buckeye Butte
BC	Bald Crater
BY	Boundary Butte
CC	Crater Creek
CD	Cascade Creek
CL	Castle Creek near Little Castle Creek
CP	Castle Point
CR	Crater Peak
CS	Cascade Spring
CT	Castle Creek near Trapper Creek
CV	Cavern Creek
CW	Cleetwood Cove (and lava flow)
DB	Dry Butte
DC	Desert Cone
DR	Dutton Ridge
GH	Grouse Hill
GP	Garfield Peak
HP	Hillman Peak
LB	Lookout Butte
LC	Little Castle Creek
LR	Llao Rock
MC	Merriam Cone
MP	Merriam Point
MR	Maklaks Crater
MS	Munson Springs
OB	Oasis Butte
PN	The Pinnacles
PP	Pumice Point
RB	Rogue River bridge, highway 230
RC	Red Cone
RD	Redcloud Cliff
RV	Rim Village
SB	Steel Bay
SH	Skell Head
SM	Sun Mountain
SP	Sharp Peak
SR	Sand Ridge
TC	Timber Crater
TY	Tiny Creek
UC	Union Creek (settlement)
WB	Whitehorse Bluff
WC	Williams Crater (aka Forgotten Crater)
WD	Submerged dome east of WI
WG	Wineglass
WI	Wizard Island
WP	Submerged platform east of WI

Numbers following locality symbols refer to height in meters above base of unit or base of exposed section.

TABLE 1
Chemical Analyses

Sample#	79C-002	79C-007	79C-012	79C-017	79C-019	79C-025	79C-026	79C-027	79C-027G	79C-031	79C-069	79C-070
Material Location	CLP WG	CMV WG	CFP WG5.5	CFP WG7.8	CFP WG6.1	CFP WG0.1	PHPC WG5.7	PHPC WG5.7	PHPC ¹ WG5.7	PLP1 WG0.1	CFS ² SH20	CFS SH43
Latitude	42° 57.72'	42° 57.73'	42° 57.73'	42° 57.72'	42° 57.73'	42° 57.73'	42° 57.73'	42° 57.72'	42° 57.72'	42° 57.72'	42° 56.78'	42° 56.79'
Longitude	122° 3.05'	122° 3.05'	122° 3.07'	122° 3.07'	122° .07'	122° 3.07'	122° 3.07'	122° 3.07'	122° 3.07'	122° 3.08'	122° 3.02'	122° 3.02'
<u>Major Elements</u>												
Pct SiO ₂	66.8	69.6	68.4	69.5	67.9	66.8	67.9	68.8	72.1	68.6	59.2	58.0
Al ₂ O ₃	15.0	15.0	15.1	15.3	14.8	14.7	14.9	15.1	14.0	15.0	17.6	17.9
Fe ₂ O ₃	3.08	2.83	2.85	2.81	2.76	2.74	2.75	2.83	2.02	2.64	5.03	5.64
MgO	0.84	0.79	0.84	0.79	0.75	0.74	0.76	0.76	0.37	0.64	2.97	3.50
CaO	2.24	2.28	2.39	2.10	2.22	2.23	2.28	2.34	1.49	2.07	6.17	6.79
Na ₂ O	4.59	5.22	5.18	5.07	5.04	5.03	5.13	5.18	5.29	5.14	4.34	4.41
K ₂ O	2.472	2.576	2.517	2.536	2.48	2.464	2.489	2.499	2.88	2.542	1.20	1.20
TiO ₂	0.48	0.47	0.47	0.48	0.46	0.46	0.45	0.48	0.41	0.45	0.65	0.81
P ₂ O ₅	0.11	0.10	0.11	0.11	0.10	0.10	0.11	0.10	-	0.09	0.18	0.18
MnO	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.07	0.07
Cl	0.11	0.13	0.12	0.031	-	0.13	0.11	0.11	-	0.11	-	-
F	0.04	0.04	0.03	0.03	-	0.04	0.04	0.04	-	0.04	-	-
LOI	4.57	0.50	1.82	2.76	2.55	3.68	2.85	2.38	-	2.71	1.76	1.18
Loss 0	0.04	0.04	0.03	0.03	-	0.04	0.04	0.04	-	0.04	-	-
Total	100.36	99.55	99.85	101.54	99.11	99.13	99.78	100.63	98.61	100.05	99.17	99.68

Trace Elements

Element	728	751	745	739	745	747	745	722	779	411	385
Ba	1.5	1.9	1.8	1.5	1.8	1.7	1.6	1.7	1.8	-	-
Be	-	-	-	-	-	-	-	-	-	-	-
Co	2.9	1.9	2.6	2.9	1.6	1.4	1.1	1.9	1.0	44.4	19.2
Cr	2.7	2.9	2.8	2.8	2.9	2.7	2.9	2.9	3.1	1.0	45.7
Cu	23	22	20	15	10	21	14	17	14	21	68
Ga	14	17	17	14	16	14	14	15	17	19	22
Hf	5.5	5.7	5.4	5.5	5.5	5.6	5.6	5.6	5.7	2.6	2.7
Nb	6.5	7.2	7.2	7.2	7.1	6.8	6.8	7.9	8.0	3.8	-
Ni	9	6	6	5	6	5	5	6	6	35	41
Rb	52	51	53	54	57	49	50	51	55	28	29
Sb	0.6	0.7	0.8	0.9	3.8	0.9	1.9	0.9	1.0	0.8	0.4
Sc	6.98	6.59	6.61	6.30	6.43	6.21	6.33	6.56	6.67	11.5	14.8
Sr	380	381	396	370	379	375	380	385	316	1060	1050
Ta	-	-	-	-	-	-	-	-	-	-	0.22
Th	4.9	5.0	4.8	4.8	5.1	4.7	4.9	4.8	5.1	2.4	2.5
U	1.9	1.8	1.9	2.1	1.9	2.0	2.1	2.2	1.9	0.8	0.8
V	38	36	36	28	33	31	29	34	26	110	130
Y	23	27	24	24	24	23	24	24	26	17	17
Zn	44	45	43	36	41	42	44	45	45	57	57
Zr	229	236	226	230	224	224	223	228	233	138	145
La	21	22	21	21	21	20	21	21	21	15	15
Ce	46	42	42	40	41	42	42	41	41	27	30
Nd	21	19	23	21	23	22	20	20	23	16	18
Sm	4.6	4.7	4.7	4.6	4.8	4.4	4.7	4.4	4.5	3.0	3.5
Eu	0.88	0.95	0.92	0.90	0.94	0.84	0.90	0.89	0.89	0.89	1.04
Gd	4.0	4.1	4.0	4.2	4.4	3.9	4.3	3.2	4.1	2.7	3.1
Tb	0.62	0.60	0.59	0.60	0.60	0.53	0.62	0.59	0.64	0.35	0.34
Tm	0.39	0.34	0.35	0.31	0.34	0.30	0.33	0.23	0.29	-	0.11
Yb	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.1	2.3	1.0	1.1
Lu	0.33	0.32	0.34	0.33	0.33	0.30	0.33	0.33	0.34	0.15	0.16

Sample#	79C-070G	79C-073	79C-087	79C-088	79C-089	79C-104	79C-105	79C-106	79C-106G	79C-108	79C-109	79C-113
Material Location	CFS SH43	CLP SH14	PHOc CW	PLPc CWO.1	PHPc CW13	CPS ² PP3	CGR PP3	CPS PP3	CPS PP3	CPS ² PP3	CPP PP2	CGR SH
Latitude	42° 56.79'	42° 56.77'	42° 58.62'	42° 58.62'	42° 58.62'	42° 58.52'	42° 58.52'	42° 58.52'	42° 58.52'	42° 58.52'	42° 58.52'	42° 57.53'
Longitude	122° 3.02'	122° 2.55'	122° 4.33'	122° 4.37'	122° 4.33'	122° 6.12'	122° 6.12'	122° 6.12'	122° 6.12'	122° 6.12'	122° 6.12'	122° 8.82'
<u>Major Elements</u>												
Pct												
SiO ₂	67.6	68.8	70.0	66.2	68.8	60.5	65.6	58.3	66.8	66.1	68.8	67.1
Al ₂ O ₃	15.4	15.1	15.2	15.0	15.5	17.4	15.6	18.2	16.3	15.2	15.0	15.6
Fe ₂ O ₃	2.69	2.93	2.78	2.70	2.83	4.97	4.44	5.46	3.52	3.17	2.73	3.62
MgO	0.9	0.89	0.78	0.74	0.88	2.87	1.86	3.63	1.13	1.29	0.74	1.39
CaO	2.91	2.31	2.29	2.13	2.34	5.75	4.02	7.08	3.66	2.94	2.20	3.32
Na ₂ O	5.46	4.07	5.29	4.70	5.04	4.58	4.27	4.61	5.11	4.79	5.04	4.88
K ₂ O	2.020	2.69	2.492	2.454	2.425	1.49	2.36	1.155	1.81	2.29	2.51	2.307
TiO ₂	0.46	0.48	0.46	0.46	0.48	0.68	0.71	0.79	0.52	0.51	0.46	0.54
P ₂ O ₅	0.22	0.12	0.11	0.11	0.11	0.20	0.16	0.16	0.25	0.13	0.11	0.12
MnO	0.05	0.05	0.05	0.05	0.05	0.07	0.07	0.07	0.06	0.06	0.05	0.06
Cl	-	-	0.11	0.12	0.13	-	-	0.094	-	-	-	0.041
F	-	-	0.04	0.04	0.04	-	-	0.05	-	-	-	0.04
LOI	2.05	3.61	0.39	5.35	3.10	1.98	0.54	0.90	0.85	3.10	3.34	0.90
Loss O	-	-	0.04	0.04	0.04	-	-	0.04	-	-	-	0.03
Total	99.76	101.05	99.90	100.02	101.69	100.49	99.63	100.45	100.01	99.58	100.98	99.88

Trace Elements

	623	760	735	716	721	464	661	356	563	681	767	660
Ba	-	1.7	1.9	1.7	1.9	1.0	1.5	-	-	1.6	1.6	1.2
Be	5.6	-	-	-	-	-	-	-	7.0	-	-	-
Co	-	2.3	0.7	2.6	2.6	34.5	19.9	49.1	-	10.3	1.5	12.9
Cr	1.7	3.0	3.2	4.2	3.1	1.4	2.4	1.1	1.6	2.8	3.0	2.8
Cs	-	12	13	19	20	33	13	70	-	21	12	13
Cu	-	14	18	14	16	20	18	20	-	16	14	14
Ga	-	5.5	5.8	5.8	5.7	3.2	5.6	2.8	3.8	5.4	5.5	5.1
Hf	4.1	6.5	7.6	7.4	7.0	4.8	9.2	4.3	-	6.7	7.2	7.2
Nb	-	7	6	6	7	32	18	48	-	16	6	13
Ni	-	53	52	52	51	36	45	27	38	46	55	46
Rb	40	1.3	1.1	1.7	1.5	0.8	1.7	1.9	0.3	1.0	1.3	1.9
Sb	0.3	6.68	6.76	6.72	6.61	12.1	11.6	15.6	4.60	7.98	6.25	9.24
Sc	3.90	391	384	359	408	990	414	1130	833	491	372	380
Sr	0.31	-	-	-	-	-	-	-	0.31	-	-	-
Ta	4.1	4.7	5.1	5.3	4.8	2.8	5.2	2.4	3.9	4.6	4.9	4.6
Th	1.4	2.1	2.5	2.6	2.1	1.0	1.8	1.0	1.5	2.1	2.3	2.3
U	-	37	37	31	37	110	97	140	-	50	30	60
V	19	25	24	25	27	19	25	18	17	25	24	24
Zn	51	44	45	45	46	57	40	58	60	48	43	44
Zr	193	228	229	237	229	149	208	139	183	215	231	196
La	20	21	22	23	22	16	21	15	20	21	21	19
Ce	42	40	43	47	44	32	42	29	44	41	41	37
Nd	20	20	26	23	24	21	23	17	21	21	22	23
Sm	3.6	4.7	5.2	5.4	4.8	3.7	5.5	3.9	3.9	4.7	4.7	4.7
Eu	0.95	0.95	0.97	0.96	0.87	1.01	1.03	1.03	1.05	0.92	0.83	0.89
Gd	2.6	3.8	4.7	4.7	4.	2.9	4.9	2.2	3.6	3.8	3.8	4.3
Tb	0.39	0.58	0.65	0.67	0.64	0.39	0.73	0.41	0.43	0.52	0.55	0.64
Tm	-	0.33	0.44	0.36	0.33	0.22	0.41	0.33	-	0.34	0.31	0.36
Yb	1.1	2.2	2.5	2.5	2.3	1.2	2.4	1.1	1.0	2.2	2.3	1.9
Lu	0.17	0.34	0.34	0.36	0.33	0.19	0.39	0.23	0.19	0.31	0.34	0.34

Sample#	79C-119	79C-120	79C-125	79C-132	79C-133	79C-153	79C-153G	79C-154	79C-155	79C-158	79C-158G
Material Location	LAV WC	IMC WC	BMB WC	BMB WC	BMB WC	PHO1 LR	PHO11 LR	CPP LR2	PLP1 LR36	PLP1 LRO.4	PLP1 LRO.4
Latitude	42° 57.22'	42° 57.22'	42° 57.60'	42° 57.27'	42° 57.27'	42° 58.32'	42° 58.32'	42° 58.67'	42° 58.65'	42° 58.63'	42° 58.63'
Longitude	122°11.00'	122°11.00'	122°10.62'	122°10.62'	122°10.62'	122° 8.73'	122° 8.73'	122° 7.57'	122° 7.57'	122° 7.43'	122° 7.43'
Major Elements											
Pct											
SiO2	60.3	52.7	58.1	61.1	48.8	70.4	73.3	68.5	69.1	69.7	-
Al2O3	15.9	16.2	16.1	16.8	16.3	15.1	14.4	15.0	15.2	14.3	-
FeT03	5.71	7.91	6.28	5.61	8.37	2.70	1.88	2.74	2.75	2.30	-
MgO	4.34	7.73	5.13	3.27	7.99	0.70	0.27	0.77	0.74	0.56	-
CaO	6.14	9.25	6.97	5.68	9.53	2.16	1.28	2.24	2.20	1.68	-
Na2O	4.22	3.78	4.05	4.68	3.38	5.39	5.19	5.13	5.28	5.16	-
K2O	1.675	1.078	1.556	1.374	0.00	2.594	2.88	2.484	2.517	2.747	-
TiO2	0.82	1.09	0.89	0.65	1.10	0.45	0.35	0.46	0.46	0.39	-
P2O5	0.25	0.36	0.28	0.16	0.39	0.11	-	0.11	0.11	0.08	-
MnO	0.09	0.12	0.10	0.11	0.13	0.05	0.06	0.05	0.05	0.05	-
Cl	0.049	0.032	0.039	0.043	0.021	0.11	-	0.11	0.11	0.13	-
F	0.04	0.04	0.05	0.03	0.04	0.04	-	0.04	0.04	0.04	-
LOI	0.74	0.25	0.68	0.61	0.86	0.38	-	2.40	1.34	2.76	-
Loss O	0.04	0.03	0.04	0.03	0.03	0.04	-	0.04	0.04	0.04	-
Total	100.24	100.51	100.18	100.09	97.71	100.15	99.61	100.00	99.86	99.86	-

Trace Elements

Ppm											
Ba	538	388	496	512	376	778	817	745	816	794	811
Be	1.4	-	1.2	1.4	-	1.9	-	1.7	-	1.8	-
Co	-	-	-	-	-	-	2.0	-	2.7	1.7	-
Cr	126	272	163	77.2	262	0.7	-	1.6	-	1.2	-
Ca	42	63	60	1.5	0.5	3.1	3.4	3.2	3.2	3.3	3.4
Cu	19	20	20	25	77	53	-	15	-	14	-
Ga	4.2	3.4	4.1	3.1	20	16	-	15	-	16	-
Hf	7.6	10.0	9.7	5.0	11.0	5.8	6.1	5.7	6.0	6.3	6.1
Nb	60	100	62	62	100	7.0	-	6.9	-	7.1	-
Ni	36	23	38	29	21	5	-	4	-	4	-
Rb	2.0	1.3	1.6	1.1	1.4	54	52	52	51	58	58
Sb	17.2	25.3	19.3	15.0	27.2	1.2	0.5	1.4	0.6	1.3	0.6
Sc	645	942	741	949	1005	6.36	5.73	6.55	5.66	6.20	4.74
Sr	-	-	-	-	-	318	250	374	298	344	199
Ta	3.8	2.8	3.6	2.8	2.7	-	0.49	-	0.50	-	0.49
Th	1.7	1.1	1.7	1.3	1.0	4.9	5.2	5.2	5.2	5.5	5.3
U	140	160	130	140	170	2.5	2.3	2.3	2.3	2.7	2.4
V	22	20	21	23	23	23	-	25	-	15	-
Y	66	81	70	68	88	25	25	26	24	27	25
Zn	178	168	182	130	173	43	41	47	48	43	46
Zr	20	21	20	15	23	236	246	232	249	243	262
La	39	42	40	30	43	21	21	22	21	22	20
Ce	21	24	21	19	24	43	41	43	43	43	40
Nd	4.6	4.6	4.7	4.2	4.7	21	21	26	21	23	20
Sm	1.06	1.23	1.10	1.11	1.28	4.9	4.7	5.0	5.0	5.0	4.5
Eu	3.9	3.7	3.6	3.7	3.8	0.96	0.87	0.92	0.94	0.87	0.78
Gd	0.59	0.56	0.59	0.52	0.52	4.3	-	3.9	4.3	4.3	-
Tb	0.28	0.30	0.33	0.28	0.30	0.57	0.65	0.53	0.53	0.55	0.62
Yb	2.0	1.8	1.9	2.0	1.8	2.4	2.2	2.4	2.4	2.5	2.2
Lu	0.28	0.30	0.29	0.30	0.34	0.36	0.36	0.34	0.36	0.39	0.36

Sample#	79C-160	79C-160G	79C-161	79C-161G	79C-165	79C-165G	79C-195	79C-195G	79C-206	79C-206G	79C-208	79C-209
Material Location	PHOc CW	PHOc ¹ CW	PPOr ¹ RD	PPOr ¹ RD	PLP1 LRI	PLP1 ¹ LRI	CGR RD	CGR ¹ RD	PPOr RD	PPOr ¹ RD	CGR RD	PHI1 LR
Latitude	42° 58.85'	42° 58.85'	42° 56.17'	42° 56.17'	42° 58.50'	42° 58.50'	42° 55.76'	42° 55.76'	42° 56.03'	42° 56.03'	42° 56.07'	42° 58.70'
Longitude	122° 4.45'	122° 4.45'	122° 2.57'	122° 2.57'	122° 7.87'	122° 5.37'	122° 3.09'	122° 3.09'	122° 2.95'	122° 2.95'	122° 2.90'	122° 7.70'
Major Elements												
Pct												
SiO2	69.9	73.5	70.4	75.0	69.0	71.3	67.7	75.0	69.9	73.7	67.5	58.4
Al2O3	15.2	14.2	15.0	14.0	14.8	13.6	15.6	11.9	15.1	14.0	15.4	17.3
FeT03	2.79	1.84	2.73	1.44	2.55	1.94	3.62	2.22	2.90	1.87	3.76	6.09
MgO	0.82	0.34	0.76	0.17	0.65	0.31	1.41	0.20	0.81	0.26	1.53	3.58
CaO	2.30	1.41	2.32	1.07	1.98	1.22	3.29	0.52	2.44	1.32	3.46	6.07
Na2O	5.38	5.25	4.87	4.92	5.18	5.11	4.89	3.53	5.02	4.98	4.71	4.77
K2O	2.549	2.81	2.734	3.24	2.611	2.87	2.310	5.06	2.730	3.25	2.229	1.415
TiO2	0.46	0.40	0.44	0.26	0.43	0.47	0.54	0.35	0.48	0.31	0.57	0.86
P2O5	0.12	-	0.10	-	0.09	-	0.13	-	0.12	-	0.12	0.36
MnO	0.05	0.06	0.04	0.04	0.05	0.06	0.06	0.04	0.05	0.04	0.05	0.08
Cl	0.010	-	0.010	-	0.13	-	0.066	-	0.088	-	0.035	0.11
F	0.04	-	0.05	-	0.04	-	0.05	-	0.06	-	0.03	0.08
LOI	0.35	-	0.35	-	2.57	-	0.90	-	0.31	-	0.31	1.08
Loss O	0.03	-	0.04	-	0.04	-	0.04	-	0.05	-	0.03	0.07
Total	99.94	99.81	99.76	100.14	100.04	96.88	100.52	98.82	99.95	99.73	99.68	100.12

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Trace Elements												
PPM												
Ba	753	798	797	863	771	-	691	-	786	-	725	617
Be	2.1	-	2.0	-	1.8	-	-	-	2.0	-	1.5	1.3
Co	-	2.6	-	2.1	-	-	8.1	-	-	-	-	-
Cr	1.6	-	1.8	-	1.0	-	12.1	-	-	-	20.5	39.3
Cs	3.1	3.6	4.1	4.6	4.1	-	2.7	-	-	-	2.8	1.2
Cu	12	-	15	-	18	-	-	-	14	-	19	11
Ga	18	-	18	-	15	-	-	-	18	-	17	21
Hf	5.7	6.7	6.4	6.6	5.7	-	5.3	-	-	-	5.5	3.2
Nb	7.8	-	7.5	-	6.8	-	6.2	-	-	-	7.0	8.1
Ni	6	-	7	-	4	-	-	-	7	-	22	54
Rb	53	53	64	67	52	-	50	-	63	-	48	41
Sb	1.6	0.5	2.0	0.9	1.0	-	-	-	-	-	2.6	0.6
Sc	6.67	6.19	7.32	5.77	6.36	-	9.10	-	-	-	9.40	10.6
Sr	387	297	287	172	285	-	375	-	304	-	369	1480
Ta	-	0.53	-	0.58	-	-	0.38	-	-	-	-	-
Th	5.2	5.8	6.3	6.9	5.0	-	4.8	-	-	-	5.0	3.8
U	2.5	2.5	3.0	3.1	2.6	-	1.9	-	-	-	2.7	1.2
V	33	-	34	-	20	-	-	-	40	-	78	140
Y	24	25	26	26	25	-	24	-	27	-	24	19
Zn	45	46	42	36	44	-	54	-	-	-	38	70
Zr	231	253	243	242	233	-	184	-	240	-	228	182
La	22	23	22	23	21	-	19	-	-	-	18	27
Ce	43	47	45	47	41	-	38	-	-	-	36	51
Nd	23	23	24	24	20	-	17	-	-	-	21	30
Sm	5.2	5.2	5.8	5.5	5.0	-	4.3	-	-	-	4.8	5.3
Eu	0.95	0.97	0.96	0.86	0.91	-	0.90	-	-	-	0.85	1.29
Gd	4.3	-	4.7	-	4.2	-	4.0	-	-	-	4.3	3.3
Tb	0.54	0.66	0.72	0.77	0.59	-	0.57	-	-	-	0.64	0.34
Tm	0.35	-	0.42	-	0.39	-	0.31	-	-	-	0.30	0.20
Yb	2.4	2.4	2.6	2.7	2.4	-	2.2	-	-	-	2.3	1.2
Lu	0.36	0.39	0.37	0.40	0.37	-	0.32	-	-	-	0.36	0.22

Sample#	79C-209G	79C-216	79C-217	80C-222	80C-224	80C-226	80C-227	80C-227G	80C-313	80C-313G	80C-320	80C-322
Material Location	PHI11 LR	CWP MP	CLB MP	PPGg GH	PP1g GH	PP1g GH	PP0g GH	PP0g1 GH	CGR DR	CGR1 DR	CIP AC3	CIP AC11
Latitude	42° 58.70'	42° 57.97'	42° 57.97'	42° 59.59'	42° 59.59'	42° 59.47'	42° 59.68'	42° 59.68'	42° 53.67'	42° 53.67'	42° 51.59'	42° 51.59'
Longitude	122° 7.70'	122° 8.89'	122° 8.89'	122° 7.19'	122° 7.19'	122° 7.43'	122° 7.86'	122° 7.86'	122° 4.42'	122° 4.42'	122° 9.00'	122° 9.00'
Major Elements												
pct												
SiO2	73.1	67.9	68.2	68.6	59.9	58.2	70.0	74.3	67.9	75.4	68.2	68.0
Al2O3	14.2	14.8	14.7	14.9	17.0	17.3	14.6	14.3	15.5	12.0	14.9	15.1
FeTO3	2.03	2.72	2.78	2.89	6.41	7.25	2.65	1.77	3.62	1.86	2.40	2.75
MgO	0.34	0.077	0.77	0.76	2.21	2.60	0.68	0.24	1.36	0.19	0.79	0.82
CaO	1.39	2.23	2.27	2.38	5.19	6.17	2.15	1.18	3.23	0.52	2.25	2.35
Na2O	5.11	5.02	5.05	4.83	4.80	4.45	4.89	4.76	4.61	3.57	4.99	5.05
K2O	2.87	2.47	2.52	2.64	1.49	1.23	2.80	3.21	2.04	5.04	2.62	2.53
TiO2	0.35	0.49	0.48	0.46	1.22	1.12	0.44	0.25	0.58	0.45	0.46	0.47
P2O5	-	0.11	0.11	0.11	0.27	0.17	0.10	-	0.12	-	0.08	0.11
MnO	0.06	0.05	0.05	0.05	0.10	0.10	0.04	0.05	0.06	0.03	0.05	0.05
Cl	-	-	-	0.067	0.072	0.056	0.11	-	-	-	0.12	0.11
F	-	-	-	0.05	0.04	0.03	0.05	-	-	-	0.01	-
LOI	-	3.27	2.84	1.43	0.85	0.70	0.45	-	0.64	-	2.75	2.50
Loss O	-	-	-	0.04	0.04	0.03	0.05	-	-	-	0.01	-
Total	99.45	99.14	99.77	99.12	99.52	99.35	98.91	100.06	99.66	99.06	99.61	99.84

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ppm	761	754	784	529	439	807	875	689	726	748
Ba	-	-	-	-	-	-	-	-	-	-
Be	1.4	1.5	1.7	1.2	1.2	1.8	-	1.3	1.6	1.6
Co	3.7	-	4.3	11.0	18.6	3.9	1.6	7.8	3.0	3.8
Cr	1.2	-	1.7	1.4	6.5	2.7	-	11.9	1.5	1.9
Ca	2.8	-	3.6	1.8	1.7	3.7	4.4	2.4	2.9	2.9
Cu	14	14	13	20	32	17	-	28	5	5
Ga	18	20	19	22	23	17	-	20	16	16
Hf	5.4	-	6.1	3.6	3.2	5.7	6.1	5.3	5.6	5.7
Nb	-	-	6.4	6.1	5.2	6.7	-	-	6.6	6.6
Ni	5	5	7	6	13	7	-	15	5	5
Rb	53	54	63	36	30	67	70	49	51	53
Sb	1.3	-	0.7	0.3	0.3	0.6	0.7	1.3	0.5	0.5
Sc	5.96	-	7.48	18.1	19.8	6.70	4.72	8.84	5.95	6.41
Sr	380	380	300	573	581	267	178	382	383	379
Ta	0.46	-	0.60	0.46	0.38	0.54	0.60	0.41	0.46	0.47
Th	4.6	-	6.1	2.9	2.6	5.9	6.6	4.6	4.7	4.6
U	1.9	-	2.6	1.0	1.0	2.2	3.1	1.7	2.0	1.9
V	31	31	28	93	190	21	-	66	21	27
Y	26	24	26	24	18	27	28	23	24	25
Zn	47	-	51	89	84	48	44	47	45	47
Zr	227	230	219	153	134	233	234	185	231	229
La	20	-	21	14	13	19	23	18	19	20
Ce	39	-	44	30	26	41	46	35	39	40
Nd	20	-	25	21	17	23	23	16	21	16
Sm	4.5	-	4.6	3.8	3.2	4.0	5.2	3.9	3.7	3.7
Eu	0.88	-	1.00	1.23	1.05	0.91	0.82	0.91	0.86	0.92
Gd	4.3	-	5.5	4.5	3.7	4.8	5.0	4.1	3.9	4.1
Tb	0.42	-	0.73	0.60	0.52	0.66	0.68	0.60	0.55	0.62
Tm	0.28	-	0.39	0.35	0.27	0.34	-	0.27	0.32	0.33
Yb	2.0	-	2.5	2.1	1.7	2.4	2.6	2.1	2.2	2.2
Lu	0.30	-	0.36	0.28	0.25	0.35	0.36	0.32	0.30	0.33

Sample#	80C-324	80C-325	80C-329	80C-330	80C-331	80C-332	80C-336	80C-337	80C-337G	80C-338	80C-340	80C-342
Material Location	CIP AC23	CIP AC30	CIP AC45	CIP AC48	CIS2 AC49	CIS AC51	CIS2 AC66	CGR AC66	CGR1 AC66	CIS2 AC67	CIS AC84	CIS AC92
Latitude Longitude	42° 51.58' 122° 9.00'	42° 51.58' 122° 9.00'	42° 51.58' 122° 9.00'	42° 51.58' 122° 9.00'	42° 51.58' 122° 9.00'	42° 51.57' 122° 9.00'	42° 51.57' 122° 8.98'	42° 51.57' 122° 8.98'	42° 51.57' 122° 8.98'	42° 51.57' 122° 8.97'	42° 51.57' 122° 8.96'	42° 51.57' 122° 8.95'
Major Elements												
Pct												
SiO2	68.8	68.3	68.1	68.0	57.7	59.4	53.5	66.8	74.8	54.1	53.3	57.1
Al2O3	15.0	14.8	14.9	14.9	17.9	17.5	18.9	15.3	11.5	18.7	19.2	18.5
FeTO3	2.54	2.74	2.78	2.83	6.66	5.78	6.66	3.74	1.64	6.26	6.18	6.86
MgO	0.78	0.78	0.79	0.88	3.23	2.64	5.00	1.46	0.22	5.41	5.44	3.26
CaO	2.27	2.21	2.30	2.34	6.90	5.96	9.06	3.32	0.74	9.12	9.52	6.87
Na2O	5.03	5.03	5.04	5.07	4.47	4.58	3.90	4.62	3.95	3.55	3.58	4.52
K2O	2.66	2.57	2.56	2.57	1.19	1.40	0.93	2.22	3.79	0.84	0.77	1.01
TiO2	0.48	0.47	0.48	0.48	0.95	0.95	1.17	0.56	0.38	1.01	1.10	0.98
P2O5	0.09	0.09	0.09	0.10	0.33	0.30	0.25	0.12	-	0.18	0.17	0.29
MnO	0.05	0.05	0.05	0.05	0.08	0.08	0.07	0.06	0.03	0.08	0.07	0.10
Cl	0.089	0.089	0.046	0.048	0.077	0.066	0.067	0.018	-	0.094	0.066	0.036
F	0.01	0.01	0.01	0.01	0.04	0.04	0.07	0.01	-	0.04	0.05	0.02
LOI	2.65	2.43	2.57	2.45	0.62	1.27	0.40	1.39	-	0.25	0.58	0.76
Less O	0.01	0.01	0.01	0.01	0.04	0.04	0.06	0.01	-	0.04	0.04	0.02
Total	100.44	99.56	99.71	99.72	100.11	99.93	99.92	99.61	97.05	99.60	99.98	100.29

Trace Elements

ppm	729	716	745	402	427	390	665	281	265	386
Ba	1.4	1.3	1.5	1.1	1.0	-	1.4	-	-	-
Be	3.8	3.3	3.1	18.9	13.8	26.0	7.2	26.2	26.5	18.2
Co	1.8	2.4	1.9	9.4	1.9	27.6	12.4	88.7	69.9	24.1
Cr	2.8	2.8	2.9	1.0	1.0	0.9	3.2	0.6	0.6	1.2
Ce	5	5	8	55	25	56	7	40	33	14
Cu	18	18	18	28	24	25	16	24	25	21
Ga	5.2	5.4	5.5	3.2	3.5	2.5	5.0	2.6	2.6	2.3
Hf	6.6	7.9	6.4	4.1	5.2	4.9	5.8	4.1	4.3	5.4
Nb	5	5	5	22	10	46	11	73	64	16
Ni	52	52	50	36	39	28	50	30	32	27
Rb	0.4	0.5	0.5	0.3	0.3	-	0.3	-	-	0.3
Sb	5.86	6.15	6.13	12.1	9.77	23.1	8.76	22.0	23.7	14.9
Sc	390	403	390	1460	1440	1370	374	1530	1520	737
Sr	0.44	0.46	0.46	0.26	0.28	0.35	0.41	0.24	0.20	0.28
Ta	4.5	4.5	4.7	2.5	2.9	1.8	4.1	1.8	1.8	1.8
Th	1.9	1.9	1.8	0.8	0.8	0.5	1.8	0.6	0.5	0.7
U	22	22	25	150	120	150	47	130	150	120
V	22	24	24	19	20	20	23	16	19	19
Y	44	44	44	74	66	69	47	65	61	75
Zn	226	225	222	158	179	125	195	137	126	110
Zr	19	19	19	19	22	15	16	16	14	11
La	38	40	39	42	47	31	32	34	31	24
Ce	20	21	23	24	23	20	19	21	21	14
Nd	3.7	3.6	3.7	3.7	3.7	4.0	3.4	3.3	3.5	2.8
Sm	0.86	0.91	0.90	1.28	1.25	1.37	0.88	1.21	1.27	1.07
Eu	3.8	3.9	3.6	3.4	3.4	3.9	3.8	3.5	3.9	3.2
Gd	0.59	0.58	0.61	0.50	0.42	0.51	0.59	0.41	0.44	0.45
Tb	0.32	0.32	0.33	0.17	0.18	0.21	0.26	0.23	0.14	0.20
Tm	2.1	2.1	2.2	1.3	1.1	1.3	2.0	1.0	1.0	1.5
Yb	0.29	0.30	0.30	0.19	0.17	0.20	0.29	0.16	0.16	0.22
Lu										

Sample#	80C-344	80C-345	80C-345G	80C-347	80C-349	80C-354	80C-355	80C-432	80C-438	80C-439	80C-441	80C-442
Material Location	CIS AC94	CIS AC97	CIS AC97	CIS2 AC97	PHP MS	BMB RC	LAV RC	CGR HP	CVS2 HP	CVS HP	CVS HP	CVS HP
Latitude	42° 51.57'	42° 51.57'	42° 51.57'	42° 51.57'	42° 54.17'	42° 59.89'	42° 59.70'	42° 57.02'	42° 57.27'	42° 57.27'	42° 57.27'	42° 57.27'
Longitude	122° 8.95'	122° 8.95'	122° 8.95'	122° 8.95'	122° 7.98'	122° 9.76'	122° 10.15'	122° 10.07'	122° 9.90'	122° 9.90'	122° 9.90'	122° 9.90'
<u>Major Elements</u>												
pct SiO2	53.6	58.2	67.1	53.2	62.8	53.0	53.6	72.6	55.5	54.5	53.1	53.0
Al2O3	19.5	18.7	15.4	18.5	16.4	16.7	16.3	13.5	19.2	19.2	19.1	20.6
Fe2O3	7.47	6.16	3.02	6.25	3.42	7.66	7.76	2.35	7.38	8.12	8.54	6.14
MgO	4.32	2.82	0.84	6.22	0.97	7.21	8.10	0.65	2.99	4.02	5.29	6.00
CaO	8.93	6.39	2.72	9.49	2.58	8.52	7.96	1.84	7.16	8.17	8.69	9.65
Na2O	3.71	4.76	5.34	3.36	4.64	3.70	3.66	3.90	4.68	4.01	3.50	3.14
K2O	0.83	1.01	2.14	0.79	2.15	1.22	1.14	3.72	0.817	0.714	0.558	0.598
TiO2	0.98	0.88	0.59	0.89	0.50	1.03	0.94	0.41	1.23	0.99	0.86	0.72
P2O5	0.26	0.25	0.20	0.15	0.17	0.42	0.31	0.06	0.39	0.19	0.12	0.10
MnO	0.09	0.10	0.06	0.08	0.06	0.11	0.11	0.03	0.10	0.10	0.13	0.09
Cl	0.054	0.033	-	0.026	-	0.040	0.010	-	-	-	-	-
F	0.03	0.01	-	0.03	-	0.05	0.04	-	-	-	-	-
LOI	0.32	0.79	2.32	0.79	5.86	0.33	-	0.47	0.60	0.31	0.36	0.55
Loss O	0.03	0.01	-	0.03	-	0.04	0.03	-	-	-	-	-
Total	100.07	100.09	99.73	99.75	99.61	99.95	99.90	99.53	100.05	100.32	100.25	100.59

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<u>Trace Elements</u>												
ppm Ba	329	400	720	298	691	548	449	847	323	275	226	214
Be	-	-	-	-	1.7	-	-	1.6	-	-	-	-
Co	25.4	13.8	3.2	30.5	5.8	31.0	35.7	5.9	-	25.1	-	30.0
Cr	32.2	16.5	-	140	3.4	268	383	4.6	-	29.8	-	57.2
Cs	0.7	1.3	2.8	0.6	2.6	0.4	0.2	3.1	-	0.8	-	0.7
Cu	48	11	-	30	26	73	50	22	-	-	-	-
Ga	22	23	-	22	21	23	22	19	-	-	-	-
Hf	2.2	2.3	4.6	2.3	5.8	3.1	2.8	7.4	-	-	-	-
Nb	4.4	5.0	-	3.7	-	7.4	6.4	-	-	1.6	-	1.5
Ni	33	14	-	95	7	170	220	10	-	2.3	-	2.1
Rb	33	29	42	26	48	27	25	93	20	-	-	-
Sb	-	0.2	0.5	-	1.9	-	0.0	1.3	-	14	13	18
Sc	18.1	11.7	7.59	21.6	8.35	19.9	20.7	5.33	-	-	-	-
Sr	1500	712	346	1370	505	1300	945	222	802	18.0	760	19.8
Ta	0.20	0.25	0.45	0.21	0.47	0.42	0.34	0.57	-	0.14	-	0.12
Th	1.7	1.8	3.6	1.6	5.5	2.7	2.4	9.9	-	1.1	-	0.9
U	0.7	0.8	1.8	0.5	1.9	0.8	0.7	3.9	-	0.5	-	0.4
V	160	120	-	120	46	160	160	52	-	-	-	-
Y	16	15	26	17	26	18	19	24	17	14	13	15
Zn	71	65	52	58	52	82	82	20	-	69	-	60
Zr	120	107	197	127	240	157	141	257	96	86	72	75
La	14	11	18	13	23	26	19	22	-	8	-	6
Ce	29	22	36	28	48	50	39	44	-	15	-	13
Nd	15	13	22	15	27	27	20	23	-	11	-	9
Sm	3.1	2.5	4.6	3.0	5.8	4.1	3.4	4.8	-	2.6	-	2.4
Eu	1.10	1.03	1.07	1.05	1.07	1.35	1.11	0.73	-	0.86	-	0.79
Gd	3.1	2.6	5.3	2.8	5.8	4.1	3.6	4.9	-	2.1	-	2.3
Tb	0.39	0.37	0.55	0.35	0.66	0.42	0.39	0.64	-	0.35	-	0.32
Tm	0.21	0.16	-	0.15	0.34	0.32	0.25	0.16	-	0.20	-	0.18
Yb	1.2	1.3	2.1	1.0	2.3	1.5	1.5	2.3	-	1.1	-	1.1
Lu	0.17	0.19	0.30	0.15	0.37	0.20	0.20	0.36	-	0.17	-	0.16

Sample#	80C-442G	80C-443	80C-444	80C-444G	80C-445	80C-446G	80C-452	80C-453	80C-456G	80C-459	80C-463	80C-466
Material Location	CVS HP	CVS2 HP	CVS HP	CVS HP	CVS HP	CGR1 HP	CGR HP	CGR HP	CGR1 HP	CGR HP	CGR HP	CGR HP
Latitude Longitude	42° 57.27' 122° 9.90'	42° 57.27' 122° 9.90'	42° 57.27' 122° 9.90'	42° 57.27' 122° 9.90'	42° 57.27' 122° 9.90'	42° 57.27' 122° 9.90'	42° 57.28' 122° 9.91'	42° 57.28' 122° 9.91'	42° 57.28' 122° 9.91'	42° 57.28' 122° 9.91'	42° 57.28' 122° 9.91'	42° 57.28' 122° 9.91'
Pct												
SiO2	62.7	53.9	51.1	62.3	52.7	74.5	63.1	65.4	75.1	72.6	67.5	65.4
Al2O3	18.7	19.4	10.6	18.0	19.5	11.9	16.6	16.6	12.1	13.3	15.7	15.9
FeTO3	3.93	8.37	9.04	4.12	8.79	1.72	5.08	3.86	2.03	2.36	3.69	4.44
MgO	1.19	3.55	16.7	1.91	4.43	0.17	2.57	1.02	0.19	0.59	1.40	1.91
CaO	5.43	8.11	9.21	4.55	8.75	0.57	5.17	3.30	0.55	1.69	3.25	3.99
Na2O	4.92	4.44	2.21	5.48	3.81	3.22	4.48	5.74	3.54	3.99	4.87	4.58
K2O	1.55	0.548	0.612	1.72	0.627	5.78	1.67	1.60	5.29	4.37	2.28	2.97
TiO2	0.70	1.15	0.37	0.56	1.09	0.38	0.62	0.66	0.41	0.35	0.57	0.64
P2O5	0.23	0.46	0.16	0.40	0.17	-	0.13	0.25	-	0.06	0.13	0.15
MnO	0.06	0.11	0.13	0.05	0.10	0.02	0.09	0.05	0.03	-	0.05	0.07
Cl	-	-	-	-	-	-	0.046	0.037	-	0.088	0.034	0.058
F	-	-	-	-	-	-	0.04	0.02	-	0.05	0.04	0.03
LOI	0.62	0.19	0.05	0.84	0.38	-	0.61	0.83	-	0.34	0.64	0.35
Loss O	-	-	-	-	-	-	0.03	0.02	-	0.04	0.03	0.03
Total	100.03	100.23	100.18	99.93	100.25	98.26	100.17	99.35	99.24	99.74	100.12	100.46

Major Elements

Trace Elements

PPM	241	210	619	249	543	703	768	684	624
Ba	-	-	-	-	-	-	-	-	-
Be	-	-	-	-	-	-	-	-	-
Co	-	76.2	9.9	-	15.2	2.6	3.4	7.1	11.9
Cr	-	579	25.3	-	30.1	2.2	3.7	14	20.1
Cs	-	0.7	2.1	-	2.7	1.4	3.2	3.3	3.5
Cu	-	-	-	-	-	-	-	-	-
Ga	-	-	-	-	-	-	-	-	-
Hf	-	1.5	3.6	-	4.2	4.5	7.0	5.4	5.0
Nb	-	1.4	-	-	4.7	8.1	6.8	6.4	6.8
Ni	-	-	-	-	-	-	-	-	-
Rb	14	12	40	16	48	35	93	42	50
Sb	-	-	-	-	0.3	-	-	0.0	0.3
Sc	-	28.2	7.62	-	12.6	6.97	5.11	9.18	10.7
Sr	821	588	834	805	533	539	216	386	436
Ta	-	0.11	0.33	-	0.32	0.48	0.62	0.50	0.44
Th	-	1.2	3.3	-	3.6	4.8	10.6	4.9	4.7
U	-	0.5	1.5	-	1.6	1.7	3.8	1.9	2.1
V	-	-	-	-	-	-	-	-	-
Y	15	10	19	16	17	23	24	19	21
Zn	-	78	54	-	62	35	21	41	52
Zr	72	79	172	80	164	175	250	191	187
La	-	7	19	-	14	20	25	19	16
Ce	-	16	37	-	26	42	49	37	33
Nd	-	10	20	-	13	23	24	20	18
Sm	-	2.5	4.0	-	3.4	5.1	4.6	4.2	4.0
Eu	-	0.61	1.04	-	0.85	1.40	0.62	0.94	0.85
Gd	-	2.2	-	-	3.4	4.2	5.7	4.2	4.7
Tb	-	0.28	0.47	-	0.51	0.72	0.59	0.59	0.64
Tm	-	0.16	-	-	0.24	0.33	0.32	0.33	0.32
Yb	-	0.8	1.4	-	1.7	2.3	2.1	2.1	2.0
Lu	-	0.13	0.18	-	0.26	0.33	0.33	0.32	0.30

Sample#	80C-471	80C-498	80C-498G	80C-503	80C-503G	80C-512	80C-513	80C-515	80C-516	80C-517	80C-518	80C-518G
Material Location	CGR HP	PDO1 LR	PDO1 ¹ LR	PDO1 LR	PDO1 ¹ LR	PCL WI	PCL WI	PCL WI	INC WI	PCL WI	PPPr RD	PPPr RD
Latitude	42° 57.28'	42° 58.18'	42° 58.18'	42° 58.12'	42° 58.12'	42° 56.34'	42° 56.34'	42° 56.34'	42° 56.36'	42° 56.06'	42° 56.16'	42° 56.16'
Longitude	122° 9.91'	122° 7.93'	122° 7.93'	122° 8.08'	122° 8.08'	122° 9.04'	122° 8.69'	122° 9.12'	122° 9.07'	122° 8.83'	122° 2.55'	122° 2.55'

Major Elements

Pct												
SiO2	67.3	71.0	73.9	72.3	73.7	58.5	58.0	59.7	50.3	58.7	68.6	70.1
Al2O3	15.8	14.6	14.0	14.8	14.1	18.2	18.4	17.9	20.3	18.2	14.6	14.1
FeTO3	3.56	2.43	1.73	2.36	1.74	6.49	6.55	6.05	10.10	6.40	2.58	1.83
MgO	1.38	0.62	0.27	0.54	0.28	3.68	3.73	3.13	5.31	3.54	0.68	0.39
CaO	3.33	1.81	1.15	1.69	1.18	6.89	6.97	6.16	8.5	6.65	2.21	1.69
Na2O	4.94	5.39	5.29	5.36	5.28	4.33	4.24	4.69	3.97	4.44	4.69	4.75
K2O	2.31	2.71	3.03	2.75	2.950	1.01	0.98	1.21	0.21	1.07	2.78	3.03
TiO2	0.53	0.41	0.26	0.40	0.28	0.75	0.75	0.72	1.15	0.74	0.41	0.29
P2O5	0.13	0.07	-	0.07	0.03	0.20	0.20	0.21	0.51	0.20	0.09	0.08
MnO	0.05	0.05	0.04	0.05	0.05	0.10	0.10	0.09	0.10	0.10	0.04	0.03
Cl	0.030	0.14	-	0.15	-	0.055	0.035	0.062	0.079	0.047	-	-
F	0.01	0.04	-	0.05	-	0.02	0.01	0.03	0.02	0.02	-	-
LOI	0.67	0.77	-	1.12	-	0.10	0.34	0.27	-	0.19	2.94	3.32
Loss O	0.07	0.04	-	0.05	-	0.02	0.01	0.03	0.02	0.02	-	-
Total	100.03	100.00	99.67	101.59	99.59	100.31	100.30	100.19	100.53	100.28	99.62	99.61

Trace Elements

PPM												
Ba	676	810	-	817	831	384	389	432	238	406	762	831
Be	-	2.2	-	2.1	-	-	-	-	1.3	-	1.6	1.8
Co	7.8	3.0	-	2.4	1.8	20.3	19.8	17.8	28.2	19.6	3.6	2.1
Cr	12.5	2.9	-	0.7	-	48.2	46.2	36.3	68.8	45.8	2.4	1.2
Ce	3.1	3.2	-	3.4	3.8	1.0	1.0	1.3	-	1.1	3.9	4.4
Cu	-	13	-	12	-	51	55	49	65	48	12	71
Ga	-	20	-	21	-	19	21	21	24	19	19	19
Hf	5.0	6.0	-	6.1	6.7	2.8	2.6	3.0	3.7	2.8	6.1	6.2
Nb	8.0	7.1	-	6.5	-	5.1	4.8	4.8	9.5	5.0	-	-
Ni	-	7	-	7	-	39	44	36	59	38	6	6
Rb	53	58	-	54	54	23	16	23	4	22	61	71
Sb	-	0.5	-	0.5	0.6	0.1	-	0.2	0.5	-	1.1	1.2
Sc	8.82	6.29	-	5.98	5.55	15.5	15.0	13.5	16.1	14.5	6.47	5.11
Sr	399	255	-	250	195	683	693	674	826	693	271	240
Ta	0.46	0.49	-	0.51	0.56	0.29	0.29	0.27	0.57	0.33	0.52	0.53
Th	4.5	5.1	-	5.3	5.9	1.7	1.7	2.1	1.5	1.9	5.7	6.5
U	1.8	2.2	-	2.2	2.6	0.6	0.7	0.8	0.5	0.8	2.5	2.5
V	-	25	-	30	-	130	150	190	130	130	32	27
Y	24	29	-	25	26	17	18	20	22	19	27	27
Zn	42	45	-	49	45	73	73	66	56	72	40	38
Zr	192	242	-	248	257	122	120	140	172	125	231	217
La	18	20	-	20	23	13	12	13	31	13	21	22
Ce	36	42	-	41	45	25	24	26	57	-	40	44
Nd	18	21	-	22	23	13	16	16	34	15	22	24
Sm	4.1	3.8	-	3.8	5.1	2.7	2.5	2.7	5.6	2.7	4.8	5.0
Eu	0.92	0.86	-	0.85	0.85	0.98	0.96	0.97	1.46	1.25	0.80	0.78
Gd	4.9	3.7	-	4.2	-	3.1	-	3.0	2.4	5.4	5.0	5.3
Tb	0.59	0.54	-	0.54	0.69	0.38	0.36	0.43	0.74	0.36	0.70	0.78
Tm	0.32	0.26	-	0.36	-	0.22	-	0.20	0.22	0.31	0.36	0.33
Yb	2.1	2.4	-	2.4	2.5	1.5	1.3	1.5	2.1	1.5	2.3	2.7
Lu	0.30	0.35	-	0.35	0.41	0.22	0.20	0.22	0.32	0.22	0.36	0.37

Sample#	81C-533	81C-535	81C-536	81C-538	81C-539	81C-543	81C-555	81C-556	81C-556G	81C-557	81C-558	81C-559
Material Location	BMB CR	PHOc CW	INC WC	LAV WC	LAV WC	LAV WC	CIP PN1	CIP PN7	CIP PN7	CIP PN7	CIP PN12	CIP PN17
Latitude	42° 51.02'	42° 59.34'	42° 57.42'	42° 57.33'	42° 57.33'	42° 57.43'	42° 51.05'	42° 51.05'	42° 51.05'	42° 51.05'	42° 51.05'	42° 51.05'
Longitude	122° 5.98'	122° 3.97'	122° 11.52'	122° 11.19'	122° 11.19'	122° 11.76'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'
Major Elements												
Pct												
SiO2	56.5	70.0	51.3	66.8	59.9	51.2	68.6	68.0	70.2	67.7	68.0	68.1
Al2O3	17.4	15.3	16.5	15.6	15.9	16.6	15.1	14.8	14.2	15.1	14.8	14.8
FeT03	6.80	2.79	8.48	3.95	5.85	8.38	2.71	2.41	1.58	2.49	2.49	2.52
MgO	4.77	0.77	8.06	1.85	4.44	7.58	0.88	0.78	0.56	0.86	0.79	0.78
CaO	7.39	2.38	9.92	3.71	6.20	9.82	2.40	2.19	1.62	2.34	2.21	2.16
Na2O	4.24	5.36	3.83	4.77	4.24	3.68	4.99	4.99	5.05	4.96	5.00	5.01
K2O	1.36	2.48	0.84	2.27	1.67	0.89	2.55	2.59	2.84	2.63	2.48	2.54
TiO2	0.93	0.51	1.26	0.62	0.86	1.24	0.47	0.46	0.42	0.46	0.45	0.45
P2O5	0.31	0.11	0.41	0.14	0.26	0.42	0.11	0.11	0.09	0.12	0.10	0.10
MnO	0.10	0.05	0.13	0.06	0.09	0.13	0.05	0.05	0.04	0.05	0.05	0.05
Cl	-	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-	-
LOI	0.31	0.29	0.01	0.52	0.64	0.01	3.17	3.25	3.30	2.88	2.95	3.09
Loss O	-	-	-	-	-	-	-	-	-	-	-	-
Total	100.11	100.14	100.74	100.29	100.05	99.95	101.03	99.63	99.90	99.59	99.32	99.60

Trace Elements

PPM	539	764	385	652	525	353	726	755	787	755	755	755
Ba	1.1	1.7	-	1.3	1.1	1.5	1.5	1.4	1.7	1.4	1.4	1.6
Be	24.6	3.7	36.2	9.2	21.1	34.1	-	2.6	1.2	-	-	-
Co	90.8	-	265	28.1	134	243	-	1.5	0.9	-	-	-
Cr	0.9	3.0	-	2.8	1.9	0.2	-	2.9	3.3	-	-	-
Ce	55	14	69	22	31	88	20	7	22	10	7	5
Cu	21	21	23	22	22	25	18	21	19	20	19	17
Ga	3.5	5.7	3.3	4.7	4.3	3.4	-	5.5	6.2	-	-	-
Hf	-	-	-	-	-	-	-	7.0	7.4	-	-	-
Nb	64	6	100	21	52	91	10	6	6	6	10	6
Ni	28	48	18	52	38	21	46	48	58	48	-	-
Rb	0.6	1.5	0.9	1.5	1.5	0.7	-	1.1	0.8	-	-	-
Sb	17.5	6.19	26.8	9.64	17.2	27.0	-	6.21	5.82	-	-	-
Sc	1020	396	1010	447	676	1020	404	384	292	403	-	-
Sr	0.33	0.50	0.53	0.43	0.50	0.52	-	0.44	0.50	-	-	-
Ta	3.1	5.0	2.7	4.7	4.1	2.7	-	4.6	5.2	-	-	-
Th	0.8	1.9	0.5	1.8	1.5	0.7	-	2.0	2.3	-	-	-
U	140	38	190	71	110	190	31	30	25	35	37	28
V	20	23	22	24	22	20	24	21	27	24	-	-
Y	76	48	87	50	68	86	-	39	37	-	-	-
Zn	159	229	170	191	178	168	219	221	247	224	-	-
Zr	21	21	23	18	20	24	-	20	21	-	-	-
La	44	41	46	36	42	48	-	39	44	-	-	-
Ce	25	23	25	19	21	23	-	19	22	-	-	-
Nd	4.5	4.6	4.6	3.9	4.2	4.6	-	4.2	4.7	-	-	-
Sm	1.24	0.95	1.36	0.98	1.15	1.43	-	0.88	0.88	-	-	-
Eu	3.7	4.4	4.3	3.9	5.0	4.9	-	4.8	3.0	-	-	-
Gd	0.46	0.57	0.50	0.51	0.50	0.55	-	0.66	0.57	-	-	-
Tb	0.21	0.28	0.21	0.29	0.27	0.33	-	0.33	0.40	-	-	-
Tm	1.8	2.1	1.7	1.7	2.0	1.6	-	2.0	2.4	-	-	-
Yb	0.24	0.34	0.27	0.28	0.29	0.26	-	0.31	0.33	-	-	-
Lu												

Sample#	81C-560	81C-561	81C-563	81C-563G	81C-566	81C-566G	81C-567	81C-568	81C-569	81C-570	81C-571	81C-572
Material Location	CIS2 PN17	CIS PN19	CIP PN20	CIP PN20	CIP PN24	CIP PN24	CIP PN24	CIP PN30	CIS2 PN30	CIS2 PN30	CIP PN35	CIS2 PN36
Latitude	42° 51.05'	42° 51.05'	42° 51.05'	42° 51.05'	42° 51.04'	42° 51.04'	42° 51.04'	42° 51.04'	42° 51.04'	42° 51.04'	42° 51.04'	42° 51.04'
Longitude	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'
<u>Major Elements</u>												
pct												
SiO2	60.1	55.1	68.1	69.8	68.7	69.8	68.0	67.8	60.3	54.0	67.7	60.4
Al2O3	17.5	19.0	14.8	14.2	15.0	14.2	14.9	14.8	17.2	19.6	15.0	17.2
Fe2O3	5.29	5.66	2.61	1.77	2.50	1.64	2.61	2.69	5.23	6.45	2.67	5.17
MgO	2.21	5.20	0.79	0.54	0.82	0.55	0.82	0.77	2.27	4.27	0.89	2.52
CaO	5.18	8.66	2.20	1.66	2.25	1.63	2.25	2.28	5.30	9.02	2.38	5.27
Na2O	4.92	3.61	4.98	5.06	4.96	4.94	5.00	5.04	4.77	3.76	5.00	4.75
K2O	1.60	0.87	2.53	2.76	2.63	2.89	2.53	2.51	1.56	0.91	2.44	1.61
TiO2	0.80	0.84	0.46	0.41	0.40	0.42	0.47	0.47	0.80	1.07	0.48	0.80
P2O5	0.26	0.15	0.10	0.09	0.10	0.09	0.10	0.13	0.30	0.22	0.08	0.14
MnO	0.08	0.07	0.05	0.04	0.05	0.04	0.05	0.05	0.08	0.07	0.05	0.07
Cl	-	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-	-
LOI	1.75	0.89	3.02	3.28	2.89	3.23	3.00	3.08	2.04	0.39	3.04	1.87
Loss O	-	-	-	-	-	-	-	-	-	-	-	-
Total	99.69	100.05	99.64	99.91	100.37	99.43	98.53	99.62	99.85	99.76	99.73	99.80

Trace Elements

[illegible]

Sample#	81C-572G	81C-573	81C-573G	81C-574	81C-575	81C-576	81C-577	81C-578	81C-578G	81C-579	81C-582	81C-582G
Material Location	CIS PN36	CIP PN38	CIP PN38	CIS2 PN41	CIS2 PN41	CIS PN41	CIS2 PN41	CIS2 PN47	CIS PN47	CIS PN49	CIS PN57	CIS PN57
Latitude	42° 51.04'	42° 51.04'	42° 51.04'	42° 51.03'	42° 51.03'	42° 51.03'	42° 51.03'	42° 51.03'	42° 51.03'	42° 51.03'	42° 51.03'	42° 51.03'
Longitude	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'
<u>Major Elements</u>												
Pct												
SiO2	68.1	66.8	69.7	59.8	53.7	52.3	56.2	55.7	66.4	54.0	55.8	66.9
Al2O3	15.2	15.1	14.9	17.5	19.6	19.6	18.6	18.5	15.6	19.0	18.9	15.8
FeTO3	1.71	3.01	1.74	5.58	7.19	6.52	6.65	6.74	3.36	7.35	7.58	3.14
MgO	0.74	1.02	0.64	2.55	4.84	5.24	2.96	3.88	1.06	3.72	3.21	0.86
CaO	2.42	2.58	1.99	5.71	9.20	9.76	7.15	7.62	2.93	8.60	7.13	2.78
Na2O	5.03	5.01	5.11	4.68	3.54	3.66	4.59	4.15	5.40	3.85	4.37	5.22
K2O	2.45	2.37	2.62	1.54	0.72	0.90	1.19	1.05	2.18	1.17	0.78	1.96
TiO2	0.44	0.49	0.42	0.82	0.93	1.19	1.03	1.01	0.60	1.12	1.09	0.55
P2O5	0.15	0.08	0.08	0.28	0.21	0.19	0.43	0.26	0.24	0.53	0.35	0.25
MnO	0.05	0.05	0.05	0.08	0.09	0.07	0.07	0.08	0.07	0.07	0.12	0.08
Cl	-	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-	-
LOI	3.03	2.80	2.97	1.70	0.31	0.42	0.94	0.78	1.75	0.52	1.00	2.44
Less O	-	-	-	-	-	-	-	-	-	-	-	-
Total	99.32	99.31	100.22	100.24	100.33	99.85	99.81	99.77	99.59	99.93	100.33	99.98

Trace Elements

ppm	714	700	766	534	408	388	701	405	334	643
Ba	1.9	1.6	2.0	1.4	-	1.2	2.1	1.2	-	2.0
Be	1.9	4.3	1.8	-	-	-	5.6	-	17.2	3.1
Co	1.9	4.1	-	-	-	-	1.7	-	20.3	-
Cr	2.6	2.7	3.1	-	-	-	2.3	-	1.0	2.5
Cs	16	8	8	21	47	31	45	110	41	48
Cu	20	19	16	20	21	21	19	22	21	19
Ga	5.2	5.3	5.7	-	-	-	4.7	-	1.7	4.1
Hf	-	6.2	6.0	-	-	-	5.4	-	3.8	-
Nb	6	7	6	17	66	36	8	28	17	7
Ni	48	48	49	37	25	30	41	34	23	37
Rb	0.4	1.1	1.3	-	-	0.7	0.7	-	1.1	1.2
Sb	3.66	6.58	5.63	-	-	19.0	5.62	-	12.6	4.15
Sc	581	448	369	1040	1490	1100	580	1580	787	377
Sr	0.43	0.43	0.46	-	-	0.24	0.40	-	0.21	0.38
Ta	5.2	4.4	5.0	-	-	2.0	4.2	-	1.2	3.3
Th	1.9	1.8	2.1	-	-	0.7	1.6	-	0.7	1.5
U	29	38	30	120	160	150	52	180	140	41
V	19	24	22	21	17	17	19	20	15	17
Y	33	40	34	-	-	75	55	-	70	36
Zn	221	221	232	162	116	127	191	149	92	164
Zr	24	19	21	-	-	14	23	-	10	17
La	49	39	41	-	-	30	47	-	20	32
Ce	21	19	-	-	-	19	24	-	10	18
Nd	4.0	4.1	4.6	-	-	3.9	4.4	-	2.9	3.4
Sm	0.91	0.93	0.90	-	-	1.28	1.13	-	1.02	0.90
Eu	-	3.6	6.3	-	-	4.0	3.6	-	3.3	3.0
Gd	0.43	0.61	0.66	-	-	0.42	-	-	0.40	0.46
Tb	-	0.30	0.38	-	-	-	-	-	-	-
Tm	1.5	1.9	2.1	-	-	1.6	1.7	-	1.2	1.5
Yb	0.23	0.29	0.32	-	-	0.22	0.25	-	0.17	0.23
Lu										

Sample#	81C-583	81C-584	81C-585	81C-586	81C-586G	81C-587	81C-589	81C-589G	81C-591	81C-591G	81C-592	81C-592G
Material Location	CIS2 PN57	CIS2 PN60	CIS PN62	CIS2 PN62	CIS PN62	CIS PN63	CIS2 CT9	CIS CT9	CIS2 CT9	CIS CT9	CIP CT9	CIP CT9
Latitude	42° 51.03'	42° 51.03'	42° 51.02'	42° 51.02'	42° 51.02'	42° 51.02'	42° 53.53'	42° 53.53'	42° 53.53'	42° 53.53'	42° 53.53'	42° 53.53'
Longitude	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 0.05'	122° 11.82'	122° 11.82'	122° 11.82'	122° 11.82'	122° 11.82'	122° 11.82'
<u>Major Elements</u>												
Pct												
SiO2	52.1	53.1	52.6	54.8	-	54.1	52.7	-	56.5	67.2	67.8	70.3
Al2O3	19.5	21.6	18.8	20.1	-	18.8	18.7	-	17.7	15.1	14.8	14.1
FeT03	6.52	5.10	9.74	6.03	-	6.08	7.60	-	6.93	2.50	2.83	2.08
MgO	5.82	4.39	4.54	5.06	-	5.32	5.3	-	3.17	0.82	0.81	0.50
CaO	10.3	10.5	8.82	9.29	-	9.13	9.00	-	6.67	2.39	2.22	1.57
Na2O	3.38	3.37	3.80	3.42	-	3.63	3.94	-	4.44	5.08	4.76	4.77
K2O	0.83	0.75	0.65	0.66	-	0.91	0.96	-	1.40	2.59	2.59	2.85
TiO2	1.11	0.83	1.17	0.63	-	1.15	1.30	-	1.04	0.50	0.47	0.40
P2O5	0.20	0.17	0.13	0.15	-	0.16	0.20	-	0.34	0.21	0.09	0.09
MnO	0.07	0.06	0.10	0.10	-	0.07	0.08	-	0.08	0.06	0.05	0.05
Cl	-	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-	-
LOI	0.40	0.33	0.09	0.21	-	0.53	0.59	-	1.44	2.88	2.94	3.33
Loss O	-	-	-	-	-	-	-	-	-	-	-	-
Total	100.23	100.20	100.44	100.45	-	99.88	100.37	-	99.71	99.33	99.36	100.04

Trace Elements

PPM	81C-583	81C-584	81C-585	81C-586	81C-586G	81C-587	81C-589	81C-589G	81C-591	81C-591G	81C-592	81C-592G
Ba	-	-	268	278	538	331	455	813	548	897	756	804
Be	-	-	-	-	1.3	-	-	1.9	1.2	1.8	1.8	1.7
Co	-	-	-	-	9.2	-	27.3	8.7	19.1	4.4	3.5	1.5
Cr	-	-	-	-	4	-	16.4	2.4	3.4	-	1.8	-
Cs	-	-	-	-	1.6	-	0.9	1.9	1.3	2.4	3.2	3.2
Cu	39	33	120	56	120	45	42	190	22	120	10	27
Ga	22	22	21	19	21	21	23	22	24	19	17	17
Hf	-	-	-	-	3.1	-	2.3	3.9	3.2	5.3	6.0	6.0
Nb	-	-	-	-	5.4	-	6.9	7.8	5.8	7.8	7.0	7.4
Ni	100	63	38	37	11	70	57	12	22	6	22	7
Rb	-	-	14	16	27	28	30	45	37	49	52	56
Sb	-	-	-	-	0.3	-	0.3	0.4	0.7	0.5	0.5	0.6
Sc	-	-	-	-	8.45	-	25.5	4.89	15.9	3.35	6.73	5.55
Sr	-	-	725	857	795	1430	1450	943	1210	611	380	277
Ta	-	-	-	-	0.32	-	0.29	0.42	-	0.50	0.50	0.45
Th	-	-	-	-	2.5	-	2.0	4.4	2.9	5.9	5.2	5.2
U	-	-	-	-	1.2	-	0.7	1.4	0.7	2.1	2.3	2.2
V	160	110	230	95	70	150	190	60	170	37	30	18
Y	-	-	14	13	18	16	18	18	19	19	23	25
Zn	-	-	-	-	61	-	75	69	77	49	43	36
Zr	-	-	79	94	142	131	130	173	149	225	228	247
La	-	-	-	-	16	-	17	28	19	30	21	21
Ce	-	-	-	-	33	-	36	53	41	56	42	41
Nd	-	-	-	-	17	-	23	27	23	24	20	22
Sm	-	-	-	-	3.9	-	4.9	4.6	5.1	4.3	4.9	4.5
Eu	-	-	-	-	1.17	-	1.42	1.21	1.41	1.02	0.95	0.83
Gd	-	-	-	-	4.6	-	4.4	3.8	4.8	3.7	4.4	4.3
Tb	-	-	-	-	0.47	-	0.50	0.40	0.56	0.49	0.57	0.56
Tm	-	-	-	-	0.23	-	0.17	0.22	0.26	0.23	0.33	0.30
Yb	-	-	-	-	1.6	-	1.3	1.3	1.3	1.3	2.34	2.34
Lu	-	-	-	-	0.23	-	0.17	0.20	0.23	0.23	0.34	0.34

Sample#	81C-594	81C-595	81C-595G	81C-596	81C-597	81C-601	81C-601G	81C-603	81C-603G	81C-605	81C-606	81C-606G
Material Location	CIP CT25	CIS CT25	CIS CT25	CIP CT30	CIP CT37	CIP CT48	CIP CT48	CIS ² CT56	CIS CT56	CIP CT61	CIS CT62	CIS CT62
Latitude	42° 53.53'	42° 53.50'	42° 53.50'	42° 53.50'	42° 53.50'	42° 53.50'	42° 53.50'	42° 53.50'	42° 53.50'	42° 53.50'	42° 53.50'	42° 53.50'
Longitude	122°11.82'	122°11.82'	122°11.82'	122°11.82'	122°11.82'	122°11.82'	122°11.82'	122°11.82'	122°11.82'	122°11.82'	122°11.82'	122°11.82'
<u>Major Elements</u>												
Pct												
SiO ₂	68.3	55.5	65.7	68.1	68.7	67.6	69.2	51.8	-	67.5	52.8	60.5
Al ₂ O ₃	14.8	18.8	16.5	14.7	15.2	15.0	14.2	19.9	-	14.9	22.1	18.2
Fe ₂ O ₃	2.76	7.37	3.39	2.95	3.08	2.70	1.78	6.15	-	2.91	4.92	4.76
MgO	0.78	3.31	0.98	0.80	0.82	0.84	0.56	5.65	-	0.84	3.72	2.00
CaO	2.18	7.19	3.54	2.21	2.25	2.33	1.74	10.5	-	2.30	10.4	5.76
Na ₂ O	4.86	4.29	5.23	4.99	4.87	5.01	4.88	3.22	-	4.89	3.46	4.85
K ₂ O	2.60	1.00	2.09	2.46	2.68	2.47	2.83	0.64	-	2.45	0.86	1.64
TiO ₂	0.47	1.13	0.57	0.46	0.46	0.48	0.41	1.12	-	0.46	0.81	0.67
P ₂ O ₅	0.09	0.32	0.29	0.10	0.10	0.10	0.10	0.16	-	0.10	0.19	0.35
MnO	0.05	0.09	0.06	0.05	0.06	0.05	0.04	0.07	-	0.05	0.05	0.07
Cl	-	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-	-
LOI	3.07	0.60	1.28	2.74	2.85	2.73	3.17	0.30	-	3.00	0.30	0.67
Loss O	-	-	-	-	-	-	-	-	-	-	-	-
Total	99.96	99.60	99.63	99.56	101.07	99.31	98.91	99.51	-	99.40	99.61	99.47

Trace Elements

Ppm												
Ba	-	354	665	-	-	705	803	235	410	-	340	626
Be	1.6	-	1.8	1.7	1.5	1.8	1.9	-	1.4	-	-	1.5
Co	-	18.3	4.8	-	-	3.3	1.4	26.8	13.3	-	18.2	11.3
Cr	-	13.6	-	-	-	1.6	-	83.6	5.7	-	42.8	5.7
Ce	-	1.1	2.5	-	-	2.9	3.2	0.6	1.0	-	0.7	1.3
Cu	7	24	55	5	9	6	34	40	230	8	34	64
Ga	17	24	20	15	17	18	17	23	21	16	25	22
Hf	-	2.4	4.5	-	-	5.4	6.2	2.3	3.8	-	2.0	3.5
Nb	-	5.9	5.8	-	-	8.2	6.8	4.2	6.0	-	4.0	5.8
Ni	6	19	6	5	5	6	5	81	19	6	46	12
Rb	-	21	43	-	-	54	54	21	21	-	31	37
Sb	-	0.5	0.8	-	-	0.3	0.6	0.6	-	-	0.5	0.2
Sc	-	18.9	6.83	-	-	6.47	5.66	24.9	10.1	-	18.8	7.71
Sr	-	725	421	-	-	405	307	1750	1600	-	1760	1320
Ta	-	0.24	0.39	-	-	0.43	0.48	0.24	0.30	-	0.18	0.29
Th	-	1.8	3.8	-	-	4.7	5.3	1.4	2.8	-	1.7	3.5
U	-	0.6	1.5	-	-	1.9	2.2	-	1.0	-	0.6	1.1
V	30	160	42	28	31	36	25	150	140	40	140	110
Y	-	19	24	-	-	26	24	17	18	-	16	19
Zn	-	75	51	-	-	43	37	81	71	-	50	69
Zr	-	109	181	-	-	222	244	132	180	-	129	177
La	-	11	18	-	-	20	21	15	25	-	15	25
Ce	-	24	37	-	-	39	41	36	54	-	32	51
Nd	-	16	20	-	-	18	21	21	31	-	16	27
Sm	-	3.9	4.6	-	-	4.2	4.7	4.3	5.0	-	3.4	4.6
Eu	-	1.25	1.09	-	-	0.94	0.86	1.28	1.40	-	1.08	1.24
Gd	-	-	4.8	-	-	4.1	4.1	-	3.4	-	2.2	3.9
Tb	-	0.60	0.62	-	-	0.56	0.60	0.41	0.40	-	0.33	0.39
Tm	-	0.23	0.32	-	-	0.35	0.33	0.18	-	-	-	0.18
Yb	-	1.7	2.1	-	-	2.1	2.3	1.0	1.1	-	0.9	1.2
Lu	-	0.26	0.31	-	-	0.32	0.33	0.15	0.18	-	0.13	0.18

Sample#	81C-608	81C-608G	81C-609	81C-609G	81C-611	81C-613	81C-613G	81C-614	81C-614G	81C-616	81C-616G	81C-620
Material Location	CIS2 CT81	CIS CT81	CIS2 CT101	CIS CT101	CIP CL7	CIS2 CL17	CIS CL17	CIP CL19	CIP CL19	CIS2 CL37	CIS CL37	CIS2 CL57
Latitude Longitude	42° 53.50' 122°11.82'	42° 53.50' 122°11.82'	42° 53.50' 122°11.82'	42° 53.50' 122°11.82'	42° 53.64' 122°14.82'	42° 53.64' 122°14.82'	42° 53.64' 122°14.82'	42° 53.64' 122°14.82'	42° 53.64' 122°14.82'	42° 53.64' 122°14.82'	42° 53.64' 122°14.82'	42° 53.64' 122°14.82'
<u>Major Elements</u>												
Pct SiO2	54.9	-	55.3	-	68.1	55.7	64.5	68.1	69.2	58.4	64.7	55.8
Al2O3	18.9	-	19.0	-	15.0	18.1	16.4	15.0	14.5	17.5	16.5	18.5
FeT03	6.76	-	7.09	-	1.22	6.39	3.81	2.78	2.12	5.65	2.94	7.24
MgO	4.72	-	3.70	-	0.89	4.67	1.43	0.78	0.57	3.10	1.18	3.17
CaO	8.78	-	7.84	-	2.24	8.06	4.03	2.24	1.82	6.18	3.86	7.09
Na2O	3.71	-	4.36	-	5.02	3.87	4.97	4.85	4.88	4.49	4.90	4.29
K2O	0.91	-	0.90	-	2.46	1.00	2.05	2.56	2.74	1.56	2.23	1.17
TiO2	1.00	-	1.06	-	0.40	0.94	0.62	0.47	0.41	0.88	0.47	1.02
P2O5	0.21	-	0.28	-	0.11	0.22	0.29	0.11	0.11	0.30	0.41	0.36
MnO	0.09	-	0.09	-	0.06	0.08	0.06	0.05	0.04	0.08	0.06	0.09
Cl	-	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-	-
LOI	0.40	-	0.26	-	2.71	0.63	1.23	2.89	3.24	1.50	2.39	1.24
Loss O	-	-	-	-	-	-	-	-	-	-	-	-
Total	100.38	-	99.88	-	100.28	99.66	99.39	99.83	99.63	99.64	99.64	99.97

PPM												
Ba	334	577	380	730	-	345	609	750	797	574	760	461
Be	-	1.4	1.0	1.9	1.7	-	1.6	1.6	2.0	1.3	1.5	1.2
Co	24.0	10.1	21.2	7.6	-	23.7	8.5	3.0	1.7	15.8	5.5	15.6
Cr	71	11.4	16.7	-	-	74	10.2	-	2.6	8.8	3.1	7.8
Cs	0.8	2.1	1.0	2.0	-	1.0	1.5	2.7	3.1	1.4	2.1	1.2
Cu	39	130	62	110	12	48	54	13	50	26	59	28
Ga	22	20	23	22	18	26	23	15	17	22	18	21
Hf	2.5	4.1	2.1	4.0	-	2.8	4.0	5.5	6.0	3.5	4.5	2.8
Nb	4.8	6.0	5.4	7.0	-	5.5	7.0	7.4	7.9	5.7	6.4	5.2
Ni	68	16	33	12	6	75	12	5	6	29	10	16
Rb	25	43	27	39	-	31	41	47	52	38	50	34
Sb	-	0.5	0.5	0.4	-	0.3	0.3	0.6	0.6	0.4	0.5	0.8
Sc	20.0	8.22	18.5	6.10	-	19.0	6.17	6.27	5.72	12.6	4.62	14.6
Sr	1310	1050	1070	812	-	1380	1000	387	320	1330	996	1140
Ta	0.17	0.32	0.21	0.37	-	0.22	0.31	0.45	0.49	0.32	0.41	0.29
Th	1.7	3.7	1.6	4.0	-	2.2	3.8	4.7	5.1	3.2	4.7	2.4
U	0.7	1.4	0.7	1.4	-	0.9	1.1	1.9	2.1	1.2	1.7	0.9
V	160	85	180	62	38	160	66	29	20	120	40	150
Y	16	21	19	18	-	17	19	25	26	18	19	17
Zn	70	64	73	61	-	68	58	29	63	56	30	65
Zr	127	184	112	175	-	140	200	234	243	178	212	136
La	14	25	13	24	-	17	24	19	21	22	29	18
Ce	31	55	27	48	-	36	50	40	42	46	57	36
Nd	19	27	-	26	-	20	25	24	21	27	28	24
Sm	3.9	4.8	3.9	4.7	-	4.2	4.2	4.5	4.8	4.9	4.6	4.5
Eu	1.19	1.36	1.25	1.21	-	1.24	1.15	0.91	0.90	1.33	1.11	1.33
Gd	2.6	4.7	4.2	3.5	-	3.5	-	4.3	4.6	4.2	3.5	4.2
Tb	0.40	0.49	0.47	0.46	-	0.39	0.38	0.49	0.59	0.45	0.46	0.48
Tm	0.20	-	0.24	0.22	-	-	-	0.34	0.36	0.21	0.23	0.21
Yb	1.2	1.7	1.2	1.6	-	1.1	1.1	2.1	2.3	1.4	1.3	1.4
Lu	0.18	0.25	0.19	0.24	-	0.19	0.18	0.32	0.33	0.21	0.21	0.21

Sample#	81C-620C	81C-621	81C-625	81C-627	81C-631	81C-631C	81C-632	81C-635	81C-637	81C-637G	81C-639	81C-639G
Material Location	CIS CL57	LAV CL	CIP RB1	CIP RB9	CIP RB33	CIP RB33	CIP RB38	CIP RB56	CIS CT78	CIS CT78	CIS ² CT89	CIS CT89
Latitude	42° 53.64'	42° 53.64'	42° 58.78'	42° 58.78'	42° 58.80'	42° 58.80'	42° 58.80'	42° 58.80'	42° 53.47'	42° 53.47'	42° 53.47'	42° 53.47'
Longitude	122°14.82'	122°14.82'	122°23.95'	122°23.95'	122°23.90'	122°23.90'	122°23.85'	122°23.85'	122°11.83'	122°11.83'	122°11.83'	122°11.83'
<u>Major Elements</u>												
Pct												
SiO2	-	47.5	68.0	68.3	67.8	69.9	67.8	67.8	58.8	69.0	54.5	-
Al2O3	-	17.4	15.0	14.8	14.8	14.3	14.9	15.0	17.6	14.4	19.6	-
FeTO3	-	10.80	2.73	2.61	2.81	1.68	2.60	2.82	6.68	1.90	5.99	-
MgO	-	9.74	0.83	0.75	0.79	0.52	0.79	0.83	2.68	0.57	4.05	-
CaO	-	11.1	2.36	2.20	2.27	1.73	2.23	2.35	5.94	2.03	8.82	-
Na2O	-	2.59	5.01	5.03	4.83	4.89	4.86	4.98	4.50	4.91	3.94	-
K2O	-	0.07	2.47	2.54	2.55	2.82	2.56	2.43	1.28	2.70	0.90	-
TiO2	-	1.08	0.46	0.46	0.46	0.41	0.45	0.47	1.04	0.45	1.06	-
P2O5	-	0.11	0.11	0.01	0.11	0.09	0.11	0.11	0.27	0.14	0.22	-
MnO	-	0.19	0.05	0.05	.05	0.03	0.05	0.05	0.10	0.03	0.07	-
Cl	-	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-	-
LOI	-	0.49	2.60	2.61	2.72	3.11	2.90	2.70	1.26	3.14	0.39	-
Less O	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	100.07	99.62	99.36	99.19	99.48	99.25	99.54	100.15	99.27	99.54	-

Trace Elements

ppm	798	80	749	771	461	779	347	598
Ba	1.8	-	1.5	1.6	1.0	1.6	-	1.5
Be	2.9	49.0	3.8	2.0	13.3	1.5	21.7	10.4
Co	2.3	305	1.9	1.9	13.3	3.1	56.5	10.5
Cr	2.3	-	3.2	3.3	1.5	3.3	1.0	2.0
Ca	59	100	13	57	9	53	57	85
Cu	20	18	18	17	20	17	23	23
Ga	4.7	1.7	5.7	6.0	3.0	5.7	2.3	3.5
Hf	7.4	2.4	7.6	7.7	7.2	7.4	5.0	6.5
Nb	7	210	7	4	13	7	58	24
Ni	45	4	48	54	29	58	26	30
Rb	1.2	0.4	0.6	0.8	0.4	0.5	0.5	0.5
Sb	4.56	35.4	6.43	5.61	14.4	6.94	21.2	10.6
Sc	770	315	389	305	618	259	1260	1300
Sr	0.42	-	0.53	0.52	0.33	0.46	0.23	0.30
Ta	4.7	-	4.8	5.0	2.6	5.3	1.3	2.5
Th	1.8	-	1.9	2.0	1.1	2.3	0.6	1.2
U	49	210	31	14	130	29	160	94
V	19	24	25	25	19	24	18	21
Y	37	86	40	37	65	33	68	57
Zn	190	80	225	240	133	231	116	120
Zr	27	3.0	19	21	13	18	12	17
La	54	9.0	41	42	26	37	27	36
Ce	26	-	24	20	16	19	16	21
Nd	5.0	2.9	4.1	4.3	3.5	4.3	4.3	4.3
Sm	1.15	1.06	0.91	0.86	1.04	0.85	1.33	1.31
Eu	4.2	3.2	3.5	4.3	3.5	4.9	4.2	4.2
Gd	0.53	0.68	0.79	0.77	0.52	0.71	0.54	0.58
Tb	0.26	-	-	-	-	-	-	-
Tm	1.6	2.6	2.1	2.2	1.5	2.2	1.4	1.7
Yb	0.25	0.38	0.31	0.33	0.23	0.33	0.22	0.26
Lu								

Sample#	81C-666	81C-667	81C-669	81C-673	82C-674	82C-698	82C-703	82C-714	82C-715	82C-716	82C-718	82C-719
Material Location	BMB WC	BMB WC	PCL WI	PCB WD	LAV SM	CVO CS	LAV LB	PPGs SP	PPGs SP	PPGs SP	PPGs SP	PPGs SP
Latitude	42° 57.30'	42° 57.30'	42° 56.74'	42° 56.57'	42° 46.93'	42° 57.38'	42° 58.34'	42° 59.86'	43° 00.01'	42° 59.82'	42° 59.71'	42° 59.61'
Longitude	122° 10.67'	122° 10.67'	122° 8.91'	122° 7.10'	121° 59.06'	122° 0.42'	121° 55.17'	122° 0.52'	122° 0.44'	122° 0.65'	122° 0.75'	122° 0.83'
<u>Major Elements</u>												
pct												
SiO2	50.9	54.1	58.1	70.6	51.2	68.7	58.2	68.7	69.3	68.3	68.8	68.7
Al2O3	16.4	16.2	18.2	14.5	16.9	15.0	16.6	14.8	14.9	14.8	14.8	14.7
Fe2O3	8.32	7.46	6.73	2.58	8.69	2.76	6.18	2.76	2.73	2.73	2.76	2.74
MgO	8.03	6.78	3.71	0.82	7.30	0.84	4.62	0.76	0.74	0.76	0.71	0.76
CaO	9.69	8.47	6.88	2.24	8.13	2.33	7.21	2.30	2.26	2.29	2.28	2.30
Na2O	3.46	3.65	4.24	4.18	3.32	5.41	3.86	4.97	5.21	4.92	5.19	4.94
K2O	0.87	1.17	1.01	3.19	0.97	2.490	1.353	2.50	2.503	2.53	2.501	2.51
TiO2	1.17	1.06	0.76	0.37	1.15	0.47	0.78	0.47	0.47	0.48	0.48	0.48
P2O5	0.41	0.36	0.21	0.09	0.36	0.12	0.18	0.12	0.11	0.12	0.12	0.12
MnO	0.13	0.11	0.10	0.04	0.13	0.05	0.09	0.05	0.05	0.05	0.05	0.05
Cl	-	-	-	-	-	0.094	-	-	-	-	-	-
F	-	-	-	-	-	0.03	-	-	-	-	-	-
LOI	0.34	0.29	0.10	0.83	1.16	0.75	0.64	0.91	1.59	1.72	1.20	1.21
Loss O	-	-	-	-	-	0.03	-	-	-	-	-	-
Total	99.72	99.65	100.04	99.44	99.31	99.02	99.71	98.34	99.86	98.70	98.95	98.51

Major Elements

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Trace Elements

[illegible]

Sample#	82C-722	82C-723	82C-724	82C-728	82C-728G	82C-729	82C-730	82C-753	82C-754	82C-761	82C-770	82C-771
Material Location	PPGs SP	PPGs SP	PPGs SP	PPGs SP	PPGs SP	PPGs SP	LAV LB	AGL BB	AGL TY	AGL CV	PHOc CW	PHOc CW
Latitude	42° 59.50'	42° 59.39'	42° 59.39'	43° 00.40'	43° 00.40'	43° 00.58'	42° 59.59'	43° 05.38'	43° 05.43'	42° 53.70'	42° 59.24'	42° 59.89'
Longitude	122° 0.93'	122° 1.02'	122° 1.02'	122° 0.20'	122° 0.20'	122° 0.04'	121° 56.66'	121° 51.03'	121° 58.42'	121° 59.92'	122° 3.41'	122° 2.76'
<u>Major Elements</u>												
Pct SiO ₂	68.8	68.4	68.5	68.4	71.1	68.0	52.6	52.3	52.8	60.8	69.8	69.3
Al ₂ O ₃	14.8	14.9	14.7	14.7	14.0	15.0	17.4	17.7	17.6	16.6	14.9	14.9
Fe ₂ O ₃	2.75	2.80	2.74	2.75	2.08	2.74	8.94	7.90	8.31	5.38	2.73	2.83
MgO	0.75	0.76	0.76	0.75	0.49	0.74	6.23	4.14	5.38	3.15	0.74	0.78
CaO	2.28	2.30	2.26	2.22	1.67	2.29	8.51	7.28	8.56	5.61	2.28	2.34
Na ₂ O	4.86	5.01	5.09	5.20	5.46	4.80	3.69	3.69	3.69	4.19	5.31	5.30
K ₂ O	2.55	2.459	2.511	2.529	2.84	2.61	0.681	2.046	1.106	1.592	2.511	2.468
TiO ₂	0.47	0.48	0.47	0.47	0.41	0.47	1.07	1.25	1.21	0.71	0.46	0.48
P ₂ O ₅	0.12	0.12	0.12	0.12	0.09	0.12	0.25	0.62	0.36	0.16	0.12	0.12
MnO	0.05	0.05	0.05	0.05	0.04	0.05	0.14	0.11	0.12	0.08	0.05	0.05
Cl	-	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-	-
LOI	1.35	1.85	1.83	1.51	2.10	1.75	-	2.24	0.78	0.59	0.49	0.44
Loss O	-	-	-	-	-	-	-	-	-	-	-	-
Total	98.78	99.13	99.03	98.70	100.28	98.57	99.51	99.28	99.92	98.86	99.39	99.01

Trace Elements

[illegible]

Sample#	82C-775	82C-776	82C-777	82C-778	82C-779	82C-785	82C-795	82C-796	82C-797	82C-798	82C-799	82C-799G
Material Location	PH1c CW	CDN CW	CDB CW	CDB CW	PHO CW	CGR WG	PPOr RC	CVO WG	CGR CW	CGR CW	CGR CW	CGR1 CW
Latitude	42° 59.89'	42° 58.35'	42° 58.35'	42° 58.35'	43° 00.07'	42° 57.98'	42° 56.88'	42° 57.23'	43° 00.73'	43° 01.25'	42° 59.41'	42° 59.41'
Longitude	122° 2.76'	122° 3.71'	122° 3.71'	122° 3.71'	122° 3.45'	122° 2.44'	122° 2.42'	122° 2.54'	122° 4.08'	122° 3.60'	122° 5.18'	122° 5.18'
<u>Major Elements</u>												
pct												
SiO2	59.4	51.6	49.5	48.7	69.7	65.8	69.3	69.3	66.1	65.7	65.9	74.8
Al2O3	17.6	18.4	18.7	18.8	14.8	15.8	14.8	15.0	15.9	15.7	15.9	12.1
FeTO3	5.24	8.15	10.30	9.35	2.75	3.61	2.76	2.78	3.28	3.63	3.53	2.36
MgO	2.82	6.10	5.30	5.78	0.75	1.41	0.76	0.78	1.35	1.39	1.39	0.23
CaO	5.17	8.98	7.99	10.3	2.23	3.37	2.40	2.31	3.26	3.3	3.44	0.66
Na2O	4.49	3.85	4.43	3.36	5.14	4.97	4.98	5.33	4.99	4.77	5.04	3.88
K2O	1.386	0.368	0.398	0.235	2.526	2.174	2.726	2.493	2.265	2.220	2.213	4.61
TiO2	0.68	0.93	1.43	1.08	0.47	0.54	0.45	0.47	0.52	0.54	0.52	0.58
P2O5	0.35	0.33	0.51	0.30	0.11	0.15	0.11	0.12	0.18	0.17	0.13	-
MnO	0.09	0.14	0.16	0.14	0.05	0.07	0.04	0.05	0.06	0.06	0.06	0.03
Cl	-	-	-	-	-	0.006	-	-	0.042	0.069	0.079	-
F	-	-	-	-	-	0.01	-	-	0.03	0.02	0.03	-
LOI	2.02	0.30	0.33	0.28	0.30	0.59	0.63	0.28	0.68	1.00	0.90	-
Loss 0	-	-	-	-	-	0.01	-	-	0.03	0.02	0.03	-
Total	99.25	99.15	99.05	98.33	99.03	98.49	98.96	98.91	98.63	98.55	99.10	99.25

Sample #	82C-800	82C-800G	82C-803	82C-803G	82C-811	82C-814	82C-816	82C-845	82C-846	82C-847	82C-848	82C-849
Material Location	CGR CW	CGR ¹ CW	PPOb SB	PPOb SB	PPib SB	BMB LC	BMB LC	BMB SB	PLP1 LR3	PLP1 LR8	PLP1 LR25	PLP1 LR30
Latitude	42° 59.41'	42° 59.41'	42° 58.70'	42° 58.70'	42° 58.87'	42° 53.88'	42° 54.40'	42° 58.58'	42° 58.62'	42° 58.63'	42° 58.63'	42° 58.64'
Longitude	122° 5.18'	122° 5.18'	122° 7.18'	122° 7.18'	122° 7.35'	122° 14.40'	122° 13.96'	122° 7.47'	122° 7.51'	122° 7.51'	122° 7.50'	122° 7.50'
<u>Major Elements</u>												
Pct SiO ₂	59.5	74.9	70.2	73.0	59.8	51.9	58.2	52.1	68.8	68.5	67.9	69.0
Al ₂ O ₃	16.8	12.0	14.4	13.3	16.6	16.8	17.2	17.4	14.0	14.5	14.8	14.4
Fe ₂ O ₃	5.71	2.42	2.49	1.76	6.58	8.00	6.72	8.19	2.22	2.44	2.57	2.35
MgO	2.95	0.26	0.62	0.34	2.28	6.86	4.05	6.34	0.51	0.62	0.67	0.57
CaO	4.98	0.73	2.11	1.27	5.19	9.58	6.94	9.47	1.61	1.88	2.03	1.78
Na ₂ O	5.11	3.79	4.94	4.92	4.96	3.57	4.09	3.45	5.22	5.25	5.21	5.24
K ₂ O	1.593	4.50	2.909	3.31	1.369	1.002	1.216	0.746	2.694	2.575	2.498	2.632
TiO ₂	0.71	0.63	0.40	0.25	1.27	1.11	0.84	1.08	0.38	0.42	0.44	0.41
P ₂ O ₅	0.18	-	0.10	0.05	0.25	0.37	0.22	0.24	0.08	0.09	0.10	0.09
MnO	0.13	0.06	0.04	0.03	0.10	0.12	0.11	0.13	0.04	0.05	0.05	0.05
Cl	0.076	-	-	-	-	-	-	-	0.13	-	-	-
F	0.02	-	-	-	-	-	-	-	0.04	-	-	-
LOI	0.94	-	0.26	2.04	0.35	0.31	-	0.59	3.01	2.78	2.83	2.46
Loss O	0.02	-	-	-	-	-	-	-	0.04	-	-	-
Total	98.68	99.29	98.47	100.27	98.75	99.62	99.59	99.74	98.70	99.11	99.10	98.98

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Trace Elements

PPM	527	817	867	506	443	472	766	771	781	788
Ba	1.4	1.6	-	1.2	1.0	-	1.9	2.1	1.9	2.2
Be	14.2	3.7	4.1	12.4	32.7	22.0	2.4	2.8	3.0	2.6
Co	44.6	2.7	-	2.2	206	81.8	-	-	1.6	-
Cr	2.6	4.0	4.8	1.3	0.5	0.6	3.4	3.2	3.1	3.3
Cu	13	16	-	31	100	51	12	12	12	10
Ga	18	20	-	22	20	20	16	17	16	17
Hf	3.6	6.1	6.3	3.3	3.2	3.2	6.3	6.0	5.9	6.0
Nb	4.1	6.8	-	5.1	7.4	5.6	5.9	5.8	5.9	6.1
Ni	25	8	-	6	79	49	5	5	5	4
Rb	32	68	72	31	21	17	53	52	48	55
Sb	-	0.6	0.8	-	-	-	0.5	0.5	0.4	0.5
Sc	14.4	6.63	4.82	18.9	26.6	17.3	6.13	6.20	6.34	6.15
Sr	473	280	164	567	986	601	235	261	294	255
Ta	0.29	0.54	0.63	0.39	0.34	0.36	0.50	0.48	0.45	0.47
Th	2.5	6.1	7.3	2.7	2.8	2.1	5.3	5.0	5.1	5.1
U	1.4	2.5	3.2	1.0	0.8	0.3	2.5	2.3	2.4	2.4
V	83	59	-	95	180	130	20	31	16	18
Y	20	27	26	21	22	19	25	24	25	24
Zn	83	42	34	90	85	72	46	49	45	44
Zr	140	227	227	140	158	156	246	231	232	243
La	15	20	24	15	22	17	21	20	19	21
Ce	32	44	47	29	44	31	42	39	42	41
Nd	18	24	24	19	26	18	23	22	24	23
Sm	4.8	5.1	5.5	4.4	4.7	3.8	5.2	4.9	5.2	5.1
Eu	1.17	0.92	0.81	1.20	1.34	1.08	0.90	0.88	0.94	0.89
Gd	3.8	5.0	-	4.6	3.2	-	4.7	4.4	4.9	4.2
Tb	0.55	0.62	0.73	0.55	0.54	0.48	0.69	0.64	0.63	0.71
Tm	0.33	0.37	-	0.26	0.32	0.28	0.38	0.30	0.38	0.29
Yb	2.1	2.4	2.5	1.8	1.8	1.7	2.3	2.1	2.3	2.4
Lu	0.30	0.36	0.40	0.28	0.27	0.26	0.36	0.35	0.36	0.36

Sample#	82C-850	82C-852	82C-853	82C-854	82C-860	82C-860G	82C-861	82C-861G	82C-862	82C-862G	82C-866	82C-866G
Material Location	PLP1 LR32	LAV TC	LAV TC	LAV DC	CVS LR	CVS LR	CVS LR	CVS LR	CVS LR	CVS LR	CVS LR	CVS LR
Latitude	42° 58.65'	43° 02.64'	43° 02.50'	43° 01.68'	42° 58.37'	42° 58.37'	42° 58.37'	42° 58.37'	42° 58.37'	42° 58.37'	42° 58.37'	42° 58.37'
Longitude	122° 7.50'	122° 5.04'	122° 4.20'	122° 9.65'	122° 8.99'	122° 8.99'	122° 8.99'	122° 8.99'	122° 8.99'	122° 8.99'	122° 8.99'	122° 8.99'
Major Elements												
Pct												
SiO2	68.1	58.2	57.8	53.4	54.4	-	53.7	65.0	55.2	65.4	52.4	62.4
Al2O3	15.0	17.2	17.1	17.5	18.7	-	19.8	16.7	18.9	16.8	9.7	17.4
FeTiO3	2.67	6.59	6.67	8.73	8.38	-	8.06	4.26	7.93	3.86	10.60	4.92
MgO	0.68	4.07	4.08	5.99	4.48	-	3.4	1.22	3.92	1.09	15.2	2.09
CaO	2.14	6.94	6.91	7.96	8.08	-	7.94	3.74	7.57	3.75	8.56	4.60
Na2O	5.32	4.01	3.91	3.94	3.90	-	4.30	5.42	4.27	5.51	2.24	5.30
K2O	2.499	1.206	1.298	0.774	0.627	-	0.694	1.64	0.768	1.76	0.552	1.51
TiO2	0.46	0.85	0.85	1.10	0.81	-	1.11	0.70	1.02	0.70	0.63	0.72
P2O5	0.11	0.30	0.30	0.25	0.30	-	0.46	0.41	0.31	0.33	0.11	0.28
MnO	0.05	0.10	0.11	0.14	0.13	-	0.09	0.08	0.12	0.07	0.16	0.07
Cl	0.110	-	-	-	-	-	-	-	-	-	-	-
F	0.03	-	-	-	-	-	-	-	-	-	-	-
LOI	2.00	0.06	0.60	0.05	0.49	-	0.54	0.91	0.15	0.55	0.30	0.71
Loss 0	0.03	-	-	-	-	-	-	-	-	-	-	-
Total	99.14	99.53	99.63	99.83	100.30	-	100.09	100.08	100.16	99.82	100.44	100.00

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Trace Elements												
ppm												
Ba	781	511	526	294	273	-	303	548	291	609	172	496
Be	2.0	1.1	1.4	-	-	-	-	-	-	-	-	-
Co	3.2	22.2	22.7	33.0	25.4	6.1	23.7	7.9	24.0	6.7	73.4	14.2
Cr	-	99	102	197	40.3	-	11.6	-	23.1	-	555	25.9
Ca	3.0	0.5	0.8	0.4	0.8	2.7	0.8	2.1	0.9	2.2	0.6	1.9
Cu	12	39	60	35	-	-	-	-	-	-	-	-
Ga	18	20	21	21	-	-	-	-	-	-	-	-
Hf	5.8	3.6	3.7	2.8	1.5	4.2	1.7	3.7	1.7	4.0	1.5	3.6
Nb	5.5	7.5	1.3	3.4	2.0	-	2.4	-	2.7	-	2.0	-
Ni	4	54	54	98	-	-	-	-	-	-	-	-
Rb	52	18	22	7	21	-	16	31	18	35	9	32
Sb	0.5	-	-	-	-	-	0.2	0.3	0.2	0.4	-	0.3
Sc	6.43	16.6	16.8	22.9	16.6	7.6	20.0	8.50	17.3	8.61	32.5	10.5
Sr	315	757	750	546	787	-	788	433	748	456	376	556
Ta	0.47	0.48	0.51	0.20	0.12	0.40	0.15	0.35	0.16	0.37	0.11	0.37
Th	4.9	2.1	2.1	1.1	1.3	3.4	1.1	2.8	1.2	2.8	0.9	2.6
U	2.2	0.7	0.9	-	0.5	1.5	0.5	1.4	0.6	1.5	0.4	1.2
V	24	130	130	170	-	-	-	-	-	-	-	-
Y	24	19	23	21	14	-	18	22	18	23	13	20
Zn	48	78	79	85	84	59	76	59	81	61	93	60
Zr	230	170	177	118	85	-	88	155	91	165	65	150
La	21	21	20	11	9	17	10	17	10	17	6	14
Ce	41	39	42	25	17	33	20	34	19	37	14	27
Nd	23	20	23	18	12	20	15	19	14	21	11	16
Sm	5.1	4.5	4.6	4.1	2.7	4.2	3.9	4.5	3.3	4.7	2.9	3.8
Eu	0.95	1.25	1.27	1.27	0.87	1.09	1.21	1.22	1.08	1.23	0.69	1.04
Gd	4.2	3.7	5.3	-	1.2	4.2	4.0	5.6	2.8	-	-	4.9
Tb	0.66	0.57	0.54	0.67	0.34	0.56	0.52	0.60	0.43	0.64	0.37	0.56
Tm	0.35	0.32	0.29	0.34	0.14	-	0.23	-	0.23	-	0.20	-
Yb	2.3	2.0	1.9	2.3	1.1	2.0	1.4	1.8	1.3	1.7	1.1	1.7
Lu	0.35	0.29	0.30	0.34	0.16	0.28	0.21	0.28	0.19	0.31	0.17	0.25

Sample#	82C-867	82C-870	82C-870G	82C-871	82C-871G	82C-874	82C-876	82C-876G	82C-878	82C-878G	82C-879
Material Location	CVS LR	CVS CW	CVS CW	CVS CW	CVS CW	CVS CW	CVS SH	CVS SH	CVS SH	CVS SH	CVS SH
Latitude	42° 58.37'	42° 58.51'	42° 58.51'	42° 58.51'	42° 58.51'	42° 58.51'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'
Longitude	122° 8.99'	122° 4.09'	122° 4.09'	122° 4.09'	122° 4.09'	122° 4.09'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'
Major Elements											
Pct											
SiO2	54.5	53.1	64.2	55.9	67.2	54.7	56.0	66.8	55.9	66.0	55.6
Al2O3	19.2	13.7	17.3	19.3	16.6	19.0	18.9	15.7	18.9	16.5	18.9
FeT03	7.95	8.81	3.96	7.36	3.18	8.07	7.46	2.64	7.64	3.86	7.65
MgO	4.08	11.0	1.43	3.96	0.87	4.02	3.65	0.69	3.60	1.04	3.59
CaO	8.05	8.32	4.29	7.90	3.39	7.89	7.40	2.99	7.54	3.61	7.39
Na2O	4.15	2.96	5.36	3.90	5.28	3.99	4.05	4.88	4.20	5.61	4.32
K2O	0.614	0.615	1.69	0.816	2.08	0.664	0.909	2.47	0.755	1.72	0.784
TiO2	0.90	0.79	0.68	0.84	0.50	1.01	0.89	0.47	1.04	0.69	1.08
P2O5	0.34	0.18	0.29	0.14	0	0.28	0.30	0.31	0.31	0.28	0.33
MnO	0.12	0.14	0.06	0.11	0.06	0.12	0.11	0.04	0.11	0.07	0.11
Cl	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-
LOI	0.26	0.46	0.75	-	0.80	0.65	0.62	2.77	0.29	0.68	0.29
Loss O	-	-	-	-	-	-	-	-	-	-	-
Total	100.16	100.08	100.01	100.23	100.16	100.39	100.29	99.76	100.29	100.06	100.04
Trace Elements											
PPM											
Ba	260	242	584	309	663	297	333	736	323	646	318
Be	-	-	-	-	-	-	-	-	-	-	-
Co	24.2	53.9	10.2	24.0	5.6	24.9	-	5.0	21.0	6.4	22.3
Cr	34.6	349	15.8	28.2	-	27.4	-	-	22.3	-	21.5
Cs	0.7	0.7	2.1	0.9	2.5	1.1	-	2.9	0.9	2.2	0.9
Cu	-	-	-	-	-	-	-	-	-	-	-
Ca	-	-	-	-	-	-	-	-	-	-	-
Hf	1.4	1.7	4.1	1.9	4.5	1.7	-	6.0	1.9	4.1	1.9
Nb	2.3	2.3	-	2.0	-	2.6	-	-	2.6	-	2.8
Ni	-	-	-	-	-	-	-	-	-	-	-
Rb	19	16	32	17	43	21	19	51	18	32	18
Sb	-	0.9	-	0.3	0.3	0.2	-	0.4	0.3	0.4	0.2
Sc	15.9	25.6	9.30	16.5	5.10	16.0	-	6.07	14.6	7.47	17.3
Sr	821	575	526	727	408	785	711	355	752	442	736
Ta	0.12	0.12	0.39	0.16	0.43	0.16	-	0.44	0.17	0.36	0.18
Th	1.0	1.0	3.4	1.3	3.6	1.4	-	5.0	1.4	3.0	1.4
U	0.5	0.5	1.6	0.6	1.8	0.6	-	2.1	0.7	1.6	0.6
V	-	-	-	-	-	-	-	-	-	-	-
Y	13	16	22	16	18	16	18	28	16	22	16
Zn	80	84	66	74	54	82	-	48	74	63	80
Zr	80	81	165	94	192	90	107	243	93	172	96
La	9	8	18	9	17	9	-	18	10	17	10
Ce	18	16	35	17	35	18	-	41	19	34	20
Nd	12	12	-	11	18	12	-	23	13	19	13
Sm	2.9	3.0	4.7	2.5	3.7	2.9	-	5.1	3.0	4.2	3.4
Eu	1.01	0.84	1.18	0.82	0.93	0.90	-	0.99	0.98	1.13	1.05
Gd	3.2	2.0	5.3	2.1	3.8	2.4	-	5.5	2.5	4.3	2.8
Tb	0.38	0.37	0.57	0.32	0.51	0.37	-	0.69	0.37	0.57	0.45
Tm	0.17	0.17	-	0.15	-	0.23	-	-	0.17	-	0.20
Yb	1.1	1.1	1.9	1.2	-	1.1	-	2.3	1.3	2.0	1.4
Lu	0.17	0.17	0.29	0.18	0.26	0.17	-	0.37	0.18	0.28	0.20

Sample#	82C-879C	82C-880	82C-881	82C-882	82C-885	82C-885G	82C-888	82C-888G	82C-889	82C-893	82C-894	82C-896
Material Location	CVS SH	CVS SH	CVS SH	CVS ² SH	CVS SH	CVS SH	CVS SH	CVS SH	CVS ² SH	LAV UC	LAV UC	PPG# GH
Latitude	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 54.70'	42° 56.04'	42° 59.65'
Longitude	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 26.34'	122° 25.27'	122° 6.58'
Major Elements												
Pct												
SiO ₂	66.5	55.7	55.2	54.5	51.3	64.5	54.8	64.9	53.8	47.7	47.4	67.4
Al ₂ O ₃	16.2	19.1	19.1	19.4	18.7	17.1	17.9	17.0	17.0	17.6	17.3	14.7
Fe ₂ O ₃	3.82	7.54	6.71	7.27	10.50	4.41	7.63	3.59	7.84	10.10	10.10	2.51
MgO	1.07	3.69	5.32	4.55	4.68	1.31	5.39	1.18	7.33	9.38	9.51	0.66
CaO	3.30	7.51	8.07	8.45	8.50	3.84	7.79	4.05	8.44	11.3	11.3	2.01
Na ₂ O	5.54	4.16	3.74	3.81	3.98	5.59	3.89	5.19	3.52	2.85	2.82	4.62
K ₂ O	1.73	0.752	0.660	0.672	0.709	1.62	0.856	1.88	0.717	0.103	0.098	2.768
TiO ₂	0.69	0.97	0.73	0.81	1.86	0.70	0.91	0.62	0.86	1.09	1.04	0.40
P ₂ O ₅	0.28	0.29	0.17	0.16	0.13	0.28	0.24	0.28	0.24	0.11	0.10	0.10
MnO	0.08	0.11	0.12	0.10	0.10	0.08	0.11	0.07	0.12	0.16	0.16	0.04
Cl	-	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-	-
LOI	0.90	0.36	0.36	0.22	0.34	0.51	0.56	0.83	0.44	-	-	4.09
Less O	-	-	-	-	-	-	-	-	-	-	-	-
Total	100.11	100.08	100.18	99.94	100.29	99.94	100.08	99.59	100.31	100.39	99.83	99.30

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PPM	82C-879C	82C-880	82C-881	82C-882	82C-885	82C-885G	82C-888	82C-888G	82C-889	82C-893	82C-894	82C-896
Trace Elements	CVS SH	CVS SH	CVS SH	CVS ² SH	CVS SH	CVS SH	CVS SH	CVS SH	CVS ² SH	LAV UC	LAV UC	PPG# GH
Latitude	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 57.10'	42° 54.70'	42° 56.04'	42° 59.65'
Longitude	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 2.49'	122° 26.34'	122° 25.27'	122° 6.58'
Trace Elements												
Ba	643	322	258	-	276	589	316	633	-	54	61	829
Be	-	-	-	-	-	-	-	-	-	-	-	1.6
Co	6.6	-	26.4	-	32.7	8.6	29.6	8.0	-	45.7	47.6	3.4
Cr	-	-	74	-	-	-	92	6.4	-	250	253	1.5
Ca	2.2	-	0.8	-	0.8	2.2	1.0	2.2	-	-	-	3.7
Cu	-	-	-	-	-	-	-	-	-	83	91	16
Ga	-	-	-	-	-	-	-	-	-	21	19	17
Hf	4.1	-	1.6	-	2.0	4.2	2.2	4.3	-	1.6	1.6	5.9
Nb	-	-	1.9	-	4.5	-	3.6	-	-	1.3	2.0	6.5
Ni	-	-	-	-	-	-	-	-	-	160	170	7
Rb	35	16	18	-	12	32	19	38	-	3	3	59
Sb	0.4	-	-	-	-	-	0.3	0.4	-	-	-	0.7
Sc	8.08	-	17.6	-	40.9	10.1	17.9	7.86	-	34.1	35.2	6.50
Sr	408	743	725	-	646	461	803	561	-	294	297	255
Ta	0.41	-	0.14	-	0.17	0.36	0.18	0.36	-	-	-	0.55
Th	3.1	-	1.1	-	1.3	3.2	1.4	3.4	-	-	-	6.2
U	1.7	-	0.5	-	0.5	1.5	0.7	1.7	-	-	-	2.8
V	-	-	-	-	-	-	-	-	-	-	-	38
Y	23	14	14	-	19	25	14	22	-	240	240	24
Zn	60	-	70	-	83	68	75	56	-	22	25	42
Zr	171	90	83	-	89	171	103	184	-	69	76	229
La	17	-	8	-	8	16	9	17	-	3	3	21
Ce	36	-	15	-	17	34	21	37	-	8	9	43
Nd	21	-	11	-	12	22	12	21	-	5	7	24
Sm	4.7	-	2.6	-	3.8	5.0	3.1	4.7	-	2.6	2.5	5.4
Eu	1.21	-	0.88	-	1.11	1.22	0.99	1.10	-	0.95	1.00	0.89
Gd	5.1	-	-	-	4.1	4.3	4.2	4.0	-	3.5	3.6	4.7
Tb	0.62	-	0.37	-	0.53	0.63	0.48	0.58	-	0.58	0.61	0.74
Tm	-	-	0.12	-	-	-	-	-	-	0.36	0.39	0.39
Yb	2.0	-	1.2	-	1.5	2.2	-	1.8	-	2.6	2.6	2.4
Lu	0.31	-	0.17	-	-	0.33	0.21	0.26	-	0.39	0.36	0.37

Sample#	82C-930	82C-938	83C-939	83C-940G	83C-946	83C-947	83C-948	83C-957	83C-980	83C-981	83C-982	83C-983
Material Location	LAV SM	PH11 LR	PCB MC	PCB WD	LAV CL	LAV CL	LAV CL	LAV AP	LAV WB	INT WB	INT WB	INT WB
Latitude	42° 44.03'	42° 58.16'	42° 57.42'	42° 56.57'	42° 54.37'	42° 54.44'	42° 54.21'	42° 52.18'	42° 52.81'	42° 53.14'	42° 53.14'	42° 53.16'
Longitude	121° 58.47'	122° 8.92'	122° 5.64'	122° 7.10'	122° 15.72'	122° 15.66'	122° 15.15'	122° 10.22'	122° 11.15'	122° 12.05'	122° 12.05'	122° 12.05'
<u>Major Elements</u>												
Pct												
SiO2	51.7	52.7	60.3	77.7	53.5	54.1	55.4	55.8	55.9	54.2	53.5	54.2
Al2O3	17.3	15.3	17.7	12.4	18.1	18.9	18.6	17.8	17.6	17.7	18.2	17.9
Fe2O3	8.79	7.64	6.00	0.92	8.77	7.44	7.63	7.37	7.68	8.52	8.53	8.61
MgO	7.00	9.30	3.05	0.12	4.51	4.38	4.11	4.00	4.32	5.00	5.26	4.77
CaO	8.94	7.63	5.97	0.68	8.02	8.12	7.89	7.21	7.22	8.15	8.40	8.16
Na2O	3.60	3.53	4.57	3.63	4.05	4.25	4.06	4.37	4.19	3.99	3.86	3.90
K2O	0.856	1.084	1.357	4.24	1.32	1.210	0.92	1.590	1.324	0.862	0.839	0.944
TiO2	1.16	0.95	0.74	0.18	1.11	1.02	1.01	1.11	1.02	1.17	1.13	1.24
P2O5	0.34	0.25	0.22	-	0.52	0.37	0.27	0.50	0.44	0.29	0.29	0.35
MnO	0.13	0.10	0.09	0.04	0.14	0.11	0.11	0.11	0.13	0.14	0.13	0.13
Cl	-	-	0.050	-	-	-	-	-	-	-	-	-
F	-	-	0.02	-	-	-	-	-	-	-	-	-
LOI	-	0.60	0.30	-	-	0.20	0.13	0.22	0.13	-	0.18	0.15
Loss O	-	-	0.02	-	-	-	-	-	-	-	-	-
Total	99.82	99.08	100.35	99.91	100.04	100.10	100.13	100.08	99.95	100.02	100.32	100.35

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<u>Trace Elements</u>												
PPM												
Ba	420	442	471	-	581	494	350	683	636	392	324	391
Be	-	1.0	-	-	-	-	-	-	-	-	-	-
Co	34.6	45.6	18.6	-	-	24.0	-	22.0	23.1	26.2	28.7	28.3
Cr	192	322	33	-	-	29.7	-	68.5	86.7	70.5	87.2	75
Cs	-	0.7	1.5	-	-	0.3	-	0.5	0.3	0.2	0.4	0.2
Cu	60	16	-	-	-	-	-	-	-	-	-	-
Ga	23	24	-	-	-	-	-	-	-	-	-	-
Hf	2.8	2.5	3.5	-	-	3.0	-	4.0	4.0	2.0	2.9	3.2
Nb	7.1	3.9	4.5	-	-	-	-	-	9.2	-	-	6.4
Ni	130	260	-	-	-	-	-	-	-	-	-	-
Rb	11	22	28	-	19	30	12	29	19	13	10	12
Sb	-	-	0.3	-	-	0.2	-	0.2	-	-	-	-
Sc	23.8	21.4	14.1	-	-	16.7	-	15.5	16.9	21.0	22.3	23.4
Sr	810	1330	-	-	868	1350	823	1370	917	688	701	676
Te	0.42	0.23	0.33	-	-	0.31	-	0.57	0.53	0.26	0.34	0.41
Th	1.6	2.5	2.6	-	-	3.1	-	3.2	2.4	1.2	1.6	1.8
U	0.4	0.8	1.1	-	-	0.7	-	0.9	0.7	0.4	0.5	0.5
V	230	170	-	-	-	-	-	-	-	-	-	-
Y	20	12	18	-	26	22	19	22	22	21	19	20
Zn	90	84	69	-	-	81	-	85	93	81	93	95
Zr	135	131	145	-	160	153	132	203	193	105	128	144
La	17	20	15	-	-	22	-	30	27	13	14	16
Ce	35	42	28	-	-	43	-	60	52	25	30	34
Nd	21	24	17	-	-	25	-	32	30	16	19	23
Sm	4.5	4.3	3.6	-	-	4.5	-	5.8	5.8	3.8	4.3	4.9
Eu	1.34	1.20	1.00	-	-	1.28	-	1.55	1.47	1.31	1.26	1.35
Gd	3.3	3.6	-	-	-	4.0	-	4.5	4.8	2.9	4.1	4.3
Tb	0.54	0.29	0.49	-	-	0.48	-	0.53	0.60	0.55	0.57	0.67
Tm	0.28	0.12	0.20	-	-	0.19	-	0.31	0.18	0.22	0.18	0.31
Yb	1.7	0.6	1.6	-	-	1.3	-	1.8	2.1	1.9	1.9	2.2
Lu	0.27	0.15	0.29	-	-	0.24	-	0.30	0.33	0.32	0.33	0.37

Sample#	83C-984	83C-985	83C-987	83C-995	83C-1006	83C-1007	83C-1008	83C-1009	83C-1010	83C-1012	83C-1013	83C-1013G	83C-1016
Material Location	INT WB	INT WB	LAV CP	CCR CL	INT AP	INT AP	INT AP	INT AP	INT AP	CWP CW	CWP CW	CWP CW	CBD GP
Latitude	42° 53.19' 42° 53.17' 42° 53.04' 42° 54.69' 42° 51.17' 42° 51.11' 42° 51.18' 42° 51.41' 42° 58.73' 42° 58.73' 42° 58.73' 42° 58.73' 42° 53.99'	122° 12.06' 122° 12.03' 122° 14.84' 122° 11.70' 122° 9.84' 122° 9.78' 122° 9.80' 122° 10.01' 122° 5.19' 122° 5.19' 122° 5.19' 122° 7.31'											
Longitude													
Major Elements													
Pct													
SiO ₂	53.5	53.2	53.3	63.8	56.6	57.5	57.0	57.1	57.1	68.1	68.0	70.6	51.2
Al ₂ O ₃	18.2	18.0	18.2	16.1	18.8	18.7	18.7	18.7	18.7	14.7	14.8	14.2	21.9
Fe ₂ O ₃	7.65	8.38	8.59	5.02	6.73	6.53	6.76	6.70	6.70	2.71	2.66	1.62	9.28
MgO	5.31	5.01	4.13	2.26	4.20	4.16	4.17	4.44	4.04	0.77	0.72	0.50	4.29
CaO	8.54	8.33	7.86	4.56	7.17	7.14	7.04	7.31	7.10	2.26	2.28	1.72	8.71
Na ₂ O	3.94	3.87	4.14	4.40	4.11	4.22	4.12	4.18	4.21	4.79	4.68	4.67	3.96
K ₂ O	0.87	0.887	1.315	2.10	0.754	0.761	0.77	0.766	0.787	2.630	2.504	2.71	0.11
TiO ₂	0.95	1.14	1.09	0.75	0.70	0.67	0.72	0.71	0.69	0.47	0.47	0.42	1.16
P ₂ O ₅	0.28	0.39	0.53	0.17	0.18	0.18	0.19	0.18	0.19	0.11	0.11	0.09	0.23
MnO	0.12	0.13	0.15	0.08	0.11	0.10	0.11	0.11	0.11	0.05	0.05	0.04	0.11
Cl	-	-	-	-	-	-	-	-	-	0.084	0.14	-	0.089
F	-	-	-	-	-	-	-	-	-	0.01	0.01	-	0.01
LOI	0.18	0.42	0.33	0.69	0.58	0.17	0.64	0.04	0.46	3.48	3.77	4.15	-
Loss 0	-	-	-	-	-	-	-	-	-	0.01	0.01	-	0.01
Total	99.54	99.76	99.64	99.93	99.93	100.13	100.22	100.24	100.09	100.15	100.18	100.72	101.04

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PPM	356	339	577	263	292	285	286	271	749	756	-	157
Ba	-	-	-	-	-	-	-	-	-	-	-	-
Be	-	-	-	-	-	-	-	-	-	-	-	-
Co	-	27.3	25.8	23.2	22.4	-	23.7	22.7	3.7	3.7	-	28.7
Cr	-	80.7	40.1	53.8	49.4	-	63.2	44.1	1.6	-	-	29.7
Ca	-	0.5	0.3	0.2	0.4	-	0.2	0.5	3.0	3.0	-	-
Cu	-	-	-	-	-	-	-	-	-	-	-	-
Ga	-	-	-	-	-	-	-	-	-	-	-	-
Hf	-	2.8	3.4	2.0	1.9	-	2.0	2.1	5.9	5.9	-	2.5
Nb	-	6.0	-	2.1	1.9	-	2.3	2.0	5.1	5.2	-	4.1
Ni	-	-	-	-	-	-	-	-	-	-	-	-
Rb	16	15	21	19	13	16	20	16	50	48	-	7
Sb	-	-	-	0.2	-	-	-	0.2	0.5	0.5	-	-
Sc	-	22.2	21.4	15.8	15.1	-	15.9	15.1	6.39	6.52	-	25.8
Sr	879	700	811	807	777	776	784	790	386	385	-	951
Ta	-	0.39	0.46	0.15	0.12	-	0.19	0.16	0.49	0.46	-	0.17
Th	-	1.6	1.9	1.1	1.1	-	1.1	1.0	4.8	4.9	-	1.1
U	-	0.5	0.4	0.4	-	-	0.4	0.3	2.0	1.8	-	0.4
V	-	-	-	-	-	-	-	-	-	-	-	-
Y	19	20	24	19	16	17	18	16	24	25	-	15
Zn	-	86	97	78	68	-	77	74	37	33	-	66
Zr	122	131	164	99	98	103	107	103	228	231	-	113
La	-	14	23	9	9	-	10	9	20	20	-	11
Ce	-	30	47	18	18	-	18	19	40	41	-	22
Nd	-	19	27	12	12	-	11	11	20	22	-	16
Sm	-	4.2	5.8	2.8	2.7	-	2.8	2.9	4.3	4.3	-	3.2
Eu	-	1.22	1.57	0.94	0.93	-	0.94	0.96	0.93	0.97	-	1.11
Gd	-	3.6	4.7	2.6	2.6	-	2.8	2.9	4.1	3.8	-	2.5
Tb	-	0.59	0.68	0.38	0.36	-	0.41	0.40	0.63	0.56	-	0.42
Tm	-	0.25	0.26	0.19	0.17	-	0.16	0.18	0.31	0.30	-	0.14
Yb	-	2.1	2.1	1.2	1.2	-	1.3	1.3	2.1	2.2	-	1.3
Lu	-	0.35	0.35	0.23	0.23	-	0.22	0.23	0.34	0.34	-	0.24

Trace Elements

Sample#	83C-1023	83C-1023G	83C-1029	83C-1037	83C-1037G	83C-1038	83C-1038G	83C-1054	83C-1059	83C-1074	83C-1087	83C-1089
Material Location	CGR GP	CGR ¹ GP	LAV CR	CGR CT	CGR ¹ CT	CGR CT	CGR ¹ CT	INT DB	AGL BY	INT AG	AGL SR	AGL BY
Latitude	42° 53.56'	42° 53.56'	42° 51.15'	42° 53.27'	42° 53.27'	42° 53.42'	42° 53.42'	42° 50.64'	42° 48.47'	42° 53.82'	42° 47.93'	42° 48.04'
Longitude	122° 6.77'	122° 6.77'	122° 5.22'	122° 10.46'	122° 10.46'	122° 10.03'	122° 10.03'	121° 56.30'	121° 55.15'	122° 6.07'	121° 59.38'	121° 56.37'
<u>Major Elements</u>												
Pct SiO ₂	67.4	75.2	57.2	68.6	75.9	67.5	75.6	56.7	52.5	56.4	53.7	51.4
Al ₂ O ₃	15.8	11.8	17.1	15.4	11.9	15.7	11.8	18.1	17.6	17.4	18.2	18.3
Fe ₂ O ₃	3.63	2.23	6.64	3.57	1.73	3.68	2.13	7.74	8.09	6.76	8.17	9.41
MgO	1.51	0.24	4.62	1.33	0.16	1.47	0.21	3.72	6.43	4.03	6.01	6.23
CaO	3.40	0.65	7.11	3.86	0.48	3.44	0.54	6.76	9.03	7.64	8.28	8.36
Mn ₂ O	5.11	4.00	4.28	5.00	3.82	5.18	3.93	4.16	3.70	3.71	3.75	3.66
K ₂ O	2.204	4.64	1.431	1.45	4.74	2.01	4.67	1.050	1.040	1.435	0.650	0.563
TiO ₂	0.57	0.49	0.89	0.54	0.40	0.57	0.47	0.99	1.08	0.96	0.95	1.23
P ₂ O ₅	0.13	0.03	0.31	0.12	-	0.14	-	0.24	0.40	0.29	0.17	0.24
MnO	0.05	0.02	0.10	0.07	0.03	0.06	0.04	0.12	0.12	0.10	0.13	0.14
Cl	0.140	-	-	0.027	-	0.075	-	-	-	-	-	-
F	0.04	-	-	0.02	-	0.04	-	-	-	-	-	-
LOI	0.65	-	0.04	0.39	-	0.57	-	0.16	0.40	1.47	0.17	0.79
Less O	0.04	-	-	0.02	-	0.04	-	-	-	-	-	-
Total	100.60	99.30	99.72	100.36	99.18	100.40	99.39	99.94	100.39	100.20	100.18	100.32

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<u>Trace Elements</u>												
Ppm Ba	668	562	541	550	-	666	423	476	643	559	293	274
Be	-	-	-	-	-	-	-	-	-	-	-	-
Co	7.8	4.2	23.3	7.7	-	14.0	4.1	24.2	31.4	21.4	31.4	36.0
Cr	12.8	1.8	86.8	13.6	-	13.3	-	29.1	173	34.4	176	147
Ce	2.5	7.6	0.8	1.7	-	2.4	9.7	0.4	0.4	1.2	0.6	-
Cu	-	-	-	-	-	-	-	-	-	-	-	-
Ga	-	-	-	-	-	-	-	-	-	-	-	-
Hf	5.1	5.8	3.6	4.8	-	5.1	11.1	2.7	3.0	3.8	2.0	2.6
Nb	5.0	-	6.0	6.5	-	6.3	-	3.6	6.2	4.6	2.3	3.5
Ni	-	-	-	-	-	-	-	-	-	-	-	-
Rb	41	116	30	25	-	37	150	22	24	28	10	3
Sb	-	0.2	-	-	-	-	0.3	0.3	-	-	-	-
Sc	9.28	7.42	17.2	8.55	-	8.94	8.40	16.8	22.7	19.6	21.3	23.4
Sr	388	54	980	445	-	387	52	610	1045	870	553	495
Ta	0.43	0.69	0.36	0.43	-	0.39	1.11	0.25	0.36	0.32	0.18	0.24
Th	4.4	8.1	3.0	4.5	-	4.4	15.5	1.3	3.1	3.1	0.8	0.8
U	1.8	3.5	0.7	1.7	-	1.7	6.6	0.6	0.3	1.0	-	0.4
V	-	-	-	-	-	-	-	-	-	-	-	-
Y	25	30	22	19	-	21	43	21	21	17	19	22
Zn	38	40	80	47	-	36	36	82	96	77	77	85
Zr	194	200	164	177	-	189	372	119	150	164	97	119
La	17	22	21	17	-	18	33	12	29	19	8	10
Ce	35	46	40	34	-	35	71	25	56	39	17	20
Nd	19	22	23	19	-	18	34	16	21	25	12	17
Sm	4.2	5.6	4.5	4.0	-	4.2	8.1	3.6	4.6	4.7	3.2	4.1
Eu	0.90	0.50	1.16	0.90	-	0.91	0.44	1.15	1.60	1.25	0.93	1.18
Gd	4.1	-	3.6	4.9	-	4.4	-	2.8	4.9	3.6	3.6	1.4
Tb	0.51	0.82	0.48	0.57	-	0.58	1.16	0.51	0.53	0.52	0.46	0.66
Tm	0.34	-	0.23	0.32	-	0.28	-	0.24	0.22	0.22	0.13	0.07
Yb	2.0	3.1	1.6	1.9	-	2.0	4.6	1.7	1.4	1.6	1.9	2.4
Lu	0.13	0.45	0.30	0.32	-	0.31	0.69	0.30	0.29	0.28	0.29	0.40

Sample#	83C-1092	84C-1107	84C-1123	84C-1141	84C-1142	84C-1143	84C-1164	84C-1165	84C-1166	84C-1169	84C-1171	84C-1172
Material Location	CGR GP	LAV WC	PLP1 RV	RMB RC	LAV RC	LAV BC	CVO AS	CVO AS	CVO AS	CVO AS	PCB WP	PCB MC
Latitude	42° 54.36'	42° 57.37'	42° 55.07'	43° 02.52'	43° 02.33'	43° 02.75'	42° 54.78'	42° 54.78'	42° 54.78'	42° 54.78'	42° 56.83'	42° 57.50'
Longitude	122° 7.41'	122° 12.95'	122° 9.82'	122° 13.67'	122° 13.38'	122° 12.32'	122° 2.98'	122° 2.98'	122° 2.98'	122° 2.98'	122° 7.00'	122° 5.50'
<u>Major Elements</u>												
Pct												
SiO2	59.8	51.2	69.9	53.2	53.8	48.7	71.0	67.0	70.1	71.0	60.0	59.8
Al2O3	16.9	16.3	14.3	16.8	17.0	17.0	14.5	15.9	15.0	14.7	17.4	17.6
Fe2O3	5.75	8.61	2.19	7.71	8.28	10.20	2.43	3.64	2.78	2.50	6.40	6.19
MgO	3.20	8.40	0.47	6.88	6.96	9.18	0.64	1.32	0.72	0.67	2.99	3.15
CaO	5.63	9.96	1.53	8.57	8.47	11.1	1.90	3.62	2.20	2.06	6.05	6.10
Na2O	4.14	3.36	4.95	3.70	3.80	2.95	5.33	4.75	5.31	5.33	4.46	4.45
K2O	1.629	0.84	2.71	0.94	0.74	0.25	2.68	2.51	2.58	2.67	1.31	1.27
TiO2	0.78	1.19	0.36	1.02	0.99	1.17	0.43	0.60	0.47	0.43	0.92	0.75
P2O5	0.18	0.42	0.07	0.31	0.25	0.17	0.09	0.13	0.11	0.09	0.25	0.22
MnO	0.09	0.13	0.05	0.12	0.13	0.17	0.05	0.05	0.05	0.05	0.10	0.10
Cl	0.007	-	-	-	-	-	-	-	-	-	-	-
P	0.03	-	-	-	-	-	-	-	-	-	-	-
LOI	1.50	0.13	3.33	0.91	-	-	0.48	0.51	0.55	0.27	0.35	0.10
Loss O	0.03	-	-	-	-	-	-	-	-	-	-	-
Total	99.61	100.54	99.86	100.16	100.42	100.89	99.53	100.03	99.87	99.77	100.23	99.73

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Sample#	83C-1092	84C-1107	84C-1123	84C-1141	84C-1142	84C-1143	84C-1164	84C-1165	84C-1166	84C-1169	84C-1171	84C-1172
Material Location	CGR GP	LAV WC	PLP1 RV	RMB RC	LAV RC	LAV BC	CVO AS	CVO AS	CVO AS	CVO AS	PCB WP	PCB MC
Latitude	42° 54.36'	42° 57.37'	42° 55.07'	43° 02.52'	43° 02.33'	43° 02.75'	42° 54.78'	42° 54.78'	42° 54.78'	42° 54.78'	42° 56.83'	42° 57.50'
Longitude	122° 7.41'	122° 12.95'	122° 9.82'	122° 13.67'	122° 13.38'	122° 12.32'	122° 2.98'	122° 2.98'	122° 2.98'	122° 2.98'	122° 7.00'	122° 5.50'
<u>Trace Elements</u>												
PPM												
Ba	513	371	787	395	305	102	817	707	768	767	471	458
Be	-	-	-	-	-	-	-	-	-	-	-	-
Co	18.4	37.3	2.2	32.5	34.1	46.9	3.1	7.5	3.7	3.3	17.2	17.9
Cr	45.2	278	-	251	276	326	2.1	10.8	-	-	30.4	34.4
Ce	0.5	0.3	3.4	0.3	-	-	3.3	3.4	3.2	3.2	1.6	1.5
Cu	-	-	-	-	-	-	-	-	-	-	-	-
Ca	-	-	-	-	-	-	-	-	-	-	-	-
Hf	3.6	3.4	6.6	2.7	2.7	2.2	6.4	6.0	6.0	6.1	3.4	3.1
Nb	4.3	8.3	6.5	4.0	3.4	2.7	6.1	6.4	5.4	5.7	4.4	3.3
Ni	-	-	-	-	-	-	-	-	-	-	-	-
Rb	31	16	53	14	11	-	48	52	48	50	30	27
Sb	0.6	-	0.5	-	-	-	0.4	0.5	0.4	0.5	0.3	0.3
Sc	14.2	27.8	5.98	20.7	22.7	38.9	6.11	8.69	6.71	6.14	14.9	14.0
Sr	534	996	229	1127	717	366	324	404	317	356	662	670
Ta	0.34	0.50	0.54	0.24	0.23	0.19	0.51	0.52	0.50	0.49	0.36	0.31
Th	3.2	2.8	5.6	1.7	1.5	0.7	5.4	5.5	5.2	5.2	2.6	2.4
U	1.3	0.8	2.5	0.4	-	0.3	2.3	2.3	2.2	2.2	1.0	0.9
V	-	-	-	-	-	-	-	-	-	-	-	-
Y	17	19	26	16	19	24	26	24	23	23	20	18
Zn	68	86	44	80	71	79	44	54	51	44	66	66
Zr	144	158	251	134	115	94	245	232	228	240	140	141
La	15	22	21	16	12	6	22	20	21	22	15	14
Ce	28	46	43	35	27	16	44	41	43	43	29	28
Nd	16	22	21	18	13	9	21	21	21	20	15	17
Sm	3.6	4.8	4.9	4.0	3.8	3.5	4.7	5.0	4.8	4.7	4.0	3.7
Eu	0.96	1.42	0.89	1.28	1.21	1.21	0.95	1.04	1.02	0.93	1.11	1.10
Gd	-	-	-	-	-	-	-	-	-	-	-	-
Tb	0.50	0.58	0.70	0.50	0.55	0.70	0.60	0.67	0.64	0.63	0.51	0.50
Tm	0.25	-	0.41	-	0.27	-	0.14	0.14	-	-	-	-
Yb	1.8	1.6	2.5	1.7	1.8	2.9	2.3	2.4	2.3	2.4	1.8	1.7
Lu	0.35	0.26	0.38	0.23	0.28	0.45	0.15	0.36	0.36	0.34	0.28	0.25

Sample#	85C-1178	85C-1181	85C-1185	85C-1186	85C-1187	85C-1193	85C-1198	85C-1210	85C-1211	85C-1216	85C-1217	85C-1222
Material Location	CGR CC	INT OB	LAV OB	LAV OB	LAV OB	LAV CC	LAV OB	LAV AF	LAV AF	BMB CR	LAV CR	AGL MR
Latitude	42° 59.90'	43° 01.25'	43° 00.93'	43° 01.06'	43° 00.85'	42° 58.36'	43° 01.07'	42° 49.14'	42° 49.55'	42° 50.27'	42° 50.29'	42° 49.97'
Longitude	122°15.19'	122°14.47'	122°14.65'	122°14.58'	122°14.42'	122°13.43'	122°12.66'	122° 6.00'	122° 6.43'	122° 5.82'	122° 5.38'	122° 0.94'
<u>Major Elements</u>												
Pct												
SiO2	64.7	52.9	53.1	53.5	53.8	52.4	53.9	52.4	57.1	53.3	56.9	53.6
Al2O3	16.2	17.1	17.2	16.9	17.4	16.9	16.3	18.0	18.1	17.4	17.3	17.9
FeT03	4.40	8.20	8.17	8.17	7.95	8.23	7.89	8.95	7.09	7.97	6.75	8.61
MgO	1.63	6.43	6.52	7.20	6.24	6.83	7.80	6.85	3.93	6.35	4.62	6.28
CaO	4.25	9.66	9.62	8.85	9.50	9.47	8.45	8.58	7.31	8.28	7.19	8.61
Na2O	4.59	3.53	3.42	3.55	3.51	3.67	3.69	3.90	4.13	3.84	4.05	3.67
K2O	1.766	1.011	0.904	1.040	0.926	0.968	1.107	0.564	1.068	1.258	1.552	0.663
TiO2	0.68	1.12	1.09	1.03	1.07	1.18	1.00	1.07	0.89	1.03	0.90	0.98
P2O5	0.34	0.24	0.24	0.24	0.22	0.32	0.33	0.20	0.22	0.35	0.28	0.15
MnO	0.07	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.11	0.12	0.10	0.13
Cl	-	-	-	-	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-	-	-	-	-
LOI	1.53	0.34	0.5	0.16	0.1	0.35	0.05	-	0.54	0.55	0.98	0.75
Loss O	-	-	-	-	-	-	-	-	-	-	-	-
Total	100.16	100.65	100.88	100.76	100.84	100.44	100.64	100.64	100.49	100.45	100.62	101.34

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ppm	350	368	397	336	396	429	196	454	548	549	270
Ba											
Be	585				1.3				1.5		
Co	10.1	29.7		29.5	32.2		35.4		30.9		33.4
Cr		153		152	198		145		134		174
Ce	0.8						0.3		0.6		0.6
Cu	16	49		42	65		57		57		69
Ga	21	20		21	23		21		23		21
Hf	4.7	2.8		2.6	3.1		2.2		3.1		1.9
Nb	5.5	3.4		3.4	5.0		2.4		4.6		1.9
Ni	4	67		70	85		150		120		120
Rb	30	13	15	14	20	17	7	16	22	24	11
Sb	0.1										
Sc	5.40	25.2		24.8	25.6		22.1		19.3		22.6
Sr	1240	888	809	857	887	959	650	678	1150	982	539
Ta	0.43	0.22		0.19	0.28		0.17		0.31		0.15
Th	4.4	1.4		1.5	2.2		0.8		2.4		0.8
U	1.3	0.5		0.5	0.6				0.7		0.4
V	77	210		210	190		200		170		180
Y	15	20	20	18	24	19	18	17	19	18	19
Zn	45	76		71	87		72		86		89
Zr	193	136	134	129	158	141	102	132	157	169	94
La	29	14		13	17		8.3		21		7.5
Ce	63	31		27	37		18		40		17
Nd	26	18		16	19		12		22		11
Sm	4.4	4.0		3.8	4.5		3.3		4.6		3.0
Eu	1.23	1.24		1.13	1.34		1.07		1.24		1.01
Gd	3.4			3.6					3.6		
Tb	0.52	0.54		0.52	0.57		0.55		0.57		0.51
Tm											
Yb	1.1	1.7		1.9	1.7		2.0		1.6		1.8
Lu	0.19	0.26		0.22	0.28		0.26		0.25		0.26

Sample#	85C-1229	85C-1230	85C-1231	85C-1234	85C-1236	85C-1239	85C-1241	85C-1267
Material Location	LAV SR	LAV SR	LAV SR	AGL SR	RMB SR	GGR LR	LAV CC	RMB BY
Latitude	42° 49.79'	43° 49.79'	42° 48.87'	42° 48.66'	42° 47.70'	42° 58.44'	42° 58.08'	42° 51.15'
Longitude	121°56.99'	121°56.99'	121°57.83'	122° 0.14'	121°58.70'	122° 8.34'	122°11.26'	121°53.83'
<u>Major Elements</u>								
Pct								
SiO2	58.5	62.2	60.7	51.9	53.9	78.7	52.7	55.4
Al2O3	17.8	16.5	16.6	17.5	17.5	11.4	17.1	18.6
FeT03	7.15	6.57	7.01	9.05	8.59	0.81	8.43	7.67
MgO	2.55	1.91	1.95	6.46	6.61	-	6.82	4.26
CaO	6.70	4.80	4.97	9.11	8.92	0.31	9.49	8.05
Na2O	4.66	5.11	5.07	3.64	3.47	3.96	3.69	3.63
K2O	1.179	1.490	1.411	0.841	0.688	4.410	0.967	0.844
TiO2	1.06	1.03	1.24	1.23	0.84	0.12	1.21	0.93
P2O5	0.20	0.22	0.37	0.33	0.17	-	0.32	0.18
MnO	0.11	0.11	0.13	0.14	0.14	-	0.13	0.11
Cl	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-
LOI	0.1	0.64	0.86	0.7	-	0.78	0.31	0.4
Loss O	-	-	-	-	-	-	-	-
Total	100.01	100.58	100.31	100.90	100.83	100.49	101.17	100.07

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<u>Trace Elements</u>								
PPM								
Ba	446	535	558	381	254	867	380	338
Be	-	-	-	1.1	-	1.5	1.3	-
Co	15.8	-	-	33.3	32.6	0.38	32.6	25.4
Cr	11.6	-	-	161	210	-	192	66
Ce	0.6	-	-	-	0.6	3.3	0.6	0.5
Cu	43	-	-	67	30	3	69	44
Ga	21	-	-	23	19	11	22	22
Hf	2.8	-	-	3.0	2.0	5.4	3.5	2.3
Nb	3.8	-	-	6.3	-	4.2	4.5	2.8
Ni	7	-	-	130	99	-	85	63
Rb	24	30	27	16	16	67	13	19
Sb	0.2	-	-	-	-	0.3	-	-
Sc	19.1	-	-	24.0	24.9	2.23	26.1	20.2
Sr	609	520	535	636	537	26	871	679
Ta	0.28	-	-	0.43	0.16	0.51	0.29	0.24
Th	1.9	-	-	1.4	0.8	6.2	2.3	1.2
U	0.8	-	-	-	-	2.4	0.8	0.5
V	190	-	-	170	190	-	200	170
Y	20	24	34	23	18	21	21	19
Zn	69	-	-	85	83	15	93	75
Zr	125	147	140	148	101	178	156	111
La	12	-	-	16	7.9	17	17	10
Ce	25	-	-	32	17	35	17	21
Nd	15	-	-	18	10	13	21	12
Sm	3.8	-	-	4.5	2.9	3.3	4.6	3.2
Eu	1.17	-	-	1.74	0.96	0.38	1.33	1.03
Gd	3.8	-	-	4.4	-	3.5	4.6	-
Tb	0.55	-	-	0.67	0.47	0.61	0.61	0.47
Tm	-	-	-	-	-	-	-	-
Yb	1.8	-	-	2.2	1.9	2.0	1.9	1.5
Lu	0.29	-	-	0.33	0.27	0.32	0.26	0.23

TARI.F. 2

Control Standards

Standard	Number	Mean	Absolute Std. Deviation	Percent Std. Deviation	Number	Mean	Absolute Std. Deviation	Percent Std. Deviation	Number	Mean	Absolute Std. Deviation	Percent Std. Deviation
			322				336				RLS132	
SiO ₂	6	68.2	0.3	0.4	8	53.4	0.3	0.6	22	75.4	0.3	0.4
Al ₂ O ₃	6	14.8	0.1	0.7	8	18.8	0.2	1.1	22	11.3	0.1	1.3
Fe ₂ O ₃	6	2.6	0.02	0.8	8	6.59	0.06	0.9	22	2.12	0.03	1.4
MgO	6	0.76	0.02	2.6	8	4.94	0.07	1.4	22	0.06	0.01	14
CaO	6	2.21	0.01	0.5	8	9.00	0.07	0.8	22	0.11	0.01	6
Na ₂ O	6	4.77	0.10	2.1	8	3.68	0.07	1.9	22	5.16	0.05	1.0
K ₂ O	6	2.58	0.01	0.4	8	0.94	0.01	1.1	22	4.44	0.04	0.9
TiO ₂	6	0.46	0.01	2.2	8	1.17	0.02	1.7	22	0.19	0.02	9
P ₂ O ₅	6	0.11	0.01	9.1	8	0.25	0.01	4.0	13	0.01	0.01	100
MnO	6	0.05	-	-	8	0.07	-	-	9	0.16	0.01	6
					8	0.45	0.06	13.3	-	-	-	-

Standard	DNC-1				RCM-1
Co	57.0	1.7	3.0	32	0.1
Cr	297	8	2.7	32	0.7
Cs	0.4	0.1	25	32	0.3
Hf	0.9	0.1	11.1	32	0.1
Sb	1.0	0.1	10	28	0.3
Ta	0.14	0.05	36	32	0.04
Th	0.3	0.1	33	32	0.4
U	0.8	0.0	0.0	31	0.5
Zn	70	6	8.6	32	2
Sc	31.0	1.1	3.6	32	0.10
La	3.9	0.2	5.1	31	1
Ce	8.4	0.5	6.0	32	2
Nd	6	2	33	32	1
Sm	1.47	0.08	5.4	31	0.3
Eu	0.55	0.02	3.6	32	0.05
Gd	2.1	0.4	19	31	0.7
Tb	0.37	0.04	11	32	0.03
Tm	0.25	0.07	28	30	0.07
Yb	2.0	0.1	5.0	32	0.2
Lu	0.32	0.02	6.3	32	0.01
					2.8
					8.3
					20
					5.1
					16
					8.5
					7.5
					5.0
					4.4
					4.2
					2.3
					6.1
					9.6
					0.5
					2
					33
					5.2
					14.6
					1.05
					1.5
					5.7
					9.6
					2.9
					2.0
					0.1
					5.0

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