GEOPT6 - AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES - REPORT ON ROUND 6 (OU-3: Nanhoron microgranite) and 6A (CAL-S: CRPG limestone).

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Abstract

Results are presented for round six of the international proficiency testing programme for analytical geochemistry laboratories. Exceptionally, two samples were distributed for round 6 during September 1999 and comprised the regular sample, OU-3 (Nanhoron microgranite) and an 'experimental' sample CAL-S (CRPG limestone). Laboratories were required to analyse samples and report results by 15th December 1999. In the present report an analysis has been undertaken to calculate z-scores so that laboratories can assess the quality of their submitted data. The results presented here draw attention to discrepancies in the reliability of major element determinations at concentration levels approaching the detection limit.

Introduction

GeoPT, the international proficiency testing programme, has now become well-established as a standard procedure for contributing to the quality assessment of data from analytical geochemistry laboratories. The trial involves distributing a sample of established homogeneity to participating laboratories, which are required to analyse the sample using a well-characterised technique or techniques operated under routine analytical conditions. Results are then tabulated by the organisers and z-scores calculated by comparing each analysed result submitted with the consensus value. By examining the magnitude of the z-score, participating laboratories can decide whether the quality of their data is satisfactory in relation to all the other laboratories contributing to the round and choose to take corrective action if this appears justified.

This sixth round was conducted in a similar manner to the first five rounds, full details of which were reported by Thompson et al. (1996, 1998, 1999a,b,c). However, the exceptional feature of the present round was that two proficiency testing samples were distributed: OU-3 (Nanhoron microgranite), which comprised the regular silicate rock proficiency testing sample and CRPG CAL-S, an 'experimental' sample designed to evaluate the success of the scheme in the analysis of limestone matrices. The latter sample (CAL-S) was originally prepared as a candidate reference material by K. Govindaraju, but was not circulated because insufficient laboratories responded to the call for analyses. Inclusion as an 'experimental'

proficiency testing sample offered the additional benefit of providing the CRPG with data for the preliminary characterisation of this sample as a reference material.

This report summarises the specific features of the present round, and presents results from participating laboratories, a listing of consensus values and the derived z-scores, together with a discussion of the overall quality of contributed data for the two samples.

Organisation

Steering Committee for Round 6: M. Thompson (Chair), P.J. Potts (Secretary), J.S. Kane, P.C. Webb and J. Carignan

Sample: (i) The GeoPT6 sample was OU-3 (Nanhoron microgranite) which was collected from Chwarel Nanhoron Quarry (SH 287 330), Inkermann Bridge, Nanhoron, North Wales (UK grid reference SH 287 330) during May 1999. The sample comprised a fresh broken block from floor of quarry and was crushed, split and packaged at the Open University using procedures described in previous rounds.

(ii) The GeoPT6A sample was CAL-S which was prepared as a candidate reference material by K. Govindaraju (1996). This sample was collected from Sorcy, near Nancy and about 300 kg was prepared for distribution in packets of 30 g.

Timetable for GeoPT6:

Distribution of sample: September 1999
Deadline for submission of analytical results:
15th December 1999
Distribution of preliminary report:
March 2000

Analysis of results

OU-3 Nanhoron microgranite

Seventy-six laboratories contributed results to the GeoPT6 round and elemental concentration data submitted by these participating laboratories are listed in Table 1. These results were analysed using 'robust' statistical procedures as described more fully by Thompson et al. (1996) to derive assigned value concentrations [X_a], these being the best estimates of the true composition of this sample. Values, which are listed in Table 2, were assigned for 11 major elements (excepting MgO and P_2O_5) and 40 trace elements. The reason values could not be assigned for other elements were (i) insufficient data, or (ii) unsatisfactory statistical analysis, normally associated with a non-normal distribution of contributed results. For the elements with assigned values, z-scores were calculated for each elemental result submitted by each laboratory using the procedures described previously. Z-score values for OU-3 (Nanhoron microgranite) are listed in Table 3. Briefly, z-scores were calculated from $z = [X - X_a] / H_a$ where X is the contributed result, X_a is the assigned value (see above) and H_a is the target precision. The target precision [H_a] was calculated using a modified form of the Horwitz function, $H_a = 0.01.X_a^{0.8495}$. Note that [X_a] must be expressed as a concentration fraction. Laboratories were required to select whether their submitted data was designed to comply with a 'pure geochemistry' or 'applied geochemistry' fitness-for-purpose criterion. For data designated to meet the pure geochemistry criterion (data quality designated 1), target precision was calculated as above. For data designated to meet the applied geochemistry criteria (data quality designated 2), target precision was calculated from: $H_a' = 0.02.X_a^{0.8495}$. Z-score results in the range $-2<z<2$ were considered to be satisfactory. If the z-score for any element falls outside this range, contributing laboratories are advised to examine their

procedures to ensure that determinations are not subject to unsuspected analytical bias.

CAL-S (CRPG limestone)

A similar analysis was undertaken for CRPG CAL-S. Contributed data from 63 laboratories are listed in Table 4. For this sample, values could only be assigned for 4 major elements (MgO, CaO, CO_2 and LOI) and 23 trace elements, a significant proportion of these being the rare earth elements. These data are listed in Table 5. Results of the z-score calculation are listed in Table 6, with the same advice to contributing laboratories in the assessment of results that fall outside the $-2<z<2$ range.

Laboratories that contributed data to this proficiency testing round are listed in Table 7. Note that in order to preserve anonymity, there is no correspondence between order of entries in this table and the order in which laboratory results are listed in results and z-score tables.

Discussion

A note on the production of charts of results.

In most previous GeoPT rounds, the report has included a comprehensive range of charts to demonstrate the distribution of data for each element assessed, as is normal practice for proficiency tests. However, GeoPT is unique in the large number of analytes covered, and it is, therefore more appropriate to be more selective in the presentation of elemental charts. In fact where z-scores are presented in a GeoPT report, it can be assumed as a matter of course that the results are distributed approximately normally (perhaps with heavy tails and a few outliers). For such elements, there will be sufficient valid results to derive an acceptable consensus, and the majority of the participants will have produced satisfactory results. Consequently there is no difficulty for the individual participant to interpret the z-score, because all of the charts will look similar. Only where the above-mentioned features do not apply is the chart going to be different and, indeed worthy of careful study by participants, in revealing systematic errors that may have a technique-related origin. Examples of charts for elements for which consensus values could not be assigned are shown in Figure 1 (OU-3, Nanhoron microgranite) and Figure 2 (CAL-S, CRPG limestone).

A preliminary comment on results for CAL-S (CRPG limestone)

Broadly the results were disappointing and indicated problems with the methods of analysis used. While some analytes were determined reasonably well (Mg, Ca, CO_2, LOI, Cd, Co, Cr, Cs, Mo, Sr, U, Zn, and the rare earths), the majority of results were unsatisfactory. This poor performance was undoubtedly the result of a combination of low concentrations of the analytes in the test material and unsuitable methods being used for those concentrations.

For the elements determined well, the distributions of results were (a few outliers aside) symmetrical with a well defined robust mean close to the median. The corresponding z-scores showed only a minority of participants falling outside the satisfactory bounds.

The results for the other analytes were all very low compared with silicate rocks and showed a common range of characteristic abnormalities.

(i) A strongly positively skewed frequency distribution of results, sometimes with hints of multimodality.

(ii) A robust mean clearly different from the mode, which makes the determination of a consensus impracticable.

(ii) A very wide distribution of results as judged by the sigma value, so that no matter where the consensus were placed most of the participants would receive an 'unsatisfactory' classification if z-scores were calculated.

This behaviour can be easily seen from the charts in Figure 2. It has been shown to occur when the analytical results are produced by a range of methods with detection limits comparable with or only slightly lower than the concentration present. That could easily have occurred in the present instance if methods suitable for concentrations typically present in silicate rocks were used for the carbonate material under consideration. It might be argued that the problem is not the result of the unsuitability of the analytical methods, but rather the result of an unsuitable fitness-for-purpose criterion (that is, the sigma value). After all, why should a geologist want to determine sodium at a concentration of perhaps 100 ppm with a precision of 4 ppm? Should not a more realistic sigma value be used? Unfortunately this argument does not help. Even if GeoPT adopted a higher sigma value in this instance, the results would not allow the determination of a reliable consensus for use as the assigned value. In fact the results are largely the outcome of random processes, and would not provide any information even if they were by some dubious procedure converted into z-scores.

So the message from this exercise is clear: If geologists really want to determine elements at the concentrations prevailing in this rock then they should use alternative analytical methods.

Overall performance

As an overall guide to the performance of laboratories participating in this round, z-scores are plotted for each element determined by that laboratory using a symbol indicating the degree of compliance with the z-score criterion, for OU-3 in Figure 3 and CAL-S in Figure 4. The symbols used indicate satisfactory results (i.e., $-2<z<+2$), or results that show larger discrepancies from this band of acceptability. These diagrams offer participating laboratories the opportunity to assess rapidly the quality of their data in the GeoPT round. Note that where a laboratory specified results of both data quality 1 and 2, these are plotted in separate columns in these Figures.

Participation in future rounds

The benefit from proficiency testing arises from regular participation. All laboratories are invited to register for future rounds of this proficiency testing programme by contacting the Secretary of the Steering Committee.

Acknowledgments

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Appendix 1

Sample preparation

Approximately 250 sachets of OU-3 (Nanhoron microgranite) were prepared at the Open University using the standard procedures described in reports of previous GeoPT rounds.

CAL-S was distributed as received from the CRPG in 30 g aliquots hermetically sealed in plastic sachets.

Homogeneity testing

(a) OU-3 (Nanhoron microgranite)

Homogeneity testing was based on analysis of duplicate test portions taken from each of 12 packets. These samples were analysed in duplicate by WD-XRF at the Open University for the major elements (SiO_2, Al_2O_3, Fe_2O_3, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5, TiO_2, LOI, Ba, Cr, Ni) on glass discs and the trace elements (As, Ba, Co, Cr, Cu, Ga, Mo, Nb, Ni, Pb, Rb, S, Sc, Sr, Th, U, V, Zn, Zr) on powder pellets, following the procedures described in the GeoPT1 report (Thompson et al. 1996). Results for 12 major/minor and 19 trace elements were analysed using standard analysis of variance (ANOVA) procedures, as described in the GeoPT2 report (Thompson et al. 1998).

The power of the ANOVA test depends on the inherent measurement precision of the individual elements determined and is poorest for those elements whose concentrations approach the method detection limits. For the GeoPT6 homogeneity test, Ba, U, Sc, V, Co, Cu, Ni, As, and S all occurred at concentrations in the detection limit range, and Cr occurred at only a slightly higher concentration. Homogeneity conclusions for these elements were not reached because of the unreliability of the test. Homogeneity is demonstrated most reliably for Rb, Zr, Nb, Ga, and Zn, all present at concentrations >10 times the detection limit. It is also demonstrated for the trace elements Sr, Pb, Th, which occur at concentrations between 5 and 10 times the detection limit.

No significant differences between packets were detected at the 95% confidence level for any of the major/minor oxides.
Detailed results of the homogeneity tests are listed in the table below. The two columns giving the associated probability that the packets are the same are for packets 1-10 and 3-12 respectively, as the software used precludes simultaneous testing involving more than ten packets. See the GeoPT2 report (Thompson et al. 1998) for more details.

Statistical data for the homogeneity testing of OU-3 (Nanhoron microgranite)

Element / oxide	Mean	Std Dev	Probability homogeneous 1-10	3-12	Element / oxide
	% m/m	% m/m			
SiO_2	74.46%	0.20	0.79	0.87	SiO_2
Al_2O_3	10.997	0.03	0.66	0.22	Al_2O_3
Fe_2O_3	3.81	0.012	0.29	0.77	Fe_2O_3
MgO	0.0172	0.006	0.15	0.13	MgO
CaO	0.204	0.0027	0.24	0.86	CaO
Na_2O	3.72	0.017	0.46	0.36	Na_2O
K_2O	4.58	0.017	0.85	0.72	K_2O
MnO	0.091	0.0012	0.09	0.49	MnO
TiO_2	0.224	0.0029	0.58	0.51	TiO_2
P_2O_5	0.0145	0.0014	0.61	0.13	P_2O_5
	$\mu g\ g^{-1}$	$\mu g\ g^{-1}$			
Rb	176.15	1.28	0.83	0.81	Rb
Sr	11.21	0.398	0.05	0.15	Sr
Zr	943	6.2	0.60	0.46	Zr
Nb	81	0.71	0.75	0.75	Nb
Pb	32.8	0.99	0.87	0.71	Pb
Th	24.1	0.95	0.21	0.56	Th
Zn	139	1.66	0.68	0.59	Zn
Ga	31.3	0.76	0.41	0.29	Ga

(b) CAL-S (CRPG limestone)

This sample was prepared as a candidate reference material and preliminary analyses were undertaken by Govindaraju (1996). Full details of a formal homogeneity test are not currently available, but results are listed below for 25 determinations made over a period of 6 months by the CRPG, Nancy, where this sample was used as a quality control sample.

Results from the use of CAL-S as a quality control sample

Data were derived from 25 determinations made over a 6 month period.

	ICP-AES				ICP-MS		
	Conc	**S.D.**	**RSD**		**Conc**	**S.D.**	**RSD**
	% *m/m*	% *m/m*	%		$\mu g\ g^{-1}$	$\mu g\ g^{-1}$	%
SiO_2	0.108	0.134	124.1	Ho	0.024	0.003	12.5
Al_2O_3	0.052	0.029	55.8	La	0.82	0.07	8.5
Fe_2O_3T	0.026	0.011	42.3	Lu	0.01	0.003	30.0
MgO	0.415	0.053	12.8	Mo	0.185	0.047	25.4
CaO	55.89	1.28	2.3	Nb	0.032	0.019	59.4
Na_2O	0.031	0.012	38.7	Nd	0.375	0.074	19.7
K_2O	0.06	0.062	103.3	Ni	5	5	100.0
TiO_2	0.02	0	0.0	Pb	0.905	0.325	35.9
Total	99.95	1.32	1.3	Pr	0.092	0.016	17.4
				Rb	0.897	0.579	64.5
		ICP-MS		Sb	0.062	0.033	53.2
	conc.	**S.D.**	**RSD**	Sm	0.058	0.025	43.1
	$\mu g\ g^{-1}$	$\mu g\ g^{-1}$	%	Sn	0.124	0.071	57.3
As	0.347	0.16	46.1	Sr	249	11	4.4
Ba	2.26	4.78	211.5	Ta	0.003	0.002	66.7
Be	0.059	0.079	133.9	Tb	0.013	0.003	23.1
Bi	0.007	0.008	114.3	Th	0.022	0.025	113.6
Cd	0.453	0.65	143.5	Tl	0.111	0.078	70.3
Ce	0.347	0.097	28.0	Tm	0.011	0.003	27.3
Co	0.665	0.225	33.8	U	0.727	0.053	7.3
Cr	3.9	1	25.6	V	2.5	0.59	23.6
Cs	0.133	0.125	94.0	W	0.21	0.24	114.3
Cu	3.4	5.2	152.9	Y	1.95	0.08	4.1
Dy	0.092	0.02	21.7	Yb	0.062	0.014	22.6
Er	0.072	0.012	16.7	Zn	15.44	2.89	18.7
Eu	0.018	0.008	44.4	Zr	1.36	1.18	86.8
Ga	0.08	0.034	42.5	In	0.05	0.02	40.0
Gd	0.095	0.021	22.1	Ge	0.008	0.009	112.5
Hf	0.031	0.024	77.4				

Results from Jean Carignan, CRPG, Nancy.

Table 1 Results submitted for OU-3 (Nanhoron microgranite)

Table 1

Results submitted in the GeoPT6 round for the analysis of OU-3 (Nanhoron microgranite)

Round identifier		F1	F2	F2	F3	F4	F5	F6	F7	F8	F9	F9	F10	F11	F11	F12	F13	F15	F15	F16	F17	F18	F19	F20	F21
Sample		OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes		A,M	X	X	X	X	M, X, W	W, X	G, M,X	X	X	X	X	X	X	A, M	AA, A, G, W	M	M	I	X	M, X, AA, G	X, W	X	I
Data quality:		2	1	2	2	1	1	2	1	2	1	2	2	1	2	2	1	1	2	2	2	1	1	1	1
SiO_2	% m/m	74.6	74.3		74.42	74.28	73.16	74.69	74.25	73.1	71.5		73.84	76.09		71.46	74.27				77.01	74.2	73.65	74.82	
TiO_2	% m/m	0.23	0.218		0.23	0.24	0.23	0.22	0.22		0.22		0.23	0.23		0.22	0.22					0.226	0.229	0.231	
Al_2O_3	% m/m	11.05	10.95		11.22	10.91	11.23	11.08	11.16	17.1	12.43		11.22	11.39		10.68	11.27				11.77	11.18	11.16	11.05	
Fe_2O_3T	% m/m	4.0	3.821		3.78	3.97	3.79	4.009	3.81	3.63	3.95		3.91	3.84		3.81	3.81			3.89	3.68	3.85	3.868	3.886	3.66
Fe(II)O	% m/m						3.28										3.40						3.31		
MnO	% m/m	0.085	0.091		0.090	0.07	0.16	0.08	0.09	0.09	0.09		0.092	0.095		0.084	0.092				0.092	0.086	0.091	0.09	
MgO	% m/m	0.03	0.017		0.03		0.03		0.1		0.075		0.02			0.021	0.021					0.017	0.027	0.017	
CaO	% m/m	0.20	0.210		0.22	0.19	0.20	0.21	0.19	0.34	0.46		0.22	0.238		0.25	0.20				0.26	0.189	0.202	0.212	
Na_2O	% m/m	3.58	3.683		3.64	3.76	3.60	3.76	3.61	3.90	4.52		3.74	3.82		3.563	3.67			3.76	4.15	3.86	3.7	3.695	3.48
K_2O	% m/m	4.47	4.583		4.65	4.37	4.59	4.38	4.57	4.47	4.56		4.51	4.49		4.471	4.50			1.94	4.57	4.3	4.56	4.601	
P_2O_5	% m/m	0.01	0.015		0.017	0.005	0.01	0.08	0.014	0.005			0.011	0.1			0.004					0.005	0.118	0.01	
H_2O^+	% m/m																0.17					0.09			
CO_2	% m/m																1.91					1.9			
LOI	% m/m	1.76	1.87		1.60	1.77		1.80	1.79			1.76	1.94	1.76			1.93					1.69	1.75	1.735	
Ag	mg kg^{-1}						0.3																		
As	mg kg^{-1}			2		3	3.7			5.80	2.2		3		6					3.7					0.02
Au	mg kg^{-1}																							2.52	3
B	mg kg^{-1}																					0.002			4E-04
Ba	mg kg^{-1}	26.4	30		15	27	10		29.4	130	19		48					27.7			130	23.7	23.5	29.1	31.7
Be	mg kg^{-1}						10.4		10.9							10.99	10					10.2			
Bi	mg kg^{-1}						0.2																		
Br	mg kg^{-1}																								
Cd	mg kg^{-1}										0.4														0.72
Ce	mg kg^{-1}	198.0			228	195	197.9		190		187.3		239			196.5		198				170	223.7		194
Cl	mg kg^{-1}				60																	149			
Co	mg kg^{-1}	0.3		3		8			0.32	1.00		59.8	7				1			1.1				3.65	0.33
Cr	mg kg^{-1}	27.0		15	7	19	16		20.8	12.0	22		15			18.9				35.2		14.5	28.1	11.15	15
Cs	mg kg^{-1}	0.66					0.7		0.67									0.669		0.60		0.58			0.61
Cu	mg kg^{-1}	6.0		4			6		3.3	3.2	1.7				21	3.2	3						4.1	1.14	
Dy	mg kg^{-1}	19.4					18.01		17.6							20.28		19.9				17.7			
Er	mg kg^{-1}	11.0					11.15		10.8							12.41		12.0				10.4			
Eu	mg kg^{-1}	1.20					1.19		1.056							1.21		1.18		0.77		1.02			1.14
F	mg kg^{-1}				1200		1370	1181																	
Ga	mg kg^{-1}		31		35	32	33.2		32.4		33.4		32	33		32.63						31			
Gd	mg kg^{-1}	17.4					18.84		16.1							17.48		18.6				15.8			
Ge	mg kg^{-1}				1.2		2.1				1.3											1.84			
Hf	mg kg^{-1}	22.1			17				21		22.4		22			23.05			25.1	24.6		19.2			23.4
Hg	mg kg^{-1}																								
Ho	mg kg^{-1}	4.10					3.72		3.68							4.54		4.07				3.5			
I	mg kg^{-1}																								
In	mg kg^{-1}																								
Ir	mg kg^{-1}																								
La	mg kg^{-1}	95.3			107	91	94.7		90		81.1		103			90.5		92.1		99.2		86.12	125.2		86.3
Li	mg kg^{-1}						1		1.5								1								

T e 1 Results submitted for OU-3 (Nanhoron microgranit

Round identifier		F1	F2	F2	F3	F4	F5	F6	F7	F8	F9	F9	F10	F11	F11	F12	F13	F15	F15	F16	F17	F18	F19	F20	F21
Sample		OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Lu	mg kg^{-1}	1.69					1.59		1.49																
Mo	mg kg^{-1}	1.9		4	2	2.6	1.9		1.92		1.4					1.68		1.68		1.75		1.37			
N	mg kg^{-1}																					1.95		2.72	2.3
Nb	mg kg^{-1}	77.0	82.7		61	88	81.0		83.5		77.2		77	85		75.03									
Nd	mg kg^{-1}	86.5			94	89	87.8		88.1		71.5					87		86.6		91.8		67.8	80.8	79.45	
Ni	mg kg^{-1}	2.0	1			2	3		2.9	25.0					9		3					72.4			88
Os	mg kg^{-1}																						4.2	1.23	0.9
Pb	mg kg^{-1}	39.0	33		31	36	36.5		34	31.0	32.2		34	33			35		38.8			38	32.6	32.57	
Pd	mg kg^{-1}																								
Pr	mg kg^{-1}	23.4			8		23.3		23.2		10.5					22.91		24.1				20.9			
Pt	mg kg^{-1}																								
Rb	mg kg^{-1}	170.0	177.1		184		176		171		170.1		168	166		183.1	176	174		178	165	149	174.3	168.3	160
Re	mg kg^{-1}																								
Rh	mg kg^{-1}																								
Ru	mg kg^{-1}																								
S	mg kg^{-1}			27			60			100.0		14.1													
Sb	mg kg^{-1}	0.33					0.4		0.32		0.4														
Sc	mg kg^{-1}	0.3		0			1		1.3											0.34		0.3			0.35
Se	mg kg^{-1}																			0.52		0.85			0.75
Sm	mg kg^{-1}	18.6			6		18.82		17.2		41					18.82		18.3		12.6					
Sn	mg kg^{-1}	11.3			23		6.0		12.5		12.2									19.27		16			18.1
Sr	mg kg^{-1}	10.0	11.3		6	8	14		10.5	16.0	11.3		10		10	8.64	14	11.2				9.44			
Ta	mg kg^{-1}	5.9			13		6.0		5.04		11		4			5.79				6.5		9.92	12.2	14.69	9
Tb	mg kg^{-1}	3.15					3.35		2.83							3.13		3.15		3.32		4.46			6.03
Te	mg kg^{-1}																					2.77			2.76
Th	mg kg^{-1}	23.5		24	27	27	23.0		22.8		35.5		28	19		22.23		22.9		25.46		19.7		21.43	22.1
Tl	mg kg^{-1}				1.2				0.61		1.4														
Tm	mg kg^{-1}	1.91																1.82				1.54			
U	mg kg^{-1}	5.4		0	6	5	5.7		5.5		5.5		6		6	5.08		5.48		5.76		4.86			5.33
V	mg kg^{-1}	0.5		4		5	4		1.1	20.0	4.7											0.87		3.49	
W	mg kg^{-1}	1.38							8.1		4.5														1.1
Y	mg kg^{-1}	109.0	121.9		97	134	111.7		108		118.2		105	117		125.7		110				103	111.7	113.6	
Yb	mg kg^{-1}	11.0					10.93		10.33		15.2					11.9		11.6		12.42		10.1			11.7
Zn	mg kg^{-1}	141.0	139		150	137	140		136	170.0	146		137	141		181.5	162					156	144	140.3	132
Zr	mg kg^{-1}	975.0	953		983	1037	914		970		1000		952	905		944.8			1047	1157	795	881	976.3	906.4	918

Technique codes: A=ICP-AES, AA=AAS, D=DCP-AES, E=emission spectrometry, G=gravimetric, I=INAA, IR=infra red detection, IS=ion selective electrodes, M=ICP-MS, O=other, T=titrimetry, V=volumetric, W=wet chemistry, X=XRF.

Table 1 Results submitted for OU-3 (Nanhoron microgranite)

Round identifier		F22	F22	F23	F24	F25	F26	F26	F27	F28	F29	F30	F31	F31	F32	F32	F33	F34	F34	F35	F35	F36	F37	F38	F39
Sample		OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes		X, AA	X, AA	X	A, I, AA,	A,M	X	X	X	X	X, T	X	G	AA, M	X	X	A, M, O	I	I	X	X	I, A, V, SI,	X, M	M	A, X
Data quality:		1	2	2	2	2	1	2	1	1	2	1	1	2	1	2	2	1	2	1	2	2	2	2	1
SiO_2	% m/m	73.97		75.3	73.4	73.97	74.86		74.00	74.45	74.31	74.55	71.02		74.7		73.23			73.91		74.3	74.7		74.12
TiO_2	% m/m	0.22		0.23	0.22	0.22	0.22		0.2220	0.219	0.23	0.21		0.242	0.22		0.23			0.21		0.22	0.23	0.23	0.227
Al_2O_3	% m/m	11.04		11.6	11.2	10.92	10.97		11.04	11.120	10.95	10.60	11.25		11.2		11.19			11.2		11.1	11.1		10.99
Fe_2O_3T	% m/m	3.74		4.06	3.72	3.89	3.77		3.840	3.84	3.87	4.21		3.00	3.83		4.20		3.675	3.725		3.95	3.81		3.86
Fe(II)O	% m/m	3.34			3.22						3.21						3.14					3.3			3.38
MnO	% m/m	0.1		0.1	0.09	0.09	0.09		0.0900	0.09	0.095	0.10		0.077	0.095		0.09			0.096		0.094	0.092	0.09	0.091
MgO	% m/m	0.06		0.05		0.03			0.030	0.05	0.03	0.03		0.56	0.08		0.02			0.025		0.024	0.065	0.03	0.02
CaO	% m/m	0.2		0.09	0.09	0.26	0.25		0.194	0.19	0.23	0.18			0.23		0.20			0.2		0.21	0.23		0.2
Na_2O	% m/m	3.76		3.81	3.73	3.59	3.35		3.680	3.54	3.66	3.66		4.04	3.70		3.53		3.729	3.69		3.75	3.61		3.72
K_2O	% m/m	4.6		4.48	4.51	4.37	4.52		4.561	4.56	4.59	4.56		1.38	4.72		4.47			4.53		4.55	4.52		4.52
P_2O_5	% m/m	0.02		0.11					0.0130	0.005	0.02	0.00				0.01				0.003				0.02	0.014
H_2O^+	% m/m									0.12							0.14								0.22
CO_2	% m/m																1.94					1.9			1.9
LOI	% m/m	1.64		2.01	1.82	1.87	1.8			1.70	1.82		1.84		1.83		1.79			1.838		1.77	1.81		1.81
Ag	mg kg^{-1}																								
As	mg kg^{-1}				3.3												0.04								
Au	mg kg^{-1}																3.66		2.872			1.4			
B	mg kg^{-1}																								
Ba	mg kg^{-1}					30.5	23		30.0		50			81.9	39		7.8								
Be	mg kg^{-1}				10												28.2			43		28	27	42.5	27.1
Bi	mg kg^{-1}																11.9					11.1	10.3		
Br	mg kg^{-1}																0.20					0.15			
Cd	mg kg^{-1}																								
Ce	mg kg^{-1}				180	228		164			201			189.8	208		0.51					0.2	0.89	0.6	
Cl	mg kg^{-1}																209	191.2		172		205	219	187.2	
Co	mg kg^{-1}									2.3				10.08			99				65		100		
Cr	mg kg^{-1}		43				12		17.0	15	20	17		6.53	22		0.32			0		0.2	0.29	0.44	
Cs	mg kg^{-1}				0.5	0.7								0.66			21.9		27.51	9.5		21	22	20	
Cu	mg kg^{-1}		5		18					2.8		1		18.80			0.90					0.69		0.653	
Dy	mg kg^{-1}				13	20.5								15.69						0		3	3.1		
Er	mg kg^{-1}					12.7								11.66			18.7					20.7	17	19	
Eu	mg kg^{-1}					1.5								1.01			11.0					12	10	11.24	
F	mg kg^{-1}																1.19	1.131				1.3	1.24	1.188	
Ga	mg kg^{-1}				33	34	31		30.0		31			13.35	31	650	1100					1000	1500		
Gd	mg kg^{-1}					20.7								15.5			38.1			33		33	34	31.74	
Ge	mg kg^{-1}																18.1					17.5	22	18.29	
Hf	mg kg^{-1}				21	24		18									1.39					1.5	1.5		
Hg	mg kg^{-1}													113.3	19		22.8		22.57			23.5	21		
Ho	mg kg^{-1}				5.6	4.2											0.005								
I	mg kg^{-1}													3.57			3.89	4.371				4.3	3.61	3.962	
In	mg kg^{-1}																								
Ir	mg kg^{-1}																0.17					0.15			
La	mg kg^{-1}				98	105.5		116			93			82.3	90		100	93.83		92.5		98	104	95.59	
Li	mg kg^{-1}				2												1.5					1.4	1.72		

T. _ 1 Results submitted for OU-3 (Nanhoron microgranit_

Round identifier		F22	F22	F23	F24	F25	F26	F26	F27	F28	F29	F30	F31	F31	F32	F32	F33	F34	F34	F35	F35	F36	F37	F38	F39
Sample		OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Lu	mg kg^{-1}				1.7	1.8								1.17			1.59	1.731				1.7	1.59	1.578	
Mo	mg kg^{-1}				2		3			1.0							1.57		5.65			1.6	2.2	2	
N	mg kg^{-1}																								
Nb	mg kg^{-1}				77	79	83		78.6	84	75			70.8	70		82.2			71.5		90.5	67	64.04	
Nd	mg kg^{-1}				59	86		99			87			86.04	88		89.3	87.67				88	99	88.24	
Ni	mg kg^{-1}		0		3							3		9.41						0			1.6		
Os	mg kg^{-1}																								
Pb	mg kg^{-1}				59	30	35		36.0	34	34			37.26	29		36.5			41.5		38	41	40.75	
Pd	mg kg^{-1}																								
Pr	mg kg^{-1}				23	22.7								23.72	18		23.6					24.5	26	22.6	
Pt	mg kg^{-1}																								
Rb	mg kg^{-1}		149		181	177.5	173		175.0	172	175	176		176.1	168		195		173.1	174		178	181	169.3	
Re	mg kg^{-1}																								
Rh	mg kg^{-1}																								
Ru	mg kg^{-1}																								
S	mg kg^{-1}																				10		41		
Sb	mg kg^{-1}				0.3												0.31		0.279			0.26	0.28		
Sc	mg kg^{-1}				0.5							0							0.428				0.37		
Se	mg kg^{-1}																								
Sm	mg kg^{-1}				20	19.2								18.43	19		18.6	19.22				19.5	19.9	18.22	
Sn	mg kg^{-1}					6									16		13.0					12	6.3	10.7	
Sr	mg kg^{-1}		44		15	14.8	10		12.0	10.6	12	11		11.63	17		11.0			12		11.5	10.7	11.22	
Ta	mg kg^{-1}					6								1.57			6.35		5.773			7	4.8	5.76	
Tb	mg kg^{-1}				0.8	3.4								2.79			2.85	2.881				3.1	2.8	2.971	
Te	mg kg^{-1}																						0.17		
Th	mg kg^{-1}				22	22	23			22	17				31		22.4		21.96			24.5	25	23.03	
Tl	mg kg^{-1}																					0.74	0.66		
Tm	mg kg^{-1}				1.4	1.9								2.79			1.76					1.9	1.62	1.689	
U	mg kg^{-1}				4.9	5	6			6.2	5				9		5.55		5.333			6	5.7	5.39	
V	mg kg^{-1}		21		9		5				7	3		24.05						4			8.9		
W	mg kg^{-1}						7										1.26					1	1.4	1.03	
Y	mg kg^{-1}				118	114	117		115.0	116	121	119		105.3	113		113			107		115	85	117.5	
Yb	mg kg^{-1}				13	12.5								11.05			10.7	11.57				11.5	10.6	10.69	
Zn	mg kg^{-1}		150		156	140	139		157.0	141	156	147		169.5	160		166		157.5	150.5		155	142	142	
Zr	mg kg^{-1}				895	873	994		910.0	1001	972	1051			890		858		1017	920		910	959	920.4	

Table 1 Results submitted for OU-3 (Nanhoron microgranite)

Round identifier		F39	F40	F41	F42	F43	F43	F44	F45	F45	F46	F47	F48	F49	F49	F50	F51	F52	F53	F54	F55	F56	F57	F57	F58
Sample		OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes		A, X	A, M, X	A, AA, T	A, X, W	D, E, AA, M	D, E, AA, M	X	A, AA	A, AA	W, AA, G,	A, X, AA	X, M	X	X	M	X	X	X	X, A, M, W	X, AA	X	M	M	X
Data quality:		2	2	1	2	1	2	1	1	2	1	2	2	1	2	1	2	1	2	2	2	2	1	2	1
SiO_2	% m/m		73.69	74	75.99	74.30		72.60			73.30	74.24	73.49	74.08			74.41	74.89	73.96	74.55		73.4			73.9
TiO_2	% m/m		0.222	0.22	0.115	0.239		0.25	0.11		0.24	0.207	0.22	0.22			0.24	0.22	0.234	0.23		0.23		0.22	0.23
Al_2O_3	% m/m		11.15	11	10.65	11.16		11.16	10.0		10.00	11.2	11.07	11.11			11.19	11.18	11	11.5		11.0			11
Fe_2O_3T	% m/m		4.009	3.83	3.676	3.88		4.02	3.95			3.82	3.82	4.02			3.9	3.74	3.74	3.85		3.85			3.83
Fe(II)O	% m/m			3.1							3.36	3.28													
MnO	% m/m		0.098	0.09	0.084		0.089	0.123	0.082		0.09	0.094	0.09	0.09			0.092	0.093	0.089	0.09		0.09		0.048	0.09
MgO	% m/m		0.025	0.14	0.014		0.053	0.02	0.02		0.017	0.01		0				0.01							0.02
CaO	% m/m		0.2	0.38	0.064	0.154		0.32	0.15		0.10	0.2	0.17	0.21			0.23	0.22	0.173	0.2		0.19			0.2
Na_2O	% m/m		7.306	3.66	3.492	3.67		4.56	3.70		3.67	3.58	3.64	3.71			3.62	3.66	3.665	3.6		3.50			3.69
K_2O	% m/m		4.618	4.53	4.213	4.48		4.67	4.2		4.37	4.75	4.6	4.56			4.57	4.54	4.649	4.5		4.55			4.55
P_2O_5	% m/m		0.003	0.02			0.014	0.03			0.25	0.02		0.01			0.006	0.026		0.0171					0.01
H_2O^+	% m/m																								
CO_2	% m/m																			2.2					
LOI	% m/m		2.181	2.17	1.804		1.83	1.83			2.00	1.78	1.76		1.8		1.74	1.88	1.85	1.98					
Ag	mg kg^{-1}						0.27		0.2				1.8												
As	mg kg^{-1}						4.0					<0,4							6		7.1				
Au	mg kg^{-1}								0.032		0.0065														
B	mg kg^{-1}						13.0					12													
Ba	mg kg^{-1}		23	31			21		25				24.2	3		27		36		29		30.	34.1		
Be	mg kg^{-1}	12.1					12.5					10.5	9.72							11					
Bi	mg kg^{-1}																							0.19	
Br	mg kg^{-1}																								
Cd	mg kg^{-1}						0.36		0.5			<0,5	0.277								0.35				
Ce	mg kg^{-1}	186.4	190			166						227	175.9		188	190.5		236		196		160.	175		
Cl	mg kg^{-1}																			230					
Co	mg kg^{-1}	2.4		2					2.1			<1	0.26					1	1		0.46			0.55	
Cr	mg kg^{-1}	15.7		42			17	5.2	10			17	13.9	17				19	16	14		20.	23.7		40
Cs	mg kg^{-1}						0.61						0.66			0.66				1.1				0.37	
Cu	mg kg^{-1}	3		4			6		2			4.5	1.9	1					6				4.18		4
Dy	mg kg^{-1}	20.9	18.5			18.3						16.8	18.15			22.41				18.1			17.4		
Er	mg kg^{-1}	12	10.5			11.4						10.1	10.91			12.7				11.7			10.8		
Eu	mg kg^{-1}	1.4	1.1			1.18						1.14	1.04			1.24				1.1			1.02		
F	mg kg^{-1}						1120													1100					
Ga	mg kg^{-1}	30										31	32.5	31				31		32			32.3		32
Gd	mg kg^{-1}	18.7	18.5			19.6						16.9	16.13			19.56				19			16.3		
Ge	mg kg^{-1}					1.1							1.7							2					
Hf	mg kg^{-1}						15.8						23.97			23.33				23.9			23.8		22
Hg	mg kg^{-1}						0.035		0.0228			<0,01													
Ho	mg kg^{-1}	4	3.6			3.78						4.2	3.702			4.59				3.6			3.86		
I	mg kg^{-1}												0.4												
In	mg kg^{-1}																								
Ir	mg kg^{-1}																								
La	mg kg^{-1}	90.8	90.5			96.1						108	82.24		88	96.55				84		90.	80.8		
Li	mg kg^{-1}	1				2			1.0			<1	1.39												

T e 1 Results submitted for OU-3 (Nanhoron microgranit

Round identifier		F39	F40	F41	F42	F43	F43	F44	F45	F45	F46	F47	F48	F49	F49	F50	F51	F52	F53	F54	F55	F56	F57	F57	F58
Sample		OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Lu	mg kg^{-1}	1.71	1.45			1.71						1.38	1.487			1.65				1.5			1.58		
Mo	mg kg^{-1}						2.3		0.6			1.7	0.28										1.92		
N	mg kg^{-1}																								
Nb	mg kg^{-1}	80		81			88					70	73.22	81		84.9		80		82	97		89.1		81
Nd	mg kg^{-1}	88.5	84				79.7					96	76.4			83.29				80		55.	77.6		
Ni	mg kg^{-1}	<0.5		24					7.0			<1		9				6	4		3.5			1.28	
Os	mg kg^{-1}																								
Pb	mg kg^{-1}	45	36				55		37.0			40	35.6		38	37.85		34	44	40	34	60.	28.9		32
Pd	mg kg^{-1}								0.024																
Pr	mg kg^{-1}	26.7	22.5			20.13						22.6	21.15			21.38				22		20.	20.3		
Pt	mg kg^{-1}								0.036																
Rb	mg kg^{-1}	172				160			100			165	172.2	173		168		171		167	179	160.	170		174
Re	mg kg^{-1}																								
Rh	mg kg^{-1}																								
Ru	mg kg^{-1}																								
S	mg kg^{-1}	98																							
Sb	mg kg^{-1}						0.12					<0,8	0.25												
Sc	mg kg^{-1}	0.47							0.64			<1			3	0.7		4		5				1.84	
Se	mg kg^{-1}											<0,4										8.			
Sm	mg kg^{-1}	18.5	17.5			18.6						19.9	16.37			19.92				16			17.2		
Sn	mg kg^{-1}						24					12.1	11.6										8.25		
Sr	mg kg^{-1}	12	8.5	17		14			10.0			15	11.6	13		11		11		23	11.6	40.	12.3		5
Ta	mg kg^{-1}												5.702			6.04				6.1			5.86		7
Tb	mg kg^{-1}	3.4				3.31						3.22	2.886			3.46				3.1			2.83		
Te	mg kg^{-1}											<1													
Th	mg kg^{-1}	17					23					16	21.03		24	24.16		23	15	26	26	25.	19.5		23
Tl	mg kg^{-1}												0.497												
Tm	mg kg^{-1}	1.8	1.55			1.58						1.5	1.616			1.83				1.6			1.72		
U	mg kg^{-1}	8					6					2.6	5.573			5.54		5.4	5	6.1	7.2		5.07		6
V	mg kg^{-1}	1.3		3			3		4.5			<5		2				6					0.91		
W	mg kg^{-1}						1.7					<5	3.3									10.	1.37		
Y	mg kg^{-1}	106.8	52	123			119		42			106	113.4	119		127		116		76	118	120.	102		135
Yb	mg kg^{-1}	11.6	9.9			11.4						10.9	10.51			11.6				10.9			11.6		
Zn	mg kg^{-1}	149	140	152			139		180			142	151.7	150				138	145	172		145.	125		139
Zr	mg kg^{-1}	964		983			939		730			948	961.2	924				952	925	933	1000	1000.	934		1011

Table 1 Results submitted for OU-3 (Nanhoron microgranite)

Round identifier		F59	F60	F61	F62	F62	F63	F64	F65	F66	F67	F68	F69	F70	F71	F71	F72	F73	F75	F76	F77	F78	F78
Sample		OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes		AA, G	X	A, M, X	I	I	I	A, M, I, X	X	X	X, O	M	X	W	X, T, IR	X, T, IR	M, X	X	X	W	A	M	M
Data quality:		2	2	1	1	2	1	2	1	1	1	1	2	1	1	2	1	2	2	2	2	1	2
SiO_2	% m/m	73	74.18	74.4			73.74	74.2	74.15	74.13	74.29		75.03	74.33	73.63		74.6	74.37	74.02	73.78	74.51		
TiO_2	% m/m		0.22	0.236	0.207			0.22	0.25	0.21	0.229		0.23	0.200	0.22		0.22	0.21	0.23	0.23	0.23		
Al_2O_3	% m/m	11.09	10.87	11.1	11.43		11.54	10.95	10.85	11.24	10.59		11.33	11.09	10.97		11.0	11.03	10.99	11.09	11.70		
Fe_2O_3T	% m/m	3.84		3.82	3.75		3.85	3.72	3.92	4.07	3.84		3.83	3.63	3.79		3.76	2.65	4.00	3.85	4.22		
Fe(II)O	% m/m		3.38					3.1						3.11		3.18				3.15			
MnO	% m/m	0.091	0.09	0.093	0.089		0.06	0.079	0.02	0.10	0.089		0.08	0.085	0.09		0.10	0.09	0.09	0.09	0.10		
MgO	% m/m	0.024	0.04				0.05			0.03			0.03	0.020	0.05			0.01	0.07		0.02		
CaO	% m/m	0.2	0.23	0.21			0.26	0.20	0.21	0.17	0.22		0.25	0.210	0.19		0.20	0.18	0.21	0.34	0.03		
Na_2O	% m/m	3.83	3.353	3.59	3.83		3.34	3.63	4.02	3.77	3.47		3.55	3.59	3.72		3.63	3.60	3.57	3.76	3.4		
K_2O	% m/m	4.63	4.54	4.58	4.63		4.33	4.71	4.53	4.62	4.23		4.68	4.37	4.82		4.59	4.70	4.59	5.00	4.79		
P_2O_5	% m/m		0.01						0.01	0.004			0.01	0.010	0.01		0.01				0.01		
H_2O^+	% m/m							0.3						0.264						0.34			
CO_2	% m/m			1.91				1.90			1.95			1.83		1.91							
LOI	% m/m	1.985	2.974	1.91			1.93	1.90	1.98	1.75	1.88		1.74	1.79	1.79		2.17		1.82	1.83	0.34		
Ag	mg kg^{-1}							2									0.3				0.4		
As	mg kg^{-1}			2.39	3.6			2									2.8				0.3		
Au	mg kg^{-1}																						
B	mg kg^{-1}																						
Ba	mg kg^{-1}		25	27.3				27	32	56		28.5				35	29.8		25		30	28	
Be	mg kg^{-1}			12.9				14								13.9	9.2				0.8		
Bi	mg kg^{-1}			0.13				4															0.9
Br	mg kg^{-1}							1.4															
Cd	mg kg^{-1}			0.26								0.785					0.3				1		0.95
Ce	mg kg^{-1}		191	194	207			216			163	196			234.9							209	
Cl	mg kg^{-1}							100															
Co	mg kg^{-1}			0.43		0.21		0.6			11	1.11					0.3				0.4		0.63
Cr	mg kg^{-1}	19	18	20.4		16.9		21.2		27	14	25.3					23.7				25		41
Cs	mg kg^{-1}			0.67	0.64			3.4				0.683			0.76		0.7					0.63	
Cu	mg kg^{-1}	3	2	1.43								11.8				4.0	4.1				2		6.4
Dy	mg kg^{-1}				20.3							20.3			21.64							22.3	
Er	mg kg^{-1}											12.8			12.57							14	
Eu	mg kg^{-1}				1.24			0.73				1.20			1.18							1.3	
F	mg kg^{-1}							1100						1060									
Ga	mg kg^{-1}			33.5				31			28	39.1	28.2			34.88							33
Gd	mg kg^{-1}											18.3			19.72							19	
Ge	mg kg^{-1}																						2.2
Hf	mg kg^{-1}				24.9			24.0				24.8			25.35								25
Hg	mg kg^{-1}							0.006															
Ho	mg kg^{-1}											4.20			4.61							4.6	
I	mg kg^{-1}																						
In	mg kg^{-1}																						
Ir	mg kg^{-1}																						
La	mg kg^{-1}		91	97.5	91.3			111			104	93.9			97.21							96	
Li	mg kg^{-1}			1.48																	6		

T e 1 Results submitted for OU-3 (Nanhoron microgranit

Round identifier		F59	F60	F61	F62	F62	F63	F64	F65	F66	F67	F68	F69	F70	F71	F71	F72	F73	F75	F76	F77	F78	F78
Sample		OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Lu	mg kg^{-1}				1.69			3.07				1.72			1.81							1.9	
Mo	mg kg^{-1}			1.83												2.3	2.3				7.6		
N	mg kg^{-1}										30												
Nb	mg kg^{-1}		97	89.0				77	95	91	77	79.7	78.1		86.83				85		96		88
Nd	mg kg^{-1}		87	90.2	86.6			46				87.4			96.81							95	
Ni	mg kg^{-1}		1	3.19				10				0.44	0.6				0.8						7.2
Os	mg kg^{-1}																						
Pb	mg kg^{-1}		33	40.6				31			32	36.7				42.50	37.7				31	38	
Pd	mg kg^{-1}	37																					
Pr	mg kg^{-1}											23.7			24.73							24	
Pt	mg kg^{-1}																						
Rb	mg kg^{-1}		179	160	169			172	171	223	177	163	174.4		165.6				172			179	
Re	mg kg^{-1}																						
Rh	mg kg^{-1}																						
Ru	mg kg^{-1}																						
S	mg kg^{-1}										188					60					104		
Sb	mg kg^{-1}			0.27		0.3		0.4															0.39
Sc	mg kg^{-1}			1.78	0.44			0.52				1.99				1.6							
Se	mg kg^{-1}																2.8						
Sm	mg kg^{-1}				19.3			22.0				19.5			20.39							20.5	
Sn	mg kg^{-1}							7								8.4	2.8		14		19.4		12
Sr	mg kg^{-1}		11	10.6				10	8	7	11	10.9	15.7			10.9	10.3		16		10	11.4	
Ta	mg kg^{-1}			4.8	5.19			3.1				5.53			6.36								7.3
Tb	mg kg^{-1}				2.93			4.4				3.25			3.40							3.4	
Te	mg kg^{-1}																						
Th	mg kg^{-1}		24	22.2	22.3			22.3			20	21.3			23.19		22.1		23			23.3	
Tl	mg kg^{-1}			0.95								0.731				0.86	0.7						
Tm	mg kg^{-1}											1.81			2.18							2.03	
U	mg kg^{-1}			4.85	4.87			6.5				6.06			5.81		4.2					5.05	
V	mg kg^{-1}			2.75				4				42.3				8	0.9				25.9		1.3
W	mg kg^{-1}							3								1.32			10				
Y	mg kg^{-1}		124	71.0				110	113	191	105	111	117.7		115.1				108		36.4	120	
Yb	mg kg^{-1}			6.93	11.5			13.0				11.9			12.43							12.9	
Zn	mg kg^{-1}	144.5	139	156	162			152	150	153	149	187				165	154				145		161
Zr	mg kg^{-1}		978		954			1000	937	358	903	927	885.2		926.1		437		871			1090	

Table 2

Assigned values for OU-3 derived from robust statistics

	Assigned value Xa	Target precision Ha	Measured precision	Ratio measured/ target		Assigned value Xa	Target precision Ha	Measured precision	Ratio measured/ target
SiO2	74.0902	0.7751	0.083	0.1071	Ge	1.5	0.11287	0.11721	1.03841
TiO2	0.224	0.0056	0.0013	0.2396	Hf	22.631	1.132	0.438	0.387
Al2O3	11.1078	0.1546	0.0254	0.1644	Ho	4.01181	0.26034	0.08392	0.32234
Fe2O3T	3.8341	0.0626	0.0151	0.2416	La	94.64	3.817	1.337	0.35
Fe(II)O	3.25563	0.05451	0.03	0.55029	Li	1.41583	0.10747	0.12029	1.11932
MnO	0.0902	0.0026	0.0006	0.2405	Lu	1.62811	0.12101	0.02755	0.22767
CaO	0.2	0.0051	0.0038	0.739	Mo	1.975	0.1426	0.0945	0.6627
Na2O	3.678	0.0605	0.0164	0.2706	Nb	80.2614	3.318	1.0984	0.331
K2O	4.55	0.0724	0.0094	0.1295	Nd	87	3.5532	0.5606	0.1578
CO2	1.91333	0.0347	0.00881	0.25385	Pb	36.2532	1.6891	0.6367	0.3769
LOI	1.815	0.0332	0.0113	0.3408	Pr	22.7	1.1349	0.3766	0.3319
					Rb	171.864	6.336	0.918	0.145
As	3.37931	0.22503	0.3022	1.34295	Sb	0.3	0.02876	0.01079	0.37506
Ba	28.75	1.387	0.82	0.591	Sm	18.7165	0.9633	0.2443	0.2536
Be	10.945	0.6107	0.3302	0.5408	Sn	11.45	0.6345	0.9282	1.4629
Cd	0.38	0.0352	0.0514	1.4608	Sr	11.21	0.6232	0.2356	0.378
Ce	196.337	7.094	3.406	0.48	Ta	5.7485	0.3534	0.1949	0.5516
Cr	18.6128	0.9588	0.874	0.9116	Tb	3.08152	0.20807	0.05633	0.27071
Cs	0.6674	0.0567	0.0143	0.2516	Th	22.8445	1.141	0.3604	0.3159
Cu	3.3	0.2205	0.3258	1.4772	Tl	0.7355	0.0616	0.0586	0.9512
Dy	18.8723	0.9701	0.3891	0.4011	Tm	1.73173	0.12752	0.04387	0.34405
Er	11.4472	0.6344	0.2093	0.3299	U	5.5396	0.3424	0.0958	0.2798
Eu	1.15196	0.0902	0.02169	0.24043	Y	113.146	4.442	1.247	0.281
F	1100	30.67	36.21	1.18	Yb	11.3745	0.631	0.1741	0.2759
Ga	32.1145	1.5239	0.2945	0.1933	Zn	149.218	5.619	1.504	0.268
Gd	18.0729	0.9351	0.3653	0.3906	Zr	942.79	26.9	7.53	0.28

Concentration units: Majors % m/m, traces mg kg^{-1}

Values were not assigned to elements omitted from this table owing to insufficient data or an unsatisfactory statistical distribution

Table 3												
Z-scores for results from the analysis of OU-3 (Nanhoron microgranite)												
Round identifier:	F1	F2	F2	F3	F4	F5	F6	F7	F8	F9	F9	F10
Sample	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes:	A,M	X	X	X	X	M, X, W	W, X	G, M,X	X	X	X	X
Data quality:	2	1	2	2	1	1	2	1	2	1	2	2
SiO_2	0.33	0.27		0.21	0.24	-1.20	0.39	0.21	-0.64	-3.34		-0.16
TiO_2	0.54	-1.07		0.54	2.86	1.07	-0.36	-0.71		-0.71		0.54
Al_2O_3	-0.19	-0.99		0.36	-1.28	0.79	-0.09	0.34	19.38	8.55		0.36
Fe_2O_3	1.33	-0.21		-0.43	2.17	-0.70	1.40	-0.38	-1.63	1.85		0.61
Fe(II)O						0.45						
MnO	-1.00	0.31		-0.04	-7.77	26.85	-1.96	-0.08	-0.04	-0.08		0.35
CaO	0.00	1.96		1.96	-1.96	0.00	0.98	-1.96	13.73	50.98		1.96
Na_2O	-0.81	0.08		-0.31	1.36	-1.29	0.68	-1.12	1.83	13.92		0.51
K_2O	-0.55	0.46		0.69	-2.49	0.55	-1.17	0.28	-0.55	0.14		-0.28
CO_2												
LOI	-0.83	1.66		-3.24	-1.36		-0.23	-0.75			-0.83	1.88
			-3.06		-1.69	1.43			5.38	-5.24		-0.84
As												
Ba	-0.85	0.90		-4.96	-1.26	-13.52		0.47	36.50	-7.03		6.94
Be						-0.89		-0.07				
Cd										0.57		
Ce	0.12			2.23	-0.19	0.22		-0.89		-1.27		3.01
Cr	4.37		-1.88	-6.06	0.40	-2.73		2.28	-3.45	3.53		-1.88
Cs	-0.07					0.57		0.05				
Cu	6.12		1.59			12.24		0.00	-0.23	-7.26		
Dy	0.27					-0.89		-1.31				
Er	-0.35					-0.47		-1.02				
Eu	0.27					0.42		-1.06				
F				1.63		8.80	1.32					
Ga		-0.73		0.95	-0.08	0.71		0.19		0.84		-0.04
Gd	-0.36					0.82		-2.11				
Ge				-1.33		5.32				-1.77		
Hf	-0.23			-2.49				-1.44		-0.20		-0.28
Ho	0.17					-1.12		-1.27				
La	0.09			1.62	-0.95	0.02		-1.22		-3.55		1.10
Li						-3.87		0.78				
Lu	0.26					-0.31		-1.14				
Mo	-0.26		7.10	0.09	4.38	-0.53		-0.39		-4.03		
Nb	-0.49	0.73		-2.90	2.33	0.22		0.98		-0.92		-0.49
Nd	-0.07			0.99	0.56	0.23		0.31		-4.36		
Pb	0.81	-1.93		-1.56	-0.15	0.15		-1.33	-1.56	-2.40		-0.67
Pr	0.31			-6.48		0.53		0.44		-10.75		
Rb	-0.15	0.83		0.96		0.65		-0.14		-0.28		-0.30
Sb	0.52					3.48		0.70		3.48		
Sm	-0.06			-6.60		0.11		-1.57		23.13		
Sn	-0.12			9.10		-8.59		1.65		1.18		
Sr	-0.97	0.14		-4.18	-5.15	4.48		-1.14	3.84	0.14		-0.97
Ta	0.21			10.26		0.71		-2.00		14.86		-2.47
Tb	0.16					1.29		-1.21				
Th	0.29		0.51	1.82	3.64	0.14		-0.04		11.09		2.26
Tl				3.77				-2.04		10.79		
Tm	0.70											
U	-0.20		-8.09	0.67	-1.58	0.47		-0.12		-0.12		0.67
Y	-0.47	1.97		-1.82	4.69	-0.33		-1.16		1.14		-0.92
Yb	-0.30					-0.70		-1.66		6.06		
Zn	-0.73	-1.82		0.07	-2.17	-1.64		-2.35	1.85	-0.57		-1.09
Zr	0.60	0.38		0.75	3.50	-1.07		1.01		2.13		0.17

Table 3 Z-scores for OU-3 (Nanhoron microgranite)

te)												
Round identifier:	F11	F11	F12	F13	F15	F15	F16	F17	F18	F19	F20	F21
Sample	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes:	X	X	A, M	AA, A, G, W	M	M	I	X	M, X, AA, G	X, W	X	I
Data quality:	1	2	2	1	1	2	2	2	1	1		1
SiO_2	2.58		-1.70	0.23				1.88	0.14	-0.57	0.94	
TiO_2	1.07		-0.36	-0.71					0.36	0.89	1.25	
Al_2O_3	1.83		-1.38	1.05				2.14	0.47	0.32	-0.41	
Fe_2O_3	0.09		-0.19	-0.38			0.45	-1.23	0.25	0.54	0.83	-2.78
Fe(II)O				2.65						1.00		
MnO	1.85		-1.19	0.69				0.35	-1.62	0.46	-0.04	
CaO	7.45		4.90	0.00				5.88	-2.16	0.39	2.35	
Na_2O	2.35		-0.95	-0.13			0.68	3.90	3.01	0.36	0.28	-3.27
K_2O	-0.83		-0.55	-0.69			-18.02	0.14	-3.45	0.14	0.70	
CO_2				-0.10					-0.38			
LOI	-1.66			3.46					-3.77	-1.96	-2.41	
		5.82					0.71				-3.82	-1.69
As												
Ba					-0.76			36.50	-3.64	-3.79	0.25	2.13
Be			0.04	-1.55					-1.22			
Cd												
Ce			0.01		0.23				-3.71	3.86		-0.33
Cr			0.15				8.65		-4.29	9.89	-7.78	-3.77
Cs					0.03		-0.59		-1.54			-1.01
Cu		40.14	-0.23	-1.36						3.63	-9.80	
Dy			0.73		1.06				-1.21			
Er			0.76		0.87				-1.65			
Eu			0.32		0.31		-2.12		-1.46			-0.13
F												
Ga	0.58		0.17						-0.73			
Gd			-0.32		0.56				-2.43			
Ge									3.01			
Hf			0.19			1.09	0.87		-3.03			0.68
Ho			1.01		0.22				-1.97			
La			-0.54		-0.67		0.60		-2.23	8.01		-2.18
Li				-3.87								
Lu			0.21		0.43		0.50		-2.13			
Mo									-0.18		5.22	2.28
Nb	1.43		-0.79						-3.76	0.16	-0.24	
Nd			0.00		-0.11		0.68		-4.11			0.28
Pb	-1.93			-0.74		0.75			1.03	-2.16	-2.18	
Pr			0.09		1.23				-1.59			
Rb	-0.93		0.89	0.65	0.34		0.48	-0.54	-3.61	0.38	-0.56	-1.87
Sb							0.70		0.00			1.74
Sm			0.05		-0.43		0.29		-2.82			-0.64
Sn									-3.17			
Sr		-0.97	-2.06	4.48	-0.02				-2.07	1.59	5.58	-3.55
Ta			0.06				1.06		-3.65			0.80
Tb			0.12		0.33		0.57		-1.50			-1.55
Th	-3.37		-0.27		0.05		1.15		-2.76		-1.24	-0.65
Tl									v			
Tm					0.69				-1.50			
U		0.67	-0.67		-0.17		0.32		-1.98			-0.61
Y	0.87		1.41		-0.71				-2.28	-0.33	0.09	
Yb			0.42		0.36		0.83		-2.02			0.52
Zn	-1.46		2.87	2.27					1.21	-0.93	-1.59	-3.06
Zr	-1.40		0.04			1.94	3.98	-2.75	-2.30	1.25	-1.35	-0.92

Table 3 Z-scores for OU-3 (Nanhoron microgranite)

Round identifier:	F22	F22	F23	F24	F25	F26	F26	F27	F28	F29	F30	F31
Sample	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes:	X, AA	X, AA	X	X, A, I, AA, V	A,M	X	X	X	X	X, T	X	G
Data quality:	1	2	2	2	2	1	2	1	1	2	1	1
SiO_2	-0.16		0.78	-0.45	-0.08	0.99		-0.12	0.46	0.14	0.59	-3.96
TiO_2	-0.71		0.54	-0.36	-0.36	-0.71		-0.36	-0.89	0.54	-2.50	
Al_2O_3	-0.44		1.59	0.30	-0.61	-0.89		-0.44	0.08	-0.51	-3.28	0.92
Fe_2O_3	-1.50		1.80	-0.91	0.45	-1.02		0.09	0.09	0.29	6.00	
Fe(II)O	1.55			-0.33						-0.42		
MnO	3.77		1.88	-0.04	-0.04	-0.08		-0.08	-0.08	0.92	3.77	
CaO	0.00		-10.78	-10.78	5.88	9.80		-1.18	-1.96	2.94	-3.92	
Na_2O	1.36		1.09	0.43	-0.73	-5.42		0.03	-2.28	-0.15	-0.30	
K_2O	0.69		-0.48	-0.28	-1.24	-0.41		0.15	0.14	0.28	0.14	
CO_2												
LOI	-5.27		2.94	0.08	0.83	-0.45			-3.46	0.08		0.75
				-0.18								
As												
Ba					0.63	-4.15		0.90		7.66		
Be				-0.77								
Cd												
Ce				-1.15	2.23		-2.28			0.33		
Cr		12.72				-6.90		-1.68	-3.77	0.72	-1.68	
Cs				-1.48	0.29							
Cu		3.85		33.33					-2.27		-10.43	
Dy				-3.03	0.84							
Er					0.99							
Eu					1.93							
F												
Ga				0.29	0.62	-0.73		-1.39		-0.37		
Gd					1.40							
Ge												
Hf				-0.72	0.60		-2.05					
Ho				3.05	0.36							
La				0.44	1.42		2.80			-0.21		
Li				2.72								
Lu				0.30	0.71							
Mo				0.09		7.19			-6.84			
Nb				-0.49	-0.19	0.83		-0.50	1.13	-0.79		
Nd				-3.94	-0.14		1.69			0.00		
Pb				6.73	-1.85	-0.74		-0.15	-1.33	-0.67		
Pr				0.13	0.00							
Rb		-1.80		0.72	0.44	0.18		0.49	0.02	0.25	0.65	
Sb				0.00								
Sm				0.67	0.25							
Sn					-4.29							
Sr		26.31		3.04	2.88	-1.94		1.27	-0.98	0.63	-0.34	
Ta					0.36							
Tb				-5.48	0.77							
Th				-0.37	-0.37	0.14			-0.74	-2.56		
Tl												
Tm				-1.30	0.66							
U				-0.93	-0.79	1.34			1.93	-0.79		
Y				0.55	0.10	0.87		0.42	0.64	0.88	1.32	
Yb				1.29	0.89							
Zn		0.07		0.60	-0.82	-1.82		1.38	-1.46	0.60	-0.39	
Zr				-0.89	-1.30	1.90		-1.22	2.16	0.54	4.02	

Table 3 Z-scores for OU-3 (Nanhoron microgranite)

Round identifier:	F31	F32	F32	F33	F34	F34	F35	F35	F36	F37	F38	F39
Sample	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes:	AA, M	X	X	A, M, O	I	I	X	X	M, A, V, SI, I	X, M	M	A, X
Data quality:	2	1	2	2	1	2	1	2	2	2	2	1
SiO_2		0.79		-0.55			-0.23		0.14	0.39		0.04
TiO_2	1.61	-0.71		0.54			-2.59		-0.36	0.54	0.54	0.54
Al_2O_3		0.60		0.27			0.60		-0.03	-0.03		-0.76
Fe_2O_3	-6.66	-0.07		2.92		-1.27	-1.74		0.93	-0.19		0.41
Fe(II)O				-1.06					0.41			2.28
MnO	-2.54	1.85		-0.04			2.04		0.73	0.35	-0.04	0.31
CaO		5.88		0.00			0.00		0.98	2.94		0.00
Na_2O	2.99	0.36		-1.22		0.42	0.20		0.60	-0.56		0.69
K_2O	-21.89	2.35		-0.55			-0.28		0.00	-0.21		-0.41
CO_2				0.38					-0.19			-0.38
LOI		0.45		-0.38			0.69		-0.68	-0.08		-0.15
				0.62		-1.13			-4.40			
As												
Ba	19.16	7.39		-0.20			10.27		-0.27	-0.63	4.96	-1.19
Be				0.78					0.13	-0.53		
Cd				1.85					-2.56	7.24	3.13	
Ce	-0.46	1.64		0.89	-0.72		-3.43		0.61	1.60	-0.65	
Cr	-6.30	3.53		1.71		4.64	-9.50		1.24	1.77	0.72	
Cs	-0.07			2.05					0.20		-0.13	
Cu	35.15						-14.97		-0.68	-0.45		
Dy	-1.64			-0.09					0.94	-0.97	0.06	
Er	0.17			-0.35					0.44	-1.14	-0.16	
Eu	-0.79			0.21	-0.23				0.82	0.49	0.20	
F			-7.34	0.00					-1.63	6.52		
Ga	-6.16	-0.73		1.96			0.58		0.29	0.62	-0.12	
Gd	-1.38			0.01					-0.31	2.10	0.11	
Ge				-0.49					0.00	0.00		
Hf	40.07	-3.21		0.07		-0.03			0.38	-0.72		
Ho	-0.85			-0.23	1.38				0.55	-0.77	-0.10	
La	-1.62	-1.22		0.70	-0.21		-0.56		0.44	1.23	0.12	
Li				0.39					-0.07	1.42		
Lu	-1.89			-0.16	0.85				0.30	-0.16	-0.21	
Mo				-1.42		12.89			-1.31	0.79	0.09	
Nb	-1.43	-3.09		0.29			-2.64		1.54	-2.00	-2.44	
Nd	-0.14	0.28		0.32	0.19				0.14	1.69	0.17	
Pb	0.30	-4.29		0.07			3.11		0.52	1.41	1.33	
Pr	0.45	-4.14		0.40					0.79	1.45	-0.04	
Rb	0.33	-0.61		1.83		0.10	0.34		0.48	0.72	-0.21	
Sb				0.17		-0.37			-0.70	-0.35		
Sm	-0.15	0.29		-0.06	0.52				0.41	0.61	-0.26	
Sn		7.17		1.22					0.43	-4.06	-0.59	
Sr	0.34	9.29		-0.17			1.27		0.23	-0.41	0.01	
Ta	-5.91			0.85		0.03			1.77	-1.34	0.02	
Tb	-0.70			-0.56	-0.96				0.04	-0.68	-0.27	
Th		7.15		-0.19		-0.39			0.73	0.94	0.08	
Tl									0.04	-0.61		
Tm	4.15			0.11					0.66	-0.44	-0.17	
U		10.11		0.02		-0.30			0.67	0.23	-0.22	
Y	-0.88	-0.03		-0.02			-1.38		0.21	-3.17	0.49	
Yb	-0.26			-0.53	0.31				0.10	-0.61	-0.54	
Zn	1.80	1.92		1.49		0.74	0.23		0.51	-0.64	-0.64	
Zr		-1.96		-1.58		1.38	-0.85		-0.61	0.30	-0.42	

Table 3 Z-scores for OU-3 (Nanhoron microgranite)

Round identifier:	F39	F40	F41	F42	F43	F43	F44	F45	F45	F46	F47	F48
Sample	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes:	A, X	A, M, X	A, AA, T	A, X, W	D, E, AA, M	D, E, AA, M	X	A, AA	A, AA	W, AA, G, V	A, X, AA	X, M
Data quality:	2	2	1	2	1	2	1	1	2	1	2	2
SiO_2		-0.26	-0.12	1.23	0.27		-1.92			-1.02	0.10	-0.39
TiO_2		-0.18	-0.71	-9.73	2.68		4.64	-20.36		2.86	-1.52	-0.36
Al_2O_3		0.14	-0.70	-1.49	0.34		0.34	-7.17		-7.17	0.30	-0.12
Fe_2O_3		1.40	-0.07	-1.26	0.73		2.97	1.85			-0.11	-0.11
Fe(II)O			-2.86							1.91	0.22	
MnO		1.50	-0.08	-1.19		-0.23	12.62	-3.15		-0.08	0.73	-0.04
CaO		0.00	35.29	-13.33	-9.02		23.53	-9.80		-19.61	0.00	-2.94
Na_2O		29.98	-0.30	-1.54	-0.13		14.58	0.36		-0.13	-0.81	-0.31
K_2O		0.47	-0.28	-2.33	-0.97		1.66	-4.83		-2.49	1.38	0.35
CO_2												
LOI		5.51	10.69	-0.17		0.23	0.45			5.57	-0.53	-0.83
						1.38						
As												
Ba		-2.07	1.62			-2.79		-2.70				-1.64
Be	0.95					1.27					-0.36	-1.00
Cd						-0.28		3.41				-1.46
Ce	-0.70	-0.45			-4.28						2.16	-1.44
Cr	-1.52		24.39			-0.84	-13.99	-8.98			-0.84	-2.46
Cs						-0.51						-0.07
Cu	-0.68		3.17			6.12		-5.90			2.72	-3.17
Dy	1.05	-0.19			-0.59						-1.07	-0.37
Er	0.44	-0.75			-0.07						-1.06	-0.42
Eu	1.37	-0.29			0.31						-0.07	-0.62
F						0.33						
Ga	-0.69										-0.37	0.13
Gd	0.34	0.23			1.63						-0.63	-1.04
Ge					-3.54							0.89
Hf						-3.02						0.59
Ho	-0.02	-0.79			-0.89						0.36	-0.60
La	-0.50	-0.54			0.38						1.75	-1.62
Li	-1.93	-6.59			5.44			-3.87				-0.12
Lu	0.34	-0.74			0.68						-1.03	-0.58
Mo						1.14		-9.64			-0.96	-5.94
Nb	-0.04		0.22			1.17					-1.55	-1.06
Nd	0.21	-0.42				-1.03					1.27	-1.49
Pb	2.59	-0.07				5.55		0.44			1.11	-0.19
Pr	1.76	-0.09			-2.26						-0.04	-0.68
Rb	0.01				-1.87			-11.34			-0.54	0.03
Sb						-3.13						-0.87
Sm	-0.11	-0.63			-0.12						0.61	-1.22
Sn						9.89					0.51	0.12
Sr	0.63	-2.17	9.29		4.48			-1.94			3.04	0.31
Ta												-0.07
Tb	0.77				1.10						0.33	-0.47
Th	-2.56					0.07					-3.00	-0.80
Tl												-1.94
Tm	0.27	-0.71			-1.19						-0.91	-0.45
U	3.59					0.67					-4.29	0.05
Y	-0.71	-6.88	2.22			0.66		-16.02			-0.80	0.03
Yb	0.18	-1.17			0.04						-0.38	-0.69
Zn	-0.02	-0.82	0.50			-0.91		5.48			-0.64	0.22
Zr	0.39		1.49			-0.07		-7.91			0.10	0.34

Table 3 Z-scores for OU-3 (Nanhoron microgranite)

Round identifier:	F49	F49	F50	F51	F52	F53	F54	F55	F56	F57	F57	F58
Sample	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes:	X	X	M	X	X	X	X, A, M, W	X, AA	X	M	M	X
Data quality:	1	2	1	2	1	2	2	2	2	1	2	1
SiO_2	-0.01			0.21	1.03	-0.08	0.30		-0.45			-0.25
TiO_2	-0.71			1.43	-0.71	0.89	0.54		0.54		-0.36	1.07
Al_2O_3	0.01			0.27	0.47	-0.36	1.27		-0.35			-0.70
Fe_2O_3	2.97			0.53	-1.50	-0.75	0.13		0.13			-0.07
Fe(II)O												
MnO	-0.08			0.35	1.08	-0.23	-0.04		-0.04		-8.12	-0.08
CaO	1.96			2.94	3.92	-2.70	0.00		-0.98			0.00
Na_2O	0.53			-0.48	-0.30	-0.11	-0.64		-1.47			0.20
K_2O	0.14			0.14	-0.14	0.68	-0.35		0.00			0.00
CO_2							4.13					
LOI		-0.23		-1.13	1.96	0.53	2.48					
						5.82		8.27				
As												
Ba	-18.57		-1.26		5.23		0.09		0.45	3.86		
Be							0.05					
Cd								-0.43				
Ce	-27.68	-0.59	-0.82		5.59		-0.02		-2.56	-3.01		
Cr	-1.68				0.40	-1.36	-2.41		0.72	5.31		22.31
Cs			-0.13				3.81				-2.62	
Cu	-10.43					6.12				3.99		3.17
Dy			3.65				-0.40			-1.52		
Er			1.97				0.20			-1.02		
Eu			0.98				-0.29			-1.46		
F							0.00			-35.87		
Ga	-0.73				-0.73		-0.04			0.12		-0.08
Gd			1.59				0.50			-1.90		
Ge							2.21			-13.29		
Hf			0.62				0.56			1.03		-0.56
Ho			2.22				-0.79			-0.58		
La		-0.87	0.50				-1.39		-0.61	-3.63		
Li												
Lu			0.18				-0.53			-0.40		
Mo										-0.39		
Nb	0.22		1.40		-0.08		0.26	2.52		2.66		0.22
Nd			-1.04				-0.99		-4.50	-2.65		
Pb		0.52	0.95		-1.33	2.29	1.11	-0.67	7.03	-4.35		-2.52
Pr			-1.16				-0.31		-1.19	-2.11		
Rb	0.18		-0.61		-0.14		-0.38	0.56	-0.94	-0.29		0.34
Sb												
Sm			1.25				-1.41			-1.57		
Sn										-5.04		
Sr	2.87		-0.34		-0.34		9.46	0.31	23.10	1.75		-9.96
Ta			0.82				0.50			0.32		3.54
Tb			1.82				0.04			-1.21		
Th		0.51	1.15		0.14	-3.44	1.38	1.38	0.94	-2.93		0.14
Tl												
Tm			0.77				-0.52			-0.09		
U			0.00		-0.41	-0.79	0.82	2.42		-1.37		1.34
Y	1.32		3.12		0.64		-4.18	0.55	0.77	-2.51		4.92
Yb			0.36				-0.38			0.36		
Zn	0.14				-2.00	-0.38	2.03		-0.38	-4.31		-1.82
Zr	-0.70				0.34	-0.33	-0.18	1.06	1.06	-0.33		2.54

Table 3 Z-scores for OU-3 (Nanhoron microgranite)

Round identifier:	F59	F60	F61	F62	F62	F63	F64	F65	F66	F67	F68	F69
Sample	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes:	AA, G	X	A, M, X	I	I	I	A, M, I, X	X	X	X, O	M	X
Data quality:	2	2	1	1	2	1	2	1	1	1	1	2
SiO_2	-0.70	0.06	0.40			-0.45	0.07	0.08	0.05	0.26		0.61
TiO_2		-0.36	2.14	-3.04			-0.36	4.64	-2.50	0.89		0.54
Al_2O_3	-0.06	-0.77	-0.05	2.08		2.80	-0.51	-1.67	0.86	-3.35		0.72
Fe_2O_3	0.05		-0.23	-1.34		0.25	-0.91	1.37	3.77	0.09		-0.03
Fe(II)O		1.14					-1.43					
MnO	0.15	-0.04	1.08	-0.46		-11.62	-2.15	-27.00	3.77	-0.46		-1.96
CaO	0.00	2.94	1.96			11.76	0.00	1.96	-5.88	3.92		4.90
Na_2O	1.26	-2.69	-1.45	2.51		-5.59	-0.40	5.65	1.52	-3.44		-1.06
K_2O	0.55	-0.07	0.41	1.10		-3.04	1.10	-0.28	0.97	-4.42		0.90
CO_2			-0.10				-0.19			1.06		
LOI	2.56	17.45	2.86			3.46	1.28	4.97	-1.96	1.96		-1.13
			-4.40	0.98			-3.06					
As												
Ba		-1.35	-1.05				-0.63	2.34	19.65		-0.18	
Be			3.20				2.50					
Cd			-3.41								11.51	
Ce		-0.38	-0.33	1.50			1.39			-4.70	-0.05	
Cr	0.20	-0.32	1.86		-0.89		1.35		8.75	-4.81	6.97	
Cs			0.05	-0.48			24.10				0.28	
Cu	-0.68	-2.95	-8.48	v							38.55	
Dy				1.47							1.47	
Er											2.13	
Eu				0.98			-2.34				0.53	
F							0.00					
Ga			0.91				-0.37			-2.70	4.58	-1.28
Gd											0.24	
Ge												
Hf				2.00			0.60				1.92	
Ho											0.72	
La		-0.48	0.75	-0.88			2.14			2.45	-0.19	
Li			0.60									
Lu				0.51			5.96				0.76	
Mo			-1.02									
Nb		2.52	2.63				-0.49	4.44	3.24	-0.98	-0.17	-0.33
Nd		0.00	0.90	-0.11			-5.77				0.11	
Pb		-0.96	2.57				-1.56			-2.52	0.26	
Pr											0.88	
Rb		0.56	-1.87	-0.45			0.01	-0.14	8.07	0.81	-1.40	0.20
Sb			-1.04		0.00		1.74					
Sm				0.61			1.70				0.81	
Sn							-3.51					
Sr		-0.17	-0.98				-0.97	-5.15	-6.76	-0.34	-0.50	3.60
Ta			-2.68	-1.58			-3.75				-0.62	
Tb				-0.73			3.17				0.81	
Th		0.51	-0.56	-0.48			-0.24			-2.49	-1.35	
Tl			3.48								-0.07	
Tm											0.61	
U			-2.01	-1.96			1.40				1.52	
Y		1.22	-9.49	-25.47			-0.35	-0.03	17.53	-1.83	-0.48	0.51
Yb			-7.04	0.20			1.29				0.83	
Zn	-0.42	-0.91	1.21	2.27			0.25	0.14	0.67	-0.04	6.72	
Zr		0.65		0.42			1.06	-0.22	-21.74	-1.48	-0.59	-1.07

Table 3 Z-scores for OU-3 (Nanhoron microgranite)

Round identifier:	F70	F71	F71	F72	F73	F75	F76	F77	F78	F78
Sample	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3	OU-3
Technique codes:	W	X, T, IR	X, T, IR	M, X	X	X	W	A	M	M
Data quality:	1	1	2	1	2	2	2	2	1	2
SiO_2	0.31	-0.59		0.66	0.18	-0.05	-0.20	0.27		
TiO_2	-4.29	-0.71		-0.71	-1.25	0.54	0.54	0.54		
Al_2O_3	-0.12	-0.89		-0.70	-0.25	-0.38	-0.06	1.92		
Fe_2O_3	-3.26	-0.70		-1.18	-9.46	1.33	0.13	3.08		
Fe(II)O	-2.67		-0.69				-0.97			
MnO	-2.00	-0.08		3.77	-0.04	-0.04	-0.04	1.88		
CaO	1.96	-1.96		0.00	-1.96	0.98	13.73	-16.67		
Na_2O	-1.45	0.69		-0.79	-0.64	-0.89	0.68	-2.30		
K_2O	-2.49	3.73		0.55	1.04	0.28	3.11	1.66		
CO_2	-2.40		-0.05							
LOI	-0.75	-0.75		10.69		0.08	0.23	-22.21		
				-2.57				-6.84		
As										
Ba			2.25	0.76		-1.35		0.45	-0.54	
Be			2.42	-2.86				-8.31		
Cd				-2.27				8.81		8.10
Ce		5.43							1.79	
Cr				5.31				3.33		11.67
Cs		1.63		0.57					-0.66	
Cu			1.59	3.63				-2.95		7.03
Dy		2.85							3.53	
Er		1.77							4.02	
Eu		0.31							1.64	
F	-1.30									
Ga			0.91							0.29
Gd		1.76							0.99	
Ge										3.10
Hf		2.40								1.05
Ho		2.30							2.26	
La		0.67							0.36	
Li								21.33		
Lu		1.50							2.25	
Mo			1.14	2.28				19.72		
Nb		1.98				0.71		2.37		1.17
Nd		2.76							2.25	
Pb			1.85	0.86				-1.56	1.03	
Pr		1.79							1.15	
Rb		-0.99				0.01			1.13	
Sb										1.56
Sm		1.74							1.85	
Sn			-2.40	-13.63		2.01		6.26		0.43
Sr			-0.25	-1.46		3.84		-0.97	0.30	
Ta		1.73								2.20
Tb		1.53							1.53	
Th		0.30		-0.65		0.07			0.40	
Tl			1.01	-0.58						
Tm		3.52							2.34	
U		0.79		-3.91					-1.43	
Y		0.43				-0.58		-8.64	1.54	
Yb		1.67							2.42	
Zn			1.40	0.85				-0.38		1.05
Zr		-0.62		-18.80		-1.33			5.47	

Table 4

Results submitted in the GeoPT6A round for the analysis of CAL-S (Limestone)

Round identifier		G1	G2	G3	G4	G5	G6	G8	G9	G9	G10	G11	G11	G12	G13	G14	G14	G15	G15	G16	G18	G19
Sample		CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Technique codes		A, M	X	X	X	M, X, W	G, A	X	X	X	X	X	X	A, M	AA	AA, A, W	AA, A, W	M	M	I	A, X, G, AA,	X, G, W
Data quality		2	2	2	1	1	1	2	1	2	2	1	2	2	1	1	2	1	2	2	1	1
SiO_2	% m/m	0.06	0.482	0.06	0.08	0.05	0.039	0.77					0.074		0.05	0.05					0.1	
TiO_2	% m/m	0.002	0.016		0.01	0.01							0.0011	0.015			0.001					0.005
Al_2O_3	% m/m	0.02	0.022		0.04		0.017		0.14						0.016		0.015				0.02	0.019
Fe_2O_3T	% m/m	0.04	0.052	0.04	0.06	0.04	0.051		0.077		0.06	0.044		0.05	0.041		0.039			0.087	0.043	0.05
Fe(II)O	% m/m																					0.04
MnO	% m/m	0.001	0.002	0.002	0.06	0.07			0.017		0.004				0.0013		0.0013				0.0013	0.0024
MgO	% m/m	0.34	0.318	0.43	0.47	0.54	0.395	0.28	0.55		0.44		0.2	0.374	0.35		0.34				0.313	0.447
CaO	% m/m	55.6	55.642	55.53	56.10	55.21	55.42	59.6	54.8		55.34	55.22		47.41	55.21		55.38				56	55.14
Na_2O	% m/m	0.05	0			0.02	0.016		0.11		0.04				0.013		0.012			0.012		0.019
K_2O	% m/m	0.035	0.006			0.01	0.003	0.006			0.03		0.0009		0.002		0.0018					
P_2O_5	% m/m	0.003	0.014	0.01	0.02	0.01		0.014			0.009						0.0022					0.0057
H_2O^+	% m/m														0.17						0.08	
CO_2	% m/m														43.72						44.4	44.175
LOI	% m/m	43.91	43.92	43.87	43.42		43.97			43.8	43.7	43.35			43.95		43.97				43.4	43.07
Ag	mg kg^{-1}																					
As	mg kg^{-1}		5	13		0.4		1.00														
Au	mg kg^{-1}																				0.003	
B	mg kg^{-1}																					
Be	mg kg^{-1}	0.5	5	15		14		110.0									0.9	1.38			1.17	
Be	mg kg^{-1}																					
Bi	mg kg^{-1}								1.6													
Br	mg kg^{-1}			3.8																		
Cd	mg kg^{-1}														0.3		0.3					
Ce	mg kg^{-1}	0.42			10	0.36					11							0.292			0.36	18.6
Cl	mg kg^{-1}																				38	
Co	mg kg^{-1}	0.8	3					1.00												1.58		
Cr	mg kg^{-1}	2.5	3	9		4		7.10												3.3	1.93	33.4
Cs	mg kg^{-1}	0.01																0.0087				
Cu	mg kg^{-1}	9.0	3		5	11		6.00														5.2
Dy	mg kg^{-1}	0.1				0.10												0.0994			0.12	
Er	mg kg^{-1}	0.08				0.07												0.0812				
Eu	mg kg^{-1}	0.02				0.01												0.0148		0.034		
F	mg kg^{-1}			440																		
Ga	mg kg^{-1}		2		1.8								2									
Gd	mg kg^{-1}	0.09				0.10												0.0909				
Ge	mg kg^{-1}																					
Hf	mg kg^{-1}	0.01									4									0.022		
Hg	mg kg^{-1}								1.5													
Ho	mg kg^{-1}	0.03				0.03												0.0254				
I	mg kg^{-1}																					
In	mg kg^{-1}								1.1													
Ir	mg kg^{-1}																			0.0014		
La	mg kg^{-1}	0.89				0.82												0.742		0.95	0.68	
Li	mg kg^{-1}														0.3							

Table 4 Results submitted for CAL-S (limestone)

Round Identifier		G1	G2	G3	G4	G5	G6	G8	G9	G9	G10	G11	G11	G12	G13	G14	G14	G15	G15	G16	G18	G19
Sample		CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Lu	mg kg^{-1}	0.01				0.01												0.0108		0.011		
Mo	mg kg^{-1}	0.15	0		1.3	0.2			1.5													
N	mg kg^{-1}																					
Nb	mg kg^{-1}	0.1	2.4		0.6	0.1							2									0.3
Nd	mg kg^{-1}	0.42				0.38												0.339			0.35	
Ni	mg kg^{-1}	5.0	1			3		1.00			3											2.8
Os	mg kg^{-1}																					
Pb	mg kg^{-1}	5.0	4			0.5		7.50	1.6										0.54		0.44	1.5
Pd	mg kg^{-1}																					
Pr	mg kg^{-1}	0.11				0.09												0.0833			0.1	
Pt	mg kg^{-1}																					
Rb	mg kg^{-1}	0.1	0.7	4	1				1		9		3					0.104				
Re	mg kg^{-1}																					
Rh	mg kg^{-1}																					
Ru	mg kg^{-1}																					
S	mg kg^{-1}		493	400	370	360		500.0		307.5							299				3.22	
Sb	mg kg^{-1}	0.1							0.9											0.048		
Sc	mg kg^{-1}	0.1	22		31															0.088		
Se	mg kg^{-1}								0.6													
Sm	mg kg^{-1}	0.07				0.07												0.0567		0.13		
Sn	mg kg^{-1}	0.1							0.8													
Sr	mg kg^{-1}	247.0	219.9	249	221	227		190.0	268.8		209	214		302.9	238		238	226			240	218.8
Ta	mg kg^{-1}	0.005																				
Tb	mg kg^{-1}	0.02				0.01												0.0136				
Te	mg kg^{-1}																					
Th	mg kg^{-1}	0.03	0						1.4		6											
Ti	mg kg^{-1}																					
Tm	mg kg^{-1}	0.01																0.0112				
U	mg kg^{-1}	0.8	0			0.8								0.67				0.0827		0.72	0.74	
V	mg kg^{-1}	1.8	3	6	9	1		9.30													4.68	
W	mg kg^{-1}	0.08																				
Y	mg kg^{-1}	1.9	3		2	2.1			5.6		5		6	1.62				1.75			1.8	3
Yb	mg kg^{-1}	0.07				0.07												0.0691				
Zn	mg kg^{-1}	12.0	15	10	12	21		20.0	15.6		23		4		12.3		13.6				11.3	18
Zr	mg kg^{-1}	1.0	2		3.4	1			3.5		7		10						0.44		1.04	1.7

Table 4 Results submitted for CAL-S (limestone)

Round identifier		G21	G22	G22	G23	G24	G25	G26	G26	G28	G29	G31	G31	G32	G33	G34	G34	G35	G35	G36	G37	G38
Sample		CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Technique codes		I	X, AA	X, AA	X	A, I, AA, G,	A,M	X	X	X	X	G, AA, M	G, AA, M	X	A, M, O	I	I	X	X	M, A, V, SI, IF	X, M	M, X
Data quality		1	1	2	2	2	2	1	2	1	2	1	2	1	2	1	2	1	2	2	2	2
SiO_2	% m/m		0.05		0.12		0.29				0.16			0.17	0.06			0.105		0.05	0.06	0.023
TiO_2	% m/m		0		0.08					0.006				0.01				0.0045		0.001	0.091	0.0015
Al_2O_3	% m/m		0.02		0.02		0.08			0.05			0.036		0.02			0.021		0.016	0.05	0.0008
Fe_2O_3T	% m/m	0.043	0.03		0.04		0.05	0.16		0.04	0.04		0.078	0.05	0.05		0.046	0.035		0.04	0.12	0.05
Fe(II)O	% m/m		0												0.045							
MnO	% m/m		0.001		0.01								0.0023					0		0.001	0.0014	0.002
MgO	% m/m		0.4		0.62	0.39	0.38	0.5		0.45	0.43		0.17	0.42	0.42			0.55		0.35	0.41	0.385
CaO	% m/m		55.04		55.47	56.3	56.29	55.95		56.18	55.67	55.66		56.5	55.70		59.51	54.355		55.6	55.4	54.78
Na_2O	% m/m	0.024	0.05				0.03						0.43		0.013		0.013	0		0.014	0.037	
K_2O	% m/m		0.003				0.03						0.037	0.01	0.004			0.0095			0.0078	0.003
P_2O_5	% m/m		0							0.008								0.003			0.0038	0.01
H_2O^+	% m/m									0.11					0.20							
CO_2	% m/m														43.49					44.0		
LOI	% m/m		43.33		43.78	43.9	43.72	43.71		43.7	45.92	43.44		43.88	43.38			43.339		43.82	43.85	43.93
Ag	mg kg^{-1}	0.005											0.02									
As	mg kg^{-1}	0.26															0.25				0.8	
Au	mg kg^{-1}																					
B	mg kg^{-1}												3.06		1.1							
Ba	mg kg^{-1}	2.2					5	9		50			17.56	27				0		1.5	1.63	6.97
Be	mg kg^{-1}												0.29									
Bi	mg kg^{-1}												0.12									
Br	mg kg^{-1}	1.61				1.1											1.024					
Cd	mg kg^{-1}												0.17		0.44					0.4	0.29	0.6
Ce	mg kg^{-1}	0.53											0.38		0.722 ✓	0.421		9.5		0.38	0.4	1.63
Cl	mg kg^{-1}																		15		62	
Co	mg kg^{-1}	0.04						11					0.84		0.43			1			0.77	0.315
Cr	mg kg^{-1}	2		11						3.7			80.7				4.22	7		2	1.4	4
Cs	mg kg^{-1}	0.008											0.018							0.01		0.05
Cu	mg kg^{-1}			5		7				3.2			11.21					0		1	0.62	4
Dy	mg kg^{-1}					1							0.05		0.072 ✓					0.11	0.11	0.137
Er	mg kg^{-1}												0.25		0.073 ✓					0.09	0.1	0.082
Eu	mg kg^{-1}	0.03											0.062		0.021 ✓	0.031				0.02	0.02	0.022
F	mg kg^{-1}																				310	
Ga	mg kg^{-1}												0.75		0.129			0.5			0.04	0.169
Gd	mg kg^{-1}												0.19							0.11	0.1	0.125
Ge	mg kg^{-1}												0.20									
Hf	mg kg^{-1}	0.011							6				0.27							0.02		0.07
Hg	mg kg^{-1}														0.004					0.01		
Ho	mg kg^{-1}												0.11		0.017	0.028				0.03	0.03	0.029
I	mg kg^{-1}																					
In	mg kg^{-1}																					
Ir	mg kg^{-1}																					
La	mg kg^{-1}	0.81					1.5		31				1.09		1.04	0.791		0		0.95	1	0.962
Li	mg kg^{-1}														1.1					0.4	0.84	

Table 4 Results submitted for CAL-S (limestone)

Round	identifier	G21	G22	G22	G23	G24	G25	G26	G26	G28	G29	G31	G31	G32	G33	G34	G34	G35	G35	G36	G37	G38
Sample		CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Lu	mg kg^{-1}												0.11		0.010	0.012				0.01	0.01	0.011
Mo	mg kg^{-1}	0.28											0.011		0.19						0.36	
N	mg kg^{-1}																					
Nb	mg kg^{-1}												7.98		0.443			0		0.2	0.19	
Nd	mg kg^{-1}					38							0.66			0.391				0.43	0.44	0.372
Ni	mg kg^{-1}	0.73		0		5							14.7					0		1	0.6	6.5
Os	mg kg^{-1}																					
Pb	mg kg^{-1}												15.28		0.64			0			1.05	0.45
Pd	mg kg^{-1}														0.128							
Pr	mg kg^{-1}												0.16							0.11	0.12	0.092
Pt	mg kg^{-1}																					
Rb	mg kg^{-1}	0.12		0									0.22					1		0.15	0.21	0.161
Re	mg kg^{-1}																					
Rh	mg kg^{-1}																					
Ru	mg kg^{-1}																					
S	mg kg^{-1}					280													305	50	290	
Sb	mg kg^{-1}	0.057											0.28							0.05		
Sc	mg kg^{-1}	0.04						3					0.47				0.051			1	0.42	
Se	mg kg^{-1}												0.037									
Sm	mg kg^{-1}	0.0195				0.1							0.14			0.071				0.07	0.07	0.102
Sn	mg kg^{-1}												2.79								0.76	
Sr	mg kg^{-1}	224		0			259	206		233	223		248.5	242	245			232.5		245	228	234.83
Ta	mg kg^{-1}	0.0026						5												0.01		0.04
Tb	mg kg^{-1}	0.013											0.046		0.015	0.021				0.015	0.02	0.02
Te	mg kg^{-1}												0.007									
Th	mg kg^{-1}	0.025													0.25					0.02		0.041
Ti	mg kg^{-1}												0.57									
Tm	mg kg^{-1}												0.37		0.014					0.01	0.01	0.012
U	mg kg^{-1}	0.83				0.8									0.82		0.77			0.9	0.88	0.856
V	mg kg^{-1}			30		3		7							1.7			5			10	3
W	mg kg^{-1}							3					0.80									
Y	mg kg^{-1}									2.4			1.81		1.99			4		2.1	2.1	3.4
Yb	mg kg^{-1}	0.074											0.14		0.056	0.065				0.07	0.08	0.082
Zn	mg kg^{-1}	14		10		23		15		15	15		31.08		12			13.5		15	12	
Zr	mg kg^{-1}												3.18		1.13			0		1.2	4.6	3.8

Table 4 Results submitted for CAL-S (limestone)

Round identifier		G39	G39	G40	G42	G43	G43	G44	G45	G46	G47	G48	G49	G49	G50	G53	G54	G55	G56	G57	G57	G61
Sample		CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Technique codes		A, X	A, X	A, M, X	A, W	D, E, AA, M	D, E, AA, M	X	A, AA,	W, AA, G, V	A, X, AA	M, X	X	X	M	X	AA, A, M, W	X, AA	X	M	M	A, M, X
Data quality		1	2	2	2	1	2	1	1	1	2	2	1	2	1	2	2	2	2	1	2	1
SiO_2	% m/m	0.07		0.096				0.62		0.00	0.2	0.04	0.43			0.057			0.08			0.22
TiO_2	% m/m	0.012		0.019	0.001			0.008	0.006	0.00			0			0.0011					0.001	
Al_2O_3	% m/m	0.016			0.009			0.01	1.10	0.00			0.07			0.013			0.07			
Fe_2O_3T	% m/m	0.044		0.068	0.036	0.18		0.39	0.055		0.028	0.04	0.05			0.039	0.04		0.06			0.053
Fe(II)O	% m/m									0.06	0.025											
MnO	% m/m	0.002			0.001		0.065		0.0014	0.00			0			0.002					0.001	
MgO	% m/m	0.224		0.358	0.26		0.451	0.48	0.36	0.39	0.25	0.36	0.4			0.387	0.33		0.35			0.93
CaO	% m/m	55.45		55.5	55.28		56.08	54.51		54.84	55.77	55.36	55.11			55.76	55.83		55.5			55.2
Na_2O	% m/m	0.021		0.021	0.074	0.02			0.05	0.06	0.01	0.05	0			0.024	0.013					
K_2O	% m/m	0.006			0.013	4.48		0.08	0.065	0.05	0.1	0.01	0			0.004	0.004					
P_2O_5	% m/m	0.006		0.005				0.018		0.04			0			0.0046	0.0165					
H_2O^+	% m/m	0.257																				
CO_2	% m/m									42.40							44.2					44.16
LOI	% m/m	43.86		44.27	43.61		44.22	43.70		43.59	44.12	43.86		43.9		43.73	43.4					43.71
Ag	mg kg^{-1}						0.08		0.4													
As	mg kg^{-1}																					0.35
Au	mg kg^{-1}								0.075	0.0025												
B	mg kg^{-1}																					
Ba	mg kg^{-1}		4.4	2							2.9	1.2	0		1	4			30.		6.11	1.63
Be	mg kg^{-1}		0.01				0.56															0.03
Bi	mg kg^{-1}																				0.012	
Br	mg kg^{-1}																					
Cd	mg kg^{-1}						0.54		5.0		0.65	0.31						0.4				0.33
Ce	mg kg^{-1}			0.26								0.3		3	0.51		1.4				0.361	
Cl	mg kg^{-1}																					
Co	mg kg^{-1}								0.5												1.11	
Cr	mg kg^{-1}		2						4.0		2.7		0			2.3					4.67	3.0
Cs	mg kg^{-1}											0.01			0.02		1.3				0.033	
Cu	mg kg^{-1}		0.4				0.6		2.0		3.5		0			3.1					2.97	
Dy	mg kg^{-1}			0.11		0.11						0.115			0.15		0.2				0.099	
Er	mg kg^{-1}			0.081		0.087						0.092			0.11		0.1				0.074	
Eu	mg kg^{-1}					0.014					0.2	0.017			0.02						0.018	
F	mg kg^{-1}						49										100					
Ga	mg kg^{-1}		5									1.3	5			0.5					0.05	0.036
Gd	mg kg^{-1}			0.14		0.093						0.101			0.13		0.2				0.093	
Ge	mg kg^{-1}																					
Hf	mg kg^{-1}					0.52									0.03						0.017	
Hg	mg kg^{-1}						0.05		0.022		0.01											
Ho	mg kg^{-1}					0.031						0.025			0.04						0.027	
I	mg kg^{-1}																					
In	mg kg^{-1}																					
Ir	mg kg^{-1}																					
La	mg kg^{-1}		0.66	0.81							2	0.745		9	1.33		1.6		14.		0.766	0.99
Li	mg kg^{-1}		0.4						<1.0			0.41										

Table 4 Results submitted for CAL-S (limestone)

Round	identifier	G39	G39	G40	G42	G43	G43	G44	G45	G46	G47	G48	G49	G49	G50	G53	G54	G55	G56	G57	G57	G61
Sample		CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Lu	mg kg^{-1}					0.014									0.01						0.01	
Mo	mg kg^{-1}								0.5			0.15									0.24	0.20
N	mg kg^{-1}																					
Nb	mg kg^{-1}		0.29										0		0.18	0.5					0.058	0.4
Nd	mg kg^{-1}			0.41		0.39											1.1				0.205	
Ni	mg kg^{-1}		0.28						25.0				0								6.67	
Os	mg kg^{-1}																					
Pb	mg kg^{-1}		1						14.0		5.7	0.25		1	0.66	1.1					1.43	0.52
Pd	mg kg^{-1}								0.02													
Pr	mg kg^{-1}			0.09		0.13						0.1			0.19		0.3				0.042	
Pt	mg kg^{-1}								0.044													
Rb	mg kg^{-1}		3						2.0		3.9	0.9	0		0.3						0.21	0.11
Re	mg kg^{-1}																					
Rh	mg kg^{-1}																					
Ru	mg kg^{-1}																					
S	mg kg^{-1}		344													260	170					300
Sb	mg kg^{-1}						0.12														0.41	0.045
Sc	mg kg^{-1}		0.06				0.41		1.0					0	0.4		4				0.42	
Se	mg kg^{-1}																		9.			
Sm	mg kg^{-1}					0.08						0.07			0.1		0.2				0.061	
Sn	mg kg^{-1}						1.5				0.7										0.93	
Sr	mg kg^{-1}	234		170		230			350		255	244.4	236		299	225.4	176	226	280.	270		222
Ta	mg kg^{-1}														0.01		0.1				0.006	
Tb	mg kg^{-1}		0.3			0.015									0.02						0.017	
Te	mg kg^{-1}																					
Th	mg kg^{-1}		7											0	0.05		0.2				0.023	
Tl	mg kg^{-1}																					
Tm	mg kg^{-1}					0.012									0.02						0.011	
U	mg kg^{-1}		2									0.847			0.99		1.5				0.82	0.91
V	mg kg^{-1}		1.1						5.0			2.9	6								1.56	
W	mg kg^{-1}																		10.		0.19	
Y	mg kg^{-1}		1.95			1.93			3.7		1.5	1.85	3		2.65	2.2	6	2.7			1.84	2.3
Yb	mg kg^{-1}		0.05	0.067		0.086						0.07			0.09		0.1				0.077	
Zn	mg kg^{-1}		18	3.6			31		46.0		17.6	13.8	15			12.8	16		70.		13.1	11.1
Zr	mg kg^{-1}		0.5				8		21.0		13	8.7	7								0.45	

Table 4 Results submitted for CAL-S (limestone)

Round identifier		G62	G62	G63	G64	G67	G68	G68	F69	F70	G71	G71	G72	G74	G75	G76	G77
Sample		CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Technique codes		I	I	AA	A, M, I, X	X, O	M	M	X	W	X, T, IR	X, T, IR	M, X	M	X	W	A
Data quality		1	2	1	2	1	1	2	2	1	1	2	1	1	2	2	2
SiO_2	% m/m			0.38	0.13				0.64	0.180	0.02					0.06	0.07
TiO_2	% m/m				0.007				0.01	0.010							0.01
Al_2O_3	% m/m				0.0028				0.00	0.230			0.02				0.04
Fe_2O_3T	% m/m	0.04		0.09	0.03				0.04	0.05	0.04				0.05	0.07	0.03
Fe(II)O	% m/m									0.035							
MnO	% m/m	0.0013			0.002				0.00	0.007						0.05	
MgO	% m/m	0.39		0.58	0.35	0.47			0.43	0.370	0.38		0.07		0.47		0.34
CaO	% m/m	55.41		52.4	55.9	63.72			56.02	54.89	55.42		56.2		55.57	54.98	55.90
Na_2O	% m/m	0.013			0.022				0.01	0.020	0.01						0.09
K_2O	% m/m			0.17	0.03				0.00	0.030							
P_2O_5	% m/m								0.01	0.007							
H_2O^+	% m/m				0.3					1.45							
CO_2	% m/m				43.9	44.01				41.52	42.95						
LOI	% m/m			43.58	43.3	43.96			41.78	43.92	44.09		44.3		43.70	43.94	42.88
Ag	mg kg^{-1}																0.1
As	mg kg^{-1}												0.9				2
Au	mg kg^{-1}																
B	mg kg^{-1}																0.9
Ba	mg kg^{-1}				34		1.42					3	1.6	1.31	7		0.6
Be	mg kg^{-1}																0.2
Bi	mg kg^{-1}				0.25												
Br	mg kg^{-1}	0.898			2.3												
Cd	mg kg^{-1}				3		0.314						0.3				0.5
Ce	mg kg^{-1}		0.32		0.4		0.304							0.34			
Cl	mg kg^{-1}																
Co	mg kg^{-1}				0.8		1.75						0.3	2.08			0.4
Cr	mg kg^{-1}				14.3		3.49						2.9	3.30			4.3
Cs	mg kg^{-1}				0.3		0.0127							0.012			
Cu	mg kg^{-1}				18		0.326						0.4				8
Dy	mg kg^{-1}				0.10		0.0939							0.105			
Er	mg kg^{-1}				0.09		0.0859							0.092			
Eu	mg kg^{-1}	0.0178			0.007		0.0198							0.0178			
F	mg kg^{-1}				68					70							
Ga	mg kg^{-1}						0.0589		2.4								
Gd	mg kg^{-1}						0.102							0.094			
Ge	mg kg^{-1}				0.9												
Hf	mg kg^{-1}				1.0		0.0187							0.010			
Hg	mg kg^{-1}				0.008												
Ho	mg kg^{-1}						0.0259							0.027			
I	mg kg^{-1}																
In	mg kg^{-1}																
Ir	mg kg^{-1}				0.011												
La	mg kg^{-1}	0.79			0.8		0.792							0.852			
Li	mg kg^{-1}																1.4

Table 4 Results submitted for CAL-S (limestone)

Round identifier		G62	G62	G63	G64	G67	G68	G68	F69	F70	G71	G71	G72	G74	G75	G76	G77
Sample		CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Lu	mg kg^{-1}	0.0106					0.0133							0.0128			
Mo	mg kg^{-1}												0.4	0.190			0.5
N	mg kg^{-1}					43											
Nb	mg kg^{-1}						0.0655		2.2					0.021	4		
Nd	mg kg^{-1}				0.4		0.357							0.375			
Ni	mg kg^{-1}								3.4				2.5	24.2			11
Os	mg kg^{-1}																
Pb	mg kg^{-1}				6		0.436						0.7	0.51			2
Pd	mg kg^{-1}																
Pr	mg kg^{-1}				0.092		0.0911							0.093			
Pt	mg kg^{-1}																
Rb	mg kg^{-1}				0.5		0.159							0.14			
Re	mg kg^{-1}																
Rh	mg kg^{-1}																
Ru	mg kg^{-1}																
S	mg kg^{-1}				400	376						2955					300
Sb	mg kg^{-1}		0.047														
Sc	mg kg^{-1}	0.0506			0.13		0.168							0.5			
Se	mg kg^{-1}				2								2.3				
Sm	mg kg^{-1}				0.04		0.0742							0.071			
Sn	mg kg^{-1}				5.1												1.5
Sr	mg kg^{-1}	250			227	241	250		209	254		192	25.5	264	202		210
Ta	mg kg^{-1}				0.7		0.0194							0.0019			
Tb	mg kg^{-1}				0.4		0.0137							0.015			
Te	mg kg^{-1}																
Th	mg kg^{-1}		0.0253		0.4		0.026							0.014			
Tl	mg kg^{-1}				0.05												
Tm	mg kg^{-1}						0.0138							0.013			
U	mg kg^{-1}	0.714			0.8		0.733						0.9	0.85			
V	mg kg^{-1}							45.5				6	1.8	2.03			3.5
W	mg kg^{-1}																
Y	mg kg^{-1}				2.1		1.81		3			3		2.373			1.9
Yb	mg kg^{-1}	0.0774					0.0784							0.0724			
Zn	mg kg^{-1}	13.5			19	17	17.6					15	12.2				16.5
Zr	mg kg^{-1}				0.7		0.304		17.9				0.7	0.25	7		

Table 5

Assigned values for CAL-S derived from robust statistics

	Assigned value Xa	Target precision Ha	Measured precision	Ratio measured/ target
MgO	0.3939	0.0091	0.0124	1.3655
CaO	55.5267	0.6067	0.0778	0.1283
CO_2	43.95	0.4974	0.1027	0.2065
LOI	43.7544	0.4955	0.0447	0.0903
Cd	0.365	0.034	0.026	0.764
Ce	0.4	0.037	0.03	0.807
Co	0.84	0.069	0.147	2.137
Cr	3.395	0.226	0.332	1.47
Cs	0.013	0.002	0.002	0.986
Dy	0.1105	0.0123	0.0057	0.4635
Er	0.08772	0.01012	0.00304	0.3007
Eu	0.02	0.0029	0.0009	0.2991
Gd	0.101	0.01141	0.00345	0.30203
Ho	0.0286	0.0039	0.0009	0.2295
La	0.89	0.072	0.034	0.471
Lu	0.0107	0.0017	0.0003	0.1531
Mo	0.2	0.0204	0.0306	1.5026
Nd	0.391	0.036	0.012	0.339
Pr	0.1	0.01131	0.0036	0.3179
Sm	0.071	0.00846	0.0034	0.40225
Sr	233.331	8.215	3.57	0.435
Tb	0.017	0.0025	0.0011	0.4297
Tm	0.012	0.0019	0.0008	0.4354
U	0.8162	0.0673	0.0218	0.3232
Y	2.2	0.1563	0.1002	0.6414
Yb	0.07489	0.00885	0.00254	0.28739
Zn	15	0.7982	0.6634	0.8312

Concentration units: Majors % m/m, traces mg kg^{-1}

Values were not assigned to elements omitted from this table owing to insufficient data or an unsatisfactory statistical distribution.

Table 6																
Z-scores calculated for results from the analysis of CAL-S (limestone)																
Round identifier	G1	G2	G3	G4	G5	G6	G8	G9	G9	G10	G11	G11	G12	G13	G14	G14
Sample	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Technique codes	A, M	X	X	X	M, X, W	G, A	X	X	X	X	X	X	A, M	AA	AA, A, W	AA, A, W
Data quality	2	2	2	1	1	1	2	1	2	2	1	2	2	1	1	2
MgO	-2.96	-4.17	1.98	8.36	16.05	0.12	-6.26	17.15		2.53		-10.65	-1.09	-4.82		-2.96
CaO	0.06	0.10	0.00	0.94	-0.52	-0.18	3.36	-1.20		-0.15	-0.51		-6.69	-0.52		-0.12
CO_2														-0.46		
LOI	0.16	0.17	0.12	-0.67		0.44			0.05	-0.05	-0.82			0.39		0.22
Cd														-1.91		-0.96
Ce	0.27			259.46	-1.08					143.24						
Co	-0.29	15.65					1.16									
Cr	-1.98	-0.87	12.40		2.68		8.20									
Cs	-0.75															
Dy	-0.43				-0.85											
Er	-0.38				-1.75											
Eu	0.00				-3.45											
Gd	-0.48				-0.09											
Ho	0.18				0.36											
La	0.00				-0.97											
Lu	-0.21				-0.41											
Mo	-1.23	-4.90		53.92	0.00			63.73								
Nd	0.40				-0.31											
Pr	0.44				-0.88											
Sm	-0.06				-0.12											
Sr	0.83	-0.82	0.95	-1.50	-0.77		-2.64	4.32		-1.48	-2.35		4.23	0.57		0.28
Tb	0.60				-2.80											
Tm	-0.53															
U	-0.12	-6.06			-0.24								-1.09			
Y	-0.96	2.56		-1.28	-0.64			21.75		8.96		12.16	-1.86			
Yb	-0.28				-0.55											
Zn	-1.88	0.00	-3.13	-3.76	7.52		3.13	0.75		5.01		-6.89		-3.38		-0.88

Table 6: Z-scores for CAL-S

Round identifier	G15	G15	G16	G18	G19	G21	G22	G22	G23	G24	G25	G26	G26	G28	G29	G31
Sample	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Technique codes	M	M	I	A, X, G, A	X, G, W	I	X, AA	X, AA	X	A, I, AA, G	A,M	X	X	X	X	G, AA, M
Data quality	1	2	2	1	1	1	1	2	2	2	2	1	2	1	2	1
MgO				-8.89	5.84		0.67		12.42	-0.21	-0.76	11.66		6.16	1.98	
CaO				0.78	-0.64		-0.80		-0.05	0.64	0.63	0.70		1.08	0.12	0.22
CO_2				0.90	0.45											
LOI				-0.72	-1.38		-0.86		0.03	0.15	-0.03	-0.09		-0.11	2.19	-0.63
Cd																
Ce	-2.92			-1.08	491.89	3.51										
Co			5.36			-11.59						147.25				
Cr			-0.21	-6.48	132.77	-6.17		16.83						1.35		
Cs	-2.15			-6.50		-2.50										
Dy	-0.90			0.77						36.16						
Er	-0.64															
Eu	-1.79		2.41			3.45										
Gd	-0.89															
Ho	-0.82															
La	-2.06		0.42	-2.92		-1.11					4.24		209.10			
Lu	0.06		0.09													
Mo						3.92										
Nd	-1.44			-1.14						522.35						
Pr	-1.48			0.00												
Sm	-1.69		3.49			-6.09				1.71						
Sr	-0.89			0.81	-1.77	-1.14		-14.20			1.56	-3.33		-0.04	-0.63	
Tb	-1.36					-1.60										
Tm	-0.42															
U	-10.90		-0.71	-1.13		0.21				-0.12						
Y	-2.88			-2.56	5.12									1.28		
Yb	-0.65					-0.10										
Zn				-4.64	3.76	-1.25		-3.13		5.01		0.00		0.00	0.00	

Table 6: Z-scores for CAL-S

Round identifier	G31	G32	G33	G34	G34	G35	G35	G36	G37	G38	G39	G39	G40	G42	G43	G43
Sample	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Technique codes	G, AA, M	X	A, M, O	I	I	X	X	, A, V, SI,	X, M	M, X	A, X	A, X	A, M, X	A, W	), E, AA, I	), E, AA, I
Data quality	2	1	2	1	2	1	2	2	2	2	1	2	2	2	1	2
MgO	-12.30	2.87	1.43			17.15		-2.41	0.88	-0.49	-18.67		-1.97	-7.36		3.14
CaO		1.60	0.14		3.28	-1.93		0.06	-0.10	-0.62	-0.13		-0.02	-0.20		0.46
CO_2			-0.46					0.05								
LOI		0.25	-0.38			-0.84		0.07	0.10	0.18	0.21		0.52	-0.15		0.47
Cd	-2.87		1.10					0.51	-1.10	3.46						2.57
Ce	-0.27		4.35	0.57		245.95		-0.27	0.00	16.62			-1.89			
Co	0.00		-2.97			2.32			-0.51	-3.80						
Cr	171.03				1.83	15.95		-3.09	-4.41	1.34		-3.09				
Cs	1.25							-0.75		9.25						
Dy	-2.46		-1.57					-0.02	-0.02	1.08			-0.02		-0.04	
Er	8.02		-0.73					0.11	0.61	-0.28			-0.33		-0.07	
Eu	7.24		0.17	3.79				0.00	0.00	0.34					-2.07	
Gd	3.90							0.39	-0.04	1.05			1.71		-0.70	
Ho	10.44		-1.49	-0.15				0.18	0.18	0.05					0.62	
La	1.39		1.04	-1.38		-12.36		0.42	0.76	0.50		-1.60	-0.56			
Lu	29.21		-0.21	0.76				-0.21	-0.21	0.09					1.94	
Mo	-4.63		-0.25						3.92							
Nd	3.74			0.00				0.54	0.68	-0.26			0.26		-0.03	
Pr	2.65							0.44	0.88	-0.35			-0.44		2.65	
Sm	4.08			0.00				-0.06	-0.06	1.83					1.06	
Sr	0.92	1.06	0.71			-0.10		0.71	-0.32	0.09	0.08		-3.85		-0.41	
Tb	5.80		-0.40	1.60				-0.40	0.60	0.60		56.60			-0.80	
Tm	94.21		0.53					-0.53	-0.53	0.00					0.00	
U			0.03		-0.34			0.62	0.47	0.30		8.79				
Y	-1.25		-0.67			11.52		-0.32	-0.32	3.84		-0.80			-1.73	
Yb	3.68		-1.07	-1.12				-0.28	0.29	0.40		-1.41	-0.45		1.26	
Zn	10.07		-1.88			-1.88		0.00	-1.88			1.88	-7.14			10.02

Table 6: Z-scores for CAL-S

Round identifier	G44	G45	G46	G47	G48	G49	G49	G50	G53	G54	G55	G56	G57	G57	G61	G62
Sample	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Technique codes	X	A, AA,	V, AA, G,	A, X, AA	M, X	X	X	M	X	A, A, M,	X, AA	X	M	M	A, M, X	I
Data quality	1	1	1	2	2	1	2	1	2	2	2	2	1	2	1	1
MgO	9.46	-3.73	-0.43	-7.91	-1.86	0.67			-0.38	-3.51		-2.41			58.91	-0.43
CaO	-1.68		-1.13	0.20	-0.14	-0.69			0.19	0.25		-0.02			-0.54	-0.19
CO_2			-3.12							0.25					0.42	
LOI	-0.11		-0.33	0.37	0.11		0.15		-0.02	-0.36					-0.09	
Cd		136.32		4.19	-0.81						0.51				-1.03	
Ce					-1.35		35.14	2.97		13.51				-0.53		
Co		-4.93												1.96		
Cr		2.68		-1.54		-15.02			-2.42					2.82	-1.75	
Cs					-0.75			3.50		321.75				5.00		
Dy					0.18			3.21		3.64				-0.47		
Er					0.21			2.20		0.61				-0.68		
Eu				31.03	-0.52			0.00						-0.34		-0.76
Gd					0.00			2.54		4.34				-0.35		
Ho					-0.46			2.92						-0.21		
La				7.71	-1.01		56.32	6.11		4.93		91.04		-0.86	1.39	-1.39
Lu								-0.41						-0.21		-0.06
Mo		14.71			-1.23									0.98	0.00	
Nd										9.85				-2.58		
Pr					0.00			7.96		8.84				-2.56		
Sm					-0.06			3.43		7.62				-0.59		
Sr		14.20		1.32	0.67	0.32		7.99	-0.48	-3.49	-0.45	2.84	4.46		-1.38	2.03
Tb								1.20						0.00		
Tm								4.21						-0.26		
U					0.23			2.58		5.08				0.03	1.39	-1.52
Y		9.60		-2.24	-1.12	5.12		2.88	0.00	12.16	1.60			-1.15	0.64	
Yb					-0.28			1.71		1.42				0.12		0.28
Zn		38.84		1.63	-0.75	0.00			-1.38	0.63		34.45		-1.19	-4.89	-1.88

Table 6: Z-scores for CAL-S

Round identifier	G62	G63	G64	G67	G68	G68	F69	F70	G71	G71	G72	G74	G75	G76	G77
Sample	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S	CAL-S
Technique codes	I	AA	A, M, I, X	X, O	M	M	X	W	X, T, IR	X, T, IR	M, X	M	X	W	A
Data quality	2	1	2	1	1	2	2	1	1	2	1	1	2	2	2
MgO		20.45	-2.41	8.36			1.98	-2.63	-1.53		-35.59		4.18		-2.96
CaO		-5.15	0.31	13.50			0.41	-1.05	-0.18		1.11		0.04	-0.45	0.31
CO_2			-0.05	0.12			-44.18	-4.89	-2.01						
LOI		-0.35	-0.46	0.41			-1.99	0.33	0.68		1.10		-0.05	0.19	-0.88
Cd			38.75		-1.50						-1.91				1.99
Ce	-1.08		0.00		-2.59							-1.62			
Co			-0.29		13.19						-7.83	17.97			-3.19
Cr			24.13		0.42						-2.19	-0.42			2.00
Cs			71.75		-0.15							-0.50			
Dy			-0.43		-1.35							-0.45			
Er			0.11		-0.18							0.42			
Eu			-2.24		-0.07							-0.76			
Gd					0.09							-0.61			
Ho					-0.69							-0.41			
La			-0.63		-1.36							-0.53			
Lu					1.53							1.24			
Mo											9.80	-0.49			
Nd			0.13		-0.94							-0.44			
Pr			-0.35		-0.79							-0.62			
Sm			-1.83		0.38							0.00			
Sr			-0.39	0.93	2.03		-1.48	2.52		-2.52	-25.30	3.73	-1.91		-1.42
Tb			76.60		-1.32							-0.80			
Tm					0.95							0.53			
U			-0.12		-1.24						1.25	0.50			
Y			-0.32		-2.50		2.56			2.56		1.11			-0.96
Yb					0.40							-0.28			
Zn			2.51	2.51	3.26					0.00	-3.51				0.94

Table 7

Analysts and laboratories that contributed results to the GeoPT6 and GeoPT6A rounds.

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Figure captions

Figure 1

OU-3 (Nanhoron microgranite): Selection of data distribution charts for elements for which consensus values could not be assigned owing to the non-normal distribution of contributed results. Charts are plotted for MgO, CaO, P_2O_5, Co, Sc, V, W, Y. Horizontal lines show the limits for $-2<z<2$ for pure geochemistry labs (solid lines) and $-2<z'<2$ for applied geochemistry labs (pecked lines).

Figure 2

CAL-S (CRPG limestone): Selection of data distribution charts for elements for which consensus values could not be assigned owing to the non-normal distribution of contributed results. Charts are plotted for SiO_2, TiO_2, Al_2O_3, Fe_2O_3, MnO, K_2O, Na_2O, Ba, Cd, Cu, Ga, Hf, Nb, Ni, Pb, Rb, S, Sb, Sc, Sn, Ta, Th, V, and Zr. See the Figure caption for Figure 1 for other details.

Figure 3

OU-3 (Nanhoron microgranite): Performance summary plot for laboratories in which the symbols indicate whether an elemental result complies with the $-2<z<+2$ criteria (plotted as '.'). Data for other categories are plotted as follows: $-3<z<-2$ (▼), $+2<z<+3$ (▲), $z<-3$ (▼), $Z>+3$ (▲).

Figure 4

CAL-S (CRPG limestone): Performance summary plot for laboratories using the same symbols as listed in Figure 3.

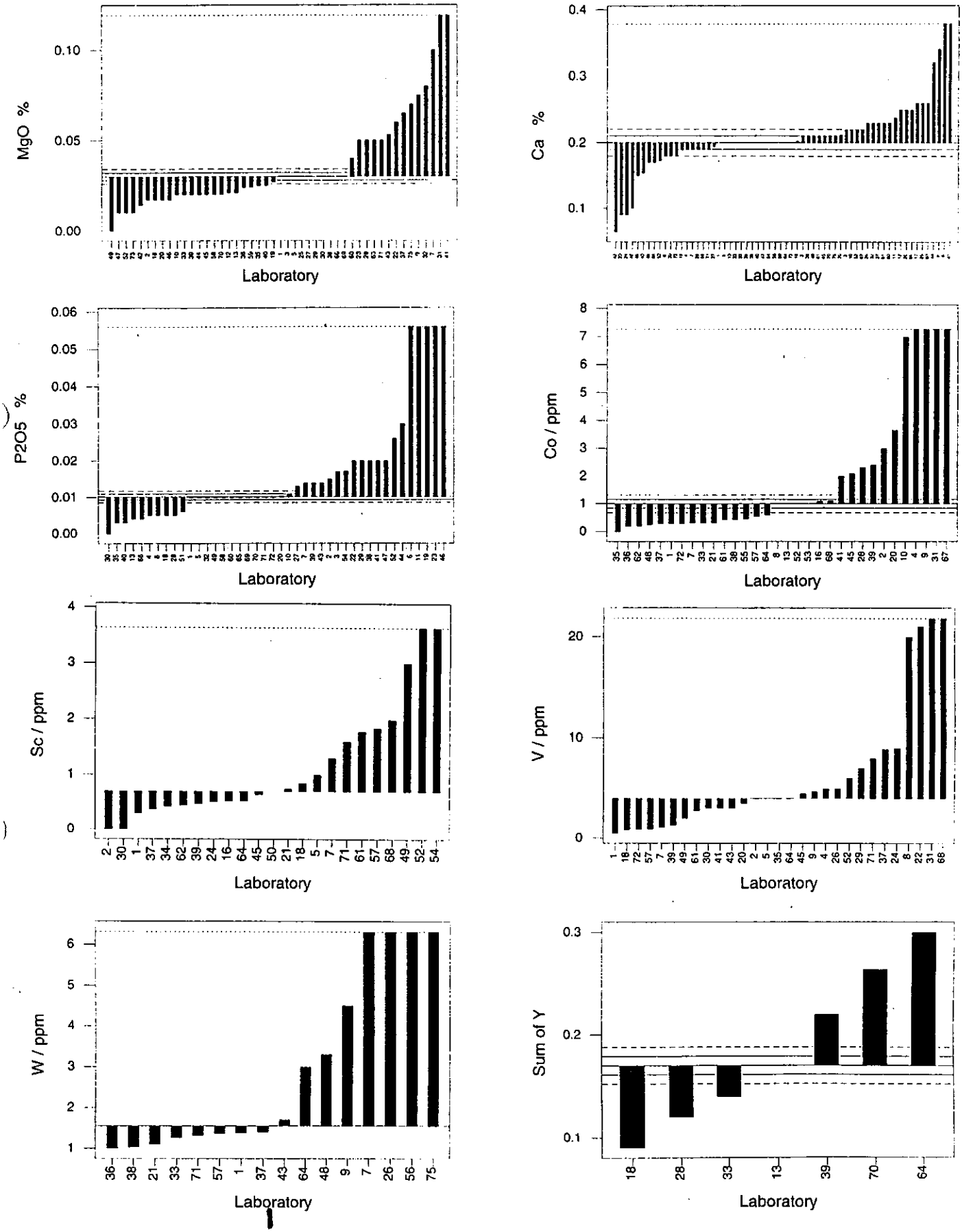


Figure 1

OU-3 (Nanhoron microgranite): Selection of data distribution charts for elements for which consensus values could not be assigned owing to the non-normal distribution of contributed results. Charts are plotted for MgO, CaO, P_2O_5, Co, Sc, V, W, Y. Horizontal lines show the limits for $-2<z<2$ for pure geochemistry labs (solid lines) and $-2<z'<2$ for applied geochemistry labs (pecked lines).

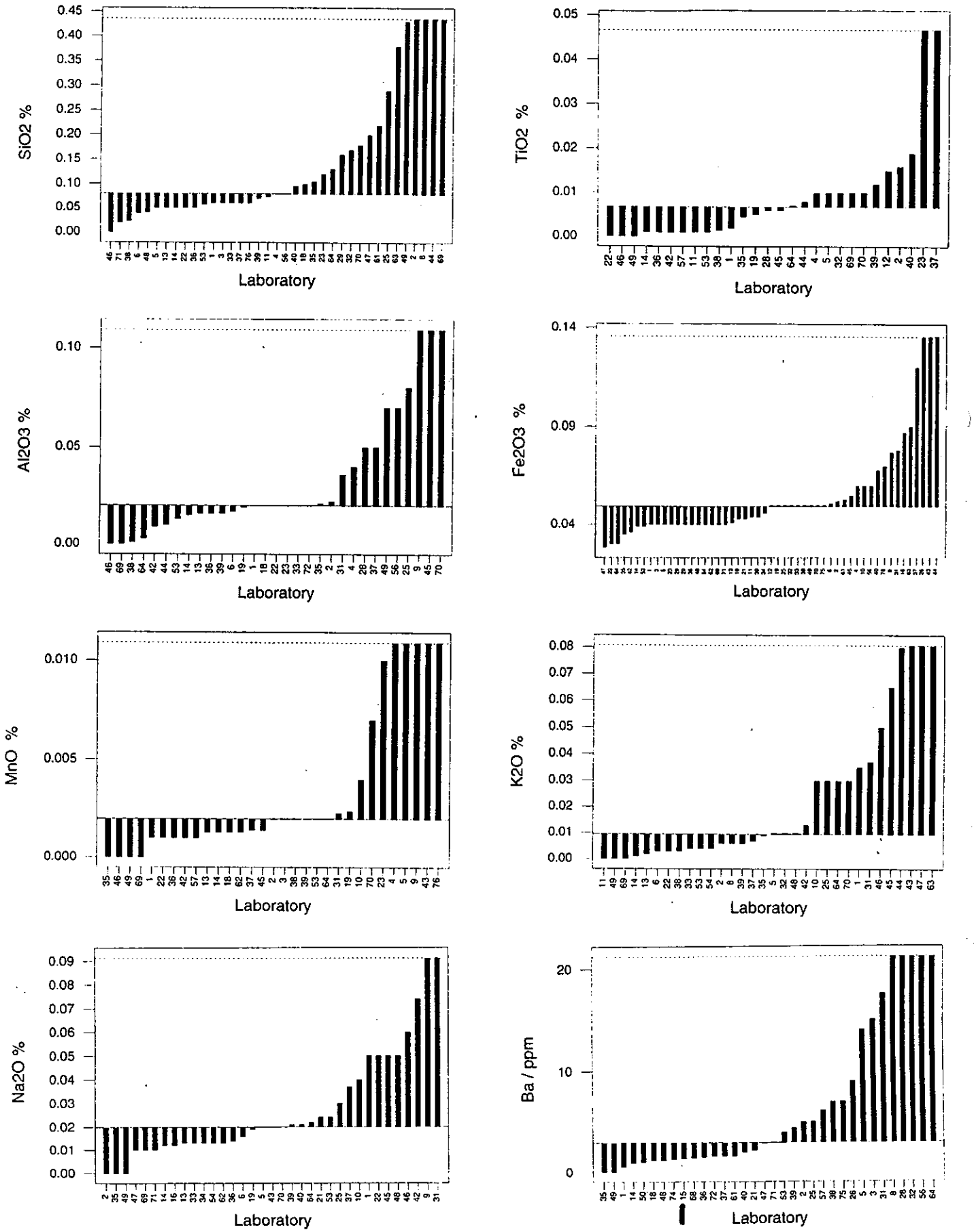
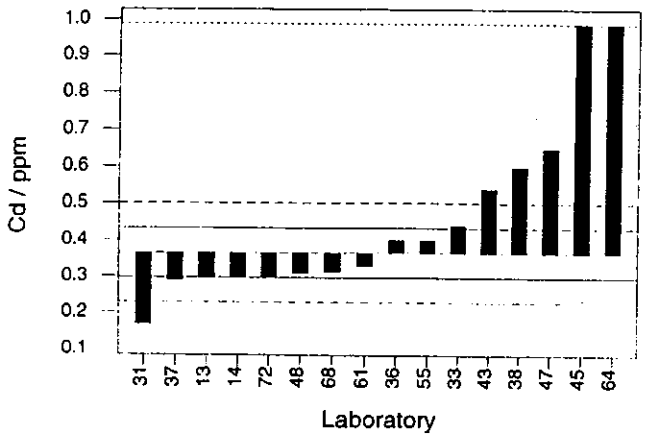
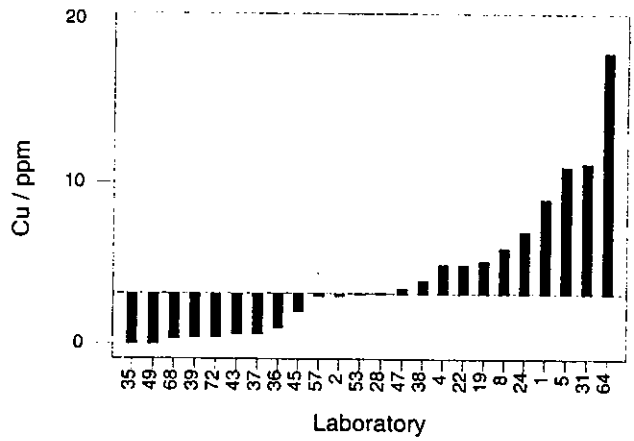
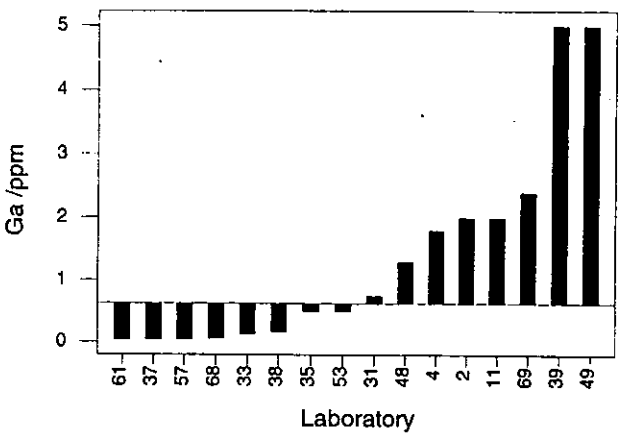


Figure 2
CAL-S (CRPG limestone): Selection of data distribution charts for elements for which consensus values could not be assigned owing to the non-normal distribution of contributed results. Charts are plotted for SiO_2, TiO_2, Al_2O_3, Fe_2O_3, MnO, K_2O, Na_2O, Ba, Cd, Cu, Ga, Hf, Nb, Ni, Pb, Rb, S, Sb, Sc, Sn, Ta, Th, V, and Zr. See the Figure caption for Figure 1 for other details.


Cd / ppm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
31 37 13 14 72 48 68 61 36 55 33 43 38 47 45 64
Laboratory


Cu / ppm
20
10
0
35 49 68 39 72 43 37 36 45 57 2 53 28 47 38 4 22 19 8 24 1 5 31 64
Laboratory


Ga /ppm
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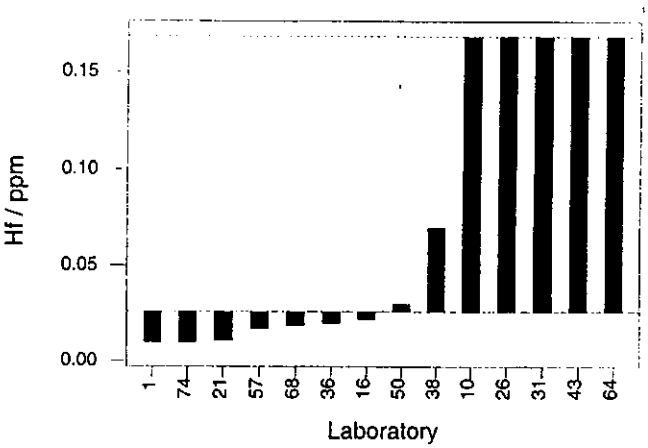
4
3
2
1
0
61 37 57 68 33 38 35 53 31 48 4 2 11 69 39 49
Laboratory


Hf / ppm
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0.10
0.05
0.00
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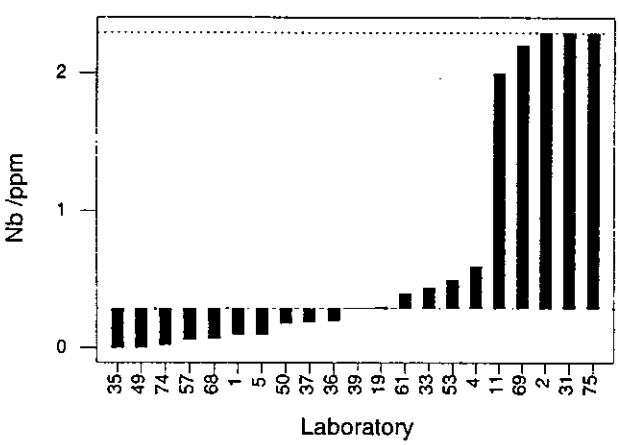
Laboratory


Nb /ppm
2
1
0
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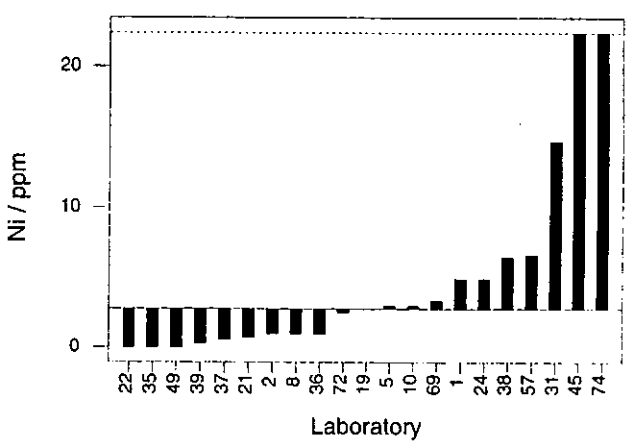
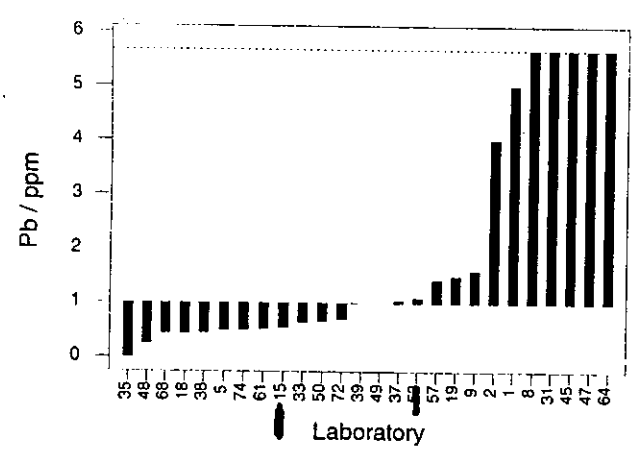
Laboratory


Ni / ppm
20
10
0
22 35 49 39 37 21 2 8 36 72 19 5 10 69 1 24 38 57 31 45 74
Laboratory


Pb / ppm
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5
4
3
2
1
0
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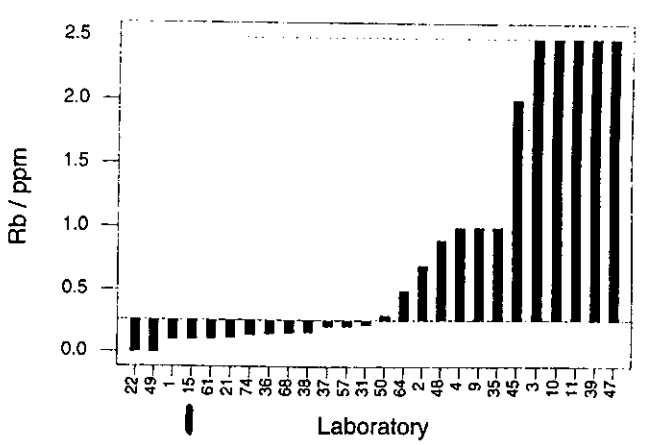
Laboratory


Rb / ppm
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2.0
1.5
1.0
0.5
0.0
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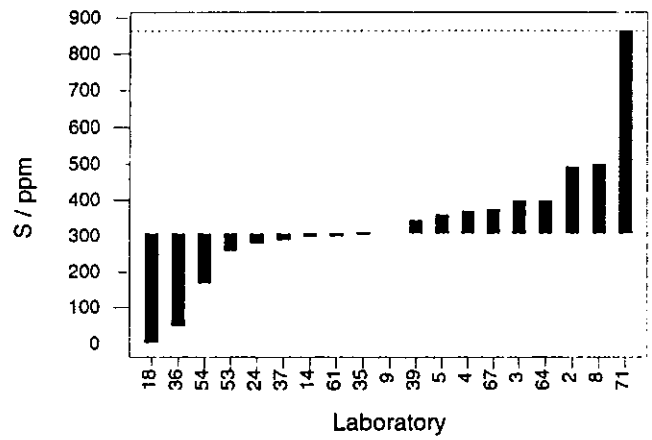
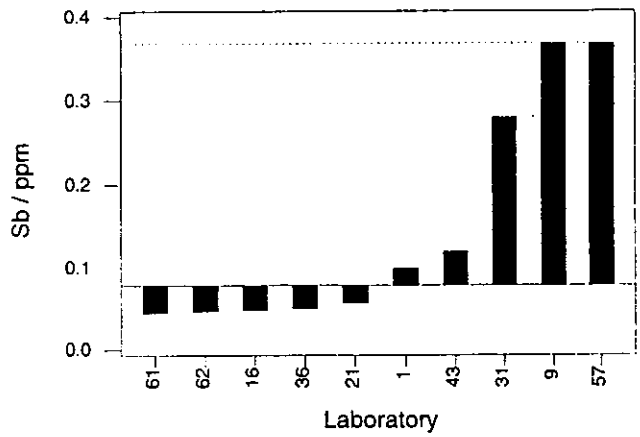
Laboratory

Figure 2(b)


S / ppm
900
800
700
600
500
400
300
200
100
0
18 36 54 53 24 37 14 61 35 9 39 5 4 67 3 64 2 8 71
Laboratory


Sb / ppm
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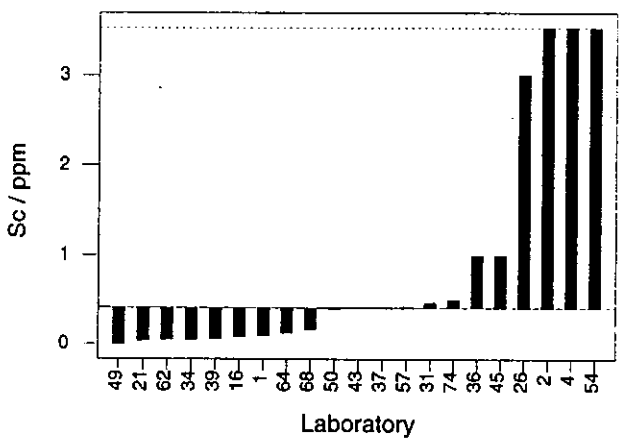
0.3
0.2
0.1
0.0
61 62 16 36 21 1 43 31 9 57
Laboratory


Sc / ppm
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2
1
0
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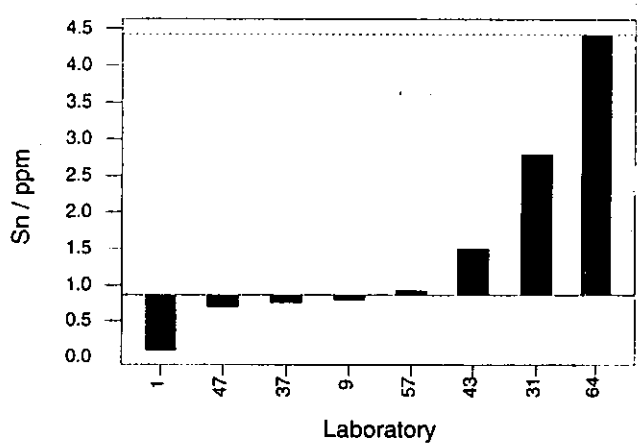
Laboratory


Sn / ppm
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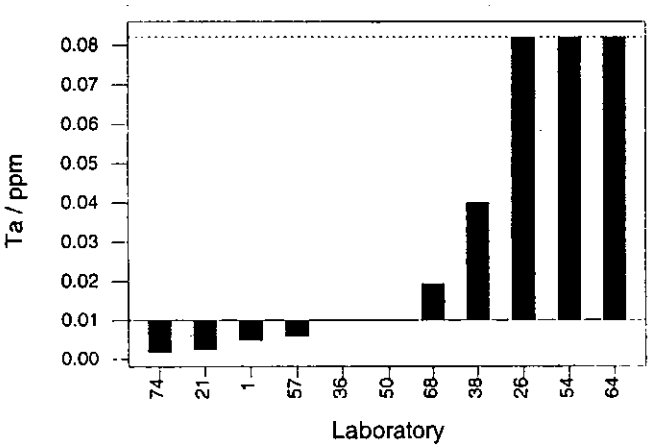
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1 47 37 9 57 43 31 64
Laboratory


Ta / ppm
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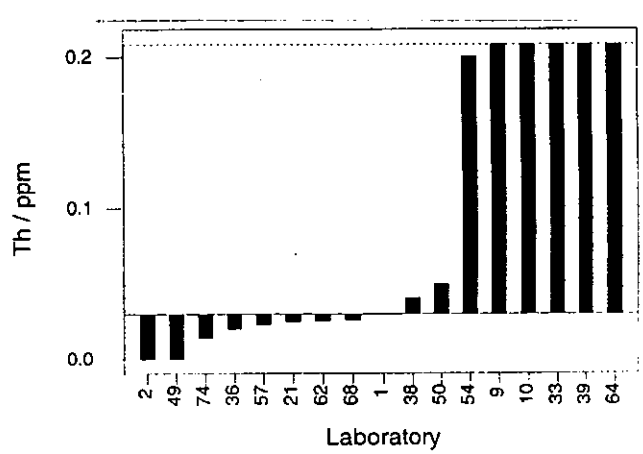
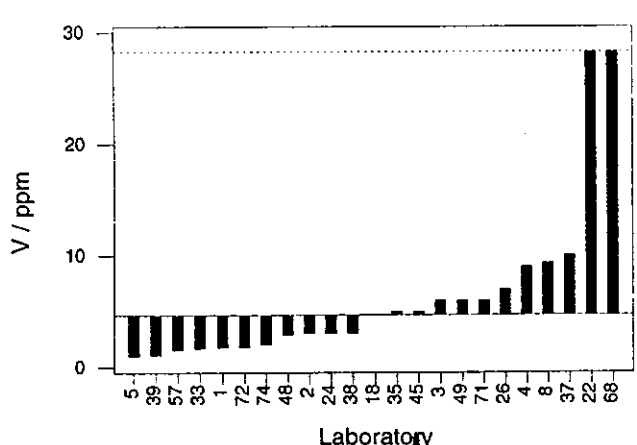
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
74 21 1 57 36 50 68 38 26 54 64
Laboratory


Th / ppm
0.2
0.1
0.0
2 49 74 36 57 21 62 68 1 38 50 54 9 10 33 39 64
Laboratory


V / ppm
30
20
10
0
5 39 57 33 1 72 74 48 2 24 38 18 35 45 3 49 71 26 4 8 37 22 68
Laboratory

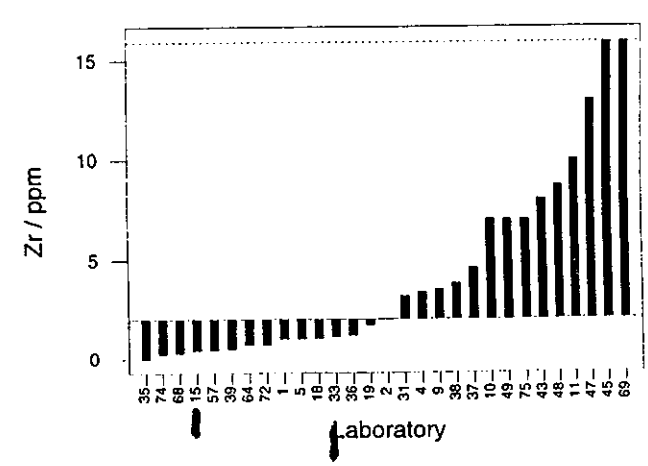

Zr / ppm
15
10
5
0
35 74 68 15 57 39 64 72 1 5 18 33 36 19 2 31 4 9 38 37 10 49 75 43 48 11 47 45 69
Laboratory

Figure 2(c)

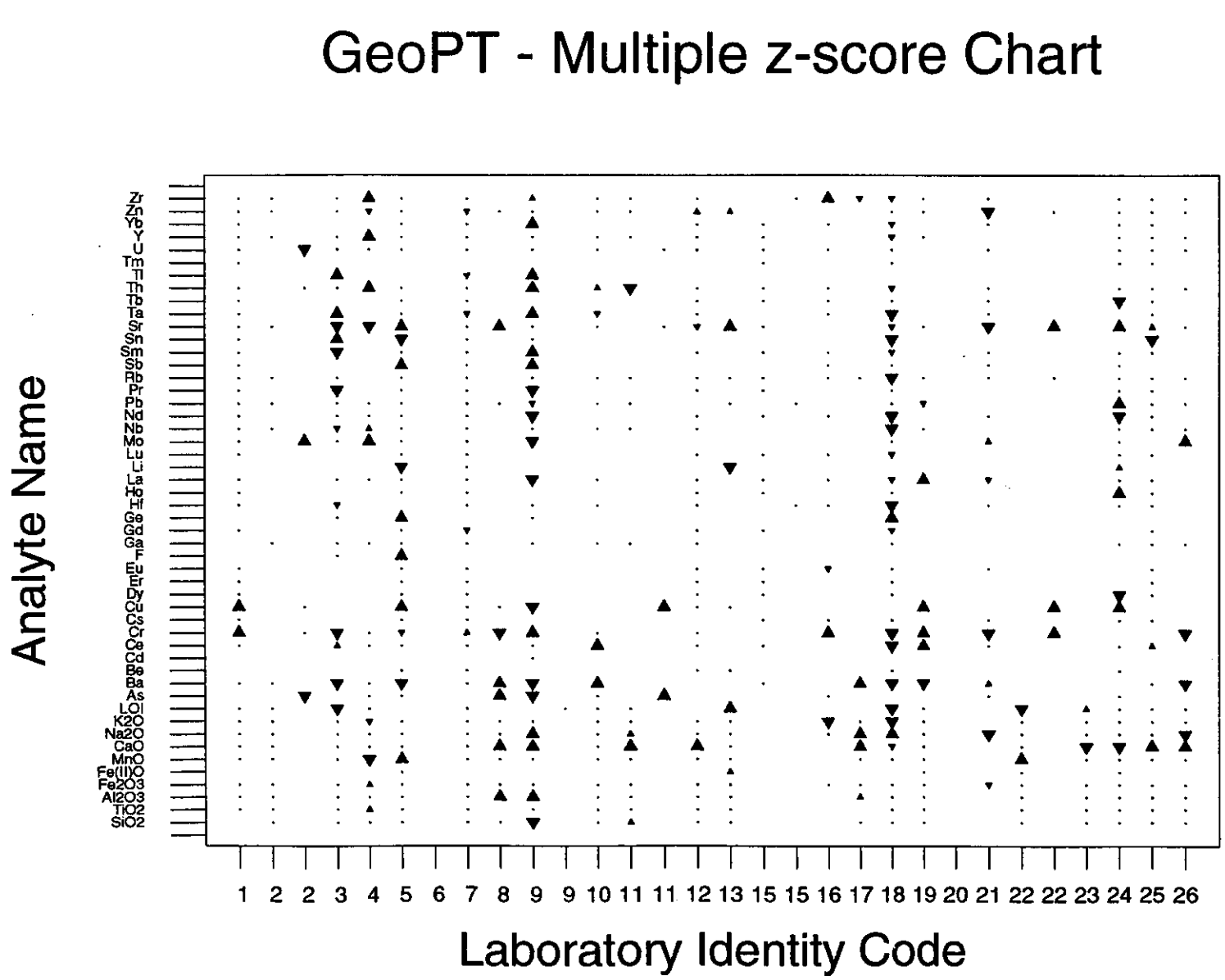


Figure 3
OU-3 (Nanhoron microgranite): Performance summary plot for laboratories in which the symbols indicate whether an elemental result complies with the -2<z<+2 criteria (plotted as '.'). Data for other categories are plotted as follows: -3<z<-2 (▼), +2<z<+3 (▲), z<-3 (▼), Z>+3 (▲).

GeoPT - Multiple z-score Chart

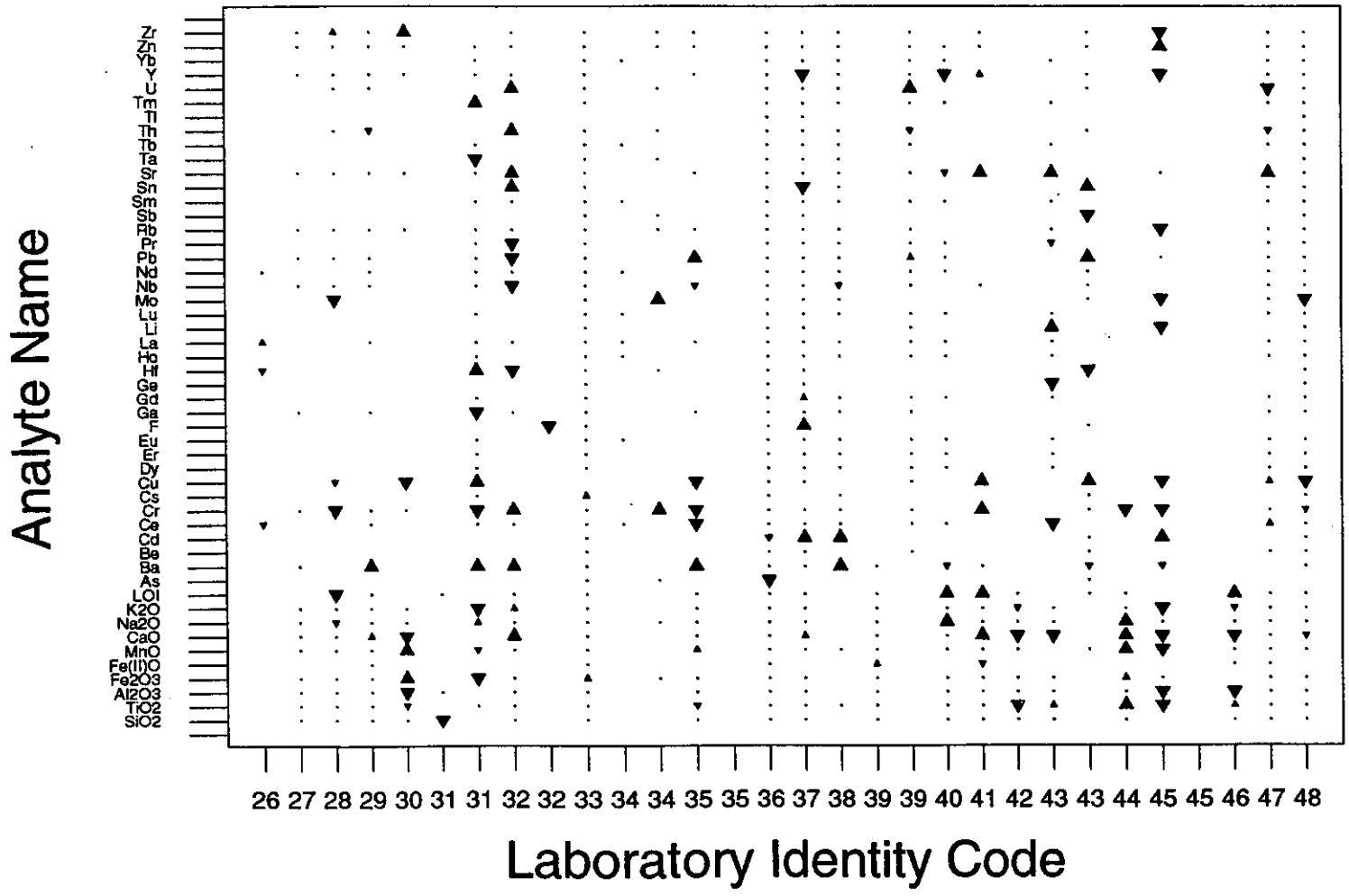


Figure 3b

GeoPT - Multiple z-score Chart

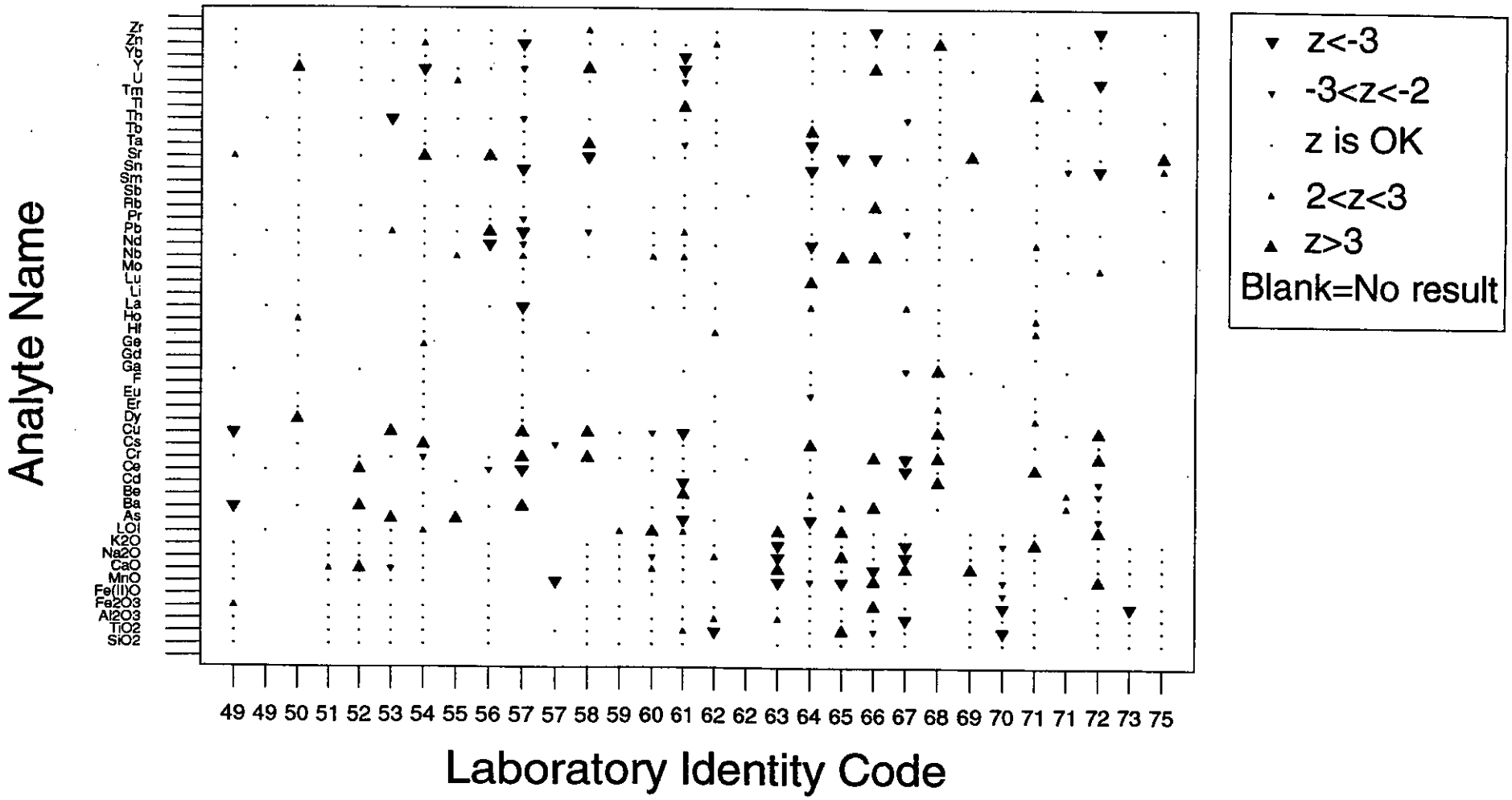


Figure 3c

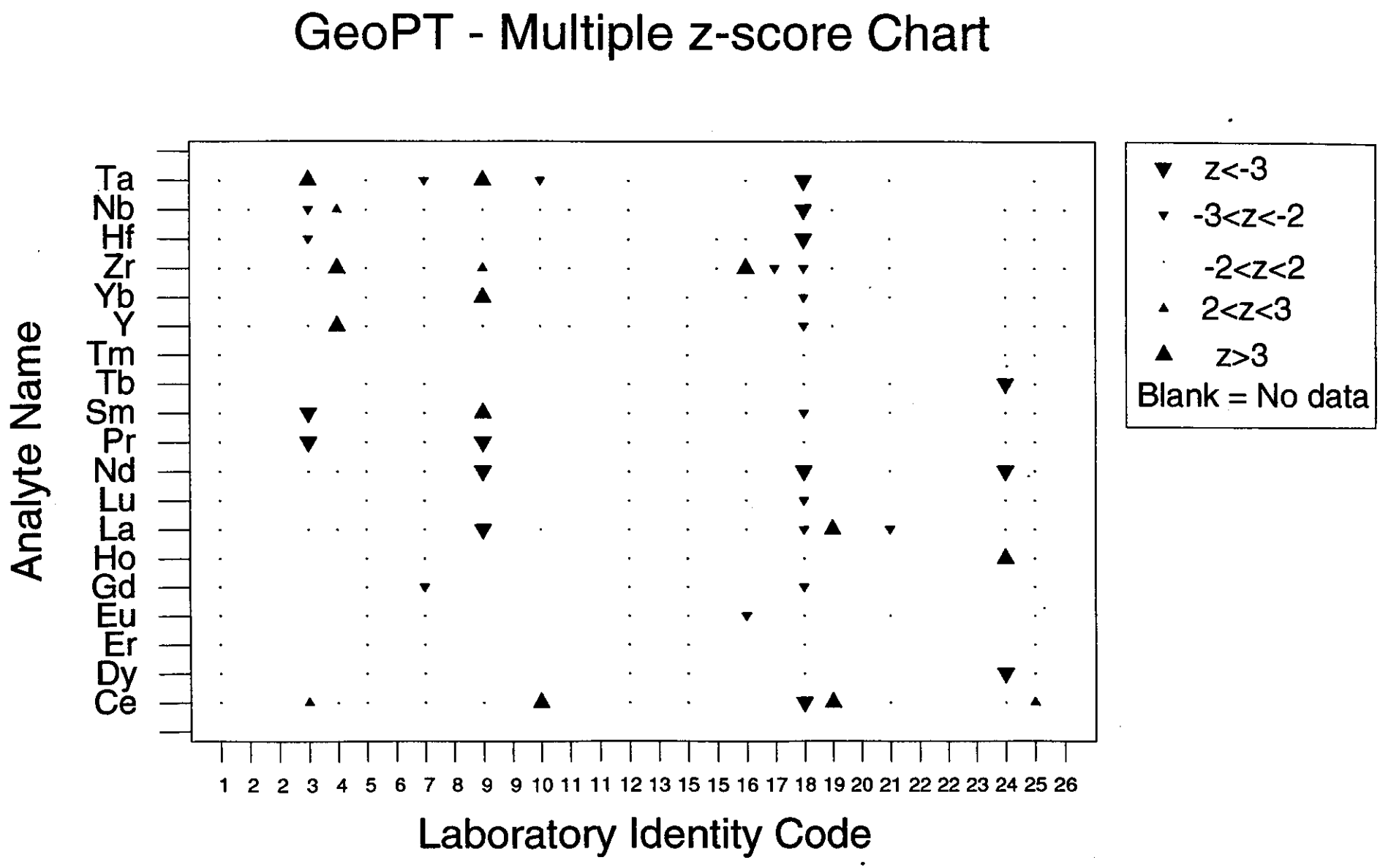


Figure 4
CAL-S (CRPG limestone): Performance summary plot for laboratories using the same symbols as listed in Figure 3.

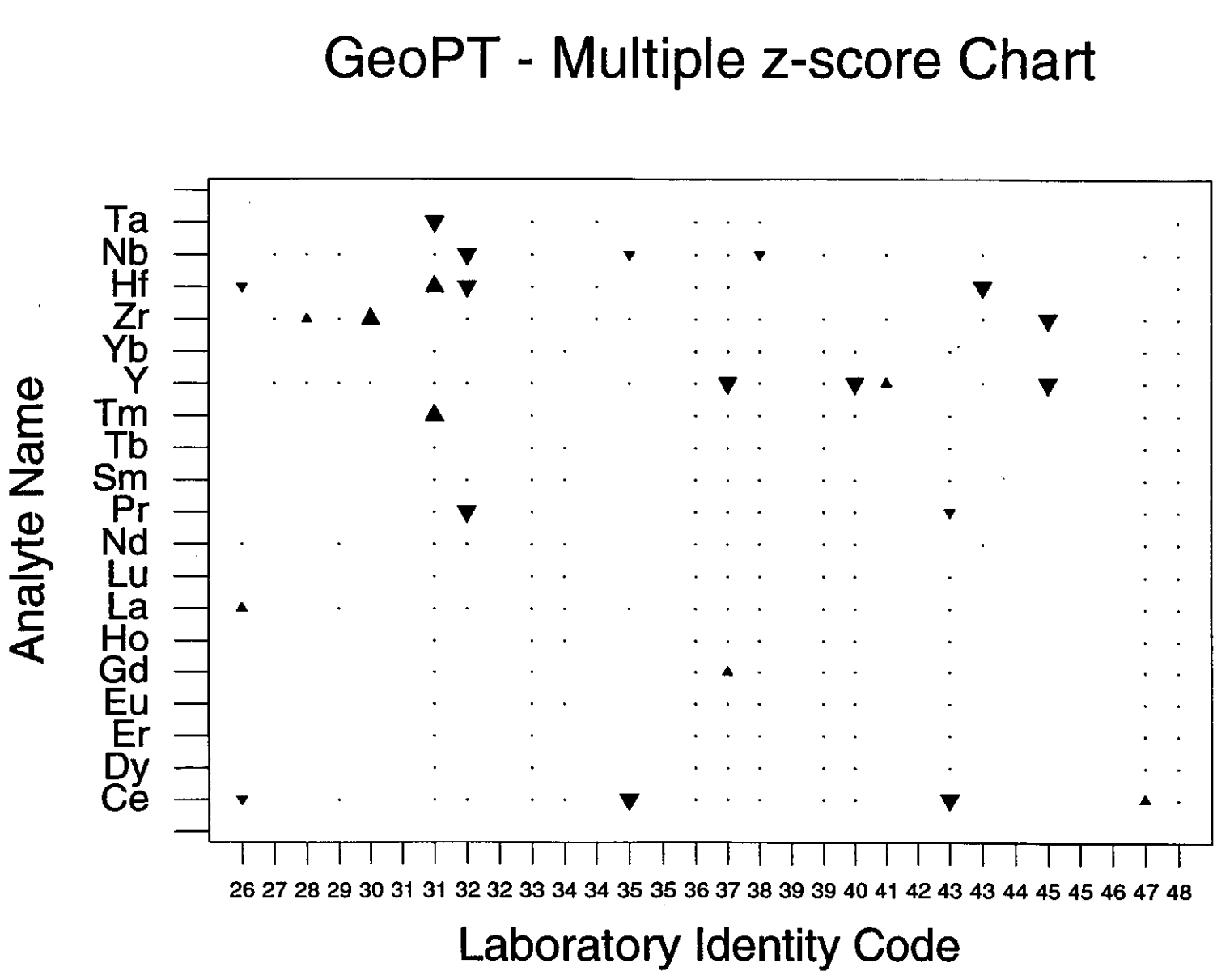

GeoPT - Multiple z-score Chart
Analyte Name
Ta
Nb
Hf
Zr
Yb
Y
Tm
Tb
Sm
Pr
Nd
Lu
La
Ho
Gd
Eu
Er
Dy
Ce
26 27 28 29 30 31 31 32 32 33 34 34 35 35 36 37 38 39 39 40 41 42 43 43 44 45 45 46 47 48
Laboratory Identity Code

Figure 4b

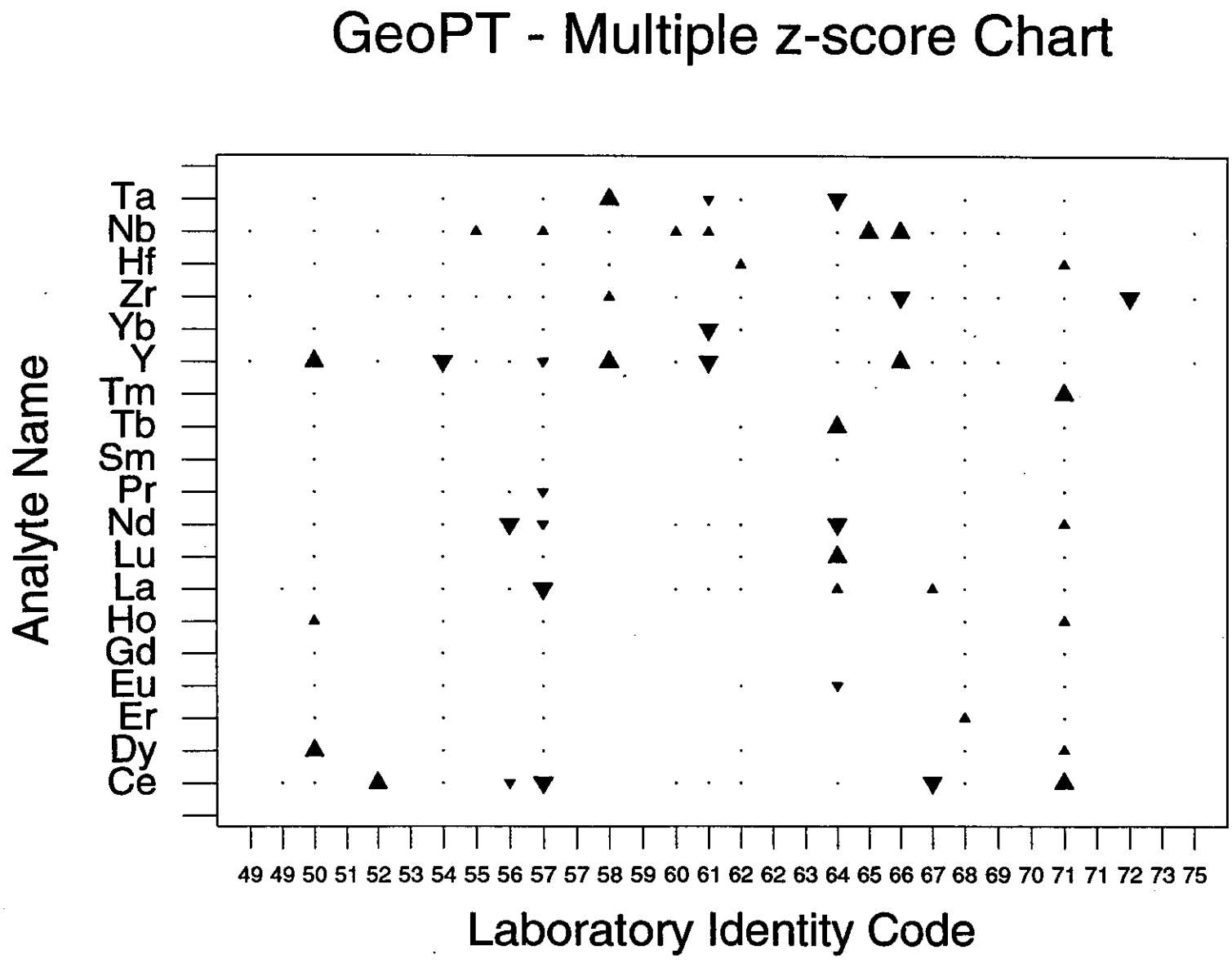

GeoPT - Multiple z-score Chart
Analyte Name
Ta
Nb
Hf
Zr
Yb
Y
Tm
Tb
Sm
Pr
Nd
Lu
La
Ho
Gd
Eu
Er
Dy
Ce
49 49 50 51 52 53 54 55 56 57 57 58 59 60 61 62 62 63 64 65 66 67 68 69 70 71 71 72 73 75
Laboratory Identity Code

Figure 4c