

## GeoPT9 - OU-6, Penrhyn Slate

**Veranstalter:** International Association of Geoanalysts and Geostandards Newsletter - GeoPT9

**Ringversuchsmaterial:** OU-6, Penrhyn Slate

**RV geschlossen:** 2001 – 8

**Literatur:** Proficiency Testing Report GeoPT9 (Laborcode CRB = J2)

### Hauptelemente [MA%]

	CRB	RV	1sRV	Z-Score
Na <sub>2</sub> O	1,69	1,77	0,03	
MgO	2,31	2,4	0,04	
Al <sub>2</sub> O <sub>3</sub>	20,58	20,2	0,03	
SiO <sub>2</sub>	57,57	57,51	0,1	
P <sub>2</sub> O <sub>5</sub>	0,117	0,118	0,002	
K <sub>2</sub> O	3,08	3,05	0,012	
CaO	0,74	0,74	0,005	
TiO <sub>2</sub>	1,01	0,998	0,004	
Fe <sub>2</sub> O <sub>3</sub> tot	9,03	9,001	0,033	
MnO	0,284	0,284	0,001	

### Spurenelemente [µg/g]

	CRB	RV	1sRV	Z-Score
As	17	13	0,45	
Ba	491	477	4,8	
Ce	73	74,4	1,1	
Co	31	29,1	0,48	
Cr	54	70	1,39	
Cu	27	39	0,48	
Ga	27	24,3	0,29	
Hf	3,5	4,7	0,09	
La	66	33	0,51	
Nb	12	14,79	0,31	
Nd	24	29,01	0,52	
Ni	45	39,83	0,71	
Pb	19	28	0,5	
Pr	7	7,8	0,13	
Rb	119	120,2	0,9	
Sm	5,6	5,92	0,08	
Sn	4,4	2,7	0,11	
Sr	131	130,9	1,16	
Th	9,7	11,5	0,49	
Tl	0,5	0,53	0,02	
U	2,3	1,96	0,02	

V	127	129,4	1,63
Y	26	27,35	0,47
Zn	120	118,2	1,4
Zr	169	174,1	1,6

## Legende

**CRB:** Ergebnisse CRB – **RV:** Ergebnisse Ringversuch -- **1s-RV:** Standardabweichung Ringversuch

**Z-Score:** Differenz des Messwertes vom Mittelwert des Ringversuchs -- \* Wert nicht zertifiziert

# **GEOPT9 - AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES - REPORT ON ROUND 9 / July 2001 (OU-6 Penrhyn slate).**

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## **Abstract**

Results are presented for round nine, GeoPT9, of the international proficiency testing programme for analytical geochemistry laboratories. The sample distributed for this round was OU-6 Penrhyn slate, a sample collected and prepared by The Open University as a proficiency testing sample. In this report, contributed data are listed, together with an assessment of assigned values, z-scores and charts showing both the distribution of contributed results and the overall performance of participating laboratories.

## **Introduction**

This ninth round of the international proficiency testing programme, GeoPT9, was conducted in a similar manner to earlier rounds. The programme is designed to be part of the routine quality assurance scheme of 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 value assigned to be the best estimate of the true composition. These assigned values were estimated

by robust statistical analysis of all the contributed data. By examining the magnitude of the z-score, participating laboratories can decide whether the quality of their data is satisfactory in relation to both their chosen fitness-for-purpose criteria and results submitted by all the other laboratories contributing to the round and choose to take corrective action if this appears justified.

Full details of the programme have been included in reports of previous rounds, the current publication status of which is listed in Appendix 1. In this report, therefore, only the features of the present round are included and readers interested in further details are invited to review the previously published reports.

## **Steering Committee for Round 9: M.**

Thompson (Chair), P.J. Potts (Secretary), P.C Webb and J.S. Watson.

**Sample:** OU-6 is slate from the Penrhyn Slate Quarries, Bethesda, North Wales. (UK grid reference SH 615 643). The sample was obtained from powdered material prepared as a commercial product. The Penrhyn slate quarry is situated in a belt of well cleaved Cambrian slates that extends N-S across part of

Snowdonia. Much of the rock is a fine grained purplish grey slate. Originally deposited as a mud, the rock became recrystallised during low grade metamorphism, when the fine grained mica was aligned under the influence of Caledonian deformation to produce the slaty cleavage. However, the rock remains mineralogically homogeneous on a fine scale, except for occasional green reduction ( $\text{Fe}^{2+}$ ) spots and crystals of pyrite.

The sample was tested for homogeneity by selecting at random ten of the packets prepared for distribution. Duplicate test portions from each packet were analysed by WD-XRF at the OU. For the elements that could be evaluated from these results, homogeneity was considered to be satisfactory for use in the GeoPT9 round. A breakdown of these results is listed in Appendix 2.

#### **Timetable for GeoPT9:**

Distribution of sample: March 2001.

Deadline for submission of analytical results: 15th May 2001.

Distribution of preliminary report: July 2001

#### **Submission of results**

Results were submitted by the seventy-eight laboratories in this round. All results submitted under codes J1 to J74 and listed in Table 1 contributed to the assessment of assigned values. The remaining results were not included in this assessment owing to late submission.

#### **Assigned values**

Following procedures described in earlier rounds, a robust statistical procedure was used to derive assigned value concentrations  $[X_a]$ , these being judged to be the best estimates of the true composition of this sample. Data in Table 2 lists assigned values for 12 major and 41 trace elements. Values were assigned on the basis that: (i) Sufficient laboratories had contributed data for

an element. (ii) The statistical assessment gave confidence that the results showed a central tendency approximating to a normal distribution. Part of this assessment involved examining a bar chart for each element to judge the distribution of results. Bar charts for elements shown in Figure 1 were judged to have satisfactory distributions, namely:  $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{FeO}$ ,  $\text{MnO}$ ,  $\text{MgO}$ ,  $\text{CaO}$ ,  $\text{Na}_2\text{O}$ ,  $\text{K}_2\text{O}$ ,  $\text{P}_2\text{O}_5$ , LOI, As, Ba, Be, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Ga, Gd, Hf, Ho, La, Li, Lu, Nb, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Sm, Sn, Sr, Ta, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn, Zr.

Charts in Figure 2 show data for elements:  $\text{H}_2\text{O}^+$ ,  $\text{CO}_2$ , B, Bi, Cd, Cl, F, Ge, Mo, W. that were not judged to be satisfactory in the statistical analysis to assign values. In the present round, values could not be assigned to these elements.

Insufficient data were available to present charts for: Ag, Au, Br, Hg, I, In, PGE, Re, S, Se, Te,

The most common reasons for elements failing the assessment of assigned values were as follows:

- (i) Insufficient number of contributed results.
- (ii) Results showing a strong positive skew in the frequency distribution diagram, sometimes with hints of multimodality.
- (iii) A robust mean clearly different from the mode, which makes the determination of a consensus impracticable.
- (iv) 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.

#### **Z-score analysis**

As in previous rounds, laboratories were invited to choose one of two performance standards against which their analytical results would be judged:

**Data quality 1** for pure geochemistry laboratories, where analytical results are designed for geochemical research and where care is taken to provide data of high precision and accuracy, sometimes at the expense of a reduced sample throughput rate.

**Data quality 2** for applied geochemistry laboratories, where, although precision and accuracy are still important, the main objective is to provide results on large numbers of samples collected as part of geochemical mapping projects or geochemical exploration programmes.

The target precision [ $H_a$ ] for each element assessed was calculated from a modified version of the Horwitz function as follows:

$$[H_a] = k \cdot [X_a]^{0.8495}$$

Where  $X_a$  is the concentration of the element expressed as a *fraction*, and the factor  $k = 0.01$  for pure geochemistry labs and  $k = 0.02$  for applied geochemistry labs.

Z-scores were calculated for each elemental result submitted by each laboratory from:

$$z = [X - X_a] / H_a$$

where

$X$  is the contributed result,  $X_a$  is the assigned value and  $H_a$  is the target precision.

Z-score results are listed in Table 3 and participating laboratories are invited to assess their performance using the following criterion:

Z-score results in the range  $-2 < z < 2$  are 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.

### **Participating laboratories**

Laboratories that contributed data to this proficiency testing round are listed in Table 4.

### **Overall performance**

As a summary of the overall performance of individual laboratories in this round, a multiple z-score chart is plotted in Figure 3. In this chart, the z-score performance for each element is distinguished by symbols that make it simple to identify whether the results were satisfactory or gave z-score values that were greater or lower than the acceptable z-score limits. These data are designed to help individual laboratories to judge their overall performance in this proficiency testing round.

### **Participation in future rounds**

The benefit from proficiency testing arises from regular participation and laboratories are invited to contribute to the GeoPT10 round, the sample for which will be distributed during September 2001.

### **Acknowledgments**

The authors are very grateful to Liz Lomas (OU) for valued assistance with this work and to Adrian Ryding, of Sir Alfred McAlpine PLC, operators of the slate quarry at Bethesda, for assistance with the collection of the sample. This program was organised on behalf of the International Association of Geoanalysts.

## Appendix 1

### Publication status of proficiency testing reports

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#### **GeoPT1**

Thompson M., Potts P.J., Kane J.S. and Webb P.C. (1996)

GeoPT1. International proficiency test for analytical geochemistry laboratories - Report on round 1. Geostandards Newsletter: The Journal of Geostandards and Geoanalysis, 20, 295-325.

#### **GeoPT2**

Thompson M., Potts P.J., Kane J.S., Webb P.C. and Watson, J.S. (1998)

GeoPT2. International proficiency test for analytical geochemistry laboratories - Report on round 2. Geostandards Newsletter: The Journal of Geostandards and Geoanalysis, 22 127-156.

#### **GeoPT3**

Thompson M., Potts P.J., Kane J.S. and Chappell B.W. (1999a)

GeoPT3. International proficiency test for analytical geochemistry laboratories - Report on round 3. Geostandards Newsletter: The Journal of Geostandards and Geoanalysis, 23, 87-121.

#### **GeoPT4**

Thompson M., Potts P.J., Kane J.S., Webb P.C. and Watson J.S. (1999b)

GeoPT4. International proficiency test for analytical geochemistry laboratories - Report on round 4. Submitted for publication to the electronic version of Geostandards Newsletter: The Journal of Geostandards and Geoanalysis (Summer 2000).

#### **GeoPT5**

Thompson M., Potts P.J., Kane J.S., and Wilson S. (1999c)

GeoPT5. International proficiency test for analytical geochemistry laboratories - Report on round 5. Submitted for publication to the electronic version of Geostandards Newsletter: The Journal of Geostandards and Geoanalysis (Summer 2000).

#### **GeoPT6**

Potts P.J., Thompson M., Kane J.S., Webb P.C. and Carignan J. (2000)

GEOPT6 - an international proficiency test for analytical geochemistry laboratories - report on round 6 (OU-3: Nanhoron microgranite) and 6A (CAL-S: CRPG limestone). International Association of Geoanalysts: Unpublished report.

#### **GeoPT7**

Potts P.J., Thompson M., Kane J.S., and Petrov L.L. (2000)

GEOPT7 - an international proficiency test for analytical geochemistry laboratories - report on round 7 (GBPG-1 Garnet-biotite plagiogneiss). International Association of Geoanalysts: Unpublished report.

#### **GeoPT8**

Potts P.J., Thompson M., Kane J.S., Webb, P.C. and Watson J.S. (2000)

GEOPT8 - an international proficiency test for analytical geochemistry laboratories - report on round 8 / February 2001 (OU-4 Penmaenmawr microdiorite). International Association of Geoanalysts: Unpublished report.

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## Appendix 2

### GeoPT9 Homogeneity Report

Homogeneity testing was based on analysis of duplicate test portions taken from each of 12 packets, which had been selected at random. These samples were analysed in duplicate by WD-XRF at the Open University for the major and minor elements (SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, MnO, MgO, CaO, Na<sub>2</sub>O, K<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub>, TiO<sub>2</sub>, 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.

Statistical analysis of homogeneity data was carried out using a new sequence of tests developed by Thompson (pers. comm.) as follows:

**DATATEST** is the outcome of a range of tests designed to identify analytical problems and discrepancies that could mask differences in analytical results related to inhomogeneity effects. All elements listed in the Tables below, passed these tests.

**CONC** is the average concentration derived from the XRF results.

**SIGMAP** is the target value for the standard deviation derived using the same modified form of the Horwitz function that was used to calculate the target precision for pure geochemistry laboratories (data quality = 1), described above.

**F** is the well-known F-statistic for one way analysis of variance. When compared to the relevant critical value of 4.94 (majors) or 2.78 (traces) all elements passed the F-test, except Ba.

**VARSAM** is the estimated between-sample variance, which is used to calculate:

**SAMRATIO**, which is the ratio of the  $\sqrt{(\text{VARSAM})} / \text{SIGMAP}$ . Where this ratio has a value of less than 0.3, the element data is considered to have passed the harmonised protocol (**HP**).

In interpreting these data, it is considered that the principal demonstrator of homogeneity is that elemental results 'pass' the classical F-test. However, this is not the ultimate arbiter of homogeneity, since the Harmonised Protocol requires that homogeneity will have an insignificant effect on the interpretation of proficiency testing results. If the within-packet variance is particularly small, the F-test may detect a significant level of between-packet variance (indicating inhomogeneity effects), which is, in fact, insignificant in relation to the target precision, against which the results from participating laboratories are evaluated. In order to test the significance of data that 'fails' the F-test, the ratio of sampling precision to target precision is calculated. If this ratio is less than 0.3, elemental results are considered to be compatible with those of a homogeneous sample, in the context of this proficiency testing programme. Barium was the only data set that did not pass the F-test, but the SAMRATIO of 0.1797 indicates that this (and all the other elements) are fit-for-purpose and compatible with criteria for acceptance in the harmonised protocol. Tables presenting these statistical parameters for both major and trace elements are listed below.

Table 1 GeoPT9		OU-6: Penrhyn Slate - Results submitted to the GeoPT9 round																							
Round identifier	J1	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J14	J15	J16	J17	J18	J19	J20	J21	J22	
Technique codes	M	M	IR, X	X	T, X	X	IR, X	A	A, M	A, M	M	A	AA, M, T, X	A, IR, M, X	M	M	X	A, tit, X	X	tit, X	M, X	X			
Test portion (g)	0.1	0.1	0.4-5	0.5	0.6-5.4	0.8	0.1-0.7	0.25	0.25	0.1	0.25	0.2	0.1-0.75	0.2-7	0.1	0.1	1.0-5	0.01-0.7	8	0.1-0.8	0.1-4	1	1.9	1	
Data quality	1	2	2	1	2	2	2	1	2	2	1	2	2	2	1	2	2	1	2	2	2	2	1	2	
SiO2			57.57	57.7	56.56	57.48	58.095	62.89	58.64	57				58.84			57.05	58.12	57.36	57.6	56.37			58.19	
TiO2			1.01	1.04	0.985	0.9955	1.015	0.79	0.964	0.96	0.87			1.02			0.97	0.99	0.99	1.03	1.08			1.03	
Al2O3			20.58	20.3	20.28	20.52	20.834	14.87	20.37	20.5	20.5			20.61			20.55	20.81	20.41	20.5	20.86			20.59	
Fe2O3			9.031	8.9	8.77	9.031	9.259	5.92	9.332	9.4	9.19			8.98			9.22	9	8.92	9	9.29			19.27	
Fe(II)					1.67																			9.2	
MnO			0.284	0.29	0.28	0.2872	0.304	0.14	0.292	0.27	0.29			0.284			0.28	0.29	0.29	0.283	0.29	0.28		0.24	
MgO			2.31	2.33	2.43	2.36	2.538	2.36	2.408	2.46	2.44			2.43			2.35	2.52	2.4	2.4	2.4	2.23		2.72	
CaO			0.74	0.76	0.742	0.7575	0.7	4.54	0.769	0.69	0.68			0.699			0.73	0.72	0.76	0.75	1.08			0.69	
Na2O			1.69	1.75	1.75	1.727	1.589	1.688	1.7	1.74	1.74			1.88			1.57	1.77	1.76	1.7	2.27			1.93	
K2O			3.08	3.11	3.03	3.049	3.107	3.005	3.01	3.21	3.21			2.98			3.25	3.1	3.05	3	2.18			2.64	
P2O5			0.117	0.11	0.095	0.1214	0.19	0.0851	0.13	0.09	0.09			0.123			0.12	0.11	0.12	0.12	0.22				
H2O+					4.11									0.257			3.66	4.02	4.02	3.63	3.5	3.53		3.68	
CO2			3.32	3.56	3.62	3.628	3.673	10.49		3.54				3.4				0.24	0.24						
LOI																									
Ag																									
As			17		13																11			14.9	
Au																								0.002	
B																									
Ba			491		479			354	442.3	465	485	500	450.3	457	494.3		462	530	471	460				519	
Be			10.5						2.7					2.71				4		2.6					
Bi																		1		0.31					
Br																									
Br																									
Cd																									
Ce																									
Cl																									
Co																									
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Cr																									
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GeoPT9 Table 1

Round identifier	J1	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J14	J15	J16	J17	J18	J19	J20	J21	J22
Technique codes	M	M	IR, X	X	T, X	X	IR, X	A	A, M	A, M	M	A	AA, M, T, X	A, IR, M, X	M	M	X	A, tit, X	X	tit, X	M, X	X	I	X
Test portion (g)	0.1	0.1	0.45	0.5	0.6-5.4	0.8	0.1-0.7	0.25	0.25	0.1	0.25	0.2	0.1-0.75	0.27	0.1	0.1	1.05	0.01-0.7	8	0.1-0.8	0.1-4	1	1.9	1
Data quality	1	2	2	1	2	2	2	1	2	2	1	2	2	2	1	2	2	1	2	2	2	2	1	2
Ir																								
La	33.5		66		30.3				27.9		32.6	33	33.3	34.2	35.01			24		29	37		33.3	
Li									0.47	0.44	0.464	130	0.44	0.47	0.494			1			105		0.47	
Lu	0.456									0.7				1.15							0.8			
Mo																								
N																								
Nb			12		12.5				13.4	12.5	16.8		11.86	12.4	15.49			15	14	13	16			
Nd	30.55		24		21.1				26.35	30.5	29		30.6	29.5	30.91			27	30	30	33		32.1	
Ni			45		43.5				38.01	38		41	39.4	38.1	42.13			43	45	38	41		50	
Os																								
Pb	29		19		29.9					28		23	27.6	27.9	29.66			28	32	29	31			
Pd																								
Pr	8.07		7						8.67	8	8.24		8.1	8.55	8.394			8			8.8			
Pt																								
Rb	122.3		119		126				120.46	115	113		121.6	11.6	126.1			123	122	122	122		128	
Re																								
Rh																								
Ru																								
S			2.8				18.80	20	23.8	22.5		23	18.4	25.7				20					0.73	
Sb																		1					23.91	
Sc																		19						
Se			2.4															8					6.19	
Sm	6.1		5.6						5.49	5.9	5.89		5.92	6.36	6.19			4					6.19	
Sn			4.4							2.9			2.27	2.27				8					6.19	
Sr	137		131		122			96	125	128	136	137	128.8	137	138.7			132	137	133	130			
Ta									0.91	1.05			0.92	0.97	1.071			3					0.31	
Tb	0.841								0.65	0.84	0.885		0.86	0.92	0.86			1					0.93	
Te																								
Th	11.47		9.7		12.3				11.53	11.3	11.5		11.6	10.6	12.03			12	12.3	13	14		12.82	
Ti			0.5																					
Tm	0.436									0.46	0.396		0.44	0.45	0.455			4					2.07	
U	1.963		2.3							1.9	2.18		1.89	1.95	2.05			4	2.1				2.07	
V			127		121			83	127	123		120	121.1	128	135.3			128		123	137		135	
W			8							1.7								0					0.51	
Y	26.69		26		27.1			50	29.7	27.4	28.5	31	25.3	28	28.8			32	28	27	27		3.08	
Yb	2.993									2.96	3.16		2.85	3.32	3.092			3						
Zn			120		115			72	105	105		110	104	124	123.4			115	117	109	105			
Zr			175.7		182			192	174.5	170	165		143.2	158	193			181	172	172	167			

Technique codes: A=ICP-AES; AA=AAS; E=emission spectrometry; G=gravimetric; I=INAA; Ign=ignition; IR=infra red detection; ISE=ion selective electrodes; M=ICP-MS; O=other; tit=titrimetry; W=wet chemistry; X=X-ray fluorescence.

GeoPT9 Table 1

Round Identifier Technique codes	J23	J24	J25	J26	J27	J27	J28	J29	J29	J30	J31	J32	J33	J34	J35	J36	J37	J38	J38	J39	J40	J40	J40	J41	J42
Test portion (g)	1.05	0.15	0.27	1.36	0.1-1.2	0.1-1.2	0.05	0.1	0.1	0.2-1	1.2	1	0.17	0.1-2	0.1	0.4	0.2-3	0.7-10	10	0.1-0.8	1.2-9	1.2-9	0.1-10	0.2-1	
Data quality	2	1	1	1	1	2	1	1	2	2	1	1	1	1	1	2	1	1	2	1	1	2	1	2	
SiO2 % m/m	60.34		56.901	60.57	56.9					56.84	57.49	56.65	56.41	56.60		57.8	57.37	57.21		57.2	57.51		57.42	57.9	
TiO2 % m/m	1		1.095	0.98	1.011					1.15	0.98	1.08	1.06	0.90		1	1.09	0.985		0.995	1.043		0.98	0.97	
Al2O3 % m/m	18.55		20.823	20.78	20.45					20.8	20.48	20.07	21.08	20.90		20.6	20.42	20.72		20.5	20.23		20.58	20.5	
Fe2O3 % m/m	8.91	5.98	9.091	9.48	9.14					8.93	8.91	9.4	10.28	9.40		8.92	8.87	8.993		8.87	8.852		8.83	9.05	
Fel(II)O % m/m			2.11										1.81			1.45								1.7	
MnO % m/m	0.27		0.28	0.28	0.284					0.288	0.28	0.305	0.32	0.28		0.28	0.287	0.276		0.281	0.289		0.25	0.287	
MgO % m/m	2.17		2.296	2.73	2.42					2.68	2.340	2.94	2.35	2.40		2.45	2.38	2.347		2.38	2.419		2.52	2.42	
CaO % m/m	0.7		0.834	0.73	0.855					0.84	0.710	0.8	0.83	0.95		0.72	0.75	0.738		0.733	0.765		0.72	0.72	
Na2O % m/m	2.26	1.98	1.709	1.54	1.78					1.68	1.9	1.45	1.72	1.82		1.81	1.77	1.759		1.763	1.73		1.76	1.8	
K2O % m/m	3.21		3.112	3.1	3.27					3	3.09	3.16	3.12	3.05		3.13	3	3.028		3.047	3.039		3.09	3.03	
P2O5 % m/m	0.13		0.125	0.12	0.116					0.17	0.13	0.15	0.104	0.105		0.11	0.113	0.123		0.055	0.122		0.12	0.12	
H2O+ % m/m																									
CO2 % m/m			3.65		4.3					3.53	3.58	3.5	3.60	3.60			3.61	3.6		3.613	3.55		3.66	3.5	
LOI % m/m																									
Ag mg kg-1																									
As mg kg-1		14.5			0.3																		12.7	11	
Au mg kg-1					12.1									0.17					13.8		14.01				
B mg kg-1																									
Ba mg kg-1	533	474	530		112.5		469		482.8	465	479	445		457.3		461		525.4		496.7	552.1		496	470	
Be mg kg-1					445.0		2.66			2.5						3.5				2.71			3.07	2.5	
Bi mg kg-1		0.32			2.5											2.5				0.193				0.32	
Br mg kg-1																									
Cd mg kg-1	84	80.1	60.516		0.03		78		77.87	56.74	66			77.5		65.2				84.97		60	81.6	85.8	
Ce mg kg-1					75.2																				
Cl mg kg-1																									
Co mg kg-1		28.0	36		33.0		27.4			31	29	15	42			27		23.8		30.1			31.7	29	
Cr mg kg-1	87	71	89		67.0		62			71	72	71	88			81		79.8		75.4	91.7		83.3	53	
Cs mg kg-1		7.77			7.0		8.9		7.898											7.86			8.62	8.35	
Cu mg kg-1			32		50.0					46						47		33		42.03	45.2		36.3	44	
Dy mg kg-1			3.848		4.9		5.2		4.972	4.58						4.83				5.22			5.09	5.15	
Er mg kg-1			2.113		2.7		2.97		2.91	3.08						2.56				3.03			3.09	2.95	
Eu mg kg-1		1.40	1.445		1.3		1.28		1.314	1.08						1.19				1.45			1.41	1.47	
F mg kg-1					500.0											630								600	
Ga mg kg-1					24.0		5.1		5.194	5.15	23	23				5.33		23.1		23.97	24.7		25	24.2	
Gd mg kg-1			4.679		4.7		4.04			1										5.71			5.34	5.35	
Ge mg kg-1					1.6				4.44											1.84			2.1	2.1	
Hf mg kg-1		4.87			5.2															5.55			4.58	4.4	
Hg mg kg-1					0.0		1.06		1.008	0.9													1.07	1.03	
Ho mg kg-1			0.749		0.9															1.035					
I mg kg-1																									
In mg kg-1																				0.101				0.09	

GeoPT9 Table 1

Round identifier	J23	J24	J25	J26	J27	J27	J28	J29	J29	J30	J31	J32	J33	J34	J35	J36	J37	J38	J38	J39	J40	J40	J41	J42
Technique codes	X	I	M,V	X	A.E.	A.E.	M	M	M	A,AA	X	X	X	AA,G	M	X	A,AA	X	X	A,I	X	X	M,X	A,I,r
Test portion (g)	1.05	0.15	0.27	1.36	0.1	0.1	0.05	0.1	0.1	0.21	1.2	1	0.17	0.12	0.1	0.4	0.23	0.7-10	10	0.1-0.8	1.29	1.29	0.1-10	0.2-1
Data quality	2	1	1	1	1	2	1	1	2	2	1	1	1	1	1	2	1	1	2	1	1	2	1	2
Ir																								
La		33.1	35.238		32.5		33.7	33.35		19.5					32.4		21.5			35.63		19.1	34.46	35.5
Li					92.0		100			53							84			100				100
Lu			0.296		0.4		0.428	0.452		0.34					0.485		0.47			4.95			0.46	0.44
Mo		0.64				0.6														0.179			0.645	0.4
N																								
Nb	17		17	16		17.0	13.9		14.08	19	23	7			15.31		13	14.5		14.67	15.4		14.75	16.5
Nd	35		24.633		29.5		30.8	30.94		24.18					30.53		26.8			33.83		10.3	31.75	30
Ni	55	38.5	25	37		47.0	39.7			39	44	41	36			31	37.6			40.73	35.5		42.9	43
Os			25																					
Pb			25			26.8	28.7	27.38		11				0.03	27.43		25	28.3		30.4	40.4		28.3	29
Pd			6.786		8.1		8.2	8.019		6.26					7.82		6.7			8.24			8.53	8.28
Pr																								
Rb	127	116.5	141	121	110.0		119	119.1			136	119			115.3		112	122.4		123	120.5		121.2	129
Re																								
Rh																								
Ru																								
S																								
Sb	21	0.69	21.9			14.0	23.8		21.2										44	0.309			0.61	0.54
Sc																				24.77	23.2		23.8	24
Se			4.767		6.0		6.2	6.1		5.31										0.17				
Sm																				6.83			6.25	6.15
Sn						3.8														2.72			3.13	2.5
Sr		131	161	128	136.0		129	131.5		153	144	125.5			121.3		115.1	130.9		135	128.6		135	145
Ta		1.04			1.1		0.999		0.833	2					1.06					1.14			1.09	0.99
Tb		0.76	0.674		0.8		0.836	0.838		0.67					0.81		1.03			0.91			0.87	0.9
Te																								
Th		11.52	11		11.3		11.3	11.004							11.63					12.8	11.9	9.5	11.2	12
Ti							0.75													0.562			0.52	0.55
Tm			0.311		0.3		0.499	0.437		0.4					0.445		0.31			0.517			1.87	2
U	2	1.99			2.2		1.91	1.824							1.93		2			2.28			133.5	129
V	148		167	125		140.0	128			114			130				126			129.3	170.8		133.5	129
W																								
Y	35		43		24.0		28.8	26.27		22.63	41	20	20		29.2		24.5	28.7		28.3	30.1		26.9	27
Yb		3.0	1.887		2.4		2.96	2.926		2.52					3.03		3.04			3.38			3.02	3
Zn	113	118	141	106	100.0				163.4	112	105	107					110	105.4		113.7	106.5		114.6	116
Zr	186	180	189	158	177.0		144			147	196	178	158				176	174.3			194.1		182.5	150

GeoPT9 Table 1

Round identifier	J43	J44	J44	J44	J45	J45	J46	J47	J48	J49	J50	J51	J51	J52	J53	J54	J55	J55	J56	J57	J57	J58	J59	J60	J60
Technique codes	A,M, X	I	I	I	T,X	T,X	AA,O, tit	A,W	A	M,X	M,T, X	X	X	A,I,M, T,X	X	M,X	A,I,r, M,T,X	A,I,r, M,T,X	M,X	A,tit, X	A,tit, X	A,M	X	X	X
Test portion (g)	0.25-1.5	1.0-1.0	1.0-1.0	1.0-1.0	0.25-6	0.25-6	0.1-0.5	0.25-0.5	0.05-0.5	0.1-0.5	0.01-1.2	1.0-20	1.0-20	0.1-2	1.0-6	0.1-12	0.2-4	0.2-4	0.12-3.5	0.2-7.5	0.2-7.5	0.2-0.5	1.5	1.0-8	1.0-8
Data quality	2	1	2	1	1	1	2	1	2	1	1	1	2	2	2	2	1	2	1	1	2	2	2	1	2
SiO2	57.5362				57.9	57.71	58.297			57.61	57.71	57.27		57.95	55.3	57.31	57.35		57.331	56.6		59.010	57.94		58.23
TiO2	0.98445				0.967	1.03	0.945		0.985	0.99	1.03	0.99		1.01	0.97	0.99	1		0.9911	1.002		0.96	1.01		
Al2O3	57.5362				20.54	20.29	20.819		20.42	20.61	20.29	20.33		20.41	19.95	20.4	20.52		20.468	20.33		19.27	20.3		20.61
Fe2O3	8.8083				8.944	8.93	8.43		8.756	9.11	8.93	9.04		8.66	8.72	8.95	8.81		9.041	9.08		8.27	8.92		9.245
Fe(II)O					1.69	1.85				1.65	1.85			1.6			1.63			1.62					
MnO	0.308				0.285	0.29	0.304		0.272	0.27	0.29	0.28		0.288	0.272	0.288	0.28		0.2876	0.299		0.26	0.277		0.28
MgO	2.41205				2.436	2.33	2.465		2.35	2.34	2.33	2.4		2.39	2.36	2.35	2.48		2.461	2.43		2.35	2.3		2.445
CaO	0.71365				0.737	0.74	0.747		0.718	0.77	0.74	0.77		0.732	0.8	0.72	0.73		0.762	0.78		0.69	0.758		0.83
Na2O	1.74495				1.946	1.83	1.875		1.894	1.64	1.83	1.71		1.801	1.78	1.87	1.78		1.756	1.99		1.62	1.76		1.875
K2O	3.0413				3.041	3.06	2.948		3.078	3.06	3.01	3.09		3.081	2.92	3.05	3.22		3.059	3.01		2.85	3.02		2.89
P2O5	0.1239				0.121	0.12				0.12	0.12	0.12		0.122	0.115	0.12	0.11		0.1177	0.119		0.09	0.122		
H2O+														3.61			3.73								
CO2														0.12											
LOI	3.83				3.57	3.66	3.685			3.52	3.66	3.61		3.51	3.69	3.57	3.6		3.573	3.71			3.59		3.6
Ag																									
As	1.32											13		9.99	13	13						8.4			
Au														2.6											
B														77.6											
Ba	1.14				497				411.6	491				512	512	443.9			483.9	496		489			
Be	0.529					0.3			2.65	2.65	2.34			3.35	2.176			2.33	3.4						
Bi																									
Br																									
Cd	2.28													51.1											
Ce														81	69	76.63			75.1	64.2		77			
Cl																									
Co	2.72													29.8	30	27.48			29.37	27		24			
Cr	8.04				78.5	64			31.3	30	27.3			88	63	60.37			64.8	79		66.0			
Cs	2.18													8.81	8.81	7.911			8.3	8.93					
Cu	4.35				42.9	45.2			33.7	37	45.2	36		39.79	37	41			49	45.4		41			26
Dy										4.64	5.06			5.05	4.953				4.72	5.59		4.4			
Er										2.79	2.84			3.3	3.03				2.64	3.119		2.6			
Eu										1.31	1.41			1.34	1.344				1.26	1.474		1.2			
F														510											
Ga										25.8	23.1			26.3	23	24			24.78	21		21			
Gd										5.11	5.53			5.62	5.157				5	5.467		5.5			
Ge														5.19	8	4.807			4.56	4.918		0.8			
Hf														1.01											
Hg																									
Ho																									
I																									
In																									

GeoPT9 Table 1

Round identifier	J43	J44	J44	J45	J45	J46	J47	J48	J49	J50	J51	J51	J52	J53	J54	J55	J55	J56	J57	J57	J58	J59	J60	J60	J60
Technique codes	A.M. X	I	I	T.X	T.X	AA.O. tit	A.W	A	M.X	M.T. X	X	X	A.I.M. T.X	X	M.X	A.ir. M.T.X	A.ir. M.T.X	M.X	A.tit. X	A.tit. X	A.M	X	X	X	
Test portion (g)	0.25-1.5	1.0-10	1.0-10	0.25-6	0.25-6	0.1-0.5	0.25-0.5	0.05-0.5	0.1-0.5	0.01-1.2	1.0-20	1.0-20	0.1-2	1.0-6	0.1-12	0.2-4	0.2-4	0.12-3.5	0.2-7.5	0.2-7.5	0.2-0.5	1.5	1.0-8	1.0-8	
Data quality	2	1	2	1	1	2	1	2	1	1	2	2	2	2	2	1	2	1	1	2	2	2	1	2	
Ir																									
La	8.25	33.23							30.2	30.8			36.1	38	29.89	29.91	34.546	29.5							
Li	25.5							97.5		90.4		96.73			92.65										
Lu	0.399	0.46							0.49	0.43		0.47	3	0.448	0.45	0.486	0.3								
Mo											3	1.1													
Nb									15.3	13.1		19.01	15	13.36		14.954	17								
Nd									30.2	27.5		33.6	43	28.3	29.01	29.061	29.3								
Ni	3.63							31.2	51	38.2	40	39.2	43	40	37.6	41.5	40							39	
Os											31	26.17	26	29	28.19	31.859	24								
Pb	7.02								7.31	7.5		9.3			7.717	7.38	7.394				7.34				
Pd																									
Pr																									
Pt																									
Rb																									
Re																									
Rh																									
Ru																									
S																									
Sb																									
Sc																									
Se																									
Sm	0.513	6.05																							
Sr	29.4																								
Ta																									
Tb																									
Ti																									
Th	3.15																								
Tl																									
Tm	0.367																								
U	14.3																								
V																									
W																									
Y	5.49																								
Yb	11.1																								
Zn	9.14																								
Zr																									

GeoPT9 Table 1

Round Identifier	J61	J61	J62	J62	J63	J63	J64	J65	J65	J66	J66	J67	J68	J69	J70	J71	J72	J73	J74
Technique codes	X	X	X	X	X	X	A,AA, X	I	I	X	X	AA,X	A,X	AA	AA	A, AA	A,M, X	M,X	X
Test portion (g)	0.8-10	0.8-10	1.6	1.6	1.4-5	1.4-5	1.0-3	0.2	0.2	0.6-6	0.6-6	0.25-4	0.5-5	0.1	0.1	0.5	0.3-0.5	0.25-0.35	0.7-5
Data quality	1	2	1	2	1	2	1	2	1	1	2	2	2	1	1	1	2	2	2
SiO2	57.24	57.29	57.29	57.29	58.2	58.2	58.2	56.95	56.95	57.57	57.1	57.57	57.1	61.78	61.78	56.39	57.43	57.43	57.74
TiO2	0.995	0.961	1.01	1.01	1	1	1	1.04	1.04	1.02	0.997	1.02	0.997	0.95	0.95	0.977	0.99	0.99	1.01
Al2O3	20.73	20.51	19.73	19.73	20.4	22.11	20.4	20.26	20.26	21.33	20.52	21.33	20.52	20.22	20.22	20.28	20.05	20.05	20.67
Fe2O3	9.09	8.7	9.06	9.06	9.1	8.61	9.1	9.11	9.11	8.09	9.11	8.09	9.11	5.61	9.55	8.97	9.27	9.27	9.11
Fe(II)O	0.294	0.293	0.29	0.29	0.28	0.28	0.29	0.29	0.29	0.275	0.272	0.275	0.272	0.098	0.27	0.31	0.3	0.3	0.292
MgO	2.38	2.35	2.38	2.38	2.4	2.5	2.39	2.5	2.39	2.5	2.49	2.5	2.49	1.14	2.15	2.32	2.402	2.18	2.37
CaO	0.77	0.73	0.75	0.75	0.7	1.05	0.73	0.73	0.73	0.43	0.77	0.43	0.77	0.85	0.74	0.84	0.741	0.69	0.73
Na2O	3.13	1.78	1.83	1.83	1.7	1.78	1.6	1.6	1.6	1.53	1.86	1.53	1.86	2.11	1.63	1.97	1.95	1.52	1.81
K2O	1.73	3.015	3.08	3.08	3	3.22	3.06	3.06	3.06	2.75	3.1	2.75	3.1	2.37	3.49	2.9	3.036	3.05	3.09
P2O5	0.126	0.11	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.092	0.13	0.092	0.13	0.095	0.095	0.111	0.14	0.14	0.11
H2O+																			
CO2																			
LOI	3.61	3.584	3.69	3.69	3.5	3.5	3.5	3.62	3.62	3.9	3.62	3.9	3.62	3.9	3.9	3.458	3.67	3.67	3.63
Ag																			
As	14.5				10	14.6	10	15	15	13	15	13	15						
Au																			
B					80		80									2200	88		
Ba	492	421	469	469	444	497	444	500	500	539	485	539	485			420	390	512.8	488
Be																5	1.5		
Bi																			
Br																			
Cd	2.7	73.5			74	81.5	74	72	72	0.101	71	0.101	71			0.05	61.1		
Ce	77																		
Cl																			
Co	32.3	23	32.8	32.8	31	27.5	31	32	32	31	67	31	67			34	27.17	26	
Cr	97	71	73	73	76	69.8	76	72	72	10	10	10	10			7	8.39	62	
Cs																			
Cu	33	39	33.6	33.6	51	8.76	51	33	33	96.7	37	96.7	37			53	37	33	37
Dy																	4.34		
Er																	2.38		
Eu																	1.25		
F																			
Ga	25	25.5	23.6	23.6	520	1.41	520	24	24								4.6	21.8	
Gd																			
Ge																			
Hf																			
Hg					4.4	5.02	4.4	4.4	4.4	0.013	4.4	0.013	4.4				4.99		
Ho																			
I																			
In																	0.83		





Table 2 GeoPT 9

## Assigned values and robust statistical analysis of contributed data

	$X_a$	$H_a$	s	$H_a/s$		$X_a$	$H_a$	s	$H_a/s$
	% m/m	% m/m	% m/m	ratio		mg kg <sup>-1</sup>	mg kg <sup>-1</sup>	mg kg <sup>-1</sup>	ratio
SiO <sub>2</sub>	57.513	0.625	0.095	0.153	Hf	4.70	0.30	0.09	0.290
TiO <sub>2</sub>	0.998	0.020	0.004	0.214	Ho	1.01	0.08	0.02	0.196
Al <sub>2</sub> O <sub>3</sub>	20.500	0.260	0.032	0.124	La	33.00	1.56	0.51	0.325
Fe <sub>2</sub> O <sub>3</sub> T	9.001	0.129	0.033	0.258	Li	92.65	3.75	2.64	0.705
FeO	1.650	0.031	0.019	0.625	Lu	0.45	0.04	0.01	0.184
MnO	0.284	0.007	0.001	0.207	Nb	14.79	0.79	0.31	0.388
MgO	2.398	0.042	0.010	0.245	Nd	29.01	1.40	0.52	0.373
CaO	0.740	0.015	0.005	0.312	Ni	39.83	1.83	0.71	0.387
Na <sub>2</sub> O	1.778	0.033	0.016	0.494	Pb	28.22	1.37	0.50	0.368
K <sub>2</sub> O	3.051	0.052	0.012	0.235	Pr	7.80	0.46	0.13	0.293
P <sub>2</sub> O <sub>5</sub>	0.118	0.003	0.002	0.479	Rb	120.20	4.68	0.90	0.192
LOI	3.604	0.059	0.011	0.192	Sb	0.55	0.05	0.02	0.477
	mg kg <sup>-1</sup>	mg kg <sup>-1</sup>	mg kg <sup>-1</sup>		Sc	22.10	1.11	0.43	0.389
As	13.00	0.71	0.45	0.638	Sm	5.92	0.36	0.08	0.222
Ba	477.24	15.09	4.80	0.318	Sn	2.72	0.19	0.11	0.573
Be	2.66	0.18	0.11	0.579	Sr	130.89	5.03	1.16	0.231
Ce	74.42	3.11	1.11	0.356	Ta	1.06	0.08	0.02	0.278
Co	29.11	1.40	0.48	0.341	Tb	0.85	0.07	0.01	0.199
Cr	70.87	2.99	1.39	0.465	Th	11.51	0.64	0.17	0.267
Cs	8.02	0.47	0.13	0.283	Tl	0.53	0.05	0.02	0.525
Cu	39.62	1.82	1.05	0.578	Tm	0.44	0.04	0.01	0.152
Dy	4.99	0.31	0.07	0.209	U	1.96	0.14	0.02	0.153
Er	2.98	0.20	0.03	0.166	V	129.35	4.98	1.63	0.327
Eu	1.36	0.10	0.02	0.186	Y	27.35	1.33	0.47	0.353
Ga	24.33	1.20	0.29	0.239	Yb	3.00	0.20	0.02	0.099
Gd	5.27	0.33	0.07	0.218	Zn	111.18	4.38	1.40	0.321
					Zr	174.15	6.41	1.59	0.247

s=standard deviation of submitted results calculated using 'robust' statistics

 $H_a$ =target precision calculated using a modified version of the Horwitz equation



Table showing the results of homogeneity testing on the WD-XRF major element data.

ANALYTE	DATATEST	CONC	SIGMAP	F	F-TEST	SAMRAT	HP-TEST
SiO2	PASS	57.231	0.622455	2.40676	PASS	0.094268	PASS
TiO2	PASS	0.9827	0.019705	1.50444	PASS	0.090109	PASS
Al2O3	PASS	20.641	0.261736	2.09801	PASS	0.062504	PASS
Fe2O3	PASS	8.9317	0.128476	2.14943	PASS	0.035527	PASS
MnO	PASS	0.2741	0.00666	1.79085	PASS	0.106606	PASS
MgO	PASS	2.3463	0.04127	0.51039	PASS	0	PASS
CaO	PASS	0.7385	0.015458	2.27778	PASS	0.163512	PASS
Na2O	PASS	1.7845	0.032709	1.77778	PASS	0.144572	PASS
K2O	PASS	3.0097	0.050993	1.70647	PASS	0.106663	PASS
P2O5	PASS	0.1215	0.003336	1.01336	PASS	0.037047	PASS
LOI	PASS	3.664	0.060267	1.04233	PASS	0.069961	PASS
Critical level				4.94		0.3	

Table showing the results of homogeneity testing on the WD-XRF trace element data.

ANALYTE	DATATEST	CONC	SIGMA-I	VAR-SAM	F	F-TEST	SAMRATIO	HP-TEST
Rb	PASS	122.231	4.7431	0.02884	1.2425	PASS		
Sr	PASS	130.565	5.0164	0	0.99168	PASS		
Y	PASS	28.815	1.3898	0	0.93054	PASS		
Zr	PASS	174.902	6.4306	0	0.47404	PASS		
Nb	PASS	14.548	0.7777	0.00237	1.07614	PASS		
Ba	PASS	524.3	16.3412	8.62051	2.95007	NEXT STAGE	0.17967	PASS
Pb	PASS	26.044	1.2754	0	0.52275	PASS		
Th	PASS	12.194	0.6694	0	0.89863	PASS		
U	PASS	2.2	0.1563	0.0712	1.3995	PASS		
Sc	PASS	22.313	1.1184	0	0.82134	PASS		
V	PASS	138.838	5.2852	0	0.4815	PASS		
Cr	PASS	79.365	3.2865	0	0.98368	PASS		
Co	PASS	22.694	1.1346	0	0.57498	PASS		
Ni	PASS	38.725	1.7865	0	0.63923	PASS		
Cu	PASS	33.765	1.5901	2.16691	1.43481	PASS		
Zn	PASS	106.258	4.2111	0	0.83316	PASS		
Ga	PASS	22.944	1.1452	0	0.91684	PASS		
As	PASS	14.656	0.7826	0.19091	1.21084	PASS		
S	PASS	37.352	1.7325	1.79506	1.51059	PASS		
Critical level					2.78		0.3	

Table 3 GeoPT9															
OU-6: Penrhyn Slate: Z-scores calculated for the GeoPT9 round															
Round identifier	J1	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14
Technique codes	M	M	IR, X	X	T, X	X	IR, X	A	A, M	A, M	M	A	AA, M, T, X	A, IR, M, X	M
Test portion (g)	0.1	0.1	0.4-5	0.5	0.6-5.4	0.8	0.1-0.7	0.25	0.25	0.1	0.25	0.2	0.1-0.75	0.2-7	0.1
Data quality	1	2	2	1	2	2	2	1	2	2	1	2	2	2	1
SiO2 % m/m	*	*	0.05	0.30	-0.76	-0.03	0.47	8.60	0.90	-0.41	*	*	*	1.06	*
TiO2 % m/m	*	*	0.31	2.13	-0.32	-0.05	0.44	-10.40	-0.84	-0.94	*	-3.20	*	0.56	*
Al2O3 % m/m	*	*	0.15	-0.77	-0.42	0.03	0.64	-21.64	-0.25	0.00	*	0.00	*	0.21	*
Fe2O3 % m/m	*	*	0.12	-0.78	-0.89	0.12	1.00	23.82	1.28	1.54	*	0.73	*	-0.08	*
Fe(II)O % m/m	*	*	*	0.33	*	*	*	*	*	*	*	*	*	*	*
MnO % m/m	*	*	0.00	0.87	-0.29	0.23	1.45	-20.98	0.58	-1.02	*	0.43	*	0.00	*
MgO % m/m	*	*	-1.05	-1.62	0.38	-0.45	1.66	-0.91	0.12	0.74	*	0.50	*	0.38	*
CaO % m/m	*	*	-0.02	1.26	0.05	0.55	-1.31	245.23	0.92	-1.63	*	-1.95	*	-1.34	*
Na2O % m/m	*	*	-1.35	-0.85	-0.43	-0.78	-2.90	*	-1.38	-1.19	*	-0.58	*	1.57	*
K2O % m/m	*	*	0.28	1.14	-0.21	-0.02	0.54	*	-0.45	-0.40	*	1.54	*	-0.69	*
P2O5 % m/m	*	*	-0.18	-2.50	-3.63	0.50	*	22.05	-5.07	1.82	*	4.32	*	0.74	*
LOI % m/m	*	*	-2.39	-0.74	0.14	0.21	0.58	115.89	*	-0.54	*	*	*	-1.71	*
As mg kg-1	*	*	2.83	*	0.00	*	*	*	*	*	*	*	*	-0.21	*
B mg kg-1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Ba mg kg-1	0.60	*	0.46	*	0.06	*	*	8.17	1.16	-0.41	0.52	0.75	-0.89	0.67	1.13
Be mg kg-1	*	*	*	*	*	*	*	*	0.12	*	*	*	*	0.15	*
Ce mg kg-1	1.25	*	-0.23	*	-0.44	*	*	*	0.74	0.74	1.67	*	0.82	-0.37	2.44
Co mg kg-1	*	*	0.67	*	1.82	*	*	-6.50	-0.72	-1.11	0.21	-1.47	-0.04	-0.18	-0.30
Cr mg kg-1	*	*	-2.83	*	-1.05	*	*	-5.65	-1.39	-0.98	*	0.19	0.04	0.69	0.14
Cs mg kg-1	-0.31	*	*	*	*	*	*	*	-0.24	-0.34	*	*	0.13	-0.22	*
Cu mg kg-1	*	*	-3.46	*	-1.19	*	*	-9.12	1.09	1.48	*	1.48	1.70	0.65	1.19
Dy mg kg-1	0.19	*	*	*	*	*	*	*	-0.35	-0.14	0.00	*	-0.06	0.13	1.16
Er mg kg-1	0.46	*	*	*	*	*	*	*	-0.01	-0.43	0.07	*	-0.09	0.01	1.04
Eu mg kg-1	0.23	*	*	*	*	*	*	*	1.81	0.18	1.61	*	-0.40	0.13	-0.10
Ga mg kg-1	*	*	1.11	*	0.36	*	*	-5.26	1.24	*	1.38	*	0.36	-0.14	0.67
Gd mg kg-1	-0.08	*	*	*	*	*	*	*	-0.39	-0.25	-0.60	*	0.81	0.63	1.71
Hf mg kg-1	*	0.19	-2.02	*	*	*	*	*	0.77	0.00	0.43	*	-0.89	-0.39	1.33
Ho mg kg-1	0.06	*	*	*	*	*	*	*	0.50	0.26	0.01	*	-0.30	0.19	0.30
La mg kg-1	0.32	*	10.58	*	-0.87	*	*	*	-1.64	*	-0.26	0.00	0.10	0.38	1.29
Li mg kg-1	*	*	*	*	*	*	*	*	*	*	*	4.98	*	*	*
Lu mg kg-1	0.13	*	*	*	*	*	*	*	0.24	-0.13	0.32	*	-0.13	0.24	1.07
Nb mg kg-1	*	*	-1.77	*	-1.45	*	*	-2.91	-0.88	-1.45	2.54	*	-1.86	-1.52	0.88
Nd mg kg-1	1.10	*	-1.79	*	-2.83	*	*	*	-0.95	0.53	-0.01	*	0.57	0.18	1.36
Ni mg kg-1	*	*	1.41	*	1.00	*	*	-10.29	-0.50	-0.50	*	0.32	-0.12	-0.47	*
Pb mg kg-1	0.57	*	-3.38	*	0.61	*	*	*	*	-0.08	*	-1.91	-0.23	-0.12	1.05
Pr mg kg-1	0.58	*	-0.88	*	*	*	*	*	0.94	0.21	0.95	*	0.32	0.81	1.29
Rb mg kg-1	0.45	*	-0.13	*	0.62	*	*	*	0.03	-0.56	1.54	*	0.15	-11.61	1.25
Sb mg kg-1	*	*	23.37	*	*	*	*	*	*	-0.21	*	*	*	-0.42	*
Sc mg kg-1	*	*	*	*	*	*	*	-1.90	0.76	0.18	*	0.40	-1.67	1.62	*
Sm mg kg-1	0.49	*	-0.44	*	*	*	*	*	-0.60	-0.03	-0.09	*	0.00	0.60	0.74
Sn mg kg-1	*	*	4.49	*	*	*	*	*	*	0.48	*	*	*	-1.20	*
Sr mg kg-1	1.22	*	0.01	*	-0.88	*	*	-6.94	-0.59	-0.29	1.02	0.61	-0.21	0.61	1.55
Ta mg kg-1	*	*	*	*	*	*	*	*	-0.87	-0.03	*	*	-0.81	-0.51	0.19
Tb mg kg-1	-0.16	*	*	*	*	*	*	*	1.45	-0.09	0.47	*	0.06	0.49	0.12
Th mg kg-1	-0.07	*	-1.42	*	0.62	*	*	*	0.01	-0.17	-0.02	*	0.07	-0.72	0.80
Tl mg kg-1	*	*	-0.30	*	*	*	*	*	*	*	*	*	*	*	-1.34
Tm mg kg-1	-0.06	*	*	*	*	*	*	*	*	0.27	-1.07	*	0.02	0.14	0.41
U mg kg-1	0.00	*	1.19	*	*	*	*	*	*	-0.22	1.53	*	-0.26	-0.05	0.61
V mg kg-1	*	*	-0.24	*	-0.84	*	*	-9.31	-0.24	-0.64	*	-0.94	-0.83	-0.14	*
Y mg kg-1	-0.50	*	-0.51	*	-0.09	*	*	17.04	0.88	0.02	0.87	1.37	-0.77	0.24	1.09
Yb mg kg-1	-0.03	*	*	*	*	*	*	*	*	-0.10	0.79	*	0.37	0.79	0.45
Zn mg kg-1	*	*	1.01	*	0.44	*	*	-8.95	*	-0.71	*	-0.13	-0.82	1.47	2.79
Zr mg kg-1	*	0.12	-0.40	*	0.61	*	*	2.79	0.03	-0.32	-1.43	*	-2.42	-1.26	2.95

Technique codes: A: ICP-AES; AA: AAS; E=emission spectrometry; G=gravimetric; I=INAA;  
 ign=ignition; IR= infra red detection; ISE=ion selective electrodes; M=ICP-MS; O=other;  
 tit=titrimetry; W= wet chemistry; X=X-ray fluorescence.

GeoPT9 Table 3

Round identifier	J14	J15	J16	J17	J18	J19	J20	J21	J22	J23	J24	J25	J26	J27	J27	J28	
Technique codes	M	X	A,tit.	X	tit,X	M,X	X	I	X	X	I	M,V,	X	A,E,	A,E,	M	
			X									X		X	X		
Test portion (g)	0.1	1.0-5	0.01-0.7	8	0.1-0.8	0.1-4	1	1.9	1	1.0-5	0.15	0.2-7	1-3.6	0.1-1.2	0.1-1.2	0.05	
Data quality	2	2	1	2	2	2	2	1	2	2	1	1	1	1	2	1	
SiO2	% m/m	*	-0.37	0.97	*	-0.12	0.07	-0.91	*	0.54	2.26	*	-0.98	4.89	-0.98	*	*
TiO2	% m/m	*	-0.69	-0.38	*	-0.19	0.81	2.06	*	0.81	0.06	*	4.88	-0.88	0.67	*	*
Al2O3	% m/m	*	0.10	1.19	*	-0.17	0.00	0.69	0.35	-2.36	-3.75	*	1.24	1.08	-0.19	*	*
Fe2O3	% m/m	*	0.85	-0.01	4.64	-0.31	0.00	1.12	-2.33	0.77	-0.35	-23.36	0.70	3.70	1.08	*	*
Fe(II)O	% m/m	*	*	-3.92	*	-0.33	*	*	*	*	*	*	15.03	*	*	*	*
MnO	% m/m	*	-0.29	0.87	0.43	-0.08	0.43	-0.29	-0.59	-3.21	-1.02	*	-0.59	-0.59	*	0.00	*
MgO	% m/m	*	-0.57	2.90	*	0.02	0.02	2.00	*	3.83	2.71	*	2.43	7.89	*	0.26	*
CaO	% m/m	*	-0.34	-1.32	*	0.63	0.31	10.96	*	-1.63	-1.31	*	6.04	-0.68	7.39	*	*
Na2O	% m/m	*	-3.19	-0.24	*	-0.27	-1.19	7.55	-0.55	2.33	7.39	6.20	2.11	-7.29	0.07	*	*
K2O	% m/m	*	1.93	0.95	*	-0.01	-0.50	-8.44	*	-3.99	1.54	*	1.18	0.95	4.24	*	*
P2O5	% m/m	*	0.28	2.50	*	0.28	0.28	15.63	*	1.82	*	*	2.10	0.57	*	-0.33	*
LOI	% m/m	*	0.47	0.44	*	0.22	-0.87	-0.62	*	0.64	*	*	0.78	*	*	5.86	*
As	mg kg-1	*	*	7.07	3.18	*	-1.41	*	2.69	*	*	2.12	*	*	*	-0.64	*
B	mg kg-1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4.91	*
Ba	mg kg-1	*	-0.51	3.50	*	-0.21	-0.57	*	2.77	*	1.85	-0.22	3.50	*	*	-1.07	-0.55
Be	mg kg-1	*	*	7.34	*	*	-0.15	*	*	*	*	*	*	*	*	-0.42	0.03
Ce	mg kg-1	*	*	0.51	*	-1.67	1.70	*	-0.46	*	1.54	1.83	4.47	*	0.25	*	1.15
Co	mg kg-1	*	*	2.06	*	-0.04	-0.04	*	-0.65	*	*	-0.79	4.92	*	*	1.39	-1.22
Cr	mg kg-1	*	*	2.39	*	-0.15	-0.31	*	0.78	*	2.70	0.04	6.07	*	*	-0.65	-2.97
Cs	mg kg-1	*	*	-2.17	*	*	*	*	0.61	*	*	-0.52	*	*	*	-1.08	1.89
Cu	mg kg-1	*	*	-0.34	*	0.93	-2.09	*	*	*	*	*	4.18	*	*	2.85	*
Dy	mg kg-1	*	*	25.57	*	*	0.66	*	0.67	*	*	*	3.64	*	*	*	0.67
Er	mg kg-1	*	*	0.12	*	*	0.31	*	*	*	*	*	4.27	*	-1.61	*	-0.02
Eu	mg kg-1	*	*	6.13	*	*	0.66	*	0.26	*	*	0.36	0.79	*	-0.22	*	-0.79
Ga	mg kg-1	*	*	0.55	*	-0.55	1.11	*	*	*	*	*	*	*	0.28	*	*
Gd	mg kg-1	*	*	5.28	*	*	*	*	*	*	*	*	-1.79	*	-1.67	*	-0.51
Hf	mg kg-1	*	*	-2.36	*	*	-1.68	*	0.66	*	*	0.56	*	*	1.67	*	-2.22
Ho	mg kg-1	*	*	-0.11	*	*	0.57	*	*	*	*	*	3.22	*	-1.10	*	0.63
La	mg kg-1	*	*	-5.77	*	-1.28	1.28	*	0.19	*	*	0.06	1.44	*	-0.32	*	0.45
Li	mg kg-1	*	*	*	*	*	1.65	*	*	*	*	*	*	*	-0.17	*	1.96
Lu	mg kg-1	*	*	*	*	*	-0.01	*	0.47	*	*	*	-3.81	*	1.99	*	-0.56
Nb	mg kg-1	*	1.40	0.26	-0.50	-1.14	0.76	*	*	1.40	*	2.80	1.53	*	1.40	*	-1.13
Nd	mg kg-1	*	*	-1.44	*	0.36	1.43	*	2.21	*	2.14	*	-3.13	*	0.35	*	1.28
Ni	mg kg-1	0.63	*	1.74	1.41	-0.50	0.32	*	5.56	*	4.15	-0.72	-8.10	-1.54	*	1.96	-0.07
Pb	mg kg-1	*	*	-0.16	1.38	0.28	1.02	*	*	*	*	*	-2.36	*	*	-0.52	0.35
Pr	mg kg-1	*	*	0.43	*	*	1.09	*	*	*	*	*	2.22	*	0.60	*	0.86
Rb	mg kg-1	*	-0.02	0.60	0.19	0.19	0.19	*	1.67	*	0.73	-0.79	4.45	0.17	-2.18	*	-0.26
Sb	mg kg-1	*	*	9.35	*	*	0.52	*	3.74	*	*	2.91	*	*	*	*	*
Sc	mg kg-1	*	*	-2.80	*	*	1.31	*	1.63	*	-0.50	-0.18	*	*	*	-3.65	1.53
Sm	mg kg-1	*	*	5.73	*	*	0.52	*	0.74	*	*	0.49	3.19	*	0.13	*	0.77
Sn	mg kg-1	*	*	6.84	*	*	-0.59	*	*	*	*	*	*	*	*	2.75	*
Sr	mg kg-1	*	-0.09	0.22	0.61	0.21	-0.09	*	*	*	*	0.02	5.99	-0.57	1.02	*	-0.38
Ta	mg kg-1	*	*	23.24	*	*	5.64	*	-8.90	*	*	-0.18	*	*	0.42	*	-0.67
Tb	mg kg-1	*	*	2.12	*	*	-0.37	*	1.12	*	*	-1.32	2.55	*	-1.32	*	-0.23
Th	mg kg-1	*	-1.19	0.76	0.62	1.16	1.95	*	2.05	*	*	0.01	-0.81	*	-0.34	*	-0.34
Tl	mg kg-1	*	*	*	*	*	0.24	*	*	*	*	*	*	*	*	*	4.79
Tm	mg kg-1	*	*	*	*	*	0.02	*	*	*	*	*	-3.21	*	-2.48	*	1.52
U	mg kg-1	*	*	14.36	0.48	*	-0.22	*	0.75	*	0.13	0.19	*	*	1.32	*	-0.37
V	mg kg-1	0.60	*	-0.27	*	-0.64	0.77	*	1.14	*	1.87	*	7.57	-0.87	*	1.07	-0.27
Y	mg kg-1	*	0.24	3.50	0.24	-0.13	-0.13	*	*	*	2.88	*	11.77	*	*	-1.26	1.09
Yb	mg kg-1	*	*	0.00	*	*	0.00	*	0.39	*	*	0.00	-5.47	*	-2.75	*	-0.20
Zn	mg kg-1	*	*	0.87	0.67	-0.25	-0.71	*	*	*	0.21	1.56	6.82	1.18	-2.55	*	*
Zr	mg kg-1	*	1.10	1.07	-0.17	-0.17	-0.56	*	*	*	0.93	0.91	2.32	-2.52	*	0.22	-4.71

GeoPT9 Table 3

Round identifier	J29	J29	J30	J31	J32	J33	J34	J35	J36	J37	J38	J38	J39	J40	J40	J41	
Technique codes	M	M	A,AA,	X	X	X	AA,G	M	X	A,AA,	X	X	A,I	X	X	M,X	
			W				P,V			O,X			M,X				
Test portion (g)	0.1	0.1	0.2-1	1.2	1	0.17	0.1-2	0.1	0.4	0.2-3	0.7-10	10	0.1-0.8	1.2-9	1.2-9	0.1-10	
Data quality	1	2	2	1	1	1	1	1	2	1	1	2	1	1	2	1	
SiO2	% m/m	*	*	-0.54	-0.04	-1.38	-1.76	-1.46	*	0.23	-0.23	-0.48	*	-0.50	-0.01	*	-0.15
TiO2	% m/m	*	*	3.82	-0.88	4.13	3.13	-4.89	*	0.06	4.63	-0.63	*	-0.13	2.28	*	-0.88
Al2O3	% m/m	*	*	0.58	-0.08	-1.65	2.23	1.54	*	0.19	-0.31	0.83	*	0.00	-1.03	*	0.31
Fe2O3	% m/m	*	*	-0.27	-0.70	3.09	9.89	3.09	*	-0.31	-1.01	-0.06	*	-1.01	-1.15	*	-1.32
Fe(II)O	% m/m	*	*	*	*	*	*	5.23	*	*	6.54	*	*	*	*	*	*
MnO	% m/m	*	*	0.29	-0.59	3.05	5.24	-0.59	*	-0.29	0.43	-1.17	*	-0.44	0.72	*	-4.96
MgO	% m/m	*	*	3.35	-1.38	12.89	-1.14	0.05	*	0.62	-0.43	-1.21	*	-0.43	0.50	*	2.90
CaO	% m/m	*	*	3.21	-1.97	3.84	5.78	13.52	*	-0.66	0.61	-0.16	*	-0.48	1.58	*	-1.32
Na2O	% m/m	*	*	-1.50	3.75	-10.05	-1.77	1.29	*	0.49	-0.24	-0.58	*	-0.45	-1.47	*	-0.55
K2O	% m/m	*	*	-0.50	0.75	2.11	1.33	-0.02	*	0.76	-0.99	-0.45	*	-0.08	-0.24	*	0.75
P2O5	% m/m	*	*	7.95	3.64	9.77	-4.34	-4.04	*	-1.25	-1.58	1.49	*	-19.38	1.30	*	0.57
LOI	% m/m	*	*	-0.62	-0.40	-1.74	-0.06	-0.06	*	*	0.11	-0.06	*	0.16	-0.90	*	0.95
As	mg kg-1	*	*	*	*	*	*	*	*	6.93	*	0.57	1.43	*	*	*	-0.42
B	mg kg-1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Ba	mg kg-1	*	0.18	-0.41	0.12	-2.14	*	*	-1.32	*	-1.08	*	1.60	1.29	4.96	*	1.24
Be	mg kg-1	*	*	*	*	*	*	*	*	4.61	*	*	0.30	*	*	*	2.26
Ce	mg kg-1	1.11	*	2.84	-2.71	*	*	0.99	*	2.96	*	*	3.39	*	-2.32	2.31	*
Co	mg kg-1	*	*	0.67	-0.08	-10.06	9.20	*	*	-1.50	*	-1.89	0.71	*	*	1.85	*
Cr	mg kg-1	*	*	0.02	0.38	0.04	5.74	*	*	3.39	*	1.50	1.52	6.98	*	4.16	*
Cs	mg kg-1	-0.25	*	*	*	*	*	-0.91	*	*	*	*	0.33	*	*	1.29	*
Cu	mg kg-1	*	*	1.75	*	*	*	*	*	4.05	-3.63	*	1.32	3.06	*	-1.82	*
Dy	mg kg-1	-0.06	*	-0.65	*	*	*	-0.96	*	-0.51	*	*	0.74	*	*	0.32	*
Er	mg kg-1	-0.32	*	0.26	*	*	*	0.07	*	2.06	*	*	0.27	*	*	0.57	*
Eu	mg kg-1	-0.47	*	-1.36	*	*	*	-0.31	*	-1.66	*	*	0.84	*	*	0.46	*
Ga	mg kg-1	*	*	*	-1.11	-1.11	*	*	*	*	*	-0.51	-0.30	0.30	*	0.55	*
Gd	mg kg-1	-0.22	*	-0.18	*	*	*	-1.27	*	0.19	*	*	1.35	*	*	0.22	*
Hf	mg kg-1	*	0.44	*	*	*	*	-1.08	*	*	*	*	2.84	*	*	-0.41	*
Ho	mg kg-1	-0.01	*	-0.68	*	*	*	0.14	*	1.50	*	*	0.32	*	*	0.76	*
La	mg kg-1	0.22	*	-4.33	*	*	*	-0.38	*	-7.37	*	*	1.69	*	-4.46	0.94	*
Li	mg kg-1	*	*	-5.29	*	*	*	*	*	2.31	*	*	1.96	*	*	*	*
Lu	mg kg-1	0.03	*	-1.36	*	*	*	0.84	*	0.47	*	*	110.66	*	*	0.22	*
Nb	mg kg-1	*	-0.45	2.67	10.40	9.88	*	0.65	*	2.28	-0.37	*	-0.16	0.77	*	0.06	*
Nd	mg kg-1	1.38	*	-1.73	*	*	*	1.09	*	-1.58	*	*	3.45	*	-6.69	1.96	*
Ni	mg kg-1	*	*	-0.23	2.28	0.64	-2.09	*	*	-4.82	-1.22	*	0.49	-2.36	*	1.68	*
Pb	mg kg-1	-0.62	*	-6.31	*	*	*	-0.58	*	-2.36	0.06	*	1.59	8.92	*	0.06	*
Pr	mg kg-1	0.47	*	-1.69	*	*	*	0.03	*	-2.41	*	*	0.95	*	*	1.58	*
Rb	mg kg-1	-0.24	*	*	3.38	-0.26	*	-1.05	*	-1.75	0.47	*	0.60	0.07	*	0.21	*
Sb	mg kg-1	*	*	*	*	*	*	*	*	*	*	*	-5.01	*	*	1.25	*
Sc	mg kg-1	*	0.41	*	*	*	*	*	*	*	*	-0.45	2.40	0.99	*	1.53	*
Sm	mg kg-1	0.49	*	-0.84	*	*	*	-0.23	*	0.85	*	*	2.50	*	*	0.90	*
Sn	mg kg-1	*	*	*	*	*	*	*	*	*	*	*	0.00	*	*	2.19	*
Sr	mg kg-1	0.12	*	2.20	2.61	-1.07	*	-1.91	*	-3.14	0.00	*	0.82	-0.46	*	0.82	*
Ta	mg kg-1	*	1.33	5.64	*	*	*	0.06	*	*	*	*	1.02	*	*	0.42	*
Tb	mg kg-1	-0.20	*	-1.30	*	*	*	-0.60	*	2.55	*	*	0.83	*	*	0.26	*
Th	mg kg-1	-0.80	*	*	*	*	*	0.18	*	*	*	1.01	0.60	3.16	*	-0.49	*
Ti	mg kg-1	*	*	*	*	*	*	*	*	*	*	*	0.74	*	*	-0.16	*
Tm	mg kg-1	-0.04	*	-0.48	*	*	*	0.16	*	-3.24	*	*	1.98	*	*	*	*
U	mg kg-1	-0.98	*	*	*	*	*	-0.23	*	0.26	*	-0.22	2.23	*	*	-0.66	*
V	mg kg-1	*	*	1.54	*	*	0.13	*	*	-0.67	*	1.17	-0.01	8.33	*	0.83	*
Y	mg kg-1	-0.81	*	-1.78	10.27	-5.53	-5.53	*	1.39	*	-2.14	1.02	*	0.71	2.07	*	-0.34
Yb	mg kg-1	-0.36	*	-1.18	*	*	*	0.15	*	0.20	*	*	1.87	*	*	0.10	*
Zn	mg kg-1	*	*	0.09	-1.41	-0.95	*	*	*	-0.27	-1.32	*	0.57	-1.07	*	0.78	*
Zr	mg kg-1	*	0.84	-2.12	3.41	0.60	-2.52	*	*	0.29	0.02	*	*	3.11	*	1.30	*

GeoPT9 Table 3

Round identifier	J42	J43	J44	J44	J45	J45	J46	J47	J48	J49	J50	J51	J51	J52	J53	J54		
Technique codes	A.ir.	A.M.	I	I	T.X	T.X	AA.O.	A.W	A	M.X	M.T.	X	X	A.I.M.	X	M.X		
	M.O.V	X					tit				X			T.X				
Test portion (g)	0.2-1	0.25-1.5	1.0-10	1.0-10	0.25-6	0.25-6	0.1-0.5	0.25-0.5	0.05-0.5	0.1-0.5	0.01-1.2	1.0-20	1.0-20	0.1-2	1.0-6	0.1-12		
Data quality	2	2	1	2	1	2	2	1	2	1	1	1	2	2	2	2		
SiO2	% m/m	0.31	0.02	*	*	0.62	*	*	1.25	*	0.16	0.32	-0.39	*	0.35	-1.77	-0.16	
TiO2	% m/m	-0.69	-0.33	*	*	-1.53	*	*	-2.63	-0.32	-0.38	1.62	-0.38	*	0.31	-0.69	-0.19	
Al2O3	% m/m	0.00	71.16	*	*	0.13	*	*	1.23	-0.15	0.42	-0.81	-0.65	*	-0.17	-1.06	-0.19	
Fe2O3	% m/m	0.19	-0.74	*	*	0.11	-0.44	*	*	-4.38	-0.95	0.84	-0.55	0.30	*	-1.32	-1.09	-0.20
Fe(II)O	% m/m	0.82	*	*	*	1.31	*	0.00	*	*	*	6.54	*	*	-0.82	*	*	
MnO	% m/m	0.22	1.74	*	*	0.11	*	1.45	*	-0.88	-2.05	0.87	-0.59	*	0.29	-0.88	0.31	
MgO	% m/m	0.26	0.17	*	*	0.90	*	*	1.59	-0.57	-1.38	-1.62	0.05	*	-0.10	-0.45	-0.57	
CaO	% m/m	-0.66	-0.87	*	*	-0.23	*	*	0.42	-0.73	1.90	-0.03	1.90	*	-0.27	1.92	-0.66	
Na2O	% m/m	0.34	-0.50	*	*	0.42	5.16	*	2.98	1.78	-4.23	1.60	-2.08	*	0.36	0.03	1.41	
K2O	% m/m	-0.21	-0.10	*	*	2.80	-0.20	*	-2.00	0.26	0.17	-0.80	0.75	*	0.29	-1.27	-0.01	
P2O5	% m/m	0.28	0.88	*	*	0.87	*	*	*	0.57	0.57	0.57	0.57	*	0.59	-0.48	0.28	
LOI	% m/m	-0.87	1.91	*	*	-0.57	*	*	1.37	*	-1.41	0.95	0.11	*	-0.79	0.73	-0.28	
As	mg kg-1	-1.41	-8.26	*	*	0.88	*	*	*	*	*	*	0.00	*	2.13	0.00	0.00	
B	mg kg-1	-1.81	*	*	*	*	*	*	*	*	*	*	*	*	-0.36	*	*	
Ba	mg kg-1	-0.24	-12.04	*	*	-0.34	1.31	*	-2.16	*	-2.18	0.91	*	*	1.15	1.15	-1.11	
Be	mg kg-1	-0.42	-5.80	*	*	*	*	*	*	*	-0.03	-1.72	*	*	1.90	*	-1.31	
Ce	mg kg-1	1.83	*	-0.83	*	*	-1.51	*	*	*	-1.58	-0.20	*	*	1.06	-0.87	0.35	
Co	mg kg-1	-0.04	-9.41	*	*	-0.21	*	0.60	*	0.78	0.64	-1.29	*	6.02	0.25	0.32	-0.58	
Cr	mg kg-1	-2.99	-10.52	*	*	-0.02	2.56	*	-0.33	*	*	-5.99	-2.30	3.06	*	2.87	-1.32	-1.76
Cs	mg kg-1	0.36	-6.23	*	*	-0.13	*	*	*	*	0.46	-0.93	*	*	0.85	*	-0.11	
Cu	mg kg-1	1.20	-9.68	*	*	1.80	*	-1.54	*	-1.62	-1.44	3.06	-1.99	*	0.05	-0.72	0.38	
Dy	mg kg-1	0.26	*	*	*	*	*	*	*	*	-1.11	0.23	*	*	0.10	*	-0.06	
Er	mg kg-1	-0.06	*	*	*	*	*	*	*	*	-0.92	-0.67	*	*	0.80	*	0.13	
Eu	mg kg-1	0.52	*	-0.89	*	*	*	*	*	*	-0.51	0.46	*	*	-0.11	*	-0.09	
Ga	mg kg-1	-0.06	*	*	*	*	*	*	*	*	1.22	-1.02	2.21	*	0.82	-0.55	-0.14	
Gd	mg kg-1	0.13	*	*	*	*	*	*	*	*	-0.48	0.80	*	*	0.54	*	-0.17	
Hf	mg kg-1	-0.51	*	*	0.48	*	*	*	*	*	3.45	-0.65	*	*	0.82	5.53	0.18	
Ho	mg kg-1	0.13	*	2.74	*	*	*	*	*	*	0.26	-0.23	*	*	0.01	*	0.01	
La	mg kg-1	0.80	-7.94	0.15	*	*	0.64	*	*	*	-1.80	-1.41	*	*	0.99	1.60	-1.00	
Li	mg kg-1	0.98	-8.96	*	*	*	*	-0.17	*	0.65	*	-0.60	*	*	0.54	*	0.00	
Lu	mg kg-1	-0.13	-0.64	0.22	*	*	*	*	*	*	0.96	-0.51	*	*	0.24	*	-0.04	
Nb	mg kg-1	1.08	*	*	*	0.13	*	*	*	*	0.64	-2.15	2.80	*	2.67	0.13	-0.91	
Nd	mg kg-1	0.36	*	2.01	*	*	*	*	*	*	0.85	-1.08	*	*	1.64	*	-0.25	
Ni	mg kg-1	0.87	-9.89	*	*	1.84	*	-1.87	*	-2.36	6.11	-0.89	0.10	*	-0.17	0.87	0.05	
Pb	mg kg-1	0.28	-7.76	*	*	0.28	*	*	*	*	4.89	*	1.02	*	-0.75	-0.81	0.28	
Pr	mg kg-1	0.52	*	*	*	*	*	*	*	*	-1.08	-0.66	*	*	1.63	*	-0.10	
Rb	mg kg-1	0.94	*	*	0.73	0.26	*	*	*	*	-5.18	-2.10	*	0.62	-0.24	0.09	-0.02	
Sb	mg kg-1	-0.10	*	*	-0.10	*	*	*	*	*	*	*	*	*	7.27	*	-0.10	
Sc	mg kg-1	0.85	*	*	0.65	*	*	*	*	*	-2.26	-0.91	*	*	0.51	*	-0.95	
Sm	mg kg-1	0.31	*	0.35	*	*	*	*	*	*	-1.36	-0.61	*	*	0.12	*	-0.17	
Sn	mg kg-1	-0.59	-5.90	*	*	*	*	*	*	*	*	*	*	*	-0.59	*	-0.62	
Sr	mg kg-1	1.40	-10.09	*	*	0.20	*	-1.78	*	-1.84	-4.75	0.14	*	1.21	0.51	0.01	0.41	
Ta	mg kg-1	-0.39	*	*	0.45	*	*	*	*	*	1.49	0.78	*	*	2.06	*	-0.28	
Tb	mg kg-1	0.34	*	0.76	*	*	*	*	*	*	-0.31	-0.89	*	*	0.27	*	-0.18	
Th	mg kg-1	0.38	-6.56	*	0.40	*	*	*	*	*	-2.42	-2.89	3.90	*	-0.17	1.95	-0.50	
Tl	mg kg-1	0.24	*	*	*	*	*	*	*	*	*	0.05	*	*	-0.83	*	-1.55	
Tm	mg kg-1	0.14	*	*	*	*	*	*	*	*	-0.21	-0.47	*	*	0.02	*	0.10	
U	mg kg-1	0.13	-5.63	*	*	*	*	*	*	*	-2.35	-0.09	*	*	0.73	*	-0.22	
V	mg kg-1	-0.04	-11.56	*	*	0.93	*	*	*	*	-9.11	0.61	7.16	*	1.57	1.17	-1.35	
Y	mg kg-1	-0.13	-8.22	*	*	1.54	*	*	*	*	0.49	-3.20	4.25	*	-0.21	0.62	-1.27	
Yb	mg kg-1	0.00	*	0.34	*	*	*	*	*	*	1.13	-1.13	*	*	0.07	*	0.02	
Zn	mg kg-1	0.55	-11.43	*	1.01	-0.02	*	-2.58	*	-3.21	29.44	-6.96	0.87	*	-0.49	-0.25	0.78	
Zr	mg kg-1	-1.89	-12.88	*	*	-0.13	*	-2.60	*	-2.65	-0.02	-2.74	2.94	*	1.47	0.46	0.22	



GeoPT9 Table 3

Round identifier	J55	J55	J56	J57	J57	J58	J59	J60	J60	J61	J61	J62	J62	J63	J63	J64	
Technique codes	A.ir.	A.ir.	M.X	A.tit.	A.tit.	A.M	X	X	X	X	X	X	X	X	X	A.AA.	
	M.T.X	M.T.X		X	X											X	
Test portion (g)	0.2-4	0.2-4	0.12-3.5	0.2-7.5	0.2-7.5	0.2-0.5	1.5	1.0-8	1.0-8	0.8-10	0.8-10	1.6	1.6	1-4.5	1-4.5	1.0-3	
Data quality	1	2	1	1	2	2	2	1	2	1	2	1	2	1	2	2	
SiO2	% m/m	-0.26	*	-0.29	-1.46	*	1.20	0.34	1.15	*	-0.44	*	-0.36	*	-0.36	*	0.55
TiO2	% m/m	0.12	*	-0.32	0.22	*	-0.94	0.31	*	-0.13	*	-1.83	*	0.62	*	0.06	
Al2O3	% m/m	0.08	*	-0.12	-0.65	*	-2.36	-0.38	*	0.20	0.88	*	0.02	*	-2.96	*	-0.19
Fe2O3	% m/m	-1.48	*	0.31	0.61	*	-2.83	-0.31	1.89	*	0.69	*	-2.33	*	0.46	*	0.38
Fe(II)O	% m/m	-0.65	*	*	-0.98	*	*	*	*	*	*	*	*	*	*	*	4.74
MnO	% m/m	-0.59	*	0.52	2.18	*	-1.75	-0.51	-0.59	*	1.45	*	1.23	*	0.87	*	-0.29
MgO	% m/m	1.95	*	1.50	0.76	*	-0.57	-1.17	1.12	*	-0.43	*	-1.14	*	-0.43	*	0.02
CaO	% m/m	-0.68	*	1.39	2.55	*	-1.63	0.57	5.78	*	1.90	*	-0.68	*	0.61	*	-1.31
Na2O	% m/m	0.07	*	-0.67	6.51	*	-2.42	-0.27	2.98	*	41.47	*	0.07	*	1.60	*	-1.19
K2O	% m/m	3.27	*	0.15	-0.80	*	-1.95	-0.30	-3.13	*	-25.61	*	-0.70	*	0.56	*	-0.50
P2O5	% m/m	2.50	*	-0.14	0.26	*	-4.32	0.59	*	2.41	*	-2.66	*	0.57	*	0.28	
LOI	% m/m	-0.06	*	-0.52	1.79	*	*	-0.12	-0.06	*	0.11	*	-0.33	*	1.45	*	-0.87
As	mg kg-1	*	*	*	*	*	3.25	*	*	*	2.12	*	*	*	*	*	-2.12
B	mg kg-1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0.00
Ba	mg kg-1	*	*	0.44	1.24	*	0.39	*	*	*	0.98	*	-3.73	*	-0.55	*	-1.10
Be	mg kg-1	*	-0.89	*	4.06	*	*	*	*	*	*	*	*	*	*	*	*
Ce	mg kg-1	*	0.11	0.31	-3.28	*	0.42	*	*	*	0.83	*	-0.29	*	*	*	-0.07
Co	mg kg-1	*	0.09	*	-1.50	*	-1.82	*	*	*	2.28	*	-4.36	*	2.63	*	0.67
Cr	mg kg-1	*	-1.02	-1.43	2.72	*	-0.82	*	*	*	8.75	*	0.04	*	0.71	*	0.86
Cs	mg kg-1	*	0.30	1.95	*	*	*	*	*	*	*	*	*	*	*	*	*
Cu	mg kg-1	*	2.58	3.17	1.86	*	0.38	*	-7.48	*	-3.63	*	-0.34	*	-3.30	*	3.12
Dy	mg kg-1	*	-0.43	1.92	1.25	*	-0.94	*	*	*	*	*	*	*	*	*	*
Er	mg kg-1	*	-0.83	0.71	*	*	-0.93	*	*	*	*	*	*	*	*	*	*
Eu	mg kg-1	*	-0.49	1.07	-0.02	*	-0.78	*	*	*	*	*	*	*	*	*	*
Ga	mg kg-1	*	0.19	-0.94	-2.77	*	-1.38	*	*	*	0.55	*	0.97	*	-0.61	*	*
Gd	mg kg-1	*	-0.41	0.61	-0.26	*	0.36	*	*	*	*	*	*	*	*	*	*
Hf	mg kg-1	*	-0.24	0.72	-0.24	*	*	*	*	*	*	*	*	*	*	-0.51	*
Ho	mg kg-1	*	-0.24	1.33	*	*	-1.30	*	*	*	*	*	*	*	*	*	*
La	mg kg-1	*	-0.99	0.99	-2.24	*	1.28	*	*	*	3.21	*	-0.96	*	*	*	0.64
Li	mg kg-1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-1.02
Lu	mg kg-1	*	-0.01	0.86	-3.71	*	*	*	*	*	*	*	*	*	*	*	*
Nb	mg kg-1	*	0.00	0.20	2.80	*	*	*	*	*	1.53	*	-12.42	*	-0.12	*	*
Nd	mg kg-1	*	0.00	0.04	0.21	*	-0.72	*	*	*	*	*	*	*	*	*	*
Ni	mg kg-1	*	-0.61	0.92	0.10	*	-1.05	*	-0.45	*	4.30	*	4.00	*	3.38	*	0.32
Pb	mg kg-1	*	-0.01	2.66	-3.09	*	-1.91	*	*	*	1.96	*	5.69	*	0.86	*	-0.81
Pr	mg kg-1	*	0.46	-0.90	*	-0.51	-0.66	*	*	*	*	*	*	*	*	*	*
Rb	mg kg-1	*	*	0.76	-0.47	*	-1.41	*	-1.75	*	0.81	*	0.92	*	1.09	*	*
Sb	mg kg-1	*	0.00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Sc	mg kg-1	*	-0.11	4.50	-0.09	*	*	*	*	*	*	*	*	*	-1.27	*	*
Sm	mg kg-1	*	-0.33	1.38	-1.28	*	-0.86	*	*	*	*	*	*	*	*	*	*
Sn	mg kg-1	*	0.40	*	*	*	*	*	*	*	*	*	*	*	*	3.95	*
Sr	mg kg-1	*	0.53	0.72	2.01	*	-0.49	*	-1.17	*	0.78	*	0.62	*	-0.14	*	-1.78
Ta	mg kg-1	*	-0.45	-0.44	*	*	*	*	*	*	*	*	*	*	*	*	*
Tb	mg kg-1	*	-0.52	1.09	0.55	*	-0.37	*	*	*	*	*	*	*	*	*	*
Th	mg kg-1	*	-0.57	2.30	-0.81	*	*	*	*	*	-0.81	*	*	*	*	1.64	*
Tl	mg kg-1	*	1.00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Tm	mg kg-1	*	*	0.64	*	-0.74	*	*	*	*	*	*	*	*	*	*	*
U	mg kg-1	*	-0.22	0.59	*	3.66	*	*	*	*	-1.85	*	*	*	*	*	*
V	mg kg-1	*	-0.54	-0.39	1.34	*	1.44	*	*	*	*	*	-1.78	*	*	-0.06	-1.14
Y	mg kg-1	*	0.46	1.93	-2.97	*	-0.88	*	*	*	2.67	*	-1.02	*	-0.64	*	-0.51
Yb	mg kg-1	*	-0.17	-0.01	-3.39	*	-0.98	*	*	*	*	*	*	*	*	*	*
Zn	mg kg-1	*	1.69	-0.93	-3.93	*	-0.71	*	-0.95	*	1.79	*	-0.84	*	-0.09	*	0.55
Zr	mg kg-1	*	0.07	-0.27	-0.02	*	-0.64	*	*	-1.10	2.71	*	-0.96	*	0.38	*	0.61

GeoPT9 Table 3

Round identifier	J65	J65	J66	J66	J67	J68	J69	J70	J71	J72	J73	J74	
Technique codes	I	I	X	X	AA,X	A,X	AA	AA	A, AA	A,M, X	M,X	X	
Test portion (g)	0.2	0.2	0.6-6	0.6-6	0.25-4	0.5-5	0.1	0.1	0.5	0.3-0.5	0.25-0.35	0.7-5	
Data quality	1	2	1	2	2	2	1	1	1	2	2	2	
SiO2	% m/m	*	*	-0.90	*	0.05	-0.33	*	6.83	*	-0.90	-0.07	0.18
TiO2	% m/m	*	1.06	0.62	*	0.56	-0.01	*	*	2.38	-0.52	-0.19	0.31
Al2O3	% m/m	6.19	*	-0.92	*	1.59	0.04	*	-1.08	*	-0.42	-0.86	0.33
Fe2O3	% m/m	-3.02	*	0.84	*	-3.52	0.42	-26.22	4.25	2.31	-0.12	1.04	0.42
Fe(II)O	% m/m	*	*	*	*	*	-1.63	*	*	*	*	*	*
MnO	% m/m	-0.59	*	0.87	*	-0.66	-0.88	-27.10	-2.05	3.78	1.23	1.16	0.58
MgO	% m/m	*	1.21	-0.19	*	1.21	1.09	-29.92	-5.90	1.86	0.05	-2.60	-0.33
CaO	% m/m	*	9.99	-0.68	*	-10.02	0.95	7.07	-0.03	6.42	0.02	-1.67	-0.34
Na2O	% m/m	0.07	*	-5.45	*	-3.80	1.26	10.19	-4.53	5.89	2.64	-3.95	0.49
K2O	% m/m	3.27	*	0.17	*	-2.92	0.47	-13.20	8.51	-2.93	-0.15	-0.01	0.38
P2O5	% m/m	*	*	3.64	*	-4.01	1.82	*	*	-7.11	-1.10	3.30	-1.25
LOI	% m/m	*	*	*	*	*	0.14	*	4.99	*	-1.23	0.56	0.22
As	mg kg-1	2.26	*	*	0.00	*	1.41	*	*	*	*	*	*
B	mg kg-1	*	*	*	*	*	-0.30	*	*	640.71	1.21	*	*
Ba	mg kg-1	*	0.66	1.51	*	2.05	0.26	*	*	-3.79	-2.89	1.18	0.36
Be	mg kg-1	*	*	*	*	*	-0.70	*	*	12.79	-3.15	*	*
Ce	mg kg-1	2.28	*	-0.78	*	*	-0.55	*	*	*	-2.14	*	*
Co	mg kg-1	-1.15	*	2.06	*	0.67	*	*	*	3.49	*	-0.69	-1.11
Cr	mg kg-1	-0.36	*	0.38	*	*	-0.65	*	*	*	*	-1.49	-1.49
Cs	mg kg-1	1.59	*	*	2.12	*	*	*	*	2.17	*	0.40	*
Cu	mg kg-1	*	*	-3.63	*	15.67	-0.72	*	*	7.35	-0.72	-1.82	-0.72
Dy	mg kg-1	*	0.83	*	*	*	-0.62	*	*	*	-1.04	*	*
Er	mg kg-1	*	*	*	*	*	1.05	*	*	*	-1.47	*	*
Eu	mg kg-1	0.46	*	*	*	*	-0.69	*	*	*	-0.54	*	*
Ga	mg kg-1	*	-0.35	-0.28	*	*	0.28	*	*	*	*	-1.05	*
Gd	mg kg-1	*	*	*	*	*	-0.10	*	*	*	-1.02	*	*
Hf	mg kg-1	1.06	*	*	*	*	-0.51	*	*	*	*	0.48	*
Ho	mg kg-1	*	*	*	*	*	-1.61	*	*	*	-1.11	*	*
La	mg kg-1	-0.32	*	*	*	*	0.00	*	*	*	-2.15	*	*
Li	mg kg-1	*	*	*	*	*	0.45	*	*	-10.63	*	*	*
Lu	mg kg-1	0.96	*	*	*	*	0.73	*	*	*	-1.24	*	*
Nb	mg kg-1	*	*	*	1.14	1.21	-0.19	*	*	*	*	-0.25	*
Nd	mg kg-1	*	-0.36	-2.15	*	*	0.00	*	*	*	-1.58	*	*
Ni	mg kg-1	*	*	0.64	*	0.87	-0.50	*	*	-4.82	-2.41	0.59	3.60
Pb	mg kg-1	*	*	*	3.95	0.39	-0.08	*	*	-12.98	*	1.07	0.65
Pr	mg kg-1	*	*	*	*	*	-0.33	*	*	*	-1.40	*	*
Rb	mg kg-1	-1.33	*	1.88	*	-0.45	-0.56	*	*	-1.75	*	-0.45	14.52
Sb	mg kg-1	*	1.35	*	*	*	*	*	*	*	*	*	*
Sc	mg kg-1	1.08	*	*	*	*	-0.50	*	*	-4.60	*	*	*
Sm	mg kg-1	1.62	*	*	*	*	-1.13	*	*	*	-1.33	*	*
Sn	mg kg-1	*	*	*	*	*	0.75	*	*	*	*	*	*
Sr	mg kg-1	*	*	1.42	*	0.11	0.71	*	*	-4.16	-2.08	-0.59	0.81
Ta	mg kg-1	*	1.05	*	*	*	*	*	*	*	*	2.42	*
Tb	mg kg-1	*	0.27	*	*	*	0.92	*	*	*	*	*	*
Th	mg kg-1	-0.02	*	*	0.38	0.38	-0.56	*	*	*	*	0.15	-1.19
Tl	mg kg-1	*	*	*	*	*	*	*	*	*	*	*	*
Tm	mg kg-1	*	*	*	*	*	-0.48	*	*	*	-1.11	*	*
U	mg kg-1	*	*	*	*	*	*	*	*	*	*	-6.39	0.13
V	mg kg-1	0.73	*	0.93	*	0.07	-0.94	*	*	4.15	*	0.57	*
Y	mg kg-1	*	*	*	0.24	-1.15	-0.88	*	*	-7.03	-3.52	0.02	10.40
Yb	mg kg-1	0.89	*	*	*	*	-0.20	*	*	*	-1.40	*	*
Zn	mg kg-1	*	2.04	-0.27	*	2.27	0.89	*	*	3.16	-2.08	-0.25	-0.02
Zr	mg kg-1	*	0.38	0.13	*	0.93	0.38	*	*	*	-6.57	*	*

**Table 4**  
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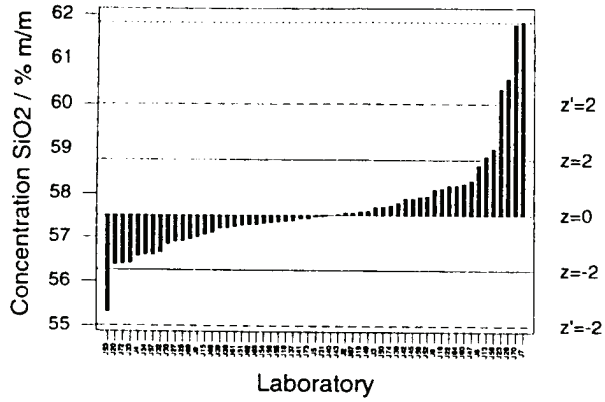
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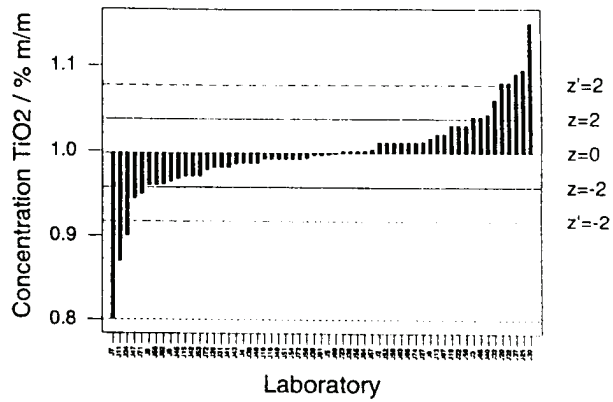
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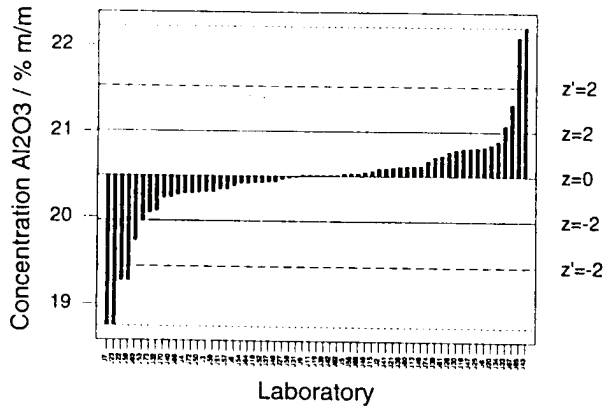
GeoPT9 - Barchart for SiO2



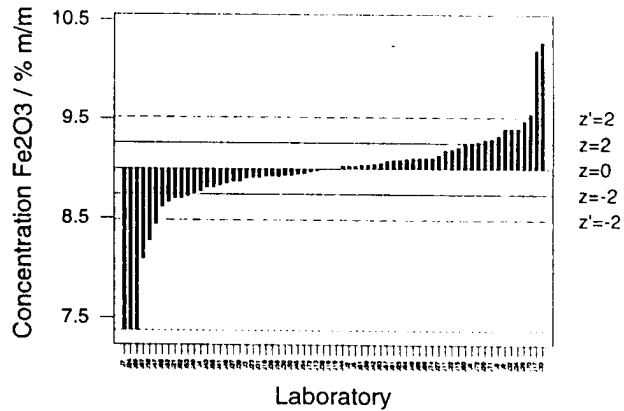
GeoPT9 - Barchart for TiO2



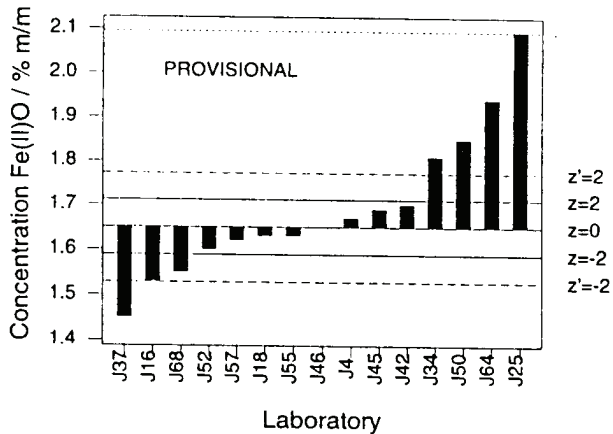
GeoPT9 - Barchart for Al2O3



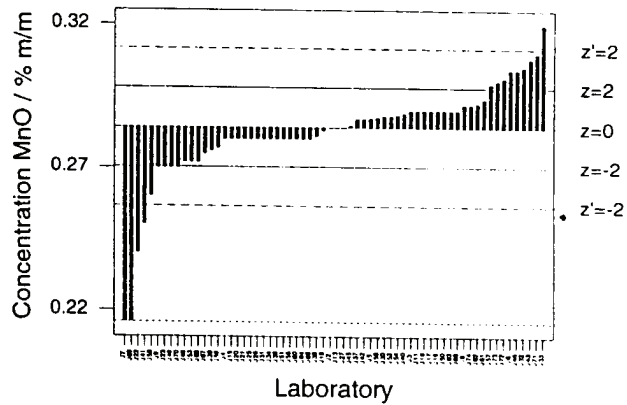
GeoPT9 - Barchart for Fe2O3



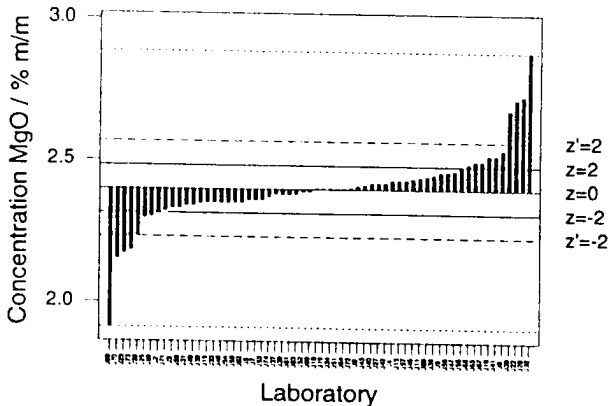
GeoPT9 - Barchart for Fe(II)O



GeoPT9 - Barchart for MnO



GeoPT9 - Barchart for MgO



GeoPT9 - Barchart for CaO

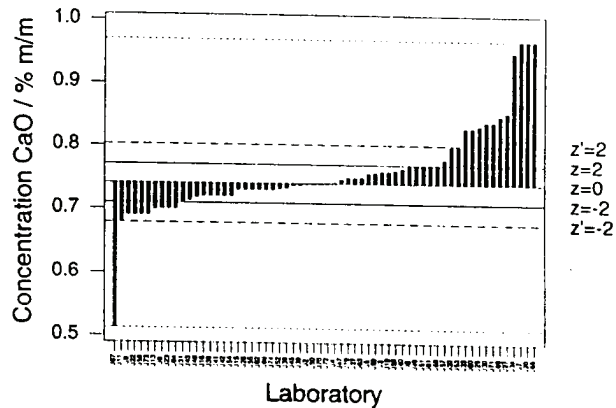
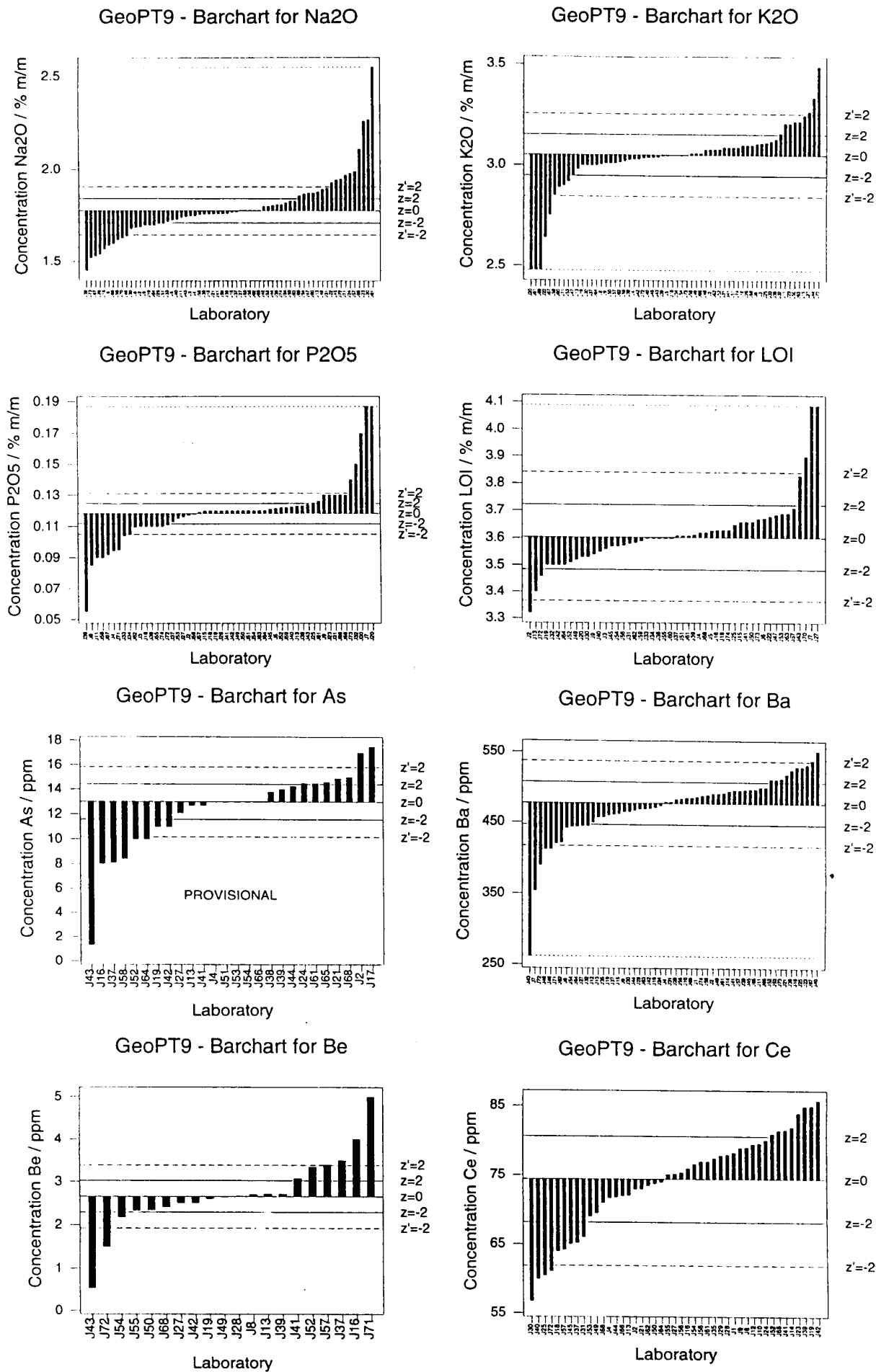
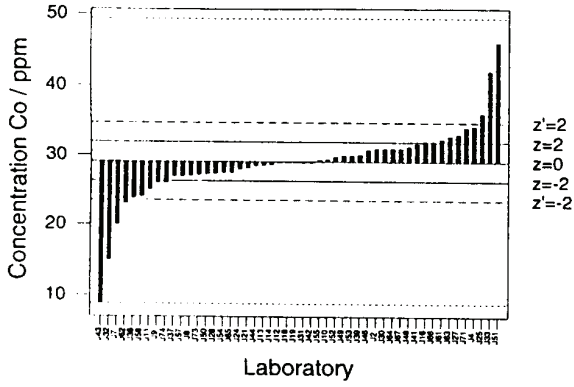


Figure 1 GeoPT9 - OU-6 Penrhyn slate: Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for  $-2 < z < 2$  for pure geochemistry labs (solid lines) and  $-2 < z' < 2$  for applied geochemistry labs (pecked lines).

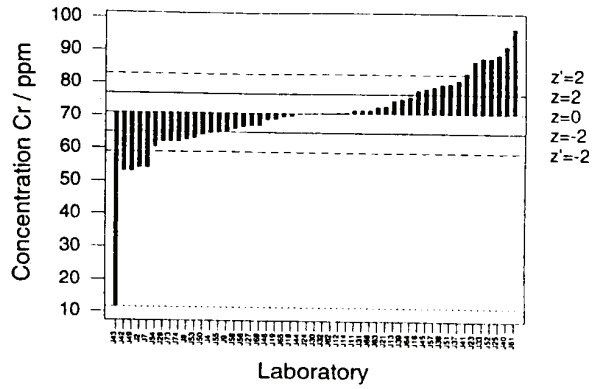


**Figure 1** GeoPT9 - OU-6 Penrhyn slate: Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for  $-2 < z < 2$  for pure geochemistry labs (solid lines) and  $-2 < z' < 2$  for applied geochemistry labs (pecked lines).

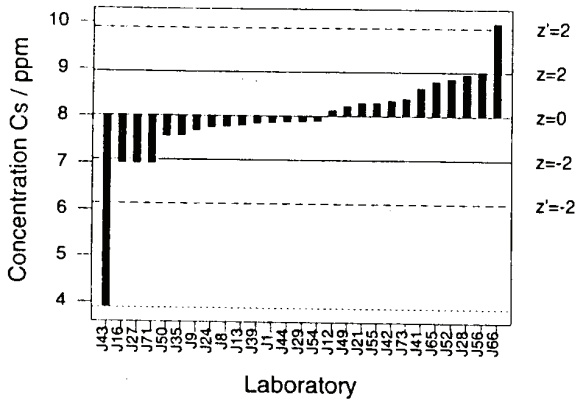
GeoPT9 - Barchart for Co



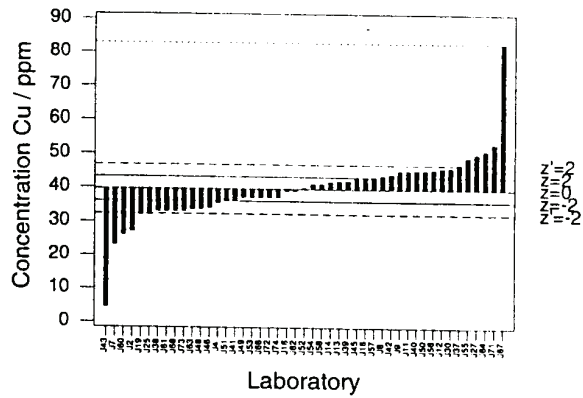
GeoPT9 - Barchart for Cr



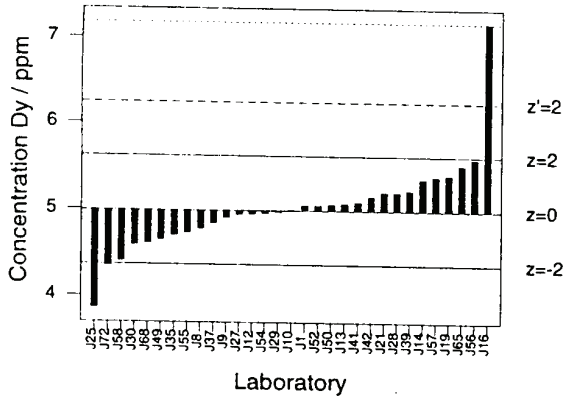
GeoPT9 - Barchart for Cs



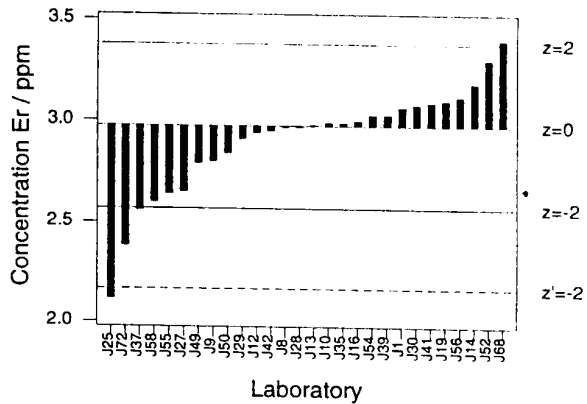
GeoPT9 - Barchart for Cu



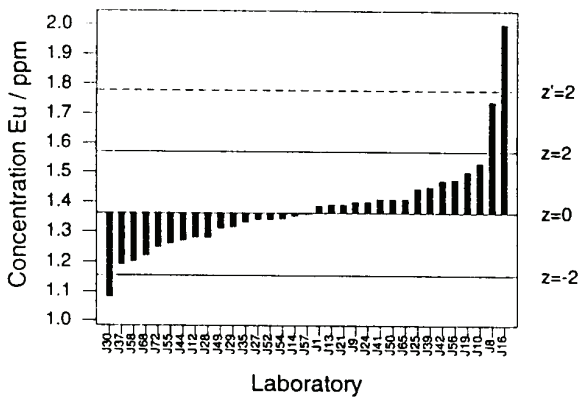
GeoPT9 - Barchart for Dy



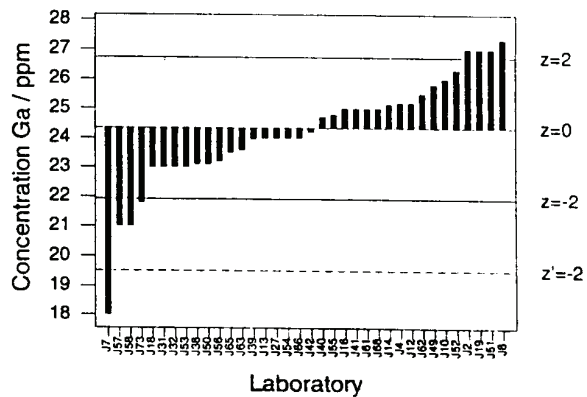
GeoPT9 - Barchart for Er



GeoPT9 - Barchart for Eu

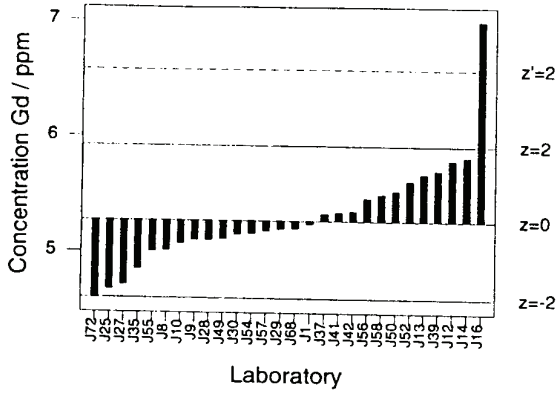


GeoPT9 - Barchart for Ga

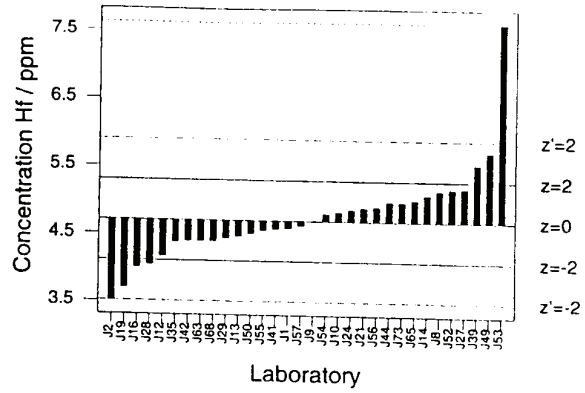


**Figure 1** GeoPT9 - OU-6 Penrhyn slate: Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for  $-2 < z < 2$  for pure geochemistry labs (solid lines) and  $-2 < z' < 2$  for applied geochemistry labs (pecked lines).

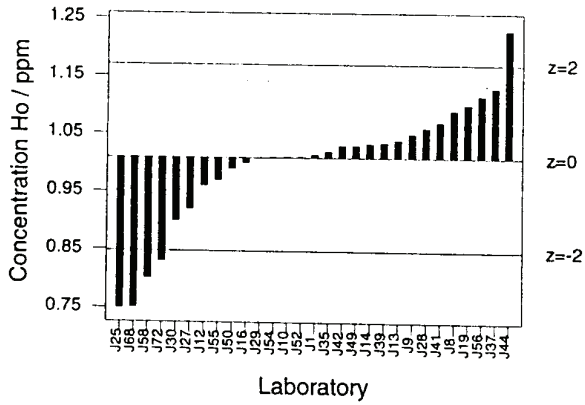
GeoPT9 - Barchart for Gd



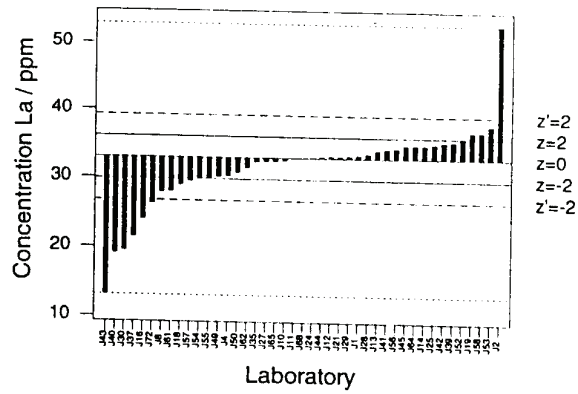
GeoPT9 - Barchart for Hf



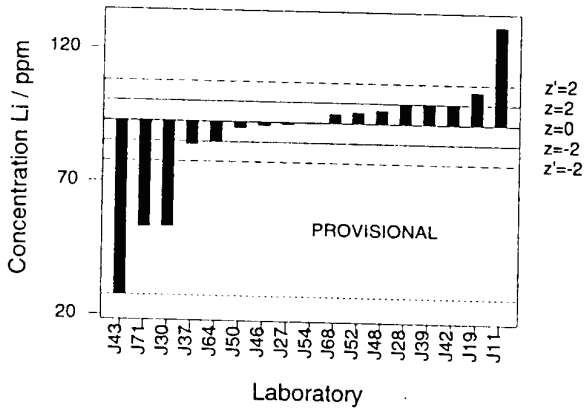
GeoPT9 - Barchart for Ho



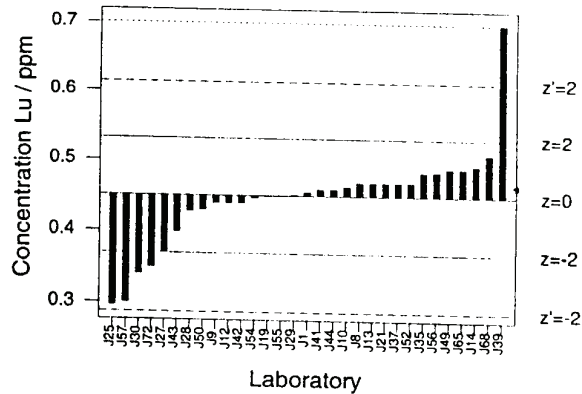
GeoPT9 - Barchart for La



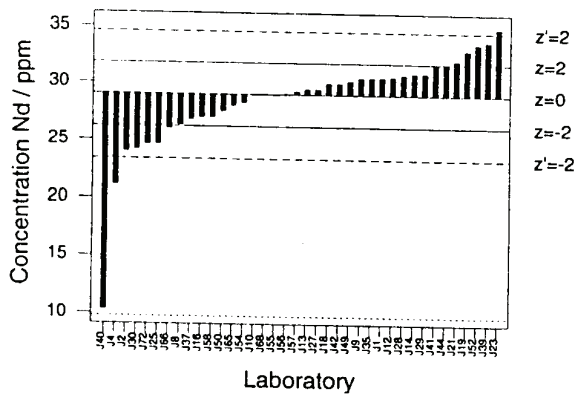
GeoPT9 - Barchart for Li



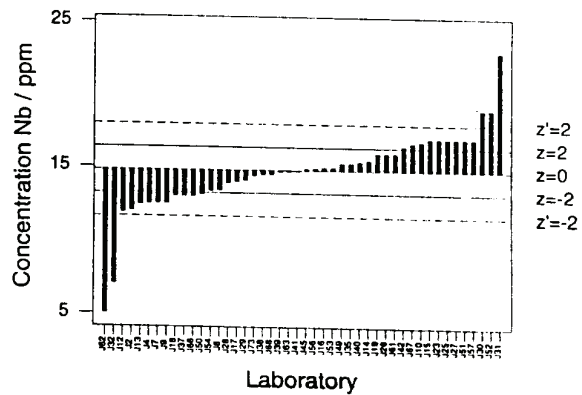
GeoPT9 - Barchart for Lu



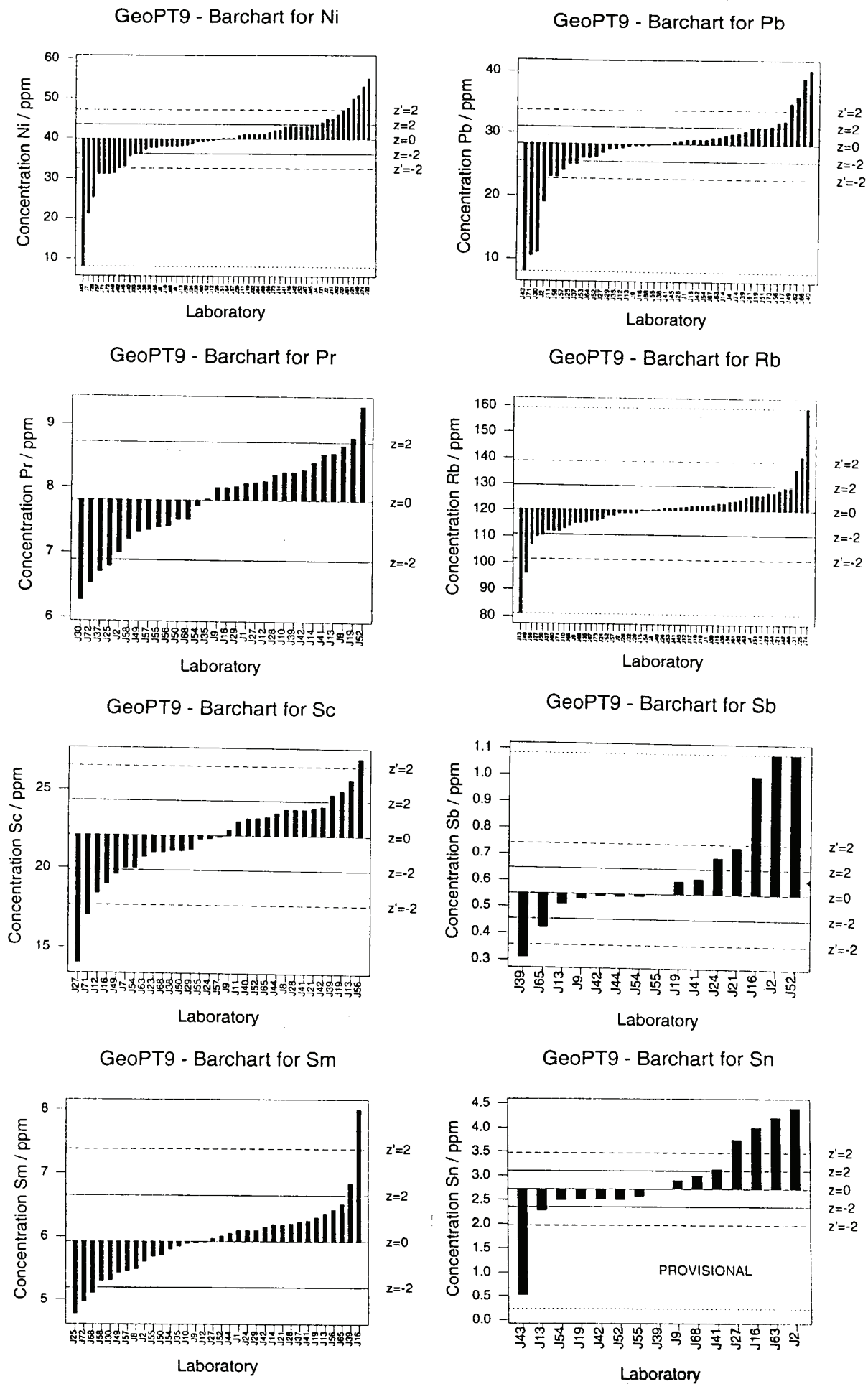
GeoPT9 - Barchart for Nd



GeoPT9 - Barchart for Nb



**Figure 1** GeoPT9 - OU-6 Penrhyn slate: Data distribution charts for elements for which values were assigned. 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).

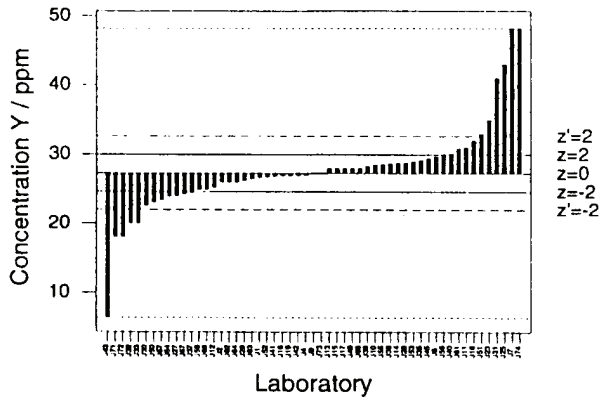


**Figure 1** GeoPT9 - OU-6 Pennhyn slate: Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for  $-2 < z < 2$  for pure geochemistry labs (solid lines) and  $-2 < z' < 2$  for applied geochemistry labs (pecked lines).

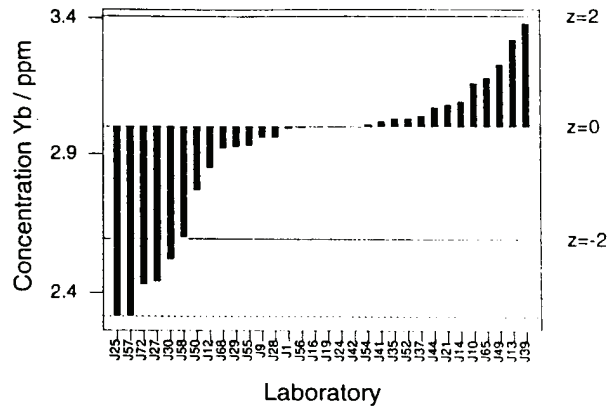




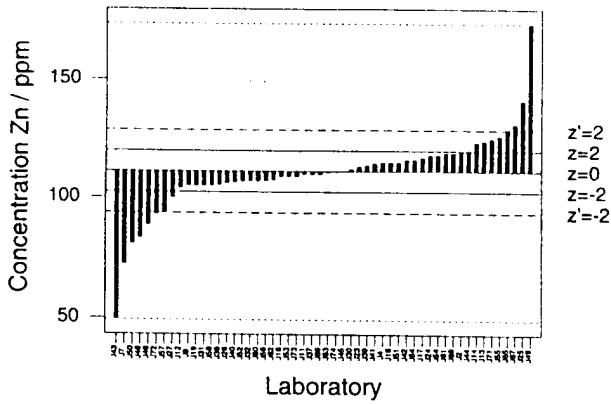
GeoPT9 - Barchart for Y



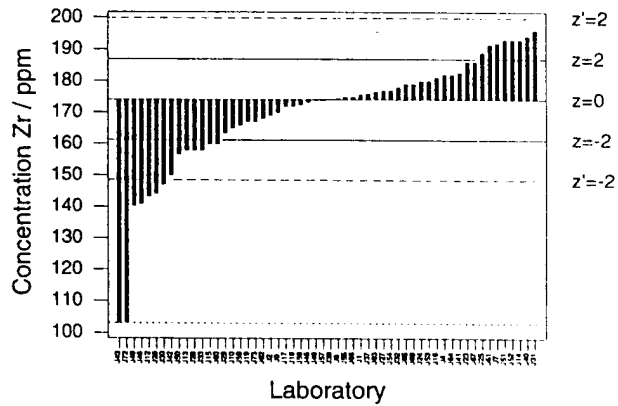
GeoPT9 - Barchart for Yb



GeoPT9 - Barchart for Zn

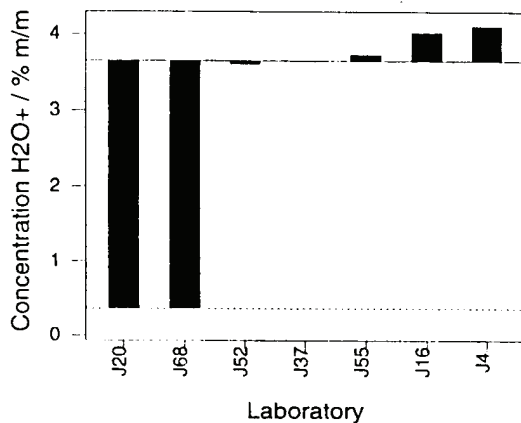


GeoPT9 - Barchart for Zr

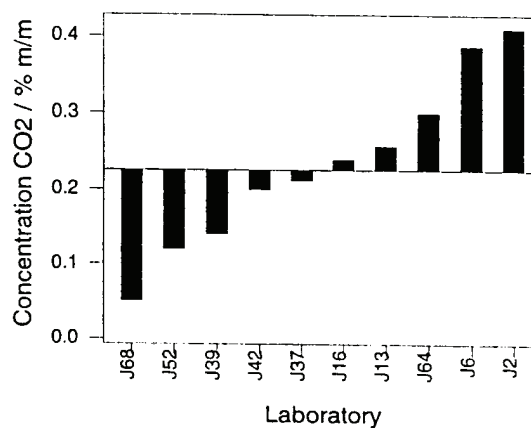


**Figure 1** GeoPT9 - OU-6 Penrhyn slate: Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for  $-2 < z < 2$  for pure geochemistry labs (solid lines) and  $-2 < z' < 2$  for applied geochemistry labs (pecked lines).

GeoPT9 - Barchart for H<sub>2</sub>O<sup>+</sup>

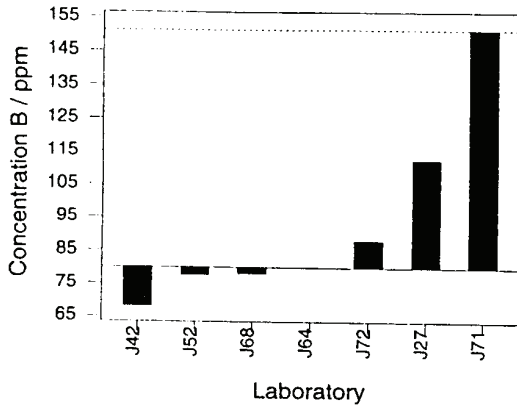


GeoPT9 - Barchart for CO<sub>2</sub>

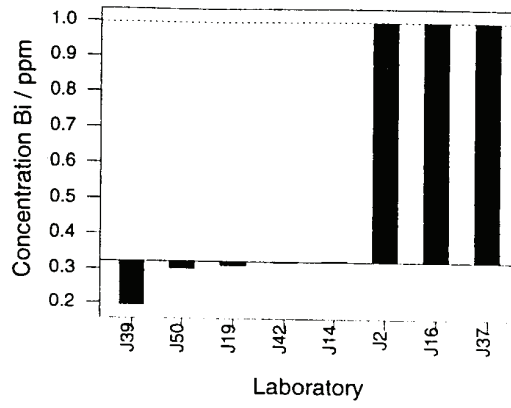


**Figure 2** GeoPT9 - OU-6 Penrhyn slate: Data distribution charts for elements for which values were not assigned.

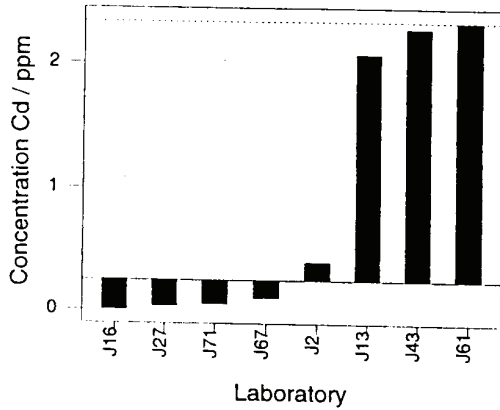
GeoPT9 - Barchart for B



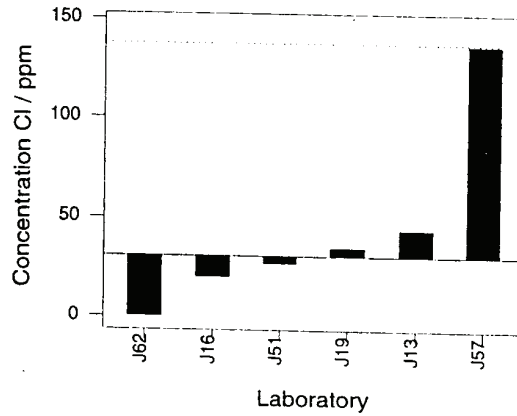
GeoPT9 - Barchart for Bi



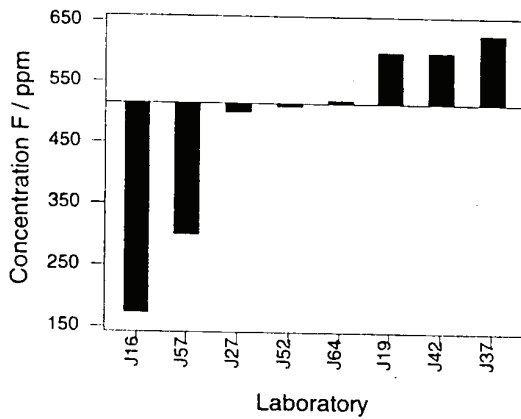
GeoPT9 - Barchart for Cd



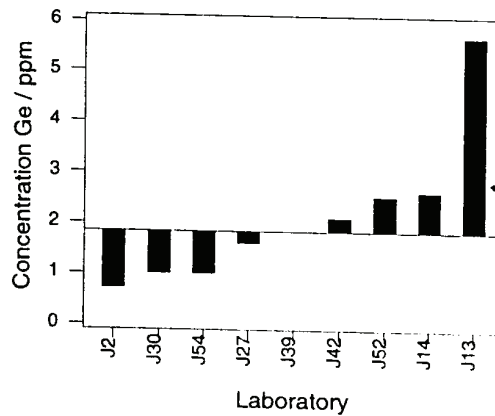
GeoPT9 - Barchart for Cl



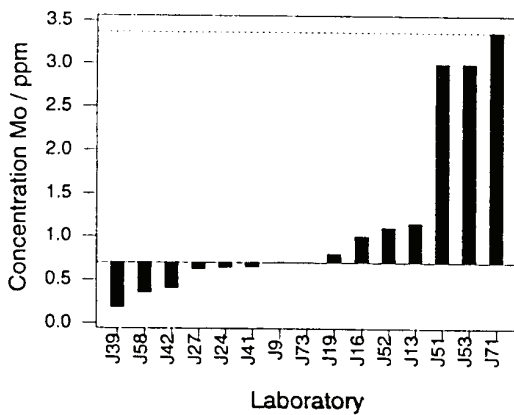
GeoPT9 - Barchart for F



GeoPT9 - Barchart for Ge



GeoPT9 - Barchart for Mo



GeoPT9 - Barchart for W

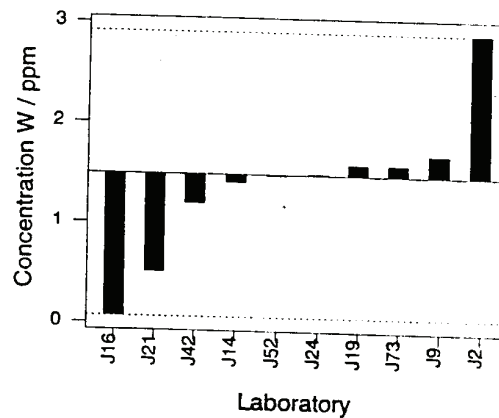
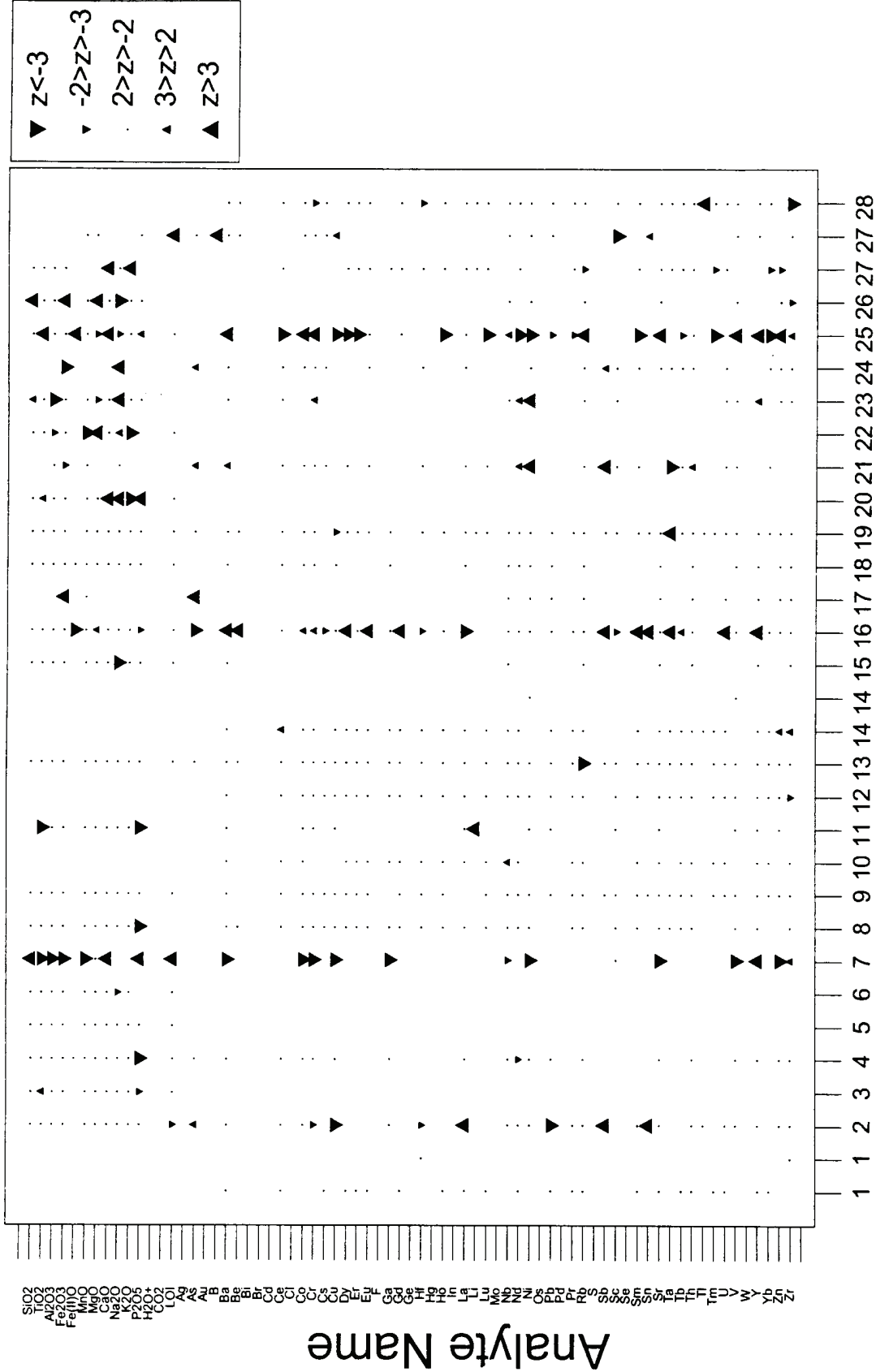


Figure 2 GeoPT9 - OU-6 Penrhyn slate: Data distribution charts for elements for which values were not assigned.

# GeoPT9 - Multiple z-score Chart



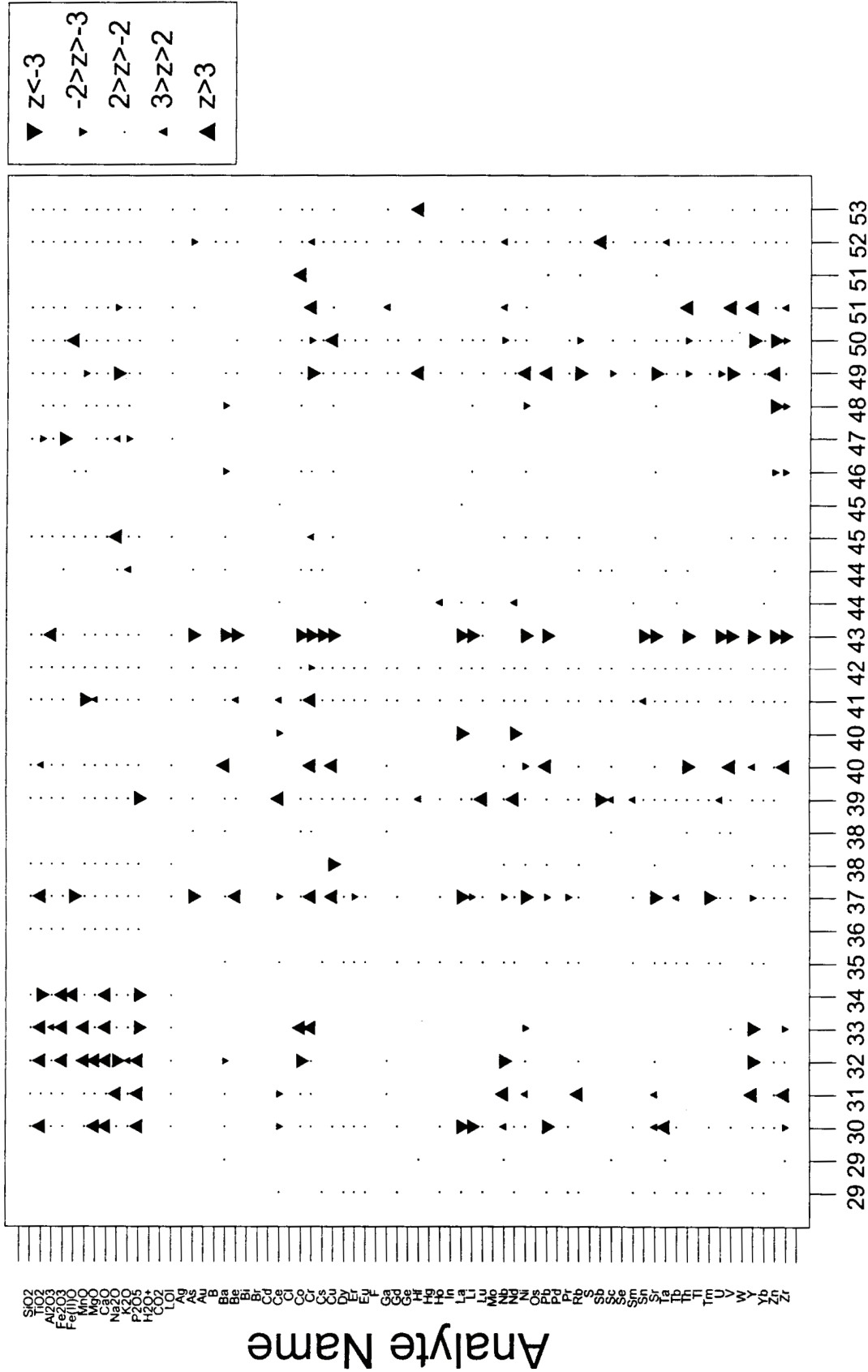
## Laboratory Identity Code

**Figure 3** GeoPT9 - OU-6 Penrhyn slate: Multiple z-score charts for laboratories participating in the GeoPT9 round. Symbols indicate whether or not an elemental result complies with the  $-2 < z < +2$  criteria. Satisfactory data are plotted as '·'. Data for other categories are plotted as follows:  $z < -3$  (▲),  $-3 < z < -2$  (▼),  $+2 < z < +3$  (▲),  $z > +3$  (▲).

GeoPT Round 9  
16/07/01

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# GeoPT9 - Multiple z-score Chart



**GeoPT Round 9**  
**16/07/01**  
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**Figure 3** GeoPT9 - OU-6 Penrhyn slate: Multiple z-score charts for laboratories participating in the GeoPT9 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria Satisfactory data are plotted as '.'). Data for other categories are plotted as follows: z<-3 (▼), -3<z<-2 (▽), +2<z<+3 (▲), +2<z<+3 (▲).

