

GeoPT17 - OU-8, Calcareous Sandstone

Veranstalter: International Association of Geoanalysts and Geostandards Newsletter - GeoPT17

Ringversuchsmaterial: OU-8, Calcareous Sandstone

RV geschlossen: 2005 – 8

Literatur: Proficiency Testing Report GeoPT17 (Laboride CRB = R42)

Hauptelemente [MA%]

	CRB	RV	1sRV	Z-Score
Na ₂ O	0,6	0,677	0,014	
MgO	1,83	1,879	0,034	
Al ₂ O ₃	6,64	6,548	0,099	
SiO ₂	54,07	54,12	0,594	
P ₂ O ₅	0,028	---		
SO ₃	0,28		---	
K ₂ O	2,97	2,967	0,05	
CaO	16,71	16,711	0,219	
TiO ₂	0,251	0,244	0,006	
Fe ₂ O ₃ tot	1,34	1,304	0,025	
MnO	0,155	0,138	0,004	

Spurenelemente [µg/g]

	CRB	RV	1sRV	Z-Score
Ba	501	528	16,4	
Cr	37	21,5	1,08	
Ga	7,9	6,3	0,38	
Nb	3,5	4,2	0,38	
Ni	165	145,7	5,4	
Pb	17	9,6	0,55	
Sr	287	264	9,14	
V	28	29,8	1,43	
Y	14	16	0,84	
Zr	199	182,7	6,7	

Legende

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

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

GEOPT17 - AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES - REPORT ON ROUND 17 / July 2005 (Calcareous sandstone OU-8)

**Philip J. Potts^{1*}, Michael Thompson², Peter C. Webb¹
and J. Nicholas Walsh³**

¹Department of Earth Sciences, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK.

²Department of Chemistry, Birkbeck College, Gordon House, London, WC1H 0PP, UK.

³ Department of Geology, Royal Holloway, University of London, Egham, Surrey, TW20 0EX, UK.

*Corresponding author: e-mail p.j.potts@open.ac.uk

Keywords: Proficiency testing, quality assurance, GeoPT, GeoPT17 round, OU-6, calcareous sandstone

Abstract

Results are presented for GeoPT16, round sixteen of the GeoPT international proficiency testing programme for analytical geochemistry laboratories. The sample distributed for this round was OU-8, a calcareous sandstone, supplied by Dr J.N. Walsh, Royal Holloway, London. 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 seventeenth round of the international proficiency testing programme, GeoPT17, 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 and the aims of the programme can be reviewed at <http://www.geoanalyst.org/geopt.html>. The programme is organised by the International Association of Geoanalysts and is conducted in accordance with a published protocol (<http://www.geoanalyst.org/GeoPt-protocol.pdf>). The overall aim of the programme is to provide

participating laboratories with z-score information for each reported elemental determination, from which the laboratories can decide whether the quality of their data is satisfactory in relation to both their chosen fitness-for-purpose criterion and results submitted by all the other laboratories contributing to the round and, therefore, 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.

Steering Committee for Round 14: M. Thompson (Chair), P.J. Potts (Secretary) and P.C. Webb.

Sample: Calcareous sandstone OU-8, was supplied by Dr J.N. Walsh (Royal Holloway, University of London) and was rehomogenised, divided and packaged at the Open University.

The sample was tested for homogeneity in accordance with the procedures outlined in the protocol on the basis of WDXRF determinations on 10 packets selected at random, each of which was analysed in

duplicate. For the analytes SiO₂, TiO₂, Al₂O₃, Fe₂O₃, MnO, MgO, CaO, Na₂O, K₂O, LOI, Rb, Sr, Y, Zr, Nb, Ba, Pb, Th, U, Sc, V, Cr, Co, Ni, Cu, Zn, Ga, Mo, As, S, no lack of sufficient homogeneity was detected by the Fearn-Thompson test. For one element tested (P) there was insufficient resolution in the data for a valid test to be conducted. It was therefore demonstrated that this material was suitable for use in the GeoPT proficiency testing programme.

Timetable for GeoPT17:

Distribution of sample: March 2005.

Deadline for submission of analytical results: 15th June 2005.

Distribution of draft report: July 2005

Submission of results

Results submitted by the seventy-seven laboratories that participated in this round are listed in Table 1. All these data were used for the assessment of assigned values.

Assigned values

Following procedures described in earlier rounds, a robust statistical procedure was used to derive assigned concentration values [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 10 major components and 37 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 portion 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/species shown in Figure 1 were judged to have satisfactory distributions, namely:

SiO₂, TiO₂, Al₂O₃, Fe₂O₃T, MnO, MgO, CaO, Na₂O, K₂O, CO₂, LOI, Ba, Be, Bi, Ce, Cr, Cs, Cu, Dy, Er, Eu, Ga, Gd, Ge, Hf, Ho, La, Li, Lu, Nb, Nd, Pb, Pr, Rb, Sb, Sc, Sm, Sr, Ta, Tb, Th, Tl, Tm, U, V, Y, Yb, and Zr.

Of these, the elements CO₂, Bi, Cr, Ge, Nb, Sc were assigned provisional values, principally because data distributions plotted in Figure 1 possess some degree of asymmetry.

Charts in Figure 2 show distribution data for elements that were not judged to be sufficiently satisfactory in the statistical analysis to assign values. In the present round, values could not be assigned to the following elements/species, despite the availability of a sufficient number of analytical results: Fe(II)O, P₂O₅, H₂O⁺, Ag, As, Cd, Cl, Co, F, Mo, Ni, S, Sn, W, Zn.

For other elements that are not included in either of these two lists, insufficient data were reported to allow any assessment to be made.

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 laboratories working to a 'pure geochemistry' standard of performance, 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 laboratories working to an 'applied geochemistry' standard of performance, where, although precision and accuracy are still important, the main objective is to provide results on large numbers of samples collected, for example, as part of geochemical mapping projects or geochemical exploration programmes.

The target standard deviation (H_a) for each element assessed was calculated from a modified form of the Horwitz function as follows:

$$H_a = k.X_a^{0.8495}$$

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 standard deviation.

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' (in the sense that no action is called for by the participant). 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.

Overall performance

A summary of the overall performance of individual laboratories in this round is plotted in Figure 3 as a multiple z-score chart. 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-scores that exceeded the action limits. This chart is designed to help individual laboratories to judge their overall performance in this proficiency testing round.

For this sample there were a larger range of elements than usual for which no assigned value could be given. There also appear to be many higher z-scores than is usual. Initial indications are that the high Ca content of this sample may pose problems that are not usually encountered, and possibly that more elements than usual were close to detection limits for some techniques.

Participation in future rounds

The benefit from proficiency testing arises from regular participation and laboratories are invited to contribute to the GeoPT18 round, the sample for which will be distributed during September 2005.

Acknowledgments

The authors thank John Watson and Liz Lomas (OU) for valued assistance with the production of this report. The GeoPT programme is organised on behalf of the International Association of Geoanalysts.

Appendix 1

Publication status of proficiency testing reports

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. Published in 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. Published in 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: Nanhon 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.

GeoPT9

Potts P.J., Thompson M., Webb, P.C. and Watson J.S. (2001)
GEOPT9 - an international proficiency test for analytical geochemistry laboratories - report on round 9 / July 2001 (OU-6 Penrhyn slate). International Association of Geoanalysts: Unpublished report.

GeoPT10

Potts P.J., Thompson M., Webb, P.C., Watson J.S. and Wang Yimin (2001)
GEOPT10 - an international proficiency test for analytical geochemistry laboratories - report on round 10 / December 2001 (CH-1 Marine sediment). International Association of Geoanalysts: Unpublished report.

GeoPT11

Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and Watson J.S. (2002)
GEOPT11 - an international proficiency test for analytical geochemistry laboratories - report on round 11 / July 2002 (OU-5 Leaton dolerite). International Association of Geoanalysts: Unpublished report.

GeoPT12

Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and Batjargal B. (2003)
GEOPT12 - an international proficiency test for analytical geochemistry laboratories - report on round 12 / January 2003 (GAS Serpentine). International Association of Geoanalysts: Unpublished report.

GeoPT13

Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and Kaspar H.U. (2003)
GEOPT13 - an international proficiency test for analytical geochemistry laboratories - report on round 13 / July 2003 (Köln Loess). International Association of Geoanalysts: Unpublished report.

GeoPT14

Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and B. Batjarga (2004)
GeoPT14 - an international proficiency test for analytical geochemistry laboratories - report on round 14 / January 2004 (OShBO - alkaline granite). International Association of Geoanalysts: Unpublished report.

GeoPT15

Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and WANG Yimin (2004)
GeoPT15 - an international proficiency test for analytical geochemistry laboratories - report on round 15 / June 2004 (Ocean floor sediment MSAN). International Association of Geoanalysts: Unpublished report.

GeoPT16

Potts P.J., Thompson M., Webb, P.C. and S.Wilson (2005)
GeoPT16 - an international proficiency test for analytical geochemistry laboratories - report on round 16 / February 2005 (Nevada basalt BNV-1). International Association of Geoanalysts: Unpublished report.

Table 1		GeoPT17 Analytical results submitted (June 2005)														
		Calcareous sandstone OU-8														
Round identifier		R1	R2	R3	R4	R4	R5	R5	R6	R7	R8	R9	R10	R11	R11	R12
Sample		OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Data quality		2	2	2	1	2	1	2	1	2	2	1	2	1	2	1
SiO2	% m/m	54.051	40.7		54.422		53.57		54.1	53.91	64.9	53.5	54.155	54.35		54.01
TiO2	% m/m	0.250	0.234		0.261		0.24		0.24	0.25	0.3	0.24	0.226	0.25		0.25
Al2O3	% m/m	6.456	6.54		1.47		6.48		6.5	6.41	7.93	6.50	6.54	6.525		6.91
Fe2O3	% m/m	1.301	1.19		10.247		1.29		1.3	1.33	1.84	1.30	1.282	1.298		1.31
Fe(II)O	% m/m									0.59				0.76		
MnO	% m/m	0.136	0.151		0.133		0.14		0.125	0.14	0.174	0.13	0.137	0.137		0.14
MgO	% m/m	1.830			1.896		1.82		1.84	1.86	2.23	1.98	1.85	1.871		1.90
CaO	% m/m	16.807	19.6		16.042		17.87		16.65	16.75	20.02	17.20	13.366	16.655		16.71
Na2O	% m/m	0.756			0.78		0.69		0.72	0.68	0.727	0.60	0.73	0.689		0.61
K2O	% m/m	2.831	2.96		2.711		2.88		3	2.96	3.57	2.66	2.966	2.922		2.80
P2O5	% m/m	0.0208			0.028		0.02			0.03	0.028	0.023		0.029		0.03
H2O+	% m/m	0.19									0.49					
CO2	% m/m	14.887								15.22	18.11					
LOI	% m/m	15.435			15.26		15.17		15	15.42	15.44	15.70	15.17	15.1		15.46
Ag	mg kg-1															
As	mg kg-1		13	1.26			6									
Au	mg kg-1															
B	mg kg-1															
Ba	mg kg-1		540			442.6		570		532	690		470	613		550
Be	mg kg-1			1.5												
Bi	mg kg-1															
Br	mg kg-1															
Cd	mg kg-1		1.7													
Ce	mg kg-1		42	42.6				43							57	152
Cl	mg kg-1							998								
Co	mg kg-1			2.7		3.7							5			
Cr	mg kg-1			30.3		20		31		15.6			15.2	42.1		
Cs	mg kg-1															
Cu	mg kg-1		7		6.3		9						9	7.9		
Dy	mg kg-1			2.28												
Er	mg kg-1			1.53												
Eu	mg kg-1			0.75												
F	mg kg-1							2342								
Ga	mg kg-1			6.84		6.3	6			5.9						
Gd	mg kg-1			2.25												
Ge	mg kg-1			1.05												
Hf	mg kg-1			5.67												6.2
Hg	mg kg-1															
Ho	mg kg-1			0.51												
I	mg kg-1															
In	mg kg-1															
Ir	mg kg-1															
La	mg kg-1		13	13.5				23		15.5					23	
Li	mg kg-1															
Lu	mg kg-1			0.27												
Mo	mg kg-1						1									
N	mg kg-1															
Nb	mg kg-1		2	5.4	6		6			7.1				4		
Nd	mg kg-1		15	12.3						14.9						17
Ni	mg kg-1				10.7		7						11.5	5.6		12
Os	mg kg-1															
Pb	mg kg-1				9.1		5						8.8	9.5		
Pd	mg kg-1															
Pr	mg kg-1			3.21												
Pt	mg kg-1															
Rb	mg kg-1		62		64.1		64			66.2				64.2		74
Re	mg kg-1															
Rh	mg kg-1															
Ru	mg kg-1															
S	mg kg-1	1760				506.5		388	0.16		1114		1525			
Sb	mg kg-1			0.21												
Sc	mg kg-1					7.9		1								
Se	mg kg-1															
Sm	mg kg-1			2.61												
Sn	mg kg-1															
Sr	mg kg-1		256	272	256.3		257			271	3412		270	259		260
Ta	mg kg-1			0.45												
Tb	mg kg-1			0.37												
Te	mg kg-1															
Th	mg kg-1			10.2			8						8.8		9	
Tl	mg kg-1															
Tm	mg kg-1			0.27												
U	mg kg-1			0.69			3								1	
V	mg kg-1			23.4		30.8		19		35.8				47.4		31
W	mg kg-1			3.9												
Y	mg kg-1		15	15.3	15.8		15			16.4				18.4		16.3
Yb	mg kg-1			1.74												
Zn	mg kg-1		9.3		10.3		19						18.1	24.8		
Zr	mg kg-1		169	234	168.3		173			204				158		210

Table 1		GeoPT17 Analytical results submitted (June 2005)														
		Calcareous sandstone OU-8														
Round identifier		R26	R27	R28	R28	R29	R30	R31	R31	R32	R33	R34	R35	R36	R37	R38
Sample		OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Data quality		1	1	1	2	1	2	1	2	1	2	1	1	2	2	1
SiO2	% m/m	61.7	53.69	54.06		54.57				54.69	53.5	54.94	53.313	54.2	59.08	54.11
TiO2	% m/m	0.3	0.23	0.24		0.24				0.28	0.28	0.2556	0.2385	0.25	0.172	0.241
Al2O3	% m/m	7.9	6.51	6.58		6.61				6.56	6.21	6.645	6.331	6.77	6	6.68
Fe2O3	% m/m	1.5	1.24	1.29		1.22	1.26			1.38	1.27	1.271	1.282	1.35	1.23	1.26
Fe(II)O	% m/m		0.63							0.9				0.72		
MnO	% m/m	0.2	0.138	0.132		0.13				0.14	0.14	0.1359	0.1360	0.142	0.128	0.126
MgO	% m/m	1.9	1.80	1.95		1.92				1.83	1.97	1.95	1.802	1.93	1.85	1.77
CaO	% m/m	17.8	17.37	16.58		16.90	15.74			17.55	16.7	16.64	16.177	16.5	16.98	16.56
Na2O	% m/m	0.2	0.70	0.75		0.67	0.7			0.64	0.66	0.692	0.645	0.69	0.8	0.69
K2O	% m/m	3.3	2.93	2.98		3.06	3.2			2.96	2.96	2.958	2.928	3.01	3.1	2.85
P2O5	% m/m		0.0235	0.04		0.03				0.02		0.022	0.0250	0.04	0.04	0.042
H2O+	% m/m		0.63							1.09			0.370			
CO2	% m/m		14.91							13.08		15.35		14.80		
LOI	% m/m		15.32	15.17		15.28				15.48	15.3	15.17	15.100	15.27		15.17
Ag	mg kg-1											0.74				
As	mg kg-1		0.78				1.26			0				0.7		
Au	mg kg-1															
B	mg kg-1															
Ba	mg kg-1	567.3	507	525		489	534	486.8		546		507	526.1	530	370	
Be	mg kg-1		1.75	1.47								0.9		1.4		
Bi	mg kg-1		0.11	0.034						0				0.03		
Br	mg kg-1															
Cd	mg kg-1	0.6								3		0.18				
Ce	mg kg-1		47.4	41.82			40.79	42.3		38		41.9	37.887	42.2		
Cl	mg kg-1									80		150				
Co	mg kg-1	41.1			2.5		2.58			3		2.93		3.1		
Cr	mg kg-1	25.2		21		13	23.2			48		7.2	18.7	22	30.7	21.5
Cs	mg kg-1	8.4		3.4			3.3	3.079		11		3.11	3.070	3.30		
Cu	mg kg-1	7	12.0	7.88						13		8	6.8	10	7.8	
Dy	mg kg-1		2.82	2.25				2.24		1		2.34	2.469	2.5		
Er	mg kg-1		1.85	1.54				1.55		4		1.57	1.607	1.6		
Eu	mg kg-1		0.65	0.651			0.604	0.627		1		0.67	0.654	0.7		
F	mg kg-1		290							312				172	206	
Ga	mg kg-1	5.7		6.4		16				8		6.27	4.4	6.2	5.1	7.9
Gd	mg kg-1		2.95	2.25				2.191		5		2.24	2.259	2.3		
Ge	mg kg-1											1.05		1.1		
Hf	mg kg-1	2.8				8	4.96		2.62	10		4.31	4.696	5.1		
Hg	mg kg-1															
Ho	mg kg-1		0.68	0.507				0.519		1		0.49	0.545	0.5		
I	mg kg-1															
In	mg kg-1													0.01		
Ir	mg kg-1															
La	mg kg-1	15.8	14.7	14.6			14.14	13.68		32		12.9	12.939	13.3		
Li	mg kg-1		9.3	10.54										10.2		
Lu	mg kg-1		0.35	0.235			0.282	0.248				0.22	0.269	0.28		
Mo	mg kg-1			0.161						6		1.09		0.2		
N	mg kg-1															
Nb	mg kg-1	4.4	5.5	4.51					4.29	7		4.02	4.272	4.6	4.9	4.3
Nd	mg kg-1		14.0	12.57			12.42	12.23		28		12.5	10.887	12.5		
Ni	mg kg-1	4	11.5	6.8						20		7.97	6.5	8	10.1	
Os	mg kg-1															
Pb	mg kg-1	9.5	7.5	8.8					9.77	13		9.79	9.451	10	7.5	
Pd	mg kg-1															
Pr	mg kg-1		1.85	3.27					3.18	5		2.98	2.729	3.3		
Pt	mg kg-1															
Rb	mg kg-1	63.9	61.5	64.1		65	64.8	62.03		72		63.4	63.70	68	60.5	66.1
Re	mg kg-1															
Rh	mg kg-1															
Ru	mg kg-1															
S	mg kg-1	831.5	100							492		1400		1600	1217	
Sb	mg kg-1		0.29	0.208			0.21			3		0.23		0.18		
Sc	mg kg-1			3.81			3.54			37		3.77	3.98	1		
Se	mg kg-1															
Sm	mg kg-1		2.91	2.49			2.46	2.362		0		2.43	2.438	2.5		
Sn	mg kg-1	2.4		0.67						2		0.39		0.7		
Sr	mg kg-1	257.8	245	267		251	244	254.5		291		281	263.3	265	278	261.2
Ta	mg kg-1			0.354			0.32		0.309	0		0.25	0.328	0.35		
Tb	mg kg-1			0.366			0.34	0.334		2		0.34	0.376	0.37		
Te	mg kg-1															
Th	mg kg-1	12.1	10.5	9.66			9.56	9.55		12		9.08	9.510	9.5	8.7	8.6
Tl	mg kg-1			1.01								0.83		1.03		
Tm	mg kg-1			0.236					0.241			0.22	0.253	0.25		
U	mg kg-1	2.2		0.736			0.66	0.715		1		0.73	0.700	0.75		
V	mg kg-1	35.6	31.6	33.1		32				43		25.4	30.1	32	37.3	52.1
W	mg kg-1			0.296						2				0.4		
Y	mg kg-1		17.9	14.7		16			14.8	17		16.4	16.407	15.3	13.4	18.8
Yb	mg kg-1		2.32	1.57			1.84	1.61		5		1.54	1.617	1.8		
Zn	mg kg-1	15.2	11.5	8.3						7		6.24	10.0	11	8.3	7.2
Zr	mg kg-1	183.3	177	174		201				108		218	209.1	193	166	182

Table 1		GeoPT17 Analytical results submitted (June 2005)														
		Calcareous sandstone OU-8														
Round identifier		R38	R39	R40	R41	R42	R43	R44	R44	R45	R46	R47	R48	R49	R50	R51
Sample		OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Data quality		2	2	1	2	2	1	1	2	2	1	2	2	2	1	2
SiO2	% m/m		53.79		48.41	54.07	53.82	54.45		54.45		53.55	54.75	53.64	53.696	54.571
TiO2	% m/m		0.27	0.1579	0.29	0.251	0.24	0.27		0.24		0.24	0.23	0.24	0.229	0.246
Al2O3	% m/m		6.65	5.787	8.22	6.64	6.68	6.56		6.54		6.494	6.53	6.68	6.469	6.32
Fe2O3	% m/m		1.32	1.233	1.48	1.34	1.30	1.28		1.3	1.20	1.291	1.28	1.31	1.3	1.344
Fe(II)O	% m/m		0.59													0.61
MnO	% m/m		0.14	0.1313	0.1	0.155	0.139	0.14		0.14	0.13	0.140	0.14	0.14	0.136	0.136
MgO	% m/m		1.83	1.881	2.23	1.83	1.98	1.88		1.84	1.98	1.837	1.91	1.93	1.829	1.878
CaO	% m/m		16.92	21.56	19.21	16.71	17.06	16.95		16.58	17.3	16.739	16.38	16.75	16.502	16.385
Na2O	% m/m		0.67	0.6773	0.54	0.6	0.02	0.67		0.65	0.52	0.675	0.67	0.71	0.669	0.689
K2O	% m/m		3.19	2.89	3.76	2.97	2.26	2.91		2.99	2.61	2.944	3.03	2.97	2.954	2.751
P2O5	% m/m			0.0189	0.04	0.028	0.025	0.02		0.02		0.019			0.028	0.025
H2O+	% m/m		0.89													
CO2	% m/m		15.06					14.400								
LOI	% m/m		15.28		15.63	15.05	15.88	15.12				15.299				15.125
Ag	mg kg-1		0.07						0.039	3					0.02	
As	mg kg-1		1.4						5.83						1.1	1
Au	mg kg-1															
B	mg kg-1		31													
Ba	mg kg-1	381	551	523		501		466		590		543.1		561	473	578.3
Be	mg kg-1		1.1	1.277					1.86			1.5			1.25	
Bi	mg kg-1								0.149							
Br	mg kg-1															
Cd	mg kg-1		0.05						0.075							
Ce	mg kg-1		41.1			21		31				40.78		45.4	42.27	57.8
Cl	mg kg-1		187													
Co	mg kg-1		2.6	2.8		31		6		7		3.3				
Cr	mg kg-1		13	32.84		37	6.75	20		21		20.8			23	25.5
Cs	mg kg-1		3.58					4.70				3.15		3.27	3.11	
Cu	mg kg-1		8.4	8.36					9.03	15		5.3		7.2	5	12.8
Dy	mg kg-1		2.23					3.10				2.42			2.21	
Er	mg kg-1		1.7					2.13				1.58			1.66	
Eu	mg kg-1		0.66					1.08				0.622			0.65	
F	mg kg-1		270												755	
Ga	mg kg-1		6			7.9		8				6		6.72	5.6	3.2
Gd	mg kg-1		2.29					3.62				2.15			2.04	
Ge	mg kg-1		1.1									1.9			1.2	
Hf	mg kg-1		5									3.7			4.55	
Hg	mg kg-1								0.121							
Ho	mg kg-1		0.46					0.723				0.511			0.45	
I	mg kg-1											1.9				
In	mg kg-1			31.14												
Ir	mg kg-1															
La	mg kg-1		13.4	15.13		20		18.77				13.26		13.2	15.2	19.5
Li	mg kg-1		10	13.3					17.0		9.1	11.67		9.9		
Lu	mg kg-1		0.25	0.36				0.365				0.197			0.24	
Mo	mg kg-1		0.19						1.08						0.2	
N	mg kg-1															
Nb	mg kg-1		4					5				4.4			4.4	6.7
Nd	mg kg-1		11.6					17.2				11.13			12.59	
Ni	mg kg-1		8.1	7.57		3		6		25		5.8		7.4	4	0
Os	mg kg-1															
Pb	mg kg-1		8.9			17		8				8.9			9.5	14.5
Pd	mg kg-1															
Pr	mg kg-1		3.07					4.41				2.99			3.42	
Pt	mg kg-1															
Rb	mg kg-1		73			82		63			62.5	63.6		68.8	62	74
Re	mg kg-1															
Rh	mg kg-1															
Ru	mg kg-1															
S	mg kg-1		0.15					0.147							1540	
Sb	mg kg-1		0.19						0.189			0.247			1.5	
Sc	mg kg-1		3.3	3.177				9				2.6			11	1.5
Se	mg kg-1															
Sm	mg kg-1		2.4			1.7		3.22				2.73			2.84	
Sn	mg kg-1								1.60							
Sr	mg kg-1		267	299.3		287		248		230		260		274	256	296.5
Ta	mg kg-1											0.275				
Tb	mg kg-1		0.37					0.535				0.326			0.31	
Te	mg kg-1								0.023							
Th	mg kg-1		9.6	9.31				10				9.31		9.8	12.4	12.8
Tl	mg kg-1		0.9	0.93					1.33			0.922				
Tm	mg kg-1		0.24					0.351				0.247				
U	mg kg-1		0.82	0.3					1.16			0.631			0.8	0
V	mg kg-1		29	33		28		36		30		29.3		34	32	37.2
W	mg kg-1			0.633					0.844			0.453				
Y	mg kg-1		16	9.597		14		15				14.6		16.4	18.1	18.8
Yb	mg kg-1		1.7					2.31				1.63			1.67	
Zn	mg kg-1		10	8.816		7		6			60.0	8.2			9	15.8
Zr	mg kg-1		157	59.77		199		163		350		167.8		174.5	155	205.3

Table 1		GeoPT17 Analytical results submitted (June 2005)														
		Calcareous sandstone OU-8														
Round identifier		R52	R53	R54	R55	R56	R56	R57	R58	R59	R60	R61	R61	R62	R63	R64
Sample		OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Data quality		2	2	2	2	2	2	1	2	2	2	1	2	1	2	1
SiO2	% m/m	54.3	53.9	54.56	53.55					54.77		54.79		53.51		53.15
TiO2	% m/m	0.24	0.25	0.269	0.262					0.24		0.248		0.246	0.23	0.242
Al2O3	% m/m	6.64	6.52	6.5	6.149					6.54		6.45		6.54		6.33
Fe2O3	% m/m	1.27	1.33	1.32	1.310	1.27		1.29		1.2	12.7	1.31		1.35	1.05	1.356
Fe(II)O	% m/m				0.716							1.08				
MnO	% m/m	0.14	0.14	0.131	0.142					0.14	1.38	0.139		0.141	0.106	0.148
MgO	% m/m	1.88	1.75	1.92	2.043					1.8	1.54	1.87		1.83		1.93
CaO	% m/m	16.5	16.9	16.93	16.575	15.67				15.91		16.63		16.69	17.3	16.95
Na2O	% m/m	0.71	0.86	0.62	0.778	0.67				0.66		0.62		0.70		0.702
K2O	% m/m	2.9	3.01	2.85	3.086	3.11				2.9		2.98		2.83	3.15	3.157
P2O5	% m/m	0.02	0.03	0.025	0.032					0.02		0.017		0.032		0.032
H2O+	% m/m									0.68		2.13				
CO2	% m/m		14.8							13.4		16.04				
LOI	% m/m	15.3	15.43	14.67	15.401					15.5		15.36		15.28		15.6
Ag	mg kg-1															
As	mg kg-1						0.9				1.17					
Au	mg kg-1															
B	mg kg-1			37												
Ba	mg kg-1	488		539	420	520		511	474.9	558.8	515.80	493		538	550	515
Be	mg kg-1			1.4	1.2					1.54			1.43			
Bi	mg kg-1	0.05									0.04					
Br	mg kg-1						0.77									
Cd	mg kg-1									0.056	0.05					
Ce	mg kg-1	36.7		34	43.2	48.5		42	39.8	42.32	32.28	40.3		79	46	
Cl	mg kg-1															
Co	mg kg-1	2.44			3.4	2.34		2.38		3.06				14		5
Cr	mg kg-1	17.7		26	19.2	21					16.25		39	30		22
Cs	mg kg-1	3.12				3.22		2.9	3.19	3.232	2.63	3.31				
Cu	mg kg-1	6.85			4.4					8.18	6.70	10		12	11	7
Dy	mg kg-1	1.9		2.58					2.217	2.245	1.98	2.3				
Er	mg kg-1	1.32		1.72					1.558	1.579	1.30	1.53				
Eu	mg kg-1	0.56		0.6		0.71		0.66	0.596	0.634	0.43	0.51				
F	mg kg-1															
Ga	mg kg-1			6	5.2		11			6.28				7	5	8
Gd	mg kg-1	2.01		2.22					2.142	2.225	0.82	2.2				
Ge	mg kg-1															
Hf	mg kg-1			4.8		5.3		4.6	4.54	3.4						
Hg	mg kg-1															
Ho	mg kg-1	0.42		0.53					0.512	0.491		0.54				
I	mg kg-1															
In	mg kg-1															
Ir	mg kg-1															
La	mg kg-1	11.6		14.1		14.9		13.6	12.54	13.54	9.38	14.0		19		
Li	mg kg-1	10.7		8	8.9					13.16						
Lu	mg kg-1	0.2		0.28		0.28		0.29	0.271	0.258	0.21	0.25				
Mo	mg kg-1				3.9					0.37						
N	mg kg-1															
Nb	mg kg-1	3.88		5	6.9				4.283	4.2		4.13		5		4
Nd	mg kg-1	10.5		13	8.2		13	11.4	11.929	12.24	9.14	13.1			23	
Ni	mg kg-1	5.4		7	6.6					11.55	1.78	8		23		10
Os	mg kg-1															
Pb	mg kg-1	8.28		10	6.5				9.79	10.3	10.25	10.9		12		8
Pd	mg kg-1															
Pr	mg kg-1	2.7		4					3.028	3.101	2.25	3.07				
Pt	mg kg-1															
Rb	mg kg-1	61.2		69	72.7	61		62	73.7	65.91		66.6		64	65	61
Re	mg kg-1															
Rh	mg kg-1															
Ru	mg kg-1															
S	mg kg-1	1501			519							1090				
Sb	mg kg-1	0.13					0.15			0.21	0.15					
Sc	mg kg-1	3.3		3.2	5.6	3.46		3.5	6.8	4.61		3.15				
Se	mg kg-1															
Sm	mg kg-1	2.1		2.9		2.59		2.42	2.277	2.34	1.79	2.64				
Sn	mg kg-1	4.41								0.61						
Sr	mg kg-1	258		256	334	290			301.2	267.4		285		260	241	258
Ta	mg kg-1					0.28		0.30	0.142	0.3		0.14				
Tb	mg kg-1	0.3		0.41		0.38		0.35	0.354	0.347	0.22	0.35				
Te	mg kg-1															
Th	mg kg-1	6.95			3.4	10		9.2	9.234	9.29	7.37	9.87		11		9
Tl	mg kg-1									1.12	1.07					
Tm	mg kg-1	0.2							0.249	0.246		0.23				
U	mg kg-1	0.59						0.57	0.753	0.709	0.56	0.86				
V	mg kg-1	22.4		28	52					29.56	26.45	31		44		33
W	mg kg-1						1			0.28						
Y	mg kg-1	12.8		18	17.9				15.6	14.99		17.1		16	15	14
Yb	mg kg-1	1.37		1.55		1.72		1.8	1.708	1.68	1.38	1.54				
Zn	mg kg-1	8.08		10	16					14.42	7.50		30	12	11	15
Zr	mg kg-1	76.9		179	162	220			184.2	138		192		166	160	165

Table 1		GeoPT17 Analytical results submitted (June 2005)													
		Calcareous sandstone OU-8													
Round identifier		R65	R66	R67	R67	R68	R69	R70	R71	R72	R73	R74	R75	R76	R77
Sample		OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Data quality		2	2	1	2	1	1	1	2	2	1	2	1	2	2
SiO2	% m/m	54.72	54.5	54.81				53.50		44.83		53.95	52.62		54.33
TiO2	% m/m	0.227	0.279	0.227			0.24	0.23	0.226	0.2802		0.248	0.25		0.25
Al2O3	% m/m	6.76	6.798	6.24			6.94	5.92	6.580	7.836		6.735	6.42		6.54
Fe2O3	% m/m	1.319	1.376	1.241			1.19	1.23	1.299	1.348		1.335	1.48		1.27
Fe(II)O	% m/m							0.07							
MnO	% m/m	0.128	0.145	0.121			0.15	0.143	0.139	0.1573		0.135	0.15		0.15
MgO	% m/m	1.912	1.957	1.716			2.2	1.78	1.849	3.328		1.84	1.91		1.9
CaO	% m/m	16.04	16.93	16.50				15.85	16.38	21.45		17.1	1.83		16.88
Na2O	% m/m	0.659	0.671	0.728			0.64	0.568	0.715			0.511	0.65		0.39
K2O	% m/m	2.93	3.137	2.999			3	2.70	2.97	3.046		2.99	2.85		2.93
P2O5	% m/m	0.033	0.033	0.02				0.014	0.020						0.03
H2O+	% m/m							1.80							
CO2	% m/m							13.35							
LOI	% m/m	-15.26		15.4				15.05					15.48		15.24
Ag	mg kg-1														
As	mg kg-1						1						17		
Au	mg kg-1														
B	mg kg-1												40		
Ba	mg kg-1		550.8		421	532	535		485.7	585.1	521	509	537	530	533
Be	mg kg-1		1.3								1.25			1.1	1.55
Bi	mg kg-1										0.056				
Br	mg kg-1									1					
Cd	mg kg-1							0.62							
Ce	mg kg-1		40.71		48	40.9	49			27.8	41.6		36		39.7
Cl	mg kg-1						90								
Co	mg kg-1		2.5			2.23	2.5	4.80			4.58				3.89
Cr	mg kg-1		18.31		49			20.0		35.4	25.8		21	6	22
Cs	mg kg-1		3.85			2.62	3.2				3.21				3.33
Cu	mg kg-1		7.65		7	8.56		12.5		9	8.47		9	8.9	8.13
Dy	mg kg-1		2.2	2.76		2.23	2.5				2.24		1.6	2	2.33
Er	mg kg-1		1.56	1.87		1.51					1.58		1832	1.4	1.54
Eu	mg kg-1		0.69	0.81		0.725	0.65				0.63		0.6	0.7	0.66
F	mg kg-1														
Ga	mg kg-1		5.67		6	4.02				7.2	7.05				6.07
Gd	mg kg-1		2.12	2.74		2.68					2.33		3.1	2.4	2.44
Ge	mg kg-1										1.28				1.24
Hf	mg kg-1		4.6		4	3.82	5				4.59				5.31
Hg	mg kg-1														
Ho	mg kg-1		0.54	0.59		0.487					0.51			0.5	0.53
I	mg kg-1														
In	mg kg-1														
Ir	mg kg-1														
La	mg kg-1		11.5		14	13.4	13				13.5		11.1	13	1.27
Li	mg kg-1			0.28					10.5		9.49		16		10.3
Lu	mg kg-1		0.25			0.28	0.26				0.26				0.3
Mo	mg kg-1										0.43				
N	mg kg-1														
Nb	mg kg-1		3.69		9	3.78				5.2	4.23		13		4.8
Nd	mg kg-1		12.23		14	11.79	11			22.8	11.7		16.4	12	12.1
Ni	mg kg-1				7		7	8.60			13.4				10.2
Os	mg kg-1														
Pb	mg kg-1				9			13.4		10.6	9.97				11.3
Pd	mg kg-1														
Pr	mg kg-1		3.05	3.64		3.05					3.09			3.5	3.15
Pt	mg kg-1														
Rb	mg kg-1		63.84		63	61.7	65			66.7	62.9				68.2
Re	mg kg-1														
Rh	mg kg-1														
Ru	mg kg-1														
S	mg kg-1									711			2500		
Sb	mg kg-1						0.23				0.49				
Sc	mg kg-1		3.6		22		3.3				8.1		2.6		3.83
Se	mg kg-1						0.027								
Sm	mg kg-1		2.43	3.07		2.23	2.4				2.36		1.6	2.3	2.36
Sn	mg kg-1										0.74				
Sr	mg kg-1		291.7		251	265			252.3	269.5	263		247	260	265
Ta	mg kg-1		0.31			0.429	0.4				0.39		7.6		0.34
Tb	mg kg-1		0.34	0.4		0.473	0.4				0.36				0.38
Te	mg kg-1														
Th	mg kg-1		9.54			9.19	10			12.1	9.49			9	9.28
Tl	mg kg-1										0.98				
Tm	mg kg-1		0.24	0.26		0.217					0.25				0.26
U	mg kg-1		0.73				0.75				0.75			0.6	0.76
V	mg kg-1		23.5		29	28.3	33		27.2		27.1			27	27.8
W	mg kg-1		0.39							37.5	0.42				
Y	mg kg-1		16.5		16	14.1				17.3	14.8		14	16	17.2
Yb	mg kg-1		1.65	1.94		1.47	1.7				1.71		1.2	1.3	1.82
Zn	mg kg-1		9.4		8		4	6.70		11.2	8.85		12	9	9.21
Zr	mg kg-1		205.2		161	175			62.7	188.9	189				202

Table 2 GeoPT17 Assigned values and robust statistical analysis of contributed data (OU-8 Calcareous Sandstone)

	X_a	H_a	sdm	sdm/H_a	status		X_a	H_a	sdm	sdm/H_a	status
	% m/m	% m/m	% m/m				mg/kg	mg/kg	mg/kg		
SiO ₂	54.120	0.594	0.097	0.163	Assigned	Hf	4.72	0.30	0.23	0.77	Assigned
TiO ₂	0.244	0.006	0.002	0.342	Assigned	Ho	0.51	0.05	0.01	0.18	Assigned
Al ₂ O ₃	6.548	0.099	0.028	0.283	Assigned	La	13.8	0.74	0.28	0.38	Assigned
Fe ₂ O ₃ T	1.304	0.025	0.008	0.307	Assigned	Li	10.3	0.58	0.31	0.53	Assigned
MnO	0.138	0.004	0.001	0.192	Assigned	Lu	0.26	0.03	0.01	0.26	Assigned
MgO	1.879	0.034	0.010	0.282	Assigned	Nb	4.46	0.28	0.12	0.43	Provisional
CaO	16.711	0.219	0.068	0.309	Assigned	Nd	12.4	0.68	0.16	0.24	Assigned
Na ₂ O	0.677	0.014	0.007	0.506	Assigned	Pb	9.64	0.55	0.26	0.48	Assigned
K ₂ O	2.967	0.050	0.015	0.296	Assigned	Pr	3.12	0.21	0.07	0.34	Assigned
LOI	15.301	0.203	0.028	0.139	Assigned	Rb	64.6	2.76	0.49	0.18	Assigned
	mg/kg	mg/kg	mg/kg			Sb	0.22	0.02	0.01	0.46	Assigned
Ba	528	16.44	4.18	0.25	Assigned	Sc	3.63	0.24	0.16	0.66	Provisional
Be	1.42	0.11	0.05	0.48	Assigned	Sm	2.42	0.17	0.05	0.27	Assigned
Bi	0.043	0.01	0.00	0.90	Provisional	Sr	264.4	9.14	2.10	0.23	Assigned
Ce	41.8	1.91	0.80	0.42	Assigned	Ta	0.32	0.03	0.02	0.57	Assigned
Cr	21.5	1.08	0.83	0.77	Provisional	Tb	0.36	0.03	0.01	0.21	Assigned
Cs	3.23	0.22	0.07	0.33	Assigned	Th	9.5	0.54	0.15	0.28	Assigned
Cu	8.36	0.49	0.28	0.57	Assigned	Tl	1.01	0.08	0.03	0.32	Assigned
Dy	2.25	0.16	0.04	0.27	Assigned	Tm	0.24	0.02	0.00	0.19	Assigned
Er	1.59	0.12	0.03	0.28	Assigned	U	0.74	0.06	0.02	0.34	Assigned
Eu	0.67	0.06	0.01	0.20	Assigned	V	29.8	1.43	0.68	0.47	Assigned
Ga	6.28	0.38	0.14	0.38	Assigned	Y	16.0	0.84	0.23	0.27	Assigned
Gd	2.32	0.16	0.06	0.37	Assigned	Yb	1.66	0.12	0.04	0.29	Assigned
Ge	1.10	0.09	0.06	0.65	Provisional	Zr	182.7	6.68	3.63	0.54	Assigned

X_a=assigned value calculated as the robust mean of submitted data.

H_a=target precision calculated using a modified version of the Horwitz equation for Data quality 1 (H_a=0.01X_a^{0.8495}).

sdm=standard deviation of the mean calculated from submitted data using robust statistics.

Table 3 GeoPT17 Z-score data for Calcareous Sandstone OU-8													
Identifier	R1	R2	R3	R4	R4	R5	R5	R6	R7	R8	R9	R10	R11
Sample	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Quality	2	2	2	1	2	1	2	1	2	2	1	2	1
SiO2	-0.1	-11.3	*	0.5	*	-0.9	*	0.0	-0.2	9.1	-1.0	0.0	0.4
TiO2	0.5	-0.8	*	2.8	*	-0.7	*	-0.7	0.5	4.6	-0.7	-1.5	1.0
Al2O3	-0.5	0.0	*	-51.5	*	-0.7	*	-0.5	-0.7	7.0	-0.5	0.0	-0.2
Fe2O3	-0.1	-2.3	*	356.8	*	-0.6	*	-0.2	0.5	10.7	-0.2	-0.4	-0.3
MnO	-0.3	1.7	*	-1.3	*	0.5	*	-3.5	0.3	4.8	-2.2	-0.1	-0.3
MgO	-0.7	*	*	0.5	*	-1.7	*	-1.1	-0.3	5.1	3.0	-0.4	-0.2
CaO	0.2	6.6	*	-3.1	*	5.3	*	-0.3	0.1	7.6	2.2	-7.6	-0.3
Na2O	2.7	*	*	7.1	*	0.9	*	3.0	0.1	1.7	-5.4	1.8	0.8
K2O	-1.4	-0.1	*	-5.1	*	-1.7	*	0.7	-0.1	6.0	-6.1	0.0	-0.9
LOI	0.3	*	*	-0.2	*	-0.6	*	-1.5	0.3	0.3	2.0	-0.3	-1.0
Ba	*	0.4	*	*	-2.6	*	1.3	*	0.1	4.9	*	-1.8	5.2
Be	*	*	0.4	*	*	*	*	*	*	*	*	*	*
Bi	*	*	*	*	*	*	*	*	*	*	*	*	*
Ce	*	0.0	0.2	*	*	*	0.3	*	*	*	*	*	*
Cr	*	*	4.1	*	-0.7	*	4.4	*	-2.7	*	*	-2.9	19.0
Cs	*	*	*	*	*	*	*	*	*	*	*	*	*
Cu	*	-1.4	*	-4.2	*	1.3	*	*	*	*	*	0.7	-0.9
Dy	*	*	0.1	*	*	*	*	*	*	*	*	*	*
Er	*	*	-0.2	*	*	*	*	*	*	*	*	*	*
Eu	*	*	0.7	*	*	*	*	*	*	*	*	*	*
Ga	*	*	0.7	*	0.0	-0.7	*	*	-0.5	*	*	*	*
Gd	*	*	-0.2	*	*	*	*	*	*	*	*	*	*
Ge	*	*	-0.3	*	*	*	*	*	*	*	*	*	*
Hf	*	*	1.6	*	*	*	*	*	*	*	*	*	*
Ho	*	*	0.0	*	*	*	*	*	*	*	*	*	*
La	*	-0.6	-0.2	*	*	*	6.2	*	1.1	*	*	*	*
Li	*	*	*	*	*	*	*	*	*	*	*	*	*
Lu	*	*	0.2	*	*	*	*	*	*	*	*	*	*
Nb	*	-4.3	1.7	5.4	*	5.4	*	*	4.6	*	*	*	-1.6
Nd	*	1.9	-0.1	*	*	*	*	*	1.8	*	*	*	*
Pb	*	*	*	-1.0	*	-8.5	*	*	*	*	*	-0.8	-0.3
Pr	*	*	0.2	*	*	*	*	*	*	*	*	*	*
Rb	*	-0.5	*	-0.2	*	-0.2	*	*	0.3	*	*	*	-0.2
Sb	*	*	-0.1	*	*	*	*	*	*	*	*	*	*
Sc	*	*	*	*	8.9	*	-5.5	*	*	*	*	*	*
Sm	*	*	0.5	*	*	*	*	*	*	*	*	*	*
Sr	*	-0.5	0.4	-0.9	*	-0.8	*	*	0.4	172.3	*	0.3	-0.6
Ta	*	*	2.1	*	*	*	*	*	*	*	*	*	*
Tb	*	*	0.1	*	*	*	*	*	*	*	*	*	*
Th	*	*	0.7	*	*	-2.7	*	*	*	*	*	-0.6	*
Tl	*	*	*	*	*	*	*	*	*	*	*	*	*
Tm	*	*	0.5	*	*	*	*	*	*	*	*	*	*
U	*	*	-0.4	*	*	36.7	*	*	*	*	*	*	*
V	*	*	-2.2	*	0.4	*	-3.8	*	2.1	*	*	*	12.3
Y	*	-0.6	-0.4	-0.2	*	-1.1	*	*	0.3	*	*	*	2.9
Yb	*	*	0.3	*	*	*	*	*	*	*	*	*	*
Zr	*	-1.0	3.8	-2.2	*	-1.5	*	*	1.6	*	*	*	-3.7

Table 3 GeoPT17 Z-score data for Calcareous Sandstone OU-8													
Identifier	R11	R12	R13	R14	R14	R15	R16	R17	R17	R18	R19	R20	R21
Sample	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Quality	2	1	1	1	2	1	2	1	2	2	2	1	2
SiO2	*	-0.2	-0.1	1.8	0.6	-0.1	-0.8	-0.5	*	-0.9	4.5	2.2	0.9
TiO2	*	1.0	-1.0	-8.9	-4.5	0.8	1.3	0.2	*	-1.2	-9.4	1.0	-1.2
Al2O3	*	3.7	0.0	-4.2	-2.2	-0.1	1.1	0.8	*	-0.2	4.3	1.1	2.6
Fe2O3	*	0.2	-0.3	-7.0	-3.3	4.2	1.9	5.0	*	-0.3	1.9	1.4	-0.3
MnO	*	0.5	-1.1	-10.2	-2.4	-0.3	-1.1	-0.8	*	-2.4	-14.5	0.5	-2.7
MgO	*	0.6	-0.6	-4.9	-1.2	-1.8	-1.7	1.9	*	-1.2	32.1	0.6	0.6
CaO	*	0.0	-0.9	-2.3	-1.4	-1.8	-1.6	1.1	*	-0.5	39.0	1.2	-1.5
Na2O	*	-4.7	0.0	-1.9	2.2	0.2	0.8	1.6	*	-2.7	99.0	3.0	3.2
K2O	*	-3.3	-0.5	1.1	0.8	-2.2	1.7	-2.7	*	0.0	135.0	1.1	0.1
LOI	*	0.8	1.7	-1.3	-0.6	-0.8	0.7	*	0.4	0.0	0.5	-0.2	0.0
Ba	*	1.3	*	*	*	3.3	*	*	-4.2	0.7	*	-0.5	0.3
Be	*	*	*	*	*	*	*	*	2.7	-0.1	*	*	0.6
Bi	*	*	*	*	*	*	*	*	*	*	*	*	0.2
Ce	4.0	57.8	*	*	*	0.1	*	*	-0.3	-2.5	*	*	0.3
Cr	*	*	*	*	*	-1.9	-2.3	*	4.4	10.4	*	0.5	1.6
Cs	*	*	*	*	*	1.0	*	*	-2.8	-1.0	*	*	0.2
Cu	*	*	*	*	*	-1.7	1.0	*	1.7	1.0	-3.0	-2.8	-0.3
Dy	*	*	*	*	*	-0.2	*	-0.3	*	-1.7	*	*	-0.2
Er	*	*	*	*	*	-0.8	*	0.2	*	-3.3	*	*	-0.7
Eu	*	*	*	*	*	-0.2	*	1.3	*	0.3	*	*	0.7
Ga	*	*	*	*	*	0.1	*	*	-0.4	0.8	*	1.9	0.1
Gd	*	*	*	*	*	-2.7	*	2.5	*	-1.0	*	*	0.2
Ge	*	*	*	*	*	*	*	*	-1.7	-2.3	*	*	*
Hf	*	4.9	*	*	*	-9.7	*	*	3.7	-6.9	*	4.3	*
Ho	*	*	*	*	*	0.0	*	0.3	*	-2.3	*	*	-0.3
La	6.2	*	*	*	*	0.2	*	*	-0.2	-2.0	*	*	-0.3
Li	*	*	*	*	*	*	-0.3	-0.5	*	1.5	*	*	1.4
Lu	*	*	*	*	*	-0.8	*	18.7	*	-3.2	*	*	-0.6
Nb	*	*	*	*	*	1.5	*	*	1.1	-2.4	*	*	8.0
Nd	*	6.7	*	*	*	-0.4	*	-1.0	*	-0.5	*	*	0.3
Pb	*	*	*	*	*	-1.1	*	*	0.3	-0.3	35.0	2.5	0.7
Pr	*	*	*	*	*	0.7	*	-0.2	*	-1.2	*	*	0.3
Rb	*	3.4	*	*	*	1.4	*	-2.0	*	0.1	*	-0.2	-0.3
Sb	*	*	*	*	*	*	*	0.7	*	2.0	*	*	0.6
Sc	*	*	*	*	*	6.2	*	1.1	*	-0.1	*	30.8	-0.1
Sm	*	*	*	*	*	-0.4	*	-1.3	*	-0.4	*	*	0.0
Sr	*	-0.5	*	*	*	0.8	-2.1	*	0.3	-0.9	*	-1.6	0.3
Ta	*	*	*	*	*	0.3	*	*	1.0	-2.0	*	*	*
Tb	*	*	*	*	*	0.4	*	1.1	*	-0.9	*	*	0.3
Th	-0.4	*	*	*	*	-0.6	*	*	0.5	-0.6	*	-0.9	0.7
Tl	*	*	*	*	*	*	*	0.7	*	-0.1	*	*	0.3
Tm	*	*	*	*	*	-0.1	*	0.7	*	-3.0	*	*	-0.5
U	2.1	*	*	*	*	-2.6	*	*	0.0	-1.9	*	*	-0.3
V	*	0.9	*	*	*	-2.0	-1.3	*	3.2	-1.1	*	-0.5	1.1
Y	*	0.4	*	*	*	0.9	*	-0.8	*	-1.9	*	1.2	1.8
Yb	*	*	*	*	*	-0.6	*	0.3	*	-4.3	*	*	-0.7
Zr	*	4.1	*	*	*	-16.2	2.8	*	-0.7	0.2	*	3.8	-1.9

Table 3 GeoPT17 Z-score data for Calcareous Sandstone OU-8													
Identifier	R22	R23	R24	R25	R26	R27	R28	R28	R29	R30	R31	R31	R32
Sample	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Quality	2	1	2	2	1	1	1	2	1	2	1	2	1
SiO2	0.6	-1.1	-1.3	0.2	12.8	-0.7	-0.1	*	0.8	*	*	*	1.0
TiO2	-0.2	0.7	-0.3	-2.0	9.3	-2.3	-0.7	*	-0.7	*	*	*	6.0
Al2O3	-0.9	-1.7	0.0	0.7	13.7	-0.4	0.3	*	0.6	*	*	*	0.1
Fe2O3	0.7	0.8	-0.3	-0.1	7.8	-2.6	-0.6	*	-3.4	-0.9	*	*	3.0
MnO	-0.4	-0.3	-1.1	0.3	16.7	0.0	-1.6	*	-2.2	*	*	*	0.5
MgO	-0.3	1.8	-0.9	-0.9	0.6	-2.3	2.1	*	1.2	*	*	*	-1.4
CaO	-0.1	-0.6	0.5	-1.2	5.0	3.0	-0.6	*	0.9	-2.2	*	*	3.8
Na2O	-0.2	-3.1	0.1	2.5	-33.2	1.6	5.1	*	-0.5	0.8	*	*	-2.6
K2O	0.6	-0.7	-1.4	-0.2	6.6	-0.7	0.3	*	1.8	2.3	*	*	-0.1
LOI	-0.3	0.6	-0.2	0.4	*	0.1	-0.6	*	-0.1	*	*	*	0.9
Ba	-4.2	0.7	0.0	-3.0	2.4	-1.3	-0.2	*	-2.4	0.2	-2.5	*	1.1
Be	*	2.0	*	*	*	3.1	0.5	*	*	*	*	*	*
Bi	*	-0.5	*	*	*	12.3	-1.6	*	*	*	*	*	-7.8
Ce	0.7	0.0	-1.1	2.1	*	2.9	0.0	*	*	-0.3	0.2	*	-2.0
Cr	-5.3	-0.9	-0.7	1.2	3.4	*	-0.5	*	-7.8	0.8	*	*	24.5
Cs	*	-0.8	-1.5	15.6	23.8	*	0.8	*	*	0.2	-0.7	*	35.8
Cu	-5.5	0.2	1.7	0.7	-2.8	7.5	-1.0	*	*	*	*	*	9.6
Dy	0.6	-1.3	-0.6	*	*	3.6	0.0	*	*	*	-0.1	*	-7.9
Er	0.3	1.5	-1.2	*	*	2.2	-0.4	*	*	*	-0.3	*	20.3
Eu	0.8	-0.4	-0.2	*	*	-0.3	-0.3	*	*	-0.5	-0.7	*	5.9
Ga	*	-0.8	*	1.0	-1.5	*	0.3	*	25.5	*	*	*	4.5
Gd	0.9	-0.4	-1.5	*	*	3.8	-0.4	*	*	*	-0.8	*	16.4
Ge	*	*	*	*	*	*	*	*	*	*	*	*	*
Hf	*	1.1	-1.1	2.1	-6.4	*	*	*	11.0	0.4	*	-3.5	17.6
Ho	0.0	-1.3	-0.4	*	*	3.8	0.0	*	*	*	0.2	*	10.9
La	0.3	-0.4	-1.2	-3.2	2.7	1.2	1.0	*	*	0.2	-0.2	*	24.4
Li	*	1.7	*	*	*	-1.7	0.4	*	*	*	*	*	*
Lu	-0.2	1.0	-0.4	*	*	3.5	-1.0	*	*	0.4	-0.5	*	*
Nb	-0.8	6.6	-1.3	-2.6	-0.2	3.7	0.2	*	*	*	*	-0.3	8.9
Nd	0.6	1.0	-1.1	2.6	*	2.3	0.2	*	*	0.0	-0.3	*	22.9
Pb	1.2	-1.2	-4.7	-2.4	-0.3	-3.9	-1.5	*	*	*	0.2	*	6.1
Pr	0.6	-1.2	-3.6	*	*	-6.0	0.7	*	*	*	0.3	*	8.9
Rb	-1.6	0.5	-1.6	-0.7	-0.3	-1.1	-0.2	*	0.1	0.0	-0.9	*	2.7
Sb	*	0.0	-0.8	*	*	3.5	-0.3	*	*	-0.1	*	*	128.5
Sc	*	0.0	-1.3	42.6	*	*	0.8	*	*	-0.2	*	*	139.5
Sm	0.5	0.6	-0.8	*	*	2.9	0.4	*	*	0.1	-0.4	*	-14.3
Sr	0.2	1.8	-0.1	-1.1	-0.7	-2.1	0.3	*	-1.5	-1.1	-1.1	*	2.9
Ta	*	1.6	0.0	*	*	*	1.1	*	*	0.0	*	-0.2	-10.5
Tb	0.3	-0.6	-0.8	*	*	*	0.1	*	*	-0.3	-0.8	*	48.6
Th	-1.4	0.7	-1.3	1.4	4.9	1.9	0.4	*	*	0.1	0.2	*	4.7
Tl	*	-0.2	*	*	*	*	-0.1	*	*	*	*	*	*
Tm	-0.1	1.5	-0.5	*	*	*	-0.3	*	*	*	-0.1	*	*
U	*	0.3	-0.9	*	23.7	*	0.0	*	*	-0.6	-0.3	*	4.3
V	-1.3	-0.3	-0.6	-1.3	4.1	1.3	2.3	*	1.6	*	*	*	9.2
Y	0.6	0.9	0.0	-1.2	*	2.3	-1.5	*	0.1	*	-1.4	*	1.2
Yb	0.2	1.0	-1.2	*	*	5.4	-0.7	*	*	0.7	-0.4	*	27.2
Zr	8.3	2.6	-0.1	-1.0	0.1	-0.9	-1.3	*	2.7	*	*	-5.6	3.9

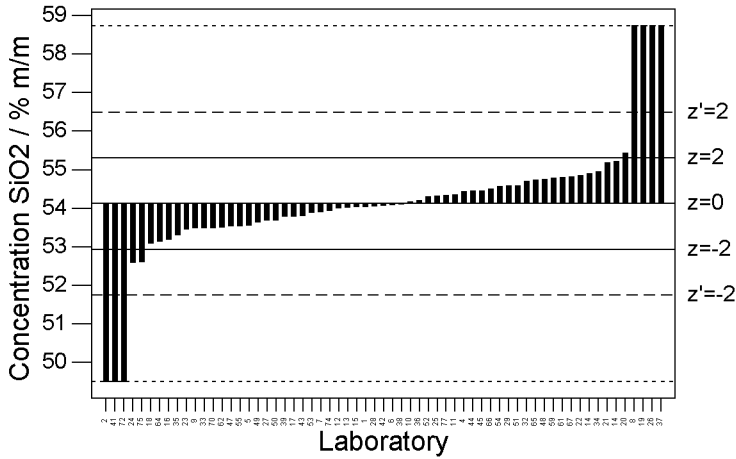
Table 3 GeoPT17 Z-score data for Calcareous Sandstone OU-8													
Identifier	R33	R34	R35	R36	R37	R38	R38	R39	R40	R41	R42	R43	R44
Sample	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Quality	2	1	1	2	2	1	2	2	1	2	2	1	1
SiO2	-0.5	1.4	-1.4	0.1	4.2	0.0	*	-0.3	*	-4.8	0.0	-0.5	0.6
TiO2	3.0	1.9	-0.9	0.5	-6.0	-0.5	*	2.2	-14.3	3.8	0.6	-0.7	4.3
Al2O3	-1.7	1.0	-2.2	1.1	-2.8	1.3	*	0.5	-7.7	8.5	0.5	1.3	0.1
Fe2O3	-0.7	-1.3	-0.9	0.9	-1.5	-1.8	*	0.3	-2.9	3.5	0.7	-0.2	-1.0
MnO	0.3	-0.6	-0.5	0.5	-1.3	-3.2	*	0.3	-1.8	-5.1	2.3	0.3	0.5
MgO	1.3	2.1	-2.2	0.7	-0.4	-3.2	*	-0.7	0.1	5.1	-0.7	3.0	0.0
CaO	0.0	-0.3	-2.4	-0.5	0.6	-0.7	*	0.5	22.2	5.7	0.0	1.6	1.1
Na2O	-0.6	1.0	-2.3	0.4	4.3	0.9	*	-0.3	0.0	-4.8	-2.7	-45.8	-0.5
K2O	-0.1	-0.2	-0.8	0.4	1.3	-2.3	*	2.2	-1.5	7.9	0.0	-14.0	-1.1
LOI	0.0	-0.6	-1.0	-0.1	*	-0.6	*	-0.1	*	0.8	-0.6	2.9	-0.9
Ba	*	-1.3	-0.1	0.1	-4.8	*	-4.5	0.7	-0.3	*	-0.8	*	-3.8
Be	*	-4.8	*	-0.1	*	*	*	-1.5	-1.3	*	*	*	*
Bi	*	*	*	-1.1	*	*	*	*	*	*	*	*	*
Ce	*	0.0	-2.1	0.1	*	*	*	-0.2	*	*	-5.5	*	-5.7
Cr	*	-13.2	-2.6	0.2	4.2	0.0	*	-3.9	10.5	*	7.2	-13.6	-1.4
Cs	*	-0.6	-0.8	0.2	*	*	*	0.8	*	*	*	*	6.8
Cu	*	-0.7	-3.2	1.7	-0.6	*	*	0.0	0.0	*	*	*	*
Dy	*	0.5	1.4	0.8	*	*	*	-0.1	*	*	*	*	5.3
Er	*	-0.2	0.2	0.0	*	*	*	0.5	*	*	*	*	4.6
Eu	*	0.1	-0.2	0.3	*	*	*	-0.1	*	*	*	*	7.3
Ga	*	0.0	-4.9	-0.1	-1.5	4.3	*	-0.4	*	*	2.1	*	4.5
Gd	*	-0.5	-0.4	-0.1	*	*	*	-0.1	*	*	*	*	7.9
Ge	*	-0.6	*	0.0	*	*	*	0.0	*	*	*	*	*
Hf	*	-1.4	-0.1	0.6	*	*	*	0.5	*	*	*	*	*
Ho	*	-0.4	0.8	-0.1	*	*	*	-0.5	*	*	*	*	4.8
La	*	-1.2	-1.2	-0.3	*	*	*	-0.3	1.8	*	4.2	*	6.6
Li	*	*	*	-0.1	*	*	*	-0.3	5.2	*	*	*	*
Lu	*	-1.6	0.3	0.4	*	*	*	-0.2	3.9	*	*	*	4.1
Nb	*	-1.5	-0.6	0.3	0.8	-0.5	*	-0.8	*	*	*	*	1.9
Nd	*	0.1	-2.3	0.1	*	*	*	-0.6	*	*	*	*	7.0
Pb	*	0.3	-0.3	0.3	-2.0	*	*	-0.7	*	*	6.7	*	-3.0
Pr	*	-0.7	-1.9	0.4	*	*	*	-0.1	*	*	*	*	6.1
Rb	*	-0.5	-0.3	0.6	-0.8	0.5	*	1.5	*	*	3.1	*	-0.6
Sb	*	0.7	*	-0.8	*	*	*	-0.6	*	*	*	*	*
Sc	*	0.6	1.5	-5.5	*	*	*	-0.7	-1.9	*	*	*	22.5
Sm	*	0.0	0.1	0.2	*	*	*	-0.1	*	*	-2.1	*	4.7
Sr	*	1.8	-0.1	0.0	0.7	-0.3	*	0.1	3.8	*	1.2	*	-1.8
Ta	*	-2.3	0.3	0.5	*	*	*	*	*	*	*	*	*
Tb	*	-0.6	0.4	0.1	*	*	*	0.1	*	*	*	*	5.2
Th	*	-0.7	0.1	0.0	-0.7	-1.6	*	0.1	-0.3	*	*	*	1.0
Tl	*	-2.3	*	0.1	*	*	*	-0.7	-1.0	*	*	*	*
Tm	*	-1.0	0.4	0.1	*	*	*	-0.1	*	*	*	*	4.4
U	*	-0.1	-0.6	0.1	*	*	*	0.7	-7.1	*	*	*	*
V	*	-3.1	0.2	0.8	2.6	15.6	*	-0.3	2.3	*	-0.6	*	4.4
Y	*	0.5	0.5	-0.4	-1.5	3.4	*	0.0	-7.6	*	-1.2	*	-1.1
Yb	*	-0.9	-0.3	0.6	*	*	*	0.2	*	*	*	*	5.3
Zr	*	5.3	3.9	0.8	-1.3	-0.1	*	-1.9	-18.4	*	1.2	*	-3.0

Table 3 GeoPT17 Z-score data for Calcareous Sandstone OU-8													
Identifier	R44	R45	R46	R47	R48	R49	R50	R51	R52	R53	R54	R55	R56
Sample	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Quality	2	2	1	2	2	2	1	2	2	2	2	2	2
SiO2	*	0.3	*	-0.5	0.5	-0.4	-0.7	0.4	0.2	-0.2	0.4	-0.5	*
TiO2	*	-0.3	*	-0.3	-1.2	-0.3	-2.5	0.2	-0.3	0.5	2.1	1.5	*
Al2O3	*	0.0	*	-0.3	-0.1	0.7	-0.8	-1.2	0.5	-0.1	-0.2	-2.0	*
Fe2O3	*	-0.1	-4.2	-0.3	-0.5	0.1	-0.2	0.8	-0.7	0.5	0.3	0.1	-0.7
MnO	*	0.3	-2.2	0.3	0.3	0.3	-0.5	-0.3	0.3	0.3	-0.9	0.5	*
MgO	*	-0.6	3.0	-0.6	0.5	0.7	-1.5	0.0	0.0	-1.9	0.6	2.4	*
CaO	*	-0.3	2.7	0.1	-0.8	0.1	-1.0	-0.7	-0.5	0.4	0.5	-0.3	-2.4
Na2O	*	-1.0	-11.0	-0.1	-0.3	1.1	-0.6	0.4	1.1	6.4	-2.0	3.5	-0.3
K2O	*	0.2	-7.1	-0.2	0.6	0.0	-0.3	-2.1	-0.7	0.4	-1.2	1.2	1.4
LOI	*	*	*	0.0	*	*	*	-0.4	0.0	0.3	-1.6	0.2	*
Ba	*	1.9	*	0.5	*	1.0	-3.3	1.5	-1.2	*	0.3	-3.3	-0.2
Be	2.0	*	*	0.4	*	*	-1.6	*	*	*	-0.1	-1.0	*
Bi	9.7	*	*	*	*	*	*	*	0.7	*	*	*	*
Ce	*	*	*	-0.3	*	0.9	0.2	4.2	-1.3	*	-2.1	0.4	1.7
Cr	*	-0.2	*	-0.3	*	*	1.4	1.8	-1.8	*	2.1	-1.1	-0.2
Cs	*	*	*	-0.2	*	0.1	-0.6	*	-0.3	*	*	*	0.0
Cu	0.7	6.8	*	-3.2	*	-1.2	-6.9	4.6	-1.6	*	*	-4.1	*
Dy	*	*	*	0.5	*	*	-0.3	*	-1.1	*	1.0	*	*
Er	*	*	*	0.0	*	*	0.6	*	-1.1	*	0.6	*	*
Eu	*	*	*	-0.4	*	*	-0.3	*	-0.9	*	-0.6	*	0.4
Ga	*	*	*	-0.4	*	0.6	-1.8	-4.0	*	*	-0.4	-1.4	*
Gd	*	*	*	-0.5	*	*	-1.7	*	-1.0	*	-0.3	*	*
Ge	*	*	*	4.6	*	*	1.2	*	*	*	*	*	*
Hf	*	*	*	-1.7	*	*	-0.6	*	*	*	0.1	*	1.0
Ho	*	*	*	0.0	*	*	-1.3	*	-1.0	*	0.2	*	*
La	*	*	*	-0.4	*	-0.4	1.9	3.8	-1.5	*	0.2	*	0.7
Li	5.8	*	-2.1	1.2	*	-0.3	*	*	0.3	*	-2.0	-1.2	*
Lu	*	*	*	-1.3	*	*	-0.8	*	-1.2	*	0.4	*	0.4
Nb	*	*	*	-0.1	*	*	-0.2	3.9	-1.0	*	1.0	4.3	*
Nd	*	*	*	-0.9	*	*	0.3	*	-1.4	*	0.4	-3.1	*
Pb	*	*	*	-0.7	*	*	-0.3	4.4	-1.2	*	0.3	-2.9	*
Pr	*	*	*	-0.3	*	*	1.4	*	-1.0	*	2.1	*	*
Rb	*	*	-0.8	-0.2	*	0.8	-1.0	1.7	-0.6	*	0.8	1.5	-0.7
Sb	-0.6	*	*	0.7	*	*	59.3	*	-2.0	*	*	*	*
Sc	*	*	*	-2.2	*	*	30.8	-4.5	-0.7	*	-0.9	4.1	-0.4
Sm	*	*	*	0.9	*	*	2.4	*	-1.0	*	1.4	*	0.5
Sr	*	-1.9	*	-0.2	*	0.5	-0.9	1.8	-0.3	*	-0.5	3.8	1.4
Ta	*	*	*	-0.7	*	*	*	*	*	*	*	*	-0.7
Tb	*	*	*	-0.5	*	*	-1.5	*	-0.9	*	0.7	*	0.3
Th	*	*	*	-0.1	*	0.3	5.4	3.1	-2.3	*	*	-5.6	0.5
Tl	1.9	*	*	-0.6	*	*	*	*	*	*	*	*	*
Tm	*	*	*	0.1	*	*	*	*	-0.9	*	*	*	*
U	3.4	*	*	-0.9	*	*	1.0	-6.0	-1.2	*	*	*	*
V	*	0.1	*	-0.2	*	1.5	1.6	2.6	-2.6	*	-0.6	7.8	*
Y	*	*	*	-0.8	*	0.3	2.6	1.7	-1.9	*	1.2	1.2	*
Yb	*	*	*	-0.1	*	*	0.1	*	-1.2	*	-0.4	*	0.3
Zr	*	12.5	*	-1.1	*	-0.6	-4.2	1.7	-7.9	*	-0.3	-1.6	2.8

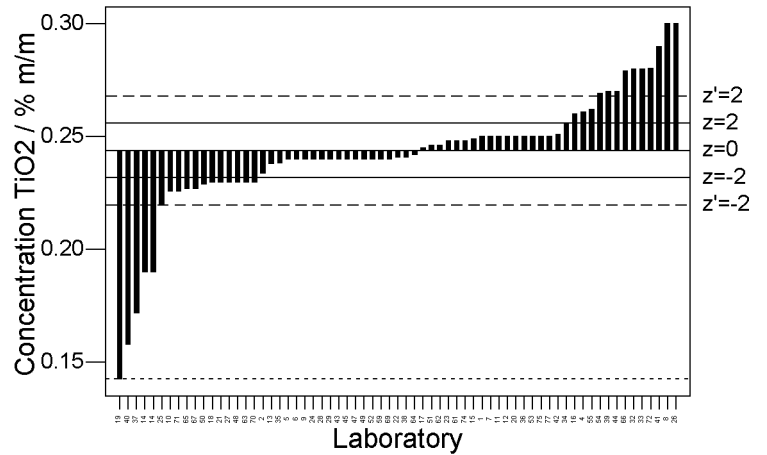
Table 3 GeoPT17 Z-score data for Calcareous Sandstone OU-8													
Identifier	R56	R57	R58	R59	R60	R61	R61	R62	R63	R64	R65	R66	R67
Sample	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8
Quality	2	1	2	2	?	1	2	1	2	1	2	2	1
SiO2	*	*	*	0.5	*	1.1	*	-1.0	*	-1.6	0.5	0.3	1.2
TiO2	*	*	*	-0.3	*	0.7	*	0.3	-1.2	-0.3	-1.4	2.9	-2.8
Al2O3	*	*	*	0.0	*	-1.0	*	-0.1	*	-2.2	1.1	1.3	-3.1
Fe2O3	*	-0.6	*	-2.1	227.3	0.2	*	1.8	-5.1	2.1	0.3	1.4	-2.5
MnO	*	*	*	0.3	167.0	0.3	*	0.8	-4.3	2.7	-1.3	0.9	-4.6
MgO	*	*	*	-1.2	-5.0	-0.3	*	-1.4	*	1.5	0.5	1.1	*
CaO	*	*	*	-1.8	*	-0.4	*	-0.1	1.3	1.1	-1.5	0.5	-1.0
Na2O	*	*	*	-0.6	*	-4.0	*	1.6	*	1.7	-0.6	-0.2	3.5
K2O	*	*	*	-0.7	*	0.3	*	-2.7	1.8	3.8	-0.4	1.7	0.6
LOI	*	*	*	0.5	*	0.3	*	-0.1	*	1.5	-75.3	*	0.5
Ba	*	-1.0	-1.6	0.9	-0.4	-2.1	*	0.6	0.7	-0.8	*	0.7	*
Be	*	*	*	0.6	*	*	0.1	*	*	*	*	-0.6	*
Bi	*	*	*	*	-0.2	*	*	*	*	*	*	*	*
Ce	*	0.1	-0.5	0.1	-2.5	-0.8	*	19.5	1.1	*	*	-0.3	*
Cr	*	*	*	*	-2.4	*	8.1	7.8	*	0.5	*	-1.5	*
Cs	*	-1.5	-0.1	0.0	-1.4	0.4	*	*	*	*	*	1.4	*
Cu	*	*	*	-0.2	-1.7	3.4	*	7.5	2.7	-2.8	*	-0.7	*
Dy	*	*	-0.1	0.0	-0.9	0.3	*	*	*	*	*	-0.2	3.2
Er	*	*	-0.1	0.0	-1.2	-0.5	*	*	*	*	*	-0.1	2.4
Eu	*	-0.1	-0.6	-0.3	-2.1	-2.8	*	*	*	*	*	0.2	2.5
Ga	6.2	*	*	0.0	*	*	*	1.9	-1.7	4.5	*	-0.8	*
Gd	*	*	-0.5	-0.3	-4.6	-0.7	*	*	*	*	*	-0.6	2.6
Ge	*	*	*	*	*	*	*	*	*	*	*	*	*
Hf	*	-0.4	-0.3	-2.2	*	*	*	*	*	*	*	-0.2	*
Ho	*	*	0.0	-0.2	*	0.7	*	*	*	*	*	0.4	1.8
La	*	-0.3	-0.9	-0.2	-3.0	0.2	*	7.0	*	*	*	-1.6	*
Li	*	*	*	2.5	*	*	*	*	*	*	*	*	-17.3
Lu	*	1.1	0.2	-0.1	-1.0	-0.4	*	*	*	*	*	-0.2	*
Nb	*	*	-0.3	-0.4	*	-1.1	*	1.9	*	-1.6	*	-1.3	*
Nd	0.4	-1.5	-0.4	-0.1	-2.4	1.0	*	*	7.8	*	*	-0.1	*
Pb	*	*	0.1	0.6	0.6	2.3	*	4.3	*	-3.0	*	*	*
Pr	*	*	*	-0.1	-2.1	-0.3	*	*	*	*	*	-0.2	2.5
Rb	*	-1.0	1.6	0.2	*	0.7	*	-0.2	0.1	-1.3	*	-0.1	*
Sb	-1.5	*	*	-0.1	-1.5	*	*	*	*	*	*	*	*
Sc	*	-0.5	6.6	2.0	*	-2.0	*	*	*	*	*	-0.1	*
Sm	*	0.0	-0.4	-0.2	-1.9	1.3	*	*	*	*	*	0.0	3.8
Sr	*	*	2.0	0.2	*	2.3	*	-0.5	-1.3	-0.7	*	1.5	*
Ta	*	-0.7	-2.9	-0.3	*	-5.9	*	*	*	*	*	-0.2	*
Tb	*	-0.3	-0.1	-0.2	-2.1	-0.3	*	*	*	*	*	-0.3	1.1
Th	*	-0.5	-0.2	-0.2	-1.9	0.8	*	2.8	*	-0.9	*	0.1	*
Tl	*	*	*	0.6	0.3	*	*	*	*	*	*	*	*
Tm	*	*	0.1	0.0	*	-0.6	*	*	*	*	*	-0.1	0.7
U	*	-2.7	0.1	-0.2	-1.4	2.0	*	*	*	*	*	0.0	*
V	*	*	*	-0.1	-1.2	0.9	*	9.9	*	2.3	*	-2.2	*
Y	*	*	-0.2	-0.6	*	1.4	*	0.1	-0.6	-2.3	*	0.3	*
Yb	*	1.2	0.2	0.1	-1.1	-0.9	*	*	*	*	*	0.0	2.3
Zr	*	*	0.1	-3.4	*	1.4	*	-2.5	-1.7	-2.7	*	1.7	*

Table 3 GeoPT17 Z-score data for Calcareous Sandstone OU-8											
Identifier	R67	R68	R69	R70	R71	R72	R73	R74	R75	R76	R77
Sample	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-8	OU-9
Quality	2	1	1	1	2	2	1	2	1	2	2
SiO2	*	*	*	-1.0	*	-7.8	*	-0.1	-2.5	*	0.2
TiO2	*	*	-0.7	-2.3	-1.5	3.0	*	0.3	1.0	*	0.5
Al2O3	*	*	4.0	-6.4	0.2	6.5	*	0.9	-1.3	*	0.0
Fe2O3	*	*	-4.6	-3.0	-0.1	0.9	*	0.6	7.0	*	-0.7
MnO	*	*	3.2	1.3	0.1	2.6	*	-0.4	3.2	*	1.6
MgO	*	*	9.4	-2.9	-0.4	21.2	*	-0.6	0.9	*	0.3
CaO	*	*	*	-3.9	-0.8	10.8	*	0.9	-68.0	*	0.4
Na2O	*	*	-2.6	-7.6	1.3	*	*	-5.8	-1.9	*	-10.0
K2O	*	*	0.7	-5.3	0.0	0.8	*	0.2	-2.3	*	-0.4
LOI	*	*	*	-1.2	*	*	*	*	0.9	*	-0.2
Ba	-3.3	0.2	0.4	*	-1.3	1.7	-0.4	-0.6	0.5	0.1	0.2
Be	*	*	*	*	*	*	-1.6	*	*	-1.5	0.6
Bi	*	*	*	*	*	*	2.5	*	*	*	*
Ce	1.6	-0.5	3.8	*	*	-3.7	-0.1	*	-3.1	*	-0.6
Cr	12.7	*	*	-1.4	*	6.4	4.0	*	-0.5	-7.2	0.2
Cs	*	-2.8	-0.2	*	*	*	-0.1	*	*	*	0.2
Cu	-1.4	0.4	*	8.5	*	0.7	0.2	*	1.3	0.6	-0.2
Dy	*	-0.1	1.6	*	*	*	-0.1	*	-4.1	-0.8	0.2
Er	*	-0.7	*	*	*	*	-0.1	*	#####	-0.8	-0.2
Eu	*	1.0	-0.3	*	*	*	-0.6	*	-1.2	0.3	-0.1
Ga	-0.4	-5.9	*	*	*	1.2	2.0	*	*	*	-0.3
Gd	*	2.2	*	*	*	*	0.1	*	4.8	0.2	0.4
Ge	*	*	*	*	*	*	2.1	*	*	*	0.8
Hf	-1.2	-3.0	0.9	*	*	*	-0.4	*	*	*	1.0
Ho	*	-0.5	*	*	*	*	0.0	*	*	-0.1	0.2
La	0.1	-0.6	-1.1	*	*	*	-0.4	*	-3.7	-0.6	-8.4
Li	*	*	*	*	0.2	*	-1.4	*	9.8	*	0.0
Lu	*	0.7	0.0	*	*	*	0.0	*	*	*	0.8
Nb	8.0	-2.4	*	*	*	1.3	-0.8	*	30.0	*	0.6
Nd	1.2	-0.9	-2.1	*	*	7.6	-1.1	*	5.9	-0.3	-0.2
Pb	-0.6	*	*	6.9	*	0.9	0.6	*	*	*	1.5
Pr	*	-0.3	*	*	*	*	-0.2	*	*	0.9	0.1
Rb	-0.3	-1.1	0.1	*	*	0.4	-0.6	*	*	*	0.6
Sb	*	*	0.7	*	*	*	12.7	*	*	*	*
Sc	38.4	*	-1.4	*	*	*	18.7	*	-4.3	*	0.4
Sm	*	-1.1	-0.1	*	*	*	-0.4	*	-4.9	-0.4	-0.2
Sr	-0.7	0.1	*	*	252.3	0.3	-0.2	*	-1.9	-0.2	0.0
Ta	*	3.6	2.6	*	*	*	2.3	*	239.5	*	0.3
Tb	*	3.3	1.1	*	*	*	0.0	*	*	*	0.3
Th	*	-0.5	1.0	*	*	2.4	0.0	*	*	-0.4	-0.2
Tl	*	*	*	*	*	*	-0.4	*	*	*	*
Tm	*	-1.1	*	*	*	*	0.2	*	*	*	0.3
U	*	*	0.2	*	*	*	0.2	*	*	-1.1	0.2
V	-0.3	-1.0	2.3	*	27.2	*	-1.9	*	*	-1.0	-0.7
Y	0.0	-2.2	*	*	*	0.8	-1.4	*	-2.3	0.0	0.7
Yb	*	-1.5	0.4	*	*	*	0.4	*	-3.7	-1.5	0.7
Zr	-1.6	-1.2	*	*	62.7	0.5	0.9	*	*	*	1.4

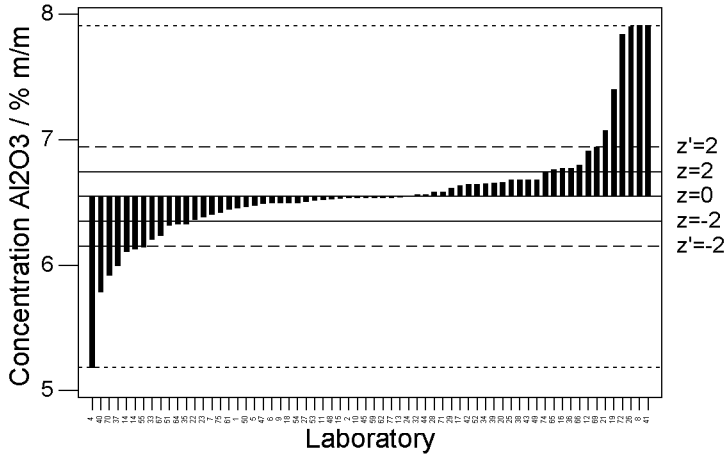
GeoPT17 - Barchart for SiO₂



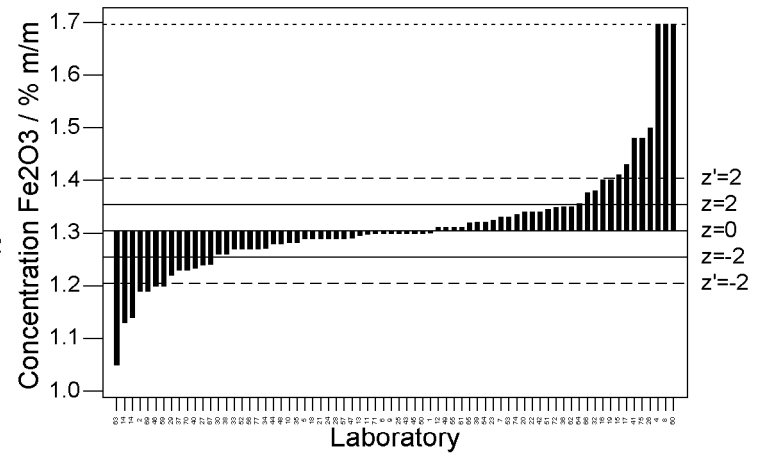
GeoPT17 - Barchart for TiO₂



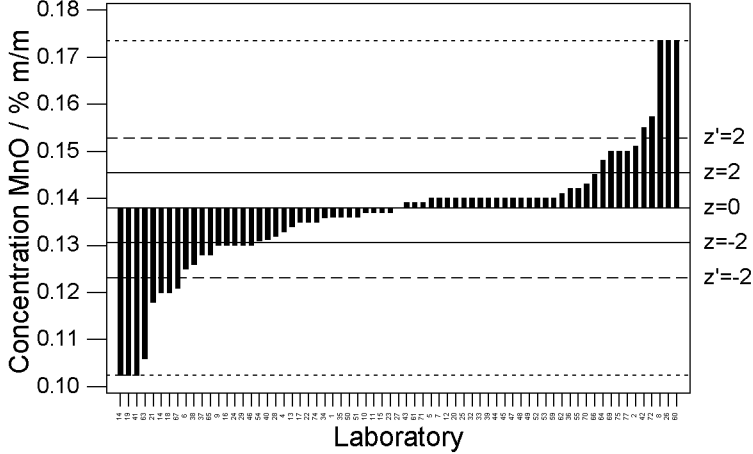
GeoPT17 - Barchart for Al₂O₃



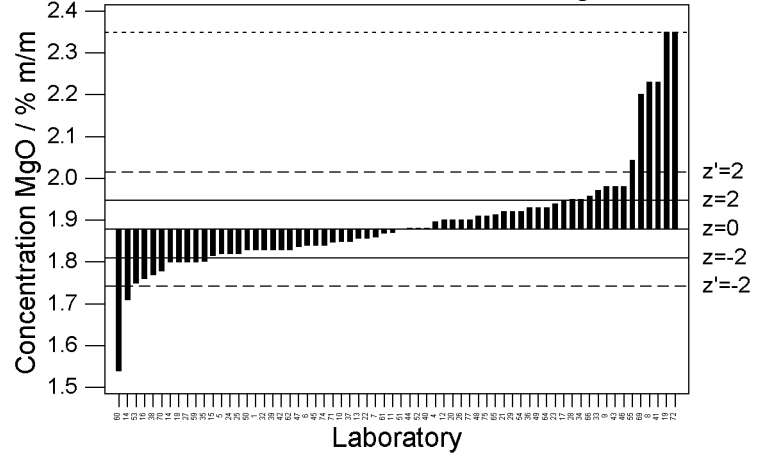
GeoPT17 - Barchart for Fe₂O₃



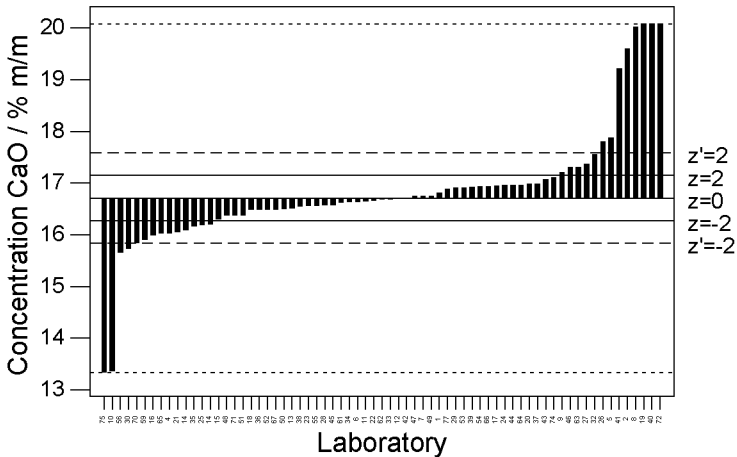
GeoPT17 - Barchart for MnO



GeoPT17 - Barchart for MgO



GeoPT17 - Barchart for CaO



GeoPT17 - Barchart for Na₂O

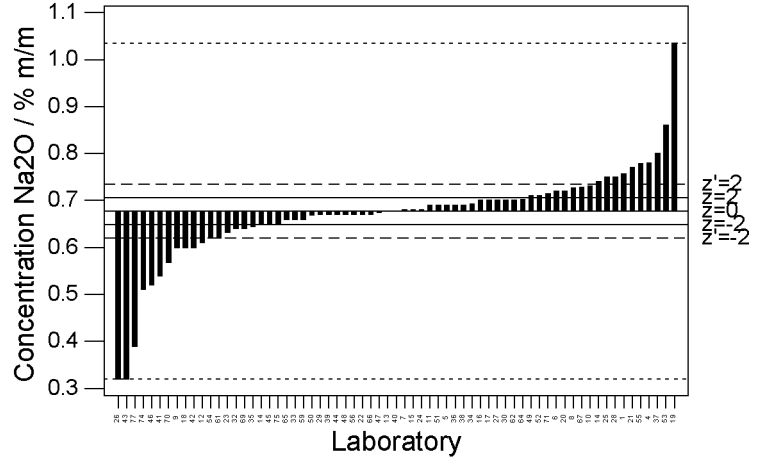
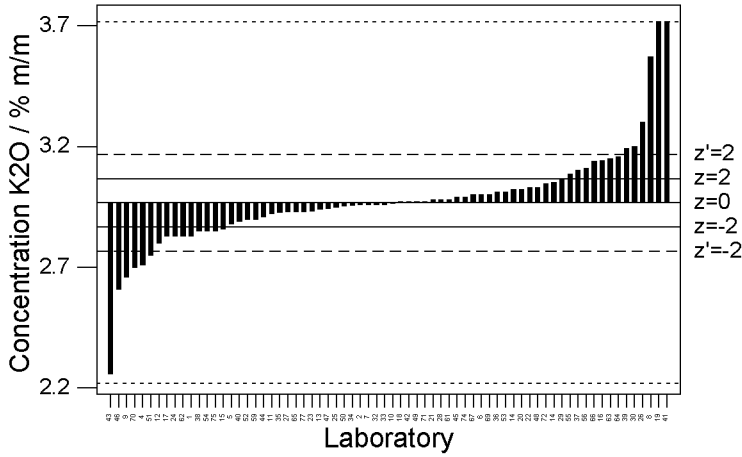
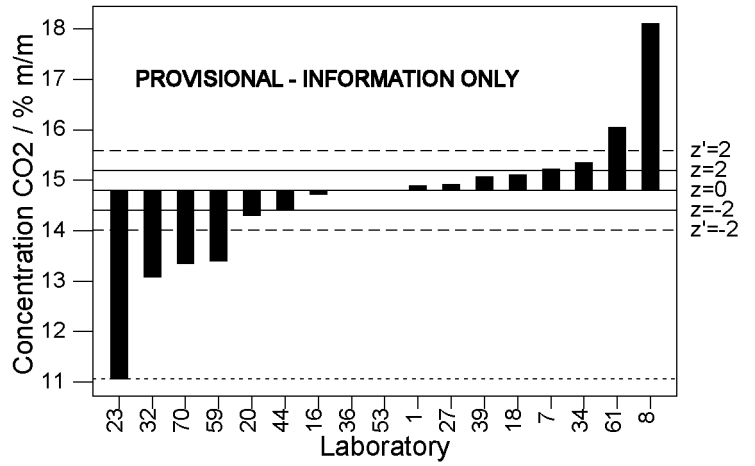


Figure 1: GeoPT17 Calcareous sandstone OU-8. Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

GeoPT17 - Barchart for K2O



GeoPT17 - Barchart for CO2



GeoPT17 - Barchart for LOI

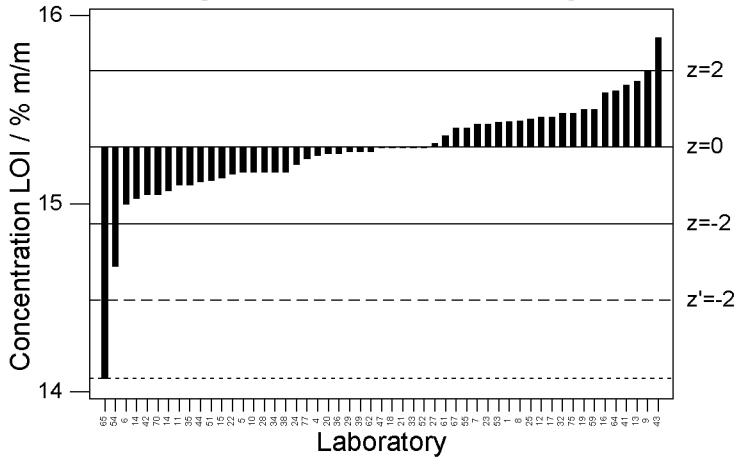


Figure 1: GeoPT17 Calcareous sandstone OU-8. Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

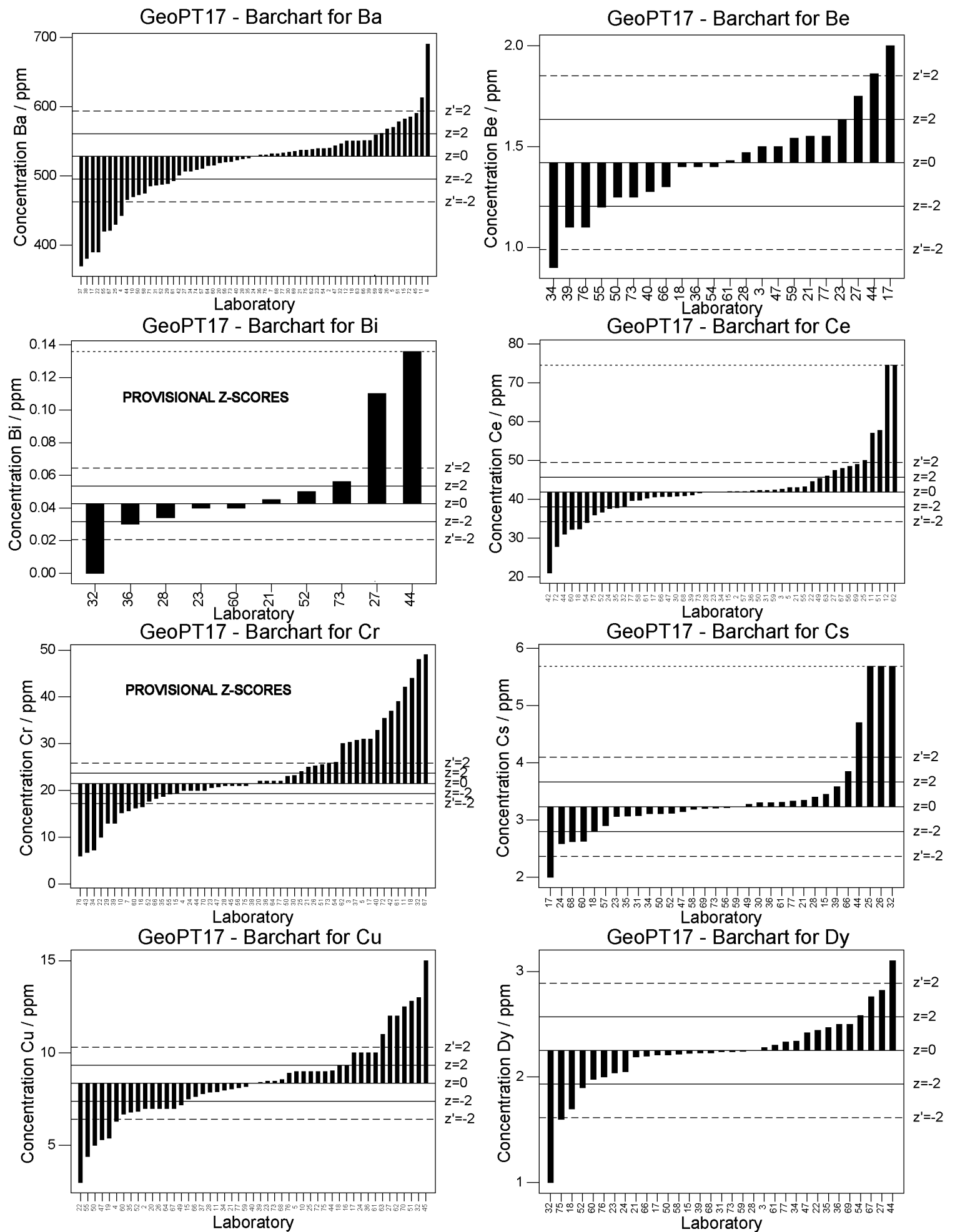


Figure 1: GeoPT17 Calcareous sandstone OU-8. Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

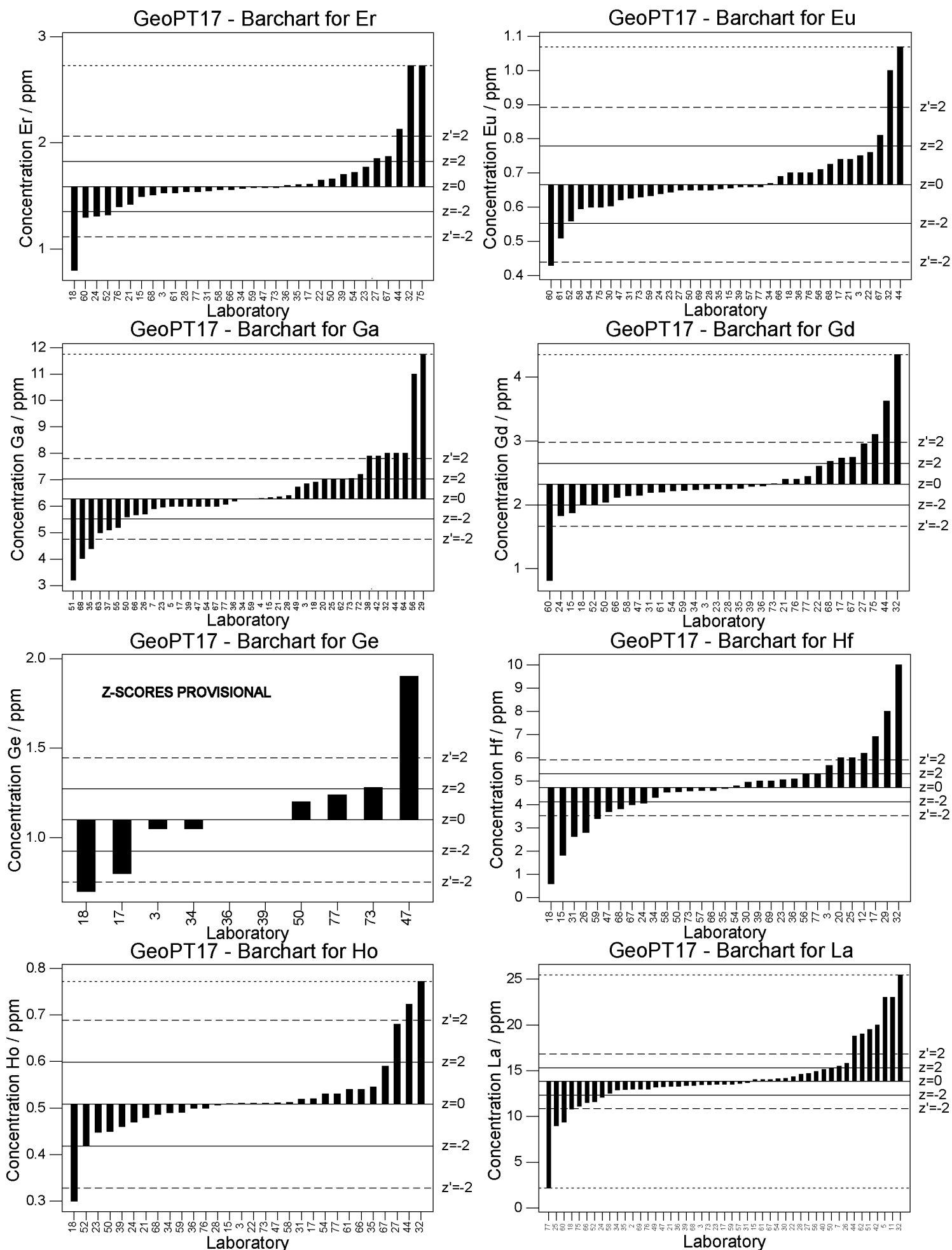


Figure 1: GeoPT17 Calcareous sandstone OU-8. Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z < 2$ for applied geochemistry labs (pecked lines).

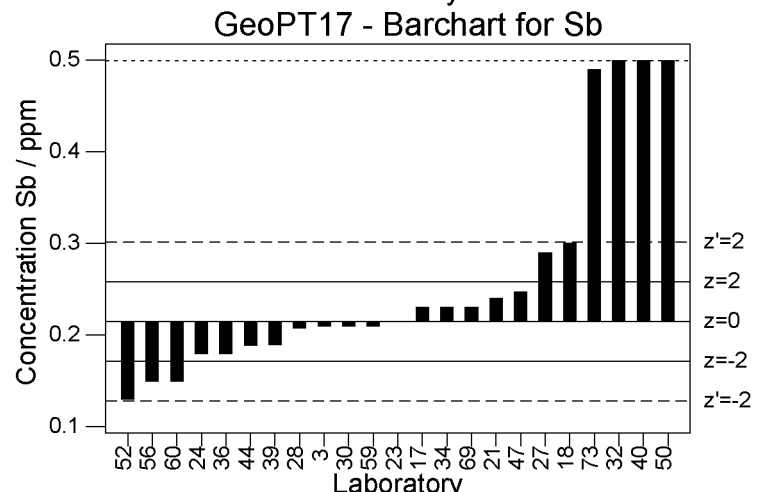
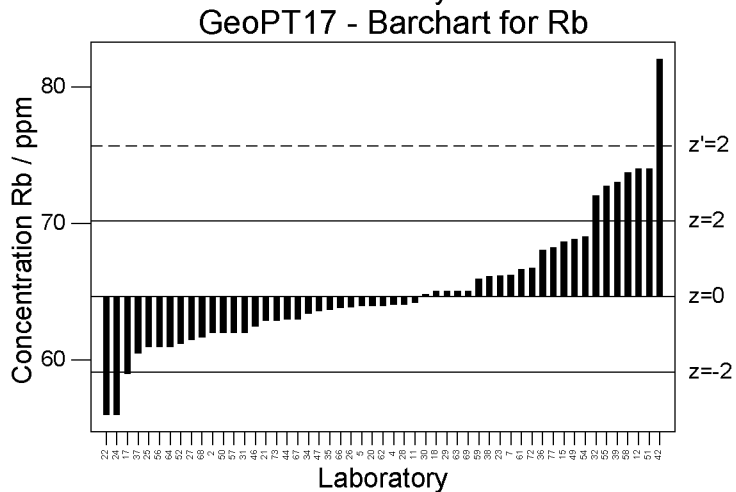
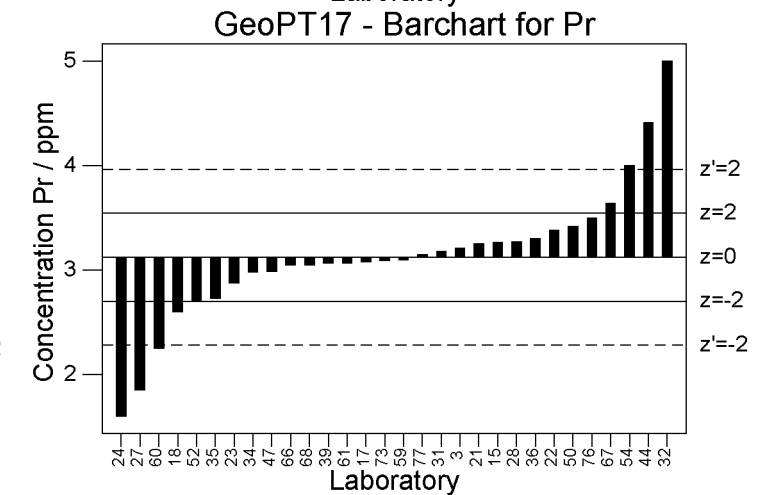
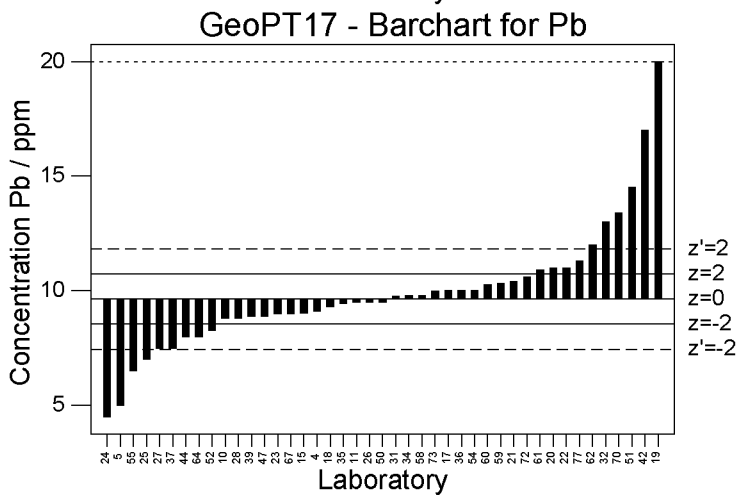
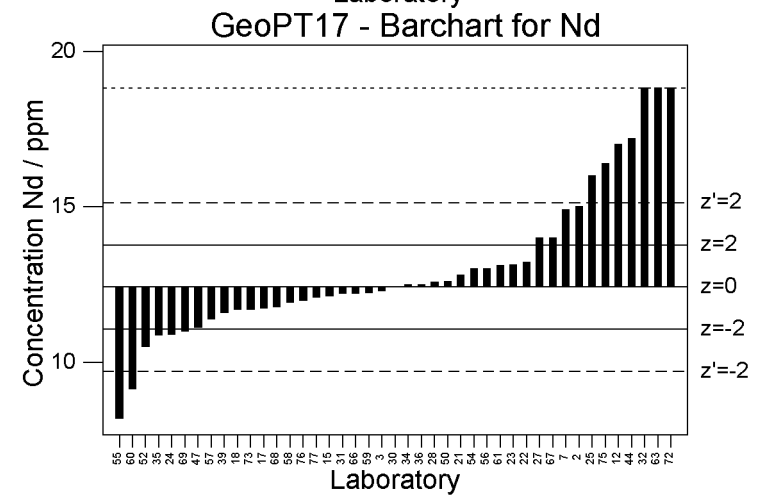
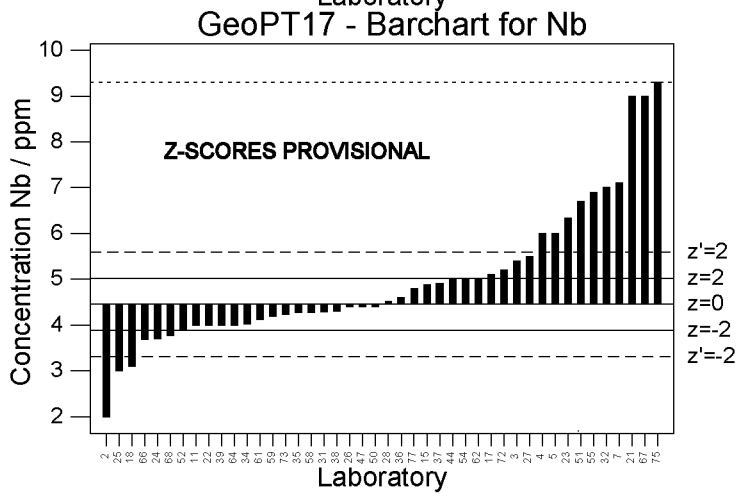
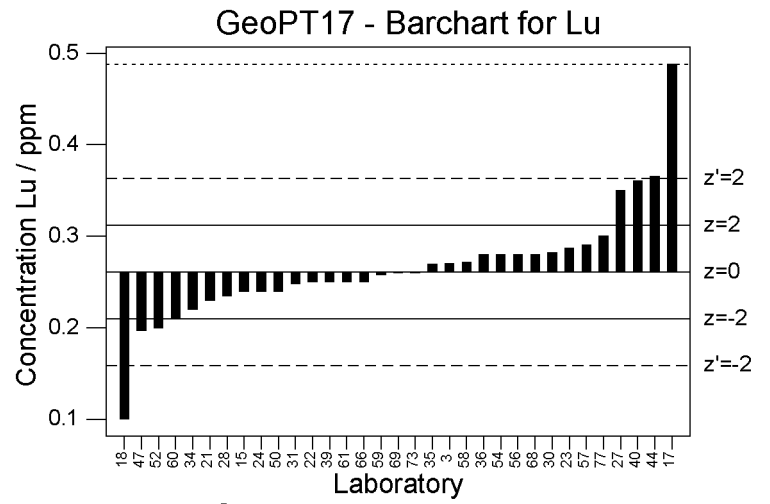
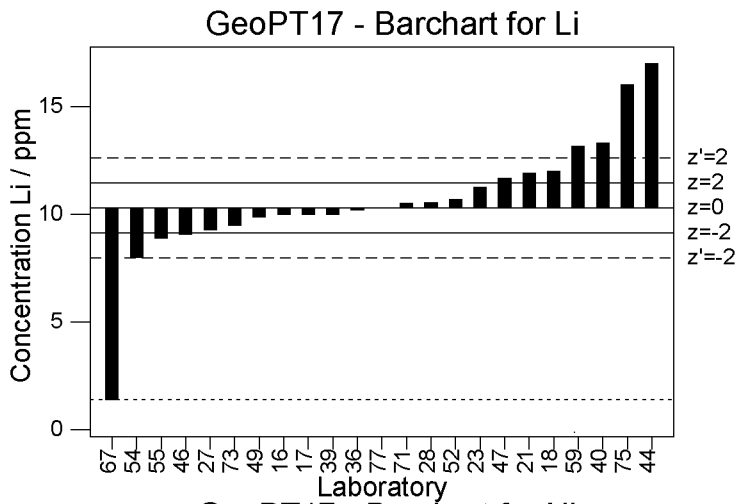


Figure 1: GeoPT17 Calcareous sandstone OU-8. Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

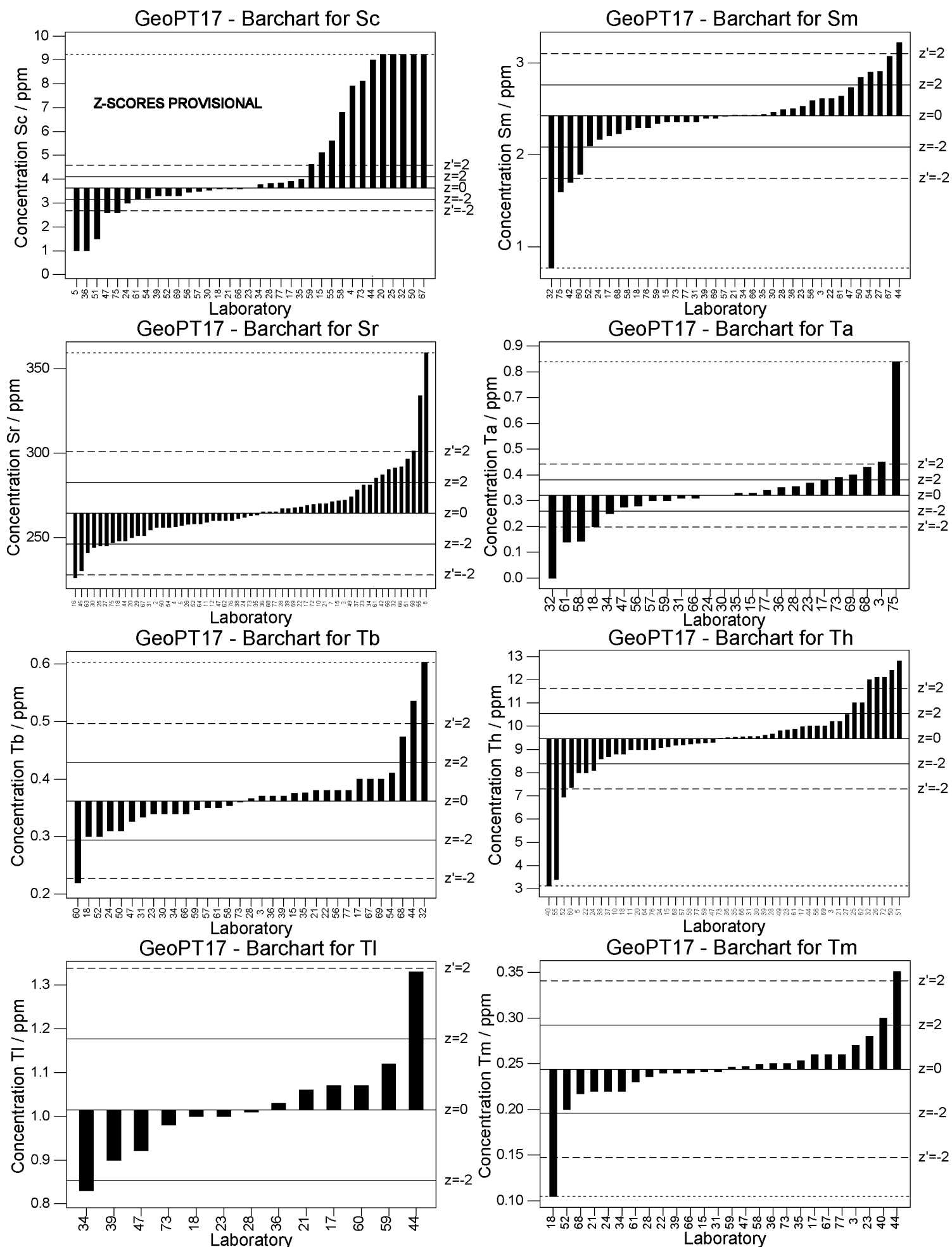


Figure 1: GeoPT17 Calcareous sandstone OU-8. Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z < 2$ for applied geochemistry labs (pecked lines).

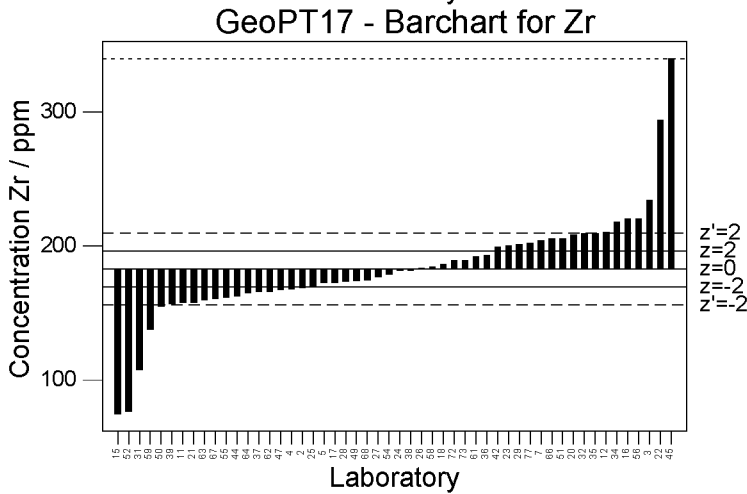
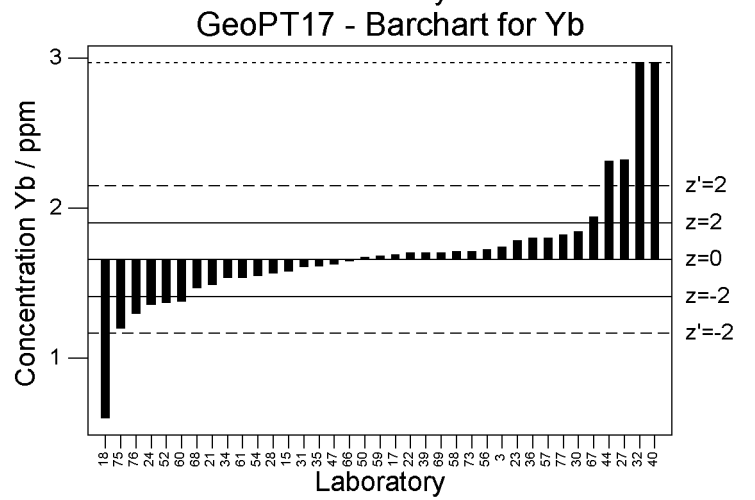
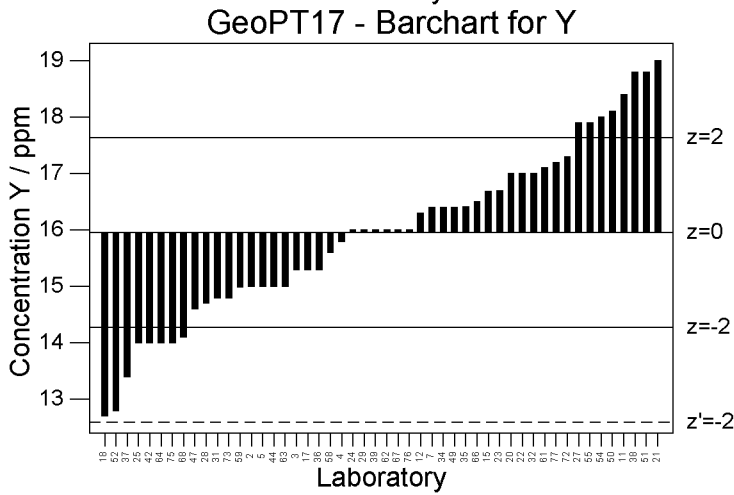
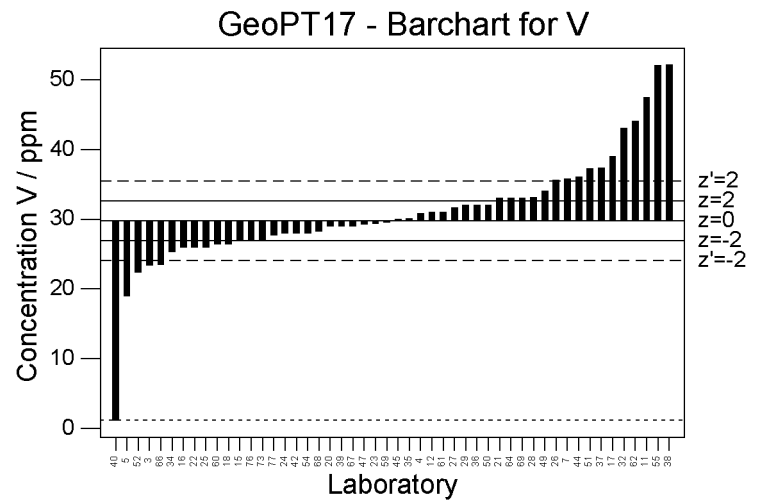
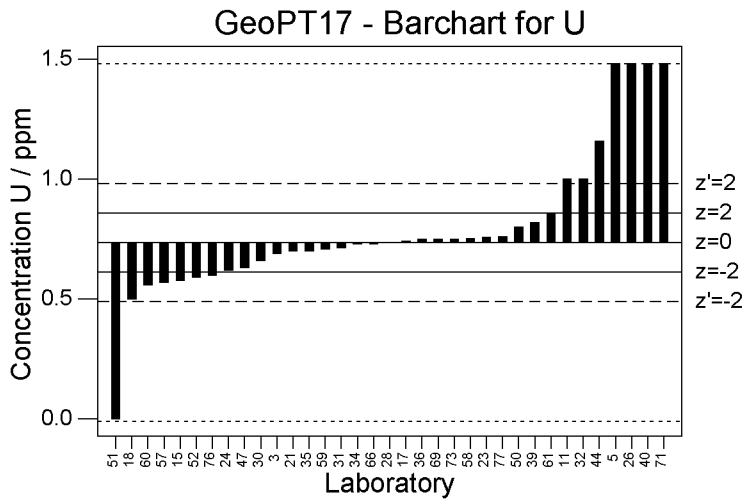


Figure 1: GeoPT17 Calcareous sandstone OU-8. Data distribution charts for elements for which values were assigned. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

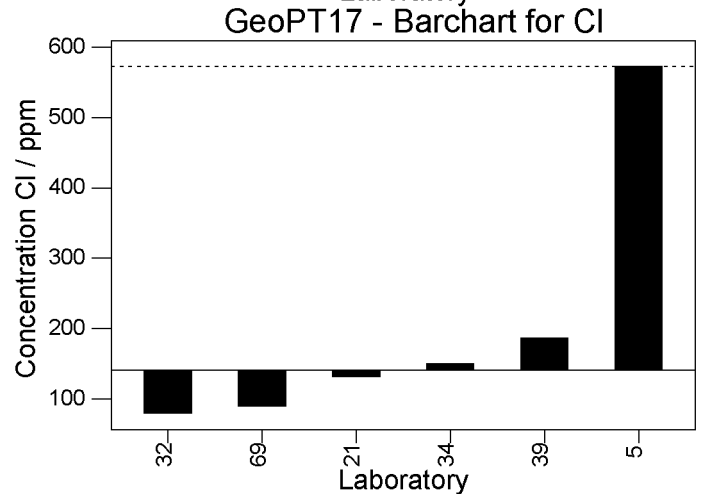
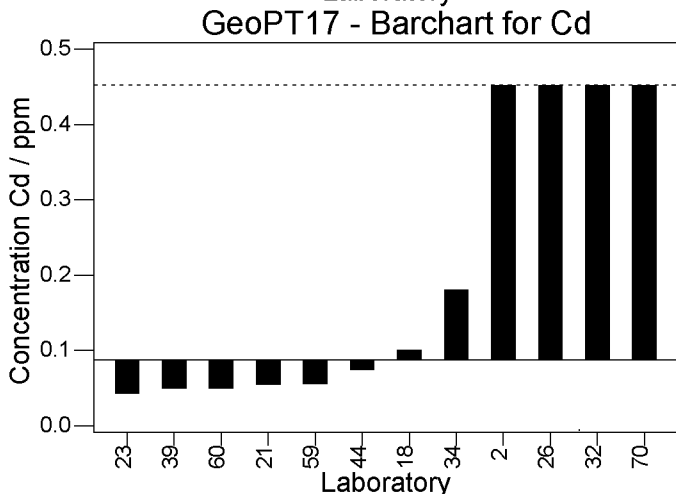
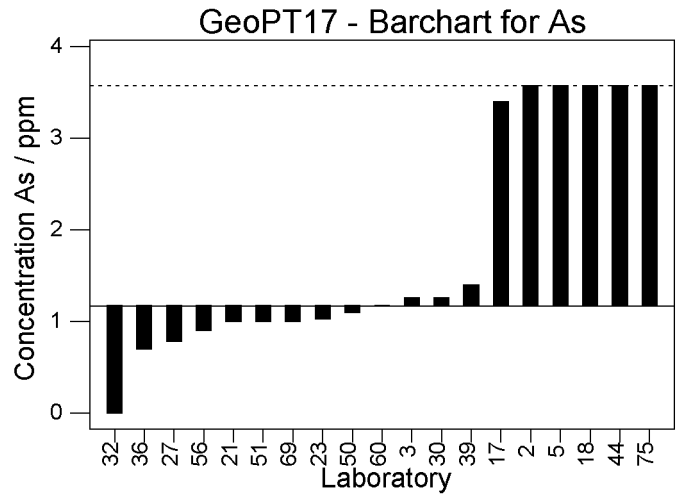
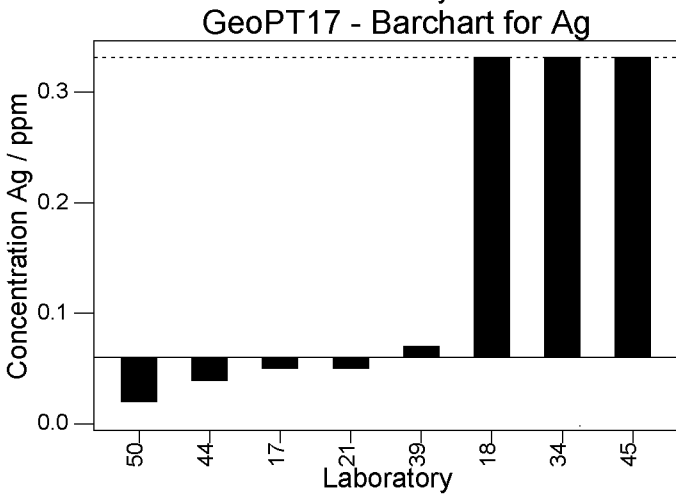
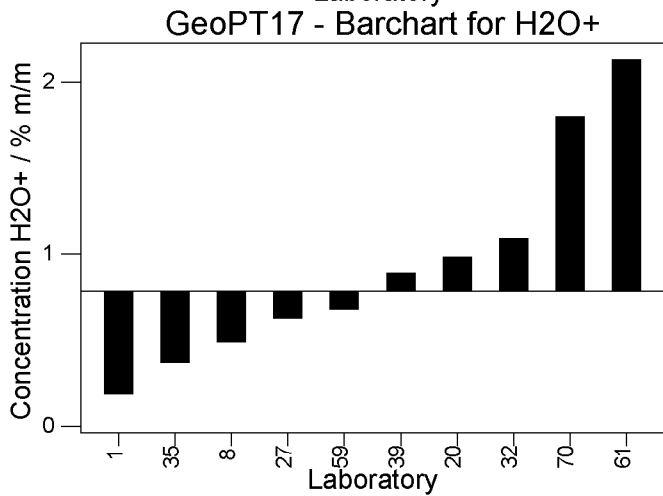
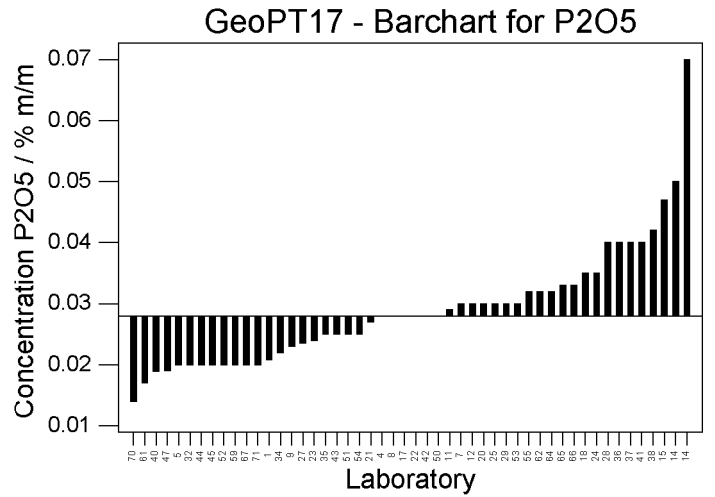
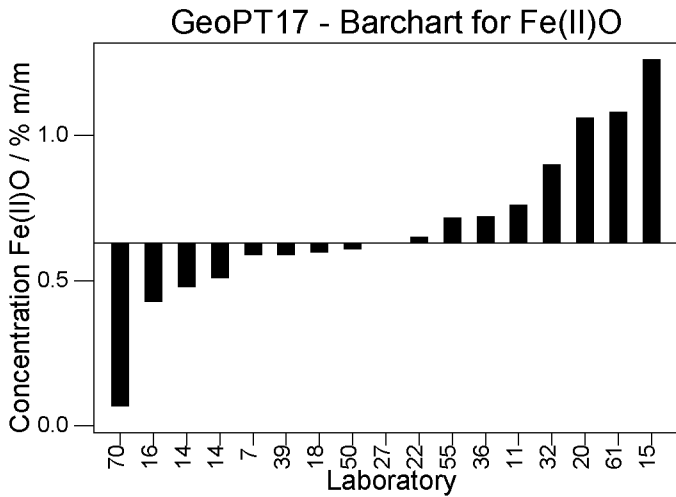


Figure 2: GeoPT17 Calcareous sandstone OU-8. Data distribution charts for elements for which only information values or where no value could be assigned.

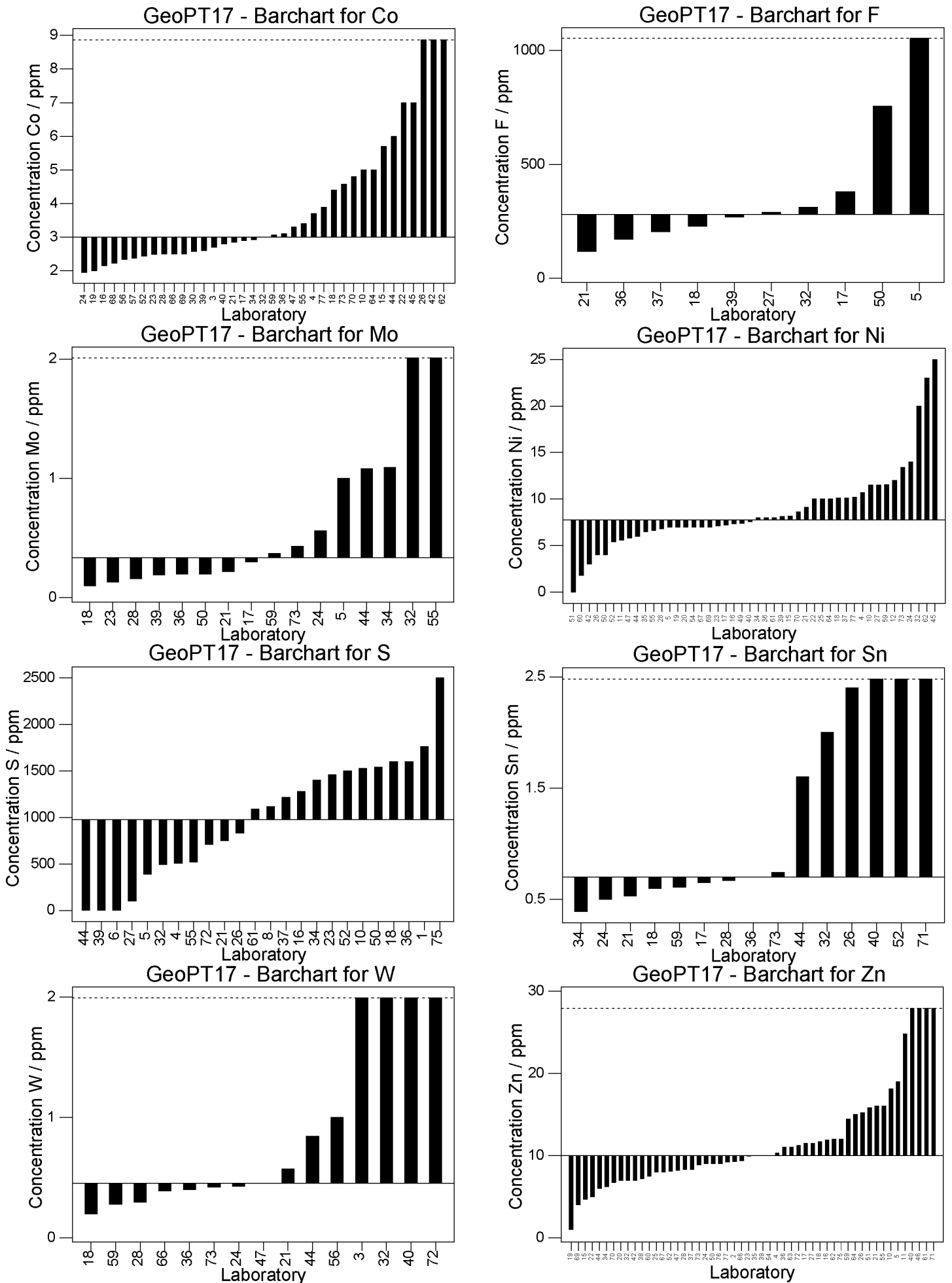


Figure 2: GeoPT17 Calcareous sandstone OU-8: Data distribution charts for elements for which only information values or where no value could be assigned.

Multiple z-score chart - GeoPT17

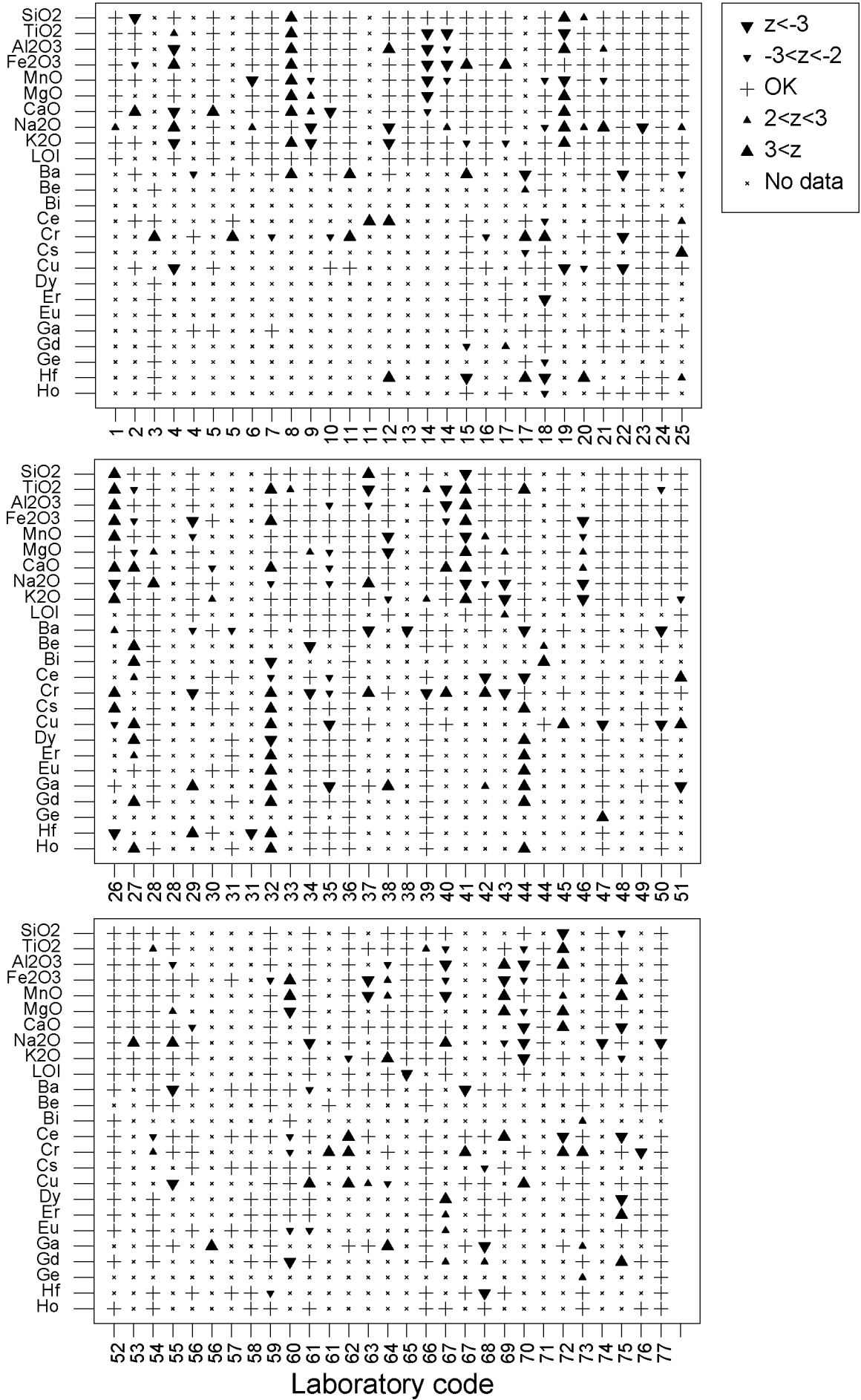


Figure 3: GeoPT17 - Calcareous sandstone OU-8: Multiple z-score charts for laboratories participating in the GeoPT17 round. Symbols indicate whether or not an elemental result complies with the $-2 < z < +2$ criteria. Satisfactory data are plotted as '+'. Data for other categories are plotted as follows: $z < -3$ (t), $-3 < z < -2$ (t), $+2 < z < +3$ (s), $Z > +3$ (s).

Multiple z-score chart - GeoPT17

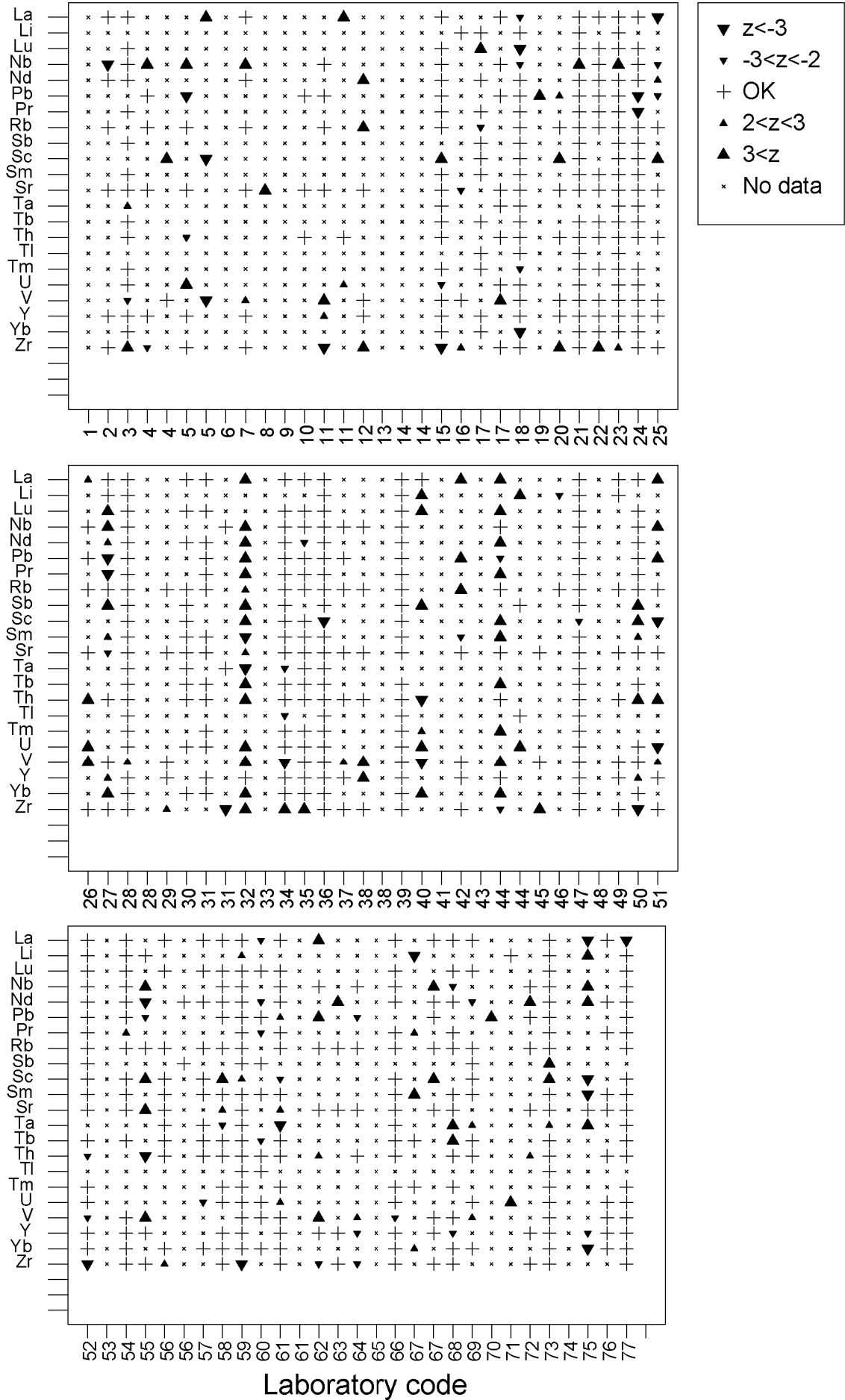


Figure 3: GeoPT17 - Calcareous sandstone OU-8: Multiple z-score charts for laboratories participating in the GeoPT17 round. Symbols indicate whether or not an elemental result complies with the $-2 < z < +2$ criteria. Satisfactory data are plotted as '+'. Data for other categories are plotted as follows: $z < -3$ (t), $-3 < z < -2$ (t), $+2 < z < +3$ (s), $Z > +3$ (s).

Errata GeoPT17

In the distributed report, data in Tables 1 and 3 for lab R40 were incorrect for Sb and below where data were displaced upwards by one row. The same was true for lab R71. This was due to an error in data transposition. Tables 1 and 3 have been corrected here, but the z-score data plotted for these laboratories and for the corresponding elements have not been corrected in the graphs.