

## GeoPT26, England - OPC-1, Portland-Zement

**Veranstalter:** International Association of Geoanalysts and Geostandards Newsletter - GeoPT26

**Ringversuchsmaterial:** OPC-1, Ordinary Portland Cement)

**RV geschlossen:** 2010 – 1

**Literatur:** Proficiency Testing Round GeoPT26 (Laborcode CRB = A10)

### Hauptelemente [MA%]

	CRB	RV	1sRV	Z-Score
Na <sub>2</sub> O				
MgO	2,6	2,54	0,05	
Al <sub>2</sub> O <sub>3</sub>	4,68	4,55	0,072	
SiO <sub>2</sub>	22,2	21,85	0,275	
P <sub>2</sub> O <sub>5</sub>	0,044	0,044	0,001	
S*	0,98	0,95	0,31	
K <sub>2</sub> O	0,37	0,34	0,008	
CaO	63,16	62,9	0,674	
TiO <sub>2</sub>	0,34	0,318	0,008	
Fe <sub>2</sub> O <sub>3</sub> tot	3,27	3,19	0,054	
MnO	0,41	0,404	0,009	
L.O.I.*	1,09	1,23	0,37	

### Spurenelemente [µg/g]

	CRB	RV	1sRV	Z-Score
As	2	4,6	0,3	
Ba	482	512	16	
Ce	50	49	2,2	
Cr*	185	186	40	
Cu	26	23,7	1,2	
Ga	7	7	0,4	
F*	640	720	200	
Hf	2,5	2,1	0,2	
La	70	26	1,3	
Ni	94	87	3,6	
Pb	9	7,2	0,4	
Pr	12	6,2	0,4	
Rb	20	14,7	0,8	
Sm	3	5	0,3	
Sr	130	118	4,6	
V	65	64	2,7	
Y	14	16	0,8	
Zn	26	28	1,3	
Zr	79	81	3,4	

## Legende

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

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

# **GeoPT26 – AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES – REPORT ON ROUND 26 (Ordinary Portland Cement, OPC-1) / Jan 2010**

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*Keywords: proficiency testing, quality assurance, GeoPT, GeoPT26 Round, OPC-1, ordinary Portland cement*

## **Abstract**

Results are presented for GeoPT26, round twenty-six of the International Association of Geoanalysts' Proficiency Testing programme for analytical geochemistry laboratories. The sample distributed for this round was OPC-1, ordinary Portland cement supplied by Maggi Loubser, RSA. In this report, contributed data are listed, together with an assessment of consensus values, z-scores and charts showing both the distribution of contributed results and the overall performance of participating laboratories.

## **Introduction**

This twenty-sixth round of the international proficiency testing programme, GeoPT, 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.

**Steering Committee for Round 26:** M. Thompson (Statistician), P.C. Webb (Results coordinator), P.J. Potts and M. Loubser.

**Sample GeoPT26:** OPC-1, an ordinary Portland cement, was produced by PPC Cement, RSA, under direction of Dr M. Loubser. The test material was tested for grain size distribution and compositional homogeneity by XRF at the Open University and was considered suitable for use in the GeoPT proficiency testing programme.

## **Timetable for Round 26:**

Distribution of sample: September 2009.  
Deadline for submission of analytical results: 18th December 2009.  
Distribution of draft report: February 2010

## Submission of results

Results submitted by 82 laboratories are listed in Table 1. All of 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 and provisional values for 9 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 bar charts for each element to judge the distribution of results and the most favourable basis for defining the assigned values. In 29 cases the robust mean was used as the preferred value. In 17 cases the median value was preferred. For OPC-1 slightly fewer values have been assigned and rather more given only provisional values than is the norm. For many elements the ranges of reported results were somewhat greater than usual. This is likely to be in part because of the somewhat unusual composition of OPC-1, with some elements at low concentrations, at or below detection limits, which may also be the reason for there being a lower total number of determinations submitted than in recent rounds.

Bar charts for 46 elements/components that were judged to have satisfactory distributions for assigned or provisional values to be given, as listed in Table 2, are shown in Figure 1, namely: SiO<sub>2</sub>, TiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>T, MnO, MgO, CaO, K<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub>, As, Ba, Be, Ce, Co, Cs, Cu, Dy, Er, Eu, Ga, Gd, Hf, Ho, La, Li, Lu, Nb, Nd, Ni, Pb, Pr, Rb, Sb, Sm, Sr, Ta, Tb, Th, Tm, U, V, W, Y, Yb, Zn, and Zr. Of these, only provisional values could be given to the 11 elements/components: P<sub>2</sub>O<sub>5</sub>, As, Be, Cu, Li, Ni, Pb, Ta, V, W and Zn. In most cases these corresponded to results for which the ratio of the

uncertainty in the assigned value to the Horwitz target value exceeded 0.5.

Bar charts for the 18 elements/components, Na<sub>2</sub>O, H<sub>2</sub>O<sup>+</sup>, CO<sub>2</sub>, LOI, Ag, B, Bi, Cd, Cl, Cr, F, Ge, Mo, S, Sc, Se, Sn and Tl are plotted in Figure 2 for information only, where the data were not amenable to a reliable determination of the consensus. In Fig. 2 some baselines were obtained by a procedure devised to determine the mode based on the analysis of mixed populations as detailed in Thompson (2006).

In the case of Na<sub>2</sub>O, there is clearly too large a spread in the data for a value to be assigned. It is possibly because it is at an unusually low concentration for rocks and perhaps calibrations are poorly constrained. Data for S were degraded because some laboratories reported percent levels instead of  $\mu\text{g g}^{-1}$ , as well as SO<sub>3</sub> equivalent concentrations. It is not normal practice for the organisers to amend values unless it is absolutely clear that it can be done with certainty. This is in any case not possible for web submission. Note that participants are instructed to give their results according to the units specified and components listed in the reporting template.

## 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. 1163 results of data quality 1 were submitted.

**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. 1490 results of data quality 2 were submitted. The much larger numbers of quality 2 data submitted in this round suggests that labs may have had less confidence in their ability to determine the composition of this sample than for routine silicate rocks.

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

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

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 standard deviation.

Z-score results are listed in Table 3. 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, especially if it is outside the range  $-3 < z < 3$ , it would be advisable for contributing laboratories to examine their procedures, and if necessary, to take action 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.

### Participation in future rounds

The benefit from proficiency testing arises from regular participation and laboratories are invited to contribute to the GeoPT27 round, the sample for which will be distributed during March 2010.

### Acknowledgements

The authors thank John Watson and Margaret Tindle (OU) for dividing the powder and packeting the samples for distribution and Liz Lomas (OU) for valued assistance in the distribution of samples and the production of this report.

### Reference

Thompson, M. (2006). Using mixture models for bump-hunting in the results of proficiency tests. *Accred. Qual. Assur.*, 10, 501-505.

## 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: 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.

**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 Serpentinite). 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. Batjargal (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.

**GeoPT17**

Potts P.J., Thompson M., Webb, P.C. and J. Nicholas Walsh (2005)  
GeoPT17 - an international proficiency test for analytical geochemistry laboratories - report on round 17 / July 2005 (Calcareous sandstone, OU-8). International Association of Geoanalysts: Unpublished report.

**GeoPT18**

Webb, P.C., Thompson M., Potts P.J. and L. Paul Bedard (2006)  
GeoPT18 - an international proficiency test for analytical geochemistry laboratories - report on round 18 / Jan 2006 (Quartz Diorite, KPT-1). International Association of Geoanalysts: Unpublished report.

**GeoPT19**

Webb, P.C., Thompson M., Potts P.J. and B. Batjargal (2006)  
GeoPT19 - an international proficiency test for analytical geochemistry laboratories - report on round 19 / July 2006 (Gabbro, MGR-N). International Association of Geoanalysts: Unpublished report.

**GeoPT20**

Webb, P.C., Thompson M., Potts P.J. and M. Burnham (2007)  
GeoPT20 - an international proficiency test for analytical geochemistry laboratories - report on round 20 / Jan 2007 (Ultramafic rock, OPY-1). International Association of Geoanalysts: Unpublished report.

**GeoPT21**

Webb, P.C., Thompson M., Potts P.J. and B. Batjargal (2007)  
GeoPT21 - an international proficiency test for analytical geochemistry laboratories - report on round 21 / July 2007 (Granite, MGT-1). International Association of Geoanalysts: Unpublished report.

**GeoPT22**

Webb, P.C., Thompson, M., Potts, P.J. and Batjargal, B. (2008)  
GeoPT22 - an international proficiency test for analytical geochemistry laboratories - report on round 22 / January 2008 (Basalt, MBL-1). International Association of Geoanalysts: Unpublished report.

**GeoPT23**

Webb, P.C., Thompson, M., Potts, P.J., Watson, J.S. and Kriete, C. (2008)  
GeoPT23 - an international proficiency test for analytical geochemistry laboratories - report on round 23 / September 2008 (Separation Lake pegmatite, OU-9) and 23A (Manganese nodule, FeMn-1). International Association of Geoanalysts: Unpublished report.

**GeoPT24**

Webb, P.C., Thompson, M., Potts, P.J. and Watson, J.S. (2009)  
GeoPT24 - an international proficiency test for analytical geochemistry laboratories - report on round 24 / January 2009 (Longmyndian greywacke, OU-10). International Association of Geoanalysts: Unpublished report.

**GeoPT25**

Webb, P.C., Thompson, M., Potts, P.J. and Enzweiler, J. (2009)  
GeoPT25 - an international proficiency test for analytical geochemistry laboratories - report on round 25 / July 2009 (Basalt, HTP-1). International Association of Geoanalysts: Unpublished report.

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Table 1		GeoPT26 Analytical results for Ordinary Portland Cement, OPC-1, submitted Dec. 2009											
Lab identifier		A01	A02	A03	A04	A05	A06	A07	A08	A09	A10	A11	A12
Sample		OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality		2	1	2	1	1	2	1	1	2	2	2	1
SiO2	% m/m		22.44	21.90	22.20		21.6		18.39	20.47	22.2	23.16	22.68
TiO2	% m/m		0.32	0.33	0.34		0.345		0.184	0.34	0.34	0.3	0.243
Al2O3	% m/m		4.59	4.80	4.81		6.97		3.42	4.66	4.68	4.6	4.21
Fe2O3 T	% m/m		3.18	3.21	2.85		3.13		1.93	3.814	3.27	3.11	3.256
Fe(II)O	% m/m								0.2				
MnO	% m/m		0.26	0.41	0.42		0.394		0.23	0.678	0.41	0.41	0.309
MgO	% m/m		2.43	2.65	2.77				1.8	4.53	2.64	2.6	2.405
CaO	% m/m		60.92	63.02	62.46		62.6		68	62.91	63.7	63.16	62.45
Na2O	% m/m		0.55	0.11	0.32				0.08	0.021	0.05	0.12	0.202
K2O	% m/m		0.34	0.36	0.35		0.587		0.32	0.344	0.34	0.37	0.321
P2O5	% m/m		0.06	0.05	0.07				0.05	0.045	0.044	0.052	0.024
H2O+	% m/m												
CO2	% m/m			0.48							0.22		
LOI	% m/m		1.13	0.99	1.14				2.91	1.66	1.09	0.87	1.47
Ag	mg kg <sup>-1</sup>								0.080				
As	mg kg <sup>-1</sup>				5				3.738		2		
Au	mg kg <sup>-1</sup>												
B	mg kg <sup>-1</sup>								2.516				
Ba	mg kg <sup>-1</sup>				530	556.2	570	533	468.884	477.7	482	491.7	
Be	mg kg <sup>-1</sup>							0.89	0.552			0.74	
Bi	mg kg <sup>-1</sup>							0.18	0.137				
Br	mg kg <sup>-1</sup>												
Cd	mg kg <sup>-1</sup>	0.1							0.060			0.08	
Ce	mg kg <sup>-1</sup>	52				47.95	46.8	40.3	46.734	42.2	50	46.7	47.9
Cl	mg kg <sup>-1</sup>												
Co	mg kg <sup>-1</sup>				15	24.40		24.9	20.303	23.4		19.1	
Cr	mg kg <sup>-1</sup>					198.6	234	201	154.167	234	185	104	
Cs	mg kg <sup>-1</sup>	1.1				1.090		0.72	0.930	0.9		0.91	
Cu	mg kg <sup>-1</sup>				32	20.72	50.3	21.9	17.207	27	26	19.3	
Dy	mg kg <sup>-1</sup>	3				3.038		2.37	2.467	2.95		2.85	2.8
Er	mg kg <sup>-1</sup>	1.6				1.567		1.35	1.310	1.43		1.61	1.57
Eu	mg kg <sup>-1</sup>	1				0.941		0.89	0.897	0.96		1.02	1
F	mg kg <sup>-1</sup>										640		
Ga	mg kg <sup>-1</sup>	7.3				7.18	5.6	6.32	5.618	7.2	7	7.1	
Gd	mg kg <sup>-1</sup>	3.3				4.07		3.48	3.103	3.98		4.27	4.07
Ge	mg kg <sup>-1</sup>	0.8						0.62	0.142			0.12	
Hf	mg kg <sup>-1</sup>					2.122		1.5	1.465	2	2.5	2.1	
Hg	mg kg <sup>-1</sup>												
Ho	mg kg <sup>-1</sup>	0.6				0.584		0.49	0.472	0.53		0.56	0.55
I	mg kg <sup>-1</sup>												
In	mg kg <sup>-1</sup>											0.029	
Ir	mg kg <sup>-1</sup>												
La	mg kg <sup>-1</sup>	27				26.52	21.7	23.4	23.015	23.5	70	24.8	24.9
Li	mg kg <sup>-1</sup>							12.9	10.892			11.2	
Lu	mg kg <sup>-1</sup>	0.2				0.193		0.16	0.171	0.2		0.2	0.2
Mo	mg kg <sup>-1</sup>								0.725			0.63	3.89
Nb	mg kg <sup>-1</sup>	5			6	5.22	3.7	4.8	3.632	4.6		4.5	
Nd	mg kg <sup>-1</sup>	26				24.7	22.9	20.9	22.350	25.2	10	23.7	23.1
Ni	mg kg <sup>-1</sup>				99	102.5	78.6	115	70.728	114	26	79.9	
Os	mg kg <sup>-1</sup>												
Pb	mg kg <sup>-1</sup>				7	6.78	14	10.3	6.899	7	9	6.8	
Pd	mg kg <sup>-1</sup>												
Pr	mg kg <sup>-1</sup>	6.6				6.50	5.7	5.3	5.676	6.04	12	6.2	6.04
Pt	mg kg <sup>-1</sup>												
Rb	mg kg <sup>-1</sup>	15			16	15.04	14.5	11.7	13.119	14.1	20	15.8	
Re	mg kg <sup>-1</sup>												
Rh	mg kg <sup>-1</sup>												
Ru	mg kg <sup>-1</sup>												
S	mg kg <sup>-1</sup>		14079		10600				288.336		9800		
Sb	mg kg <sup>-1</sup>							0.17	0.172			0.27	0.28
Sc	mg kg <sup>-1</sup>					8.32		3.79	6.183			5.2	
Se	mg kg <sup>-1</sup>						3		0.684				2.08
Sm	mg kg <sup>-1</sup>	4.8				4.70		3.86	3.972	4.500	3	4.37	4.4
Sn	mg kg <sup>-1</sup>	1							0.697				
Sr	mg kg <sup>-1</sup>				123	125.7	120	114	111.068	141.6	130	119	
Ta	mg kg <sup>-1</sup>	0.4				0.3529		0.41	0.282	0.3		0.3	
Tb	mg kg <sup>-1</sup>	0.5				0.566		0.48	0.409	0.51		0.58	0.53
Te	mg kg <sup>-1</sup>								0.039				
Th	mg kg <sup>-1</sup>	4.2				4.23	5.1	2.72	3.818	3.83		3.93	
Tl	mg kg <sup>-2</sup>							0.035	0.056				0.11
Tm	mg kg <sup>-1</sup>	0.2				0.2337		0.18	0.187	0.2		0.21	0.21
U	mg kg <sup>-1</sup>	0.9				0.831		0.85	0.845	0.81		0.78	
V	mg kg <sup>-1</sup>				64	63.74		73.7	54.245	77	65	60	
W	mg kg <sup>-1</sup>	0.7						1.13	0.570	2			
Y	mg kg <sup>-1</sup>	16			18	18.47	14.2	10.8	12.489	15.3	14	15.1	
Yb	mg kg <sup>-1</sup>	1.4				1.3967		1.11	1.192	1.29		1.38	1.34
Zn	mg kg <sup>-1</sup>				31	20.7	26.1	36.9	22.276	34	26	27	
Zr	mg kg <sup>-1</sup>				92	85.8	76.3	54.3	58.159	84	79	84	

Table 1		GeoPT26 Analytical results for Ordinary Portland Cement, OPC-1, submitted Dec. 2009											
Lab identifier		A12	A13	A14	A14	A15	A16	A17	A18	A19	A20	A21	A22
Sample		OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality		2	1	1	2	1	2	2	2	1	2	1	1
SiO2	% m/m		21.865	21.7			21.343	29.92	21.18	21.43	21.52	21.77	23.38
TiO2	% m/m		0.321	0.33			0.291	0.31	0.33	0.38	0.338	0.33	0.280
Al2O3	% m/m		4.571	4.63			4.508	4.5	4.55	4.8	4.45	4.39	4.410
Fe2O3 T	% m/m		3.193	3.21			3.702	3.21	2.98	3.55	3.24	3.29	2.560
Fe(II)O	% m/m						0.162						
MnO	% m/m		0.414	0.408			0.484	0.4	0.18	0.44	0.416	0.42	
MgO	% m/m		2.602	2.58			2.639	2.44	2.54	2.78	2.41	2.65	
CaO	% m/m		62.655	62.81			62.903	58.21	58.51	62.42	62.73	62.56	64.320
Na2O	% m/m		0.099		0.193		0.135	0.1	0.02	0.12	0.04	0.11	0.12
K2O	% m/m		0.338	0.3			0.281	0.36	0.32	0.36	0.27	0.37	0.34
P2O5	% m/m		0.043	0.047			0.039	0.05	0.03	0.06	0.045	0.054	
H2O+	% m/m												
CO2	% m/m												
LOI	% m/m		1.160	1.6			1.304		1.65	1.98	1.32	1.64	
Ag	mg kg <sup>-1</sup>				18.58								
As	mg kg <sup>-1</sup>	7	7.7	7.4					46		11		
Au	mg kg <sup>-1</sup>												
B	mg kg <sup>-1</sup>								46			10.0	
Ba	mg kg <sup>-1</sup>	518	479.0	511		477	389	508	433		545	543	
Be	mg kg <sup>-1</sup>	0.7	1.05						7			0.82	
Bi	mg kg <sup>-1</sup>												
Br	mg kg <sup>-1</sup>	2.2											
Cd	mg kg <sup>-1</sup>		0.02						8			0.036	
Ce	mg kg <sup>-1</sup>		160.0	41		45.8	29.8	50.4				49.7	
Cl	mg kg <sup>-1</sup>												
Co	mg kg <sup>-1</sup>	23	20.1	21		20.5	20.1	21.5	2		15	22.8	
Cr	mg kg <sup>-1</sup>	229	109.0	203		190	164.5	129	191		196	194	
Cs	mg kg <sup>-1</sup>					0.6		1.01				1.06	
Cu	mg kg <sup>-1</sup>	25	32.4	25		27.8		21.4	15		22	22.1	
Dy	mg kg <sup>-1</sup>					2.6		2.91				2.95	
Er	mg kg <sup>-1</sup>					1.4		1.55				1.50	
Eu	mg kg <sup>-1</sup>					1.00		1.02				1.03	
F	mg kg <sup>-1</sup>				709								
Ga	mg kg <sup>-1</sup>	5.9		6.9		6.9					7	7.00	
Gd	mg kg <sup>-1</sup>					3.6		3.59				3.94	
Ge	mg kg <sup>-1</sup>											0.70	
Hf	mg kg <sup>-1</sup>			5.4		1.9						2.12	
Hg	mg kg <sup>-1</sup>		0.07										
Ho	mg kg <sup>-1</sup>					0.5		0.55				0.56	
I	mg kg <sup>-1</sup>												
In	mg kg <sup>-1</sup>												
Ir	mg kg <sup>-1</sup>												
La	mg kg <sup>-1</sup>			28		24.0	7	26.5				26.4	
Li	mg kg <sup>-1</sup>	15					14.8	13.5	8			14.1	10.0
Lu	mg kg <sup>-1</sup>					0.2		0.2				0.20	
Mo	mg kg <sup>-1</sup>				2.4				3			0.63	
Nb	mg kg <sup>-1</sup>	5.5		5.9		4.7	7.1				6	4.92	
Nd	mg kg <sup>-1</sup>			28		22.4	25	25.4				24.8	
Ni	mg kg <sup>-1</sup>	96	94.7	89		88.1	82	85.1	61		88	95.7	
Os	mg kg <sup>-1</sup>												
Pb	mg kg <sup>-1</sup>	8.7	8.0	5.3			10	7.39	5			7.06	
Pd	mg kg <sup>-1</sup>												
Pr	mg kg <sup>-1</sup>					5.8		6.36				6.50	
Pt	mg kg <sup>-1</sup>												
Rb	mg kg <sup>-1</sup>	14.3	22.4	14		11.9	10.7				13	14.9	9.0
Re	mg kg <sup>-1</sup>												
Rh	mg kg <sup>-1</sup>												
Ru	mg kg <sup>-1</sup>												
S	mg kg <sup>-1</sup>		10043.0	9892			0.752		8880				
Sb	mg kg <sup>-1</sup>												
Sc	mg kg <sup>-1</sup>			3.6			8.8	4.9				6.52	
Se	mg kg <sup>-1</sup>		0.0										
Sm	mg kg <sup>-1</sup>			10		4.000		4.66				4.76	
Sn	mg kg <sup>-1</sup>											1.05	
Sr	mg kg <sup>-1</sup>	110	147.9	115		112	113.5	122	124		107	127	
Ta	mg kg <sup>-1</sup>	5.2		2.3		0.3						0.37	
Tb	mg kg <sup>-1</sup>					0.5		0.5				0.54	
Te	mg kg <sup>-1</sup>												
Th	mg kg <sup>-1</sup>	6.3		4.5		3.5		3.92			11	3.84	
Tl	mg kg <sup>-2</sup>		0.05									0.03	
Tm	mg kg <sup>-1</sup>					0.2		0.21				0.22	
U	mg kg <sup>-1</sup>	1	0.0			0.7		0.85				0.81	
V	mg kg <sup>-1</sup>	70	64.8	75		59.4	45.1	58.2	1		67	69.2	
W	mg kg <sup>-1</sup>											0.60	
Y	mg kg <sup>-1</sup>	15.1		15		13.7	13.8	16	22		17	16.8	
Yb	mg kg <sup>-1</sup>			4.5		1.3		1.37				1.33	
Zn	mg kg <sup>-1</sup>	24.5	30.2	27			37.7	24.6	63		26	24.5	
Zr	mg kg <sup>-1</sup>	78.4		80		74.5	80	65			82	82.9	





Table 1		GeoPT26 Analytical results for Ordinary Portland Cement, OPC-1, submitted Dec. 2009											
Lab identifier		A34	A35	A36	A37	A38	A39	A40	A41	A42	A43	A44	A45
Sample		OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality		2	2	2	1	1	2	2	1	2	2	2	2
SiO2	% m/m	24.55	21.8	21.307	21.47			21.898	21.9	21.7	22.23	21.46	
TiO2	% m/m	0.360	0.327	0.336	0.324			0.324	0.3	0.317	0.314	0.30	0.31
Al2O3	% m/m	5.050	4.57	4.581	4.55			4.608	4.2	4.52	5.06	4.34	
Fe2O3 T	% m/m	3.570	3.15	3.219	3.19			3.248	3.05	3.14	3.01	2.84	3.08
Fe(II)O	% m/m											0.81	
MnO	% m/m	0.450	0.404	0.406	0.400			0.381	0.40	0.411	0.385	0.36	0.37
MgO	% m/m	2.950	2.56	2.629	2.67			2.669	2.55	2.58	2.54	2.30	
CaO	% m/m	62.21	63.0	62.252	62.82			62.094	61.8	63.1	61.19	64.06	63.02
Na2O	% m/m	0.090			0.04			0.082	0.5	0.112	0.08	0.16	
K2O	% m/m	0.380	0.278	0.333	0.34			0.401	0.35	0.342	0.312	0.43	
P2O5	% m/m	0.060	0.040		0.040			0.049	0.05	0.038	0.01	0.06	
H2O+	% m/m												
CO2	% m/m												
LOI	% m/m	0.940	1.06	0.900	1.21			1.061		1.23	1.13	1.24	
Ag	mg kg <sup>-1</sup>												
As	mg kg <sup>-1</sup>	1.10						4.0					
Au	mg kg <sup>-1</sup>												
B	mg kg <sup>-1</sup>										87	14.2	
Ba	mg kg <sup>-1</sup>	575.6	484		438	440	550	438.0	440	473	534	553.9	
Be	mg kg <sup>-1</sup>						0.98						
Bi	mg kg <sup>-1</sup>												
Br	mg kg <sup>-1</sup>												
Cd	mg kg <sup>-1</sup>									0.18			
Ce	mg kg <sup>-1</sup>	52.90	61		48.6	84	50.4	75.3	33	44	56	66.8	
Cl	mg kg <sup>-1</sup>												
Co	mg kg <sup>-1</sup>	23.80	21.0		19	27	23.9		20	14	17	21.4	
Cr	mg kg <sup>-1</sup>	246.9	185		192	206	207	224.0	130	190	173	231.6	
Cs	mg kg <sup>-1</sup>	0.70			1.01		1.05						
Cu	mg kg <sup>-1</sup>		18.7		26	24	22.4	37.3	27	20	24		24
Dy	mg kg <sup>-1</sup>	3.10			2.73		2.99						
Er	mg kg <sup>-1</sup>	1.50			1.45		1.56						
Eu	mg kg <sup>-1</sup>	1.10			0.98		1.05		0.7				
F	mg kg <sup>-1</sup>												
Ga	mg kg <sup>-1</sup>		5.1			6	7.18	7.3			470	14	
Gd	mg kg <sup>-1</sup>	3.80			3.55		4.11		5	2.40			
Ge	mg kg <sup>-1</sup>						0.73			2.58			
Hf	mg kg <sup>-1</sup>	2.30			1.85		2.09			5.22	7		
Hg	mg kg <sup>-1</sup>												
Ho	mg kg <sup>-1</sup>	0.60			0.54		0.6						
I	mg kg <sup>-1</sup>												
In	mg kg <sup>-1</sup>												
Ir	mg kg <sup>-1</sup>												
La	mg kg <sup>-1</sup>	28.10	43		24.1	37	26.6	36.7	22	25	23	23.6	
Li	mg kg <sup>-1</sup>							14.8	7	19	13	22.5	
Lu	mg kg <sup>-1</sup>	0.20			0.18		0.21						
Mo	mg kg <sup>-1</sup>	0.90	1.6		0.40								
Nb	mg kg <sup>-1</sup>	5.50	4.1		4.36	5	4.97				3	5.2	7
Nd	mg kg <sup>-1</sup>	27.00	21		24.7		24.9		18	18	14		
Ni	mg kg <sup>-1</sup>	97.0	84.2		85	129	100	94.3	75	75	92	74.4	
Os	mg kg <sup>-1</sup>												
Pb	mg kg <sup>-1</sup>	7.50			6.12		7.33	12.3		6.85		11.7	
Pd	mg kg <sup>-1</sup>												
Pr	mg kg <sup>-1</sup>	6.90			6.29		6.57			5.40			
Pt	mg kg <sup>-1</sup>												
Rb	mg kg <sup>-1</sup>	14.90	14.3		12.3	28	16.4	15.3	9	28			11
Re	mg kg <sup>-1</sup>												
Rh	mg kg <sup>-1</sup>												
Ru	mg kg <sup>-1</sup>												
S	mg kg <sup>-1</sup>				0.842					10230	12794		
Sb	mg kg <sup>-1</sup>	2.40											
Sc	mg kg <sup>-1</sup>	6.30			4.26		6.98	22.3	4			5.5	
Se	mg kg <sup>-1</sup>												
Sm	mg kg <sup>-1</sup>	4.90			4.50		4.79		5	4.49			
Sn	mg kg <sup>-1</sup>											13.2	
Sr	mg kg <sup>-1</sup>	117.6	109		121	124	126	123.7	100	116	117	120.1	112
Ta	mg kg <sup>-1</sup>	0.40			0.31		0.37						
Tb	mg kg <sup>-1</sup>	0.50			0.50		0.54						
Te	mg kg <sup>-1</sup>												
Th	mg kg <sup>-1</sup>	4.30			3.42		3.84	4.0					
Tl	mg kg <sup>-2</sup>	0.20											
Tm	mg kg <sup>-1</sup>				0.21		0.22						
U	mg kg <sup>-1</sup>	1.10			0.71		0.84						
V	mg kg <sup>-1</sup>	74.9	57.2		64	67	70.3	63.3	40	59	62	61.6	
W	mg kg <sup>-1</sup>	5.7			0.34								
Y	mg kg <sup>-1</sup>	17.2	17.2		14.6	17	17.5	17.3	12	16	14		13
Yb	mg kg <sup>-1</sup>	1.40			1.24		1.41		1.2				
Zn	mg kg <sup>-1</sup>		25.0		32	25	24.5	27.3	28	28	86	20.5	31
Zr	mg kg <sup>-1</sup>	87.9	80.0		84	85	82.7	95.7	240		102		87

Table 1		GeoPT26 Analytical results for Ordinary Portland Cement, OPC-1, submitted Dec. 2009											
Lab identifier		A46	A47	A48	A49	A50	A51	A52	A53	A54	A55	A56	A57
Sample		OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality		1	2	2	1	1	1	1	2	2	2	1	1
SiO2	% m/m	21.7	21.2	21.74	23.74333	21.67747	21.84333	21.92	22.14		21.75	22.989	21.9
TiO2	% m/m	0.31	0.309	0.315	0.332333	0.318685	0.316667	0.332	0.34	0.23	0.33	0.303	0.31
Al2O3	% m/m	4.88	4.37	4.509	4.311333	4.424661	4.46	4.53	4.79		4.48	4.911	4.57
Fe2O3 T	% m/m	3.15	3.01	3.189	2.97	3.05013	3.103333	3.24	3.22	3.33	3.14	2.95	3.22
Fe(II)O	% m/m												
MnO	% m/m	0.37	0.372	0.404	0.399833	0.393096	0.44	0.423	0.41		0.405	0.361	0.41
MgO	% m/m	2.45	2.52	2.549	2.622	2.525598	2.803333	2.58	2.79	2.71	2.63	2.578	2.63
CaO	% m/m	64.55	60.1	64.68	65.32333	62.01523	61.49667	63.43	63.21		63.02	63.042	63
Na2O	% m/m	0.56	0.125	0.116	0.108367	0.104743	0.096667	0.05	0.18		0.13	0.123	0.11
K2O	% m/m	0.29	0.316	0.342	0.336333	0.350583	0.33	0.34	0.35	0.35	0.34	0.361	0.34
P2O5	% m/m	0.032	0.042	0.036	0.03277	0.044607	0.043333	0.047	0.03	0.04		0.047	0.046
H2O+	% m/m				0.5625	0.001	0.87						
CO2	% m/m		0.5		0.539		0.51						
LOI	% m/m	1.12	1.29		0.712	1.18	0.95	1.04		1.59	1.25	1.51	1.11
Ag	mg kg <sup>-1</sup>			0.35	0.230154								
As	mg kg <sup>-1</sup>	2.4						4.66				4.23	
Au	mg kg <sup>-1</sup>												
B	mg kg <sup>-1</sup>												
Ba	mg kg <sup>-1</sup>	535	450	512	545	518.6951	473	493		690	571	526	
Be	mg kg <sup>-1</sup>	0.74		0.66	0.885521								
Bi	mg kg <sup>-1</sup>												
Br	mg kg <sup>-1</sup>												
Cd	mg kg <sup>-1</sup>	0.28			0.110942					20			
Ce	mg kg <sup>-1</sup>		50	48.3	54.81781	48.79776	71	42.94			119	47.03	
Cl	mg kg <sup>-1</sup>		90		190								
Co	mg kg <sup>-1</sup>	24.2		22.7	21.11398			21.5			69.6	20.63	
Cr	mg kg <sup>-1</sup>	235	170		81.63609	187.8958	136	188		120	209	190.7	
Cs	mg kg <sup>-1</sup>				1.190279	0.947633						0.953	
Cu	mg kg <sup>-1</sup>	25.8	20	21.3	21.38352	27.31217	28	22		20	41.5	23.93	
Dy	mg kg <sup>-1</sup>			2.96	3.335489	3.011413		2.793					
Er	mg kg <sup>-1</sup>			1.59	1.801691	1.542741		1.489					
Eu	mg kg <sup>-1</sup>			1	1.045246	1.046973		0.984				0.947	
F	mg kg <sup>-1</sup>		800		1071								
Ga	mg kg <sup>-1</sup>				6.496216	7.2766					16	6.77	
Gd	mg kg <sup>-1</sup>			4.01	4.26886	3.822531		3.631				3.59	
Ge	mg kg <sup>-1</sup>												
Hf	mg kg <sup>-1</sup>	7.18			2.3783	2.109977						2	
Hg	mg kg <sup>-1</sup>												
Ho	mg kg <sup>-1</sup>			0.54	0.648841	0.585824		0.536				0.564	
I	mg kg <sup>-1</sup>												
In	mg kg <sup>-1</sup>												
Ir	mg kg <sup>-1</sup>												
La	mg kg <sup>-1</sup>			25.8	29.21664	26.10548		23.1			68.2	25.4	
Li	mg kg <sup>-1</sup>			12.9	12.53864							13.53	
Lu	mg kg <sup>-1</sup>				0.235225	0.196596		0.192				0.193	
Mo	mg kg <sup>-1</sup>	0.5		0.94	0.844202								
Nb	mg kg <sup>-1</sup>	12.8			4.749475	4.457466	5					6.43	
Nd	mg kg <sup>-1</sup>			24.7	28.53939	24.40827	36	23.6			52	23.87	
Ni	mg kg <sup>-1</sup>	94.1	120	91.7	91.57754	90.11022	106	83		60	112	82.1	
Os	mg kg <sup>-1</sup>												
Pb	mg kg <sup>-1</sup>	2.8		6.95	7.46825	6.949137		3.8			7.1	6.72	
Pd	mg kg <sup>-1</sup>												
Pr	mg kg <sup>-1</sup>			6.2	6.988016	6.279781		6.22				3.93	
Pt	mg kg <sup>-1</sup>												
Rb	mg kg <sup>-1</sup>		20		15.38786	14.33132	19	12.9			26.4	13.23	
Re	mg kg <sup>-1</sup>												
Rh	mg kg <sup>-1</sup>												
Ru	mg kg <sup>-1</sup>												
S	mg kg <sup>-1</sup>	6388	8500		9960		10100	10126				1.043	9720
Sb	mg kg <sup>-1</sup>				0.24953							0.22	
Sc	mg kg <sup>-1</sup>		40		5.286637	5.509693		13				5.09	
Se	mg kg <sup>-1</sup>	0.11											
Sm	mg kg <sup>-1</sup>			4.44	5.100383	4.686411		4.393				4.44	
Sn	mg kg <sup>-1</sup>				1.046653								
Sr	mg kg <sup>-1</sup>	132	120	111	117	121.8859	93	108		120	112	113	
Ta	mg kg <sup>-1</sup>				0.385353	0.339368							
Tb	mg kg <sup>-1</sup>				0.595213	0.551853		0.509				0.496	
Te	mg kg <sup>-1</sup>												
Th	mg kg <sup>-1</sup>		20	3.86	4.618658	3.859604	18	3.77				3.82	
Tl	mg kg <sup>-2</sup>												
Tm	mg kg <sup>-1</sup>				0.249134	0.215949		0.208				0.218	
U	mg kg <sup>-1</sup>		20	0.85	1.001889	0.800391		0.79			5.6	0.819	
V	mg kg <sup>-1</sup>	55.7	80	65.5	56.7	68.77882	15	67			68.1	63.93	
W	mg kg <sup>-1</sup>				0.677786								
Y	mg kg <sup>-1</sup>			14.9	16.3946	16.20683	19	15.52			13.2	19.07	
Yb	mg kg <sup>-1</sup>			1.36	1.624568	1.307708		1.316				1.317	
Zn	mg kg <sup>-1</sup>	20.6	30	25.9	22.19503	24.32179	32	26.5		30	45.2	23.6	
Zr	mg kg <sup>-1</sup>	139	80		90.29326	82.57486	77	75.5		60	81.6	81.3	

Table 1		GeoPT26 Analytical results for Ordinary Portland Cement, OPC-1, submitted Dec. 2009											
Lab identifier		A58	A59	A59	A60	A60	A61	A62	A63	A64	A65	A66	A67
Sample		OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality		2	1	2	1	2	1	1	2	2	2	2	2
SiO2	% m/m	21.542	22.567		21.85		21.92	21.66	21.38	21.9	21.86	21.66	21.613
TiO2	% m/m	0.317	0.327		0.288		0.304	0.31	0.292	0.33	0.33	0.33	0.317
Al2O3	% m/m	4.532	4.572		4.36		4.646	4.55	4.49	4.5	4.55	4.49	4.583
Fe2O3 T	% m/m	3.074	3.57		3.19		3.07	3.61	3.58	3.21	3.18	3.18	3.103
Fe(II)O	% m/m												
MnO	% m/m	0.402	0.425		0.401		0.415	0.41	0.409	0.44	0.32	0.42	0.411
MgO	% m/m	2.485	2.68		2.56		2.536	2.62	2.489	2.6	2.57	2.67	2.583
CaO	% m/m	63.52	62.758		64.43		63.15	62.08	65.14	62.8	62.71	62.57	62.626
Na2O	% m/m	0.102	0.17				0.094	0.11	0.131	0.12	0.09	0.1	
K2O	% m/m	0.312	0.343		0.21		0.342	0.34	0.435	0.33	0.34	0.33	0.337
P2O5	% m/m	0.04	0.051				0.04	0.05	0.065	0.046	0.04	0.04	
H2O+	% m/m												
CO2	% m/m											0.46	
LOI	% m/m	1.164	1.05		1.02		0.92	1.75	1.16	1.06	0.91	1.73	1.307
Ag	mg kg <sup>-1</sup>												
As	mg kg <sup>-1</sup>							3.6	4.577	4.5			
Au	mg kg <sup>-1</sup>												
B	mg kg <sup>-1</sup>												
Ba	mg kg <sup>-1</sup>	506.2		292.1	516.69			536.05	502.2	510		476	504.1
Be	mg kg <sup>-1</sup>				0.93				1.035	0.9		0.785	0.7
Bi	mg kg <sup>-1</sup>							0.29				0.145	
Br	mg kg <sup>-1</sup>												
Cd	mg kg <sup>-1</sup>				0.08			0.06				0.118	
Ce	mg kg <sup>-1</sup>	49.1			49.82			49.04	47.11	48.6		52.73	45.06
Cl	mg kg <sup>-1</sup>												
Co	mg kg <sup>-1</sup>	22.2		12	20.03				21.75	22		22.9	21.38
Cr	mg kg <sup>-1</sup>	207.5	159.8		64.5				242	198		209.82	193.2
Cs	mg kg <sup>-1</sup>	0.9			1			0.99	0.975	0.98		1.059	0.88
Cu	mg kg <sup>-1</sup>	30.1	30.5		20.44				21.17	23		22.49	22.1
Dy	mg kg <sup>-1</sup>	2.7			2.87			2.84	2.801	2.85		3.063	2.7
Er	mg kg <sup>-1</sup>	1.4			1.49			1.5	1.466	1.54		1.639	1.51
Eu	mg kg <sup>-1</sup>	1.1			0.99			0.97	1.035	0.94		1.067	0.98
F	mg kg <sup>-1</sup>											582	
Ga	mg kg <sup>-1</sup>	7.1	7.4		6.26			6.25	7.036	6		6.815	6.66
Gd	mg kg <sup>-1</sup>	3.7			3.74			3.68	3.706	3.85		4.105	3.54
Ge	mg kg <sup>-1</sup>							0.55	0.65	0.2			
Hf	mg kg <sup>-1</sup>	2.5			2.21			2.09	1.966	2.2		2.255	1.91
Hg	mg kg <sup>-1</sup>												
Ho	mg kg <sup>-1</sup>	0.57			0.55			0.54	0.533	0.55		0.599	0.53
I	mg kg <sup>-1</sup>												
In	mg kg <sup>-1</sup>									0.02		0.03	
Ir	mg kg <sup>-1</sup>												
La	mg kg <sup>-1</sup>	26.1			27			25.65	25.68	25.6		28.03	23
Li	mg kg <sup>-1</sup>				13.6					16		13.359	
Lu	mg kg <sup>-1</sup>	0.19			0.19			0.18	0.198	0.19		0.213	0.19
Mo	mg kg <sup>-1</sup>	0.62			0.53			0.6	0.77			0.941	
Nb	mg kg <sup>-1</sup>	4.3	5.9		4.6			4.7	3.992	4.3		4.738	3.95
Nd	mg kg <sup>-1</sup>	24.65			23.76			24.24	23.84	24.1		26.339	23.57
Ni	mg kg <sup>-1</sup>	77.2	86		87.96				80.86	83		100.91	91.5
Os	mg kg <sup>-1</sup>												
Pb	mg kg <sup>-1</sup>		16.6		7.19			7.5	4.107	7		7.408	6.71
Pd	mg kg <sup>-1</sup>												
Pr	mg kg <sup>-1</sup>	6.1			6.04			6.2	6.055	6.1		6.735	5.85
Pt	mg kg <sup>-1</sup>												
Rb	mg kg <sup>-1</sup>	14.5	15.9		18.07			14.8	13.96	14.9		15.82	13.44
Re	mg kg <sup>-1</sup>												
Rh	mg kg <sup>-1</sup>												
Ru	mg kg <sup>-1</sup>												
S	mg kg <sup>-1</sup>	23620		11685.8		6127	10127	10060	435.3	10700			
Sb	mg kg <sup>-1</sup>				0.21				0.262	0.24		0.247	
Sc	mg kg <sup>-1</sup>	4.9	26.9		5.74			6.1	5.631	12		21.932	4.9
Se	mg kg <sup>-1</sup>												
Sm	mg kg <sup>-1</sup>	4.5			4.53			4.67	4.345	4.38		4.955	4.3
Sn	mg kg <sup>-1</sup>				1.38			0.65	1.05	1		1.178	
Sr	mg kg <sup>-1</sup>	120.1	121.1		109.9			127.2	116.9	130		125.297	104.1
Ta	mg kg <sup>-1</sup>	0.3			0.35			0.31	0.228	0.3		0.242	
Tb	mg kg <sup>-1</sup>				0.52			0.47	0.533	0.5		0.546	0.49
Te	mg kg <sup>-1</sup>												
Th	mg kg <sup>-1</sup>	3.9		6.6	4.08			3.68	3.458	3.9		4.07	3.54
Tl	mg kg <sup>-2</sup>											0.03	
Tm	mg kg <sup>-1</sup>				0.22				0.204	0.21		0.231	0.21
U	mg kg <sup>-1</sup>	0.8			0.84			0.8	0.841	0.82		0.87	0.73
V	mg kg <sup>-1</sup>	64.2		54.7	57.9				65.72	65		70.854	58.3
W	mg kg <sup>-1</sup>				0.58				0.723	0.6		0.8	
Y	mg kg <sup>-1</sup>	16.4	18.1		15.17			17.85	15.79	16		17.181	18
Yb	mg kg <sup>-1</sup>	1.2			1.32			1.34	1.375	1.4		1.56	1.3
Zn	mg kg <sup>-1</sup>	57.8	26.1		24.61				29.91	28		29.054	26.4
Zr	mg kg <sup>-1</sup>	78.5	88.7		80.03			81.65	72.02	93		87.02	80.8

Table 1		GeoPT26 Analytical results for Ordinary Portland Cement, OPC-1, submitted Dec. 2009											
Lab identifier		A68	A69	A70	A70	A71	A72	A73	A74	A75	A76	A77	A78
Sample		OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality		2	2	1	2	2	2	2	2	2	1	2	1
SiO2	% m/m	22.81	22.151		25.35	21.56	21.87	22.3	21.713	21.77			21.74
TiO2	% m/m	0.23	0.329		0.32	0.31	0.311	0.32	0.312	0.328	0.384		0.31
Al2O3	% m/m	4.57	4.531		3.89	4.29	4.56	4.55	4.469	4.63	4.38		4.49
Fe2O3 T	% m/m	3.26	3.388		3.19	3.24	3.22	3.12	3.231	3.16	3.2		3.19
Fe(II)O	% m/m												
MnO	% m/m	0.41	0.421		0.394	0.38	0.421	0.4	0.398	0.387	0.393		0.400
MgO	% m/m	2.66	2.58		2.89	2.52	2.67	2.5	2.481	2.38	2.24		2.54
CaO	% m/m	64.47	63.515		60.3	63.22	63.05	65.6	63.349	63.22	61.98		62.64
Na2O	% m/m	0.112				0.11	0.06	0.1	0.109	0.1	0.109		0.1
K2O	% m/m	0.28	0.249		0.37	0.36	0.349	0.37	0.337	0.36	0.361		0.35
P2O5	% m/m	0.05	0.0348		0.044	0.04		0.046	0.044	0.04			0.03
H2O+	% m/m							0.8					
CO2	% m/m		0.526					0.29		0.495		0.528	
LOI	% m/m	1.17	0.9			1.7	1.08		1.06	1.02		1.294	
Ag	mg kg <sup>-1</sup>							0.05					0
As	mg kg <sup>-1</sup>							4.6			4.87		4
Au	mg kg <sup>-1</sup>												
B	mg kg <sup>-1</sup>									12			
Ba	mg kg <sup>-1</sup>	506		534.7		262	220	532	246	514	526	485.3	489
Be	mg kg <sup>-1</sup>							0.7		0.82			
Bi	mg kg <sup>-1</sup>												1
Br	mg kg <sup>-1</sup>										0.51		0
Cd	mg kg <sup>-1</sup>							0.11					6
Ce	mg kg <sup>-1</sup>			48.053				47.5		46	48.9		107
Cl	mg kg <sup>-1</sup>				171			80				97.5	56
Co	mg kg <sup>-1</sup>	20				13		22.3	22	19	21.4		18
Cr	mg kg <sup>-1</sup>	187			218	94	89	210	84	198	212	134.5	177
Cs	mg kg <sup>-1</sup>							1.1			0.93		7
Cu	mg kg <sup>-1</sup>	25				20	28	22.3	9			18.1	25
Dy	mg kg <sup>-1</sup>			2.863				2.73			2.9		
Er	mg kg <sup>-1</sup>			1.561				1.51					
Eu	mg kg <sup>-1</sup>			0.867				0.91			1.07		
F	mg kg <sup>-1</sup>	584						590				1276.3	
Ga	mg kg <sup>-1</sup>					11		7.5		6	7.7		7
Gd	mg kg <sup>-1</sup>			3.684				3.72					
Ge	mg kg <sup>-1</sup>												0
Hf	mg kg <sup>-1</sup>			2.045				2			2.33		0
Hg	mg kg <sup>-1</sup>												
Ho	mg kg <sup>-1</sup>			0.551				0.56					
I	mg kg <sup>-1</sup>												0
In	mg kg <sup>-1</sup>												
Ir	mg kg <sup>-1</sup>												
La	mg kg <sup>-1</sup>			25.955		9		26.7		25	26.5		38
Li	mg kg <sup>-1</sup>							15					
Lu	mg kg <sup>-1</sup>			0.188				0.2			0.187		
Mo	mg kg <sup>-1</sup>							0.91					2
Nb	mg kg <sup>-1</sup>	5		6.098		10		5	4	7			5
Nd	mg kg <sup>-1</sup>	36		25.182				25.6		26.2	26		28
Ni	mg kg <sup>-1</sup>	90				62	65	84	50	82	110	52.7	76
Os	mg kg <sup>-1</sup>												
Pb	mg kg <sup>-1</sup>	9				4	4	7.4	4	11			10
Pd	mg kg <sup>-1</sup>												
Pr	mg kg <sup>-1</sup>			6.211				6.27					
Pt	mg kg <sup>-1</sup>												
Rb	mg kg <sup>-1</sup>	14				15		15.5	11	17	15.4		14
Re	mg kg <sup>-1</sup>												
Rh	mg kg <sup>-1</sup>												
Ru	mg kg <sup>-1</sup>												
S	mg kg <sup>-1</sup>		15333		23386	10280	1035	1.02		2.39		10585	4926
Sb	mg kg <sup>-1</sup>							0.27			0.3		0
Sc	mg kg <sup>-1</sup>				23			5.1		4.1	5.51		0
Se	mg kg <sup>-1</sup>												0.000
Sm	mg kg <sup>-1</sup>			4.045				4.5			4.56		7.000
Sn	mg kg <sup>-1</sup>							0.7					0
Sr	mg kg <sup>-1</sup>	114			118.1	119	85	110	100	123	122		114
Ta	mg kg <sup>-1</sup>			0.401							0.41		0
Tb	mg kg <sup>-1</sup>			0.521				0.54			0.52		
Te	mg kg <sup>-1</sup>							0.29					0
Th	mg kg <sup>-1</sup>	7		4.042		17	6	4.2			3.91		5
Tl	mg kg <sup>-2</sup>												0
Tm	mg kg <sup>-1</sup>			0.201				0.23					
U	mg kg <sup>-1</sup>					18		0.76			0.77		0
V	mg kg <sup>-1</sup>	58			66	36		68	38	58	67	48.8	51
W	mg kg <sup>-1</sup>										0.91		1
Y	mg kg <sup>-1</sup>	15		14.432		9		16.6	8	19			15
Yb	mg kg <sup>-1</sup>			1.363				1.4			1.28		0
Zn	mg kg <sup>-1</sup>	26				29	35	28	13	26	27	20.7	29
Zr	mg kg <sup>-1</sup>	82		92.891		69		76.9	44	88	105	11.3	86
Revised values for CO <sub>2</sub> and Co													

<b>Table 1</b>		<b>GeoPT26 Analytical results for Ordinary Portlan</b>					
Lab identifier		A78	A79	A80	A81	A82	A83**
Sample		OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality		2	1	2	2	2	2
SiO2	% m/m			21.88		23.21	21.63
TiO2	% m/m		0.32	0.32		0.304	0.34
Al2O3	% m/m		4.78	4.53		4.61	4.52
Fe2O3 T	% m/m		3.16	3.19		3.42	3.29
Fe(II)O	% m/m						
MnO	% m/m		0.43	0.419		0.376	0.44
MgO	% m/m		2.6	2.57		2.51	2.63
CaO	% m/m		64.7	62.7		61.78	63.38
Na2O	% m/m		0.11	0.07		0.182	0.08
K2O	% m/m		0.33	0.27		0.337	0.282
P2O5	% m/m			0.04		0.039	0.046
H2O+	% m/m					0.01	
CO2	% m/m					1.29	
LOI	% m/m	1.26		1.08		0.04	1.22
Ag	mg kg <sup>-1</sup>			0.71		0.33	0.02
As	mg kg <sup>-1</sup>		4.4	4.55		4.3	5.2
Au	mg kg <sup>-1</sup>		0.019			0.0092	
B	mg kg <sup>-1</sup>					34.5	
Ba	mg kg <sup>-1</sup>		518	546.8		546	577
Be	mg kg <sup>-1</sup>			0.76		0.583	0.71
Bi	mg kg <sup>-1</sup>					0.84	0.14
Br	mg kg <sup>-1</sup>			2		12.8	
Cd	mg kg <sup>-1</sup>			0.12		0.0225	
Ce	mg kg <sup>-1</sup>		48.6	51.65		38.5	65
Cl	mg kg <sup>-1</sup>					198	
Co	mg kg <sup>-1</sup>		20.4	24	13.5	15.9	24
Cr	mg kg <sup>-1</sup>		194	198		170	204
Cs	mg kg <sup>-1</sup>		1	0.93		1.1	1.0
Cu	mg kg <sup>-1</sup>		93	19	5.27	15.9	21.1
Dy	mg kg <sup>-1</sup>		2.4	3.056		1.95	3.0
Er	mg kg <sup>-1</sup>			1.618		1.41	1.6
Eu	mg kg <sup>-1</sup>		0.98	1.036		0.49	1.1
F	mg kg <sup>-1</sup>			550			
Ga	mg kg <sup>-1</sup>			6		5.51	7.2
Gd	mg kg <sup>-1</sup>			3.75		3.49	4.2
Ge	mg kg <sup>-1</sup>					0.35	
Hf	mg kg <sup>-1</sup>		2.16	2.252		3.48	2.3
Hg	mg kg <sup>-1</sup>					0.009	0.0022
Ho	mg kg <sup>-1</sup>		0.48	0.576		0.22	0.57
I	mg kg <sup>-1</sup>					0.11	
In	mg kg <sup>-1</sup>					0.021	
Ir	mg kg <sup>-1</sup>					0.00001	
La	mg kg <sup>-1</sup>		25.9	27.76		19.5	33
Li	mg kg <sup>-1</sup>			11.67		21.3	10.8
Lu	mg kg <sup>-1</sup>		0.20	0.186		0.64	0.21
Mo	mg kg <sup>-1</sup>			0.44		0.83	0.56
Nb	mg kg <sup>-1</sup>			4.681		5.9	4.7
Nd	mg kg <sup>-1</sup>		22	25.45		19.1	25.3
Ni	mg kg <sup>-1</sup>		85	86	42	68	89
Os	mg kg <sup>-1</sup>					0.000001	
Pb	mg kg <sup>-1</sup>			7.534		0.98	7.6
Pd	mg kg <sup>-1</sup>					0.0003	
Pr	mg kg <sup>-1</sup>			6.51		0.37	6.5
Pt	mg kg <sup>-1</sup>					0.0031	
Rb	mg kg <sup>-1</sup>		14.7	14		11.3	20
Re	mg kg <sup>-1</sup>					0.0005	
Rh	mg kg <sup>-1</sup>					0.00001	
Ru	mg kg <sup>-1</sup>					0.000001	
S	mg kg <sup>-1</sup>			10100		11080	
Sb	mg kg <sup>-1</sup>		0.22	0.28		0.18	0.20
Sc	mg kg <sup>-1</sup>		5.3			3.46	5.4
Se	mg kg <sup>-1</sup>			0.23		1.02	0.14
Sm	mg kg <sup>-1</sup>		4.34	4.573		1.8	4.7
Sn	mg kg <sup>-1</sup>			1.24		0.85	0.99
Sr	mg kg <sup>-1</sup>			115		118	118
Ta	mg kg <sup>-1</sup>		0.06	0.328		1.18	0.39
Tb	mg kg <sup>-1</sup>			0.523		0.36	0.55
Te	mg kg <sup>-1</sup>					0.033	
Th	mg kg <sup>-1</sup>		3.8	3.798		5.78	4.6
Tl	mg kg <sup>-2</sup>			0.035		0.001	0.04
Tm	mg kg <sup>-1</sup>			0.226		0.088	0.22
U	mg kg <sup>-1</sup>		0.8	0.846		0.55	0.88
V	mg kg <sup>-1</sup>		76	62		42.4	69
W	mg kg <sup>-1</sup>		0.6	0.71		0.65	0.60
Y	mg kg <sup>-1</sup>			15		10.5	22
Yb	mg kg <sup>-1</sup>		1.39	1.418		1.05	1.44
Zn	mg kg <sup>-1</sup>		32	27	5.63	30.8	26
Zr	mg kg <sup>-1</sup>			79		74.9	87

\*\*Additional data omitted from evaluation in error

**Table 2 GeoPT26 Assigned values and statistical summary for contributed data (Ordinary Portland Cement OPC-1)**

	Assigned value	Uncertainty of assigned	Horwitz Target value	Uncertainty y/Target	Number of reported results	Robust mean of results	Median of results	Status	Type of assigned value
	$X_a$	sdm	$H_a$	sdm/ $H_a$	n	% m/m	% m/m		
	% m/m	% m/m	% m/m						
SiO2	21.85	0.052	0.275	0.190	68	21.93	21.85	Assigned	Median
TiO2	0.318	0.002	0.008	0.303	74	0.318	0.3193	Assigned	Robust Mean
Al2O3	4.55	0.021	0.072	0.283	71	4.55	4.55	Assigned	Robust Mean
Fe2O3 T	3.19	0.012	0.054	0.219	74	3.18	3.19	Assigned	Median
MnO	0.404	0.003	0.009	0.325	72	0.404	0.4045	Assigned	Robust Mean
MgO	2.58	0.011	0.045	0.236	71	2.58	2.58	Assigned	Median
CaO	62.9	0.126	0.674	0.186	73	62.9	62.82	Assigned	Robust Mean
K2O	0.344	0.003	0.008	0.381	73	0.344	0.342	Assigned	Robust Mean
P2O5	0.044	0.001	0.001	0.736	62	0.044	0.044	Provisional	Robust Mean
	mg/kg	mg/kg	mg/kg			mg/kg	mg/kg		
As	4.6	0.183	0.291	0.631	26	4.8	4.5635	Provisional	Median
Ba	512	6.023	16.002	0.376	68	506	511.5	Assigned	Median
Be	0.82	0.036	0.068	0.537	24	0.84	0.82	Provisional	Median
Ce	48.9	0.580	2.178	0.266	55	49.5	48.9	Assigned	Median
Co	21.4	0.324	1.079	0.300	55	20.9	21.38	Assigned	Median
Cs	1.00	0.019	0.080	0.237	32	1.00	1	Assigned	Robust Mean
Cu	23.7	0.614	1.179	0.521	62	23.7	23.615	Provisional	Robust Mean
Dy	2.87	0.031	0.196	0.160	34	2.87	2.87	Assigned	Robust Mean
Er	1.52	0.015	0.114	0.131	32	1.52	1.54	Assigned	Robust Mean
Eu	1.00	0.012	0.080	0.149	36	1.00	1	Assigned	Robust Mean
Ga	7	0.111	0.418	0.267	45	6.9	7	Assigned	Median
Gd	3.75	0.050	0.246	0.204	35	3.81	3.75	Assigned	Median
Hf	2.12	0.039	0.151	0.255	35	2.16	2.12	Assigned	Median
Ho	0.55	0.006	0.049	0.133	34	0.55	0.5505	Assigned	Robust Mean
La	25.9	0.383	1.271	0.302	54	25.7	25.9275	Assigned	Median
Li	13.1	0.553	0.714	0.775	27	13.1	13.359	Provisional	Robust Mean
Lu	0.20	0.002	0.020	0.096	34	0.20	0.199	Assigned	Robust Mean
Nb	4.9	0.137	0.311	0.440	51	4.9	4.92	Assigned	Robust Mean
Nd	24.7	0.254	1.219	0.209	49	24.4	24.7	Assigned	Median
Ni	87.0	1.888	3.552	0.531	67	87.0	87.96	Provisional	Robust Mean
Pb	7.2	0.301	0.426	0.707	52	7.2	7.145	Provisional	Robust Mean
Pr	6.2	0.075	0.378	0.199	36	6.2	6.2155	Assigned	Robust Mean
Rb	14.7	0.298	0.783	0.381	59	14.7	14.7	Assigned	Robust Mean
Sb	0.26	0.012	0.025	0.472	20	0.25	0.2558	Assigned	Median
Sm	4.5	0.053	0.289	0.185	40	4.5	4.515	Assigned	Robust Mean
Sr	118.2	1.051	4.610	0.228	66	118.2	118.55	Assigned	Robust Mean
Ta	0.35	0.016	0.033	0.480	30	0.35	0.3515	Provisional	Robust Mean
Tb	0.52	0.006	0.046	0.127	32	0.52	0.52	Assigned	Robust Mean
Th	3.93	0.064	0.256	0.248	49	4.25	3.93	Assigned	Median
Tm	0.21	0.003	0.022	0.118	29	0.21	0.21	Assigned	Robust Mean
U	0.83	0.014	0.068	0.208	39	0.83	0.831	Assigned	Robust Mean
V	64.0	1.066	2.736	0.389	64	62.6	63.965	Provisional	Median
W	0.7	0.034	0.059	0.576	19	0.75	0.7	Provisional	Median
Y	15.5	0.295	0.822	0.359	58	15.5	15.56	Assigned	Robust Mean
Yb	1.34	0.015	0.103	0.147	39	1.34	1.36	Assigned	Robust Mean
Zn	27.8	0.603	1.349	0.447	66	27.8	27.65	Provisional	Robust Mean
Zr	81.2	1.170	3.352	0.349	62	81.2	81.45	Assigned	Robust Mean

Table 3	GeoPT26 Z-scores for Ordinary Portland cement, OPC-1 (December 2009)																		
Lab identifier	A01	A02	A03	A04	A05	A06	A07	A08	A09	A10	A11	A12	A12	A13	A14	A15	A16	A17	A18
Sample	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality	2	1	2	1	1	2	1	1	2	2	2	1	2	1	1	1	2	2	2
SiO2	*	2.15	0.09	1.27	*	-0.46	*	-12.60	-2.51	0.64	2.38	3.02	*	0.05	-0.55	*	-0.92	14.69	-1.22
TiO2	*	0.31	0.82	2.96	*	1.81	*	-17.70	1.48	1.48	-1.17	-9.89	*	0.45	1.64	*	-1.76	-0.51	0.82
Al2O3	*	0.57	1.73	3.60	*	16.71	*	-15.59	0.77	0.90	0.35	-4.68	*	0.30	1.12	*	-0.28	-0.34	0.01
Fe2O3 T	*	-0.19	0.19	-6.35	*	-0.56	*	-23.52	5.82	0.75	-0.75	1.23	*	0.06	0.37	*	4.78	0.19	-1.96
MnO	*	-15.53	0.34	1.76	*	-0.52	*	-18.77	14.82	0.34	0.34	-10.23	*	1.11	0.46	*	4.34	-0.20	-12.09
MgO	*	-3.35	0.78	4.25	*	*	*	-17.44	21.79	0.67	0.22	-3.91	*	0.49	0.00	*	0.66	-1.56	-0.45
CaO	*	-2.91	0.10	-0.63	*	-0.21	*	7.59	0.02	0.60	0.20	-0.64	*	-0.34	-0.11	*	0.01	-3.47	-3.24
K2O	*	-0.45	1.01	0.78	*	15.07	*	-2.93	0.02	-0.23	1.63	-2.81	*	-0.70	-5.41	*	-3.88	1.01	-1.47
P2O5	*	11.34	2.12	18.44	*	*	*	4.25	0.35	-0.01	2.83	-14.21	*	-0.72	2.12	*	-1.78	2.12	-4.98
As	*	*	*	1.50	*	*	*	-2.84	*	-4.41	*	*	4.19	10.80	9.77	*	*	*	71.33
Ba	*	*	*	1.16	2.79	1.83	1.34	-2.66	-1.06	-0.92	-0.62	*	0.20	-2.03	-0.03	-2.16	-3.83	-0.11	-2.45
Be	*	*	*	*	*	*	1.04	-3.97	*	*	-0.59	*	-0.89	3.40	*	*	*	*	45.73
Ce	0.71	*	*	*	-0.44	-0.48	-3.95	-0.99	-1.54	0.25	-0.51	-0.46	*	51.01	-3.63	-1.42	-4.38	0.34	*
Co	*	*	*	-5.92	2.80	*	3.26	-1.00	0.94	*	-1.06	*	0.75	-1.19	-0.35	-0.82	-0.59	0.06	-8.98
Cs	0.62	*	*	*	1.12	*	-3.50	-0.88	-0.63	*	-0.56	*	*	*	*	-5.00	*	0.06	*
Cu	*	*	*	7.01	-2.56	11.27	-1.56	-5.54	1.38	0.96	-1.88	*	0.54	7.35	1.07	3.45	*	-0.99	-3.71
Dy	0.34	*	*	*	0.88	*	-2.54	-2.04	0.21	*	-0.04	-0.34	*	*	*	-1.36	*	0.11	*
Er	0.34	*	*	*	0.39	*	-1.51	-1.86	-0.41	*	0.38	0.41	*	*	*	-1.08	*	0.12	*
Eu	0.01	*	*	*	-0.71	*	-1.35	-1.26	-0.24	*	0.14	0.03	*	*	*	0.03	*	0.14	*
Ga	0.36	*	*	*	0.43	-1.68	-1.63	-3.31	0.24	0.00	0.12	*	-1.32	*	-0.24	-0.24	*	*	*
Gd	-0.92	*	*	*	1.30	*	-1.10	-2.63	0.47	*	1.06	1.30	*	*	*	-0.61	*	-0.33	*
Hf	*	*	*	*	0.01	*	-4.09	-4.33	-0.40	1.25	-0.07	*	*	*	21.66	-1.45	*	*	*
Ho	0.47	*	*	*	0.61	*	-1.33	-1.70	-0.25	*	0.06	-0.09	*	*	*	-1.13	*	-0.05	*
La	0.42	*	*	*	0.47	-1.66	-1.99	-2.29	-0.96	17.34	-0.44	-0.81	*	*	1.63	-1.52	-7.45	0.23	*
Li	*	*	*	*	*	*	-0.34	-3.16	*	*	-1.36	*	1.30	*	*	*	1.16	0.25	-3.61
Lu	0.09	*	*	*	-0.17	*	-1.81	-1.26	0.09	*	0.09	0.18	*	*	*	0.18	*	0.09	*
Nb	0.08	*	*	3.38	0.88	-2.00	-0.47	-4.23	-0.56	*	-0.72	*	0.89	*	3.06	-0.79	3.46	*	*
Nd	0.53	*	*	*	0.00	-0.74	-3.12	-1.93	0.21	-6.03	-0.41	-1.31	*	*	2.71	-1.89	0.12	0.29	*
Ni	*	*	*	3.39	4.37	-1.18	7.89	-4.57	3.80	-8.58	-1.00	*	1.27	2.18	0.57	0.32	-0.70	-0.26	-3.66
Pb	*	*	*	-0.39	-0.91	8.02	7.35	-0.63	-0.20	2.15	-0.43	*	1.80	1.95	-4.38	*	3.32	0.26	-2.54
Pr	0.50	*	*	*	0.73	-0.69	-2.44	-1.45	-0.24	7.64	-0.03	-0.49	*	*	*	-1.12	*	0.18	*
Rb	0.21	*	*	1.70	0.48	-0.11	-3.79	-1.98	-0.36	3.41	0.72	*	-0.23	9.88	-0.85	-3.53	-2.53	*	*
Sb	*	*	*	*	*	*	-3.41	-3.34	*	*	0.28	0.96	*	*	*	*	*	*	*
Sm	0.45	*	*	*	0.55	*	-2.35	-1.97	-0.07	-2.66	-0.30	-0.49	*	*	18.88	-1.87	*	0.21	*
Sr	*	*	*	1.04	1.63	0.20	-0.91	-1.55	2.54	1.28	0.09	*	-0.89	6.44	-0.69	-1.34	-0.51	0.41	0.63
Ta	0.75	*	*	*	0.07	*	1.80	-2.09	-0.77	*	-0.77	*	73.82	*	59.35	-1.54	*	*	*
Tb	-0.21	*	*	*	1.02	*	-0.86	-2.41	-0.10	*	0.66	0.23	*	*	*	-0.42	*	-0.21	*
Th	0.53	*	*	*	1.17	2.29	-4.73	-0.44	-0.20	*	0.00	*	4.63	*	2.23	-1.68	*	-0.02	*
Tm	-0.30	*	*	*	0.98	*	-1.52	-1.20	-0.30	*	-0.06	-0.13	*	*	*	-0.59	*	-0.06	*
U	0.51	*	*	*	0.01	*	0.29	0.22	-0.15	*	-0.37	*	1.25	-12.16	*	-1.91	*	0.15	*
V	*	*	*	-0.54	-0.63	*	2.93	-4.03	2.06	-0.09	-0.99	*	0.80	-0.25	3.40	-2.19	-3.66	-1.31	-11.55
W	0.00	*	*	*	*	*	7.28	-2.20	11.00	*	*	*	*	*	*	*	*	*	*
Y	0.28	*	*	3.00	3.57	-0.81	-5.76	-3.70	-0.14	-0.93	-0.26	*	-0.26	*	-0.65	-2.23	-1.05	0.28	3.93
Yb	0.27	*	*	*	0.51	*	-2.28	-1.48	-0.26	*	0.17	-0.04	*	*	30.69	-0.43	*	0.13	*
Zn	*	*	*	2.35	-5.28	-0.64	6.72	-4.12	2.29	-0.68	-0.31	*	-1.23	1.76	-0.62	*	3.66	-1.20	13.03
Zr	*	*	*	3.21	1.36	-0.74	-8.03	-6.88	0.41	-0.33	0.41	*	-0.42	*	-0.37	-2.01	-0.18	-2.42	*



Table 3 GeoPT26 Z-scores for Ordinary Portland cement, OPC-1 (December 2009)																			
Lab identifier	A19	A20	A21	A22	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36
Sample	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality	1	2	1	1	2	2	1	1	2	1	2	2	1	1	2	2	2	2	2
SiO2	-1.53	-0.60	-0.29	5.57	*	-0.50	0.00	2.18	0.49	*	-0.38	1.00	-1.53	10.37	*	-0.16	4.91	-0.09	-0.99
TiO2	8.26	1.35	1.64	-4.99	*	-6.86	1.90	-1.01	-1.83	2.96	0.62	3.47	-0.35	-23.40	-1.63	0.82	2.81	0.62	1.22
Al2O3	3.46	-0.68	-2.20	-1.92	*	3.18	-0.82	-1.23	0.70	-2.75	-0.41	0.83	3.46	-5.92	*	0.01	3.46	0.14	0.22
Fe2O3 T	6.72	0.47	1.87	-11.76	*	0.03	-1.12	-0.75	2.15	-17.36	-1.49	4.01	0.56	-35.65	-2.33	-0.19	3.55	-0.37	0.27
MnO	3.92	0.66	1.76	*	*	1.04	0.68	-1.48	3.31	5.00	0.02	2.50	-0.62	-25.90	-1.34	-0.20	2.50	0.02	0.12
MgO	4.47	-1.90	1.56	*	-0.56	0.35	0.67	-1.79	-1.45	-2.46	-0.56	3.35	-0.22	-23.92	*	0.34	4.14	-0.22	0.55
CaO	-0.69	-0.11	-0.48	2.13	*	1.71	-0.21	0.56	-0.42	0.17	-0.57	1.38	-0.87	-1.76	-2.74	0.02	-0.50	0.09	-0.47
K2O	2.02	-4.56	3.26	-0.45	*	2.56	0.78	-0.45	8.45	0.78	-0.60	1.63	3.26	0.78	9.06	1.01	2.25	-4.07	-0.66
P2O5	11.34	0.35	7.09	*	*	-0.01	-1.43	-0.72	16.32	*	-0.72	2.12	-7.11	-2.85	*	2.12	5.67	-1.43	*
As	*	11.08	*	*	*	*	7.36	2.40	-1.31	*	*	*	*	*	0.06	*	-5.96	*	*
Ba	*	1.05	1.97	*	1.52	*	1.22	3.22	0.64	3.19	-0.02	1.52	3.84	-10.53	-3.83	*	2.00	-0.86	*
Be	*	*	0.00	*	1.18	*	*	*	-0.52	*	*	1.26	11.54	*	*	*	*	*	*
Ce	*	*	0.37	*	-5.95	*	4.22	1.33	0.28	0.41	-0.90	0.51	*	*	*	*	0.92	2.78	*
Co	*	-2.96	1.32	*	3.07	*	2.99	1.50	0.24	*	-0.18	1.91	0.67	*	*	*	1.12	-0.18	*
Cs	*	*	0.75	*	*	*	*	0.50	0.56	1.25	*	0.81	*	*	*	*	-1.88	*	*
Cu	*	-0.74	-1.39	*	0.96	*	1.67	1.33	-0.18	*	0.96	-1.03	5.48	-15.22	1.38	*	*	-2.14	*
Dy	*	*	0.43	*	*	*	*	0.53	0.37	0.94	*	0.01	*	*	*	*	0.60	*	*
Er	*	*	-0.20	*	*	*	*	0.15	0.16	0.67	*	0.29	*	*	*	*	-0.10	*	*
Eu	*	*	0.40	*	*	*	*	0.78	0.64	0.65	*	0.33	*	*	*	*	0.64	*	*
Ga	*	0.00	0.00	*	-6.34	*	5.75	1.29	0.36	0.72	27.53	1.21	*	-12.93	*	*	*	-2.27	*
Gd	*	*	0.77	*	*	*	*	0.33	2.54	2.24	*	0.41	*	*	*	*	0.10	*	*
Hf	*	*	0.00	*	*	*	*	0.66	*	-0.13	*	-5.18	*	*	*	*	0.59	*	*
Ho	*	*	0.11	*	*	*	*	-0.03	0.26	-0.09	*	0.57	*	*	*	*	0.47	*	*
La	*	*	0.37	*	-5.09	*	3.28	1.47	0.26	0.06	-1.15	0.38	*	-10.73	*	*	0.85	6.72	*
Li	*	*	1.34	-4.41	*	*	*	-5.11	-0.38	*	*	1.09	-5.39	*	*	*	*	*	*
Lu	*	*	0.18	*	*	*	*	0.83	0.34	0.18	*	-0.16	*	*	*	*	0.09	*	*
Nb	*	1.69	-0.09	*	*	*	-2.08	-1.28	*	-3.08	*	0.21	1.78	-9.80	-2.49	*	0.89	-1.36	*
Nd	*	*	0.08	*	*	*	-3.44	0.98	0.49	0.04	*	0.21	*	*	*	*	0.94	-1.52	*
Ni	*	0.14	2.46	*	-0.98	*	1.78	3.67	1.69	2.54	0.71	2.68	-1.26	-14.94	1.69	*	1.41	-0.39	*
Pb	*	*	-0.25	*	-0.20	*	2.42	1.74	0.68	0.31	*	0.28	*	-8.60	-2.19	*	0.39	*	*
Pr	*	*	0.73	*	*	*	*	1.23	0.37	0.10	*	0.59	*	*	*	*	0.89	*	*
Rb	*	-1.06	0.30	-7.24	*	*	1.45	1.45	-0.30	-0.21	*	1.04	1.19	-11.45	-0.23	*	0.15	-0.23	*
Sb	*	*	*	*	*	*	*	0.57	1.28	*	*	*	*	45.56	*	*	42.69	*	*
Sm	*	*	0.76	*	*	*	*	1.07	0.10	0.45	*	0.22	*	*	*	*	0.62	*	*
Sr	*	-1.22	1.91	*	-0.13	*	0.93	3.21	0.85	1.48	*	0.63	*	-17.16	-0.56	2.37	-0.07	-1.00	*
Ta	*	*	0.59	*	*	*	*	1.50	*	8.81	*	0.29	*	*	*	*	0.75	*	*
Tb	*	*	0.45	*	*	*	*	0.43	0.88	0.23	*	0.01	*	*	*	*	-0.21	*	*
Th	*	13.82	-0.35	*	*	*	-6.37	0.35	1.11	-0.39	*	-5.80	*	-4.81	2.68	*	0.72	*	*
Tm	*	*	0.34	*	*	*	*	0.43	0.17	-0.13	*	0.17	*	*	*	*	*	*	*
U	*	*	-0.29	*	*	*	*	0.59	0.44	0.44	*	-0.07	*	*	*	*	1.98	*	*
V	*	0.27	1.32	*	3.49	*	2.18	1.50	-0.45	2.32	0.09	0.59	-1.87	-13.86	-2.06	*	1.68	-1.49	*
W	*	*	-1.69	*	*	*	*	-0.68	0.68	*	*	*	*	*	*	*	42.32	*	*
Y	*	0.89	1.54	*	-2.76	*	0.08	1.66	*	*	0.28	-0.02	*	-10.86	-0.57	*	1.01	1.01	*
Yb	*	*	-0.14	*	0.27	*	*	0.74	0.61	0.44	*	-0.07	*	*	*	*	0.27	*	*
Zn	*	-0.68	-2.47	*	7.10	*	1.31	3.02	0.80	0.13	1.17	-1.94	2.50	-13.21	0.80	*	*	-1.05	*
Zr	*	0.11	0.50	*	-1.38	*	1.39	1.69	1.90	0.23	-0.03	-8.13	-0.99	-16.06	-0.48	*	0.99	-0.18	*

Table 3 GeoPT26 Z-scores for Ordinary Portland cement, OPC-1 (December 2009)																				
Lab identifier	A37	A38	A39	A40	A41	A42	A43	A44	A45	A46	A47	A48	A49	A50	A51	A52	A53	A54	A55	
Sample	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	
Data quality	1	1	2	2	1	2	2	2	2	1	2	2	1	1	1	1	2	2	2	
SiO2	-1.38	*	*	0.09	0.18	-0.27	0.69	-0.71	*	-0.55	-1.18	-0.20	6.89	-0.63	-0.02	0.25	0.53	*	-0.18	
TiO2	0.84	*	*	0.42	-2.34	-0.04	-0.24	-1.17	-0.51	-1.01	-0.57	-0.17	1.95	0.14	-0.13	1.90	1.48	-5.80	0.82	
Al2O3	0.01	*	*	0.41	-4.82	-0.20	3.53	-1.44	*	4.57	-1.24	-0.28	-3.28	-1.72	-1.23	-0.26	1.66	*	-0.48	
Fe2O3 T	0.00	*	*	0.54	-2.61	-0.47	-1.68	-3.27	-1.03	-0.75	-1.68	-0.01	-4.11	-2.61	-1.62	0.93	0.28	1.31	-0.47	
MnO	-0.40	*	*	-1.23	-0.40	0.39	-1.01	-2.36	-1.82	-3.64	-1.71	0.02	-0.42	-1.15	3.92	2.08	0.34	*	0.07	
MgO	2.01	*	*	0.99	-0.67	0.00	-0.45	-3.13	*	-2.91	-0.67	-0.35	0.94	-1.22	4.99	0.00	2.35	1.45	0.56	
CaO	-0.10	*	*	-0.59	-1.61	0.16	-1.26	0.87	0.10	2.47	-2.06	1.33	3.62	-1.29	-2.06	0.81	0.24	*	0.10	
K2O	-0.45	*	*	3.55	0.78	-0.10	-1.96	5.35	*	-6.65	-1.71	-0.10	-0.91	0.86	-1.69	-0.45	0.39	0.39	-0.23	
P2O5	-2.85	*	*	1.77	4.25	-2.14	-12.08	5.67	*	-8.53	-0.72	-2.85	-7.99	0.42	-0.49	2.12	-4.98	-1.43	*	
As	*	*	*	-0.97	*	*	*	*	*	-7.45	*	*	*	*	*	0.33	*	*	*	
Ba	-4.59	-4.47	1.20	-2.30	-4.47	-1.20	0.70	1.33	*	1.47	-1.92	0.02	2.09	0.45	-2.41	-1.16	*	5.58	1.86	
Be	*	*	1.18	*	*	*	*	*	*	-1.18	*	-1.18	0.97	*	*	*	*	*	*	
Ce	-0.14	16.12	0.34	6.06	-7.30	-1.12	1.63	4.11	*	*	0.25	-0.14	2.72	-0.05	10.15	-2.74	*	*	16.09	
Co	-2.21	5.21	1.17	*	-1.28	-3.42	-2.03	0.01	*	2.61	*	0.61	-0.25	*	*	0.11	*	*	22.35	
Cs	0.12	*	0.31	*	*	*	*	*	*	*	*	*	2.38	-0.66	*	*	*	*	*	
Cu	1.92	0.22	-0.57	5.75	2.77	-1.58	0.11	*	0.11	1.75	-1.58	-1.03	-2.00	3.03	3.62	-1.47	*	-1.58	7.54	
Dy	-0.70	*	0.32	*	*	*	*	*	*	*	*	0.24	2.40	0.74	*	-0.38	*	*	*	
Er	-0.64	*	0.16	*	*	*	*	*	*	*	*	0.29	2.44	0.17	*	-0.30	*	*	*	
Eu	-0.22	*	0.33	*	-3.73	*	*	*	*	*	*	0.01	0.59	0.62	*	-0.17	*	*	*	
Ga	*	-2.39	0.22	0.36	*	*	8.38	*	*	*	*	*	-1.21	0.66	*	*	*	*	10.77	
Gd	-0.81	*	0.73	*	5.08	-2.75	*	*	*	*	*	0.53	2.11	0.30	*	-0.48	*	*	*	
Hf	-1.78	*	-0.10	*	*	10.24	16.11	*	*	33.41	*	*	1.71	-0.07	*	*	*	*	*	
Ho	-0.30	*	0.47	*	*	*	*	*	*	*	*	-0.15	1.94	0.64	*	-0.38	*	*	*	
La	-1.44	8.71	0.26	4.24	-3.09	-0.37	-1.15	-0.92	*	*	*	-0.05	2.59	0.14	*	-2.23	*	*	16.64	
Li	*	*	1.16	*	-8.61	4.10	-0.10	6.56	*	*	*	-0.17	-0.85	*	*	*	*	*	*	
Lu	-0.81	*	0.34	*	*	*	*	*	*	*	*	*	1.94	0.01	*	-0.22	*	*	*	
Nb	-1.89	0.17	0.04	*	*	*	-3.13	0.41	3.30	25.24	*	*	-0.64	-1.57	0.17	*	*	*	*	
Nd	0.00	*	0.08	*	-5.50	-2.75	-4.39	*	*	*	*	0.00	3.15	-0.24	9.27	-0.90	*	*	11.20	
Ni	-0.56	11.83	1.83	1.03	-3.37	-1.69	0.71	-1.77	*	2.01	4.65	0.67	1.30	0.88	5.36	-1.12	*	-3.80	3.52	
Pb	-2.46	*	0.19	6.02	*	-0.37	*	5.32	*	-10.25	*	-0.25	0.71	-0.51	*	-7.90	*	*	-0.08	
Pr	0.18	*	0.46	*	*	-1.09	*	*	*	*	*	-0.03	2.02	0.15	*	-0.01	*	*	*	
Rb	-3.02	17.03	1.11	0.40	-7.24	8.51	*	*	*	-2.34	*	3.41	*	0.92	-0.43	5.53	-2.26	*	7.49	
Sb	*	*	*	*	*	*	*	*	*	*	*	*	*	-0.25	*	*	*	*	*	
Sm	-0.14	*	0.43	*	1.59	-0.09	*	*	*	*	*	-0.17	1.94	0.50	*	-0.51	*	*	*	
Sr	0.61	1.26	0.85	0.60	-3.95	-0.24	-0.13	0.21	-0.67	2.99	0.20	-0.78	-0.26	0.80	-5.47	-2.21	*	0.20	-0.67	
Ta	-1.24	*	0.29	*	*	*	*	*	*	*	*	*	1.05	-0.35	*	*	*	*	*	
Tb	-0.42	*	0.22	*	*	*	*	*	*	*	*	*	1.65	0.71	*	-0.23	*	*	*	
Th	-1.99	*	-0.18	0.14	*	*	*	*	*	*	*	31.41	-0.14	2.69	-0.28	55.00	-0.63	*	*	
Tm	-0.13	*	0.17	*	*	*	*	*	*	*	*	*	1.70	0.15	*	-0.22	*	*	*	
U	-1.76	*	0.07	*	*	*	*	*	*	*	140.38	0.15	2.52	-0.43	*	-0.59	*	*	34.93	
V	-0.54	0.53	0.86	-0.40	-9.14	-1.17	-0.63	-0.70	*	-3.51	2.59	0.00	-3.16	1.17	-18.09	0.53	*	*	0.46	
W	-6.09	*	*	*	*	*	*	*	*	*	*	*	-0.38	*	*	*	*	*	*	
Y	-1.13	1.79	1.20	1.08	-4.30	0.28	-0.93	*	-1.54	*	*	-0.38	1.05	0.82	4.22	-0.01	*	*	-1.42	
Yb	-1.01	*	0.32	*	-1.40	*	*	*	*	*	*	0.08	2.73	-0.36	*	-0.28	*	*	*	
Zn	3.09	-2.10	-1.23	-0.20	0.13	0.06	21.55	-2.72	1.17	-5.36	0.80	-0.72	-4.18	-2.60	3.09	-0.99	*	0.80	6.44	
Zr	0.83	1.12	0.22	2.16	47.36	*	3.10	*	0.86	17.23	-0.18	*	2.70	0.40	-1.26	-1.71	*	-3.17	0.05	

Table 3 GeoPT26 Z-scores for Ordinary Portland cement, OPC-1 (December 2009)																			
Lab identifier	A56	A57	A58	A59	A59	A60	A61	A62	A63	A64	A65	A66	A67	A68	A69	A70	A70	A71	A72
Sample	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality	1	1	2	1	2	1	1	1	2	2	2	2	2	2	2	1	2	2	2
SiO2	4.15	0.18	-0.56	2.61	*	0.00	0.25	-0.69	-0.86	0.09	0.02	-0.35	-0.43	1.75	0.55	*	6.37	-0.53	0.04
TiO2	-1.94	-1.01	-0.04	1.24	*	-3.93	-1.81	-1.01	-1.70	0.82	0.82	0.82	-0.04	-5.80	0.75	*	0.16	-0.51	-0.44
Al2O3	5.00	0.29	-0.12	0.32	*	-2.61	1.34	0.01	-0.41	-0.34	0.01	-0.41	0.23	0.14	-0.12	*	-4.55	-1.79	0.08
Fe2O3 T	-4.48	0.56	-1.08	7.09	*	0.00	-2.24	7.84	3.64	0.19	-0.09	-0.09	-0.81	0.65	1.85	*	0.00	0.47	0.28
MnO	-4.62	0.68	-0.09	2.30	*	-0.29	1.22	0.68	0.29	1.96	-4.52	0.88	0.39	0.34	0.93	*	-0.52	-1.28	0.93
MgO	-0.04	1.12	-1.06	2.24	*	-0.45	-0.98	0.89	-1.02	0.22	-0.11	1.01	0.03	0.89	0.00	*	3.46	-0.67	1.01
CaO	0.23	0.17	0.47	-0.19	*	2.29	0.39	-1.19	1.67	-0.06	-0.13	-0.23	-0.19	1.18	0.47	*	-1.92	0.25	0.12
K2O	2.15	-0.45	-1.96	-0.08	*	-16.56	-0.21	-0.45	5.66	-0.85	-0.23	-0.85	-0.41	-3.94	-5.86	*	1.63	1.01	0.33
P2O5	2.12	1.41	-1.43	4.96	*	*	-2.85	4.25	7.45	0.70	-1.43	-1.43	*	2.12	-3.27	*	-0.01	-1.43	*
As	-1.15	*	*	*	*	*	*	-3.32	0.02	-0.11	*	*	*	*	*	*	*	*	*
Ba	0.91	*	-0.17	*	-6.86	0.32	*	1.53	-0.29	-0.05	*	-1.11	-0.23	-0.17	*	1.45	*	-7.80	-9.11
Be	*	*	*	*	*	1.63	*	*	1.59	0.59	*	-0.26	-0.89	*	*	*	*	*	*
Ce	-0.86	*	0.05	*	*	0.42	*	0.06	-0.41	-0.07	*	0.88	-0.88	*	*	-0.39	*	*	*
Co	-0.70	*	0.38	*	-4.35	-1.25	*	*	0.17	0.29	*	0.70	0.00	-0.64	*	*	*	-3.88	*
Cs	-0.59	*	-0.63	*	*	0.00	*	-0.13	-0.16	-0.13	*	0.37	-0.75	*	*	*	*	*	*
Cu	0.17	*	2.70	5.74	*	-2.80	*	*	-1.09	-0.31	*	-0.53	-0.69	0.54	*	*	*	-1.58	1.81
Dy	*	*	-0.43	*	*	0.02	*	-0.14	-0.17	-0.04	*	0.50	-0.43	*	*	-0.02	*	*	*
Er	*	*	-0.54	*	*	-0.29	*	-0.20	-0.25	0.07	*	0.51	-0.06	*	*	0.33	*	*	*
Eu	-0.64	*	0.64	*	*	-0.10	*	-0.35	0.23	-0.36	*	0.43	-0.11	*	*	-1.64	*	*	*
Ga	-0.55	*	0.12	0.96	*	-1.77	*	-1.80	0.04	-1.20	*	-0.22	-0.41	*	*	*	*	4.79	*
Gd	-0.65	*	-0.10	*	*	-0.04	*	-0.28	-0.09	0.20	*	0.72	-0.43	*	*	-0.27	*	*	*
Hf	-0.79	*	1.25	*	*	0.59	*	-0.20	-0.51	0.26	*	0.45	-0.69	*	*	-0.50	*	*	*
Ho	0.19	*	0.16	*	*	-0.09	*	-0.30	-0.22	-0.05	*	0.46	-0.25	*	*	-0.07	*	*	*
La	-0.42	*	0.07	*	*	0.84	*	-0.22	-0.10	-0.13	*	0.83	-1.15	*	*	0.02	*	-6.66	*
Li	0.54	*	*	*	*	0.64	*	*	*	2.00	*	0.15	*	*	*	*	*	*	*
Lu	-0.17	*	-0.16	*	*	-0.32	*	-0.81	0.04	-0.16	*	0.42	-0.16	*	*	-0.41	*	*	*
Nb	4.77	*	-1.04	3.06	*	-1.12	*	-0.79	-1.54	-1.04	*	-0.34	-1.60	0.08	*	3.70	*	8.12	*
Nd	-0.68	*	-0.02	*	*	-0.77	*	-0.38	-0.35	-0.25	*	0.67	-0.46	4.63	*	0.40	*	*	*
Ni	-1.37	*	-1.38	-0.27	*	0.28	*	*	-0.86	-0.56	*	1.96	0.64	0.43	*	*	*	-3.52	-3.09
Pb	-1.05	*	*	22.13	*	0.05	*	0.78	-3.59	-0.20	*	0.28	-0.54	2.15	*	*	*	-3.72	-3.72
Pr	-6.07	*	-0.16	*	*	-0.49	*	-0.06	-0.22	-0.16	*	0.68	-0.49	*	*	-0.03	*	*	*
Rb	-1.83	*	-0.11	1.58	*	4.35	*	0.17	-0.45	0.15	*	0.74	-0.78	-0.43	*	*	*	0.21	*
Sb	-1.42	*	*	*	*	-1.82	*	*	0.12	-0.31	*	-0.17	*	*	*	*	*	*	*
Sm	-0.35	*	-0.07	*	*	-0.04	*	0.45	-0.34	-0.28	*	0.72	-0.42	*	*	-1.71	*	*	*
Sr	-1.13	*	0.21	0.63	*	-1.80	*	1.95	-0.14	1.28	*	0.77	-1.53	-0.46	*	*	-0.01	0.09	-3.60
Ta	*	*	-0.77	*	*	-0.02	*	-1.24	-1.87	-0.77	*	-1.66	*	*	*	1.53	*	*	*
Tb	-0.51	*	*	*	*	0.01	*	-1.08	0.15	-0.21	*	0.29	-0.32	*	*	0.03	*	*	*
Th	-0.43	*	-0.06	*	5.22	0.59	*	-0.98	-0.92	-0.06	*	0.27	-0.76	6.00	*	0.44	*	25.55	4.05
Tm	0.25	*	*	*	*	0.34	*	*	-0.20	-0.06	*	0.43	-0.06	*	*	-0.55	*	*	*
U	-0.16	*	-0.22	*	*	0.15	*	-0.44	0.08	-0.07	*	0.29	-0.73	*	*	*	*	125.74	*
V	-0.57	*	-0.23	*	-1.94	-2.73	*	*	0.04	-0.09	*	0.96	-1.29	-1.35	*	*	0.09	-5.28	*
W	*	*	*	*	*	-2.03	*	*	0.19	-0.85	*	0.85	*	*	*	*	*	*	*
Y	4.30	*	0.53	3.12	*	-0.44	*	2.82	0.16	0.28	*	1.00	1.50	-0.32	*	-1.34	*	-3.97	*
Yb	-0.27	*	-0.70	*	*	-0.24	*	-0.04	0.15	0.27	*	1.05	-0.22	*	*	0.18	*	*	*
Zn	-3.14	*	11.10	-1.28	*	-2.39	*	*	0.77	0.06	*	0.45	-0.53	-0.68	*	*	*	0.43	2.66
Zr	0.02	*	-0.41	2.23	*	-0.36	*	0.12	-1.37	1.76	*	0.86	-0.06	0.11	*	3.48	*	-1.82	*

<b>Table 3 GeoPT26 Z-scores for Ordinary Portland cement, OPC-1 (December 2009)</b>											
Lab identifier	A73	A74	A75	A76	A77	A78	A79	A80	A81	A82	A83**
Sample	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1	OPC-1
Data quality	2	2	2	1	2	1	1	2	2	2	2
SiO2	0.82	-0.25	-0.15	*	*	-0.40	*	0.05	*	2.48	-0.41
TiO2	0.16	-0.37	0.69	8.79	*	-1.01	0.31	0.16	*	-0.90	1.32
Al2O3	0.01	-0.55	0.56	-2.33	*	-0.82	3.19	-0.13	*	0.42	-0.22
Fe2O3 T	-0.65	0.38	-0.28	0.19	*	0.00	-0.56	0.00	*	2.15	0.89
MnO	-0.20	-0.31	-0.90	-1.16	*	-0.40	2.84	0.83	*	-1.50	1.88
MgO	-0.89	-1.11	-2.24	-7.60	*	-0.89	0.45	-0.11	*	-0.78	0.53
CaO	2.01	0.34	0.25	-1.34	*	-0.36	2.69	-0.14	*	-0.82	0.36
K2O	1.63	-0.41	1.01	2.15	*	0.78	-1.69	-4.56	*	-0.41	-3.85
P2O5	0.70	-0.01	-1.43	*	*	-9.95	*	-1.43	*	-1.78	0.53
As	0.06	*	*	1.06	*	-1.94	-0.56	-0.02	*	-0.45	1.10
Ba	0.64	-8.30	0.08	0.91	-0.82	-1.41	0.41	1.10	*	1.08	2.05
Be	-0.89	*	0.00	*	*	*	*	-0.44	*	-1.75	-0.81
Ce	-0.32	*	-0.67	0.00	*	26.68	-0.14	0.63	*	-2.39	3.70
Co	{0.43}	0.29	-1.10	0.02	*	-3.13	-0.91	1.21	-3.65	-2.54	1.21
Cs	0.62	*	*	-0.88	*	75.00	0.00	-0.44	*	0.62	0.00
Cu	-0.61	-6.25	*	*	-2.39	1.07	58.76	-2.01	-7.83	-3.32	-1.12
Dy	-0.35	*	*	0.17	*	*	-2.38	0.48	*	-2.34	0.34
Er	-0.06	*	*	*	*	*	*	0.42	*	-0.49	0.34
Eu	-0.55	*	*	0.90	*	*	-0.22	0.24	*	-3.18	0.64
Ga	0.60	*	-1.20	1.68	*	0.00	*	-1.20	*	-1.78	0.24
Gd	-0.06	*	*	*	*	*	*	0.00	*	-0.53	0.92
Hf	-0.40	*	*	1.39	*	-14.00	0.26	0.44	*	4.49	0.59
Ho	0.06	*	*	*	*	*	-1.54	0.22	*	-3.45	0.16
La	0.30	*	-0.37	0.45	*	9.50	-0.02	0.72	*	-2.53	2.78
Li	1.30	*	*	*	*	*	*	-1.03	*	5.71	-1.64
Lu	0.09	*	*	-0.46	*	*	0.18	-0.26	*	11.06	0.34
Nb	0.08	-1.52	3.30	*	*	0.17	*	-0.43	*	1.53	-0.40
Nd	0.37	*	0.62	1.07	*	2.71	-2.21	0.31	*	-2.30	0.25
Ni	-0.42	-5.20	-0.70	6.48	-4.82	-3.09	-0.56	-0.14	-6.33	-2.67	0.29
Pb	0.27	-3.72	4.50	*	*	6.65	*	0.43	*	-7.26	0.51
Pr	0.06	*	*	*	*	*	*	0.38	*	-7.74	0.37
Rb	0.53	-2.34	1.49	0.94	*	-0.85	0.04	-0.43	*	-2.15	3.41
Sb	0.28	*	*	1.76	*	-10.18	-1.42	0.48	*	-1.51	-1.11
Sm	-0.07	*	*	0.07	*	8.50	-0.69	0.06	*	-4.74	0.28
Sr	-0.89	-1.97	0.52	0.83	*	-0.91	*	-0.35	*	-0.02	-0.02
Ta	*	*	*	1.80	*	-10.68	-8.85	-0.35	*	12.62	0.60
Tb	0.22	*	*	0.01	*	*	*	0.04	*	-1.74	0.33
Th	0.53	*	*	-0.08	*	4.18	-0.51	-0.26	*	3.62	1.31
Tm	0.40	*	*	*	*	*	*	0.31	*	-2.90	0.17
U	-0.51	*	*	-0.88	*	-12.16	-0.44	0.12	*	-2.05	0.37
V	0.45	-4.93	-1.35	0.53	-2.99	-5.20	3.76	-0.63	*	-4.14	0.92
W	*	*	*	3.55	*	5.08	-1.69	0.08	*	-0.42	-0.85
Y	0.65	-4.58	2.11	*	*	-0.65	*	-0.32	*	-3.06	3.93
Yb	0.27	*	*	-0.63	*	-13.07	0.44	0.36	*	-1.43	0.47
Zn	0.06	-5.50	-0.68	-0.62	-2.64	0.87	3.09	-0.31	-8.23	1.10	-0.68
Zr	-0.65	-5.55	1.01	7.09	-10.43	1.42	*	-0.33	*	-0.94	0.86
<i>{based on revised data}</i>											
**Based on data omitted in error from evaluation											

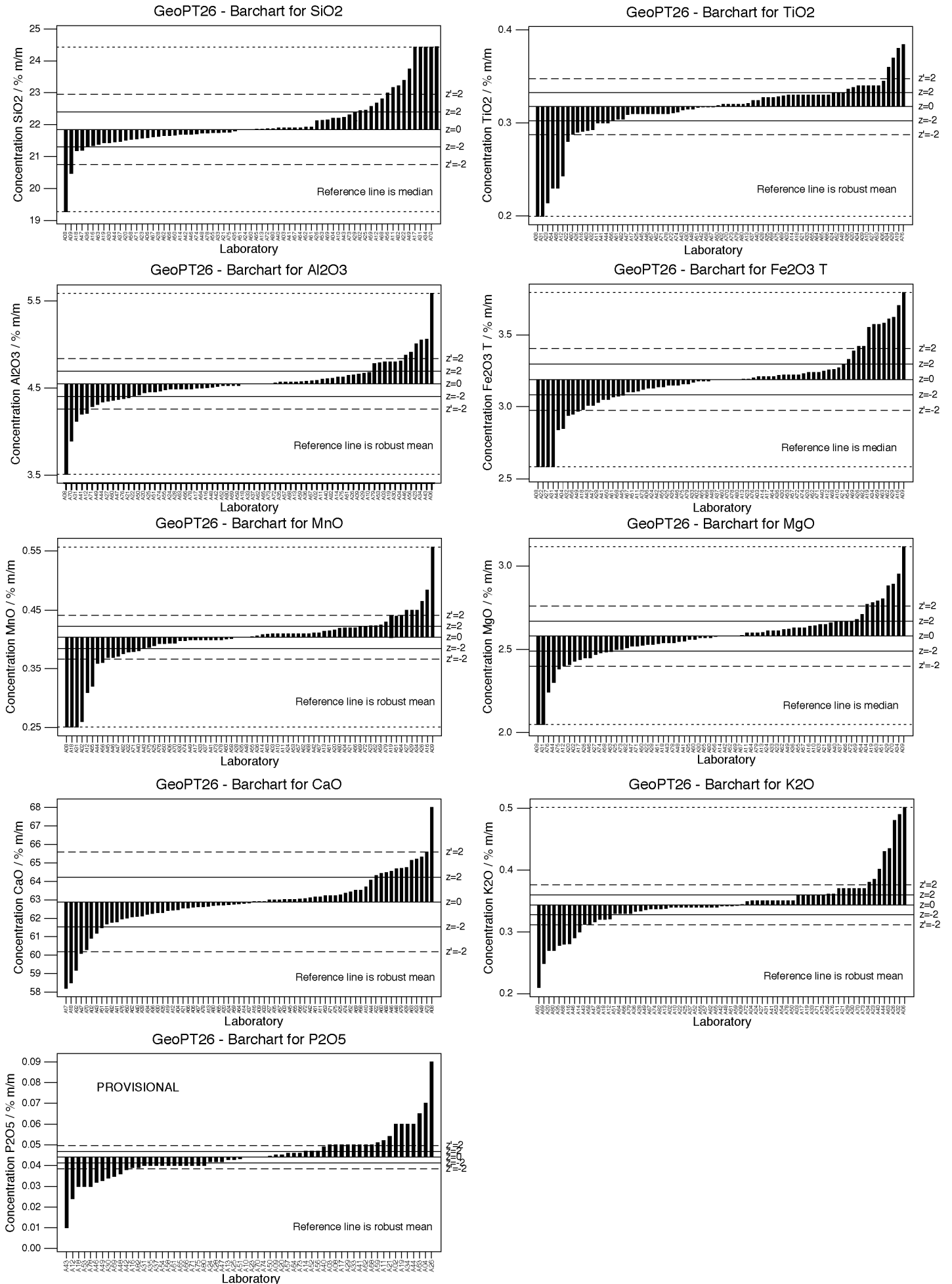


Figure 1: GeoPT26 – Ordinary Portland Cement, OPC-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for  $-2 < z < 2$  for pure geochemistry labs (solid lines) and  $-2 < z' < 2$  for applied geochemistry labs (pecked lines).

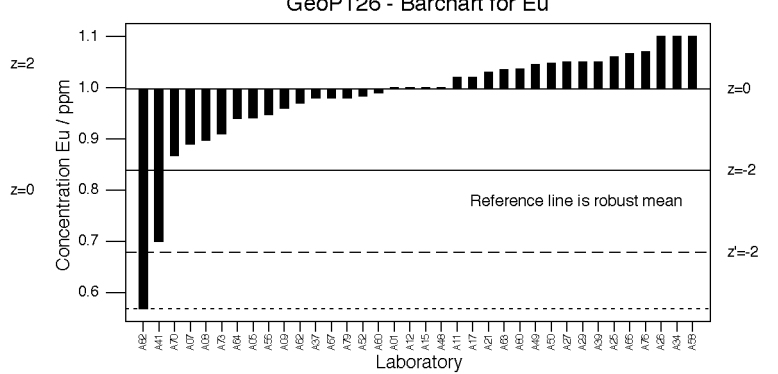
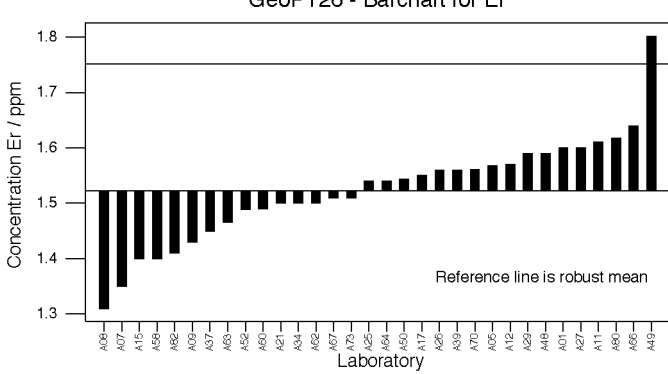
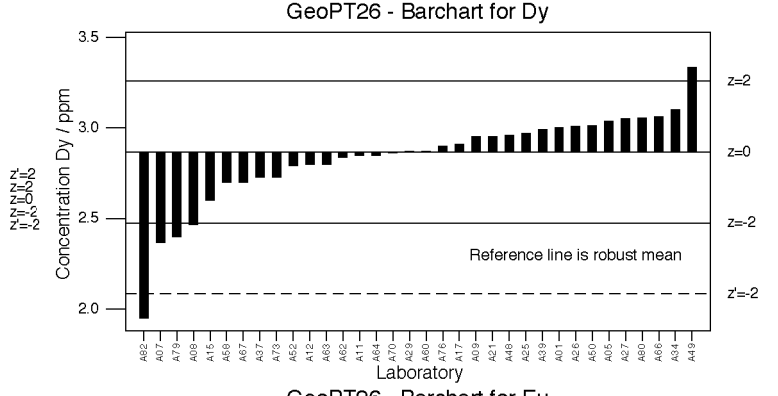
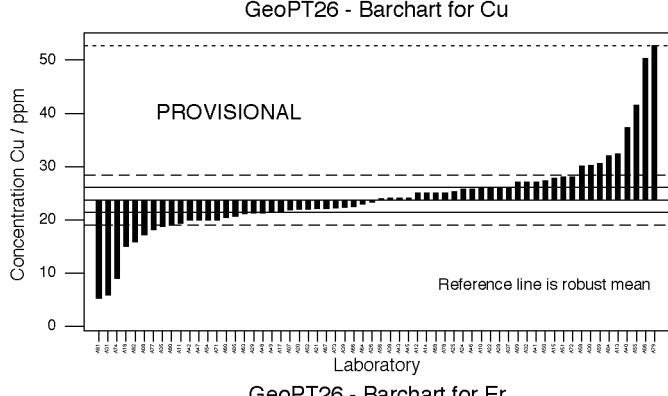
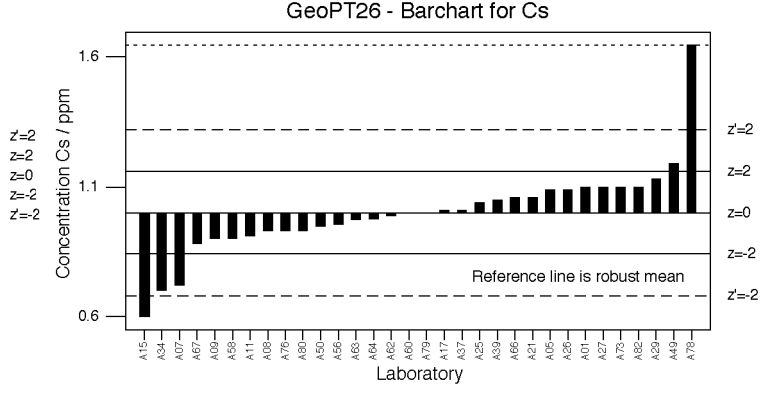
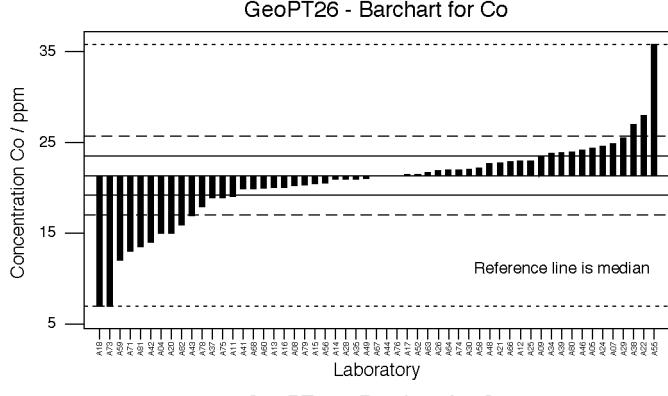
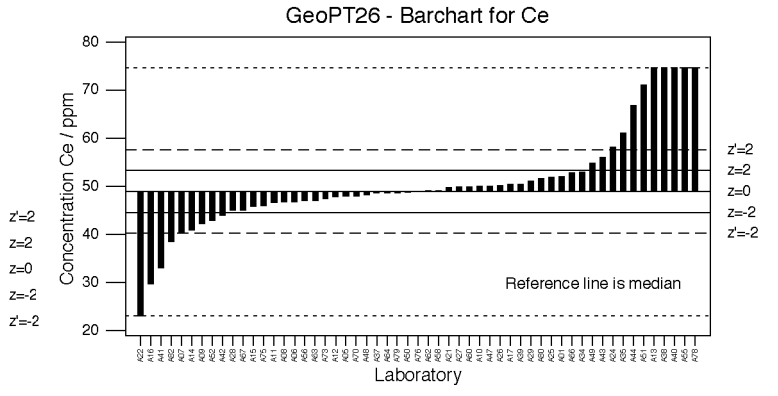
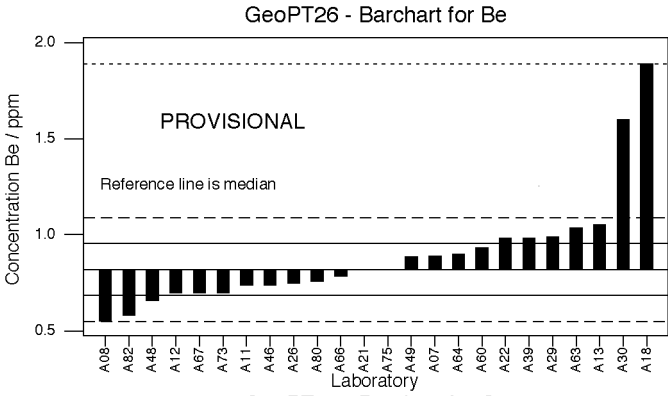
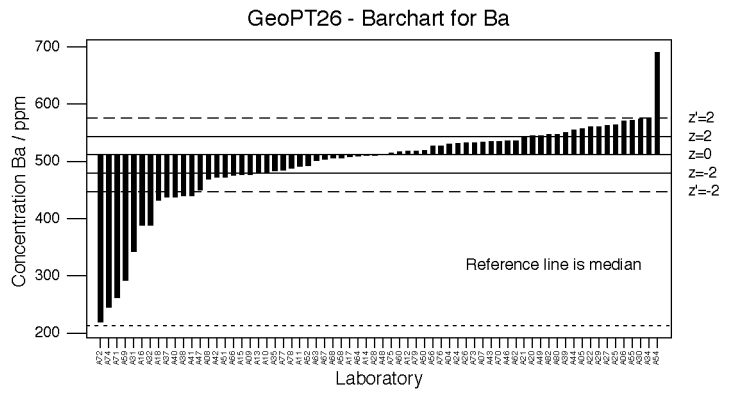
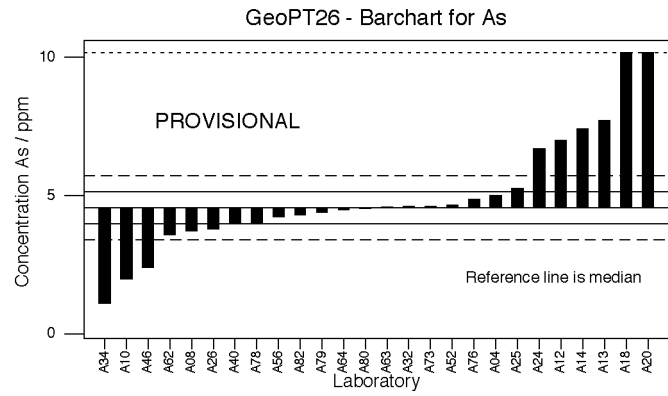


Figure 1 (cont'd): GeoPT26 – Ordinary Portland Cement, OPC-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for  $-2 < z < 2$  for pure geochemistry labs (solid lines) and  $-2 < z' < 2$  for applied geochemistry labs (pecked lines).

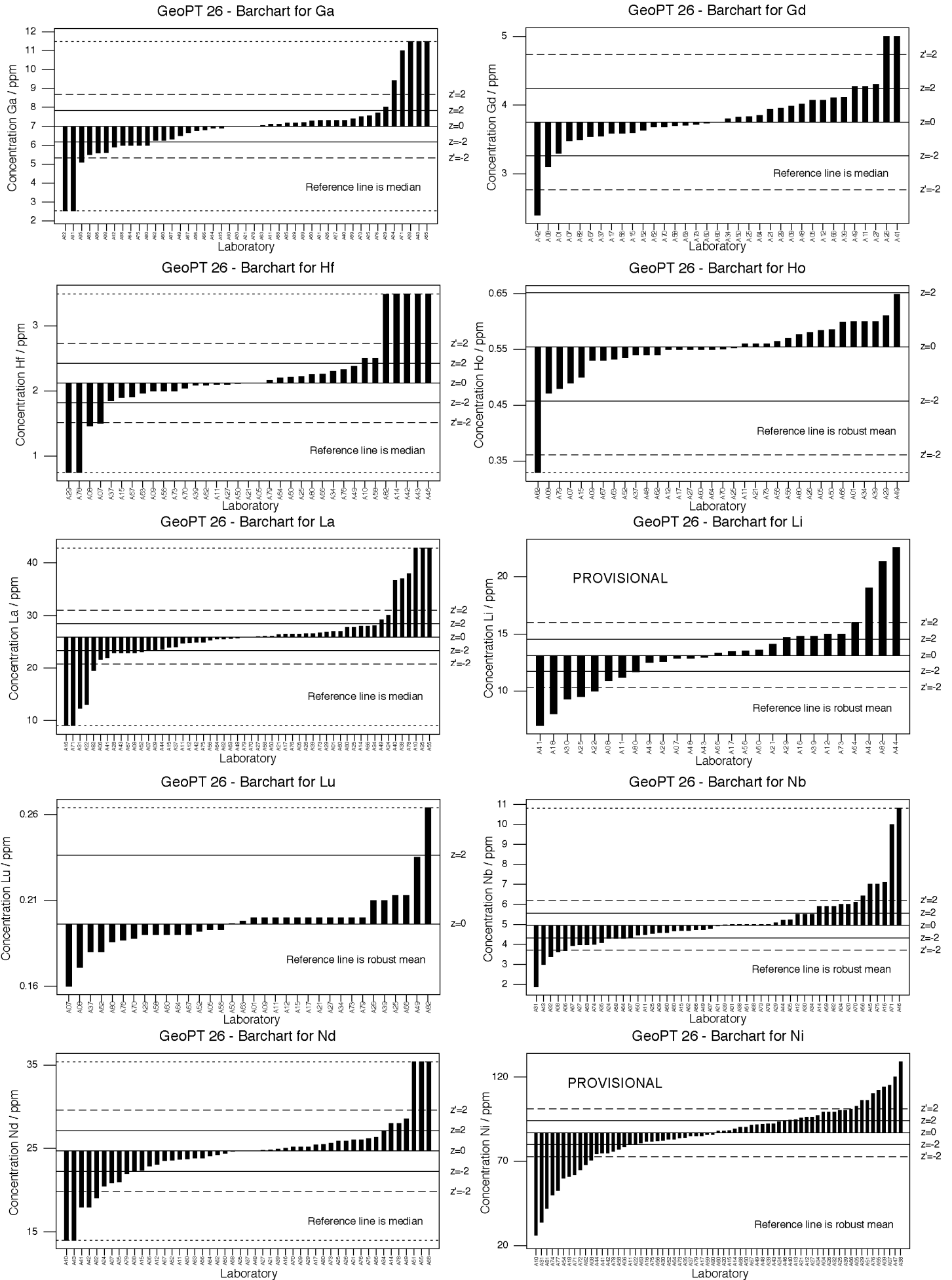
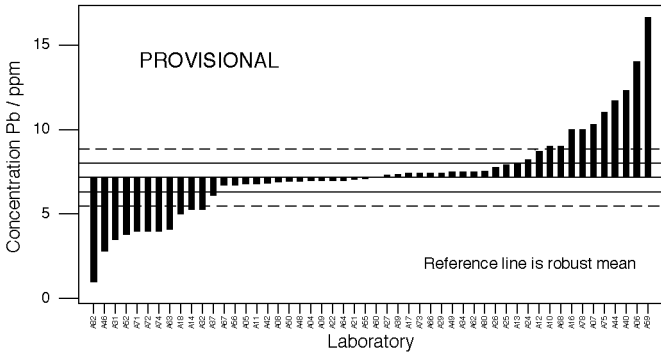
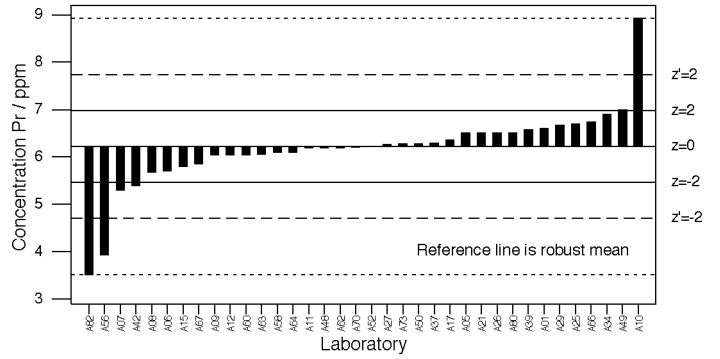


Figure 1 (cont'd): GeoPT26 – Ordinary Portland Cement, OPC-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for  $-2 < z < 2$  for pure geochemistry labs (solid lines) and  $-2 < z' < 2$  for applied geochemistry labs (pecked lines).

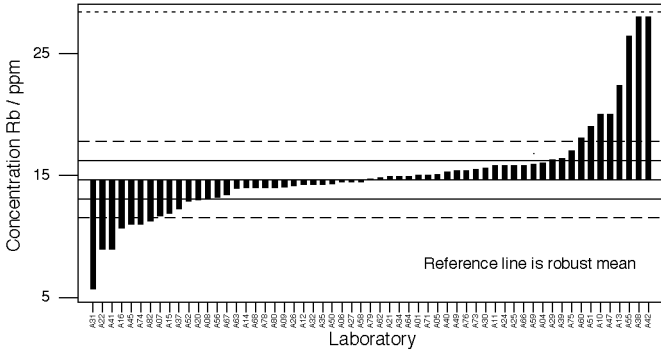
GeoPT 26 - Barchart for Pb



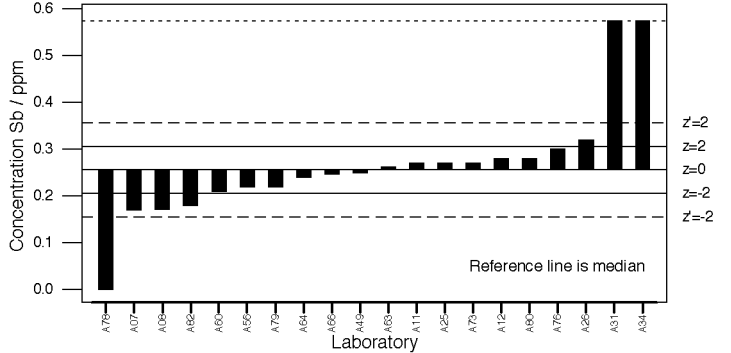
GeoPT 26 - Barchart for Pr



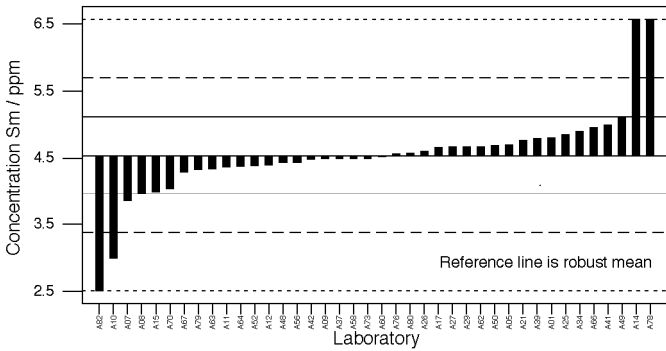
GeoPT 26 - Barchart for Rb



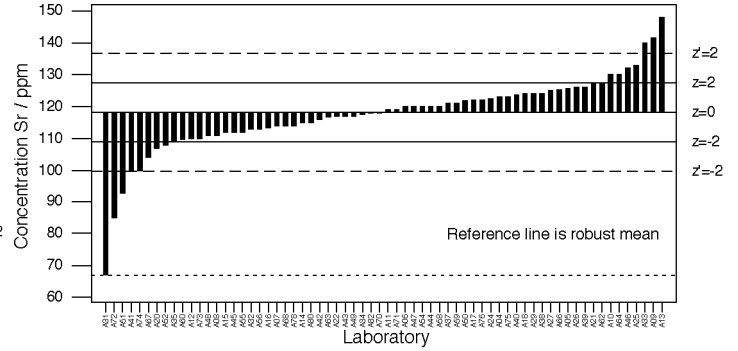
GeoPT26 - Barchart for Sb



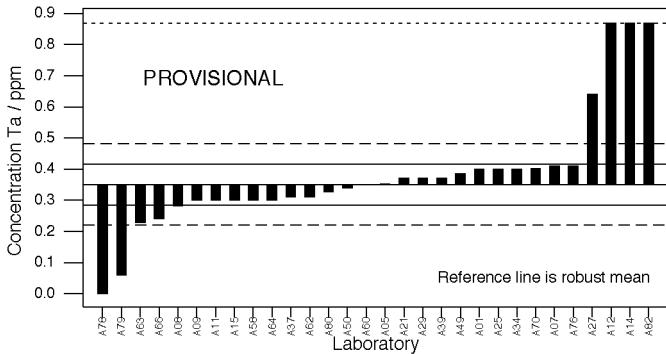
GeoPT26 - Barchart for Sm



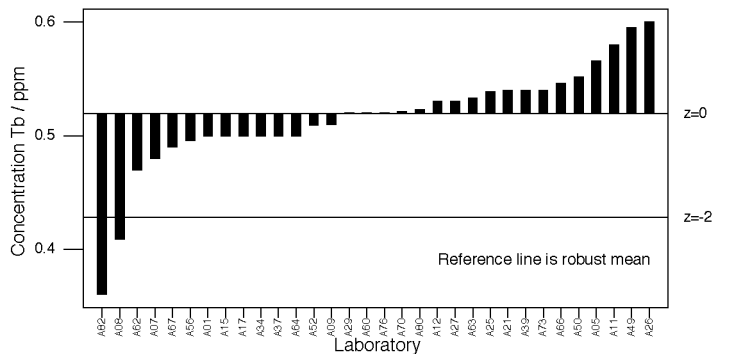
GeoPT26 - Barchart for Sr



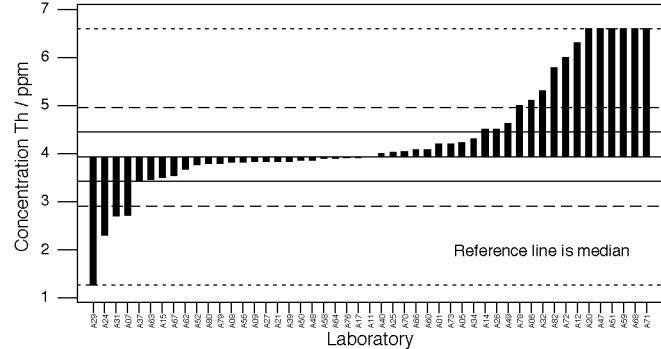
GeoPT26 - Barchart for Ta



GeoPT26 - Barchart for Tb



GeoPT26 - Barchart for Th



GeoPT 26 - Barchart for Tm

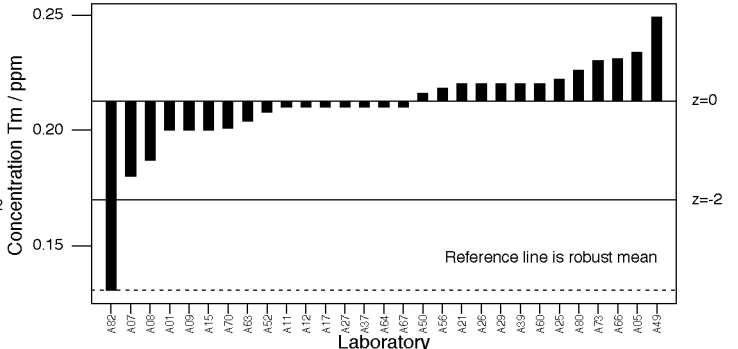


Figure 1 (cont'd): GeoPT26 – Ordinary Portland Cement, OPC-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for  $-2 < z < 2$  for pure geochemistry labs (solid lines) and  $-2 < z' < 2$  for applied geochemistry labs (pecked lines).



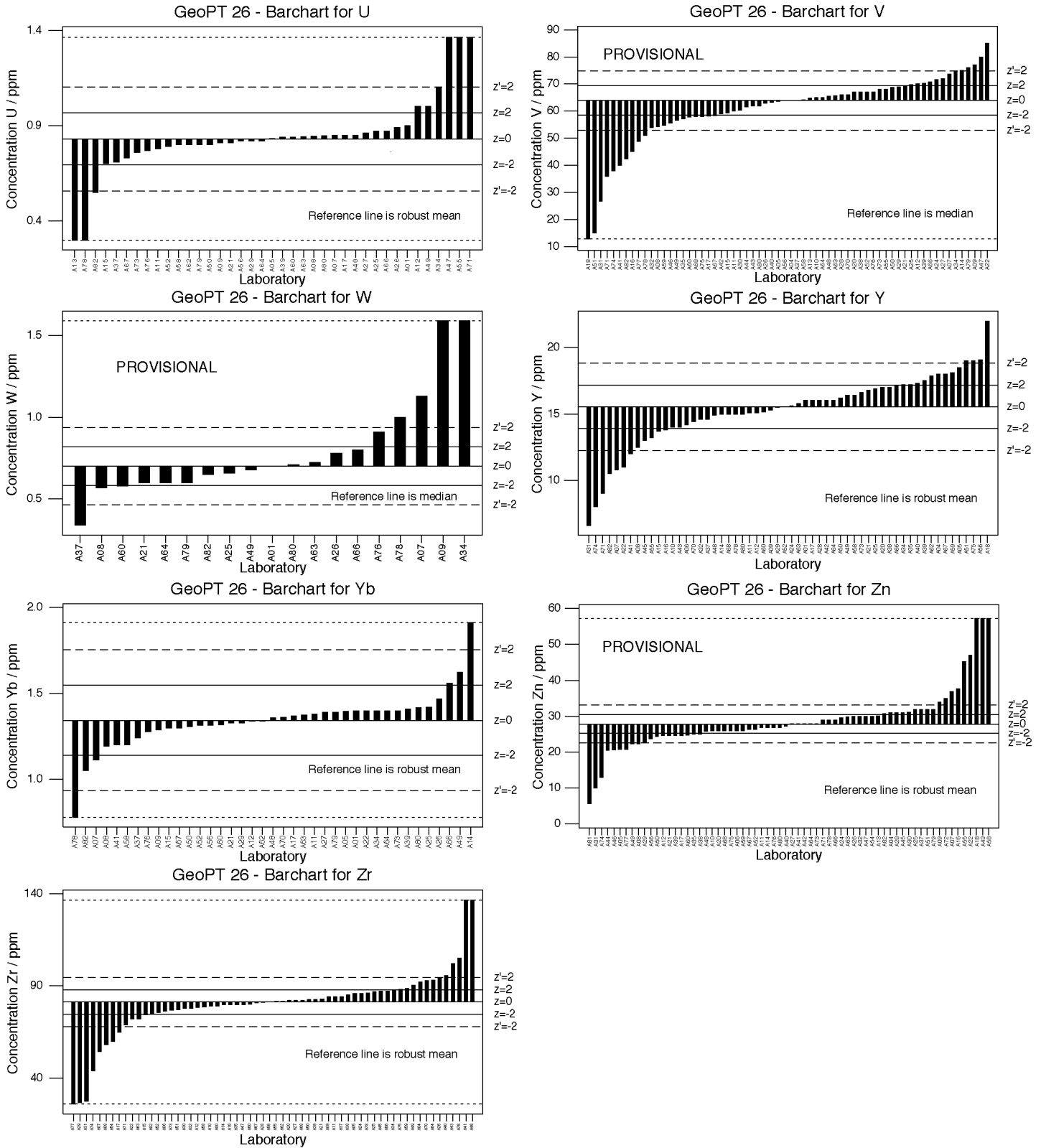


Figure 1 (cont'd): GeoPT26 – Ordinary Portland Cement, OPC-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for  $-2 < z < 2$  for pure geochemistry labs (solid lines) and  $-2 < z' < 2$  for applied geochemistry labs (pecked lines).

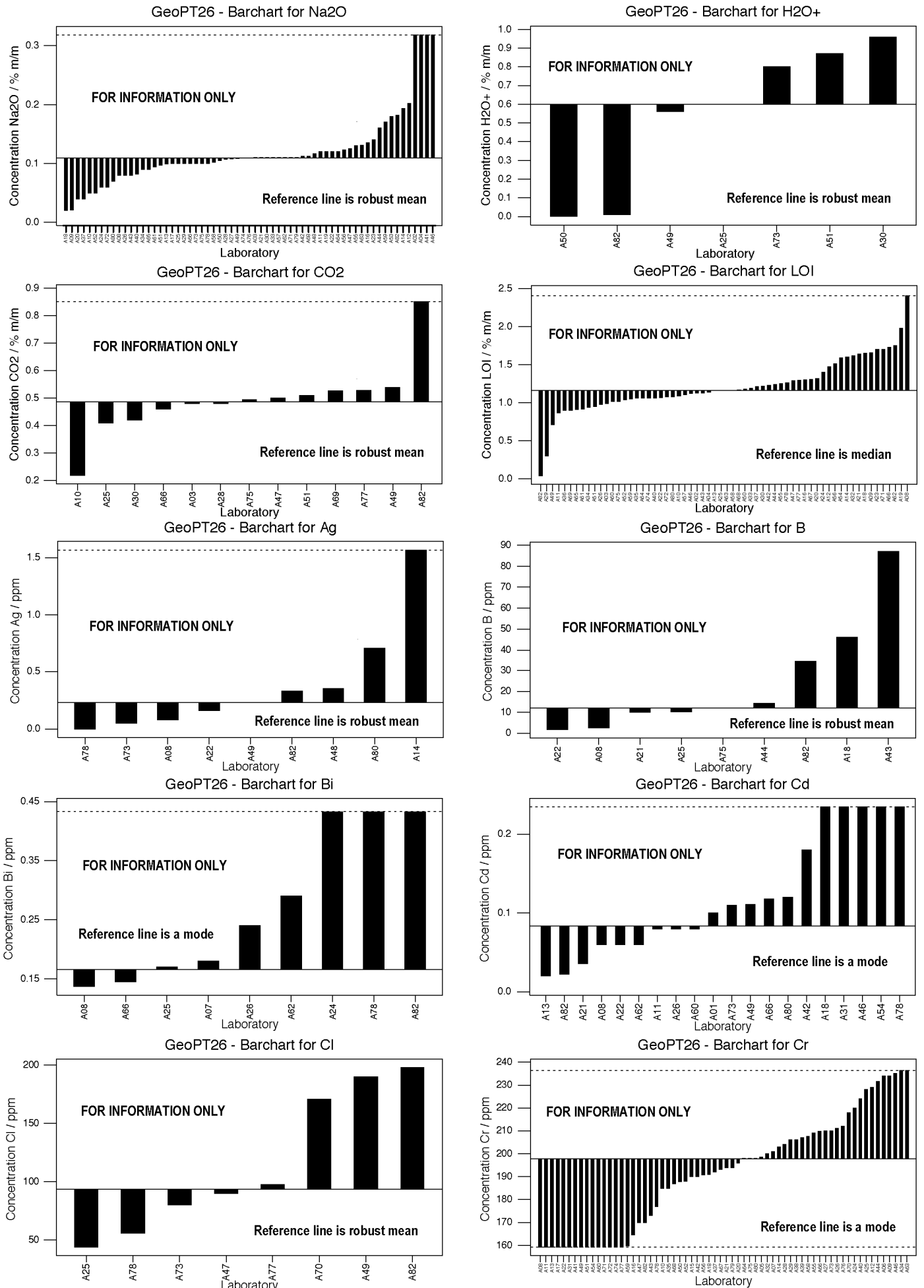


Figure 2: GeoPT26 – Ordinary Portland cement, OPC-1. Data distribution charts for information only for elements for which values could not be assigned.

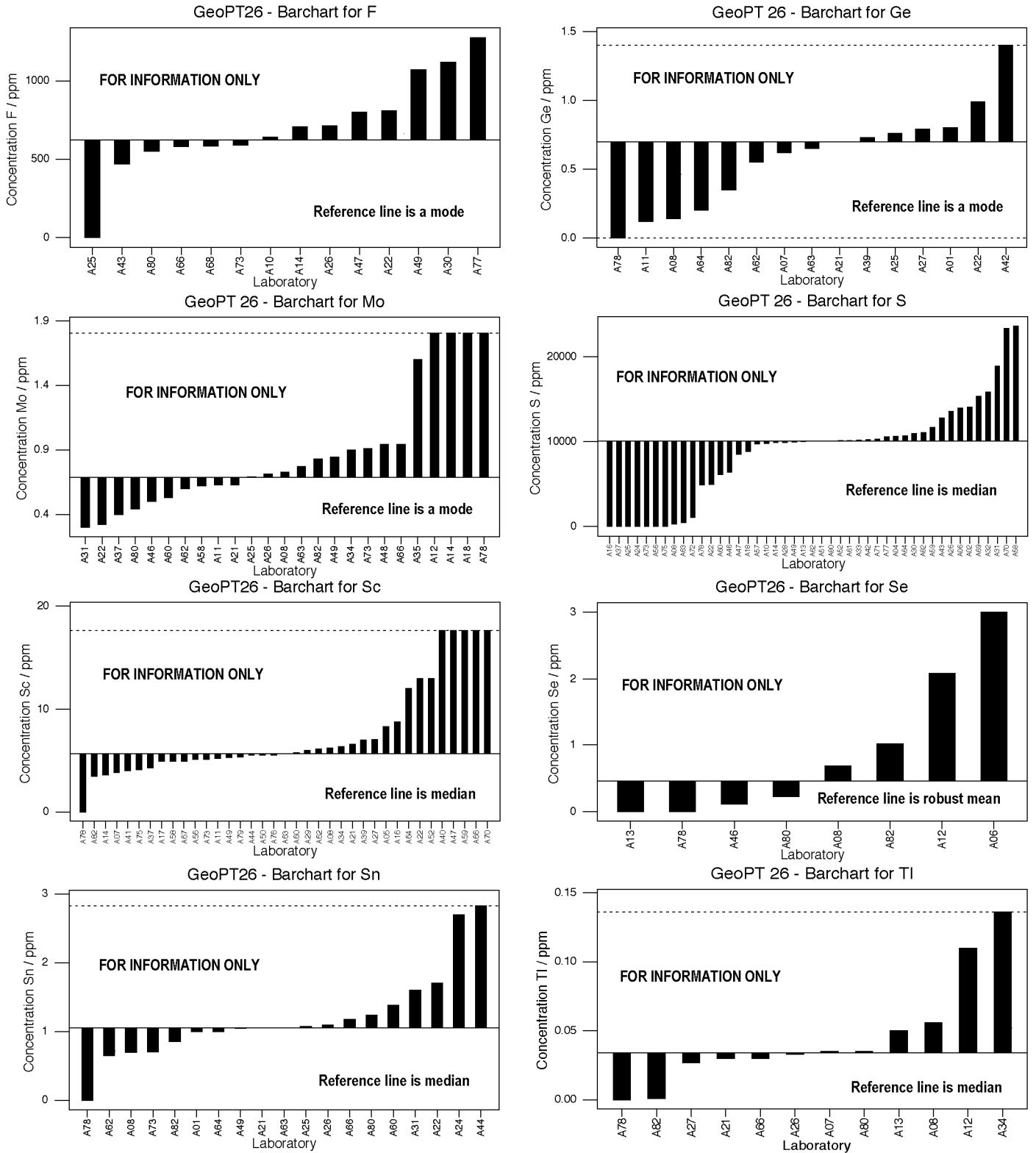


Figure 2 (cont'd): GeoPT26 – Ordinary Portland cement, OPC-1. Data distribution charts for information only for elements for which values could not be assigned.

### GeoPT26 multiple z-score chart

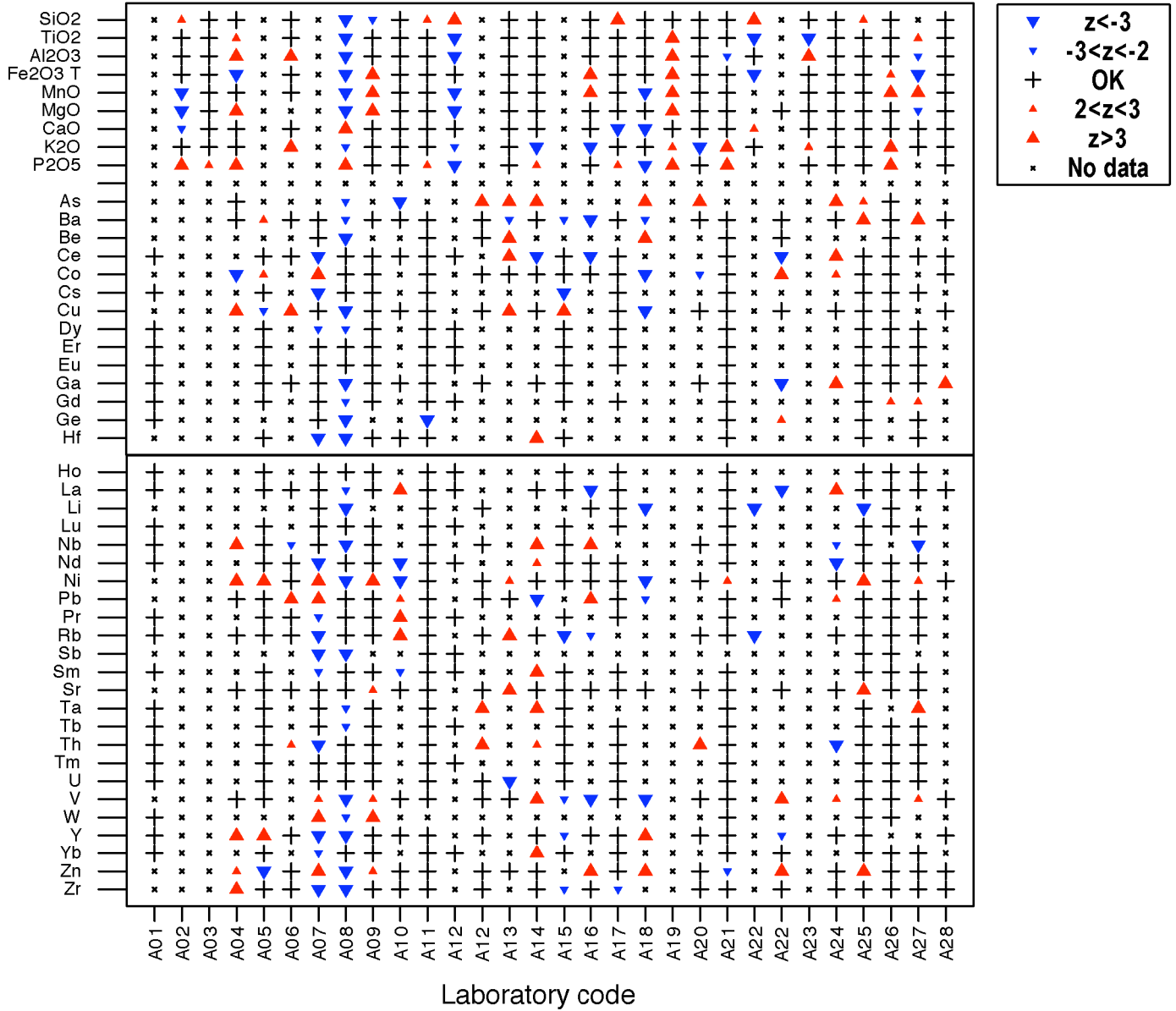


Figure 3: GeoPT26 – Ordinary Portland cement, OPC-1. Multiple z-score charts for laboratories participating in the GeoPT26 round. Symbols indicate whether or not an elemental result complies with the  $-2 < z < +2$  criteria. Satisfactory data are plotted as '+'. Data for other categories are plotted as follows:  $z < -3$  (▼),  $-3 < z < -2$  (▽),  $+2 < z < +3$  (▲),  $Z > +3$  (▲).

### GeoPT26 multiple z-score chart

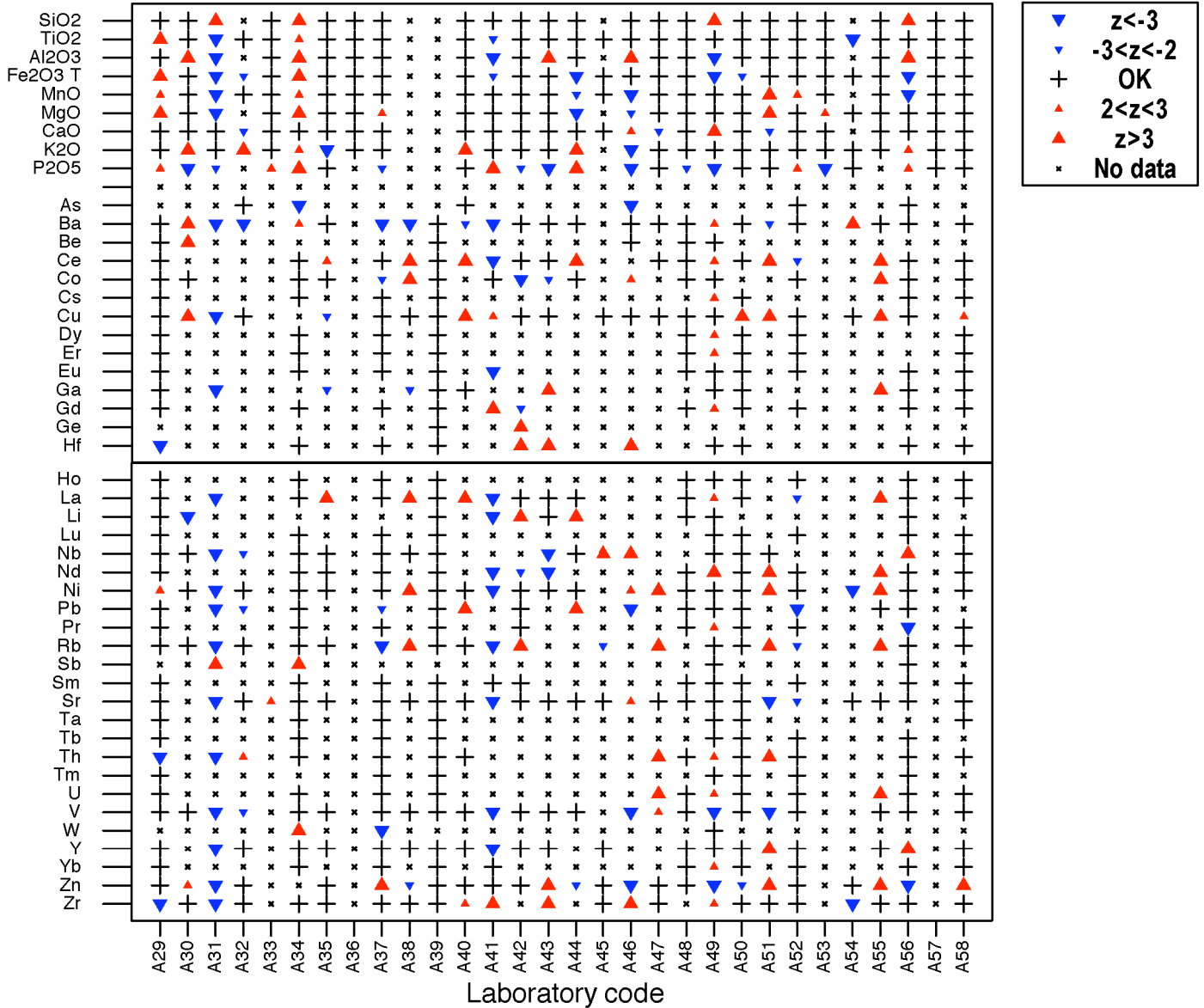


Figure 3 (cont'd): GeoPT26 – Ordinary Portland cement, OPC-1. Multiple z-score charts for laboratories participating in the GeoPT26 round. Symbols indicate whether or not an elemental result complies with the  $-2 < z < +2$  criteria. Satisfactory data are plotted as '+'. Data for other categories are plotted as follows:  $z < -3$  (▼),  $-3 < z < -2$  (▽),  $+2 < z < +3$  (▲),  $Z > +3$  (▲).

### GeoPT26 multiple z-score chart

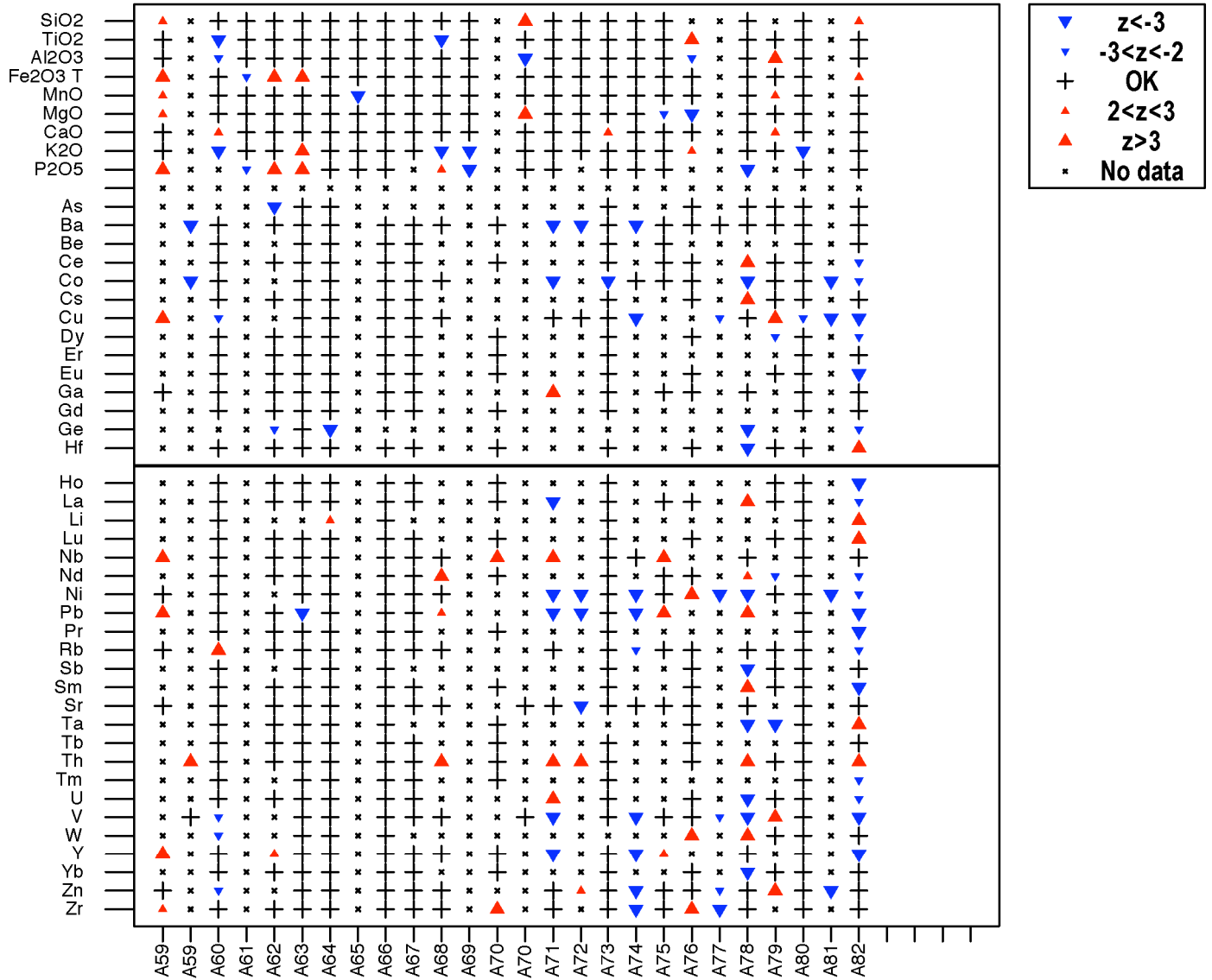


Figure 3 (cont'd): GeoPT26 – Ordinary Portland cement, OPC-1. Multiple z-score charts for laboratories participating in the GeoPT26 round. Symbols indicate whether or not an elemental result complies with the  $-2 < z < +2$  criteria. Satisfactory data are plotted as '+'. Data for other categories are plotted as follows:  $z < -3$  (▼),  $-3 < z < -2$  (▽),  $+2 < z < +3$  (▲),  $Z > +3$  (▲).