Bahnhofstraße 14 // D-37181 Hardegsen // T +49 (0)5505 94098-0
Geschäftsführer: Ralf Klaus Blecher // Amtsgericht Göttingen HRB 130263
www.crb-gmbh.de // labor@crb-gmbh.de

CRB Analyse Service GmbH

RFA Ringversuch GeoPT 46, England - HG-1, Granodiorite

Veranstalter des Ringversuchs:	International Association of Geoanalysts and Geostandards Newsletter - GeoPT46
Ringversuchsmaterial:	HG-1, Granodiorite
RV geschlossen:	2020 - 2
Literatur:	Report - GeoPT46 Proficiency Testing Round 46 (Laborcode CRB = F90)

Hauptelemente [MA%]

	CRB	RV	1sRV	Z-Score
MgO	1,150	1,150	0,023	0,000
Al_2O_3	15,270	15,240	0,202	0,070
SiO_2	68,270	68,330	0,724	-0,040
P_2O5	0,207	0,210	0,005	-0,240
K_2O	5,090	5,090	0,080	0,000
CaO	1,700	1,703	0,031	-0,050
TiO_2	0,490	0,490	0,011	0,000
Fe_2O_3tot	2,680	2,669	0,046	0,120
L.O.I. *	0,930	0,920	0,073	0,040
C-gesamt *	0,071	0,056	0,010	0,710

Spurenelemente [µg/g]

	CRB	RV	1sRV	Z-Score
Ba	701,00	701,40	35,40	-0,01
Cr	512,00	506,40	15,90	0,18
Cu	50,00	52,40	2,30	-0,52
Ga	24,00	24,00	1,20	0,00
Nb	14,00	12,50	0,70	1,11
Ni	14,00	19,00	1,00	-2,56
Rb	259,00	266,00	9,20	-0,38
Sr	462,00	450,00	14,40	0,42
V	34,00	39,80	1,80	-1,59
Zn	28,00	32,00	1,50	-1,32
Zr	179,00	174,00	6,40	0,39

Legende

CRB: Ergebnisse CRB – **RV:** Ergebnisse Ringversuch -- **1s-RV:** Standardabweichung Ringversuch
Z-Score: Differenz des Messwertes vom Mittelwert des Ringversuchs -- * Wert nicht zertifiziert

Geo*PT*

Proficiency Testing Programme for Geochemical Laboratories

Organised by the International Association of Geoanalysts (IAG)

Certificate of Performance

Subscriber: **GeoPT240** Laboratory Code: **F90** Test Material: **HG-1**

Round: **GeoPT46** Date: **December 2019**

Analyte	Z-Score	Data Quality	Consensus Value	Result Submitted
			g/100g	g/100g
SiO2	**-0.04**	2	68.33	68.27
TiO2	**0**	2	0.4900	0.49
Al2O3	**0.07**	2	15.24	15.27
Fe2O3T	**0.12**	2	2.669	2.68
MnO	**1.05**	2	0.04593	0.049
MgO	**0**	2	1.150	1.15
CaO	**-0.05**	2	1.703	1.7
Na2O	**-0.6**	2	3.825	3.75
K2O	**0**	2	5.090	5.09
P2O5	**-0.24**	2	0.2095	0.207
			mg/kg	mg/kg
Ag	-	2	0.1850	
Ba	**-0.01**	2	701.4	701
Be	-	2	8.113	
Bi	-	2	5.071	
Cd	-	2	0.06250	
Ce	-	2	96.96	
Co	-	2	5.800	
Cr	**0.18**	2	506.4	512
Cs	-	2	13.80	
Cu	**-0.52**	2	52.40	50
Dy	-	2	2.314	
Er	-	2	1.045	
Eu	-	2	1.366	
Ga	**-0.01**	2	24.01	24
Gd	-	2	3.900	
Ge	-	2	1.770	
Hf	-	2	5.063	

Analyte	Z-Score	Data Quality	Consensus Value	Result Submitted
			mg/kg	mg/kg
Ho	-	2	0.3975	
La	-	2	47.90	
Li	-	2	100.1	
Lu	-	2	0.1370	
Mo	-	2	4.320	
Nb	**1.11**	2	12.49	14
Nd	-	2	36.98	
Ni	**-2.56**	2	19.00	14
Pb	-	2	40.54	
Pr	-	2	10.60	
Rb	**-0.38**	2	266.0	259
Sb	-	2	0.2100	
Sc	-	2	4.615	
Sm	-	2	5.756	
Sn	-	2	4.075	
Sr	**0.42**	2	450.0	462
Ta	-	2	0.9958	
Tb	-	2	0.4900	
Th	-	2	23.90	
Tl	-	2	1.330	
Tm	-	2	0.1460	
U	-	2	7.840	
V	**-1.59**	2	39.83	34
W	-	2	19.93	
Y	-	2	10.84	
Yb	-	2	0.9180	
Zn	**-1.32**	2	32.00	28
Zr	**0.39**	2	174.0	179

The principles upon which GeoPT z-scores are based are detailed in the full report for this round

- indicates result within acceptable range of z-score limits |z| < 2

- indicates result outside z-score limits |z| > 2 but within the z-score limits |z| < or = 3

- indicates result outside z-score limits |z| > 3 and likely to require investigation

Consensus values are assigned values unless otherwise indicated

Shaded Consensus values have provisional status

Peter Webb . Peter Webb - Administrator of GeoPT on behalf of the International Association of Geoanalysts

GeoPT46 — AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES — REPORT ON ROUND 46 (Granodiorite, HG-1) / January 2020

Peter C. Webb[1]*, Philip J. Potts[1], Michael Thompson[2] and Charles J. B. Gowing[3]

[1]Faculty of Science, Technology, Engineering and Mathematics, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK.

[2]School of Biological and Chemical Sciences, Birkbeck University of London, Malet Street, London WC1E 7HX, UK.

[3]British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, NG12 5GG, UK.

*Corresponding author, Peter Webb: e-mail geopt.iag@gmail.com

*Keywords: proficiency testing, quality assurance, Geo*PT*, Geo*PT*46, Round 46, HG-1, Granodiorite, BGS*

Abstract

Results are presented for Round 46 of the International Association of Geoanalysts' Proficiency Testing programme for analytical geochemistry laboratories. The test material distributed in this round of Geo*PT* was the Granodiorite, HG-1, collected and processed under the direction of Dr Charles Gowing of the British Geological Survey. In this report, the data contributed by 96 laboratories are listed, together with an assessment of consensus values, consequent *z*-scores and charts to show the distribution of contributed results and the overall performance of participating laboratories.

Introduction

This forty-sixth round of the international proficiency testing programme, Geo*PT*, was conducted in a similar manner to earlier rounds. The programme is designed to be part of the routine quality assurance procedures employed by analytical geochemistry laboratories. The programme is organised by the International Association of Geoanalysts and is conducted in accordance with a published protocol, recently revised (IAG, 2018). The overall aim of the programme is to provide participating laboratories with *z*-score information for their reported measurement results so that each laboratory can decide whether the quality of their data is satisfactory in relation both to their chosen fitness-for-purpose criteria and to the results submitted by other laboratories contributing to the round. In circumstances where *z*-scores are unsatisfactory, a participating laboratory is encouraged to investigate for unsuspected analytical bias and to take corrective action if this appears justified.

Steering Committee for Round 46: P.C. Webb (administrator and results assessor), P.J. Potts (results reviewer), M. Thompson (statistical advisor), C.J.B. Gowing (distribution manager and provision of HG-1).

Timetable for Round 46:
Distribution of sample: September 2019
Results submission deadline: 11th December 2019
Release of report: January 2020

Test Material details

Geo*PT*46: The Granodiorite test material, HG-1, is rock material of granodioritic composition obtained from a commercial source and processed at the British Geological Survey, Keyworth, under the direction of Dr Charles Gowing. The test material was evaluated for homogeneity by the originator, and as a result, the sample was considered suitable for use in this proficiency test.

Submission of results

For Geo*PT*46 (HG-1), a total of 3735 results are listed in Table 1 (excluding zeros) as submitted by 96 laboratories. Measurement results that were designated by the participating laboratory as data quality 1 (see ***Z*-score analysis section** below for explanation) are shown in **bold** and those specified as data quality 2 are shown underlined. Results from all laboratories submitting data were used to assess respective consensus values. Contrary to our ongoing instructions, one value of '0' (i.e. zero) was reported for this round. This value was excluded from consideration in the data assessment process. It is pleasing that fewer such values were reported in this round than in previous rounds. It is suspected that another five laboratories reported results for either S or F in units of g/100g instead of mg/kg. We must remind analysts reporting results that measurements of both these and those of all trace constituents should be reported in mg/kg. Analysts should be aware that suspected invalid results ***cannot be altered or removed*** once they have been submitted and that corresponding *z*-scores will be adversely affected by inappropriate reporting.

Assigned values and results summary

Following procedures described in earlier rounds, and detailed fully in the Geo*PT* protocol (IAG, 2018), robust statistical procedures were used to derive consensus values for measurands in this test material: these consensus values being judged to be the best available estimates of the true composition. Values were assigned on the basis that: i) sufficient laboratories had contributed data for estimating a measurand, ii) visual assessment gave confidence that a substantial proportion of the results distribution was symmetrically disposed about the consensus, iii) the ratio of the uncertainty in the location estimate to the target precision was an acceptably small value, and iv) an evaluation of measurement results by procedure – including both methods of analysis and sample preparation – indicated no significant procedural bias among measurement results from which the consensus was derived. Where these criteria were not fully met, values were credited with 'provisional' rather than 'assigned' status.

These assessments also involve examining the distribution of results from barcharts of data contributed for each measurand (as presented in Figures 1 and 2). In addition, when appropriate, a variety of plots permitting discrimination of data by method of analysis and by sample preparation procedure, as developed by Thomas Meisel using the Shiny App (*https://www.shinyapps.io*) and linked to the statistical package 'R', were also examined. This enabled us, when necessary, to refine the selection of consensus values by taking account of data distributions according to analytical procedure.

As detailed in the Geo*PT* protocol, the consensus values derived from contributed data were provided where appropriate by the Huber robust mean: in this round in 14 instances. Although outliers can be accommodated by this procedure, when a dataset is skewed, it does not provide a satisfactory estimation of the consensus. Consequently, the median was considered to be a more appropriate robust estimator in 23 cases. For more severely skewed and strongly tailed datasets, a mode can often be a more suitable as a means of estimating the location of the consensus. In this round the use of modes as consensus location estimators was preferred in 18 cases, and in 16 of these, distributions were compatible with the conditions outlined above to justify their designation as assigned values. The procedure used to determine modes was most often that described by Thompson (2017) involving the estimation of the mass fraction corresponding to the maximum value of the kernel density distribution for the dataset. Such modes derived by bootstrapping provide robust estimates of consensus locations that represent the most coherent part of data distributions where data are symmetrically disposed, although the dataset as a whole may be asymmetric.

Table 2 lists assigned and provisional values for 10 major components and 45 trace elements in Geo*PT*46 (HG-1). Barcharts for the 55 measurands of Geo*PT*46 that were judged to have satisfactory distributions for consensus values to be designated as assigned or provisional values are shown in Figure 1. These are: SiO_2, TiO_2, Al_2O_3, Fe_2O_3T, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5, Ag, Ba, Be, Bi*, Cd*, Ce, Co, Cr*, Cs, Cu, Dy, Er, Eu, Ga, Gd, Ge*, Hf, Ho, La, Li, Lu, Mo, Nb, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Sm, Sn, Sr, Ta, Tb, Th, Tl, Tm, U, V, W, Y, Yb, Zn and Zr. Of these, the 4 analytes marked '*' were credited with provisional status. Instances of provisional status were identified because either: i) a relatively small number of results (<15) contributed to the consensus, or ii) the results were unduly dispersed in relation to the target value, or iii) the distribution of results was significantly skewed.

Bar charts for the 13 analytes: Fe(II)O, H_2O^+, CO_2, LOI, As, B, C(tot), Cl, F, In, S, Se and Te are plotted in Figure 2 for information only, as the data were either insufficient in number, or the distribution was too highly skewed or too variable for the reliable determination of a consensus for the estimation of *z*-scores.

An impressive number of datasets in this round were normally disposed, showing remarkable symmetry with relatively little dispersion of the majority of the data, particularly for SiO_2, Al_2O_3, CaO, Ba, Dy, Er, Eu, Ga, Lu, Rb, Ta, Tb, Tm, V and Yb. A small amount of asymmetry with some high or low tailing of data but remarkably little dispersion otherwise was noted for Fe_2O_3T, Na_2O, K_2O, Ho, La, Pr, Sm and Sr. However, there were a number of constituents for which more marked low tailing distributions were noted, as for Hf and Zr, but also present to varying extents for Ce, Cr, Cu, Nb, Nd and Ni. For Zr and Hf the majority of these low values was reported by laboratories using acid digestion prior to ICP-MS or ICP-AES measurement. It is suspected that digestion recoveries were incomplete for these analytes, because they are commonly hosted by zircons which are refractory and susceptible to incomplete dissolution, as recognised by Potts et al (2015). However, in some cases, particularly for Ce, Nd and Sm, these low values correspond with XRF measurement on powder pellets. High tails were noted for Ag, Cd, Co, Gd, Sb, Sc, Y and Zn. Some of the measurements contributing to these high tails originated as XRF values, and in some cases as ICP-AES values, being reported at mass fractions that are close to, and in some cases below, a realistic detection limit for the technique. It is noted, however, that distributions of data were more regular for many analytes that frequently displayed poor distributions in previous Geo*PT* rounds, in particular, Cu, Mo, Sn, Ta, V and W. In some cases this may have been due to the elevated mass fractions present in this test material.

In some sets of results stepped distributions are apparent where insufficient decimal places are quoted to obtain a smooth distribution. It is to be recommended that minor components such TiO_2, MnO and P_2O_5 are quoted to at least three decimal places in order to more effectively define the consensus. Similar logic also applies to components at low mass fractions. For several trace elements, some of which rarely feature in Geo*PT* and are not often illustrated for information purposes, there is a suggestion that with more data, a valid consensus might have been achieved. This applies especially to In and Te.

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. For Geo*PT*46, 1623 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. For Geo*PT*46, 2112 results of data quality 2 were submitted.

The target standard deviation (H_a) for each measurand 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 mass fraction of the element; the factor k = 0.01 for pure geochemistry laboratories and k = 0.02 for applied geochemistry laboratories.

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

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

Where X is the contributed measurement result, X_a is the assigned value and H_a is the target standard deviation (all as mass fractions). *Z*-scores for results contributed to Geo*PT*46 are listed in Table 3. Results designated as data quality 1 are shown in bold: results of data quality 2 are shown underlined. *Z*-scores derived from provisional values of measurands are shown in italics.

Participating laboratories are invited to assess their performance using the following criteria:–

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 an element falls outside this range, especially if it is outside the range $-3<z<3$, laboratories are advised to examine their procedures, and if necessary, take action to ensure that determinations are not subject to unsuspected analytical bias.

Overall performance

A summary of the overall performance of individual laboratories for this round is plotted in multiple *z*-score charts in Figure 3. In these charts, the *z*-score performance for each element is distinguished by symbols that make it easy to identify whether the results were satisfactory or gave *z*-scores that exceeded the action limits. This chart is designed to help individual laboratories judge their overall performance in this proficiency testing round. Participants should always review their *z*-scores in accordance with their own fitness-for-purpose criteria.

Participation in future rounds

The benefit from proficiency testing arises from regular participation and laboratories are invited to contribute to Round 47, the test sample for which will be distributed during March 2020.

Acknowledgements

The authors once again thank Cynthia Turner and Andrea Mills (BGS) for much-valued assistance in distributing this sample and Thomas Meisel for development of procedures involving the Shiny App which has greatly assisted the investigation of data according to analytical procedure and facilitated analysis of datasets involving modes derived according to Thompson (2017).

References

IAG (2018) Protocol for the operation of the Geo*PT* Proficiency testing scheme. International Association of Geoanalysts (Keyworth, UK), 18pp. <u>*http://www.geoanalyst.org/wp-content/uploads/2018/06/GeoPT-revised-protocol-2018.pdf*</u>.

Potts P.J., Webb P.C. and Thompson M. (2015) Bias in the determination of Zr, Y and rare earth element concentrations in selected silicate rocks by ICP-MS when using some routine acid dissolution procedures: Evidence from the GeoPT proficiency testing programme. *Geostandards and Geoanalytical Research*, 39, 403–416.

Thompson, M. (2017) On the role of the mode as a location parameter for the results of proficiency tests in chemical measurement. *Anal. Methods*, **9**, p.5534-5540.

ADDENDUM
— <u>AN IMPORTANT NOTICE TO ANALYSTS</u>

<u>Explicit advice to analysts regarding reporting of procedures involving ignition and fusion</u>:

We continue to request that analysts reporting measurement results for procedures involving fusion, sintering or ignition, and in particular, LOI determinations, specify the temperature used and where appropriate, the end-point criterion, e.g. the duration of ignition. This information should be supplied in the descriptions of your relevant **Procedures,** as **Additional Details**.

Note that a large number of laboratories are listing their procedure for determining LOI as the same as that employed for major elements, rather than providing separate, specific details. It is important to provide information that is appropriate for every analyte.

In addition it would help if details of gravimetric procedures were included under **Analytical Technique details** rather than under **Sample Preparation details**. For gravimetric analysis, other than drying, which should in any case be carried out according to our instructions, there is no other sample preparation involved.

References of general relevance

Potts P.J., Webb, P.C. and Thompson M. (2019) The Geo*PT* proficiency testing programme as a scheme for the certification of geological reference materials. *Geostandards and Geoanalytical Research*, **43**, 409–418.

Webb, P.C., Potts P.J., Thompson M., Wilson, S.A. and Gowing, C.J.B. (2019) The long-term robustness and stability of consensus values as composition location estimators for a typical geochemical test material in the Geo*PT* proficiency testing programme. *Geostandards and Geoanalytical Research*, **43**, 397–408.

Potts P.J. and Webb, P.C (2019) An Evaluation of Methods for Assessing the Competence of Laboratories Based on Performance in the Geo*PT* Proficiency Testing Scheme. *Geostandards and Geoanalytical Research*, **43**, 217–229.

Appendix 1

Publication status of proficiency testing reports. Previous reports are available for download from the IAG website (http://www.geoanalyst.org/).

Geo*PT*1
Thompson M., Potts P.J., Kane J.S. and Webb P.C. (1996) Geo*PT*1. International proficiency test for analytical geochemistry laboratories - Report on round 1. Geostandards Newsletter: The Journal of Geostandards and Geoanalysis, 20, 295-325.

Geo*PT*2
Thompson M., Potts P.J., Kane J.S., Webb P.C. and Watson, J.S. (1998)
Geo*PT*2. International proficiency test for analytical geochemistry laboratories - Report on round 2. Geostandards Newsletter: The Journal of Geostandards and Geoanalysis, 22 127-156.

Geo*PT*3
Thompson M., Potts P.J., Kane J.S. and Chappell B.W. (1999a) Geo*PT*3. International proficiency test for analytical geochemistry laboratories - Report on round 3. Geostandards Newsletter: The Journal of Geostandards and Geoanalysis, 23, 87-121.

Geo*PT*4
Thompson M., Potts P.J., Kane J.S., Webb P.C. and Watson J.S. (1999b)
Geo*PT*4. 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).

Geo*PT*5
Thompson M., Potts P.J., Kane J.S., and Wilson S. (1999c) Geo*PT*5. 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).

Geo*PT*6
Potts P.J., Thompson M., Kane J.S., Webb P.C. and Carignan J. (2000) GEO*PT*6 - 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.

Geo*PT*7
Potts P.J., Thompson M., Kane J.S., and Petrov L.L. (2000) GEO*PT*7 - an international proficiency test for analytical geochemistry laboratories - report on round 7 (GBPG-1 Garnet-biotite plagiogneiss). International Association of Geoanalysts: Unpublished report.

Geo*PT*8
Potts P.J., Thompson M., Kane J.S., Webb, P.C. and Watson J.S. (2000)
GEO*PT*8 - an international proficiency test for analytical geochemistry laboratories - report on round 8 / February 2001 (OU-4 Penmaenmawr microdiorite). International Association of Geoanalysts: Unpublished report.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Geo*PT*23
Webb, P.C., Thompson, M., Potts, P.J., Watson, J.S. and Kriete, C. (2008)
Geo*PT*23 - 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.

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

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

Geo*PT*26
Webb, P.C., Thompson, M., Potts, P.J. and Loubser, M. (2010)
Geo*PT*26 - an international proficiency test for analytical geochemistry laboratories - report on round 26 / January 2010 (Ordinary Portland cement, OPC-1). International Association of Geoanalysts: Unpublished report.

Geo*PT*27
Webb, P.C., Thompson, M., Potts, P.J. and Batjargal, B. (2010)
Geo*PT*27 - an international proficiency test for analytical geochemistry laboratories - report on round 27 / July 2010 (Andesite, MGL-AND). International Association of Geoanalysts: Unpublished report.

Geo*PT*28
Webb, P.C., Thompson, M., Potts, P.J. and Wilson, S. (2011)
Geo*PT*28 - an international proficiency test for analytical geochemistry laboratories - report on round 28 / January 2011 (Shale, SBC-1). International Association of Geoanalysts: Unpublished report.

Geo*PT*29
Webb, P.C., Thompson, M., Potts, P.J. and Wilson, S. (2011)
Geo*PT*29 - an international proficiency test for analytical geochemistry laboratories - report on round 29 / July 2011 (Nephelinite, NKT-1). International Association of Geoanalysts: Unpublished report.

Geo*PT*30
Webb, P.C., Thompson, M., Potts, P.J., Long, D. and Batjargal, B. (2012)
Geo*PT*30 - an international proficiency test for analytical geochemistry laboratories - report on round 30 / January 2012 (Syenite, CG-2) and 30A (Limestone, ML-2). International Association of Geoanalysts: Unpublished report.

Geo*PT*31
Webb, P.C., Thompson, M., Potts, P.J and Wilson, S. (2012)
Geo*PT*31 - an international proficiency test for analytical geochemistry laboratories - report on round 31 / July 2012 (Modified river sediment, SdAR-1). International Association of Geoanalysts: Unpublished report.

Geo*PT*32
Webb, P.C., Thompson, M., Potts, P.J and Webber, E. (2013)
Geo*PT*32 - an international proficiency test for analytical geochemistry laboratories - report on round 32 / January 2013 (Woodstock Basalt, WG-1). International Association of Geoanalysts: Unpublished report.

Geo*PT*33
Webb, P.C., Thompson, M., Potts, P.J., Prusisz, B., and Young, K. (2013)
Geo*PT*33 - an international proficiency test for analytical geochemistry laboratories - report on round 33 / July-August 2013 (Ball Clay, DBC-1). International Association of Geoanalysts: Unpublished report.

Geo*PT*34
Webb, P.C., Thompson, M., Potts, P.J and Wilson, S. (2014)
Geo*PT*34 - an international proficiency test for analytical geochemistry laboratories - report on round 34 (Granite, GRI-1) / January 2014. International Association of Geoanalysts: Unpublished report.

Geo*PT*35
Webb, P.C., Thompson, M., Potts, P.J and Wilson, S. (2014)
Geo*PT*35 - an international proficiency test for analytical geochemistry laboratories - report on round 35 (Tonalite, TLM-1) / August 2014. International Association of Geoanalysts: Unpublished report.

Geo*PT*35A
Webb, P.C., Thompson, M., Potts, P.J and Wilson, S. (2014)
Geo*PT*35A - an international proficiency test for analytical geochemistry laboratories - report on round 35A (Metalliferous sediment, SdAR-H1) / August 2014. International Association of Geoanalysts: Unpublished report.

Geo*PT*36
Webb, P.C., Thompson, M., Potts, P.J and Wilson, S. (2015)
Geo*PT*36 - an international proficiency test for analytical geochemistry laboratories - report on round 36 (Gabbro, GSM-1) / January 2015. International Association of Geoanalysts: Unpublished report.

Geo*PT*36A
Webb, P.C., Thompson, M., Potts, P.J and Wilson, S. (2015)
Geo*PT*36A - an international proficiency test for analytical geochemistry laboratories - report on round 36A (Metal-rich sediment, SdAR-M2) / January 2015. International Association of Geoanalysts: Unpublished report.

GeoPT37
Webb, P.C., Thompson, M., Potts, P.J, Gowing, C.J.B. and Burnham, M. (2015)
Geo*PT*37 - an international proficiency test for analytical geochemistry laboratories - report on round 37 (Rhyolite, ORPT-1) / July 2015. International Association of Geoanalysts: Unpublished report.

GeoPT37A
Webb, P.C., Thompson, M., Potts, P.J, Gowing, C.J.B. and Wilson, S. (2015)
Geo*PT*37A - an international proficiency test for analytical geochemistry laboratories - report on round 37A (Blended sediment, SdAR-L2) / July 2015. International Association of Geoanalysts: Unpublished report.

GeoPT38
Webb, P.C., Thompson, M., Potts, P.J, Gowing, C.J.B. and Wilson, S.A. (2016)
Geo*PT*38 - an international proficiency test for analytical geochemistry laboratories - report on round 38 (Gabbro, OU-7) / January 2016. International Association of Geoanalysts: Unpublished report.

GeoPT38A
Webb, P.C., Thompson, M., Potts, P.J, Gowing, C.J.B. and Meisel, T. (2016)
Geo*PT*38A - an international proficiency test for analytical geochemistry laboratories – special report on round 38A (Modified harzburgite, HARZ01) / June 2016. International Association of Geoanalysts: Unpublished report.

GeoPT39
Webb, P.C., Thompson, M., Potts, P.J, Gowing, C.J.B. and Wilson, S.A. (2016)
Geo*PT*39 - an international proficiency test for analytical geochemistry laboratories - report on round 39 (Syenite, SyMP-1) / July 2016. International Association of Geoanalysts: Unpublished report.

GeoPT39A
Webb, P.C., Thompson, M., Potts, P.J, and Gowing, C.J.B. (2016)
Geo*PT*39A - an international proficiency test for analytical geochemistry laboratories - report on round 39A (Nepheline syenite, MNS-1) / July 2016. International Association of Geoanalysts: Unpublished report.

GeoPT40
Webb, P.C., Thompson, M., Potts, P.J, Gowing, C.J.B. and Wilson, S.A. (2017)
Geo*PT*40 - an international proficiency test for analytical geochemistry laboratories - report on round 40 (Silty marine shale, ShWYO-1) / January 2017. International Association of Geoanalysts: Unpublished report.

GeoPT40A
Webb, P.C., Thompson, M., Potts, P.J, Gowing, C.J.B. and Wilson, S.A. (2017)
Geo*PT*40A - an international proficiency test for analytical geochemistry laboratories - report on round 40A (Calcareous organic-rich shale, ShTX-1) / January 2017. International Association of Geoanalysts: Unpublished report.

GeoPT41
Webb, P.C., Thompson, M., Potts, P.J, Gowing, C.J.B. and Wilson, S.A. (2017)
Geo*PT*41 - an international proficiency test for analytical geochemistry laboratories - report on round 41 (Andesite, ORA-1) / July 2017. International Association of Geoanalysts: Unpublished report.

GeoPT41A
Webb, P.C., Thompson, M., Potts, P.J, Gowing, C.J.B. and Wilson, S.A. (2017)
Geo*PT*41A - an international proficiency test for analytical geochemistry laboratories - report on round 41A (Mineralized stream sediment, SSCO-1) / July 2017. International Association of Geoanalysts: Unpublished report.

GeoPT42
Webb, P.C., Thompson, M., Potts, P.J., Gowing, C.J.B. and Burnham, M. (2018)
Geo*PT*42 – an international proficiency test for analytical geochemistry laboratories – report on round 42 (Queenston shale, QS-1) / January 2018. International Association of Geoanalysts: Unpublished report.

GeoPT43
Webb, P.C., Potts, P.J., Thompson, M. and Gowing, C.J.B. (2018)
Geo*PT*43 – an international proficiency test for analytical geochemistry laboratories – report on round 43 (Dolerite, ADS-1) / July 2018. International Association of Geoanalysts: Unpublished report.

GeoPT44
Webb, P.C., Potts, P.J., Thompson, M., Gowing, C.J.B. (2019)
Geo*PT*44 – an international proficiency test for analytical geochemistry laboratories – report on round 44 (Calcareous shale, ShCX-1) / January 2019. International Association of Geoanalysts: Unpublished report.

GeoPT44A
Webb, P.C., Potts, P.J., Thompson, M. Gowing, C.J.B. and Wilson, S.A. (2019)
Geo*PT*44A – an international proficiency test for analytical geochemistry laboratories – report on round 44A (Calcareous mudrock, CM-1) / January 2019. International Association of Geoanalysts: Unpublished report.

GeoPT45
Webb, P.C., Potts, P.J., Thompson, M. Gowing, C.J.B. and Wilson, S.A. (2019)
Geo*PT*45 – an international proficiency test for analytical geochemistry laboratories – report on round 45 (Silicified siltstone, GONV-1) / July 2019. International Association of Geoanalysts: Unpublished report.

Table 1 - GeoPT46 Contributed data for Granodiorite, HG-1. 11/12/2019

Lab Code		F1	F2	F3	F4	F5	F6	F7	F9	F10	F11	F12	F14	F15
SiO2	g 100g⁻¹	68	67.982	**68.102**	67	68.066	68.21	**68.2**	**68.13**			68.1	67.88	**68.64**
TiO2	g 100g⁻¹	0.5	0.502	**0.504**	0.468	0.478	0.48	**0.5**	**0.472**			0.49	0.48	**0.487**
Al2O3	g 100g⁻¹	15.25	15.912	**15.094**	14.99	15.133	15.44	**15.2**	**15.34**			15.12	15.18	**15.14**
Fe2O3T	g 100g⁻¹	2.66	2.747	**2.625**	2.61	2.653	2.7	**2.84**	**2.74**			2.63	2.62	**2.75**
Fe(II)O	g 100g⁻¹			**1.353**										
MnO	g 100g⁻¹	0.037	0.044	**0.044**	0.045	0.057	0.043		**0.047**	0.044		0.05		**0.046**
MgO	g 100g⁻¹	1.15	1.188	**1.11**	1.12	1.143	1.2	**1.14**	**1.173**			1.1	1.12	**1.13**
CaO	g 100g⁻¹	1.69	1.708	**1.715**	1.7	1.534	1.79	**1.71**	**1.713**			1.7	1.64	**1.7**
Na2O	g 100g⁻¹	3.96	3.715	**3.966**	3.87	3.741	3.85	3.36	**3.662**			3.77	3.79	**3.8**
K2O	g 100g⁻¹	5.17	5.046	**5.581**	5.05	5.107	5.3	**5.18**	**4.76**			5.17	4.95	**5.07**
P2O5	g 100g⁻¹	0.21	0.216	**0.198**	0.2	0.182	0.217	**0.21**	**0.208**			0.2	0.2	**0.208**
H2O+	g 100g⁻¹			**1.425**				**0.18**						
CO2	g 100g⁻¹													
LOI	g 100g⁻¹	0.85	0.859	**0.68**		0.865	0.81	**0.85**	**0.991**			0.75	0.86	**0.77**
Ag	mg kg⁻¹			**0.408**							0.18			
As	mg kg⁻¹			**1.77**			1.7				1.75		1.476	
Au	mg kg⁻¹													
B	mg kg⁻¹										2			
Ba	mg kg⁻¹	670	719	**653.440**	711	727	643.9	**701**	**691**	684.4	76.18	709	849.208	**719**
Be	mg kg⁻¹			**10.81**					**9.87**		2		6.641	
Bi	mg kg⁻¹			**6.13**			4.1				5.36		3.590	
Br	mg kg⁻¹													
C(org)	mg kg⁻¹													
C(tot)	mg kg⁻¹				570		500							
Cd	mg kg⁻¹			**0.065**							0.075		0.066	
Ce	mg kg⁻¹			**94.695**	97	99.6	76.1	80	**96.5**	88.7			110.750	**98.59**
Cl	mg kg⁻¹													
Co	mg kg⁻¹		11	**12.53**		12.2	6.1		**5.8**	6	5	11	4.125	
Cr	mg kg⁻¹		461	**241.830**	519	433	414.5	511	**484**	467.3	257	482	437.144	**515**
Cs	mg kg⁻¹			**14.78**		9.67	10.7		**96.5**	11.8	7.008		71.580	**13.94**
Cu	mg kg⁻¹		38	**56.43**	51	53.8	47		**52.5**	47.8	52.7	52	42.230	**53**
Dy	mg kg⁻¹			**3.019**					**2.31**		1.43		2.662	**2.54**
Er	mg kg⁻¹			**1.379**					**1.01**		0.644		1.250	**1.08**
Eu	mg kg⁻¹			**1.73**					**1.54**		0.7		1.562	**1.48**
F	mg kg⁻¹		1156	**0.151**						1059				
Ga	mg kg⁻¹		27	**34.5**	24	22	22.3			24.49		23	25.155	**23**
Gd	mg kg⁻¹			**5.676**					**4.85**		3.37		4.300	**3.88**
Ge	mg kg⁻¹										0.1			
Hf	mg kg⁻¹		9	**2.739**			4.2		**4.51**				3.427	**5.03**
Hg	mg kg⁻¹													
Ho	mg kg⁻¹			**0.521**					**0.4**		0.22		0.469	**0.44**
I	mg kg⁻¹													
In	mg kg⁻¹			**0.027**										
La	mg kg⁻¹			**47.908**	46	47.8	45.4	49	**47.1**	44.1		43	54.326	**49.55**
Li	mg kg⁻¹		92	**94.54**							69		217.553	
Lu	mg kg⁻¹			**0.217**					**0.15**		0.07		0.168	**0.14**
Mo	mg kg⁻¹			**5.55**			3.4		**4.5**	3.82	3.79		3.479	
Nb	mg kg⁻¹			**15.48**		9.63	10.6	**12**	**14.73**	11.86	0.17			**12.12**
Nd	mg kg⁻¹			**46.085**		36.4	25.4		**39.3**		27.66		42.674	**38.21**
Ni	mg kg⁻¹		24	**19.3**	20	18.4	14.7	21	**18.8**	16.8	13.8	18	12.937	**17**
Pb	mg kg⁻¹			**34.24**		45.4	34.9	43	**45.8**	42.22	15.11		40.110	**41.34**
Pd	mg kg⁻¹													
Pr	mg kg⁻¹			**12**					**10.99**		7.9		12.425	**11.01**
Pt	mg kg⁻¹													
Rb	mg kg⁻¹			**389.050**		266	251.6	**270**	**254**	268.820			808.406	**268**
Re	mg kg⁻¹													
S	mg kg⁻¹	1080		**1100**	1180		300							
Sb	mg kg⁻¹			**0.59**			3.1				0.009		0.193	
Sc	mg kg⁻¹			**6.78**			3.2		**4.4**		3.7		8.120	**4.8**
Se	mg kg⁻¹										0.22			
Sm	mg kg⁻¹			**7.264**			5.6		**6.01**		3.89		6.773	**6.2**
Sn	mg kg⁻¹			**6.3**		3.69	5.7				1.56		4.747	
Sr	mg kg⁻¹	456	422	**411.7**		466	426.1	**451**	**386**	444.050		437	450.601	**468**
Ta	mg kg⁻¹			**2.47**			1.1		**1.238**				0.924	**0.97**
Tb	mg kg⁻¹			**0.572**					**0.55**		0.327		0.562	**0.51**
Te	mg kg⁻¹			**0.34**			1.6							
Th	mg kg⁻¹			**32.71**		29.5	21.3		**23.26**	24.29	26.31		41.253	**24.73**
Tl	mg kg⁻¹			**1.574**							0.318		1.709	
Tm	mg kg⁻¹			**0.221**					**0.15**		0.079		0.177	**0.15**
U	mg kg⁻¹			**9.27**		7.44	8.7		**8.18**	6.7	6.49		7.598	**7.99**
V	mg kg⁻¹			**39.79**	35		30.3	41	**39.38**	36.74		39	33.206	**42**
W	mg kg⁻¹			**26.96**			17		**22.54**		6.57		23.662	
Y	mg kg⁻¹		14	**11.02**	100		9.2		**10.35**	9.91			17.463	**11.6**
Yb	mg kg⁻¹			**1.049**					**1.02**		0.489		1.207	**0.94**
Zn	mg kg⁻¹		30	**30.38**	33	31	30	39	**32.45**	32.18	31.6	32	24.585	**31**
Zr	mg kg⁻¹		225	**75.53**	165	203	152	172	**182.5**	168.850	6.49	140	114.900	**182**

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2

Table 1 - GeoPT46 Contributed data for Granodiorite, HG-1. 11/12/2019

Lab Code		F16	F17	F18	F19	F20	F21	F22	F26	F29	F30	F31	F33	F34
SiO2	g 100g^{-1}	68.21		68.69	69.16	68.59	68.721	70.52	72.3	68.45	68.5	68.32	68.37	68.562
TiO2	g 100g^{-1}	0.5		0.46	0.483	0.498	0.497	0.48	0.44	0.48	0.53	0.49	0.506	0.492
Al2O3	g 100g^{-1}	15.43	16.04	15.54	15.61	15.5	15.33	14.44	14.23	15.28	15.4	15.28	15.15	15.199
Fe2O3T	g 100g^{-1}	2.6	2.81	2.1	2.69	2.57	2.838	2.626	2.497	2.66	2.73	2.68	2.657	2.672
Fe(II)O	g 100g^{-1}			1					1.66					
MnO	g 100g^{-1}	0.05	0.044	0.05	0.04	0.053	0.048	0.042	0.044	0.05	0.06	0.05		0.043
MgO	g 100g^{-1}	1.18	1.22	1.33	1.2	1.11	1.202	1.104	1.18	1.12	1.28	1.11	1.169	1.153
CaO	g 100g^{-1}	1.66	1.61	1.71	1.72	1.66	1.893	1.542	1.61	1.7	1.7	1.66	1.639	1.725
Na2O	g 100g^{-1}	4	3.93	3.85	3.71	3.62	3.736	3.948	2.86	3.83	3.89	3.85	3.881	3.819
K2O	g 100g^{-1}	5.03	5.13	5.02	5.1	5.02	4.429	4.978	4.39	5.07	5.13	5.24	5.136	5.048
P2O5	g 100g^{-1}	0.19		0.21	0.198	0.205	0.204	0.214	0.188	0.21	0.21	0.21	0.206	0.209
H2O+	g 100g^{-1}													
CO2	g 100g^{-1}						0.195							
LOI	g 100g^{-1}	0.93		0.9	0.92		1.018		0.85	0.8	0.87	0.98	0.876	0.85
Ag	mg kg^{-1}			0.2			0.134	0.192	0.26		0.18			
As	mg kg^{-1}	2.9		1.8	2.33		2.75	2.122			1.96			
Au	mg kg^{-1}								0.001					
B	mg kg^{-1}			8.4				6.1						
Ba	mg kg^{-1}	658.5	717.3	475	703.060	676	747.719	713.6	665.7	730	714	652		703.2
Be	mg kg^{-1}			3.8	8.291	9.34		7.66	9.03	8.1	7.29			7.862
Bi	mg kg^{-1}			3.3	5.352			5.962	4.76	4.93				5.281
Br	mg kg^{-1}													
C(org)	mg kg^{-1}													
C(tot)	mg kg^{-1}						532.250			500			452	
Cd	mg kg^{-1}			0.019	0.199	0.28		0.073	0.113		0.04			
Ce	mg kg^{-1}	83.2	94.08	57	92.03	97.28	100.670	95.99	96.3	99.6	91.9			83.98
Cl	mg kg^{-1}													
Co	mg kg^{-1}	6.5	5.31	4	5.356	5.77	6.292	5.972	5.31	6	5.24			5.505
Cr	mg kg^{-1}	423.5	523.8	410	474.845	529.5	515.497	472.3	607.4	522.8	579	412		544.6
Cs	mg kg^{-1}	13.1	13.72	9	13.35	13.65	14	12.87		13.4				13.79
Cu	mg kg^{-1}	45.5	50.72	37	56.371	62.83	79.062	55.64	40.83	54	51.4	52		50.47
Dy	mg kg^{-1}		2.15	1.5	2.228	2.36	2.355	2.449	2.72	2.25	2.32			2.306
Er	mg kg^{-1}		0.934	0.68	0.997	1.27	1.063	1.062	1.27	1.03	1.09			1.011
Eu	mg kg^{-1}		1.25	0.9	1.373	1.57	1.409	1.508	1.4	1.31	1.32			1.366
F	mg kg^{-1}					0.08					1130			
Ga	mg kg^{-1}	21.8	23.99	21	23.74	24.54	24.569	22.15	22.54	23.9		21		23.01
Gd	mg kg^{-1}		4.19	2.5	3.663	6.01	3.951	3.843	5.03	3.94	4.19			3.776
Ge	mg kg^{-1}			1.6						1.7				
Hf	mg kg^{-1}		4.82	2.4	5.039		4.892	5.445		5.4	5.21			4.883
Hg	mg kg^{-1}													
Ho	mg kg^{-1}		0.383	0.26	0.371	0.4	0.406	0.406	0.4	0.4	0.39			0.384
I	mg kg^{-1}													
In	mg kg^{-1}								0.038					
La	mg kg^{-1}	56.8	46.7	27	46.62	47.6	49.514	48.26	47	50.1	47.2			46.74
Li	mg kg^{-1}			53		104		93.94		96				102.5
Lu	mg kg^{-1}		0.138	0.09	0.133	0.14	0.142	0.132	0.24	0.145	0.14			0.136
Mo	mg kg^{-1}	3.1	4.04	4.9	3.85	4.66	4.86	4.68		4.2	3.76			4.183
Nb	mg kg^{-1}	10.9	12.66	12	11.68		12.574	11.21		12.1	11.2	11		11.72
Nd	mg kg^{-1}	27.6	36.86	24	36.53	36.33	38.699	37.53	37.2	38.22	36.6			35.74
Ni	mg kg^{-1}	16	20.68	14	28.265	21.74	20.248	19.86	19.2	18	17.4	16		19.32
Pb	mg kg^{-1}	54.6	43.63	15	41.072	35.5	55.623	42.41	35.7	42	39.9	43		40.38
Pd	mg kg^{-1}								0.001					
Pr	mg kg^{-1}		10.68	6.6	10.18	10.38	10.87	11.05	10	10.92	9.81			9.978
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	265.4	262.2	213	264.210	254	271.420	263.3	260	270.1		255		265.9
Re	mg kg^{-1}													
S	mg kg^{-1}			0.1			1065.750	1147	2.34	1100	1400		1150	
Sb	mg kg^{-1}			0.15			0.325	0.212	0.72		0.2			0.194
Sc	mg kg^{-1}	8.2	5.24	4.3		4.21	10.397	6.13	4.5					4.079
Se	mg kg^{-1}			0.178				0.08			1.64			
Sm	mg kg^{-1}	3.2	5.66	3.8	5.69	5.69	5.95	5.587	5.63	5.74	5.89			5.762
Sn	mg kg^{-1}			3	4.55			3.96	9.66	4.2		10		4.036
Sr	mg kg^{-1}	445.1	434.3	340	451.910	420	468.845	413.9	439	461.7		440		453.3
Ta	mg kg^{-1}		1.05	0.9	0.754		0.918	0.941		0.95	0.77			1.048
Tb	mg kg^{-1}		0.532	0.26	0.477	0.61	0.458	0.466	0.56	0.45	0.49			0.452
Te	mg kg^{-1}			0.09		0.65								
Th	mg kg^{-1}	20.8	23.15	9.1	23.047	22.29	24.481	21.02	24.36	23.1	21	24		22.92
Tl	mg kg^{-1}			0.8	1.187	1.33		1.425		1.37	1.37			
Tm	mg kg^{-1}		0.148	0.09	0.138	0.14	0.158	0.174	0.15	0.15	0.14			0.146
U	mg kg^{-1}	8.6	7.45	5.2	7.646	7.85	8.214	7.913	7.27	8.1	7.58			8.105
V	mg kg^{-1}	38.6	38.18	33	37.429	41.1	45.687	41.58	36.7	40	37.6	37		38.55
W	mg kg^{-1}	23.3		21	20.05	68		18.95		21		18		
Y	mg kg^{-1}	11.9	11.06	7	10.893		11.035	10.6	9.8	10.3	9.3	10		11.31
Yb	mg kg^{-1}		0.913	0.6	0.895	1	0.963	0.983	0.9	0.96	0.96			0.901
Zn	mg kg^{-1}	32.6	31.09	20	44	29	34.365	35.3	30.3	34	29.8	29		31.42
Zr	mg kg^{-1}	163.8	173.6	130	174.960	163	143.256	178.5	105	176	176	158		169.4

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2

Table 1 - GeoPT46 Contributed data for Granodiorite, HG-1. 11/12/2019

Lab Code		F35	F36	F37	F38	F39	F40	F41	F43	F45	F46	F47	F48	F50
SiO2	g 100g^{-1}	68.6	68.7	**68.3**	68.569	68.542	69.068	**69.96**	**68.8**	67.86	**68.399**	**64.74**	69.39	68.84
TiO2	g 100g^{-1}	0.487	0.487	**0.47**	0.485	0.532	0.511	**0.47**	**0.51**	0.493	**0.501**	**0.501**	0.49	0.49
Al2O3	g 100g^{-1}	15.3	15.3	**15**	15.411	15.282	15.266	**14.87**	**15.3**	15.23	**15.294**	**13.55**	15.35	15.57
Fe2O3T	g 100g^{-1}	2.76	2.62	**2.65**	2.694	2.701	2.726	**2.45**	**2.58**	2.666	**2.685**		2.68	2.64
Fe(II)O	g 100g^{-1}				1.782			**0.53**					1.7	
MnO	g 100g^{-1}	0.044	0.047	**0.045**	0.048	0.038		**0.04**	**0.05**	0.045	**0.046**		0.05	
MgO	g 100g^{-1}	1.12	1.15	**1.12**	1.158	1.163	1.107	**1.45**	**1.14**	1.141	**1.132**		1.16	1.09
CaO	g 100g^{-1}	1.67	1.693	**1.73**	1.713	1.724	1.798	**1.68**	**1.67**	1.703	**1.724**	**1.68**	1.71	1.68
Na2O	g 100g^{-1}	3.75	3.57	**4.45**	3.896	3.691	3.682	**3.83**	**4.01**	3.879	**3.851**	**0.018**	3.79	3.67
K2O	g 100g^{-1}	5.12	4.84	**5.15**	5.081	5.193	5.011	**5.08**	**4.97**	5.093	**5.092**	**0.217**	5.04	4.99
P2O5	g 100g^{-1}	0.214	0.21	**0.21**	0.213	0.206	0.209	**0.21**	**0.19**	0.209	**0.209**		0.21	0.2
H2O+	g 100g^{-1}				1.048			**0.96**						
CO2	g 100g^{-1}							**0.2**						
LOI	g 100g^{-1}	0.855	0.99	**0.88**	0.786	0.93	0.92		**0.9**	0.8	**0.74**	**0.875**	0.74	0.8
Ag	mg kg^{-1}			**0.18**	0.150								0.18	
As	mg kg^{-1}			**2.151**	1.868				**3.018**				2.6	
Au	mg kg^{-1}													
B	mg kg^{-1}													
Ba	mg kg^{-1}		736	**719.7**	666.6	661	700.8	**683**	**724.406**	668.2	**706.2**		704	725
Be	mg kg^{-1}			**9.615**	7.404		8.08		**8.151**				7.45	
Bi	mg kg^{-1}			**4.942**	4.67						**5.5**		4.75	
Br	mg kg^{-1}													
C(org)	mg kg^{-1}												400	
C(tot)	mg kg^{-1}				401								700	
Cd	mg kg^{-1}			**0.06**	0.046				**0.093**				0.06	
Ce	mg kg^{-1}		96	**99.917**	92.53		96.83	**9**	**98.476**	85.76	**91.6**	**105**	97	
Cl	mg kg^{-1}				129			**52**			**112**			
Co	mg kg^{-1}			**5.882**	5.742	6	5.69	**4**	**5.727**				6	
Cr	mg kg^{-1}		518	**529.143**	551.020	574	518.4	**481**	**545.7**	457	**528.8**		367	392
Cs	mg kg^{-1}		12.8	**13.485**	13.748		13.82	**14**	**13.935**		**10.6**		14.65	
Cu	mg kg^{-1}		51.8	**58.744**	50.55	59	50.3	**49**	**52.9**	50.63	**55.3**		55.8	
Dy	mg kg^{-1}		2.37	**2.085**	2.319		2.23		**2.228**		**2.56**	**2.45**	2.28	
Er	mg kg^{-1}		1.08	**0.91**	1.041		1.02		**1.003**			**1.145**	1.02	
Eu	mg kg^{-1}		1.45	**1.296**	1.318		1.35		**1.322**			**1.545**	1.25	
F	mg kg^{-1}				1156			**848**						
Ga	mg kg^{-1}		25.3	**24.565**	23.461		23.5	**23**	**23.031**	24.6	**23.8**		24.2	
Gd	mg kg^{-1}		4.59	**3.572**	3.756		3.82		**3.675**			**5.295**	3.54	
Ge	mg kg^{-1}												0.15	
Hf	mg kg^{-1}			**5.087**	4.85		4.62	**5**	**4.616**	8.44	**4.3**		3.2	
Hg	mg kg^{-1}													
Ho	mg kg^{-1}		0.4	**0.349**	0.406		0.39		**0.394**			**0.42**	0.4	
I	mg kg^{-1}													
In	mg kg^{-1}				0.022								0.022	
La	mg kg^{-1}		47.7	**47.705**	45.71		47.92	**47**	**18.246**	51.86	**43.9**	**54.15**	47.6	
Li	mg kg^{-1}			**100.351**	89.77				**103.632**				104.5	
Lu	mg kg^{-1}		0.15	**0.124**	0.139				**0.13**			**0.175**	0.14	
Mo	mg kg^{-1}			**4.466**	3.897		4.35	**5**	**4.584**	4.193	**3.7**		4.38	
Nb	mg kg^{-1}		12.3	**12.562**	11.145	8	10.37	**10**	**12.439**	11.71	**12.3**		13	
Nd	mg kg^{-1}		33.3	**37.723**	36.048		36.98	**33**	**37.476**	42.42	**33.8**	**43.4**	37.3	
Ni	mg kg^{-1}		20.8	**17.801**	19.29	21	15.9	**19**	**18.501**	18.19	**18.1**		19.4	
Pb	mg kg^{-1}		38	**41.899**	39.161	39	41.33	**39**	**33.995**	37.2	**40.5**		41	
Pd	mg kg^{-1}													
Pr	mg kg^{-1}		10.6	**10.027**	10.312		10.57		**10.894**			**11.15**	10.85	
Pt	mg kg^{-1}													
Rb	mg kg^{-1}		244	**271.305**	250.038	275	253.770	**262**	**283.534**	269.4	**273.6**		276	
Re	mg kg^{-1}												0.002	
S	mg kg^{-1}				923			**568**		1110			1200	
Sb	mg kg^{-1}			**0.213**	0.21				**0.261**				0.24	
Sc	mg kg^{-1}		7.58	**4.779**	4.54		4.7	**5**	**6.058**		**4.52**		4.6	
Se	mg kg^{-1}				0.481								1	
Sm	mg kg^{-1}		5.8	**6.107**	5.507		5.58		**5.761**		**5.62**	**5.585**	5.86	
Sn	mg kg^{-1}		3.8	**4.161**	3.91		3.87	**6**	**4.765**	5.107	**1.95**		4.3	
Sr	mg kg^{-1}		424	**446.040**	421.670	459	454.4	**435**	**453.091**	439.5	**453.5**		463	431
Ta	mg kg^{-1}			**1.054**	0.895		0.85		**0.938**				1	
Tb	mg kg^{-1}		0.51	**0.475**	0.451		0.48		**0.451**			**0.635**	0.5	
Te	mg kg^{-1}		0.7		0.168								0.17	
Th	mg kg^{-1}		25.2	**23.737**	22.963	26	23.05	**23**	**19.742**	24.85	**24.2**		24.6	
Tl	mg kg^{-1}			**1.33**	1.338		1.02		**1.176**				1.38	
Tm	mg kg^{-1}		0.15	**0.144**	0.149				**0.146**			**0.15**	0.18	
U	mg kg^{-1}		8.14	**7.971**	7.550		7.65	**7**	**6.587**	7.684	**8.1**		7.3	
V	mg kg^{-1}		39	**40.012**	39.02	44	36.8	**41**	**39.434**	39.39	**42.1**		39	
W	mg kg^{-1}		15.5	**17.549**	21.016		18.68	**14**	**18.779**				19.5	
Y	mg kg^{-1}		10.3	**9.316**	10.857	28	11.9	**10**	**10.482**	8.181	**11.5**	**9.67**	11.4	
Yb	mg kg^{-1}		0.97	**0.876**	0.957		0.91		**0.907**		**1.5**	**1.035**	0.93	
Zn	mg kg^{-1}		32.5	**33.566**	30.89	21	33.2	**32**	**32.485**	31.1	**33.6**		34	
Zr	mg kg^{-1}		169	**176.076**	182.3	196	161.980	**156**	**167.228**	152.7	**176.8**		216	

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2

Table 1 - GeoPT46 Contributed data for Granodiorite, HG-1. 11/12/2019

Lab Code		F51	F52	F53	F54	F55	F56	F57	F58	F59	F60	F61	F62	F64
SiO2	g 100g^{-1}	68.15	68.62	**68.69**	68.18	68.3	68.09	**69.06**	56.6	**68.3**	68.36	**68.384**	**67.79**	69.6
TiO2	g 100g^{-1}	0.49	0.515	**0.48**	0.486	0.47	0.5	**0.46**	0.339	**0.49**	0.47	**0.493**	**0.48**	0.46
Al2O3	g 100g^{-1}	15.18	15.075	**14.97**	15.1	15.67	15.17	**15.14**	16.2	**15.4**	15.3	**15.136**	**15.15**	14.2
Fe2O3T	g 100g^{-1}	2.61	2.77	**2.39**	2.658	2.68	2.68	**2.53**	1.86	**2.69**	2.65	**2.774**	**2.64**	2.4
Fe(II)O	g 100g^{-1}	1.57	1.78		1.9		1.9			**1.7**				
MnO	g 100g^{-1}	0.04	0.042	**0.06**	0.043	0.07	0.046	**0.041**	0.032	**0.04**	0.04	**0.047**	**0.05**	0.045
MgO	g 100g^{-1}	1.18	1.135	**1.18**	1.143	1.04	1.16	**1.05**	1.86	**1.14**	1.15	**1.134**	**1.13**	1.2
CaO	g 100g^{-1}	1.69	1.685	**1.7**	1.709	1.75	1.73	**1.63**	1.39	**1.73**	1.71	**1.697**	**1.73**	1.6
Na2O	g 100g^{-1}	3.79	3.55	**3.98**	3.854	3.71	3.85	**3.78**		**3.88**	3.89	**3.791**	**3.83**	3.8
K2O	g 100g^{-1}	5.1	5.24	**5.13**	5.065	5.03	4.85	**5.16**	4.51	**5.18**	5.05	**4.957**	**5.02**	5.1
P2O5	g 100g^{-1}	0.219	0.214	**0.21**	0.209	0.19	0.21	**0.2**		**0.21**	0.209	**0.210**	**0.23**	0.25
H2O+	g 100g^{-1}	0.85			0.4									
CO2	g 100g^{-1}				0.22				1.09					
LOI	g 100g^{-1}	0.71	0.91	**0.96**	1.066	1.05	0.88	**0.76**		**0.91**	0.76	**0.984**	**0.69**	0.9
Ag	mg kg^{-1}	0.165			0.39									
As	mg kg^{-1}	2.69			2.7									
Au	mg kg^{-1}													
B	mg kg^{-1}						13							
Ba	mg kg^{-1}	766	722.8	**674**	673.1	617	713		1100	**707**			**691**	688
Be	mg kg^{-1}	7.87	10.134		7.084		8.96							7.6
Bi	mg kg^{-1}	4.66	4.563		4.7		5.2		3.2					
Br	mg kg^{-1}								1.7					
C(org)	mg kg^{-1}	400												
C(tot)	mg kg^{-1}	400			470									
Cd	mg kg^{-1}	0.043					0.15							0.065
Ce	mg kg^{-1}	90.6	94.36	**79**	91.3		102		162	**69**			**86**	87.4
Cl	mg kg^{-1}													160
Co	mg kg^{-1}	5.9	5.93		6	6	5.9						**12**	5.6
Cr	mg kg^{-1}	424	505.980	**426**	545	59	499	**520**	397	**523**			**494**	480
Cs	mg kg^{-1}	14.8	13.818	**19**	14.9		15.5							13.4
Cu	mg kg^{-1}	55.5	56.668	**49**	52.76	45	53		69	**52**			**52**	54.7
Dy	mg kg^{-1}	2.37	2.632		2.04		2.91						**2**	2
Er	mg kg^{-1}	1.105	1.058		0.97		1.23							0.89
Eu	mg kg^{-1}	1.365	1.34		1.23		1.43						**1**	
F	mg kg^{-1}				1192									700
Ga	mg kg^{-1}	24.9	25.355	**24**	25.97	29	26		16	**24**			**23**	23.8
Gd	mg kg^{-1}	3.82	4.728		3.57		6.51						**4**	
Ge	mg kg^{-1}	0.17		**13**	1.86									
Hf	mg kg^{-1}	3.22			5.36		5.5							
Hg	mg kg^{-1}													
Ho	mg kg^{-1}	0.4	0.348		0.35		0.38							0.34
I	mg kg^{-1}													
In	mg kg^{-1}	0.021	0.022				0.019							
La	mg kg^{-1}	43.8	47.008	**47**	44.6		51		84	**55**			**46**	43.7
Li	mg kg^{-1}	99.4			98.2		91.6						**100**	97.6
Lu	mg kg^{-1}	0.145	0.12				0.12							0.12
Mo	mg kg^{-1}	4.52		**4**	4.52				2.3					4.32
Nb	mg kg^{-1}	12.5		**11**	11.52	10	12.2		5.8	**13**			**23**	
Nd	mg kg^{-1}	37.2	35.257		33.3		39		62.9	**29**			**35**	34.5
Ni	mg kg^{-1}	19.25	20.509	**16**	17.9	19	18.3		118	**19**			**12**	19
Pb	mg kg^{-1}	40.8	39.258	**40**	40.24	26	42.5		34.4	**41**				39.9
Pd	mg kg^{-1}													
Pr	mg kg^{-1}	10.7	10.426		9.83		11.6						**8**	9.8
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	291	268.350	**258**	288	272	270		212	**260**			**243**	250
Re	mg kg^{-1}													
S	mg kg^{-1}	1200			1080		1450	**1030**	394					620
Sb	mg kg^{-1}	0.21			0.2		0.33							0.22
Sc	mg kg^{-1}	4.71	4.83	**7**		4	4.77							4.3
Se	mg kg^{-1}	0.066												
Sm	mg kg^{-1}	5.75	5.587		4.99		5.84		110				**5**	5.3
Sn	mg kg^{-1}	4.14			4.22		4.7							4.11
Sr	mg kg^{-1}	452	471.853	**432**	443	457	453		358	**453**			**451**	424
Ta	mg kg^{-1}	0.95			0.9		1							
Tb	mg kg^{-1}	0.488	0.513				0.64							
Te	mg kg^{-1}	0.154												
Th	mg kg^{-1}	23.8	25.114	**13**	22.05	20	25.4		17.2	**27**			**21**	21.4
Tl	mg kg^{-1}	1.33	1.321		1.34		1.32							1.37
Tm	mg kg^{-1}	0.136	0.125				0.12							0.12
U	mg kg^{-1}	7.69	8.237	**11**	7.76		8.8			**8**			**5**	7.66
V	mg kg^{-1}	42.2	42.82	**42**	41	46				**42**			**38**	41.2
W	mg kg^{-1}	21.2			20.48				13.5					
Y	mg kg^{-1}	10.6	10.936	**11**	10.5	8	11.1		7.5	**12**			**9**	18
Yb	mg kg^{-1}	0.909	0.81		0.9		1.02						**0.9**	0.83
Zn	mg kg^{-1}	33.9	36.751	**29**	31.4	35	35.2		29.8	**34**			**44**	34.6
Zr	mg kg^{-1}	108		**165**	173	214	172		103	**169**			**228**	185

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2

Table 1 - GeoPT46 Contributed data for Granodiorite, HG-1. 11/12/2019

Lab Code		F65	F68	F69	F70	F71	F72	F73	F75	F76	F77	F78	F79	F80
SiO2	g 100g^{-1}	68.43	**68.19**	**68**	67.37	67.54	67.92	68	67.43	**68.06**	**67.96**	**68.74**	66.29	68.4
TiO2	g 100g^{-1}	0.49	**0.49**	**0.49**	0.493	0.49	0.51	0.46	0.484	**0.48**	**0.46**	**0.49**	0.448	0.48
Al2O3	g 100g^{-1}	15.36	**15.27**	**15.5**	15.35	16.18	15.61	15.5	14.59	**15.22**	**14.94**	**15.16**	17.02	15.39
Fe2O3T	g 100g^{-1}	2.66	**2.68**	**2.62**	2.66	2.7	2.41	2.82	2.602	**2.64**	**2.71**	**2.74**	2.54	2.71
Fe(II)O	g 100g^{-1}											**1.821**		
MnO	g 100g^{-1}	0.038	**0.028**	**0.05**	0.046	0.06	0.05	0.045	0.04	**0.049**	**0.04**	**0.045**	0.050	0.042
MgO	g 100g^{-1}	1.11	**1.17**	**1.18**	1.13	1.25	1.13	1.3	1.071	**1.1**	**1.17**	**1.13**	1.6	1.17
CaO	g 100g^{-1}	1.57	**1.66**	**1.74**	1.76	1.67	1.65	1.82	1.707	**1.69**	**1.64**	**1.75**	1.74	1.75
Na2O	g 100g^{-1}	3.25	**4**	**3.91**	4	3.66	3.77	3.88	3.882	**4.02**	**3.64**	**3.86**	3.9	3.66
K2O	g 100g^{-1}	4.88	**5.08**	**5.11**	5.01	5.04	5.22	4.99	5.168	**5.27**	**5.1**	**5.12**	5.18	5.2
P2O5	g 100g^{-1}	0.19	**0.19**	**0.21**	0.213	0.19	0.22	0.197	0.209	**0.2**	**0.2**	**0.22**	0.28	0.22
H2O+	g 100g^{-1}					0.17						**0.832**		
CO2	g 100g^{-1}											**0.171**		
LOI	g 100g^{-1}	0.91	**1**	**0.87**	1	0.85	1.04	0.63	0.75	**1.58**	**0.99**	**0.81**	0.735	0.93
Ag	mg kg^{-1}								1.651	**0.9**		**0.218**		
As	mg kg^{-1}	2.8		**2.5**					3.045	**2**		**2.37**		
Au	mg kg^{-1}													
B	mg kg^{-1}											**13.179**		
Ba	mg kg^{-1}		113	**695**	701	939	1043	685	701.8	**666**	**722**	**689**	683	712
Be	mg kg^{-1}	6.3		**7.9**	9.06		8.8	8.6	7.43			**8.07**		
Bi	mg kg^{-1}		6	**5.61**					5.54	**4**		**5.85**		
Br	mg kg^{-1}													
C(org)	mg kg^{-1}											**104**		
C(tot)	mg kg^{-1}								430					
Cd	mg kg^{-1}	1.8										**0.08**		
Ce	mg kg^{-1}			**98.2**	72		102.670	95	98.18	**87**	**80**	**92.8**		91
Cl	mg kg^{-1}	166							190		**122**	**181.005**	323	
Co	mg kg^{-1}	8.2		**5.5**	8		7.5	5.7	5.381	**7**	**4**	**5.66**		3
Cr	mg kg^{-1}	487	517	**529**		495	522	490	366	**471**	**497**	**557**	467	562
Cs	mg kg^{-1}			**13.3**	15.28			11.8	13.355	**12**		**13.5**		
Cu	mg kg^{-1}	52	**56**	**52.4**	36		53	52	51.17	**50**	**46**	**59.9**	139	33
Dy	mg kg^{-1}			**2.36**	2.43		2.46	2.09	2.47			**2.32**		
Er	mg kg^{-1}			**1.02**	1.05		1.08	0.92	1.099			**0.996**		
Eu	mg kg^{-1}			**1.34**	1.4		1.41	1.27	1.518			**1.36**		
F	mg kg^{-1}								1230		**890**	**1126**		
Ga	mg kg^{-1}			**23.9**	23		26	24.1	25.695	**24**	**23**	**25.3**	24	21
Gd	mg kg^{-1}			**3.7**	4.03		3.92	3.9	4.376		**4**	**3.74**		
Ge	mg kg^{-1}			**2.11**			1.42					**1.87**		
Hf	mg kg^{-1}			**5.14**			5.39	4.7		**3**	**6**	**5.02**		
Hg	mg kg^{-1}	0.002			0.001							**0.003**		
Ho	mg kg^{-1}			**0.4**	0.41		0.4	0.36	0.377			**0.398**		
I	mg kg^{-1}									**0.5**				
In	mg kg^{-1}													
La	mg kg^{-1}			**47.9**	52.5		52.87	46	49.74	**48**	**49**	**48.1**		41
Li	mg kg^{-1}		**57**		109.5			95	93.43			**100.247**		
Lu	mg kg^{-1}				0.13		0.15	0.123	0.154			**0.135**		
Mo	mg kg^{-1}			**4.6**	5.07		4.64	4.4	4.576	**4**		**4.27**		
Nb	mg kg^{-1}		200	**12**	12		13	11.7	12.91	**12**	**12**	**10.7**		13
Nd	mg kg^{-1}			**36.9**	40.3		40.83	34	38.03	**31**	**32**	**36.7**		
Ni	mg kg^{-1}	22	**21**	**19.8**	15		19	19	18.24	**17**		**18.6**	30	7
Pb	mg kg^{-1}	56	**45**	**42.8**	40		35	37	38.49	**42**	**41**	**39.9**		66
Pd	mg kg^{-1}													
Pr	mg kg^{-1}			**10.5**	11.9		11.68	9.7	10.82			**10.6**		
Pt	mg kg^{-1}													
Rb	mg kg^{-1}			**264**	252	258	266	260	255.5	**266**	**257**	**266**	268	237
Re	mg kg^{-1}													
S	mg kg^{-1}	880	918	**1200**		900			980	**801**	**401**	**1039**		0.11
Sb	mg kg^{-1}	3.2			0.26			0.19				**0.21**		
Sc	mg kg^{-1}			**5.5**	5.4		3.5	5.3	6.331	**6**	**6**	**5**		
Se	mg kg^{-1}											**0.061**		
Sm	mg kg^{-1}			**5.8**	6.16		6.13	5.9	6.147	**7**		**5.82**		
Sn	mg kg^{-1}			**4.5**			4.39	4.3		**3.5**		**4.09**		
Sr	mg kg^{-1}	425	48	**446**	417	580	461	450	450.8	**449**	**397**	**458**	451	452
Ta	mg kg^{-1}			**1.07**			1.07	0.85				**1.07**		
Tb	mg kg^{-1}			**0.46**	0.49		0.53	0.49	0.498			**0.461**		
Te	mg kg^{-1}													
Th	mg kg^{-1}			**24.1**	27		23	26	27.48	**24**	**24**	**23.3**		
Tl	mg kg^{-1}	1.1			1.43			1.2						
Tm	mg kg^{-1}				0.15		0.15	0.127	0.138			**0.147**		
U	mg kg^{-1}			**8.06**	5		7.63	6.5	9.009	**7**		**7.45**		
V	mg kg^{-1}	39	**47**	**39.9**	37		37	41	39.835	**39**	**37**	**38.9**	76	43
W	mg kg^{-1}			**21.1**			20.06	20.2	33.6	**17**		**21.6**		
Y	mg kg^{-1}			**10.8**	10		20	9.75	10.7	**11**	**12**	**10.8**		46
Yb	mg kg^{-1}			**0.9**	0.88		1.03	0.82	0.96			**0.935**		
Zn	mg kg^{-1}	42	**113**	**31.7**	36		62.5		48.73	**31**	**37**	**37.6**		48
Zr	mg kg^{-1}			**179**			183	188		**164**	**159**	**181**	146	184

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2

Table 1 - GeoPT46 Contributed data for Granodiorite, HG-1. 11/12/2019

Lab Code		F81	F83	F84	F85	F86	F88	F89	F90	F91	F93	F94	F96	F97
SiO2	g 100g^{-1}	69.47	69.34	68.56	**68.317**	68.1	**68.07**		68.27	67.473	**60.7**	68.7	**67.92**	68.3
TiO2	g 100g^{-1}	0.535	0.487	0.559	**0.495**	0.493	**0.492**		0.49	0.509	**0.38**	0.49	**0.48**	0.5
Al2O3	g 100g^{-1}	15.89	14.85	14.17	**15.119**	14.7	**15.47**		15.27	15.224	**11**	15.3	**15.08**	15
Fe2O3T	g 100g^{-1}	2.74	2.67	2.55	**2.673**	2.65	**3.18**		2.68	2.629	**2.81**	2.66	**2.57**	2.63
Fe(II)O	g 100g^{-1}													
MnO	g 100g^{-1}	0.046	0.047	0.061	**0.045**	0.045	**0.051**		0.049		**0.02**	0.05	**0.04**	
MgO	g 100g^{-1}	1.239	1.07	1.04	**1.191**	1.09	**1.184**		1.15	1.021		1.16	**1.13**	1.22
CaO	g 100g^{-1}	1.973	1.7	2.38	**1.724**	1.71	**0.712**		1.7	1.648	**1.75**	1.71	**1.69**	1.79
Na2O	g 100g^{-1}	4.055	3.61	1.7	**3.796**	3.93	**4.041**		3.75	3.285		3.86	**3.79**	3.86
K2O	g 100g^{-1}	5.278	5.01	3.05	**5.107**	5.1	**5.07**		5.09	5.108	**3.94**	5.14	**5.09**	5.1
P2O5	g 100g^{-1}	0.242	0.2	0.22	**0.207**	0.205	**0.262**		0.207	0.21	**1.33**	0.2	**0.21**	0.21
H2O+	g 100g^{-1}													
CO2	g 100g^{-1}													
LOI	g 100g^{-1}		0.95	0.96	**0.917**	0.83	**0.94**		0.93	0.973	**0.9**	0.94	1.56	0.82
Ag	mg kg^{-1}	0.185	0.7			0.203								
As	mg kg^{-1}			8	**0.234**	3.7	**4**			2.564				
Au	mg kg^{-1}									0.074				
B	mg kg^{-1}				**12.746**							26		
Ba	mg kg^{-1}	727.6	720		**716.006**	697	**686**	697	701	444.1		717	**700.5**	
Be	mg kg^{-1}	8.205	9		**8.491**	8.98				10.58		9		
Bi	mg kg^{-1}	6.715	2		**6.058**	5.78						5.9		
Br	mg kg^{-1}													
C(org)	mg kg^{-1}													
C(tot)	mg kg^{-1}	486							709					
Cd	mg kg^{-1}	0.15			**0.046**	0.117								
Ce	mg kg^{-1}	98.87	102		**98.464**	99.9	**87**	93		73.528		105	**98.05**	
Cl	mg kg^{-1}			255		240								
Co	mg kg^{-1}	5.973	6	3	**5.549**	5.74	**7**			9.914		6		
Cr	mg kg^{-1}	506.5	580	283	**504.135**	493	**565**		512	465.8	**433**	528	**516.3**	
Cs	mg kg^{-1}	14.92	13.8		**13.911**		**12**	13.8				14.1	**14.5**	
Cu	mg kg^{-1}	51.12	60	31	**54.704**	57.9	**58**		50	53.41	**93**	54	**49**	
Dy	mg kg^{-1}	2.4	2.3		**2.359**	2.33		2.2		1.724		2.45	**2.111**	
Er	mg kg^{-1}	1.033	1		**1.084**	1.12		1.1		0.914		1.05	**0.927**	
Eu	mg kg^{-1}	1.395	1.45		**1.358**	1.35		1.3		1.441		1.38	**1.285**	
F	mg kg^{-1}					1090	**1328**							
Ga	mg kg^{-1}	26.22	27		**24.960**	24.5		26	24	16.97		26.3	**23**	
Gd	mg kg^{-1}	4.378	3.8		**3.684**	4.19		4.2		4.373		4.39	**3.54**	
Ge	mg kg^{-1}	1.704	2		**1.186**	2.41						2		
Hf	mg kg^{-1}	5.307	5.2		**4.976**	5.71		4.8				5	**4.56**	
Hg	mg kg^{-1}									0.075				
Ho	mg kg^{-1}	0.397	0.4		**0.391**	0.406		0.4		0.303		0.4	**0.354**	
I	mg kg^{-1}													
In	mg kg^{-1}	0.04												
La	mg kg^{-1}	48.93	50.5		**49.008**	48.9	**38**	46.7		39.244		50.4	**45.15**	
Li	mg kg^{-1}	101.9			**100.975**	103						106		
Lu	mg kg^{-1}	0.164	0.12		**0.135**	0.143		0.14		0.158		0.14	**0.131**	
Mo	mg kg^{-1}	4.646	4		**4.536**	4.33	**5**			5.002		4	**3.7**	
Nb	mg kg^{-1}	13.996	13		**12.712**	12.1	**11**	12.6	14			10	**13**	
Nd	mg kg^{-1}	39.34	39.4		**37.371**	38.5	**34**	35.7		28.761		39.9	**35.35**	
Ni	mg kg^{-1}	21.53		11	**20.041**	21.6	**19**		14	11.73	**15**	20	**18**	
Pb	mg kg^{-1}	39.51	38	11	**42.029**	41.5	**37**			40.15	**47**	45	**35.8**	
Pd	mg kg^{-1}													
Pr	mg kg^{-1}		10.8		**11.226**	10.95		10.3		8.339		11.4	**10.34**	
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	280.1	291		**272.427**	257	**266**	271	259	230.897	**174**	275	**269**	
Re	mg kg^{-1}													
S	mg kg^{-1}	1039				1090	**797**				**550**	909		
Sb	mg kg^{-1}	0.218				0.238								
Sc	mg kg^{-1}	6.037	5		**4.615**	4.35							**4.59**	
Se	mg kg^{-1}	0.897		6										
Sm	mg kg^{-1}	6.233	6.3		**5.765**	5.94		5.7		4.369		5.9	**5.4**	
Sn	mg kg^{-1}	3.299	4		**4.113**	4.06		3.8				4		
Sr	mg kg^{-1}	468.7	465		**462.655**	446	**435**	448	462		**666**	464	**457.8**	
Ta	mg kg^{-1}	1.089	1		**0.949**	1.09		1					**1.03**	
Tb	mg kg^{-1}	0.486	0.5		**0.491**	0.493		0.5		0.455		0.56	**0.449**	
Te	mg kg^{-1}	0.219				0.219								
Th	mg kg^{-1}	23.26	24.3		**24.029**	25.8	**29**	22.9		16.901		24	**22.2**	
Tl	mg kg^{-1}	1.29	1.2	1	**1.427**	1.35								
Tm	mg kg^{-1}	0.149	0.13		**0.148**	0.148		0.15		0.114		0.14	**0.127**	
U	mg kg^{-1}	9.224	8.1		**7.957**	8.5	**5**	7.8		5.001	**6**	8.55	**7.88**	
V	mg kg^{-1}	40.96	43	27	**41.302**	41.9	**40**		34		**47**	42	**42.8**	
W	mg kg^{-1}	12.52	21		**19.508**	22.1		19.4			**25**	20		
Y	mg kg^{-1}	11.64	11		**11.245**	10.7	**12**	10.9		8.99	**23**	10.8	**12.3**	
Yb	mg kg^{-1}	0.955	0.8		**0.943**	0.95		0.9		0.7		1	**0.846**	
Zn	mg kg^{-1}	36.48	40	22	**32.495**	34.4	**37**		28	34.09	**32**	32	**29.5**	
Zr	mg kg^{-1}	186.8	163		**178.369**	178	**168**	173	179		**180**	185	**173.8**	

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2

Table 1 - GeoPT46 Contributed data for Granodiorite, HG-1. 11/12/2019

Lab Code		F99	F100	F101	F102	F104	F105	F106	F107	F108	F110	F111	F112	F114
SiO2	g 100g^{-1}	68.76	**68.582**	68.29	**67.86**	**67.97**	67.73	68.53	**69.07**	**68.61**	68.33	68.36	69.523	**68.453**
TiO2	g 100g^{-1}	0.486	**0.492**	0.49	**0.49**	**0.49**	0.44	0.49	**0.5**	**0.516**	0.501	0.48	0.52	**0.484**
Al2O3	g 100g^{-1}	15.26	**15.234**	15.21	**15.09**	**15.15**	14.08	15.48	**15**	**15.23**	15.31	15.14	15.735	**15.28**
Fe2O3T	g 100g^{-1}	2.63	**2.676**	2.72	**2.7**	**2.69**	2.639	2.73	**2.7**	**2.579**	2.69	2.69	2.813	**2.675**
Fe(II)O	g 100g^{-1}					**2.38**				**1.8**				
MnO	g 100g^{-1}	0.045	**0.046**	0.04		**0.045**	0.049	0.046	**0.05**	**0.046**	0.053	0.05	0.051	**0.053**
MgO	g 100g^{-1}	1.11	**1.127**	1.16	**1.16**	**1.12**	1.143	1.2	**1.12**	**1.172**	1.02	1.16	1.202	**1.143**
CaO	g 100g^{-1}	1.71	**1.727**	1.7	**1.66**	**1.71**		1.82	**1.75**	**1.573**	1.74	1.71	1.558	**1.734**
Na2O	g 100g^{-1}	3.86	**3.812**	3.89	**3.7**	**3.68**	4.154	3.66	**3.86**	**3.797**	3.8	3.86	4.339	**3.745**
K2O	g 100g^{-1}	5.1	**5.103**	5.13	**5.06**	**5.11**		5.04	**5.08**	**4.749**	5.6	5.1	5.170	**5.245**
P2O5	g 100g^{-1}	0.215	**0.209**	0.21	**0.23**	**0.206**		0.21	**0.2**	**0.202**	0.21	0.22	0.179	**0.204**
H2O+	g 100g^{-1}				**0.1**					**0.89**				**0.93**
CO2	g 100g^{-1}									**0.12**				**0.16**
LOI	g 100g^{-1}	0.78	**0.901**	0.97	**0.94**	**0.94**		1.07	1.69	**0.93**	0.82	0.95		**0.81**
Ag	mg kg^{-1}		**0.188**										0.22	
As	mg kg^{-1}		**3.806**						**4.6**			3	2.22	
Au	mg kg^{-1}													
B	mg kg^{-1}													
Ba	mg kg^{-1}	700	**655.107**	721		**718**		729.680	**696.6**	767		705	748.330	
Be	mg kg^{-1}		**5.456**	9.03				8					7.79	
Bi	mg kg^{-1}		**2.587**						**2.2**				4.84	
Br	mg kg^{-1}								**1.4**					
C(org)	mg kg^{-1}													
C(tot)	mg kg^{-1}				**608**					**783**				**490**
Cd	mg kg^{-1}		**0.050**										0.1	
Ce	mg kg^{-1}	80.4	**41.727**	98		**92.1**		99.4	**58.9**	**99.2**		94	102.110	
Cl	mg kg^{-1}	190												
Co	mg kg^{-1}		**2.604**	5.66				6.3					5.6	
Cr	mg kg^{-1}	490.5	**255.144**	502		**479**		533.9	**385.8**			554	511.650	
Cs	mg kg^{-1}		**12.022**	14.7		**13.7**		13.9					11.9	
Cu	mg kg^{-1}	55	**36.914**	55.7		**52**		50.8	**48.8**			49	52.52	
Dy	mg kg^{-1}		**1.935**	2.39		**2.17**		2.4		**2.18**			2.12	
Er	mg kg^{-1}		**0.866**	1.07		**0.95**		1.1		**1.012**			1.02	
Eu	mg kg^{-1}		**1.116**	1.38		**1.3**		1.4		**1.33**			1.39	
F	mg kg^{-1}					1361			1520	**1277**				
Ga	mg kg^{-1}	23	**17.592**	24.2		**24**		24.5	**21.8**			24	23.96	
Gd	mg kg^{-1}		**3.128**	4.14		**3.4**		4.5		**3.73**			4.51	
Ge	mg kg^{-1}		**3.935**	1.77									1.72	
Hf	mg kg^{-1}		**3.739**	5.32		**5.31**		5.2						
Hg	mg kg^{-1}													
Ho	mg kg^{-1}		**0.322**	0.4		**0.37**		0.4		**0.376**			0.36	
I	mg kg^{-1}													
In	mg kg^{-1}													
La	mg kg^{-1}	42.8	**35.102**	47.7		**46.7**		49.5	**36.6**	**49.3**		49	51.84	
Li	mg kg^{-1}		**58.892**	104						**118.4**			97.87	
Lu	mg kg^{-1}		**0.103**	0.14		**0.14**		0.1		**0.135**			0.12	
Mo	mg kg^{-1}		**4.954**			**4.71**		4.9	**3.9**				4.43	
Nb	mg kg^{-1}	12.8	**12.885**	12.8		**13.1**		13.1	**11.6**			12	11.02	
Nd	mg kg^{-1}		**28.622**	39.9		**35.1**		38.6	**23**	**37.2**			35.63	
Ni	mg kg^{-1}	16	**11.429**	18.7		**13**		17.7	**14.8**			17	18.37	
Pb	mg kg^{-1}	40	**14.339**	43.9		**39.8**		41.3	**38.2**			43	38.42	
Pd	mg kg^{-1}												0.4	
Pr	mg kg^{-1}		**8.177**	10.8		**10.1**		11.2		**10.61**			10.32	
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	266	**135.423**	262		**271**		275.3	**254.5**			270	251.970	
Re	mg kg^{-1}													
S	mg kg^{-1}	550				561				**1026**			106	**830**
Sb	mg kg^{-1}		**0.341**										0.22	
Sc	mg kg^{-1}		**3.448**	5.03		**2.59**		4.73	**4.2**			6	4.72	
Se	mg kg^{-1}		**2.206**										0.07	
Sm	mg kg^{-1}		**4.685**	5.95		**5.55**		6		**5.83**			5.49	
Sn	mg kg^{-1}		**4.473**					3.8					3.92	
Sr	mg kg^{-1}	450	**256.079**	460		**450**		450.680	**431.5**	**483**		453	435.830	
Ta	mg kg^{-1}		**2.118**	0.98		**0.96**		1						
Tb	mg kg^{-1}		**0.376**	0.49		**0.43**		0.5		**0.466**			0.49	
Te	mg kg^{-1}													
Th	mg kg^{-1}	24.8	**16.132**	25.4		**23.7**		24.3				25	22.2	
Tl	mg kg^{-1}		**1.134**					1.7					1.1	
Tm	mg kg^{-1}		**0.115**	0.15		**0.13**		0.2		**0.15**			0.13	
U	mg kg^{-1}		**3.031**	8.55		**7.78**		7.9	**7.6**			8	6.6	
V	mg kg^{-1}	43.5	**38.23**	40.3		**40**		44.3	**34.8**			39	41.38	
W	mg kg^{-1}		**20.868**			**32.5**		18.5	**17.5**				18.88	
Y	mg kg^{-1}		**8.675**	11.8		**11**		12.1	**13.9**	**10.85**		11	9.8	
Yb	mg kg^{-1}		**0.81**	0.95		**0.87**		0.9		**0.922**			0.81	
Zn	mg kg^{-1}	33.5	**20.566**	32.2		**34**		33.13	**30.6**			34	31.18	
Zr	mg kg^{-1}	169.5	**128.859**	193		**170**		182.990	**156.6**			166	90.97	**341**

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2

Table 1 - GeoPT46 Contributed data for Granodiorite, HG-1. 11/12/2019

Lab Code		F115	F117	F118	F120	F121	-	-	-	-	-	-	-	-
SiO2	g 100g^{-1}	68.03	67.7	68.144		68.295								
TiO2	g 100g^{-1}	0.5	0.502	0.499		0.503								
Al2O3	g 100g^{-1}	15.23	15.3	15.105		15.504								
Fe2O3T	g 100g^{-1}	2.65	2.84	2.694		2.818								
Fe(II)O	g 100g^{-1}	1.54												
MnO	g 100g^{-1}	0.052	0.044	0.046	0.04	0.043								
MgO	g 100g^{-1}	1.17	1.15	1.142		1.180								
CaO	g 100g^{-1}	1.68	1.71	1.719		1.653								
Na2O	g 100g^{-1}	3.8	3.97	3.68		3.853								
K2O	g 100g^{-1}	5.08	5.25	5.069		5.073								
P2O5	g 100g^{-1}	0.21	0.178	0.186		0.247								
H2O+	g 100g^{-1}		0.32											
CO2	g 100g^{-1}		0.01											
LOI	g 100g^{-1}	0.82	0.82	0.813		1.005								
Ag	mg kg^{-1}	0.314	0.25											
As	mg kg^{-1}	1.849	1.95											
Au	mg kg^{-1}													
B	mg kg^{-1}	16.86		35.71										
Ba	mg kg^{-1}	668.1	682	559.4	718	735								
Be	mg kg^{-1}	8.125	6.46	8.261	7.74	8.33								
Bi	mg kg^{-1}	5.524	5.36											
Br	mg kg^{-1}													
C(org)	mg kg^{-1}		564											
C(tot)	mg kg^{-1}		662											
Cd	mg kg^{-1}	1.095			0.07	0.048								
Ce	mg kg^{-1}	81.49	88.5	59.98	121	101								
Cl	mg kg^{-1}													
Co	mg kg^{-1}	5.525	8.35	9.069	5.42	5.9								
Cr	mg kg^{-1}	506.2	644	408.2	477	587.130								
Cs	mg kg^{-1}	13.54	14	27.03	14.2	14.4								
Cu	mg kg^{-1}	55.45	54.2	64.08	50.6	56.3								
Dy	mg kg^{-1}	2.244	2.17	0.81	2.33	2.3								
Er	mg kg^{-1}	1.088	1.05	0.413	1.05	1.1								
Eu	mg kg^{-1}	1.375	1.33	0.789	1.42	1.44								
F	mg kg^{-1}													
Ga	mg kg^{-1}	23.46	23.5	39.67	24.3	25.88								
Gd	mg kg^{-1}	4.11	4.07	1.458	4.12	4.63								
Ge	mg kg^{-1}	4.025												
Hf	mg kg^{-1}	5.726	2.82	0.413	5.66	5.03								
Hg	mg kg^{-1}		0.18											
Ho	mg kg^{-1}	0.422	0.371	0.16	0.41	0.38								
I	mg kg^{-1}													
In	mg kg^{-1}		0.035											
La	mg kg^{-1}	41.47	43.7	21.21	49.8	49.8								
Li	mg kg^{-1}	97.93	90.5	186.9	95.6									
Lu	mg kg^{-1}	0.163	0.121	0.05	0.15	0.13								
Mo	mg kg^{-1}	4.321	4.01		4.11									
Nb	mg kg^{-1}	12.48	12.6	8.24	12	12.9								
Nd	mg kg^{-1}	34.59	36.1	16.3	38.6	38.3								
Ni	mg kg^{-1}	19.1	19.3	34.68	17.4	19.5								
Pb	mg kg^{-1}	40	40.7	66.16	39.6	53								
Pd	mg kg^{-1}		0.133											
Pr	mg kg^{-1}	9.82	10.5	5.304	10.9	11.1								
Pt	mg kg^{-1}		0.01											
Rb	mg kg^{-1}	163.3	282	398.9	259	323.640								
Re	mg kg^{-1}													
S	mg kg^{-1}		914											
Sb	mg kg^{-1}	2.119	0.22		0.32									
Sc	mg kg^{-1}	3.68	3.96	6.705	4.88	6.08								
Se	mg kg^{-1}	1.129	0.11											
Sm	mg kg^{-1}	5.571	5.71	2.316	5.17	5.96								
Sn	mg kg^{-1}	4.48	4.06		4.29									
Sr	mg kg^{-1}	403.2	506	293.3	440	502								
Ta	mg kg^{-1}	1.094	1.11	0.376	1.19	0.95								
Tb	mg kg^{-1}	0.505		0.181	0.53	0.53								
Te	mg kg^{-1}	0.198	0.13											
Th	mg kg^{-1}	20.55	26.1	11.02	25.7									
Tl	mg kg^{-1}	1.405	1.34		1.26									
Tm	mg kg^{-1}	0.172	0.139	0.059	0.14	0.14								
U	mg kg^{-1}	6.947	7.84	8.395	7.54	9.04								
V	mg kg^{-1}	32.37	40.2	57.73	39.6	33.3								
W	mg kg^{-1}	20.19	18.6		18.5									
Y	mg kg^{-1}	9.858	10.3	4.069	10.7	11.1								
Yb	mg kg^{-1}	0.948	0.856	0.326	0.94	0.95								
Zn	mg kg^{-1}	40.69	22.2	86.42	27.9	32								
Zr	mg kg^{-1}	171.5	86.9	14.25	249	177								

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2

Table 2 - GeoPT46 Consensus values and statistical summary for Granodiorite, HG-1.

	Consensus Value	Uncertainty of consensus value	Horwitz Target Value	Uncertainty/ Target	Number of reported results	Robust Mean of results	Robust SD of results	Median of results	Status of consensus value	Type of consensus value
	X_a	sdm	H_a	sdm/H_a	n					
	g 100g⁻¹	g 100g⁻¹	g 100g⁻¹			g 100g⁻¹	g 100g⁻¹	g 100g⁻¹		
SiO2	68.33	0.05176	0.7236	0.07152	91	68.33	0.4937	68.3	Assigned	Robust Mean
TiO2	0.49	0.001554	0.01091	0.1424	91	0.4893	0.01535	0.49	Assigned	Median
Al2O3	15.24	0.0257	0.2023	0.127	92	15.24	0.2465	15.24	Assigned	Robust Mean
Fe2O3T	2.669	0.007853	0.04604	0.1706	91	2.669	0.07491	2.672	Assigned	Robust Mean
MnO	0.04593	0.000548	0.00146	0.3752	85	0.04593	0.005052	0.046	Assigned	Robust Mean
MgO	1.15	0.004688	0.02252	0.2082	90	1.151	0.04484	1.15	Assigned	Median
CaO	1.703	0.004196	0.03144	0.1335	91	1.699	0.04724	1.703	Assigned	Median
Na2O	3.825	0.01208	0.06251	0.1933	90	3.812	0.1391	3.825	Assigned	Median
K2O	5.09	0.009325	0.07969	0.117	91	5.083	0.09983	5.09	Assigned	Median
P2O5	0.2095	0.0007902	0.005301	0.1491	88	0.2079	0.009584	0.2095	Assigned	Median
	mg kg⁻¹	mg kg⁻¹	mg kg⁻¹			mg kg⁻¹	mg kg⁻¹	mg kg⁻¹		
Ag	0.185	0.0075	0.01907	0.3932	22	0.2447	0.1024	0.2015	Assigned	Mode
Ba	701.4	3.111	20.92	0.1487	82	699.6	32.86	701.4	Assigned	Median
Be	8.113	0.156	0.4735	0.3295	44	8.161	1.081	8.113	Assigned	Median
Bi	5.071	0.1331	0.3177	0.419	34	4.96	1.004	5.071	Provisional	Median
Cd	0.0625	0.00627	0.007587	0.8264	26	0.08786	0.05067	0.0715	Provisional	Mode
Ce	96.96	1.21	3.896	0.3106	71	92.53	9.768	94.36	Assigned	Mode
Co	5.8	0.123	0.3561	0.3454	61	5.969	1.045	5.9	Assigned	Mode
Cr	506.4	7.24	15.86	0.4564	82	489.4	61.55	498	Provisional	Mode
Cs	13.8	0.1311	0.7434	0.1764	54	13.64	1.298	13.8	Assigned	Median
Cu	52.4	0.5088	2.31	0.2203	79	52.51	4.88	52.4	Assigned	Median
Dy	2.314	0.02714	0.1632	0.1663	54	2.291	0.2053	2.314	Assigned	Median
Er	1.045	0.009643	0.08306	0.1161	52	1.035	0.0892	1.045	Assigned	Median
Eu	1.366	0.01412	0.1043	0.1354	52	1.366	0.1018	1.365	Assigned	Robust Mean
Ga	24.01	0.1877	1.19	0.1577	71	24.01	1.581	24	Assigned	Robust Mean
Gd	3.9	0.12	0.2542	0.4721	53	4.042	0.4948	4	Assigned	Mode
Ge	1.77	0.1156	0.1299	0.8902	19	1.796	0.7648	1.77	Provisional	Median
Hf	5.063	0.0945	0.3172	0.2979	47	4.85	0.7897	5	Assigned	Mode
Ho	0.3975	0.002673	0.03653	0.07317	52	0.3868	0.02775	0.3975	Assigned	Median
La	47.91	0.224	2.14	0.1047	72	47.31	3.621	47.65	Assigned	Mode
Li	100.1	1.97	4.004	0.4921	35	98.3	7.745	98.2	Assigned	Mode
Lu	0.137	0.002452	0.01478	0.1659	49	0.137	0.01716	0.139	Assigned	Robust Mean
Mo	4.32	0.0689	0.2772	0.2485	52	4.32	0.4968	4.34	Assigned	Robust Mean
Nb	12.49	0.165	0.6832	0.2415	68	12.02	1.19	12.05	Assigned	Mode
Nd	36.98	0.447	1.718	0.2602	65	36.26	3.627	36.7	Assigned	Mode
Ni	19	0.15	0.9757	0.1537	78	18.28	2.73	18.65	Assigned	Mode
Pb	40.54	0.69	1.857	0.3715	74	40.28	3.925	40.2	Assigned	Mode
Pr	10.6	0.08944	0.5943	0.1505	52	10.53	0.7252	10.6	Assigned	Median
Rb	265.9	1.37	9.181	0.1492	74	264.1	13.4	265.9	Assigned	Median
Sb	0.21	0.0075	0.02124	0.3531	29	0.2562	0.08641	0.22	Assigned	Mode
Sc	4.615	0.142	0.2933	0.4842	53	5.02	1.114	4.779	Assigned	Mode
Sm	5.755	0.03786	0.3537	0.107	58	5.734	0.3957	5.755	Assigned	Median
Sn	4.075	0.0678	0.2638	0.257	42	4.206	0.5481	4.127	Assigned	Mode
Sr	450	2.043	14.35	0.1424	80	445.2	20.7	450	Assigned	Median
Ta	0.9958	0.01698	0.0797	0.2131	40	0.9958	0.1074	1	Assigned	Robust Mean
Tb	0.49	0.006354	0.04363	0.1456	49	0.4922	0.04675	0.49	Assigned	Median
Th	23.9	0.2517	1.186	0.2123	68	23.6	2.425	23.9	Assigned	Median
Tl	1.33	0.02452	0.1019	0.2406	33	1.292	0.1591	1.33	Assigned	Median
Tm	0.146	0.001271	0.0156	0.08146	49	0.1425	0.01609	0.146	Assigned	Median
U	7.84	0.09	0.46	0.1957	65	7.699	0.8361	7.78	Assigned	Mode
V	39.83	0.3617	1.83	0.1977	74	39.83	3.111	39.87	Assigned	Robust Mean
W	19.93	0.4355	1.016	0.4286	43	19.93	2.856	20.05	Assigned	Robust Mean
Y	10.84	0.1541	0.6057	0.2545	72	10.84	1.308	10.88	Assigned	Robust Mean
Yb	0.9179	0.01087	0.07437	0.1462	54	0.9179	0.07988	0.9175	Assigned	Robust Mean
Zn	32	0.403	1.519	0.2653	78	32.95	3.818	32.49	Assigned	Mode
Zr	174	2.85	6.402	0.4451	75	169.3	21.24	172	Assigned	Mode

Table 3 - GeoPT46 Z-scores for Granodiorite, HG-1. 11/12/2019

Lab Code	F1	F2	F3	F4	F5	F6	F7	F9	F10	F11	F12	F14	F15
SiO2	-0.23	-0.24	**-0.31**	-0.92	-0.18	-0.08	**-0.18**	**-0.27**	*	*	-0.16	-0.31	**0.43**
TiO2	0.46	0.55	**1.28**	-1.01	-0.55	-0.46	**0.92**	**-1.65**	*	*	0.00	-0.46	**-0.27**
Al2O3	0.02	1.65	**-0.73**	-0.62	-0.27	0.49	**-0.21**	**0.48**	*	*	-0.30	-0.15	**-0.51**
Fe2O3T	-0.09	0.85	**-0.95**	-0.64	-0.17	0.34	**3.72**	**1.55**	*	*	-0.42	-0.53	**1.76**
MnO	-3.06	-0.66	**-1.32**	-0.32	3.79	-1.00	*	**0.66**	-0.78	*	1.39	*	**0.05**
MgO	0.00	0.84	**-1.78**	-0.67	-0.16	1.11	**-0.44**	**1.02**	*	*	-1.11	-0.67	**-0.89**
CaO	-0.21	0.08	**0.38**	-0.05	-2.69	1.38	**0.22**	**0.32**	*	*	-0.05	-1.00	**-0.10**
Na2O	1.08	-0.88	**2.26**	0.36	-0.67	0.20	-3.72	**-2.60**	*	*	-0.44	-0.28	**-0.39**
K2O	0.50	-0.28	**6.16**	-0.25	0.11	1.32	**1.13**	**-4.14**	*	*	0.50	-0.88	**-0.25**
P2O5	0.05	0.61	**-2.17**	-0.90	-2.59	0.71	**0.09**	**-0.28**	*	*	-0.90	-0.90	**-0.28**
Ag	*	*	**11.69**	*	*	*	*	*	*	-0.13	*	*	*
Ba	-0.75	0.42	**-2.29**	0.23	0.61	-1.37	**-0.02**	**-0.50**	-0.41	-14.94	0.18	3.53	**0.84**
Be	*	*	**5.70**	*	*	*	*	**3.71**	*	-6.45	*	-1.55	*
Bi	*	*	***3.33***	*	*	*-1.53*	*	*	*	*0.45*	*	*-2.33*	*
Cd	*	*	***0.33***	*	*	*	*	*	*	*0.82*	*	*0.24*	*
Ce	*	*	**-0.58**	0.01	0.34	-2.68	-2.18	**-0.12**	-1.06	*	*	1.77	**0.42**
Co	*	7.30	**18.90**	*	8.99	0.42	*	**0.00**	0.28	-1.12	7.30	-2.35	*
Cr	*	*-1.43*	***-16.67***	*0.40*	*-2.31*	*-2.89*	*0.15*	***-1.41***	*-1.23*	*-7.86*	*-0.77*	*-2.18*	***0.55***
Cs	*	*	**1.33**	*	-2.77	-2.08	*	**111.26**	-1.34	-4.57	*	38.87	**0.20**
Cu	*	-3.12	**1.74**	-0.30	0.30	-1.17	*	**0.04**	-1.00	0.06	-0.09	-2.20	**0.26**
Dy	*	*	**4.32**	*	*	*	*	**-0.03**	*	-2.71	*	1.07	**1.38**
Er	*	*	**4.02**	*	*	*	*	**-0.43**	*	-2.42	*	1.23	**0.42**
Eu	*	*	**3.49**	*	*	*	*	**1.66**	*	-3.20	*	0.94	**1.09**
Ga	*	1.25	**8.81**	-0.01	-0.85	-0.72	*	*	0.20	*	-0.43	0.48	**-0.85**
Gd	*	*	**6.99**	*	*	*	*	**3.74**	*	-1.04	*	0.79	**-0.08**
Ge	*	*	*	*	*	*	*	*	*	*-6.43*	*	*	*
Hf	*	6.21	**-7.33**	*	*	-1.36	*	**-1.74**	*	*	*	-2.58	**-0.10**
Ho	*	*	**3.38**	*	*	*	*	**0.07**	*	-2.43	*	0.98	**1.16**
La	*	*	**0.00**	-0.45	-0.02	-0.59	0.26	**-0.38**	-0.89	*	-1.15	1.50	**0.77**
Li	*	-1.01	**-1.39**	*	*	*	*	*	*	-3.89	*	14.67	*
Lu	*	*	**5.42**	*	*	*	*	**0.88**	*	-2.27	*	1.04	**0.21**
Mo	*	*	**4.44**	*	*	-1.66	*	**0.65**	-0.90	-0.96	*	-1.52	*
Nb	*	*	**4.38**	*	-2.09	-1.38	**-0.72**	**3.28**	-0.46	-9.02	*	*	**-0.54**
Nd	*	*	**5.30**	*	-0.17	-3.37	*	**1.35**	*	-2.71	*	1.66	**0.72**
Ni	*	2.56	**0.31**	0.51	-0.31	-2.20	1.02	**-0.20**	-1.13	-2.66	-0.51	-3.11	**-2.05**
Pb	*	*	**-3.39**	*	1.31	-1.52	0.66	**2.83**	0.45	-6.85	*	-0.12	**0.43**
Pr	*	*	**2.36**	*	*	*	*	**0.66**	*	-2.27	*	1.54	**0.69**
Rb	*	*	**13.41**	*	0.00	-0.78	**0.44**	**-1.30**	0.16	*	*	29.54	**0.22**
Sb	*	*	**17.89**	*	*	68.02	*	*	*	-4.73	*	-0.41	*
Sc	*	*	**7.38**	*	*	-2.41	*	**-0.73**	*	-1.56	*	5.97	**0.63**
Sm	*	*	**4.26**	*	*	-0.22	*	**0.72**	*	-2.64	*	1.44	**1.26**
Sn	*	*	**8.43**	*	-0.73	3.08	*	*	*	-4.77	*	1.27	*
Sr	0.21	-0.98	**-2.67**	*	0.56	-0.83	**0.07**	**-4.46**	-0.21	*	-0.45	0.02	**1.25**
Ta	*	*	**18.50**	*	*	0.65	*	**3.04**	*	*	*	-0.45	**-0.32**
Tb	*	*	**1.88**	*	*	*	*	**1.38**	*	-1.87	*	0.82	**0.46**
Th	*	*	**7.43**	*	2.36	-1.10	*	**-0.54**	0.16	1.02	*	7.32	**0.70**
Tl	*	*	**2.39**	*	*	*	*	*	*	-4.97	*	1.86	*
Tm	*	*	**4.81**	*	*	*	*	**0.26**	*	-2.15	*	1.01	**0.26**
U	*	*	**3.11**	*	-0.43	0.93	*	**0.74**	-1.24	-1.47	*	-0.26	**0.33**
V	*	*	**-0.02**	-1.32	*	-2.60	0.32	**-0.24**	-0.84	*	-0.23	-1.81	**1.19**
W	*	*	**6.92**	*	*	-1.44	*	**2.57**	*	-6.57	*	1.84	*
Y	*	2.61	**0.30**	73.60	*	-1.35	*	**-0.81**	-0.77	*	*	5.47	**1.26**
Yb	*	*	**1.76**	*	*	*	*	**1.37**	*	-2.88	*	1.95	**0.30**
Zn	*	-0.66	**-1.07**	0.33	-0.33	-0.66	2.30	**0.30**	0.06	-0.13	0.00	-2.44	**-0.66**
Zr	*	3.98	**-15.38**	-0.70	2.26	-1.72	-0.16	**1.33**	-0.40	-13.08	-2.66	-4.62	**1.25**

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

Table 3 - GeoPT46 Z-scores for Granodiorite, HG-1. 11/12/2019

Lab Code	F16	F17	F18	F19	F20	F21	F22	F26	F29	F30	F31	F33	F34
SiO2	**-0.16**	*	0.25	**1.15**	**0.36**	0.27	1.51	**5.49**	0.08	**0.24**	-0.01	0.03	0.32
TiO2	**0.92**	*	-1.37	**-0.64**	**0.73**	0.32	-0.46	**-4.58**	-0.46	**3.67**	0.00	0.73	0.18
Al2O3	**0.93**	**3.94**	0.73	**1.82**	**1.27**	0.22	-1.98	**-5.01**	0.09	**0.78**	0.09	-0.23	-0.22
Fe2O3T	**-1.49**	**3.07**	-6.18	**0.46**	**-2.14**	1.84	-0.46	**-3.73**	-0.09	**1.33**	0.12	-0.13	0.07
MnO	**2.79**	**-1.32**	1.39	**-4.06**	**4.84**	0.71	-1.35	**-1.32**	1.39	**9.63**	1.39	*	-2.21
MgO	**1.33**	**3.11**	4.00	**2.22**	**-1.78**	1.15	-1.02	**1.33**	-0.67	**5.77**	-0.89	0.42	0.13
CaO	**-1.37**	**-2.96**	0.11	**0.54**	**-1.37**	3.02	-2.56	**-2.96**	-0.05	**-0.10**	-0.68	-1.02	0.70
Na2O	**2.81**	**1.69**	0.20	**-1.83**	**-3.27**	-0.71	0.99	**-15.43**	0.04	**1.05**	0.20	0.45	-0.09
K2O	**-0.75**	**0.50**	-0.44	**0.13**	**-0.88**	-4.15	-0.70	**-8.78**	-0.13	**0.50**	0.94	0.29	-0.53
P2O5	**-3.68**	*	0.05	**-2.17**	**-0.85**	-0.52	0.42	**-4.06**	0.05	**0.09**	0.05	-0.33	-0.09
Ag	*	*	0.39	*	*	-1.34	0.18	**3.93**	*	**-0.26**	*	*	*
Ba	**-2.05**	**0.76**	-5.41	**0.08**	**-1.21**	1.11	0.29	**-1.71**	0.68	**0.60**	-1.18	*	0.09
Be	*	*	-4.55	**0.38**	**2.59**	*	-0.48	**1.94**	-0.01	**-1.74**	*	*	-0.53
Bi	*	*	*-2.79*	***0.88***	*	*	*1.40*	***-0.98***	*-0.22*	*	*	*	*0.66*
Cd	*	*	*-2.87*	***17.99***	***28.67***	*	*0.69*	***6.66***	*	*-1.48*	*	*	*
Ce	**-3.53**	**-0.74**	-5.13	**-1.26**	**0.08**	0.48	-0.12	**-0.17**	0.34	**-1.30**	*	*	-3.33
Co	**1.97**	**-1.38**	-2.53	**-1.25**	**-0.08**	0.69	0.24	**-1.38**	0.28	**-1.57**	*	*	-0.83
Cr	***-5.22***	***1.10***	*-3.04*	***-1.99***	***1.46***	*0.29*	*-1.07*	***6.37***	*0.52*	***4.58***	*-2.97*	*	*2.41*
Cs	**-0.93**	**-0.10**	-3.23	**-0.60**	**-0.20**	0.14	-0.62	*	-0.27	*	*	*	-0.01
Cu	**-2.99**	**-0.73**	-3.33	**1.72**	**4.52**	5.77	0.70	**-5.01**	0.35	**-0.43**	-0.09	*	-0.84
Dy	*	**-1.01**	-2.50	**-0.53**	**0.28**	0.12	0.41	**2.49**	-0.20	**0.03**	*	*	-0.05
Er	*	**-1.34**	-2.20	**-0.58**	**2.70**	0.11	0.10	**2.70**	-0.09	**0.54**	*	*	-0.41
Eu	*	**-1.12**	-2.24	**0.06**	**1.95**	0.20	0.68	**0.32**	-0.27	**-0.44**	*	*	-0.00
Ga	**-1.86**	**-0.02**	-1.27	**-0.23**	**0.44**	0.23	-0.78	**-1.24**	-0.05	*	-1.27	*	-0.84
Gd	*	**1.14**	-2.75	**-0.93**	**8.30**	0.10	-0.11	**4.45**	0.08	**1.14**	*	*	-0.49
Ge	*	*	*-0.65*	*	*	*	*	*	*-0.27*	*	*	*	*
Hf	*	**-0.77**	-4.20	**-0.08**	*	-0.27	0.60	*	0.53	**0.46**	*	*	-0.57
Ho	*	**-0.40**	-1.88	**-0.73**	**0.07**	0.12	0.12	**0.07**	0.03	**-0.21**	*	*	-0.37
La	**4.15**	**-0.56**	-4.88	**-0.60**	**-0.14**	0.38	0.08	**-0.42**	0.51	**-0.33**	*	*	-0.55
Li	*	*	-5.88	*	**0.97**	*	-0.77	*	-0.51	*	*	*	0.59
Lu	*	**0.07**	-1.59	**-0.27**	**0.21**	0.17	-0.17	**6.97**	0.27	**0.21**	*	*	-0.07
Mo	**-4.40**	**-1.01**	1.05	**-1.70**	**1.23**	0.97	0.65	*	-0.22	**-2.02**	*	*	-0.49
Nb	**-2.33**	**0.25**	-0.36	**-1.19**	*	0.06	-0.94	*	-0.29	**-1.89**	-1.09	*	-1.13
Nd	**-5.46**	**-0.07**	-3.78	**-0.26**	**-0.38**	0.50	0.16	**0.13**	0.36	**-0.22**	*	*	-0.72
Ni	**-3.07**	**1.72**	-2.56	**9.50**	**2.81**	0.64	0.44	**0.20**	-0.51	**-1.64**	-1.54	*	0.33
Pb	**7.57**	**1.66**	-6.88	**0.29**	**-2.71**	4.06	0.50	**-2.61**	0.39	**-0.34**	0.66	*	-0.09
Pr	*	**0.13**	-3.37	**-0.71**	**-0.37**	0.23	0.38	**-1.01**	0.27	**-1.33**	*	*	-1.05
Rb	**-0.06**	**-0.41**	-2.88	**-0.19**	**-1.30**	0.30	-0.14	**-0.65**	0.23	*	-0.60	*	-0.01
Sb	*	*	-1.41	*	*	2.71	0.05	**24.01**	*	**-0.47**	*	*	-0.75
Sc	**12.22**	**2.13**	-0.54	*	**-1.38**	9.86	2.58	**-0.39**	*	*	*	*	-1.83
Sm	**-7.22**	**-0.27**	-2.76	**-0.19**	**-0.19**	0.27	-0.24	**-0.35**	-0.02	**0.38**	*	*	0.02
Sn	*	*	-2.04	**1.80**	*	*	-0.22	**21.17**	0.24	*	11.23	*	-0.15
Sr	**-0.34**	**-1.09**	-3.83	**0.13**	**-2.09**	0.66	-1.26	**-0.77**	0.41	*	-0.35	*	0.23
Ta	*	**0.68**	-0.60	**-3.03**	*	-0.49	-0.34	*	-0.29	**-2.83**	*	*	0.66
Tb	*	**0.96**	-2.64	**-0.30**	**2.75**	-0.37	-0.28	**1.60**	-0.46	**0.00**	*	*	-0.87
Th	**-2.61**	**-0.63**	-6.24	**-0.72**	**-1.36**	0.25	-1.21	**0.39**	-0.34	**-2.45**	0.04	*	-0.83
Tl	*	*	-2.60	**-1.40**	**0.00**	*	0.47	*	0.20	**0.39**	*	*	*
Tm	*	**0.13**	-1.79	**-0.51**	**-0.38**	0.38	0.90	**0.26**	0.13	**-0.38**	*	*	0.00
U	**1.65**	**-0.85**	-2.87	**-0.42**	**0.02**	0.41	0.08	**-1.24**	0.28	**-0.57**	*	*	0.58
V	**-0.67**	**-0.90**	-1.87	**-1.31**	**0.70**	1.60	0.48	**-1.71**	0.05	**-1.22**	-0.77	*	-0.70
W	**3.32**	*	0.53	**0.12**	**47.31**	*	-0.48	*	0.53	*	-0.95	*	*
Y	**1.75**	**0.36**	-3.17	**0.09**	*	0.16	-0.20	**-1.72**	-0.45	**-2.54**	-0.69	*	0.78
Yb	*	**-0.07**	-2.14	**-0.31**	**1.10**	0.30	0.44	**-0.24**	0.28	**0.57**	*	*	-0.23
Zn	**0.39**	**-0.60**	-3.95	**7.90**	**-1.97**	0.78	1.09	**-1.12**	0.66	**-1.45**	-0.99	*	-0.38
Zr	**-1.59**	**-0.06**	-3.44	**0.15**	**-1.72**	-2.40	0.35	**-10.78**	0.16	**0.31**	-1.25	*	-0.72

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

Table 3 - GeoPT46 Z-scores for Granodiorite, HG-1. 11/12/2019

Lab Code	F35	F36	F37	F38	F39	F40	F41	F43	F45	F46	F47	F48	F50
SiO2	0.19	0.26	**-0.04**	0.17	0.15	0.51	**2.25**	**0.65**	-0.32	0.10	**-4.96**	0.73	0.35
TiO2	-0.14	-0.14	**-1.83**	-0.23	1.92	0.96	**-1.83**	**1.83**	0.14	0.99	**1.01**	0.00	0.00
Al2O3	0.14	0.14	**-1.20**	0.42	0.10	0.06	**-1.84**	**0.28**	-0.03	0.25	**-8.37**	0.27	0.81
Fe2O3T	0.99	-0.53	**-0.41**	0.27	0.35	0.62	**-4.75**	**-1.93**	-0.03	0.35	*	0.12	-0.31
MnO	-0.66	0.37	**-0.64**	0.75	-2.72	*	**-4.06**	**2.79**	-0.35	0.32	*	1.39	*
MgO	-0.67	0.00	**-1.33**	0.19	0.29	-0.95	**13.32**	**-0.44**	-0.20	-0.80	*	0.22	-1.33
CaO	-0.52	-0.16	**0.86**	0.16	0.33	1.51	**-0.73**	**-1.05**	0.00	0.67	**-0.73**	0.11	-0.37
Na2O	-0.60	-2.04	**10.01**	0.57	-1.07	-1.14	**0.09**	**2.97**	0.44	0.42	**-60.90**	-0.28	-1.24
K2O	0.19	-1.57	**0.75**	-0.06	0.65	-0.50	**-0.13**	**-1.51**	0.02	0.03	**-61.15**	-0.31	-0.63
P2O5	0.42	0.05	**0.09**	0.30	-0.33	-0.05	**0.09**	**-3.68**	-0.09	-0.13	*	0.05	-0.90
Ag	*	*	**-0.26**	-0.91	*	*	*	*	*	*	*	-0.13	*
Ba	*	0.83	**0.87**	-0.83	-0.97	-0.01	**-0.88**	**1.10**	-0.79	0.23	*	0.06	0.56
Be	*	*	**3.17**	-0.75	*	-0.03	*	**0.08**	*	*	*	-0.70	*
Bi	*	*	***-0.41***	*-0.63*	*	*	*	*	*	*1.35*	*	*-0.51*	*
Cd	*	*	***-0.33***	*-1.09*	*	*	*	***4.02***	*	*	*	*-0.16*	*
Ce	*	-0.12	**0.76**	-0.57	*	-0.02	**-22.58**	**0.39**	-1.44	-1.38	**2.06**	0.01	*
Co	*	*	**0.23**	-0.08	0.28	-0.15	**-5.06**	**-0.21**	*	*	*	0.28	*
Cr	*	*0.37*	***1.44***	*1.41*	*2.13*	*0.38*	***-1.60***	***2.48***	*-1.56*	*1.42*	*	*-4.39*	*-3.60*
Cs	*	-0.67	**-0.42**	-0.03	*	0.02	**0.28**	**0.19**	*	-4.30	*	0.58	*
Cu	*	-0.13	**2.75**	-0.40	1.43	-0.45	**-1.47**	**0.22**	-0.38	1.26	*	0.74	*
Dy	*	0.17	**-1.41**	0.01	*	-0.26	*	**-0.53**	*	1.51	**0.83**	-0.11	*
Er	*	0.21	**-1.63**	-0.03	*	-0.15	*	**-0.51**	*	*	**1.20**	-0.15	*
Eu	*	0.40	**-0.68**	-0.23	*	-0.08	*	**-0.43**	*	*	**1.71**	-0.56	*
Ga	*	0.54	**0.46**	-0.23	*	-0.22	**-0.85**	**-0.83**	0.25	-0.18	*	0.08	*
Gd	*	1.36	**-1.29**	-0.28	*	-0.16	*	**-0.89**	*	*	**5.49**	-0.71	*
Ge	*	*	*	*	*	*	*	*	*	*	*	*-6.23*	*
Hf	*	*	**0.08**	-0.34	*	-0.70	**-0.20**	**-1.41**	5.32	-2.40	*	-2.94	*
Ho	*	0.03	**-1.33**	0.11	*	-0.10	*	**-0.10**	*	*	**0.62**	0.03	*
La	*	-0.05	**-0.09**	-0.51	*	0.00	**-0.42**	**-13.86**	0.92	-1.87	**2.92**	-0.07	*
Li	*	*	**0.06**	-1.29	*	*	*	**0.88**	*	*	*	0.55	*
Lu	*	0.44	**-0.88**	0.07	*	*	*	**-0.47**	*	*	**2.57**	0.10	*
Mo	*	*	**0.53**	-0.76	*	0.05	**2.45**	**0.95**	-0.23	-2.24	*	0.11	*
Nb	*	-0.14	**0.11**	-0.98	-3.29	-1.55	**-3.64**	**-0.07**	-0.57	-0.28	*	0.37	*
Nd	*	-1.07	**0.43**	-0.27	*	-0.00	**-2.32**	**0.29**	1.58	-1.85	**3.74**	0.09	*
Ni	*	0.92	**-1.23**	0.15	1.02	-1.59	**0.00**	**-0.51**	-0.42	-0.92	*	0.20	*
Pb	*	-0.68	**0.73**	-0.37	-0.41	0.21	**-0.83**	**-3.52**	-0.90	-0.02	*	0.12	*
Pr	*	0.00	**-0.96**	-0.24	*	-0.03	*	**0.49**	*	*	**0.93**	0.21	*
Rb	*	-1.20	**0.58**	-0.87	0.49	-0.66	**-0.43**	**1.92**	0.19	0.83	*	0.55	*
Sb	*	*	**0.14**	0.00	*	*	*	**2.40**	*	*	*	0.71	*
Sc	*	5.05	**0.56**	-0.13	*	0.14	**1.31**	**4.92**	*	-0.33	*	-0.03	*
Sm	*	0.06	**0.99**	-0.35	*	-0.25	*	**0.02**	*	-0.38	**-0.48**	0.15	*
Sn	*	-0.52	**0.33**	-0.31	*	-0.39	**7.30**	**2.62**	1.96	-8.05	*	0.43	*
Sr	*	-0.91	**-0.28**	-0.99	0.31	0.15	**-1.05**	**0.22**	-0.37	0.24	*	0.45	-0.66
Ta	*	*	**0.73**	-0.63	*	-0.91	*	**-0.73**	*	*	*	0.03	*
Tb	*	0.23	**-0.34**	-0.45	*	-0.11	*	**-0.89**	*	*	**3.32**	0.11	*
Th	*	0.55	**-0.14**	-0.39	0.89	-0.36	**-0.76**	**-3.51**	0.40	0.25	*	0.30	*
Tl	*	*	**0.00**	0.04	*	-1.52	*	**-1.51**	*	*	*	0.25	*
Tm	*	0.13	**-0.13**	0.08	*	*	*	**0.00**	*	*	**0.26**	1.09	*
U	*	0.33	**0.28**	-0.31	*	-0.21	**-1.83**	**-2.72**	-0.17	0.57	*	-0.59	*
V	*	-0.23	**0.10**	-0.22	1.14	-0.83	**0.64**	**-0.21**	-0.12	1.24	*	-0.23	*
W	*	-2.18	**-2.34**	0.53	*	-0.62	**-5.84**	**-1.13**	*	*	*	-0.21	*
Y	*	-0.45	**-2.52**	0.01	14.17	0.88	**-1.39**	**-0.59**	-2.19	1.09	**-1.93**	0.46	*
Yb	*	0.35	**-0.56**	0.26	*	-0.05	*	**-0.15**	*	7.83	**1.57**	0.08	*
Zn	*	0.16	**1.03**	-0.37	-3.62	0.39	**0.00**	**0.32**	-0.30	1.05	*	0.66	*
Zr	*	-0.39	**0.32**	0.65	1.72	-0.94	**-2.81**	**-1.06**	-1.66	0.44	*	3.28	*

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

Table 3 - GeoPT46 Z-scores for Granodiorite, HG-1. 11/12/2019

Lab Code	F51	F52	F53	F54	F55	F56	F57	F58	F59	F60	F61	F62	F64
SiO2	-0.12	0.20	**0.50**	-0.10	-0.02	-0.16	**1.01**	-8.10	**-0.04**	0.02	**0.08**	**-0.74**	0.88
TiO2	0.00	1.15	**-0.92**	-0.18	-0.92	0.46	**-2.75**	-6.92	**0.00**	-0.92	**0.28**	**-0.92**	-1.37
Al2O3	-0.15	-0.41	**-1.35**	-0.35	1.06	-0.18	**-0.51**	2.37	**0.78**	0.14	**-0.53**	**-0.46**	-2.58
Fe2O3T	-0.64	1.10	**-6.05**	-0.12	0.12	0.12	**-3.01**	-8.78	**0.46**	-0.20	**2.29**	**-0.62**	-2.92
MnO	-2.03	-1.35	**9.63**	-1.00	8.24	0.02	**-3.38**	-4.77	**-4.06**	-2.03	**0.53**	**2.79**	-0.32
MgO	0.67	-0.33	**1.33**	-0.16	-2.44	0.22	**-4.44**	15.76	**-0.44**	0.00	**-0.69**	**-0.89**	1.11
CaO	-0.21	-0.29	**-0.10**	0.10	0.75	0.43	**-2.32**	-4.98	**0.86**	0.11	**-0.18**	**0.86**	-1.64
Na2O	-0.28	-2.20	**2.49**	0.24	-0.92	0.20	**-0.71**	*	**0.89**	0.52	**-0.54**	**0.09**	-0.20
K2O	0.06	0.94	**0.50**	-0.16	-0.38	-1.51	**0.88**	-3.64	**1.13**	-0.25	**-1.67**	**-0.88**	0.06
P2O5	0.90	0.42	**0.09**	-0.05	-1.84	0.05	**-1.79**	*	**0.09**	-0.05	**0.14**	**3.87**	3.82
Ag	-0.52	*	*	5.37	*	*	*	*	*	*	*	*	*
Ba	1.54	0.51	**-1.31**	-0.68	-2.02	0.28	*	9.52	**0.27**	*	*	**-0.50**	-0.32
Be	-0.26	2.13	*	-1.09	*	0.89	*	*	*	*	*	*	-0.54
Bi	*-0.65*	*-0.80*	*	*-0.58*	*	*0.20*	*	*-2.94*	*	*	*	*	*
Cd	*-1.28*	*	*	*	*	*5.77*	*	*	*	*	*	*	*0.17*
Ce	-0.82	-0.33	**-4.61**	-0.73	*	0.65	*	8.35	**-7.18**	*	*	**-2.81**	-1.23
Co	0.14	0.18	*	0.28	0.28	0.14	*	*	*	*	*	**17.41**	-0.28
Cr	*-2.60*	*-0.01*	***-5.06***	*1.22*	*-14.10*	*-0.23*	***0.86***	*-3.45*	***1.05***	*	*	***-0.78***	*-0.83*
Cs	0.68	0.02	**7.00**	0.74	*	1.15	*	*	*	*	*	*	-0.27
Cu	0.67	0.92	**-1.47**	0.08	-1.60	0.13	*	3.59	**-0.17**	*	*	**-0.17**	0.50
Dy	0.17	0.97	*	-0.84	*	1.83	*	*	*	*	*	**-1.93**	-0.96
Er	0.36	0.08	*	-0.45	*	1.11	*	*	*	*	*	*	-0.94
Eu	-0.01	-0.13	*	-0.65	*	0.31	*	*	*	*	*	**-3.51**	*
Ga	0.37	0.56	**-0.01**	0.82	2.09	0.83	*	-3.37	**-0.01**	*	*	**-0.85**	-0.09
Gd	-0.16	1.63	*	-0.65	*	5.13	*	*	*	*	*	**0.39**	*
Ge	*-6.16*	*	***86.44***	*0.35*	*	*	*	*	*	*	*	*	*
Hf	-2.90	*	*	0.47	*	0.69	*	*	*	*	*	*	*
Ho	0.03	-0.68	*	-0.65	*	-0.24	*	*	*	*	*	*	-0.79
La	-0.96	-0.21	**-0.42**	-0.77	*	0.72	*	8.43	**3.31**	*	*	**-0.89**	-0.98
Li	-0.09	*	*	-0.24	*	-1.06	*	*	*	*	*	**-0.03**	-0.31
Lu	0.27	-0.57	*	*	*	-0.57	*	*	*	*	*	*	-0.57
Mo	0.36	*	**-1.15**	0.36	*	*	*	-3.64	*	*	*	*	0.00
Nb	0.01	*	**-2.18**	-0.71	-1.82	-0.21	*	-4.90	**0.75**	*	*	**15.38**	*
Nd	0.06	-0.50	*	-1.07	*	0.59	*	7.54	**-4.65**	*	*	**-1.15**	-0.72
Ni	0.13	0.77	**-3.07**	-0.56	0.00	-0.36	*	50.73	**0.00**	*	*	**-7.17**	0.00
Pb	0.07	-0.35	**-0.29**	-0.08	-3.91	0.53	*	-1.65	**0.25**	*	*	*	-0.17
Pr	0.08	-0.15	*	-0.65	*	0.84	*	*	*	*	*	**-4.37**	-0.67
Rb	1.36	0.13	**-0.87**	1.20	0.33	0.22	*	-2.94	**-0.65**	*	*	**-2.50**	-0.87
Sb	0.00	*	*	-0.24	*	2.82	*	*	*	*	*	*	0.24
Sc	0.16	0.37	**8.13**	*	-1.05	0.26	*	*	*	*	*	*	-0.54
Sm	-0.01	-0.24	*	-1.08	*	0.12	*	147.34	*	*	*	**-2.14**	-0.64
Sn	0.12	*	*	0.27	*	1.18	*	*	*	*	*	*	0.07
Sr	0.07	0.76	**-1.25**	-0.24	0.24	0.10	*	-3.21	**0.21**	*	*	**0.07**	-0.91
Ta	-0.29	*	*	-0.60	*	0.03	*	*	*	*	*	*	*
Tb	-0.02	0.26	*	*	*	1.72	*	*	*	*	*	*	*
Th	-0.04	0.51	**-9.19**	-0.78	-1.64	0.63	*	-2.83	**2.61**	*	*	**-2.45**	-1.05
Tl	0.00	-0.04	*	0.05	*	-0.05	*	*	*	*	*	*	0.20
Tm	-0.32	-0.67	*	*	*	-0.83	*	*	*	*	*	*	-0.83
U	-0.16	0.43	**6.87**	-0.09	*	1.04	*	*	**0.35**	*	*	**-6.17**	-0.20
V	0.65	0.82	**1.19**	0.32	1.69	*	*	*	**1.19**	*	*	**-1.00**	0.38
W	0.62	*	*	0.27	*	*	*	-3.16	*	*	*	*	*
Y	-0.20	0.08	**0.26**	-0.28	-2.34	0.21	*	-2.76	**1.92**	*	*	**-3.04**	5.91
Yb	-0.06	-0.73	*	-0.12	*	0.69	*	*	*	*	*	**-0.24**	-0.59
Zn	0.63	1.56	**-1.97**	-0.20	0.99	1.05	*	-0.72	**1.32**	*	*	**7.90**	0.86
Zr	-5.15	*	**-1.41**	-0.08	3.12	-0.16	*	-5.54	**-0.78**	*	*	**8.43**	0.86

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

Table 3 - GeoPT46 Z-scores for Granodiorite, HG-1. 11/12/2019

Lab Code	F65	F68	F69	F70	F71	F72	F73	F75	F76	F77	F78	F79	F80
SiO2	0.07	**-0.19**	**-0.45**	-0.66	-0.54	-0.28	-0.23	-0.62	**-0.37**	**-0.51**	**0.57**	-1.41	0.05
TiO2	0.00	**0.00**	**0.00**	0.14	0.00	0.92	-1.37	-0.29	**-0.92**	**-2.75**	**0.00**	-1.92	-0.46
Al2O3	0.29	**0.14**	**1.27**	0.27	2.32	0.91	0.64	-1.61	**-0.11**	**-1.50**	**-0.41**	4.39	0.36
Fe2O3T	-0.09	**0.24**	**-1.06**	-0.09	0.34	-2.81	1.64	-0.72	**-0.62**	**0.90**	**1.55**	-1.40	0.45
MnO	-2.72	**-12.62**	**2.79**	0.02	4.82	1.39	-0.32	-2.03	**2.10**	**-4.06**	**-0.64**	1.22	-1.35
MgO	-0.89	**0.89**	**1.33**	-0.44	2.22	-0.44	3.33	-1.75	**-2.22**	**0.89**	**-0.89**	9.99	0.44
CaO	-2.12	**-1.37**	**1.18**	0.91	-0.52	-0.84	1.86	0.06	**-0.41**	**-2.00**	**1.50**	0.59	0.75
Na2O	-4.60	**2.81**	**1.37**	1.40	-1.32	-0.44	0.44	0.46	**3.13**	**-2.95**	**0.57**	0.60	-1.32
K2O	-1.32	**-0.13**	**0.25**	-0.50	-0.31	0.82	-0.63	0.49	**2.26**	**0.13**	**0.38**	0.56	0.69
P2O5	-1.84	**-3.68**	**0.09**	0.33	-1.84	0.99	-1.18	-0.09	**-1.79**	**-1.79**	**1.98**	6.65	0.99
Ag	*	*	*	*	*	*	*	38.43	**37.48**	*	**1.73**	*	*
Ba	*	-14.06	**-0.31**	-0.01	5.68	8.16	-0.39	0.01	**-1.69**	**0.98**	**-0.59**	-0.44	0.25
Be	-1.91	*	**-0.45**	1.00	*	0.73	0.51	-0.72	*	*	**-0.09**	*	*
Bi	*	*1.46*	***1.70***	*	*	*	*	*0.74*	***-3.37***	*	***2.45***	*	*
Cd	*114.51*	*	*	*	*	*	*	*	*	*	***2.31***	*	*
Ce	*	*	**0.32**	-3.20	*	0.73	-0.25	0.16	**-2.56**	**-4.35**	**-1.07**	*	-0.76
Co	3.37	*	**-0.84**	3.09	*	2.39	-0.14	-0.59	**3.37**	**-5.06**	**-0.39**	*	-3.93
Cr	*-0.61*	*0.34*	***1.43***	*	*-0.36*	*0.49*	*-0.52*	*-4.42*	***-2.23***	***-0.59***	***3.19***	*-1.24*	*1.75*
Cs	*	*	**-0.67**	1.00	*	*	-1.34	-0.30	**-2.41**	*	**-0.40**	*	*
Cu	-0.09	**1.56**	**0.00**	-3.55	*	0.13	-0.09	-0.27	**-1.04**	**-2.77**	**3.25**	18.75	-4.20
Dy	*	*	**0.28**	0.35	*	0.45	-0.69	0.48	*	*	**0.03**	*	*
Er	*	*	**-0.31**	0.03	*	0.21	-0.75	0.32	*	*	**-0.59**	*	*
Eu	*	*	**-0.25**	0.16	*	0.21	-0.46	0.73	*	*	**-0.06**	*	*
Ga	*	*	**-0.10**	-0.43	*	0.83	0.04	0.71	**-0.01**	**-0.85**	**1.08**	-0.01	-1.27
Gd	*	*	**-0.79**	0.26	*	0.04	0.00	0.94	*	**0.39**	**-0.63**	*	*
Ge	*	*	***2.62***	*	*	*-1.35*	*	*	*	*	***0.77***	*	*
Hf	*	*	**0.24**	*	*	0.52	-0.57	*	**-6.50**	**2.95**	**-0.14**	*	*
Ho	*	*	**0.07**	0.17	*	0.03	-0.51	-0.28	*	*	**0.01**	*	*
La	*	*	**-0.00**	1.07	*	1.16	-0.45	0.43	**0.04**	**0.51**	**0.09**	*	-1.61
Li	*	**-10.77**	*	1.17	*	*	-0.64	-0.84	*	*	**0.03**	*	*
Lu	*	*	*	-0.24	*	0.44	-0.47	0.58	*	*	**-0.13**	*	*
Mo	*	*	**1.01**	1.35	*	0.58	0.14	0.46	**-1.15**	*	**-0.18**	*	*
Nb	*	137.23	**-0.72**	-0.36	*	0.37	-0.58	0.31	**-0.72**	**-0.72**	**-2.62**	*	0.37
Nd	*	*	**-0.05**	0.97	*	1.12	-0.87	0.31	**-3.48**	**-2.90**	**-0.16**	*	*
Ni	1.54	**2.05**	**0.82**	-2.05	*	0.00	0.00	-0.39	**-2.05**	*	**-0.41**	5.64	-6.15
Pb	4.16	**2.40**	**1.22**	-0.15	*	-1.49	-0.95	-0.55	**0.79**	**0.25**	**-0.34**	*	6.85
Pr	*	*	**-0.17**	1.09	*	0.91	-0.76	0.19	*	*	**0.00**	*	*
Rb	*	*	**-0.21**	-0.76	-0.43	0.00	-0.32	-0.57	**0.01**	**-0.97**	**0.01**	0.11	-1.58
Sb	70.37	*	*	1.18	*	*	-0.47	*	*	*	**0.00**	*	*
Sc	*	*	**3.02**	1.34	*	-1.90	1.17	2.93	**4.72**	**4.72**	**1.31**	*	*
Sm	*	*	**0.13**	0.57	*	0.53	0.20	0.55	**3.52**	*	**0.18**	*	*
Sn	*	*	**1.61**	*	*	0.60	0.43	*	**-2.18**	*	**0.06**	*	*
Sr	-0.87	-14.01	**-0.28**	-1.15	4.53	0.38	0.00	0.03	**-0.07**	**-3.69**	**0.56**	0.03	0.07
Ta	*	*	**0.93**	*	*	0.47	-0.91	*	*	*	**0.93**	*	*
Tb	*	*	**-0.69**	0.00	*	0.46	0.00	0.09	*	*	**-0.66**	*	*
Th	*	*	**0.17**	1.31	*	-0.38	0.89	1.51	**0.08**	**0.08**	**-0.51**	*	*
Tl	-1.13	*	*	0.49	*	*	-0.64	*	*	*	*	*	*
Tm	*	*	*	0.13	*	0.13	-0.61	-0.26	*	*	**0.06**	*	*
U	*	*	**0.48**	-3.09	*	-0.23	-1.46	1.27	**-1.83**	*	**-0.85**	*	*
V	-0.23	**3.92**	**0.04**	-0.77	*	-0.77	0.32	0.00	**-0.45**	**-1.54**	**-0.51**	9.89	0.87
W	*	*	**1.15**	*	*	0.06	0.13	6.73	**-2.88**	*	**1.64**	*	*
Y	*	*	**-0.07**	-0.69	*	7.56	-0.90	-0.12	**0.26**	**1.92**	**-0.07**	*	29.03
Yb	*	*	**-0.24**	-0.26	*	0.75	-0.66	0.28	*	*	**0.23**	*	*
Zn	3.29	**53.32**	**-0.20**	1.32	*	10.04	*	5.51	**-0.66**	**3.29**	**3.69**	*	5.27
Zr	*	*	**0.78**	*	*	0.70	1.09	*	**-1.56**	**-2.34**	**1.09**	-2.19	0.78

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

Table 3 - GeoPT46 Z-scores for Granodiorite, HG-1. 11/12/2019

Lab Code	F81	F83	F84	F85	F86	F88	F89	F90	F91	F93	F94	F96	F97
SiO2	0.79	0.70	0.16	**-0.02**	-0.16	**-0.36**	*	-0.04	-0.59	**-10.54**	0.26	**-0.56**	-0.02
TiO2	2.06	-0.14	3.16	**0.41**	0.14	**0.18**	*	0.00	0.87	**-10.08**	0.00	**-0.92**	0.46
Al2O3	1.60	-0.97	-2.65	**-0.61**	-1.34	**1.12**	*	0.07	-0.05	**-20.97**	0.14	**-0.80**	-0.60
Fe2O3T	0.77	0.01	-1.29	**0.10**	-0.20	**11.10**	*	0.12	-0.43	**3.07**	-0.09	**-2.14**	-0.42
MnO	0.02	0.37	5.16	**-0.98**	-0.32	**3.47**	*	1.05	*	**-17.76**	1.39	**-4.06**	*
MgO	1.98	-1.78	-2.44	**1.80**	-1.33	**1.51**	*	0.00	-2.86	*	0.22	**-0.89**	1.55
CaO	4.29	-0.05	10.77	**0.66**	0.11	**-31.52**	*	-0.05	-0.87	**1.50**	0.11	**-0.41**	1.38
Na2O	1.84	-1.72	-16.99	**-0.46**	0.84	**3.46**	*	-0.60	-4.32	*	0.28	**-0.55**	0.28
K2O	1.18	-0.50	-12.80	**0.21**	0.06	**-0.25**	*	0.00	0.11	**-14.43**	0.31	**0.00**	0.06
P2O5	3.07	-0.90	0.99	**-0.49**	-0.42	**9.90**	*	-0.24	0.05	**211.37**	-0.90	**0.09**	0.05
Ag	0.00	13.50	*	*	0.47	*	*	*	*	*	*	*	*
Ba	0.63	0.44	*	**0.70**	-0.11	**-0.74**	-0.11	-0.01	-6.15	*	0.37	**-0.04**	*
Be	0.10	0.94	*	**0.80**	0.92	*	*	*	2.61	*	0.94	*	*
Bi	*2.59*	*-4.83*	*	***3.11***	*1.12*	*	*	*	*	*	*1.30*	*	*
Cd	*5.77*	*	*	***-2.23***	*3.59*	*	*	*	*	*	*	*	*
Ce	0.25	0.65	*	**0.39**	0.38	**-2.56**	-0.51	*	-3.01	*	1.03	**0.28**	*
Co	0.24	0.28	-3.93	**-0.71**	-0.08	**3.37**	*	*	5.78	*	0.28	*	*
Cr	*0.00*	*2.32*	*-7.04*	***-0.14***	*-0.42*	***3.70***	*	*0.18*	*-1.28*	***-4.62***	*0.68*	***0.63***	*
Cs	0.76	0.00	*	**0.16**	*	**-2.41**	0.00	*	*	*	0.21	**0.95**	*
Cu	-0.28	1.65	-4.63	**1.00**	1.19	**2.42**	*	-0.52	0.22	**17.58**	0.35	**-1.47**	*
Dy	0.26	-0.04	*	**0.28**	0.05	*	-0.35	*	-1.81	*	0.42	**-1.25**	*
Er	-0.07	-0.27	*	**0.46**	0.45	*	0.33	*	-0.79	*	0.03	**-1.43**	*
Eu	0.14	0.40	*	**-0.08**	-0.08	*	-0.32	*	0.36	*	0.07	**-0.78**	*
Ga	0.93	1.25	*	**0.79**	0.20	*	0.83	-0.01	-2.96	*	0.96	**-0.85**	*
Gd	0.94	-0.20	*	**-0.85**	0.57	*	0.59	*	0.93	*	0.96	**-1.42**	*
Ge	*-0.25*	*0.89*	*	***-4.49***	*2.46*	*	*	*	*	*	*0.89*	*	*
Hf	0.38	0.22	*	**-0.27**	1.02	*	-0.41	*	*	*	-0.10	**-1.59**	*
Ho	-0.01	0.03	*	**-0.19**	0.12	*	0.03	*	-1.29	*	0.03	**-1.19**	*
La	0.24	0.61	*	**0.51**	0.23	**-4.63**	-0.28	*	-2.02	*	0.58	**-1.29**	*
Li	0.22	*	*	**0.21**	0.36	*	*	*	*	*	0.73	*	*
Lu	0.91	-0.57	*	**-0.13**	0.20	*	0.10	*	0.71	*	0.10	**-0.41**	*
Mo	0.59	-0.58	*	**0.78**	0.02	**2.45**	*	*	1.23	*	-0.58	**-2.24**	*
Nb	1.10	0.37	*	**0.32**	-0.29	**-2.18**	0.08	1.11	*	*	-1.82	**0.75**	*
Nd	0.69	0.70	*	**0.23**	0.44	**-1.74**	-0.37	*	-2.39	*	0.85	**-0.95**	*
Ni	1.30	*	-4.10	**1.07**	1.33	**0.00**	*	-2.56	-3.73	**-4.10**	0.51	**-1.02**	*
Pb	-0.28	-0.68	-7.95	**0.80**	0.26	**-1.91**	*	*	-0.10	**3.48**	1.20	**-2.55**	*
Pr	*	0.17	*	**1.05**	0.29	*	-0.25	*	-1.90	*	0.67	**-0.44**	*
Rb	0.77	1.36	*	**0.71**	-0.49	**0.01**	0.28	-0.38	-1.91	**-10.02**	0.49	**0.33**	*
Sb	0.19	*	*	*	0.66	*	*	*	*	*	*	*	*
Sc	2.42	0.66	*	**-0.00**	-0.45	*	*	*	*	*	*	**-0.09**	*
Sm	0.67	0.77	*	**0.03**	0.26	*	-0.08	*	-1.96	*	0.20	**-1.00**	*
Sn	-1.47	-0.14	*	**0.15**	-0.03	*	-0.52	*	*	*	-0.14	*	*
Sr	0.65	0.52	*	**0.88**	-0.14	**-1.05**	-0.07	0.42	*	**15.05**	0.49	**0.54**	*
Ta	0.58	0.03	*	**-0.59**	0.59	*	0.03	*	*	*	*	**0.43**	*
Tb	-0.05	0.11	*	**0.03**	0.03	*	0.11	*	-0.40	*	0.80	**-0.94**	*
Th	-0.27	0.17	*	**0.11**	0.80	**4.30**	-0.42	*	-2.95	*	0.04	**-1.43**	*
Tl	-0.20	-0.64	-1.62	**0.95**	0.10	*	*	*	*	*	*	*	*
Tm	0.10	-0.51	*	**0.10**	0.06	*	0.13	*	-1.03	*	-0.19	**-1.22**	*
U	1.50	0.28	*	**0.25**	0.72	**-6.17**	-0.04	*	-3.09	**-4.00**	0.77	**0.09**	*
V	0.31	0.87	-3.51	**0.81**	0.57	**0.10**	*	-1.59	*	**3.92**	0.59	**1.63**	*
W	-3.65	0.53	*	**-0.42**	1.07	*	-0.26	*	*	**4.99**	0.03	*	*
Y	0.66	0.13	*	**0.67**	-0.12	**1.92**	0.05	*	-1.53	**20.08**	-0.03	**2.41**	*
Yb	0.25	-0.79	*	**0.34**	0.22	*	-0.12	*	-1.47	*	0.55	**-0.97**	*
Zn	1.47	2.63	-3.29	**0.33**	0.79	**3.29**	*	-1.32	0.69	**0.00**	0.00	**-1.65**	*
Zr	1.00	-0.86	*	**0.68**	0.31	**-0.94**	-0.08	0.39	*	**0.94**	0.86	**-0.03**	*

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

Table 3 - GeoPT46 Z-scores for Granodiorite, HG-1. 11/12/2019

Lab Code	F99	F100	F101	F102	F104	F105	F106	F107	F108	F110	F111	F112	F114
SiO2	0.30	**0.35**	-0.03	**-0.65**	**-0.50**	-0.41	0.14	**1.02**	**0.39**	0.00	0.02	0.83	**0.17**
TiO2	-0.18	**0.18**	0.00	**0.00**	**0.00**	-2.29	0.00	**0.92**	**2.38**	0.50	-0.46	1.37	**-0.56**
Al2O3	0.04	**-0.04**	-0.08	**-0.75**	**-0.46**	-2.87	0.59	**-1.20**	**-0.06**	0.17	-0.25	1.22	**0.18**
Fe2O3T	-0.42	**0.16**	0.56	**0.68**	**0.46**	-0.32	0.67	**0.68**	**-1.95**	0.23	0.23	1.56	**0.14**
MnO	-0.32	**0.05**	-2.03	*	**-0.64**	1.05	0.02	**2.79**	**0.11**	2.42	1.39	1.56	**4.77**
MgO	-0.89	**-1.02**	0.22	**0.44**	**-1.33**	-0.16	1.11	**-1.33**	**0.98**	-2.89	0.22	1.14	**-0.33**
CaO	0.11	**0.76**	-0.05	**-1.37**	**0.22**	*	1.86	**1.50**	**-4.14**	0.59	0.11	-2.31	**1.00**
Na2O	0.28	**-0.20**	0.52	**-1.99**	**-2.31**	2.64	-1.32	**0.57**	**-0.44**	-0.20	0.28	4.12	**-1.27**
K2O	0.06	**0.16**	0.25	**-0.38**	**0.25**	*	-0.31	**-0.13**	**-4.28**	3.20	0.06	0.50	**1.95**
P2O5	0.52	**-0.09**	0.05	**3.87**	**-0.66**	*	0.05	**-1.79**	**-1.45**	0.05	0.99	-2.88	**-1.09**
Ag	*	**0.16**	*	*	*	*	*	*	*	*	*	0.92	*
Ba	-0.03	**-2.21**	0.47	*	**0.79**	*	0.68	**-0.23**	1.57	*	0.09	1.12	*
Be	*	**-5.61**	0.97	*	*	*	-0.12	*	*	*	*	-0.34	*
Bi	*	***-7.82***	*	*	*	*	*	***-9.04***	*	*	*	*-0.36*	*
Cd	*	***-1.59***	*	*	*	*	*	*	*	*	*	*2.47*	*
Ce	-2.13	**-14.18**	0.13	*	**-1.25**	*	0.31	**-9.77**	**0.58**	*	-0.38	0.66	*
Co	*	**-8.98**	-0.20	*	*	*	0.70	*	*	*	*	-0.28	*
Cr	*-0.50*	***-15.83***	*-0.14*	*	***-1.72***	*	*0.87*	***-7.60***	*	*	*1.50*	*0.17*	*
Cs	*	**-2.39**	0.61	*	**-0.13**	*	0.07	*	*	*	*	-1.27	*
Cu	0.56	**-6.70**	0.71	*	**-0.17**	*	-0.35	**-1.56**	*	*	-0.74	0.03	*
Dy	*	**-2.33**	0.23	*	**-0.89**	*	0.26	*	**-0.82**	*	*	-0.60	*
Er	*	**-2.16**	0.15	*	**-1.15**	*	0.33	*	**-0.40**	*	*	-0.15	*
Eu	*	**-2.40**	0.07	*	**-0.64**	*	0.16	*	**-0.35**	*	*	0.11	*
Ga	-0.43	**-5.40**	0.08	*	**-0.01**	*	0.20	**-1.86**	*	*	-0.01	-0.02	*
Gd	*	**-3.04**	0.47	*	**-1.97**	*	1.18	*	**-0.67**	*	*	1.20	*
Ge	*	***16.66***	*0.00*	*	*	*	*	*	*	*	*	*-0.19*	*
Hf	*	**-4.17**	0.41	*	**0.78**	*	0.22	*	*	*	*	*	*
Ho	*	**-2.07**	0.03	*	**-0.75**	*	0.03	*	**-0.59**	*	*	-0.51	*
La	-1.19	**-5.98**	-0.05	*	**-0.56**	*	0.37	**-5.28**	**0.65**	*	0.26	0.92	*
Li	*	**-10.30**	0.48	*	*	*	*	*	**4.57**	*	*	-0.28	*
Lu	*	**-2.30**	0.10	*	**0.21**	*	-1.25	*	**-0.13**	*	*	-0.57	*
Mo	*	**2.29**	*	*	**1.41**	*	1.05	**-1.51**	*	*	*	0.20	*
Nb	0.23	**0.58**	0.23	*	**0.89**	*	0.45	**-1.30**	*	*	-0.36	-1.08	*
Nd	*	**-4.87**	0.85	*	**-1.09**	*	0.47	**-8.14**	**0.13**	*	*	-0.39	*
Ni	-1.54	**-7.76**	-0.15	*	**-6.15**	*	-0.67	**-4.30**	*	*	-1.02	-0.32	*
Pb	-0.15	**-14.11**	0.90	*	**-0.40**	*	0.20	**-1.26**	*	*	0.66	-0.57	*
Pr	*	**-4.08**	0.17	*	**-0.84**	*	0.50	*	**0.02**	*	*	-0.24	*
Rb	0.00	**-14.22**	-0.22	*	**0.55**	*	0.51	**-1.25**	*	*	0.22	-0.76	*
Sb	*	**6.17**	*	*	*	*	*	*	*	*	*	0.24	*
Sc	*	**-3.98**	0.71	*	**-6.91**	*	0.20	**-1.42**	*	*	2.36	0.18	*
Sm	*	**-3.03**	0.27	*	**-0.58**	*	0.35	*	**0.21**	*	*	-0.38	*
Sn	*	**1.51**	*	*	*	*	-0.52	*	*	*	*	-0.29	*
Sr	0.00	**-13.51**	0.35	*	**0.00**	*	0.02	**-1.29**	**2.30**	*	0.10	-0.49	*
Ta	*	**14.08**	-0.10	*	**-0.45**	*	0.03	*	*	*	*	*	*
Tb	*	**-2.61**	0.00	*	**-1.38**	*	0.11	*	**-0.55**	*	*	0.00	*
Th	0.38	**-6.55**	0.63	*	**-0.17**	*	0.17	*	*	*	0.46	-0.72	*
Tl	*	**-1.92**	*	*	*	*	1.82	*	*	*	*	-1.13	*
Tm	*	**-1.99**	0.13	*	**-1.03**	*	1.73	*	**0.26**	*	*	-0.51	*
U	*	**-10.46**	0.77	*	**-0.13**	*	0.07	**-0.52**	*	*	0.17	-1.35	*
V	1.00	**-0.87**	0.13	*	**0.10**	*	1.22	**-2.75**	*	*	-0.23	0.42	*
W	*	**0.92**	*	*	**12.37**	*	-0.70	**-2.39**	*	*	*	-0.52	*
Y	*	**-3.57**	0.79	*	**0.26**	*	1.04	**5.05**	**0.02**	*	0.13	-0.86	*
Yb	*	**-1.45**	0.22	*	**-0.64**	*	-0.12	*	**0.05**	*	*	-0.73	*
Zn	0.49	**-7.53**	0.07	*	**1.32**	*	0.37	**-0.92**	*	*	0.66	-0.27	*
Zr	-0.35	**-7.05**	1.48	*	**-0.62**	*	0.70	**-2.72**	*	*	-0.62	-6.48	**26.08**

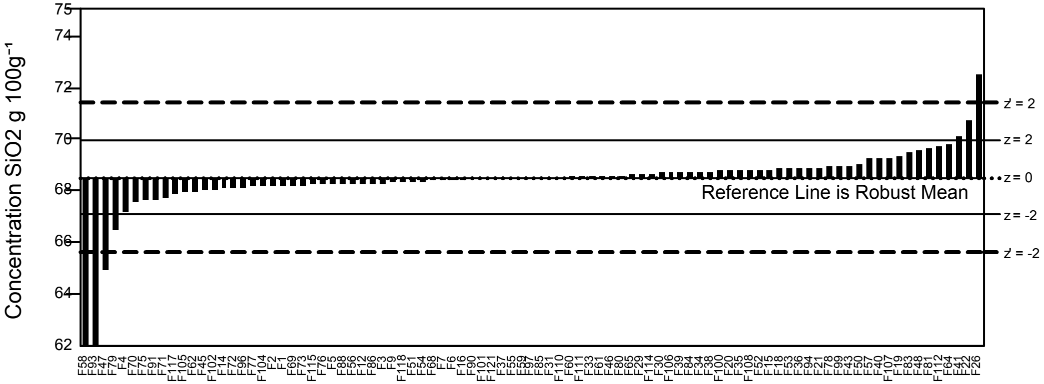
Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

Table 3 - GeoPT46 Z-scores for Granodiorite, HG-1. 11/12/2019

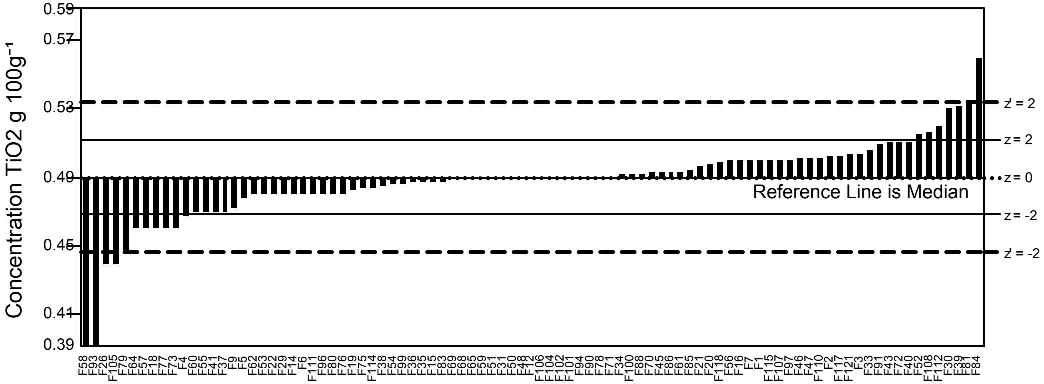
Lab Code	F115	F117	F118	F120	F121
SiO2	-0.41	-0.87	-0.25	*	-0.05
TiO2	0.92	1.10	0.82	*	1.21
Al2O3	-0.06	0.28	-0.68	*	1.29
Fe2O3T	-0.41	3.72	0.55	*	3.23
MnO	4.15	-1.32	0.05	-4.06	-1.87
MgO	0.89	0.00	-0.36	*	1.34
CaO	-0.73	0.22	0.51	*	-1.59
Na2O	-0.39	2.33	-2.31	*	0.45
K2O	-0.13	2.01	-0.26	*	-0.21
P2O5	0.09	-5.94	-4.43	*	7.02
Ag	6.77	3.41	*	*	*
Ba	-1.59	-0.93	-3.39	0.79	1.61
Be	0.03	-3.49	0.16	-0.79	0.46
Bi	*1.43*	*0.91*	*	*	*
Cd	*136.09*	*	*	*0.99*	*-1.91*
Ce	-3.97	-2.17	-4.75	6.17	1.04
Co	-0.77	7.16	4.59	-1.07	0.28
Cr	*-0.01*	*8.68*	*-3.09*	*-1.85*	*5.09*
Cs	-0.34	0.28	8.90	0.54	0.81
Cu	1.32	0.78	2.53	-0.78	1.69
Dy	-0.43	-0.89	-4.61	0.10	-0.09
Er	0.51	0.06	-3.81	0.06	0.66
Eu	0.08	-0.35	-2.77	0.51	0.71
Ga	-0.47	-0.43	6.58	0.24	1.57
Gd	0.83	0.67	-4.80	0.87	2.87
Ge	*17.36*	*	*	*	*
Hf	2.09	-7.07	-7.33	1.88	-0.10
Ho	0.67	-0.73	-3.25	0.34	-0.48
La	-3.01	-1.97	-6.24	0.88	0.88
Li	-0.55	-2.40	10.84	-1.13	*
Lu	1.74	-1.08	-2.94	0.88	-0.47
Mo	0.00	-1.12	*	-0.76	*
Nb	-0.01	0.16	-3.11	-0.72	0.60
Nd	-1.39	-0.51	-6.02	0.94	0.77
Ni	0.10	0.31	8.04	-1.64	0.51
Pb	-0.29	0.09	6.90	-0.51	6.71
Pr	-1.31	-0.17	-4.46	0.50	0.84
Rb	-11.18	1.75	7.24	-0.76	6.28
Sb	89.86	0.47	*	5.18	*
Sc	-3.19	-2.23	3.56	0.90	4.99
Sm	-0.52	-0.13	-4.86	-1.66	0.58
Sn	1.54	-0.06	*	0.81	*
Sr	-3.26	3.90	-5.46	-0.70	3.62
Ta	1.23	1.43	-3.89	2.44	-0.57
Tb	0.34	*	-3.54	0.92	0.92
Th	-2.83	1.86	-5.43	1.52	*
Tl	0.74	0.10	*	-0.69	*
Tm	1.65	-0.45	-2.79	-0.38	-0.38
U	-1.94	0.00	0.60	-0.65	2.61
V	-4.08	0.20	4.89	-0.12	-3.57
W	0.26	-1.31	*	-1.41	*
Y	-1.62	-0.89	-5.59	-0.23	0.43
Yb	0.40	-0.83	-3.98	0.30	0.43
Zn	5.72	-6.45	17.91	-2.70	0.00
Zr	-0.39	-13.60	-12.48	11.71	0.47

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

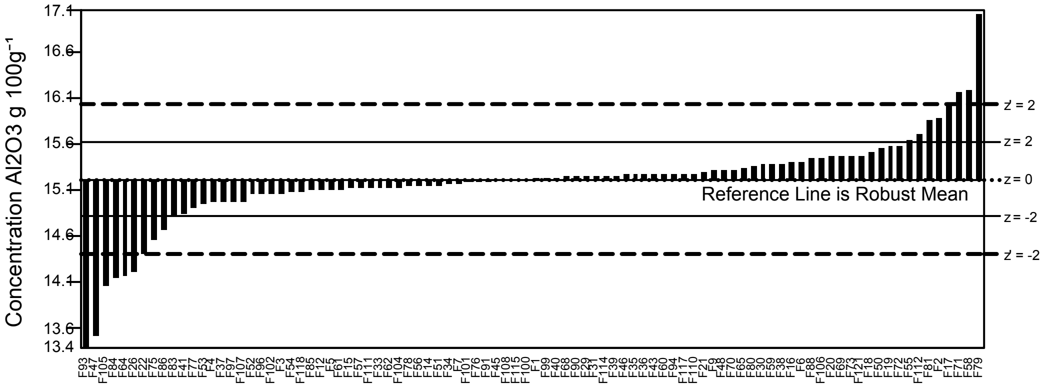
GeoPT46 - Barchart for SiO2



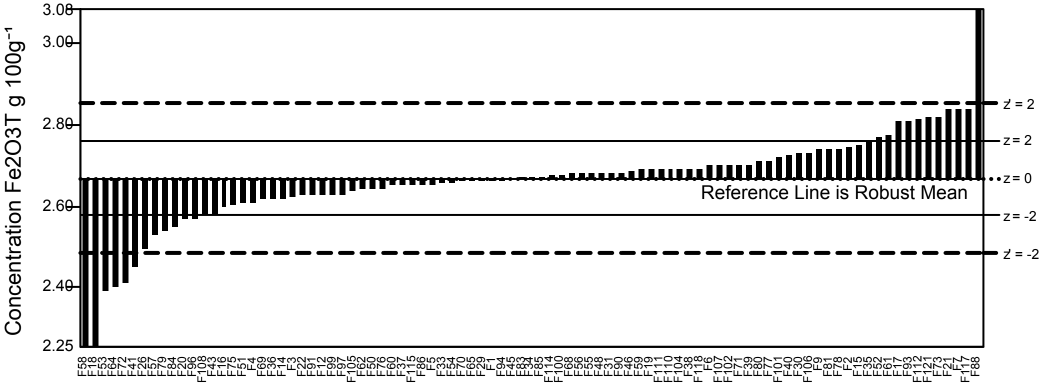
GeoPT46 - Barchart for TiO2



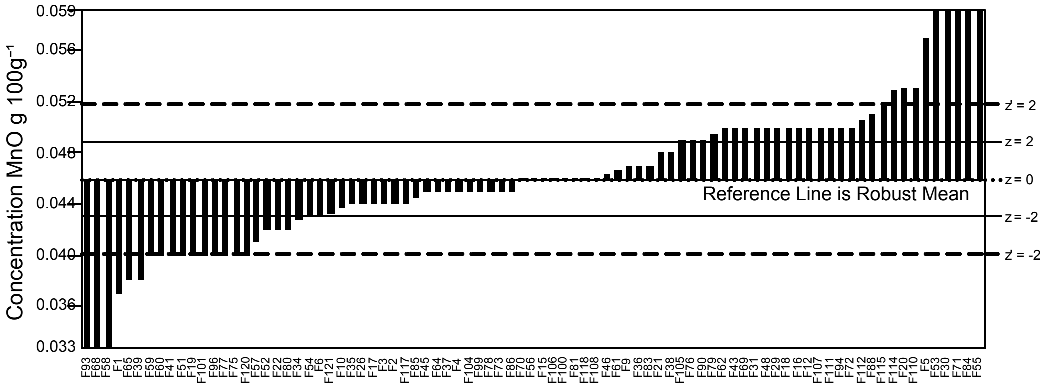
GeoPT46 - Barchart for Al2O3



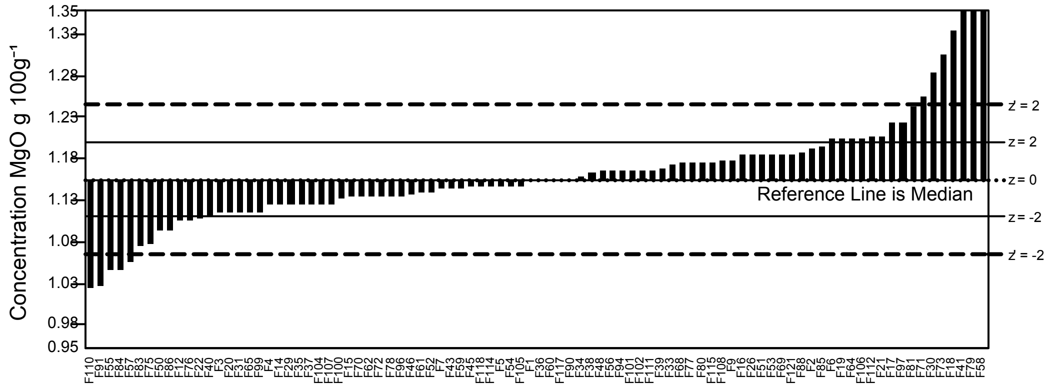
GeoPT46 - Barchart for Fe2O3T



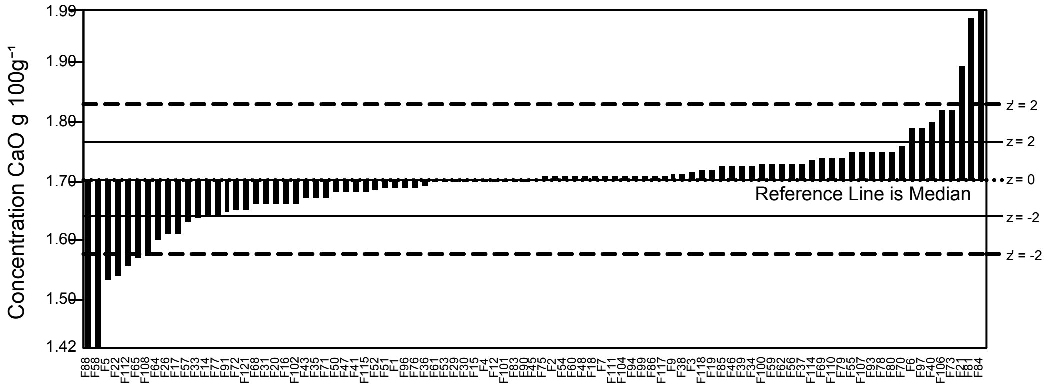
GeoPT46 - Barchart for MnO



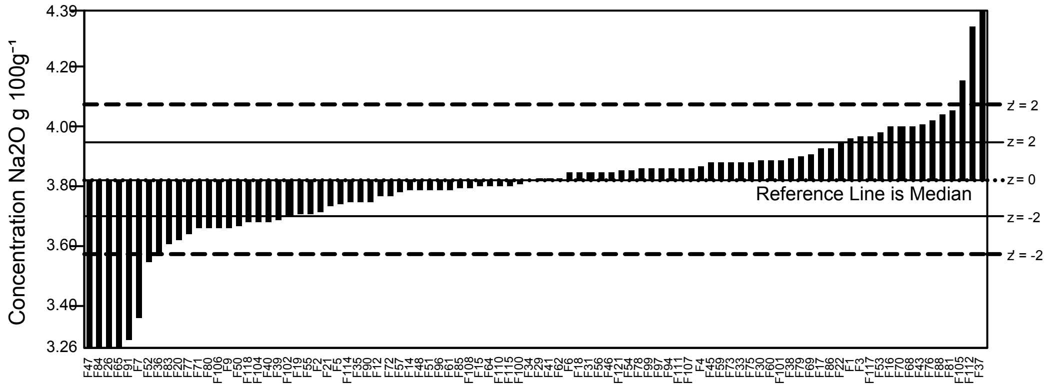
GeoPT46 - Barchart for MgO



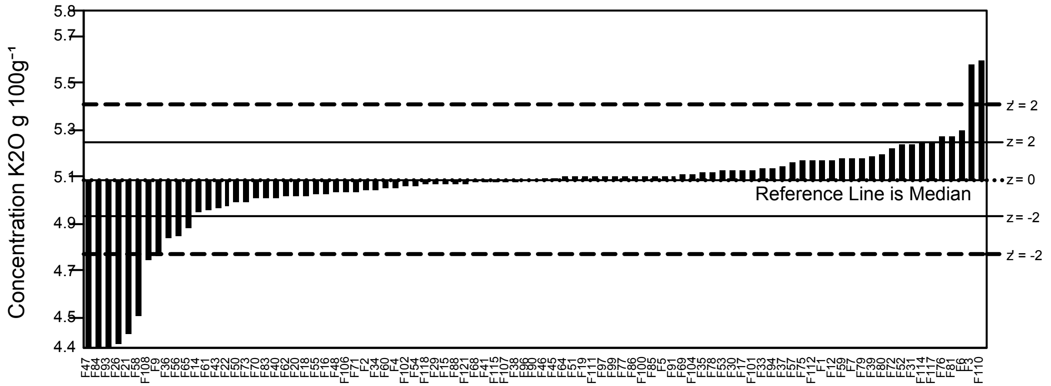
GeoPT46 - Barchart for CaO



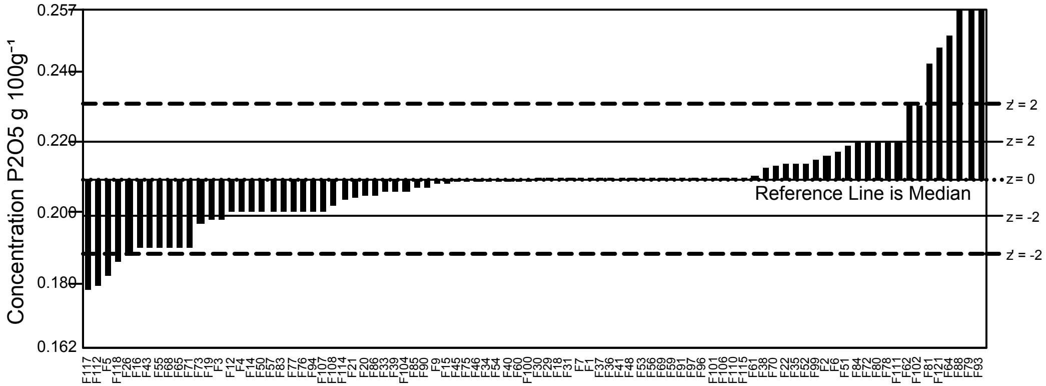
GeoPT46 - Barchart for Na2O



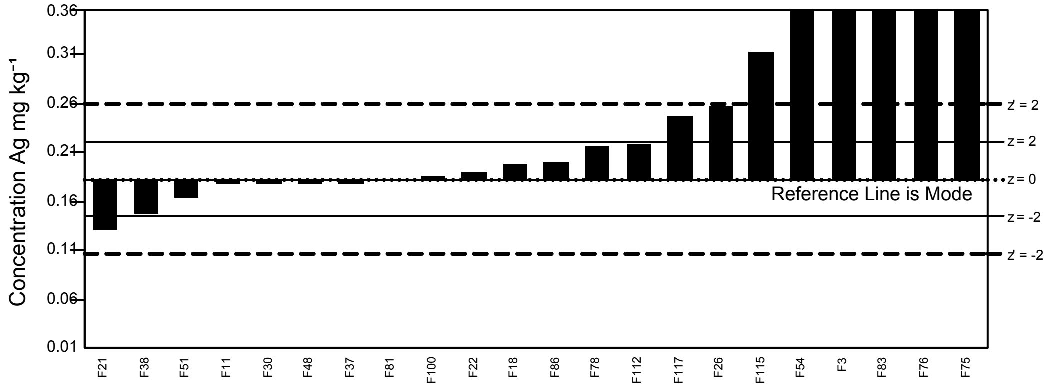
GeoPT46 - Barchart for K2O



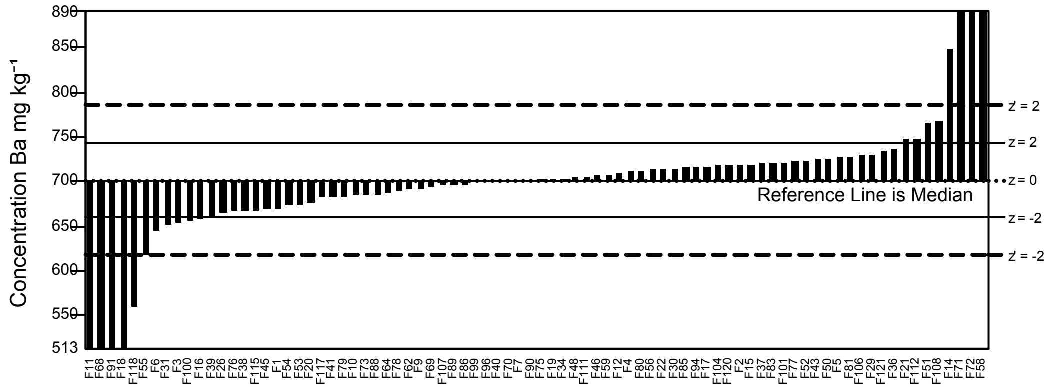
GeoPT46 - Barchart for P2O5



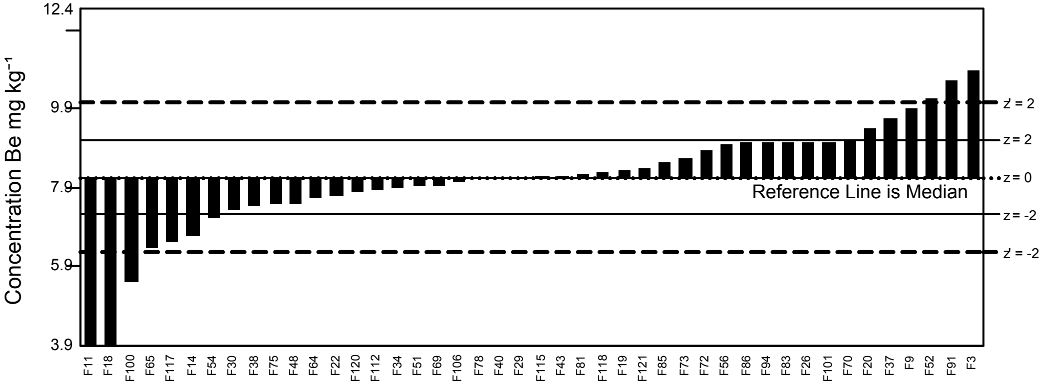
GeoPT46 - Barchart for Ag



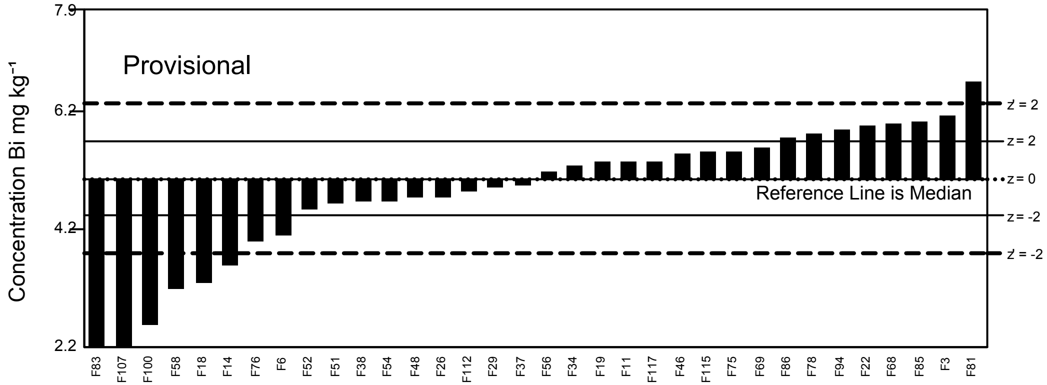
GeoPT46 - Barchart for Ba



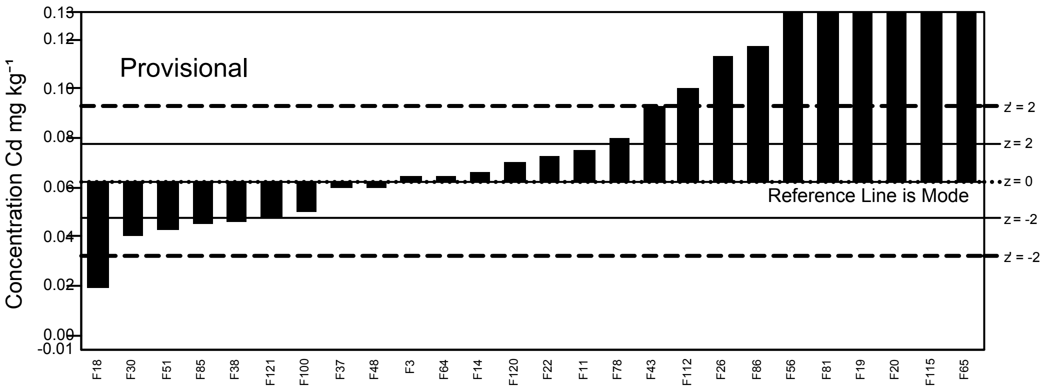
GeoPT46 - Barchart for Be



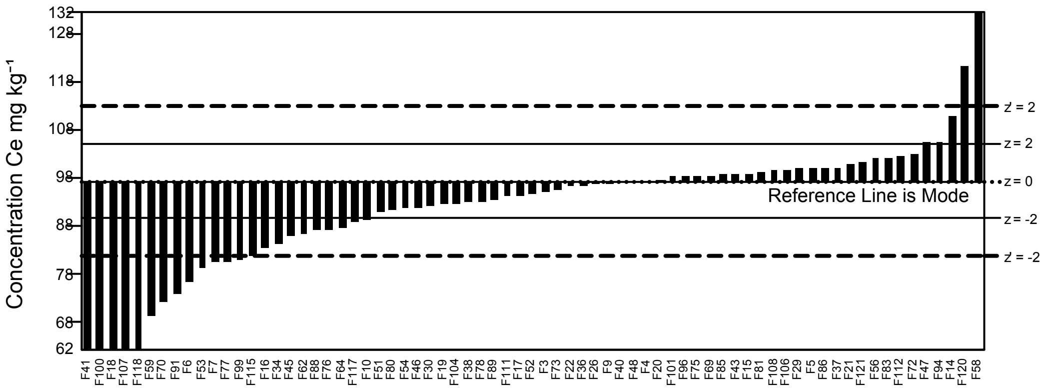
GeoPT46 - Barchart for Bi



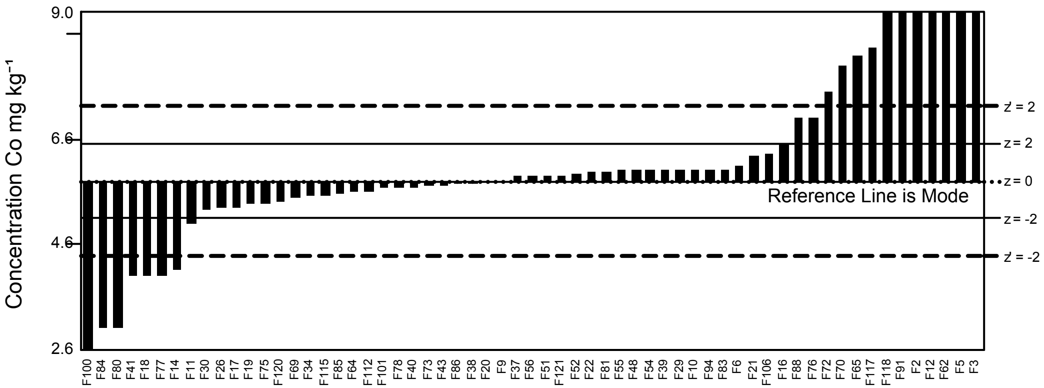
GeoPT46 - Barchart for Cd



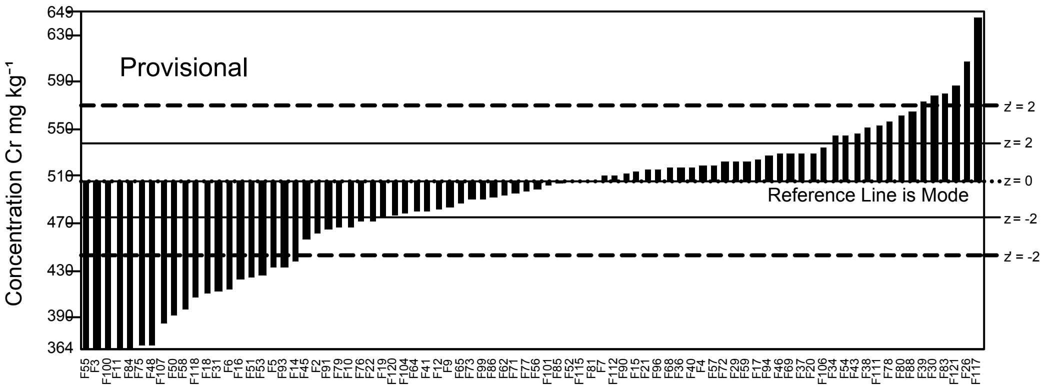
GeoPT46 - Barchart for Ce



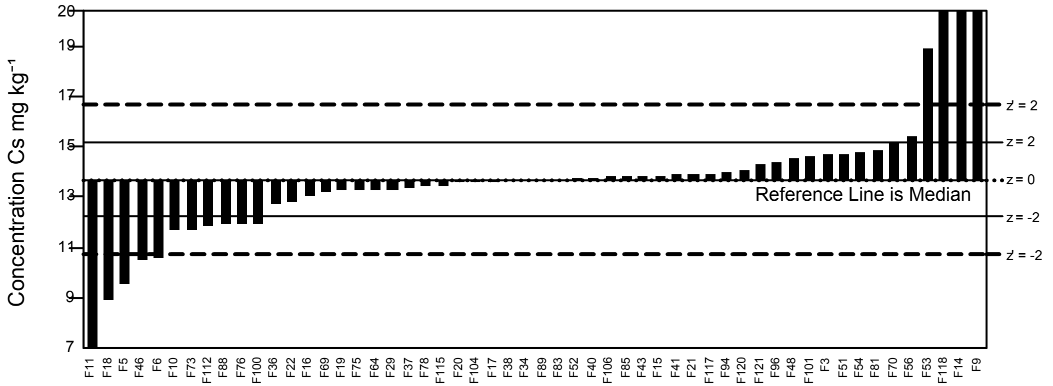
GeoPT46 - Barchart for Co



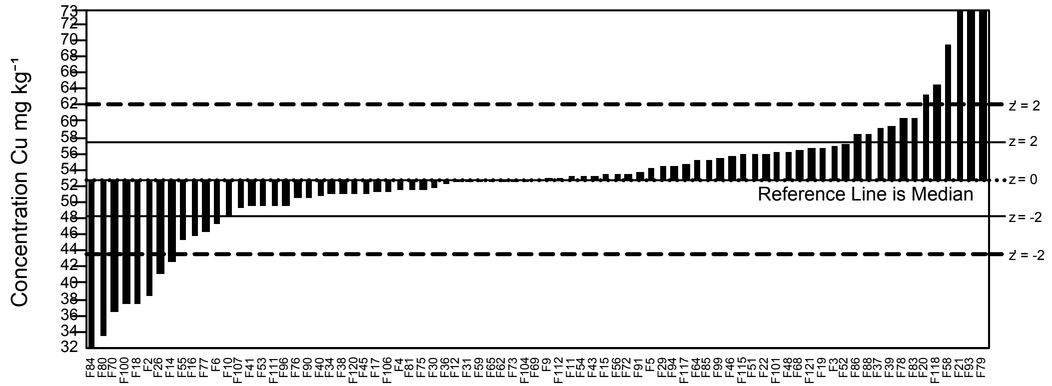
GeoPT46 - Barchart for Cr



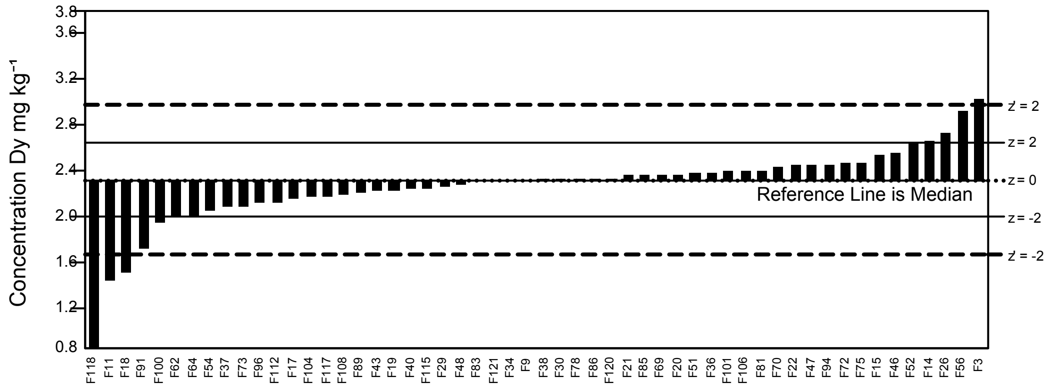
GeoPT46 - Barchart for Cs



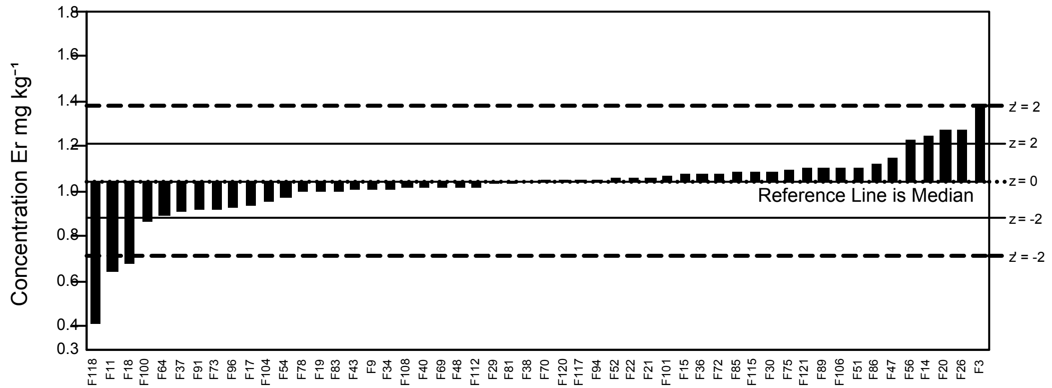
GeoPT46 - Barchart for Cu



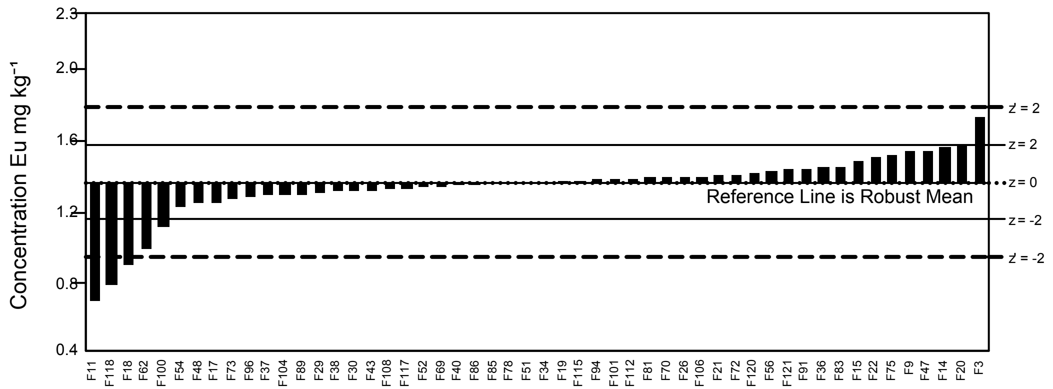
GeoPT46 - Barchart for Dy



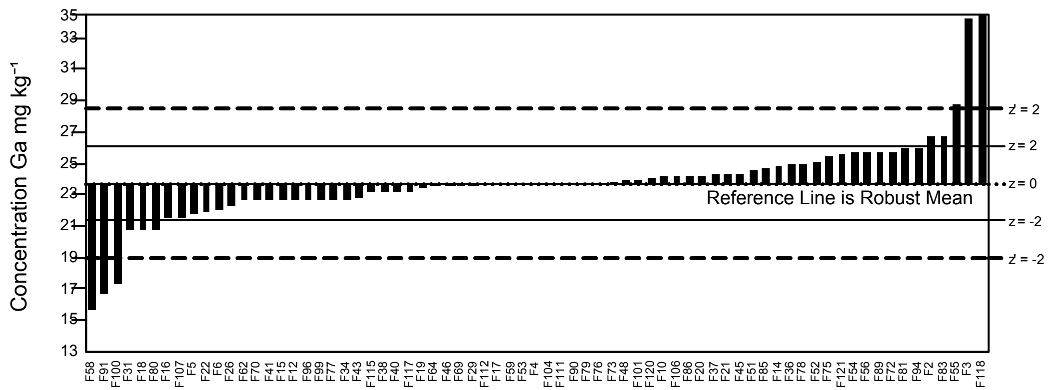
GeoPT46 - Barchart for Er

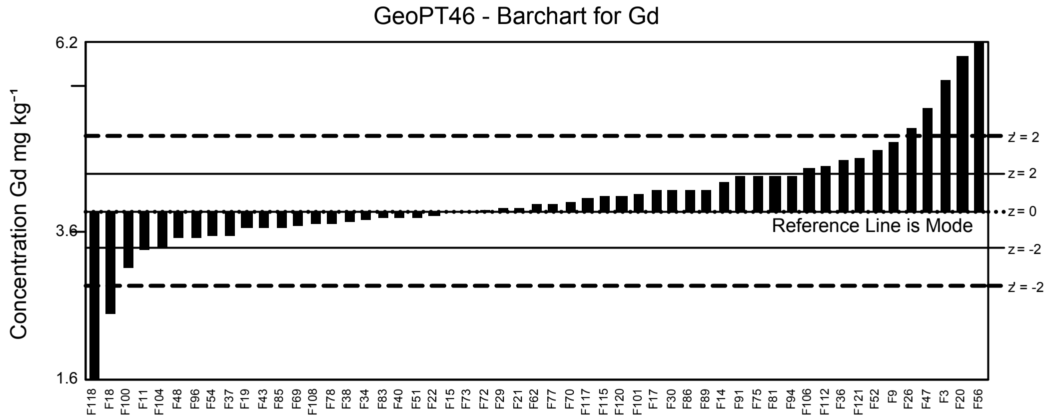


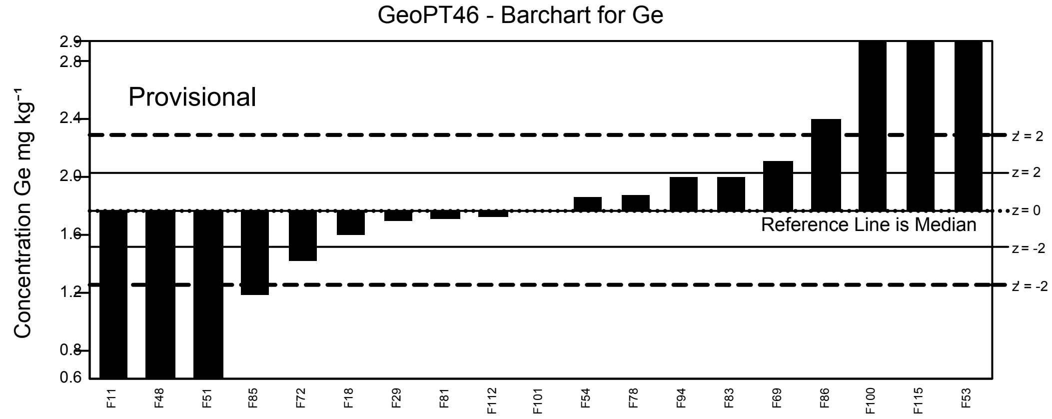
GeoPT46 - Barchart for Eu

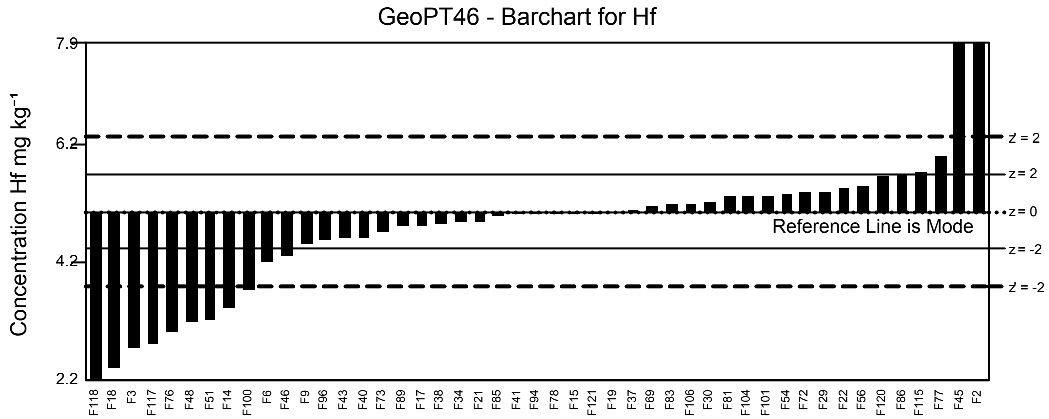


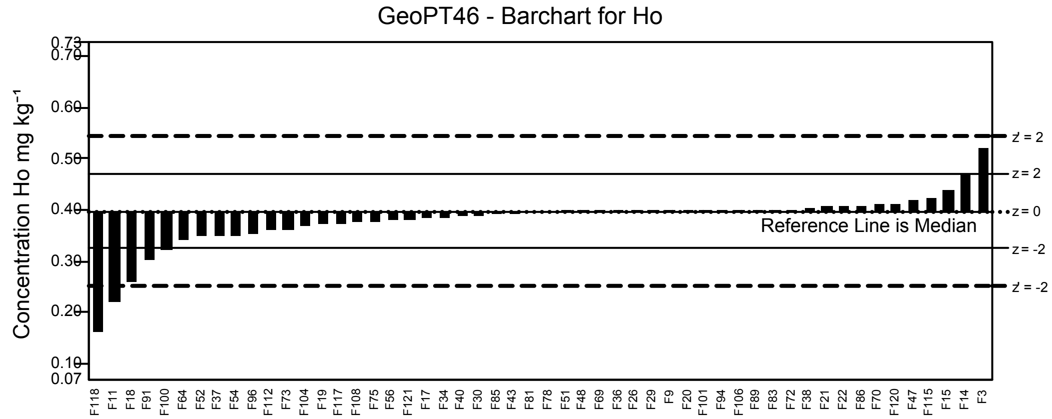
GeoPT46 - Barchart for Ga

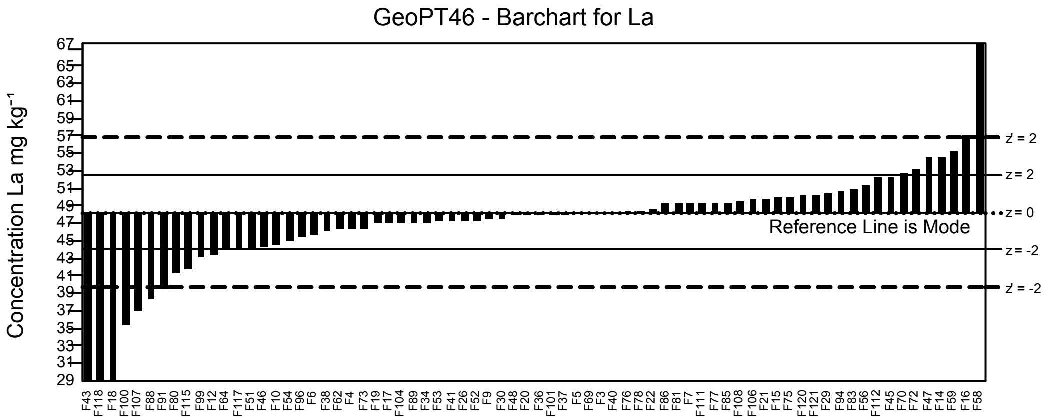


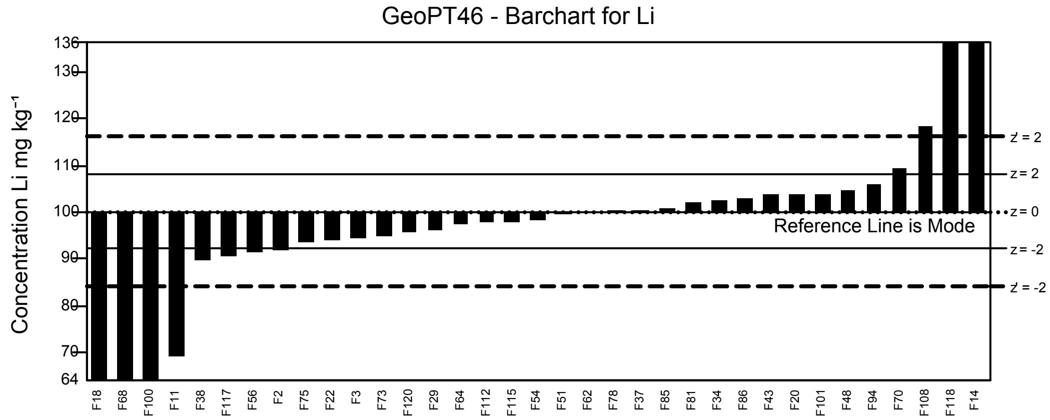

GeoPT46 - Barchart for Gd
Concentration Gd mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2


GeoPT46 - Barchart for Ge
Concentration Ge mg kg⁻¹
Provisional
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

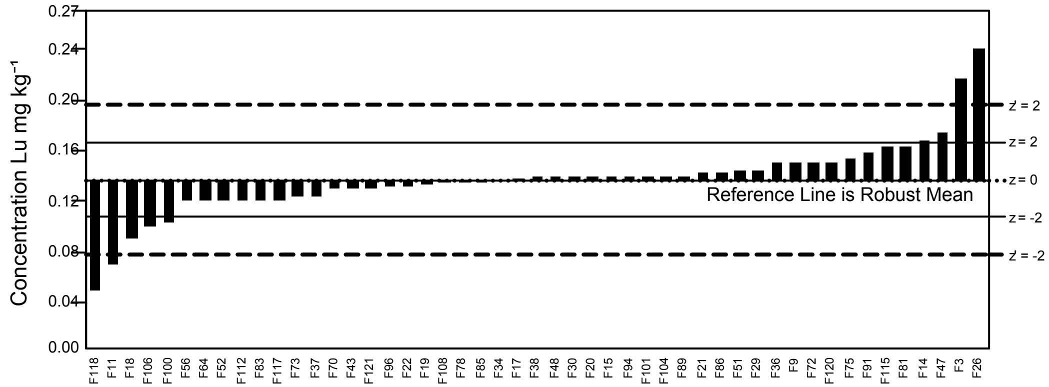

GeoPT46 - Barchart for Hf
Concentration Hf mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2


GeoPT46 - Barchart for Ho
Concentration Ho mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

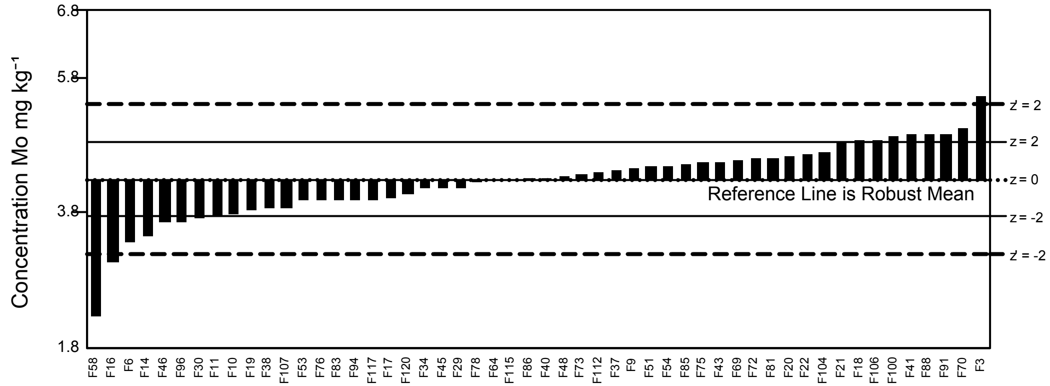

GeoPT46 - Barchart for La
Concentration La mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2


GeoPT46 - Barchart for Li
Concentration Li mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

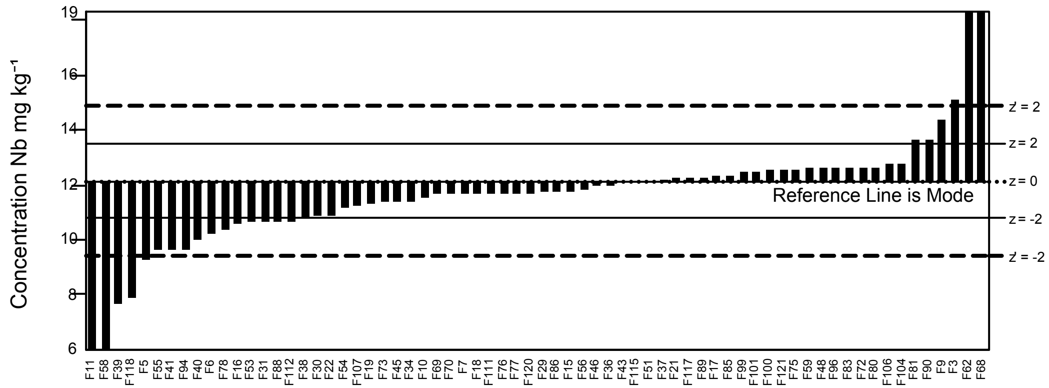
GeoPT46 - Barchart for Lu



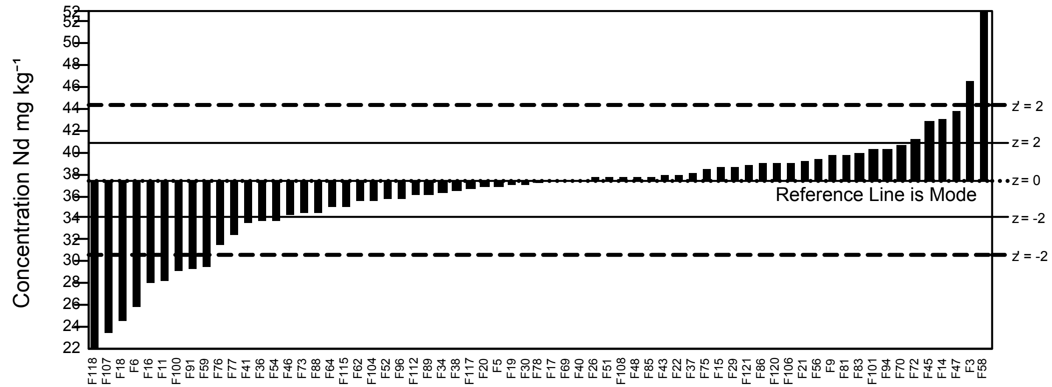
GeoPT46 - Barchart for Mo



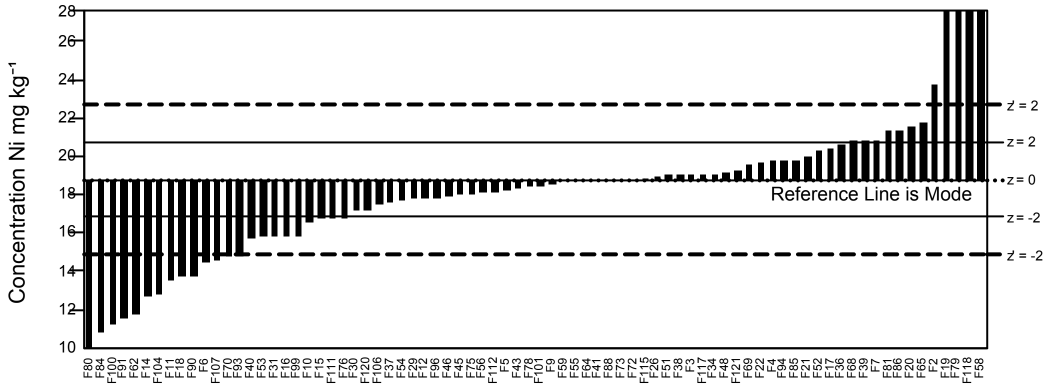
GeoPT46 - Barchart for Nb



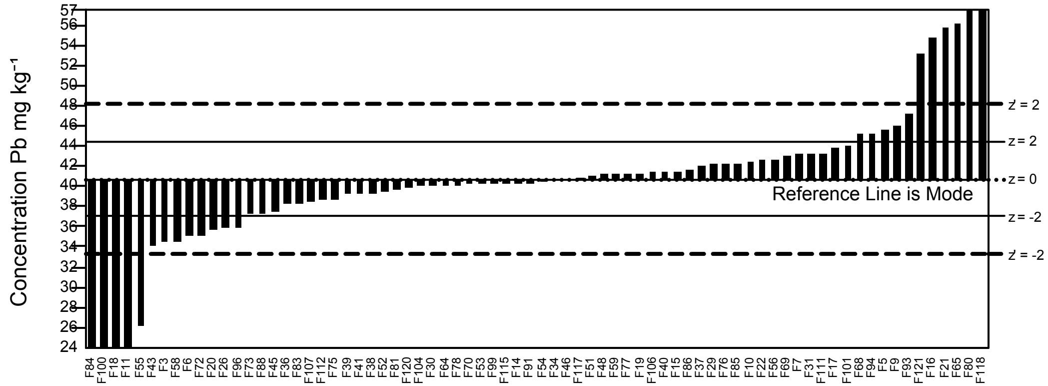
GeoPT46 - Barchart for Nd



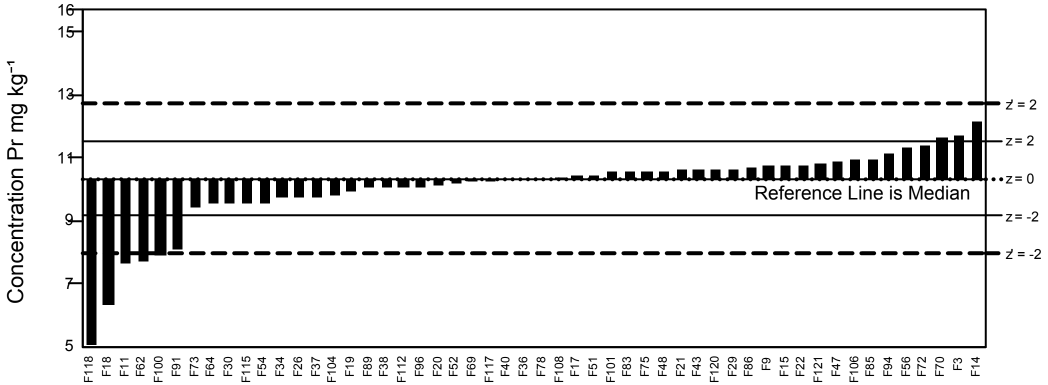
GeoPT46 - Barchart for Ni



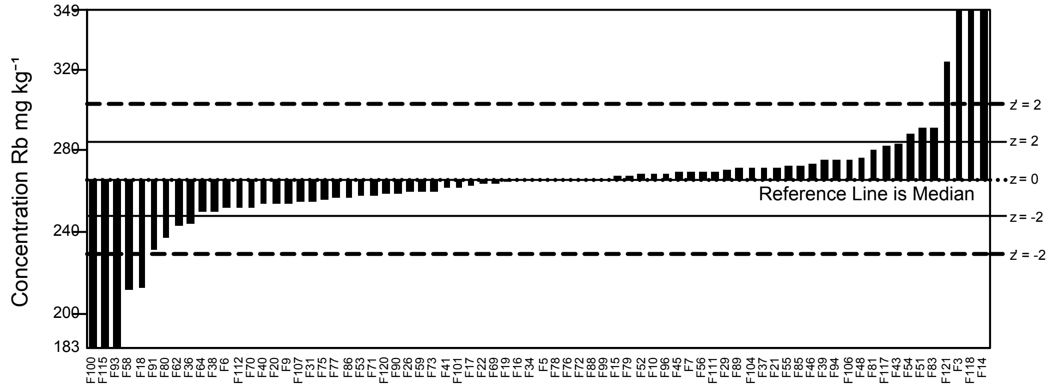
GeoPT46 - Barchart for Pb



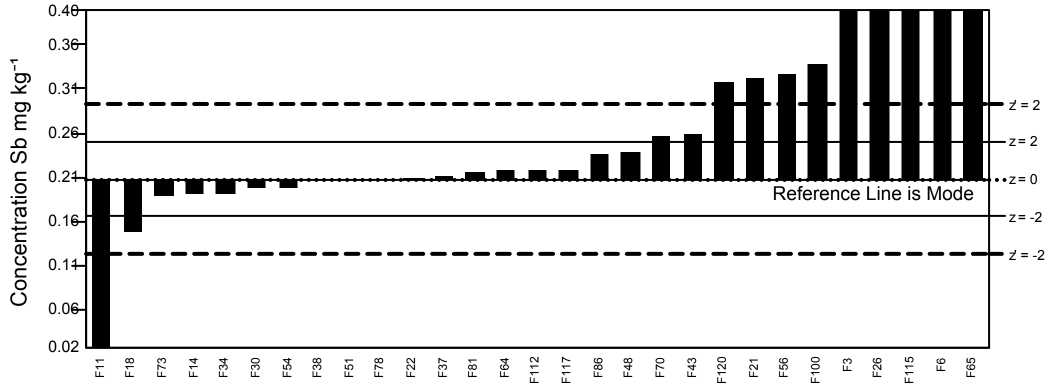
GeoPT46 - Barchart for Pr



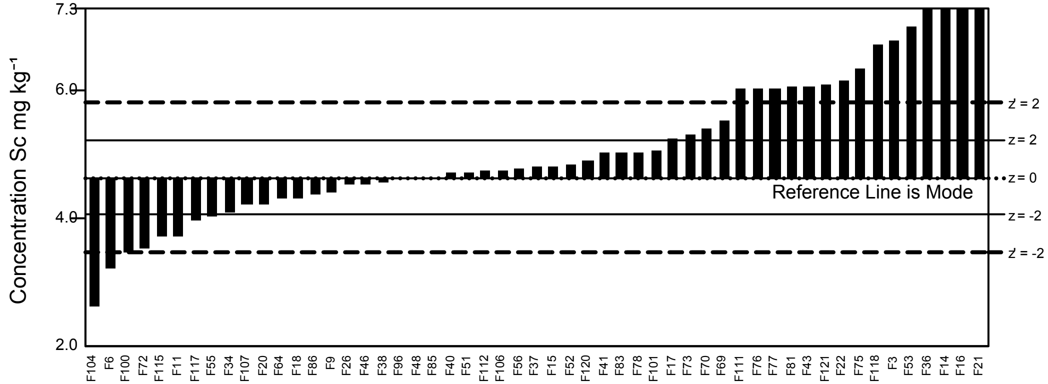
GeoPT46 - Barchart for Rb



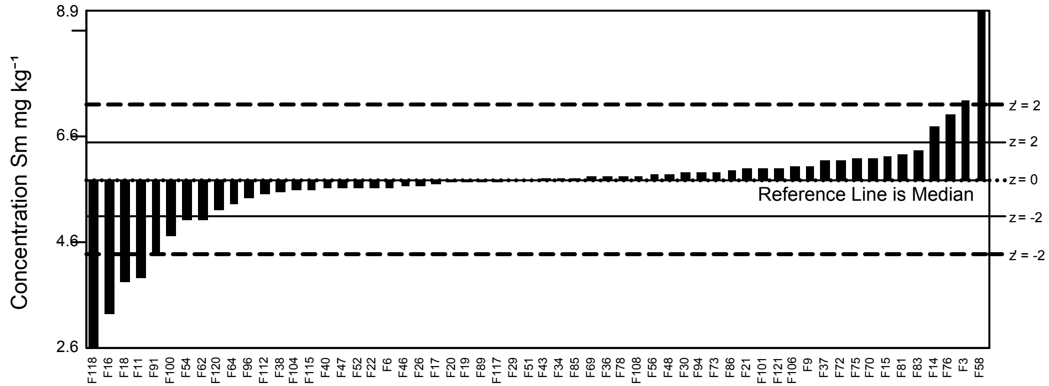
GeoPT46 - Barchart for Sb



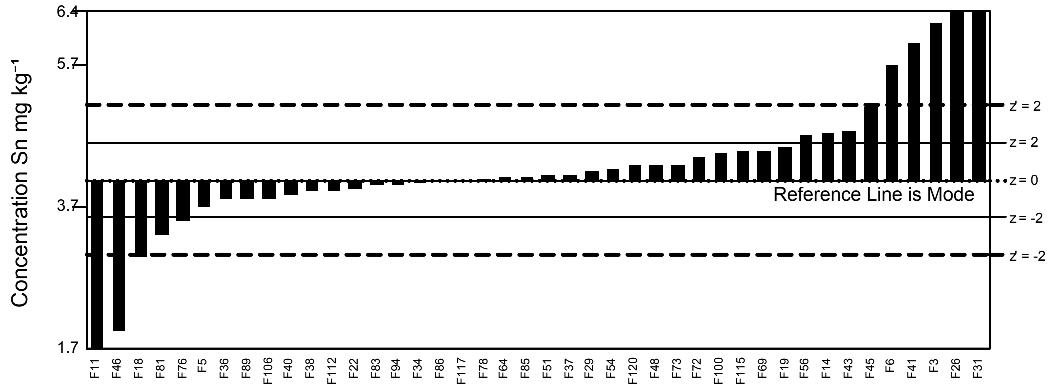
GeoPT46 - Barchart for Sc

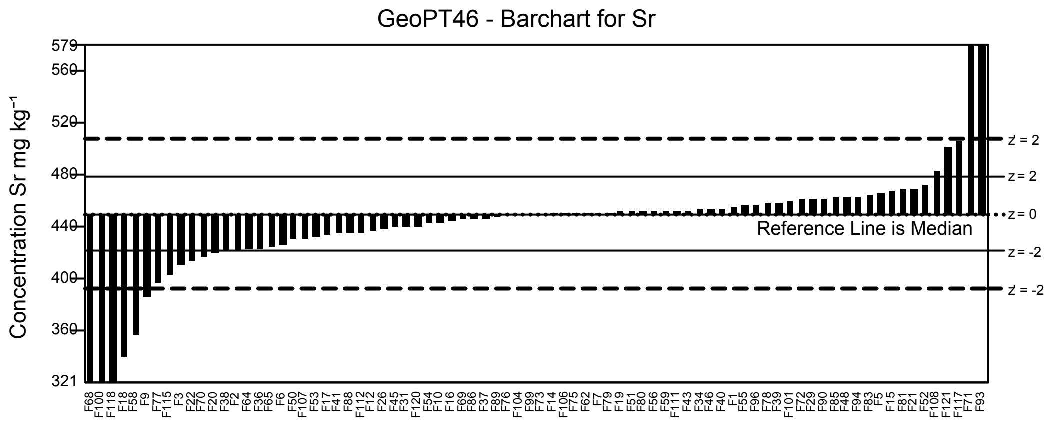


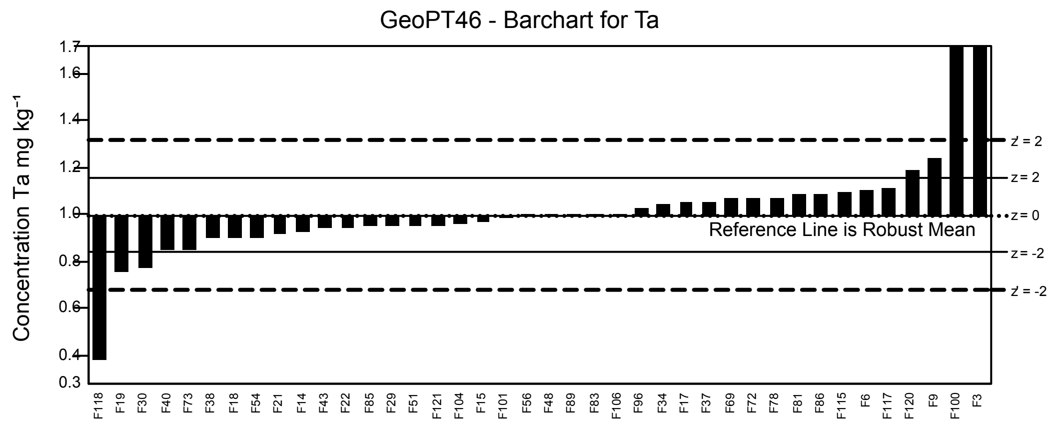
GeoPT46 - Barchart for Sm

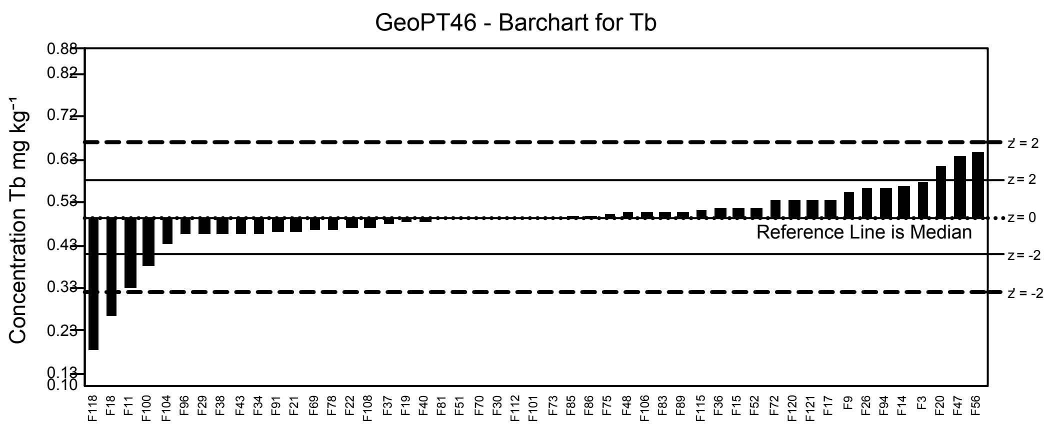


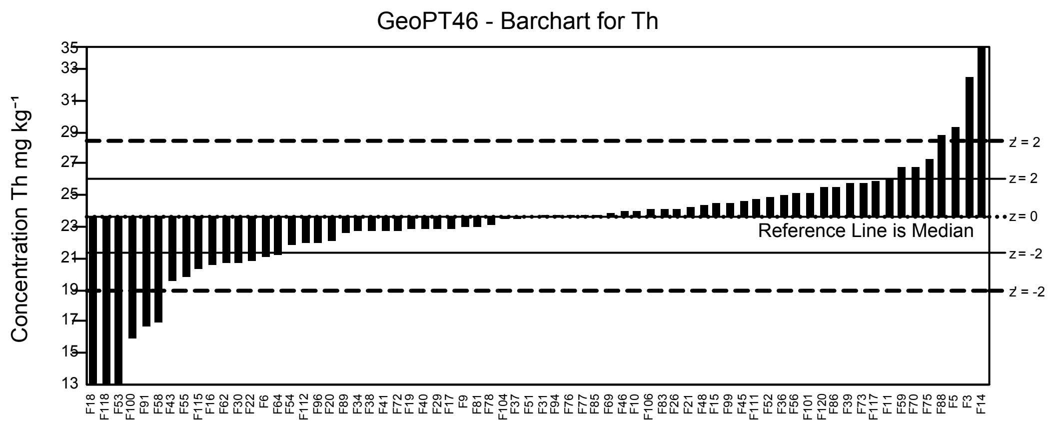
GeoPT46 - Barchart for Sn

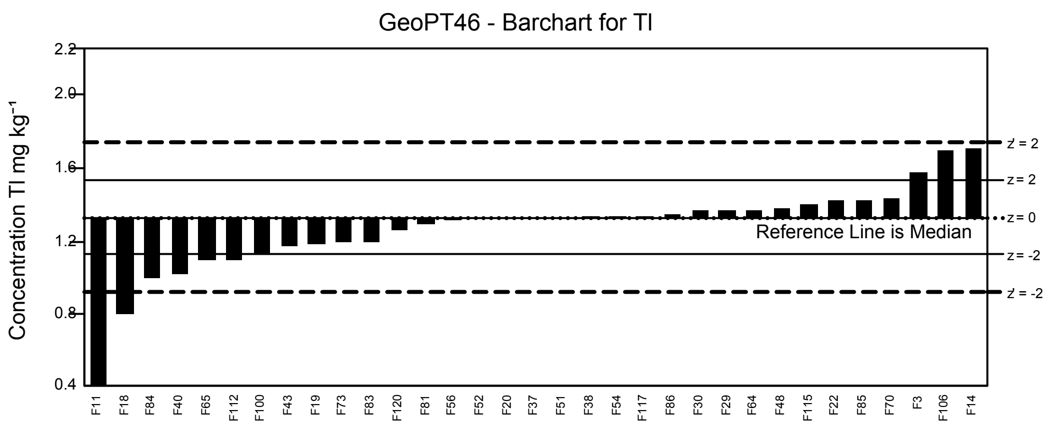


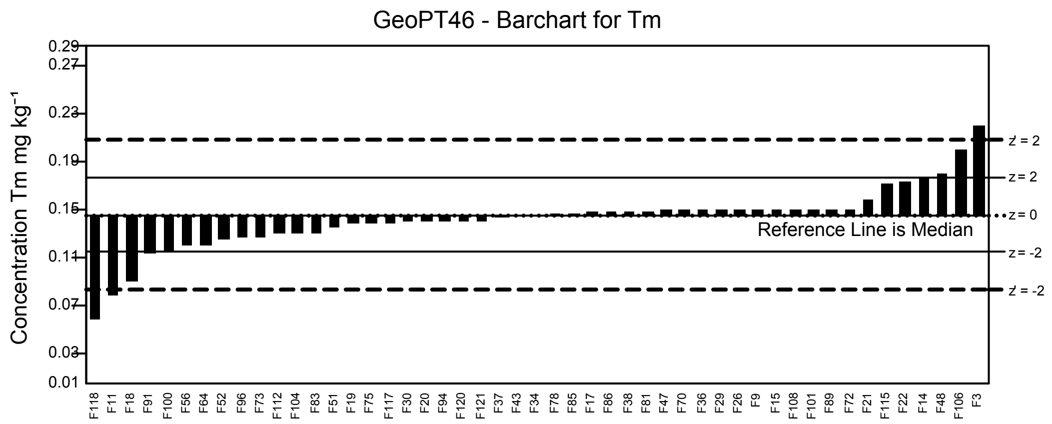

GeoPT46 - Barchart for Sr
Concentration Sr mg kg⁻¹
z' = 2
z = 2
z = 0
Reference Line is Median
z = -2
z' = -2


GeoPT46 - Barchart for Ta
Concentration Ta mg kg⁻¹
z' = 2
z = 2
z = 0
Reference Line is Robust Mean
z = -2
z' = -2

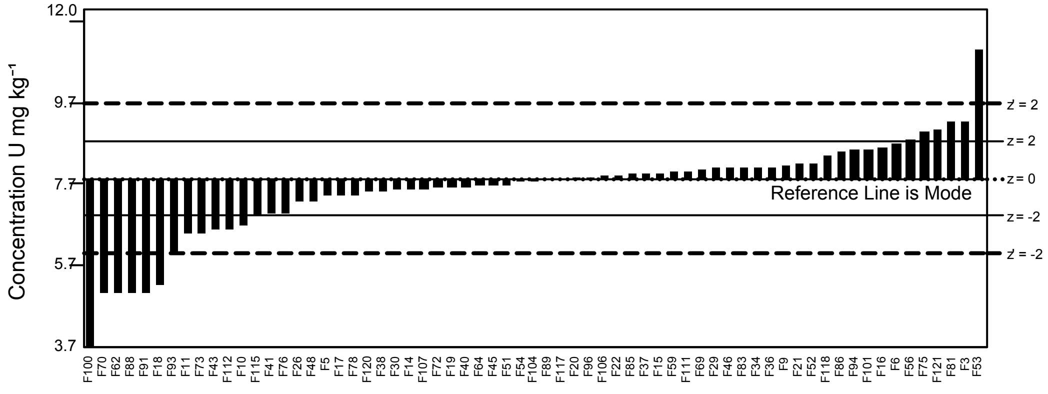

GeoPT46 - Barchart for Tb
Concentration Tb mg kg⁻¹
z' = 2
z = 2
z = 0
Reference Line is Median
z = -2
z' = -2


GeoPT46 - Barchart for Th
Concentration Th mg kg⁻¹
z' = 2
z = 2
z = 0
Reference Line is Median
z = -2
z' = -2

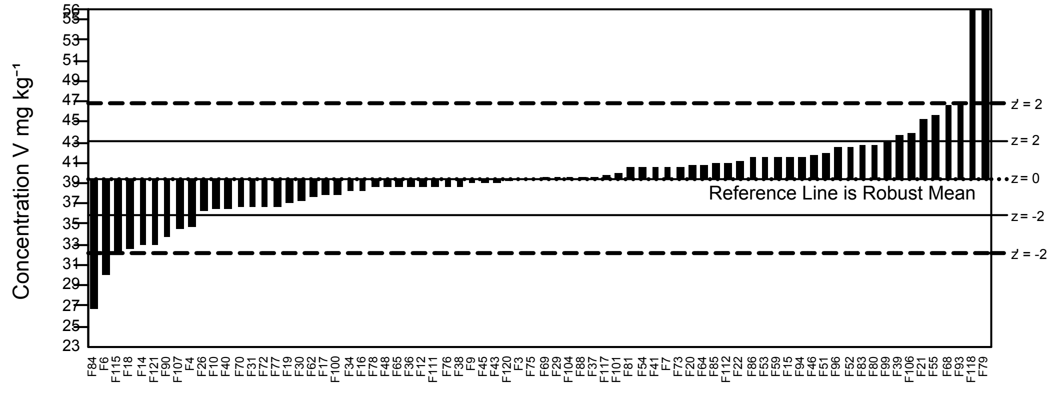

GeoPT46 - Barchart for Tl
Concentration Tl mg kg⁻¹
z' = 2
z = 2
z = 0
Reference Line is Median
z = -2
z' = -2


GeoPT46 - Barchart for Tm
Concentration Tm mg kg⁻¹
z' = 2
z = 2
z = 0
Reference Line is Median
z = -2
z' = -2

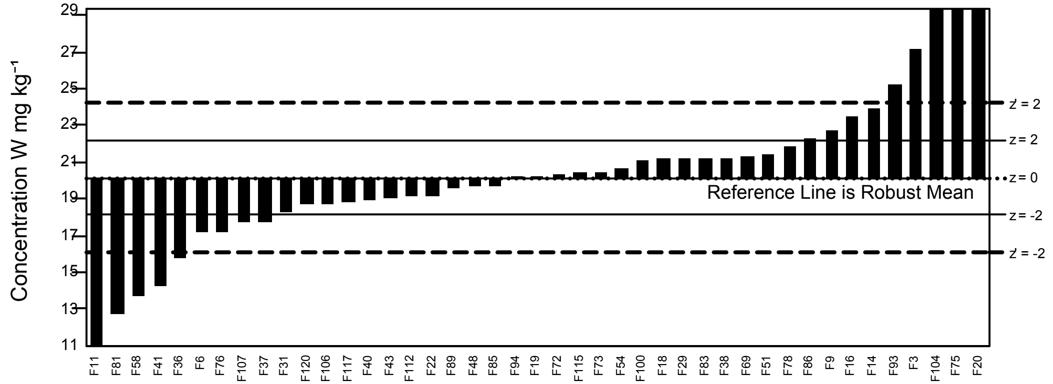
GeoPT46 - Barchart for U



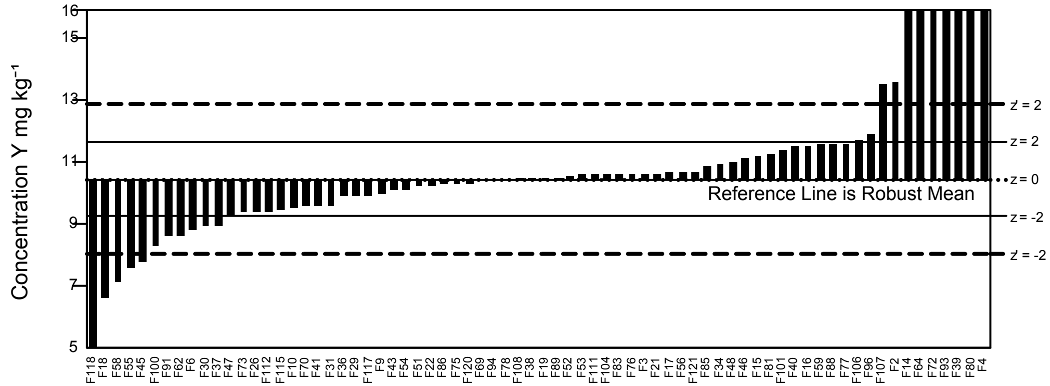
GeoPT46 - Barchart for V



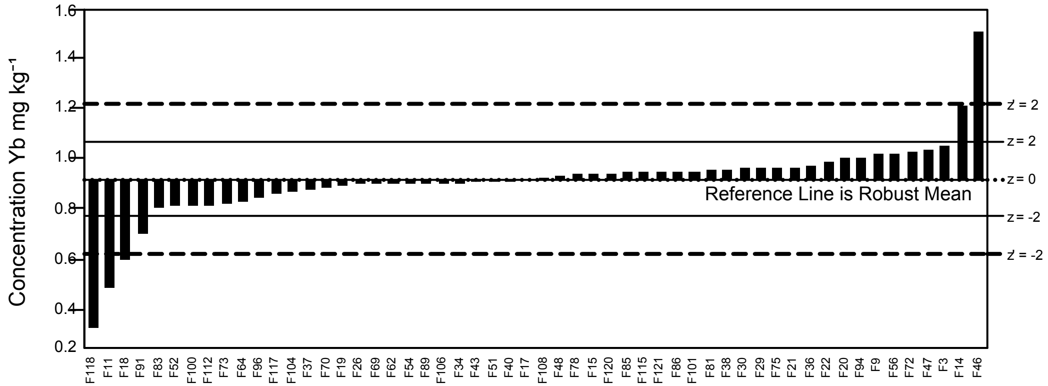
GeoPT46 - Barchart for W



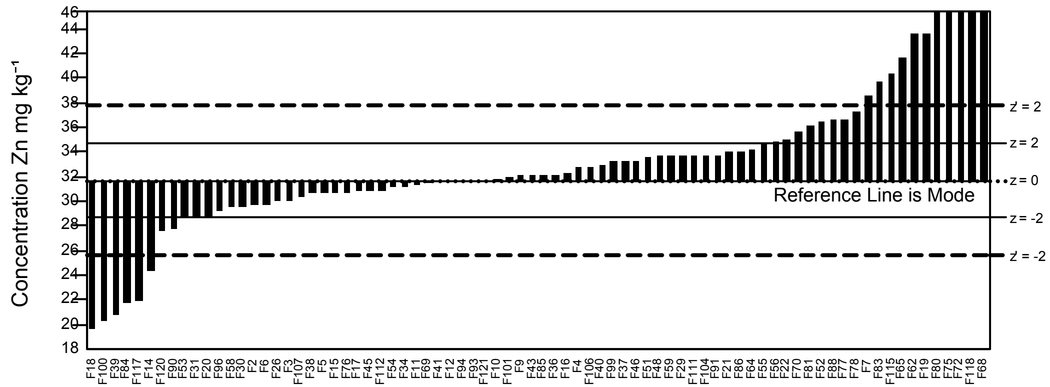
GeoPT46 - Barchart for Y



GeoPT46 - Barchart for Yb



GeoPT46 - Barchart for Zn



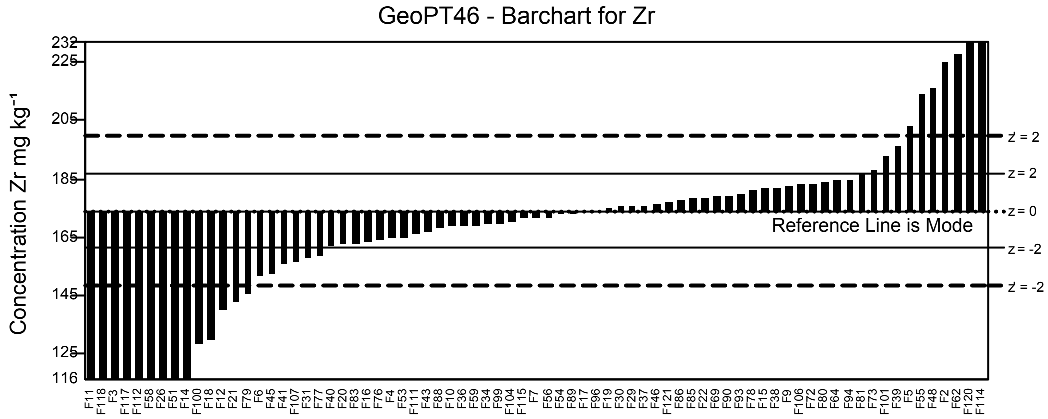
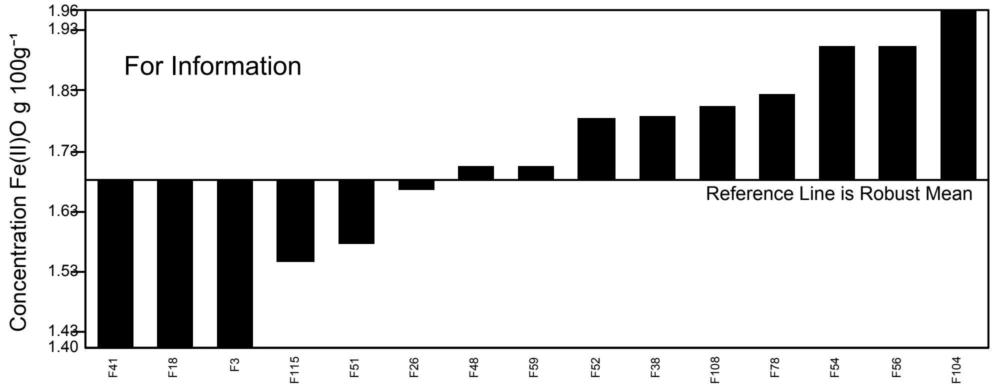
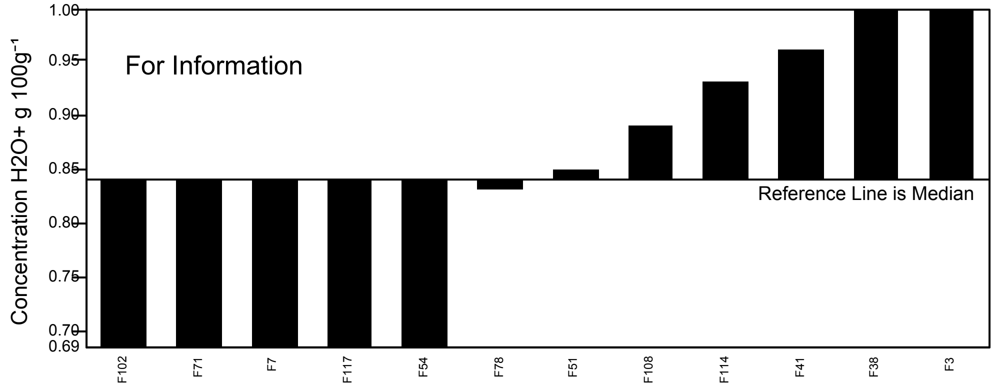


Figure 1: GeoPT46 - Granodiorite, HG-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for -2<z<2 for pure geochemistry labs (solid lines) and -2<z'<2 for applied geochemistry labs (pecked lines).

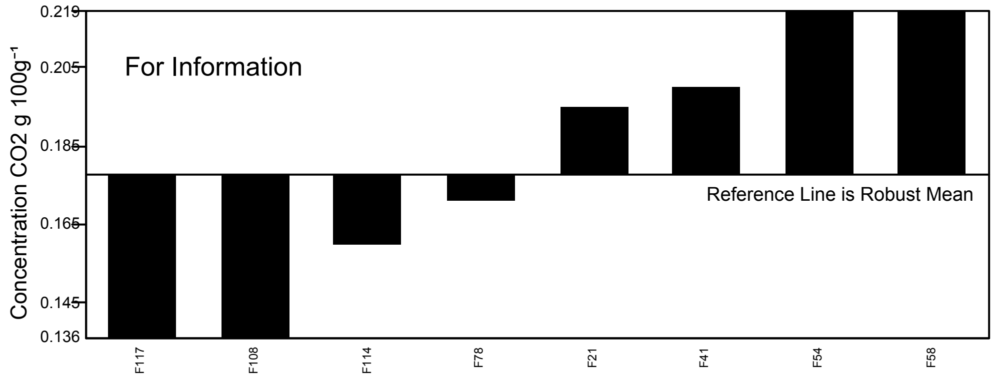
GeoPT46 - Barchart for Fe(II)O



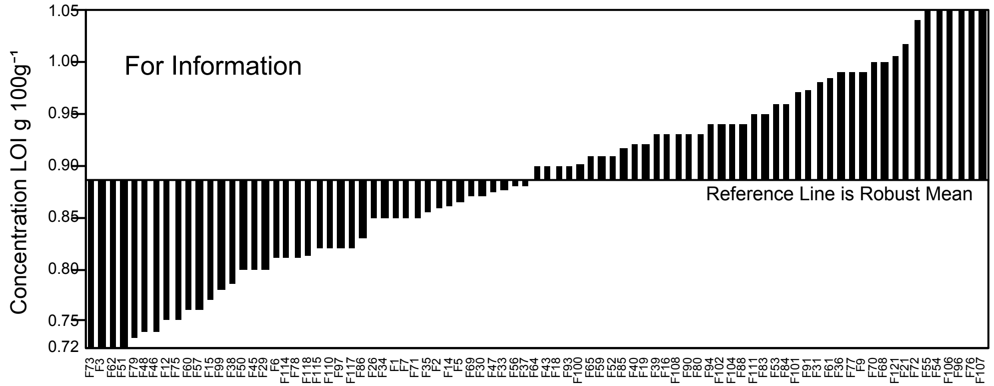
GeoPT46 - Barchart for H2O+



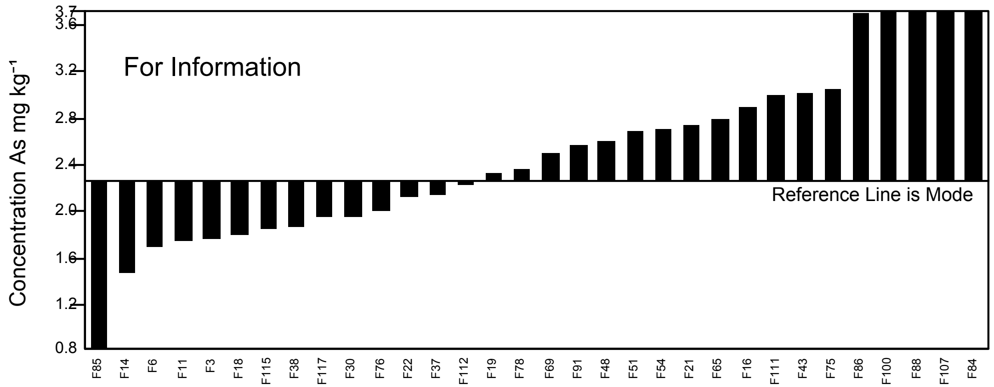
GeoPT46 - Barchart for CO2



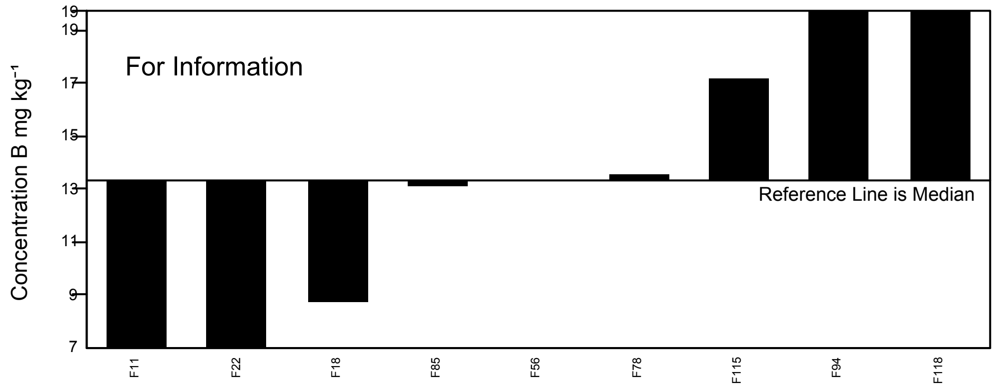
GeoPT46 - Barchart for LOI

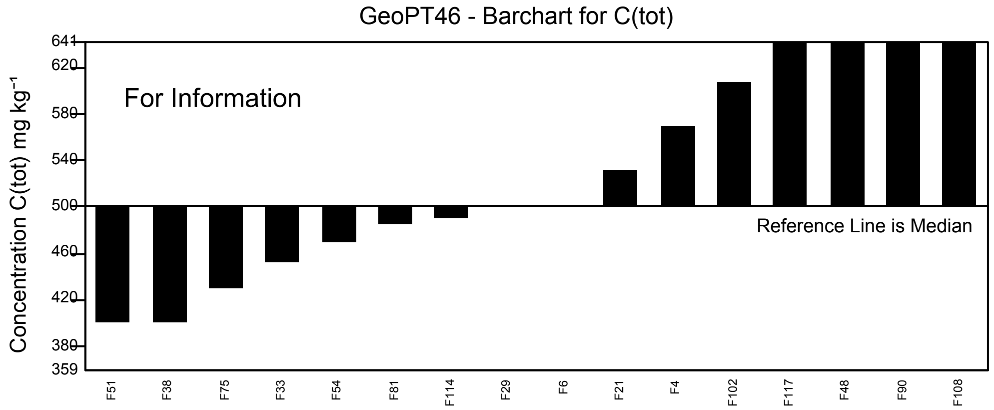


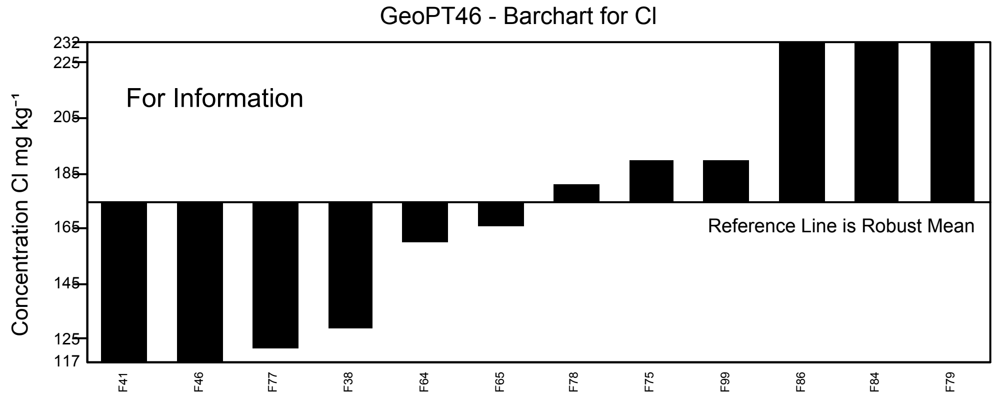
GeoPT46 - Barchart for As

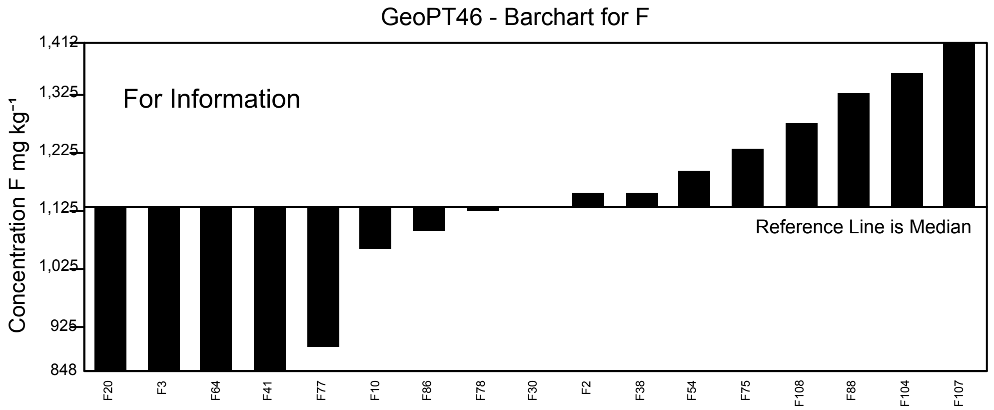


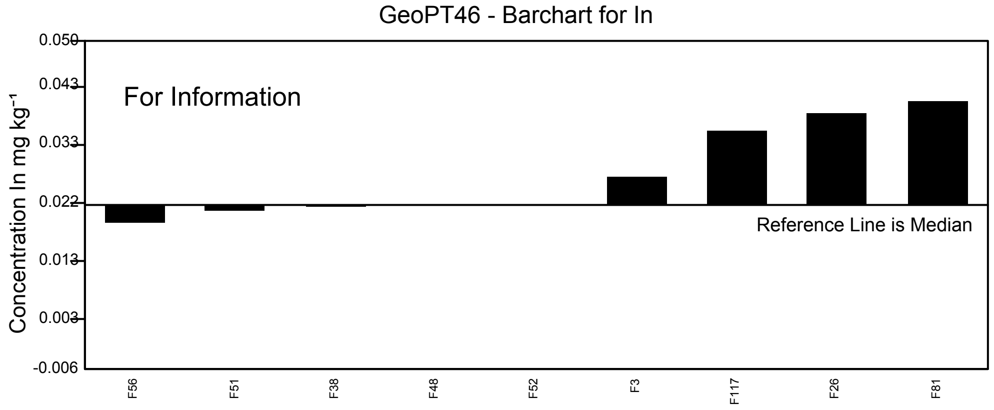
GeoPT46 - Barchart for B

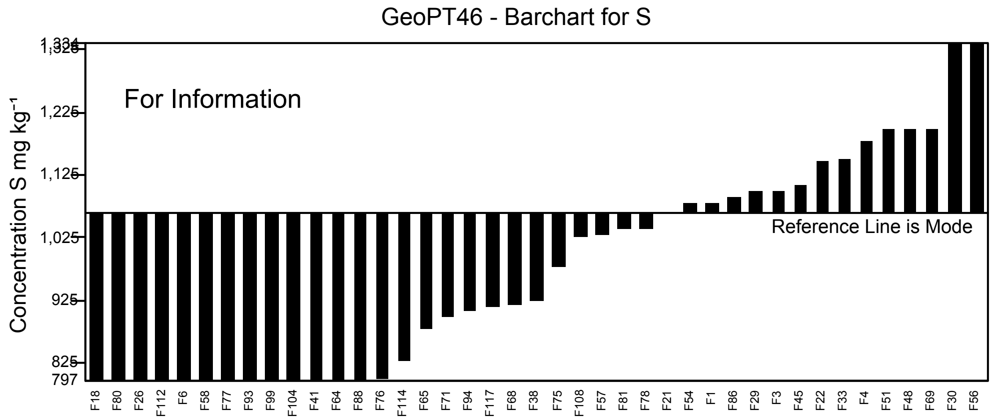


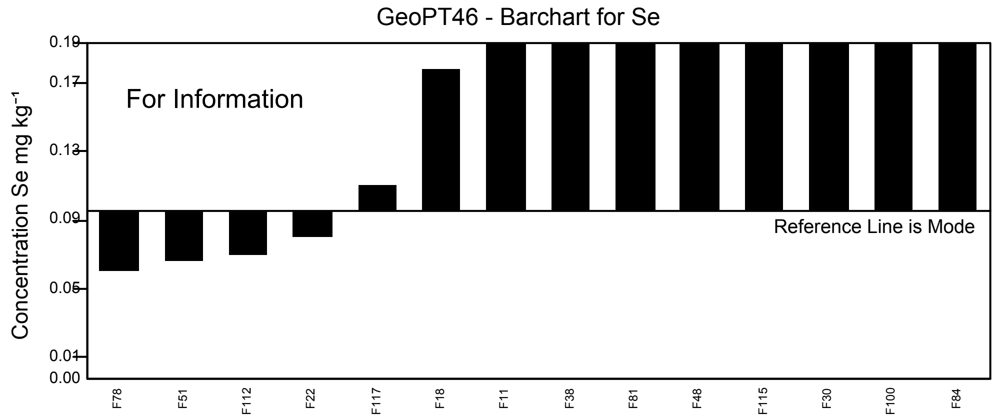

GeoPT46 - Barchart for C(tot)
For Information
Reference Line is Median
Concentration C(tot) mg kg⁻¹


GeoPT46 - Barchart for Cl
For Information
Reference Line is Robust Mean
Concentration Cl mg kg⁻¹


GeoPT46 - Barchart for F
For Information
Reference Line is Median
Concentration F mg kg⁻¹


GeoPT46 - Barchart for In
For Information
Reference Line is Median
Concentration In mg kg⁻¹


GeoPT46 - Barchart for S
For Information
Reference Line is Mode
Concentration S mg kg⁻¹


GeoPT46 - Barchart for Se
For Information
Reference Line is Mode
Concentration Se mg kg⁻¹

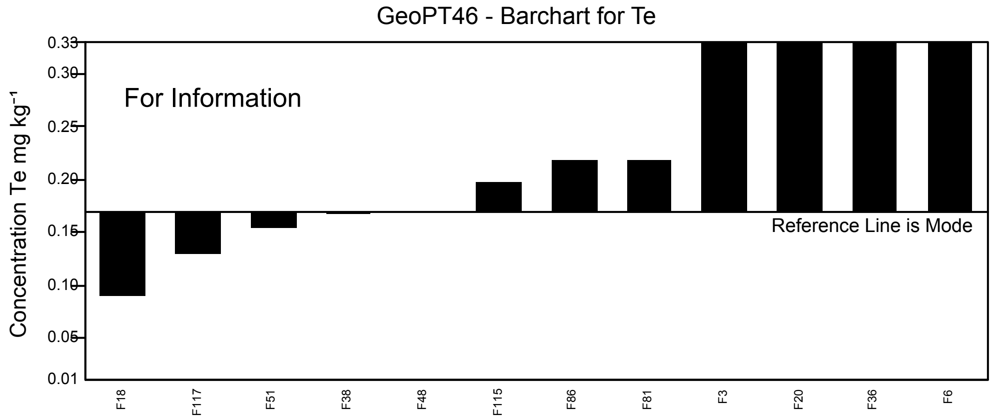
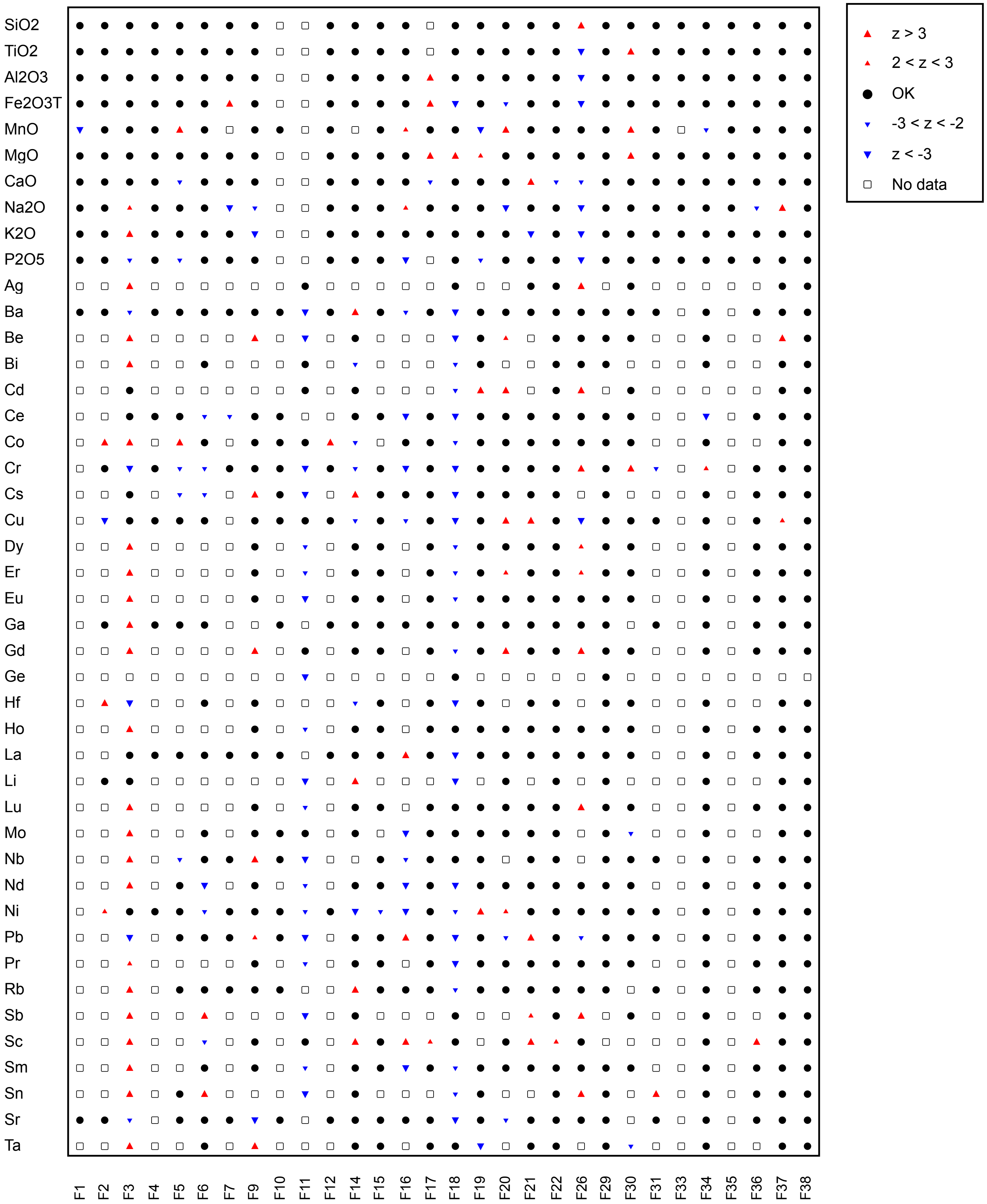


Figure 2: GeoPT46 - Granodiorite, HG-1. Data distribution charts provided for information only for elements for which values could not be assigned.

Multiple Z-Score Chart for GeoPT46



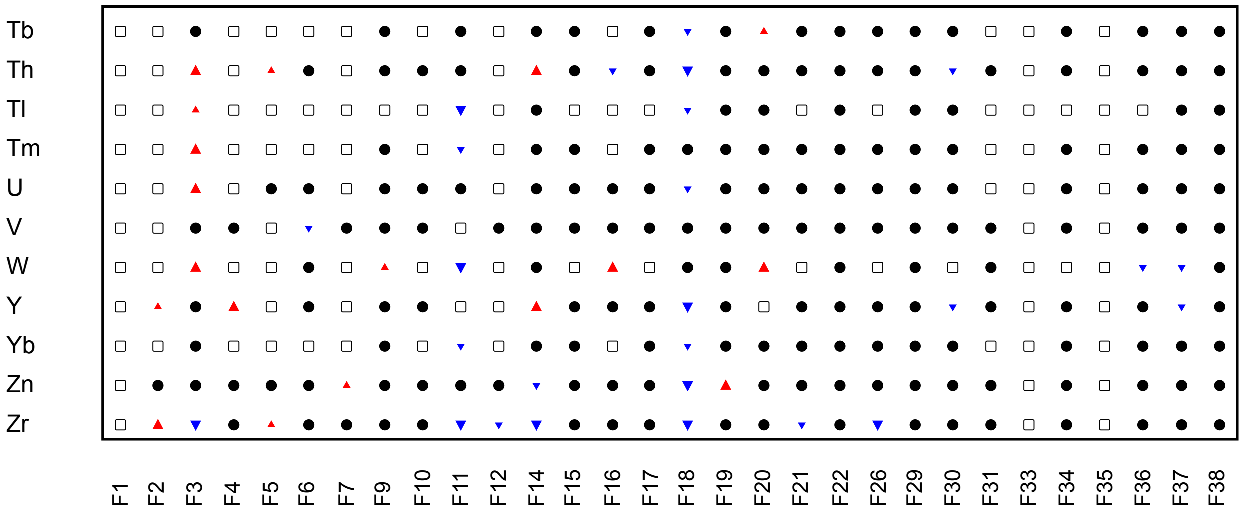
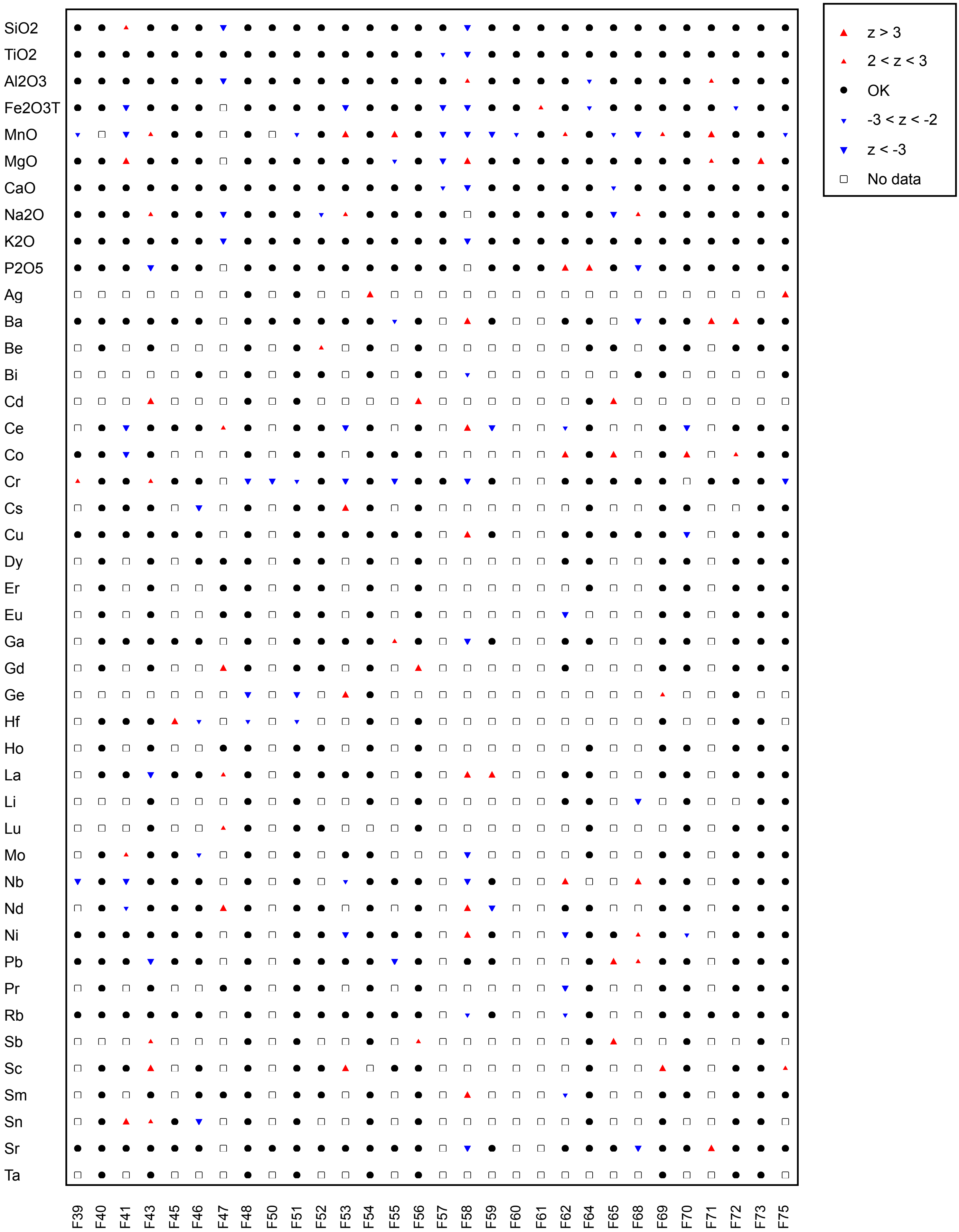


Figure 3: GeoPT46 - Granodiorite, HG-1. Multiple z-score charts for laboratories participating in the GeoPT46 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT46



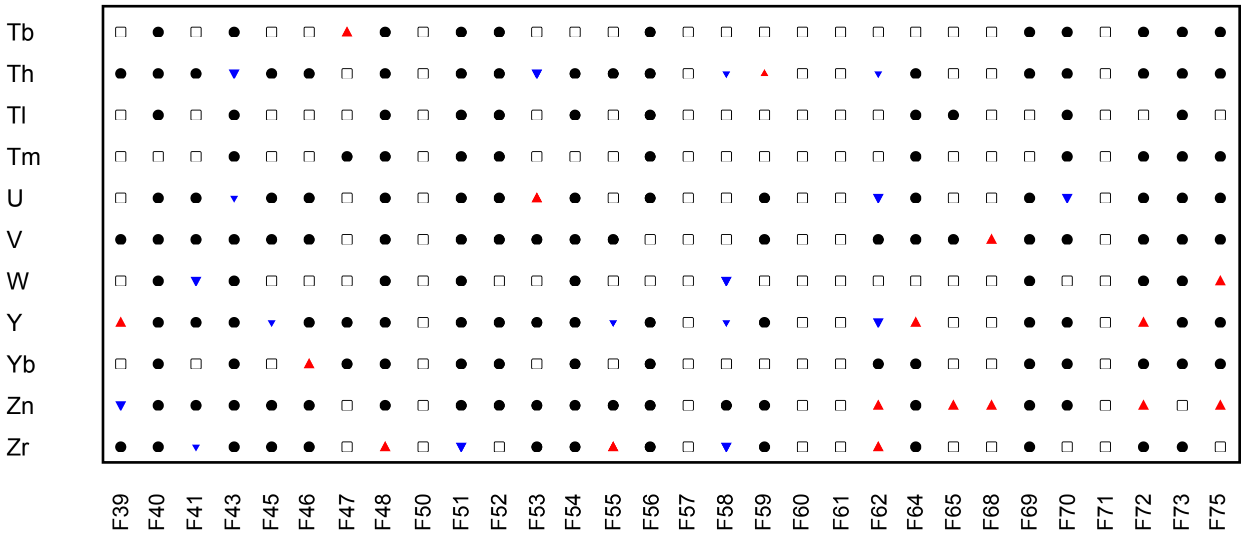
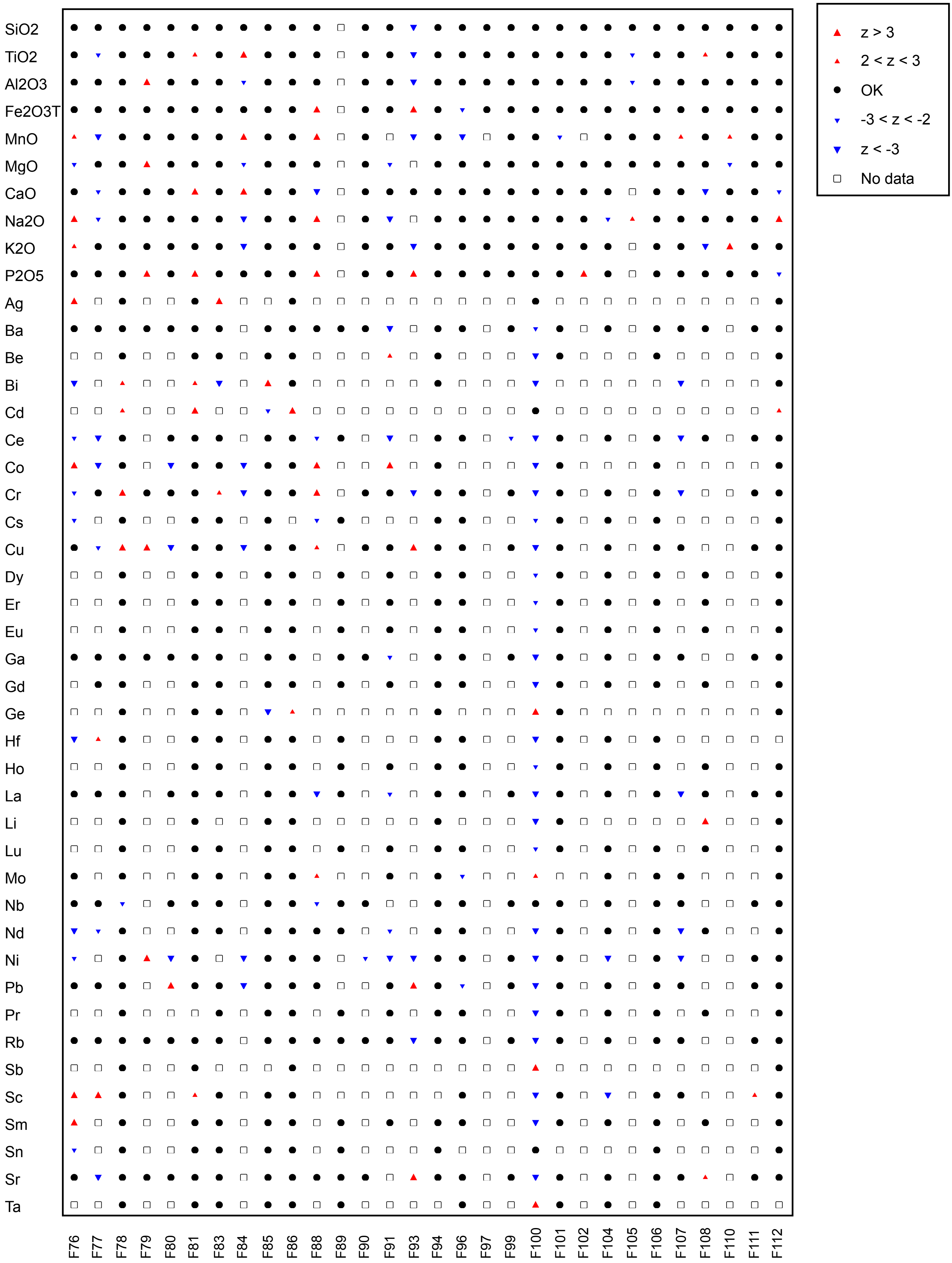


Figure 3: GeoPT46 - Granodiorite, HG-1. Multiple z-score charts for laboratories participating in the GeoPT46 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT46



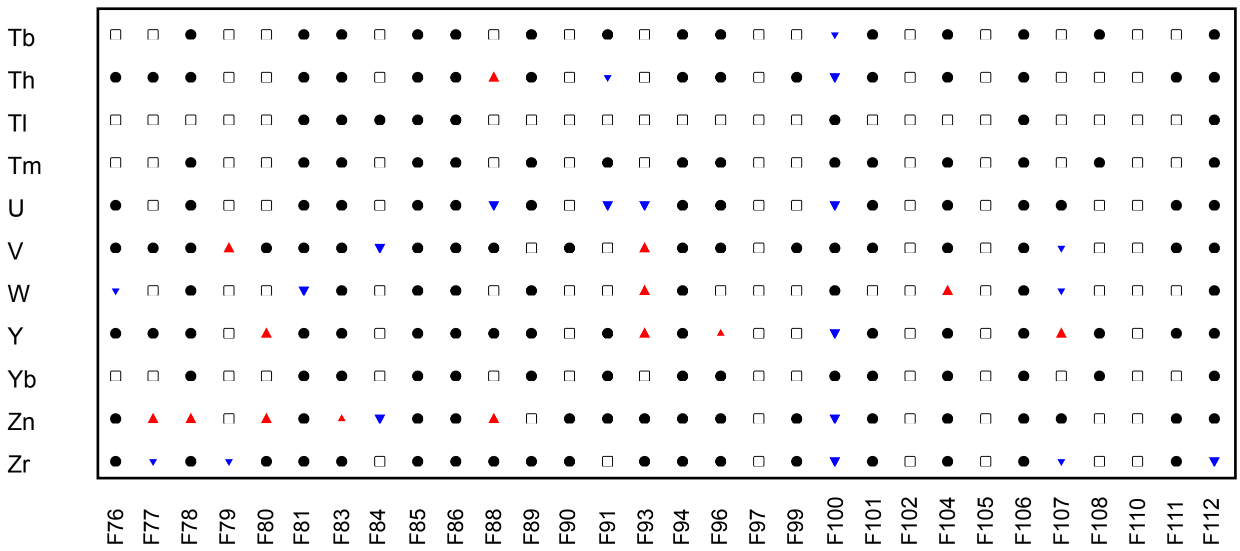


Figure 3: GeoPT46 - Granodiorite, HG-1. Multiple z-score charts for laboratories participating in the GeoPT46 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT46

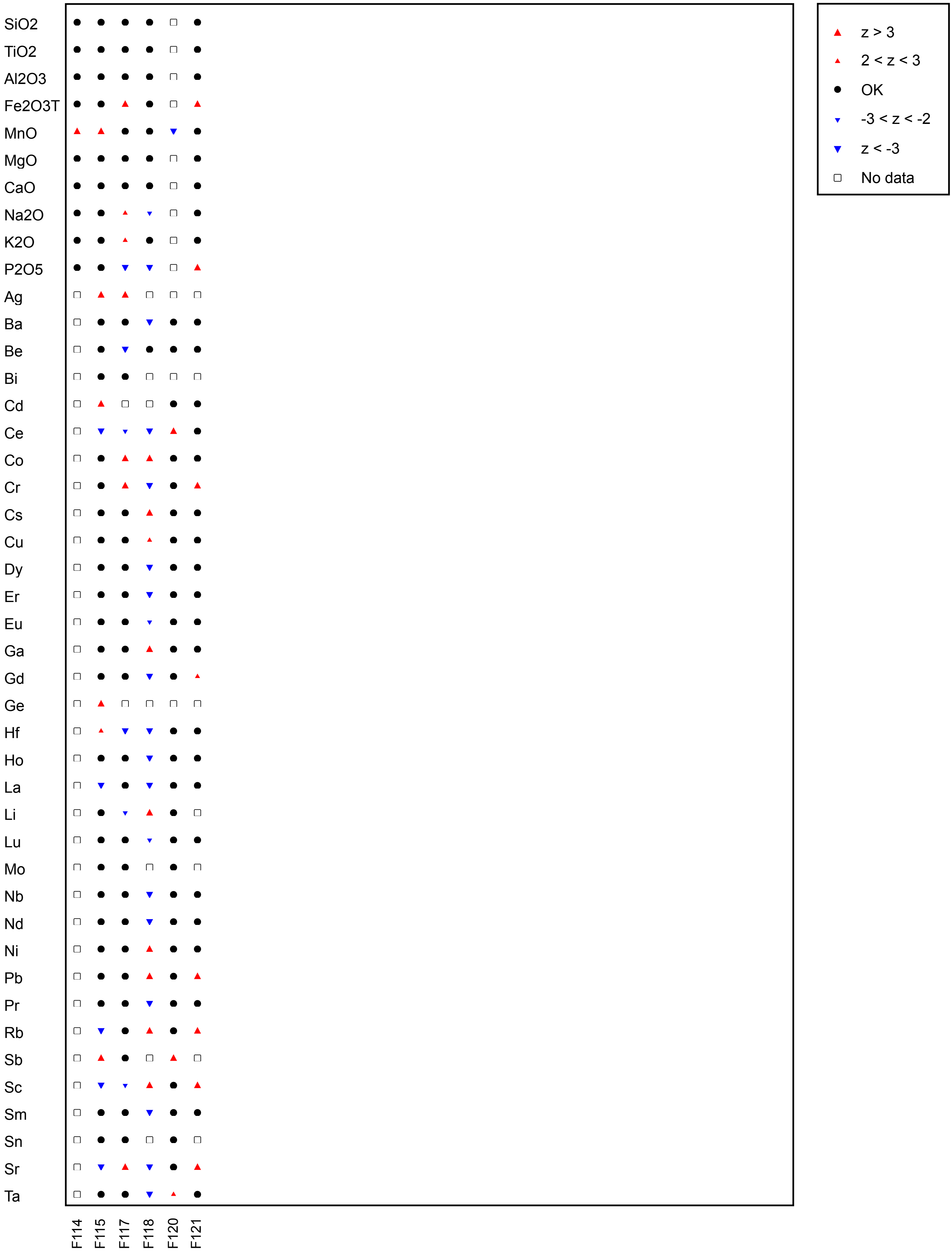


Figure 3: GeoPT46 - Granodiorite, HG-1. Multiple z-score charts for laboratories participating in the GeoPT46 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).