Geo*PT*46A — AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES — REPORT ON ROUND 46A (Phosphate rock, POLC-1) / January 2020

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Abstract

Results are presented for Round 46A 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 Phosphate rock, POLC-1, collected and processed under the direction of Dr Stephen Wilson of the U.S. Geological Survey. In this report, the data contributed by 91 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 it appears to be justified.

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

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

Test material details

Geo*PT*46A: The Phosphate rock test material, POLC-1, is not a common geological material. It has a calcium phosphate matrix, largely comprising the mineral francolite, a carbonate-rich fluorapatite with elevated levels of CO_3^{2-} and F and rare earth elements. It was obtained from the Love Hollow phosphorite unit, a sedimentary deposit of Upper Ordovician age, in northern Arkansas and processed under the direction of Dr Stephen Wilson at the U.S. Geological Survey. The test material was known to be coarser than the norm for the proficiency testing materials that we provide, having proved difficult to crush to a finer grade. Nevertheless, on evaluation for homogeneity by the originator, it was considered suitable for use in this proficiency test.

Submission of results

For Geo*PT*46A (POLC-1), a total of 3410 results are listed in Table 1 as submitted by 91 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 of data quality 2 are shown underlined. Results from all laboratories submitting data were used to assess respective consensus values. It was refreshing to find that no laboratory had reported values of zero in this round, however, it is suspected that six 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 their corresponding *z*-scores will be adversely affected by mistakes in reporting.

It was brought to our attention that the coarseness of grain size caused difficulties in dissolution, which might be a reason for underestimated results for some analytes.

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 involved 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 10 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 a more appropriate robust estimator in 30 cases. For more severely skewed and strongly tailed datasets, a mode can often be 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 14 cases, and in 9 of those, 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 a data distribution 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 44 trace elements in Geo*PT*46A (POLC-1). Barcharts for the 54 measurands of

Geo*PT*46A 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, K_2O*, P_2O_5, LOI*, As*, Ba, Be, Bi, C(tot)*, Ce, Co, Cr, Cs, Cu*, Dy, Er, Eu, Gd, Hf, Ho, In*, 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, provisional values were credited to the 14 analytes marked '*'. 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: thus increasing the uncertainty in the identification of the consensus.

Bar charts for the 15 analytes: Fe(II)O, Na_2O, H_2O^+, CO_2, Ag, B, C(org), Cd, Cl, F, Ga, Ge, 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.

There was an expectation that results could be adversely affected on account of: i) the matrix being unfamiliar to many analysts; ii) the mass fractions of many analytes being significantly in excess of those routinely encountered with the consequent possibility of unexpected interferences that would not be accounted for; and iii) mass fractions of some analytes being at or beyond the limits of routine calibrations. However, an assessment of the distribution of submitted results indicates that in general these concerns did not significantly affect the quality of the data, other than possibly causing, in some cases, a higher than usual dispersion of data. Indeed, a substantial number of datasets in this round were normally disposed, showing remarkable symmetry without excessive dispersion of the majority of the data, particularly for Al_2O_3, Fe_2O_3T, MnO, Dy, Er, Eu, Ho, Lu, Sm, Tb, Tm, U and Yb. A small amount of asymmetry with some high or low tailing of data but without excessive dispersion was noted for CaO, Be, Ho, Li, Mo, Pb, Pr, Th, Tl, V and U. However, there were a number of constituents for which low tailing distributions were noted, most markedly for Hf and Zr, but also present to varying extents for CaO, P_2O_5, Ba, C(tot), Ce, La, Nb, Ni, Pb, Sb, V, Y and Zn. 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, there are also instances where XRF powder pellet results appear to be biased towards lower values compared to results on fusion discs. High tails were noted for MgO, Bi, Cd, Cr, Cs, Cu, Mo, Nb, Ni, Rb, Sc, Sn, Th and W. A significant proportion of measurements contributing to these high tails originate as XRF values (e.g. Bi, Cs, Rb, Sc, W) and sometimes ICP-AES values being reported at mass fractions that are close to, and in some cases below, a realistic detection limit for the technique.

For Na_2O, the low mass fraction present in the test material was almost certainly the reason for a high dispersion of data which extended well beyond our fitness-for-purpose targets. As a consequence, although values reported for a number of laboratories coincided, it was not possible to propose with any confidence a consensus value for the purpose of calculating *z*-scores. In some sets of results stepped distributions were apparent where insufficient decimal places were quoted in much of the contributed data to obtain a smooth distribution. This applies particularly to the POLC-1 results for TiO_2 and K_2O.

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*46A, 1457 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*46A, 1953 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*46A 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.

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References

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

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 Geo*PT* 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
— AN IMPORTANT NOTICE TO ANALYSTS

Explicit advice to analysts regarding reporting of procedures involving ignition and fusion:

We continue to request that analysts reporting measurement results for procedures involving fusion, sintering or ignition, particularly 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. Reports of previous rounds 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.

Geo*PT*37
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.

Geo*PT*37A
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.

Geo*PT*38
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.

Geo*PT*38A
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.

Geo*PT*39
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.

Geo*PT*39A
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.

Geo*PT*40
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.

Geo*PT*40A
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.

Geo*PT*41
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.

Geo*PT*41A
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.

Geo*PT*42
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.

Geo*PT*43
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.

Geo*PT*44
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.

Geo*PT*44A
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.

Geo*PT*45
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 - GeoPT46A Contributed data for Phosphate rock, POLC-1. 11/12/2019

Lab Code		G2	G4	G5	G6	G9	G10	G11	G12	G13	G14	G16	G17	G18
SiO2	g 100g^{-1}	**13.24**	13.52	13.37	**13.172**	12.9	13.32	13.41	14.4	12.9	**13.64**	15.76	13.978	13.98
TiO2	g 100g^{-1}		0.14	0.157	**0.325**	0.14	0.141	0.15	1.57	0.153	**0.16**	0.075	0.269	0.12
Al2O3	g 100g^{-1}	**2.11**	2.25	2.29	**2.34**	2.25	2.287	2.31	3.02	2.27	**2.21**	3.16	2.666	2.34
Fe2O3T	g 100g^{-1}	**5.69**	5.79	5.87		5.5	5.675	5.8	4.8	5.67	**6.1**	6.19	10.251	5.81
Fe(II)O	g 100g^{-1}						1.2							
MnO	g 100g^{-1}	**1.09**	1.2	1.078			1.082	1.12	1.05	1.11	**1.27**	1.15		1.08
MgO	g 100g^{-1}	**0.96**	1.11	1.09		1.07	1.076	1.06		1.04	**1.16**	1.2	1.156	1.08
CaO	g 100g^{-1}	**41.23**	41.22	41.03	**1.68**	41.5	40.91	40.51	39.1	40.5	**43.03**	37.52	35.164	39.68
Na2O	g 100g^{-1}	**0.22**	0.22	0.21	**0.012**		0.203	0.17		0.206	**0.43**	0.31		
K2O	g 100g^{-1}	**0.11**	0.12	0.1	**0.08**	0.12	0.118	0.12	0.078	0.121	**0.12**	0.21	0.103	0.11
P2O5	g 100g^{-1}	**26.25**	26.96	26.36		27.1	26.7	23.91	25.2	26.4	**25.02**	24.66	26.786	29.1
H2O+	g 100g^{-1}						2.2							
CO2	g 100g^{-1}						4.17			4.06				
LOI	g 100g^{-1}	8.92	5.58	5.44	**0.92**	5.94	5.795	5.42		6.04	**6.43**	6.36	6.238	6.28
Ag	mg kg^{-1}													
As	mg kg^{-1}	**23**					25		12.1	46.9	**25**		43.52	20
Au	mg kg^{-1}												0.062	
B	mg kg^{-1}													
Ba	mg kg^{-1}	**224**					271.8	913	350	226	**243**		121.1	233
Be	mg kg^{-1}						1.829			2.21			1.234	
Bi	mg kg^{-1}						0.1		3.6	0.126				
Br	mg kg^{-1}	**1.7**												
C(org)	mg kg^{-1}													
C(tot)	mg kg^{-1}						12500			12400				
Cd	mg kg^{-1}								12.2				0.608	
Ce	mg kg^{-1}	**815**			**1013.500**		847.5		1740	1040	**914**		707.391	
Cl	mg kg^{-1}									120				
Co	mg kg^{-1}	**26.8**					30.2			28.6			23.54	34
Cr	mg kg^{-1}	**42.3**					40		42	39.5	**37**		32.27	41
Cs	mg kg^{-1}	**29.5**					0.2				**54**			
Cu	mg kg^{-1}	**32.9**					22.94		53.7	21.5	**61**			25
Dy	mg kg^{-1}				**82.1**		72.7		143	87.5			68.307	
Er	mg kg^{-1}				**40.6**		38.1			46.5			36.697	
Eu	mg kg^{-1}				**21.75**		17.54			21.3			16.278	
F	mg kg^{-1}	4115					25569			22700		29600		
Ga	mg kg^{-1}						5.65			20.1	**27**		11.163	
Gd	mg kg^{-1}				**126.5**		93.55		231	114			92.673	
Ge	mg kg^{-1}						1.16		2.3	30.5				
Hf	mg kg^{-1}						1.78							
Hg	mg kg^{-1}						0.01						0.041	
Ho	mg kg^{-1}				**16.15**		14.63			17.6			13.641	
I	mg kg^{-1}	**104.3**							102					
In	mg kg^{-1}													
La	mg kg^{-1}	**438.8**			**521**		419.8		792	513	**503**		377.203	
Li	mg kg^{-1}									7.33				
Lu	mg kg^{-1}				**3.42**		2.92			3.64			3.126	
Mo	mg kg^{-1}	**1.5**					1.24			1.24	**12**		3.691	
Nb	mg kg^{-1}	**11.7**					7.21		10.9	5.53	**8**			
Nd	mg kg^{-1}	**393**			**497**		377.9		844	479			328.870	
Ni	mg kg^{-1}	**40.5**					30.3		170	31.5	**50**		17.38	24
Pb	mg kg^{-1}	**71.4**					78.89		75.6	88.8	**76**		109.6	74
Pd	mg kg^{-1}													
Pr	mg kg^{-1}				**100**		85.95		128	106			79.643	
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	**5.1**					5.2		12.2	5.67	**9**		3.641	
Re	mg kg^{-1}													
S	mg kg^{-1}	805					1930	1567		1985	**649**			
Sb	mg kg^{-1}	**4.3**					3.3			2.08				
Sc	mg kg^{-1}	**26.7**					9			8.56	**33**			18
Se	mg kg^{-1}	**1.3**								17				
Sm	mg kg^{-1}	**76.1**			**86.85**		78.25		311	95.4			71.797	
Sn	mg kg^{-1}													
Sr	mg kg^{-1}	**696.4**					758.8	719	649	780	**704**			684
Ta	mg kg^{-1}													
Tb	mg kg^{-1}				**17.05**		13.01			15.4			12.991	
Te	mg kg^{-1}													
Th	mg kg^{-1}						9.77		9.7	11.9	**65**		10.026	
Tl	mg kg^{-1}									0.179				
Tm	mg kg^{-1}				**4.725**		4.37			5.42			4.151	
U	mg kg^{-1}	**27**					28.52		20.2	32.6	**39**		27.029	32
V	mg kg^{-1}	**88.8**					84		127	76.7	**104**		1.4	85
W	mg kg^{-1}	**6.7**					1.88			1.5				
Y	mg kg^{-1}	**601.5**			**537**		628.9		540	638	**646**		674.881	618
Yb	mg kg^{-1}	**21.2**			**25.6**		22.57			28.9	**5**		21.664	
Zn	mg kg^{-1}	**37.4**					36.4		24.4	33.4	**33**		29.896	31
Zr	mg kg^{-1}	**57.2**					54.8		38.6	6.07	**49**			44

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

Table 1 - GeoPT46A Contributed data for Phosphate rock, POLC-1. 11/12/2019

Lab Code		G19	G20	G21	G22	G23	G24	G25	G26	G27	G28	G29	G30	G31
SiO2	$g\ 100g^{-1}$	**13.13**	14.563	15.5	**13.38**	**13.37**	12.54	**13.07**	12.7	**12.48**	**13.018**	**13.48**	13.54	13.3
TiO2	$g\ 100g^{-1}$	**0.15**	0.151	0.17	**0.15**	**0.147**		**0.15**	0.144	**0.18**	**0.144**	**0.16**	0.155	0.15
Al2O3	$g\ 100g^{-1}$	**2.08**	2.434	2.7	**2.24**	**2.38**	2.01	**2.22**	2.24	**2.82**	**2.261**	**2.23**	2.44	2.27
Fe2O3T	$g\ 100g^{-1}$	**5.37**	5.01	6.6	**5.73**	**5.78**	5.75	**5.67**	5.54	**7.27**	**5.584**	**5.92**	5.66	5.74
Fe(II)O	$g\ 100g^{-1}$	**1.09**				**1.04**								
MnO	$g\ 100g^{-1}$	**1.01**	1.03	1.17	**1.12**	**1.09**	1.12	**1.08**	1.06	**1.21**	**1.056**	**1.12**	0.507	1.09
MgO	$g\ 100g^{-1}$	**1.1**	1.218	1.5	**1.15**	**1.07**	1.11	**1.06**	1.06	**1.34**	**1.073**	**1.06**	1.09	1.12
CaO	$g\ 100g^{-1}$	**40.34**	42.18	37.4	**41.83**	**40.72**		**40.58**	40.3	**40.21**	**39.78**	**41.91**	40.68	36.3
Na2O	$g\ 100g^{-1}$	**0.22**	0.334	0.2	0.18	**0.16**		**0.24**	0.19	**0.22**	**0.164**	**0.21**	0.163	0.182
K2O	$g\ 100g^{-1}$	**0.12**	0.167	0.12	0.11	**0.11**	0.089	**0.11**	0.11	**0.13**	**0.114**	**0.12**	0.103	0.106
P2O5	$g\ 100g^{-1}$	**26.5**	26.295	25.7	**25.83**	**27.25**		**26.49**	26.5	**24.51**	**25.07**	**27.63**	57.4	29.5
H2O+	$g\ 100g^{-1}$				**0.51**						**2.11**			
CO2	$g\ 100g^{-1}$										**3.74**			
LOI	$g\ 100g^{-1}$	**5.59**		5.8	**5.83**	**6.11**	5.9	**6.08**		**6.61**	**5.8**	**5.99**	6.25	5.84
Ag	$mg\ kg^{-1}$	**0.068**	0.01											
As	$mg\ kg^{-1}$	**26.47**	26.14		22			**18**		**25.5**		**28.064**	27	
Au	$mg\ kg^{-1}$													
B	$mg\ kg^{-1}$	**12.7**												
Ba	$mg\ kg^{-1}$	**270.6**	235.730	215	245	**184**		**231**	211	**250.1**		**212.159**		
Be	$mg\ kg^{-1}$	**2.069**	1.96	2.1								**2.255**		
Bi	$mg\ kg^{-1}$	**0.118**	0.11									**0.105**		
Br	$mg\ kg^{-1}$													
C(org)	$mg\ kg^{-1}$													
C(tot)	$mg\ kg^{-1}$								12200		**12200**			
Cd	$mg\ kg^{-1}$	**2.607**	0.02	0.015										
Ce	$mg\ kg^{-1}$	**964.1**	1036	945	773	**913**		**1097**	912	**940.4**		**976.361**		
Cl	$mg\ kg^{-1}$			150										
Co	$mg\ kg^{-1}$	**27.16**	28.36	28.4		**32**		**37**		**35.7**		**30.301**	16	
Cr	$mg\ kg^{-1}$	**44.12**	37.6	37		**31**		**53**	38	**45.1**		**39.498**	23	
Cs	$mg\ kg^{-1}$	**0.22**	0.16	0.2		**0.17**				**18**		**0.185**		
Cu	$mg\ kg^{-1}$	**19.29**	20.69	21.1	49	**26**		**18**	20	**22.3**		**20.933**	11	
Dy	$mg\ kg^{-1}$	**85.22**	88.62	80.5		**65.5**						**76.87**		
Er	$mg\ kg^{-1}$	**44.4**	46.69	41.1		**38.3**						**38.237**		
Eu	$mg\ kg^{-1}$	**20.82**	21.28			**18.2**						**19.512**		
F	$mg\ kg^{-1}$			25000		23488		**31200**		**21300**				
Ga	$mg\ kg^{-1}$	**12.11**	11.13	9.5				**4**		**2.4**		**2.791**		
Gd	$mg\ kg^{-1}$	**113.5**	118.420			**101**						**103.679**		
Ge	$mg\ kg^{-1}$	**11.14**	0.44											
Hf	$mg\ kg^{-1}$	**1.55**				**1.71**						**1.304**		
Hg	$mg\ kg^{-1}$													
Ho	$mg\ kg^{-1}$	**17.38**	17.41	15.9		**14.9**						**15.132**		
I	$mg\ kg^{-1}$							**76.8**						
In	$mg\ kg^{-1}$													
La	$mg\ kg^{-1}$	**489.8**	527.370	476		**440**		**581**	422	**489.3**		**487.217**		
Li	$mg\ kg^{-1}$	**6.348**	3.82	7.12								**5.979**		
Lu	$mg\ kg^{-1}$	**3.571**	3.65	3.39		**2.94**						**3.17**		
Mo	$mg\ kg^{-1}$	**1.258**		1.13		**3.25**		**1**		**1.4**		**1.08**		
Nb	$mg\ kg^{-1}$	**7.99**			**14**	6.17		**8**		**4.8**		**7.855**		
Nd	$mg\ kg^{-1}$	**453.1**	494.6	432		**363**		**426**		**423.1**		**461.127**		
Ni	$mg\ kg^{-1}$	**31.08**	29.56	29.6	71	**48**		**28**	24	**21.7**		**28.844**	19	
Pb	$mg\ kg^{-1}$	**75.21**	87.34	72.6		**63.2**		**77**		**85.2**		**83.517**	49	
Pd	$mg\ kg^{-1}$		9.48										10	
Pr	$mg\ kg^{-1}$	**105.3**	112.120	96.9		**90.9**						**93.375**		
Pt	$mg\ kg^{-1}$													
Rb	$mg\ kg^{-1}$	**5.163**	4.57	4.63	5	4		**6**		**7.6**		**5.568**		
Re	$mg\ kg^{-1}$													
S	$mg\ kg^{-1}$		1791	3900		1206		**1600**	2240		**1600**			
Sb	$mg\ kg^{-1}$	**7.427**	2.99	2.3				**2.1**				**2.987**		
Sc	$mg\ kg^{-1}$	**8.93**	9.55	9.9		**9.84**				**99.1**		**10.366**		
Se	$mg\ kg^{-1}$	**16.39**	0.06										9	
Sm	$mg\ kg^{-1}$	**93.59**	93.8	89.4		**79.4**		**90**		**71.3**		**94.157**		
Sn	$mg\ kg^{-1}$	**0.707**	1.05	0.47								**0.522**		
Sr	$mg\ kg^{-1}$	**780.8**	805.530	729	**736**	**732**		**712**		**701.3**		**763.301**		
Ta	$mg\ kg^{-1}$	**0.358**				**0.26**						**0.283**		
Tb	$mg\ kg^{-1}$	**15.26**	16.01			**13**						**15.128**		
Te	$mg\ kg^{-1}$	**0.123**												
Th	$mg\ kg^{-1}$	**9.441**	11.71	10.6		**10.5**		**10**		**8.7**		**11.323**		
Tl	$mg\ kg^{-1}$	**0.213**		0.17								**0.17**		
Tm	$mg\ kg^{-1}$	**5.176**	5.26	4.92		**4.46**						**5.068**		
U	$mg\ kg^{-1}$	**30.43**	28.56	29.4		**28.2**		**29**		**31.7**		**29.66**		
V	$mg\ kg^{-1}$	**87.41**	81.07	80.2	**86**	**85**		**93**	80	**99.1**		**84.043**	46	
W	$mg\ kg^{-1}$	**1.351**	1.23			**1.41**		**15**		**17.1**		**1.317**		
Y	$mg\ kg^{-1}$	**640.1**	703.1	630	**693**	**643**		**637**	625	**628.5**		**603.439**		
Yb	$mg\ kg^{-1}$	**26.43**	28.08	26.3		**21.4**		**25**				**24.807**		
Zn	$mg\ kg^{-1}$	**36.14**	32.99	35.8	35	**36**		**34**	34	**38.2**		**30.545**	17	
Zr	$mg\ kg^{-1}$	**51.73**		100	**60**	**64**		**54**	49	**55.8**	**0.022**	**50.838**		

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

Table 1 - GeoPT46A Contributed data for Phosphate rock, POLC-1. 11/12/2019

Lab Code		G32	G34	G35	G36	G38	G39	G40	G41	G42	G43	G44	G47	G48
SiO2	$g\ 100g^{-1}$	12.19	**12.11**	12.91	**13.16**	**13.2**	13.44	**11.91**	13.25	13.34	12.91	12.609	13.21	**11.64**
TiO2	$g\ 100g^{-1}$	0.18	**0.14**	0.15	**0.15**	**0.15**	0.16	**0.17**	0.16	0.13		0.179	0.14	**0.09**
Al2O3	$g\ 100g^{-1}$	3.85	**2.24**	2.27	**2.28**	**2.3**	2.29	**2.47**	2.27	2.22	2.18	2.284	2.4	**1.84**
Fe2O3T	$g\ 100g^{-1}$	7.72	**5.96**	5.64	**5.72**	**6.01**	5.75	**5.85**	5.69	6.06	5.78	5.115	5.92	**7.13**
Fe(II)O	$g\ 100g^{-1}$	0.35			**0.975**		1.05							
MnO	$g\ 100g^{-1}$	0.98	**0.97**	1.09	**1.09**	**1.07**	1.11	**1.17**	1.1	1.3		0.961	1.11	**1.42**
MgO	$g\ 100g^{-1}$	1.87	**1.53**	1.09	**1.1**	**1.14**	1.11	**1.19**	1.06	1.17	1.09	1.082	1.03	**1.16**
CaO	$g\ 100g^{-1}$	42.32	**41.49**	41.08	**40.31**	**41.1**	41.29	**42.68**	40.29	42.53	40.41	40.368	41.67	**42.61**
Na2O	$g\ 100g^{-1}$	0.34	**0.24**	0.15	**0.21**	**0.59**	0.19	**0.17**	0.26	0.21	0.3	0.209	0.14	**0.31**
K2O	$g\ 100g^{-1}$	0.12	**0.13**	0.11	**0.12**	**0.14**	0.12	**0.13**	0.12	0.11	0.12	0.1	0.14	**0.11**
P2O5	$g\ 100g^{-1}$	24.13	**27.58**	26.4	**26.49**	**27.2**	27.073	**27.36**	26.87	27.16	26.68	26.4	26.66	**28.04**
H2O+	$g\ 100g^{-1}$				**1.939**		2.09						0.65	
CO2	$g\ 100g^{-1}$				**4.349**		4							
LOI	$g\ 100g^{-1}$	6	**6.08**	5.31	**6.48**	**5.92**	5.52	6.05	5.34	5.8	5.88	5.72	5.66	**6.1**
Ag	$mg\ kg^{-1}$	0.1								4.7				
As	$mg\ kg^{-1}$	15.9		16.349	**24.1**	**23.9**	27.4			21				
Au	$mg\ kg^{-1}$													
B	$mg\ kg^{-1}$	7			**10.621**									
Ba	$mg\ kg^{-1}$	150	**195**	284.754	**208**	**211**	218	**277**		235		114		**227**
Be	$mg\ kg^{-1}$	0.9		1.605	**1.95**	**2.1**	1.82							**2.02**
Bi	$mg\ kg^{-1}$	0.068			**0.12**		0.095							
Br	$mg\ kg^{-1}$													
C(org)	$mg\ kg^{-1}$				**820**		1000							
C(tot)	$mg\ kg^{-1}$						12000			11100				
Cd	$mg\ kg^{-1}$						0.012			8.2				
Ce	$mg\ kg^{-1}$	600	**780**	1502.719	**893**	**905**	905	**934**		902.7				**1158**
Cl	$mg\ kg^{-1}$				**100.4**									
Co	$mg\ kg^{-1}$	19	**22**	24.822	**28.8**	**28.9**	29.1			33.8		37		**28.4**
Cr	$mg\ kg^{-1}$	25	**42**	34.192	**42.1**	**39.5**	38.6			59.2		38		**38.4**
Cs	$mg\ kg^{-1}$	0.17		1.279	**0.19**		0.23			53.2				**0.1**
Cu	$mg\ kg^{-1}$	11.5	**21**	14.500	**23.9**	**21.3**	21.6	**47**		25.7		18		**18.4**
Dy	$mg\ kg^{-1}$	41	**68**	129.329	**77.8**	**80.2**	85.1							**79.8**
Er	$mg\ kg^{-1}$	26	**34**	68.110	**37.6**	**41.5**	44.1							**40.2**
Eu	$mg\ kg^{-1}$	13	**16**	25.229	**19.4**	**19.5**	21.2							**19.2**
F	$mg\ kg^{-1}$				**22110**	**16800**							14700	
Ga	$mg\ kg^{-1}$	6		18.767	**10.6**	**16.2**	3.17			3.5				**8.97**
Gd	$mg\ kg^{-1}$	70	**85**	155.998	**95.2**	**103**	107.5							**104**
Ge	$mg\ kg^{-1}$	1.2			**5.53**	**5.4**	1.16							
Hf	$mg\ kg^{-1}$	0.6		1.338	**1.35**	**1.31**	0.051							**1.5**
Hg	$mg\ kg^{-1}$				**0.007**									
Ho	$mg\ kg^{-1}$	11	**13**	26.487	**15.8**	**16.1**	17							**16.1**
I	$mg\ kg^{-1}$									86.6				
In	$mg\ kg^{-1}$						0.027							
La	$mg\ kg^{-1}$	290	**409**	604.572	**462**	**450**	390	**453**		430.4				**570**
Li	$mg\ kg^{-1}$	4		15.689	**7.338**		6.3							
Lu	$mg\ kg^{-1}$	2.1	**3.6**	6.111	**3.26**	**3.29**	3.59							**3.47**
Mo	$mg\ kg^{-1}$	1.8		0.939	**1.25**	**1.2**	1.06			2.1				
Nb	$mg\ kg^{-1}$	8			**6.84**	**7.69**	7.17			5.1		18		**8.18**
Nd	$mg\ kg^{-1}$	270	**365**	550.042	**410**	**420**	459	**404**		372.6				**439**
Ni	$mg\ kg^{-1}$	22	**29**	23.967	**30.2**	**29.7**	30			23.9		85		**36.2**
Pb	$mg\ kg^{-1}$	23		99.070	**79.5**	**80.5**	79			65.5		73		**92.2**
Pd	$mg\ kg^{-1}$													
Pr	$mg\ kg^{-1}$	62	**71**	127.851	**93.6**	**94.2**	102.5							**100**
Pt	$mg\ kg^{-1}$													
Rb	$mg\ kg^{-1}$	4	**26**	19.123	**4.83**	**4.8**	6.25			6.2		2		**4.07**
Re	$mg\ kg^{-1}$						0.003							
S	$mg\ kg^{-1}$	0.29			**1789**	**1600**	1800		1810				1119	
Sb	$mg\ kg^{-1}$	2		4.138	**2.82**	**3.4**	2.51			1.7				
Sc	$mg\ kg^{-1}$	7	**7**	22.007	**10.1**	**9.7**	10.8			13.1				**9.61**
Se	$mg\ kg^{-1}$	3.4		2.489	**0.098**		0.182							
Sm	$mg\ kg^{-1}$	60	**76**	114.800	**86.3**	**90.6**	92.8			87.2				**91.1**
Sn	$mg\ kg^{-1}$	0.43		0.733	**0.54**	**0.6**	0.5							
Sr	$mg\ kg^{-1}$	580	**658**	861.704	**736**	**732**	742	**802**	757	669.5		729	733	
Ta	$mg\ kg^{-1}$	0.28		0.327	**0.31**	**0.37**	0.1							**0.32**
Tb	$mg\ kg^{-1}$	8.9	**12**	22.724	**13.3**	**13.8**	15.05							**14.9**
Te	$mg\ kg^{-1}$	0.08					0.122							
Th	$mg\ kg^{-1}$	4.1	**20**	30.140	**11**	**11.2**	11.65			12		10		**10.7**
Tl	$mg\ kg^{-1}$	0.11		0.289			0.163							
Tm	$mg\ kg^{-1}$	3.1	**4**	8.362	**4.65**		5.19							**5.25**
U	$mg\ kg^{-1}$	9	**21**	46.925	**28.6**	**29.9**	30.5			30.6				**31.7**
V	$mg\ kg^{-1}$	60	**70**	71.523	**80.4**	**82.1**	83.7	**91**		79.3		33		**62.7**
W	$mg\ kg^{-1}$	1.2		1.614	**1.31**	**0.85**	1.51			4.4				
Y	$mg\ kg^{-1}$	450	**464**	1310.914	**673**	**656**	670	**706**		600.8		1262	430	**907**
Yb	$mg\ kg^{-1}$	16	**21**	44.909	**23.9**	**24.8**	25.2			24.7				**25.7**
Zn	$mg\ kg^{-1}$	14	**28**	26.306	**36.5**	**30.9**	31.5			33.1		3		**25.7**
Zr	$mg\ kg^{-1}$	31.6	**67**	47.318	**53.5**	**56.1**	1.7			46.7		309		**55.6**

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

Table 1 - GeoPT46A Contributed data for Phosphate rock, POLC-1. 11/12/2019

Lab Code		G49	G50	G53	G55	G56	G58	G59	G60	G61	G62	G65	G66	G67
SiO2	g 100g^{-1}	13.57		12.62	13.47	13.64	**13.45**	**13.3**	13.442	13.445	14.12	13.39		13.18
TiO2	g 100g^{-1}	0.147		0.16	0.140	0.18	**0.158**	**0.18**	0.149	0.165	0.148	0.16		0.155
Al2O3	g 100g^{-1}	2.268	**2.16**	3	2.193	2.36	**2.29**	**2.27**	2.242	2.435	2.2	2.22		2.224
Fe2O3T	g 100g^{-1}	5.669	**5.87**	5.81	5.727	5.96	**5.83**	**5.74**	5.779	5.605	5.778	5.77		5.683
Fe(II)O	g 100g^{-1}								1.078	1.12		1.12		
MnO	g 100g^{-1}	1.093	**1.13**		1.006	1.02	**1.14**	**1.11**	1.102	1.088	1.127	1.11		1.078
MgO	g 100g^{-1}	1.127	**1.05**	1.35	1.03	1.1	**1.09**	**1.19**	1.099	1.095	1.098	1.1		1.096
CaO	g 100g^{-1}	40.973	**38.57**	39.5	40.08	41.29	**40.94**	**39.7**	41.529	40.265	40.24	41.4		40.95
Na2O	g 100g^{-1}	0.55	**0.191**	0.29	0.206	0.22	**0.18**	**0.24**	0.228		0.193	0.2		
K2O	g 100g^{-1}	0.124	**0.11**	0.13		0.12	**0.1**	**0.13**	0.116	0.115	0.101	0.12		0.122
P2O5	g 100g^{-1}	26.442		27.2	26.702	27.43	24.8	**26.3**	27.697	25.67	26.17	26.7		
H2O+	g 100g^{-1}								2.083					
CO2	g 100g^{-1}													
LOI	g 100g^{-1}	5.881		5.24	5.59	**6**	**6.19**	**6.2**	5.397	6.13		5.25		5.53
Ag	mg kg^{-1}				0.938							0.01	0.118	
As	mg kg^{-1}	30.1			32.165			**29.8**	26.390	25.948	24.06	26.2	27.96	
Au	mg kg^{-1}					**82**								
B	mg kg^{-1}										2.5		5.85	
Ba	mg kg^{-1}	195	**228.1**	208	213.6	67	**207.5**	**220**	212.620	204.011	220.4	198	249	207
Be	mg kg^{-1}			2.2			**2.34**	**1.93**	1.903	2.724	2.012	1.86	1.81	
Bi	mg kg^{-1}				0.147					0.105	0.111	0.12	0.1	
Br	mg kg^{-1}													
C(org)	mg kg^{-1}							**3500**				1300		12200
C(tot)	mg kg^{-1}				12200			**11100**	12744			12500		2500
Cd	mg kg^{-1}						**0.076**		0.014		0.012	0.02	0.032	
Ce	mg kg^{-1}	769	**1109**	893	947	1346	**917.7**	**883**	923.717	952.9	1052	868		
Cl	mg kg^{-1}								57					
Co	mg kg^{-1}		**28.9**	29	27.33	**28**	**28.78**	**27.9**	31.863	30.909	30.79	28.6	26.47	
Cr	mg kg^{-1}	118	**40.92**	37	39.23	31	**32.39**	**41.1**	43.26	35.889	44.2	37	34.04	
Cs	mg kg^{-1}		**0.199**	0.21	0.194		**0.183**		0.204	0.42	0.188	0.21	0.185	
Cu	mg kg^{-1}	26.4	**20.95**	23	20.49	**28**	**29.83**	**21.7**	20.35	22.303	23.7	21	137	
Dy	mg kg^{-1}		**78.9**	78	89.82		**77**	**80**	79.431	84.841	87.27	82.7	89.86	
Er	mg kg^{-1}		**39.02**	39	47.37		**38.74**	**42.7**	41.207	40.888	45.31	42.2	45.75	
Eu	mg kg^{-1}		**18.96**	18.8	21.36		**19.22**	**19.1**	19.803	19.592	20.49	18.5	21.33	
F	mg kg^{-1}					23000		**28600**	11617	2.69				
Ga	mg kg^{-1}	6.94	**15.89**	4.3	27.03		**11.94**		4.457	16.497	2.348	9.73		
Gd	mg kg^{-1}		**103**	95	113		**99.25**	**107**	103.729	99.146	112.4	103.5	129.7	
Ge	mg kg^{-1}											1.02	2.009	
Hf	mg kg^{-1}	4.92	**1.7**	1.2			**1.371**	**1.57**	1.16		1.287	0.1		
Hg	mg kg^{-1}													
Ho	mg kg^{-1}		**15.89**	15.3	18.01		**15.18**	**15.7**	16.076	15.21	16.84	17.55	17.16	
I	mg kg^{-1}													
In	mg kg^{-1}								0.020	0.02		0.021		
La	mg kg^{-1}	402	**549.8**	443	478	426	**470.7**	**458**	471.141	467.294	471.1	400		
Li	mg kg^{-1}			6.3	6.53	**7**			5.9	8.892	6.38	5.9	4.44	
Lu	mg kg^{-1}		**3.47**	3.18	3.797		**3.25**	**3.33**	3.309	3.258	3.524	3.45	3.44	
Mo	mg kg^{-1}		**1.15**	1.2	1.123		**0.637**	**0.9**	1.08		1.29	1.14	1.12	
Nb	mg kg^{-1}		**8.13**	5.7	9.408		**7.15**	**6.89**	7.503		7.568	8	1.17	
Nd	mg kg^{-1}	428	**419.4**	395	441		**417.2**	**412**	437.027	436.037	434.2	423	487	
Ni	mg kg^{-1}	36.3	**37.65**	29	30.015	**33**	**40.83**	**30.2**	33.5	52.121	34.5	29	120	
Pb	mg kg^{-1}	72.7	**81.3**	75	77.11	**52**	**75.55**	**80.3**	82.349	79.887	42.41	74	77	80.8
Pd	mg kg^{-1}													
Pr	mg kg^{-1}		**95.65**	93	99.76		**91.09**	**86.6**	96.485	100.778	102.7	93.8	109	
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	5.65	**4.97**	4.7	4.832		**4.91**		4.723	6.347	6.08	4.9		
Re	mg kg^{-1}											0.003		
S	mg kg^{-1}				1800	1500		**2400**	1583		1728	1700		1340
Sb	mg kg^{-1}	2.21		2.8			**3.92**	**1.3**	2.997		2.984	2.06	3	
Sc	mg kg^{-1}		**10.48**	9.5	11.28				9.63	8.734	9.53	9.5	9.73	
Se	mg kg^{-1}				17.015			**57**			0.19	1	6.86	
Sm	mg kg^{-1}		**85.82**	84	94.02		**86.04**	**87.3**	88.556	89.335	86.64	86.1	99.4	
Sn	mg kg^{-1}								0.55		0.67	0.7	0.501	
Sr	mg kg^{-1}	735	**837.6**	750	764.7	227	**732.4**		727.480	856.981	687.5	797		748
Ta	mg kg^{-1}		**0.345**		0.283		**0.089**	**0.05**	0.247		0.271	0.2		
Tb	mg kg^{-1}		**14.33**	13.6	15.46		**14.09**	**14.4**	13.770	14.345	14.16	14.35	15.9	
Te	mg kg^{-1}											0.12		
Th	mg kg^{-1}	10.7	**11.02**	11	13.17		**10.97**	**11.4**	10.827	12.496	21.02	10.65	11.4	
Tl	mg kg^{-1}			0.17			**0.164**	**0.17**	0.171	0.18	0.174	0.17	0.164	
Tm	mg kg^{-1}		**4.93**	4.5	5.292		**4.538**	**4.98**	4.777	4.595	4.825	4.91	5.04	
U	mg kg^{-1}	26.6	**29.53**	25	34.38		**29.5**	**30.8**	29.977	34.267	7.913	32.8	29	
V	mg kg^{-1}	119	**81.38**	80	80.735	**84**	**80.67**	**88.6**	85.54	78.42	85.43	74		68.2
W	mg kg^{-1}			1.2	3.515		**1.358**		1.193		1.21	1.2	0.818	
Y	mg kg^{-1}	557	**793.6**	605	671		**656.7**	**543**	647.642	698.449	655.2	643		
Yb	mg kg^{-1}		**25.53**	24	28.49		**24.15**	**26.5**	24.751	24.44	27.21	24.2	26.3	
Zn	mg kg^{-1}	36.6	**29.27**		48.6	**118**	**42**	**31.1**	31.15	31.328	33.8	29	29.2	
Zr	mg kg^{-1}	36.2	**51.33**	54		1040	**45.22**	**54.9**	51.7		47	58	19.9	66.3

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

Table 1 - GeoPT46A Contributed data for Phosphate rock, POLC-1. 11/12/2019

Lab Code		G68	G70	G71	G72	G74	G75	G76	G77	G78	G79	G80	G82	G84
SiO2	g 100g^{-1}	13.36	13.92	**8.4**	**13.22**	14.34		13.721	**13.81**	**13.311**		13.476	13.34	13.93
TiO2	g 100g^{-1}	0.151	0.158	**0.1**	**0.146**	0.21		0.157	**0.154**	**0.111**		0.143	0.148	0.16
Al2O3	g 100g^{-1}	2.31	2.298	**1.3**	**2.51**	1.87		2.417	**2.3**	**2.134**		2.27	2.24	2.25
Fe2O3T	g 100g^{-1}	5.72	5.799	**5.9**	**5.98**	5.38		6.387	**5.89**	**5.792**		5.735	5.59	5.8
Fe(II)O	g 100g^{-1}									**0.853**				
MnO	g 100g^{-1}	1.165		**0.96**	**1.12**	0.08		1.167	**1.13**	**1.13**	1.261	1	1.07	1.08
MgO	g 100g^{-1}	1.09	1.136		**1.106**	1.19		1.164	**1.05**	**1.091**		1.087	1.09	1.16
CaO	g 100g^{-1}	40.96	41.24	**36.63**	**43.56**	36.38		41.568	**42.12**	**41.616**		39.721	40.7	37.6
Na2O	g 100g^{-1}	0.13	0.145		**0.154**	0.07		0.228	**0.195**	**0.187**		0.21	0.201	0.24
K2O	g 100g^{-1}	0.103	0.108	**0.14**	**0.097**	0.14		0.129	**0.115**	**0.119**		0.109	0.128	0.16
P2O5	g 100g^{-1}	26.7	27.33	**19.07**	**26.27**	26.72		26.841	**26.66**	**26.575**		30.435	26.73	26.58
H2O+	g 100g^{-1}									**42.1**				
CO2	g 100g^{-1}							4.4						
LOI	g 100g^{-1}	5.91	5.968	**6.21**	**6.691**	6.06		6.199	**6.41**	**5.37**		5.961	5.77	5.72
Ag	mg kg^{-1}									**0.159**				
As	mg kg^{-1}	24.5						26.713		**28.83**	28.7		23.7	
Au	mg kg^{-1}													
B	mg kg^{-1}													
Ba	mg kg^{-1}	180			**206**	117	220	239.025		**195.120**	233.6	217	213	234.210
Be	mg kg^{-1}				**2.26**		2.03			**2.94**				2
Bi	mg kg^{-1}									**0.5**				
Br	mg kg^{-1}													
C(org)	mg kg^{-1}													
C(tot)	mg kg^{-1}		12200					11997.100	**11400**					
Cd	mg kg^{-1}									**0.072**				
Ce	mg kg^{-1}	976			**96.47**		923	986.379		**1056.585**	1004.700	967	922	988
Cl	mg kg^{-1}												385	
Co	mg kg^{-1}	29.5			**28.78**	10	28.7	31.443		**37.57**	32.72	21		30.5
Cr	mg kg^{-1}	37.5		**145**	**37.79**	57	37.4	36.671		**30.48**	43.9	44	42	41.1
Cs	mg kg^{-1}						0.2			**0.25**				0.3
Cu	mg kg^{-1}	22.5		**127**	**20.45**	24	20	34.92		**27.49**	11	17	26	21.4
Dy	mg kg^{-1}	83.8			**82.33**		82.7	85.302		**93.845**		65		80.3
Er	mg kg^{-1}	42.5			**40.72**		42.1	44.683		**47.583**		41		39.7
Eu	mg kg^{-1}	20.3			**21.34**		20.6	20.701		**23.053**				19.8
F	mg kg^{-1}									**2.796**	10890	14370		
Ga	mg kg^{-1}						16.2	14.906		**11.79**	4.07	25		9.7
Gd	mg kg^{-1}	111			**104**		105	112.022		**125.053**		91		99
Ge	mg kg^{-1}						3							
Hf	mg kg^{-1}				**1.01**		1.27	1.387		**1.157**		4		1.9
Hg	mg kg^{-1}													
Ho	mg kg^{-1}	16.4			**16.63**		16.5	16.743		**19.966**		8		16.7
I	mg kg^{-1}	83.1												
In	mg kg^{-1}									**0.022**				
La	mg kg^{-1}	488			**471**	62	447	492.394		**531.112**	530.1	420	445	481.9
Li	mg kg^{-1}						6.98			**7.22**		12		
Lu	mg kg^{-1}	3.6			**3.66**		3.35	3.525		**4.024**				3.4
Mo	mg kg^{-1}				**1.25**			1.529		**1.56**	1.27			1.4
Nb	mg kg^{-1}	7.8			**9**	26	8.09	8.281		**7.03**				8.4
Nd	mg kg^{-1}	392			**454**		424	455.824		**485.547**		417		431.2
Ni	mg kg^{-1}	31		**46**	**29.97**	19	30.4	24.889		**39.3**	30.07	17	32.8	34.1
Pb	mg kg^{-1}	63		**84**	**94.4**	39	81.7	89.851		**70.33**	78.55		74.8	56.5
Pd	mg kg^{-1}													
Pr	mg kg^{-1}	97.4			**100.5**		91.9	100.325		**104.024**		90		98.4
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	5.8		**6**	**4.72**	79	4.96	6.456		**6.5**	6.19			6.7
Re	mg kg^{-1}													
S	mg kg^{-1}		1910	**1254**		0.17		1708.600	**1740**				1530	
Sb	mg kg^{-1}	1.4						3.08		**3.91**				
Sc	mg kg^{-1}	9.39					9.6	10.041		**13.77**	17.9			9.81
Se	mg kg^{-1}													
Sm	mg kg^{-1}	89.7			**92**		90.1	94.35		**104.413**		102		88.3
Sn	mg kg^{-1}									**1.3**				0.6
Sr	mg kg^{-1}	710		**615**	**640**	456	754	789.622	**676**	**685.070**	702.4	704	702	725.640
Ta	mg kg^{-1}				**0.326**		0.29	0.257		**0.56**				0.3
Tb	mg kg^{-1}	14.6			**15.1**		14.6	14.324		**14.963**		12		14.2
Te	mg kg^{-1}									**0.26**				
Th	mg kg^{-1}	12.4			**11.15**		11.7	12.25		**14.14**	10.33			11.7
Tl	mg kg^{-1}									**0.196**				0.1
Tm	mg kg^{-1}	5.13					5.04	5.108		**5.8**				4.7
U	mg kg^{-1}	30.9		**29**	**32.31**		30.4	32.586		**41.8**	31.2		26.5	29.5
V	mg kg^{-1}	86.8		**74**	**78.23**	100	79.3	93.463		**79.08**	94.36		80.1	87.3
W	mg kg^{-1}			**18**	**1.68**					**2.65**				1.6
Y	mg kg^{-1}	612		**467**	**666**		651	680.195	**630**	**632.109**	656.020	590	618	707.1
Yb	mg kg^{-1}	26.7			**28.18**		26.9	26.627		**28.968**		25		25.2
Zn	mg kg^{-1}	34.5		**49**	**31.23**	48	28.8	32.384		**29.42**	34.32	36	34.3	35.28
Zr	mg kg^{-1}	56.5		**71**	**22.26**	86	48.8	48.738		**27.44**	53.91	117	50	63.32

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

Table 1 - GeoPT46A Contributed data for Phosphate rock, POLC-1. 11/12/2019

Lab Code		G86	G88	G90	G92	G94	G95	G96	G99	G101	G102	G103	G104	G106
SiO2	g 100g^{-1}	13.5	13.363	13.16	13.468	14.9	13.03	12.94	13.18	13.6	14.886			13.6
TiO2	g 100g^{-1}	0.14	0.147	0.492	0.157	0.16	0.15	0.146	0.15	0.158	0.116			0.16
Al2O3	g 100g^{-1}	2.26	2.276	2.33	2.362	2.35	2.32	2.26	2.23	2.4	1.393			2.34
Fe2O3T	g 100g^{-1}	5.83	5.741	6.138	5.731	5.73	5.99	5.55	5.81	5.82	6.141			6
Fe(II)O	g 100g^{-1}													
MnO	g 100g^{-1}	1.27	1.096	1.1	1.081	1.17		1.022	1.11	1.112	1.165		1.09	1.12
MgO	g 100g^{-1}	1.16	1.063	1.54	1.04	1.11	1.21	1.07	1.1	1.05	1.23			1.15
CaO	g 100g^{-1}	42.04	41.35	40.616	40.907	42.4	40.89	38.29	40.75	40.91	40.237			42
Na2O	g 100g^{-1}	0.18	0.098	0.291	0.206		0.27	0.33	0.23		0.357			0.24
K2O	g 100g^{-1}	0.12	0.112	0.12		0.14	0.11	0.13	0.11	0.13	0.184			0.11
P2O5	g 100g^{-1}	26.57	26.121	26.131	27.894	23.91	26.34	25.802	26.82	26.14	26.399			26.7
H2O+	g 100g^{-1}						0.3							
CO2	g 100g^{-1}													
LOI	g 100g^{-1}	6.25	5.794	6.52	5.66	5.79	6.14	6.3	5.38		5.56			5.91
Ag	mg kg^{-1}													
As	mg kg^{-1}	22		29		31.27			25	30	65.4			
Au	mg kg^{-1}													
B	mg kg^{-1}		10.67											
Ba	mg kg^{-1}	221	177.8	224	208.5	215.6		198	214	232	249.9	200.7	222	200
Be	mg kg^{-1}		2.216		1.9	2.06		2.03	2.1	2.15		1.737	2.05	
Bi	mg kg^{-1}										7.3	0.152		
Br	mg kg^{-1}										1.7			
C(org)	mg kg^{-1}													11128
C(tot)	mg kg^{-1}						11810		12400					
Cd	mg kg^{-1}					0.017							0.01	
Ce	mg kg^{-1}	697	851.6	971	933.470	989.9		884	918.5	1085	892.4	942.3	956	770
Cl	mg kg^{-1}													
Co	mg kg^{-1}	27	29.6	31	29.8	29.74		23	28.7	30.27		37.87	29.3	
Cr	mg kg^{-1}	39	47.08	77	46.7	41.47			39	39.5	118.5		37.5	31
Cs	mg kg^{-1}	14	0.232	38		0.186		0.23				0.193	0.2	
Cu	mg kg^{-1}	17	18.56	18	28.1	19.48		15	23	23.86	9.4	19.14	19.3	
Dy	mg kg^{-1}		75.97		81.32	80.33		84.58	78.49	76.77	161.8	78.61	83.6	
Er	mg kg^{-1}		38.86		41.72	40.14		42.58	41.43	41.3		40.18	40.7	
Eu	mg kg^{-1}		20.22		18.86	19.57		20.82	19.29	18.4		18.52	20.1	
F	mg kg^{-1}	18348		21194			31300		19573		16500			16400
Ga	mg kg^{-1}	9	10.46		18.92				3.6	12.95	2.8	5.344	10.6	
Gd	mg kg^{-1}	37	96.76		92.04	102.760		107.650	100.360	104		92.3	105	
Ge	mg kg^{-1}								1.2					
Hf	mg kg^{-1}		0.53		1.5	1.395			1.4			0.406	0.61	
Hg	mg kg^{-1}							0.006						
Ho	mg kg^{-1}		15.15		16.36	16.05		16.96	15.56	15.19		15.55	16.3	
I	mg kg^{-1}													
In	mg kg^{-1}													
La	mg kg^{-1}	375	399.4	512	472.710	498.6		500.3	458.260	527	449.5	437.7	490	390
Li	mg kg^{-1}		5.477			6.73		6.9	6.2	6.78		6.923	6.43	
Lu	mg kg^{-1}		3.138		3.41	3.185		3.53	3.28	3.41		3.328	3.49	
Mo	mg kg^{-1}				1.34	1.138		1.23	1	3.02	0.3	0.985	1.16	
Nb	mg kg^{-1}	9	5.314	12	7.05	8.01		19	7.4		4.2		7.27	
Nd	mg kg^{-1}	337	426.9	386	424.740	445.7		461.2	428	406	397.4	404.2	439	430
Ni	mg kg^{-1}	41	35.73	43	30.8	30.67		38	29	48.22	42.3	38.36	30.6	45
Pb	mg kg^{-1}	88	62.07	57	78.03	69.67		68	80	73	77.3		73.1	123
Pd	mg kg^{-1}													
Pr	mg kg^{-1}		99.16		96.62	102.8		107.3	95.68	91.68		85.82	96.8	
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	9	5.509	15	4.81	4.81		9	5.1		5.6	4.598	5.06	
Re	mg kg^{-1}													
S	mg kg^{-1}	1339		3091					1800					
Sb	mg kg^{-1}					3.86		3.1	3.1			2.009	2.33	
Sc	mg kg^{-1}		9.251	42	9	11.25		11.3	10	9.8	21	9.832	9.57	
Se	mg kg^{-1}								9					
Sm	mg kg^{-1}		87.23		84.61	86.31		92.73	86.95	82.06	129.7	83.37	79.3	
Sn	mg kg^{-1}					0.618						0.242	0.75	
Sr	mg kg^{-1}	652	711.1	706	736.9	755.7		638	764.1	692	740.7	752	747	690
Ta	mg kg^{-1}		0.173			0.162			0.26			0.255	0.15	
Tb	mg kg^{-1}		13.06		14.27	13.98		14.5	13.82	14.83		13.69	14.9	
Te	mg kg^{-1}									0.78				
Th	mg kg^{-1}	12	10.47	16	11.1	10.98		11	11.1	10.23	2.4	12.36	11.4	
Tl	mg kg^{-1}					0.169		0.19	0.18	0.18	10.8		0.16	
Tm	mg kg^{-1}		4.5		4.76	4.87		5.2	4.72	4.55		4.658	4.91	
U	mg kg^{-1}		30.55	27	29.24	33		27	30.5	29.69	25.9	34.78	29.1	
V	mg kg^{-1}	81	92.27		83.9	84.47		52	84	70.28	78.6	73.12	82.7	119
W	mg kg^{-1}					1.28							1.35	
Y	mg kg^{-1}	474	532.3	662	706.3	681.6		653	620.7	705	606.5	625.1	636	540
Yb	mg kg^{-1}		24.17		24.72	24.84		26.39	24.86	25.35	51	25.26	25.6	
Zn	mg kg^{-1}	33	37.16	37	32.8	31.27		36	32	23	27.3	22.95	27.6	39
Zr	mg kg^{-1}	63	21.53	58	58.45	63.26			63	37	66.4	7.604	16.7	66

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

Table 1 - GeoPT46A Contributed data for Phosphate rock, POLC-1. 11/12/2019

Lab Code		G107	G108	G109	G110	G111	G112	G113	G114	G115	G116	G117	G118	G119
SiO_2	g 100g^{-1}	15.8	8.57		13.1	13.31				13.48	14.94	14.05	14.6	13.42
TiO_2	g 100g^{-1}	0.13	0.161		0.15	0.15			0.179	0.17	0.165	0.156	0.127	0.15
Al_2O_3	g 100g^{-1}	2.11	2.41		2.2	2.35			2.272	3.6	2.394	2.31	2.32	2.3
Fe_2O_3T	g 100g^{-1}	5.46	5.9		5.94	5.82			6.002	6.97	5.935	5.65	5.8	5.85
Fe(II)O	g 100g^{-1}	0.89			0.93	1.01								
MnO	g 100g^{-1}	1.02	1.118		1.1	1.04			1.075	1.4	1.092	1.059	1.08	0.815
MgO	g 100g^{-1}	1.12	1.13		1.11	1.11			1.081	2.06	1.17	1.07	1.18	1.09
CaO	g 100g^{-1}	41.61	41.25		41.35	41.53			39.867	41.8	40.68	41.69	40.1	41.41
Na_2O	g 100g^{-1}		0.92		0.42	0.23			0.213	0.225	0.225	0.21	0.577	0.21
K_2O	g 100g^{-1}		0.12		0.12	0.12			0.137	0.14	0.117	0.12	0.04	0.11
P_2O_5	g 100g^{-1}	27.4	20.35		25.7	26.74			25.672	27.38	28.95	26.98	24.5	27.33
H_2O^+	g 100g^{-1}												0.77	
CO_2	g 100g^{-1}												1.05	
LOI	g 100g^{-1}	5.5	5.54		5.94	5.59						5.95	6.11	5.4
Ag	mg kg^{-1}	0.075						0.027			0.007		0.614	
As	mg kg^{-1}			13.5	27	23.7		48.36	2.080			22	31.8	35.6
Au	mg kg^{-1}	0.002												
B	mg kg^{-1}					7.9		2.044	14.364					
Ba	mg kg^{-1}	273	213	193	227	237	218	243.460	218.600	290	224.9	223	197	
Be	mg kg^{-1}	1.98				2.24		2.184	2.132		2.212	2	1.42	1.4
Bi	mg kg^{-1}	0.14						0.108	0.114		0.146		0.11	
Br	mg kg^{-1}													
C(org)	mg kg^{-1}										2290		2562	
C(tot)	mg kg^{-1}					10200					10930		13050	
Cd	mg kg^{-1}	0.070		0.02					0.013		0.024			0.27
Ce	mg kg^{-1}	836	894.9	1154	1010	979	918	977.040	919.749	606	934.3	949	794	
Cl	mg kg^{-1}									125				113
Co	mg kg^{-1}	25.78		18.5	29	30.4		34.03	29.804		2965	26	23	24
Cr	mg kg^{-1}	51.03	43	24.7	38			36.14	38.194		3936	40	25.2	57
Cs	mg kg^{-1}		0.18	0.17			0.22	0.224	0.196		0.212		0.2	
Cu	mg kg^{-1}	20.32	30	13.6	29			23.13	20.892	144	19.5	30	21.3	19.6
Dy	mg kg^{-1}	80	88.18	101		91.7	82.1	88.31	84.077		86.07	78.9	80.8	
Er	mg kg^{-1}	38.64	42.03	48		46.1	39.3	44.52	41.274		40.54	38.6	42.5	
Eu	mg kg^{-1}	16.91	21.17	115		21	19.5	21.5	19.913		19.99	20.6	19.2	
F	mg kg^{-1}					30400				1.91				
Ga	mg kg^{-1}	5.43	7			8.7	12.4	76.47	9.487		32.24	8	8.1	
Gd	mg kg^{-1}	100	105.9	167		97.1	85.7	114.160	100.989		111.4	106	103	
Ge	mg kg^{-1}							40.221	2.714		4.964	2		
Hf	mg kg^{-1}		1.47			9.4	2.29	0.193	1.951		1.419	1.5		
Hg	mg kg^{-1}												0.11	0.008
Ho	mg kg^{-1}		17.57	86.3		17.2	15.4	17.44	16.151		16.7	15.4	16	
I	mg kg^{-1}													
In	mg kg^{-1}	0.013									0.02		0.017	
La	mg kg^{-1}	413	460.6	552	529	493	466	525.180	456.640	318	468.6	472	387	
Li	mg kg^{-1}					5.4		6.66	6.361		6.664		6	
Lu	mg kg^{-1}	3.03	3.42	3.59		4.13	3.25	3.62	3.261		3.615	3.37	3.41	
Mo	mg kg^{-1}							0.623	1.074		1.167		1.43	
Nb	mg kg^{-1}		7.64				8.3	0.848	8.085	122	9.029	8	8.12	
Nd	mg kg^{-1}	398	426.4	543	387	438	429.5	469.330	422.952	377	439.3	428	418	
Ni	mg kg^{-1}	29.23	32	19.6	32			35.29	35.841		34.58	30	35	34
Pb	mg kg^{-1}	81	77.13	71	77	77.3		82.51	76.326		77.65	69	79	74
Pd	mg kg^{-1}	0.002											2.44	
Pr	mg kg^{-1}	84	95.8	125		103	95.9	10704	96.577	133	100.940	95.2	95.1	
Pt	mg kg^{-1}												0.007	
Rb	mg kg^{-1}	6.02	5.5		2	5.7	4.58	7.624	4.910		5.487	5	5.58	
Re	mg kg^{-1}										0.008			
S	mg kg^{-1}	3.82				1900					1400		1690	1600
Sb	mg kg^{-1}	8.1		2.5		2.95		1.75			2.87	3.3	2.98	7.1
Sc	mg kg^{-1}	10.99	9.9			9.8		9.827	9.234		10.69	10	7.45	
Se	mg kg^{-1}							78.06			22.33		0.85	
Sm	mg kg^{-1}	81.1	93.46	103		96.4	85.2	97.41	88.876		95.26	90.6	87.6	
Sn	mg kg^{-1}	0.845		0.61		0.8		0.068	0.544		0.574	1	0.54	
Sr	mg kg^{-1}	703	757	613	782	755	742	863.870	754.140	775	772.9	767	882	676
Ta	mg kg^{-1}		0.28				0.55	0.051	0.352		0.272		0.42	
Tb	mg kg^{-1}	14	15.41	87		17.6	13.4	15.31	14.796		14.28	15.1		
Te	mg kg^{-1}										0.133		0.17	
Th	mg kg^{-1}	9.21	11.66	15	16		11.3	10.2	11.308		11.05	11.1	3.31	
Tl	mg kg^{-1}			0.11		0.2		0.104	0.186		0.113	0.2	0.16	9.4
Tm	mg kg^{-1}	4.18	5.02	5.71		5.31	4.83	5.19	4.814		5.092	4.52	4.81	
U	mg kg^{-1}	26.4	29.84	43.8	26	36.2	28.4	30.6	30.027		33.3	30.5	30.6	
V	mg kg^{-1}	79.54	88	43.6	78			27.86	80.966		84.61	84	76.2	73
W	mg kg^{-1}							1.136	1.428		0.948	2	1.27	
Y	mg kg^{-1}	593	685	613	692	678	660	714.180	668.059	640	701.780	635	674	
Yb	mg kg^{-1}	23.1	24.89	32.6		31.9	25.7	27.47	25.829		26.61	24.2	25.7	
Zn	mg kg^{-1}	34.4	33	19.1	34	37.4		44.87	29.199		40.06	30	23.5	32
Zr	mg kg^{-1}	69.7	60		75		60.8	4.66	69.312		58.86	51	29.8	

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

Table 2 - GeoPT46A Consensus values and statistical summary for Phosphate rock, POLC-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	13.37	0.03954	0.181	0.2184	81	13.38	0.5403	13.37	Assigned	Median
TiO2	0.1533	0.001676	0.004066	0.4123	79	0.1533	0.0149	0.15	Provisional	Robust Mean
Al2O3	2.28	0.009764	0.04028	0.2424	83	2.294	0.1123	2.28	Assigned	Median
Fe2O3T	5.796	0.02006	0.08898	0.2254	82	5.809	0.1991	5.796	Assigned	Median
MnO	1.096	0.007031	0.02162	0.3251	78	1.096	0.06209	1.095	Assigned	Robust Mean
MgO	1.1	0.00605	0.02169	0.279	80	1.116	0.05936	1.1	Assigned	Mode
CaO	40.91	0.1067	0.468	0.2279	82	40.81	1.107	40.91	Assigned	Median
K2O	0.118	0.001476	0.003255	0.4535	80	0.118	0.0132	0.12	Provisional	Robust Mean
P2O5	26.58	0.08224	0.3245	0.2534	79	26.54	0.9225	26.58	Assigned	Median
LOI	5.91	0.04567	0.09047	0.5048	74	5.887	0.3778	5.91	Provisional	Median
	mg kg⁻¹	mg kg⁻¹	mg kg⁻¹			mg kg⁻¹	mg kg⁻¹	mg kg⁻¹		
As	25.93	0.7719	1.271	0.6074	47	25.93	5.292	26.14	Provisional	Robust Mean
Ba	219.4	2.855	7.795	0.3663	74	219.4	24.56	218.3	Assigned	Robust Mean
Be	2.03	0.03566	0.146	0.2443	41	2.02	0.2174	2.03	Assigned	Median
Bi	0.11	0.00323	0.01226	0.2634	22	0.1225	0.02594	0.116	Assigned	Mode
C(tot)	12200	102	236.8	0.4309	19	11910	769.1	12200	Provisional	Median
Ce	932.9	12.5	26.66	0.4687	69	932.9	103.8	933.5	Assigned	Robust Mean
Co	28.88	0.4929	1.392	0.354	62	28.88	3.881	28.9	Assigned	Robust Mean
Cr	39	0.746	1.797	0.4151	68	40.01	6.447	39.5	Assigned	Mode
Cs	0.2	0.004631	0.02038	0.2272	41	0.22	0.05245	0.2	Assigned	Median
Cu	21.05	0.39	1.064	0.3664	71	22.59	5.629	21.4	Provisional	Mode
Dy	81.32	1.05	3.355	0.313	53	82.29	6.44	82.1	Assigned	Mode
Er	41.21	0.4541	1.883	0.2411	51	41.54	3.237	41.21	Assigned	Median
Eu	19.8	0.2125	1.011	0.2102	49	19.91	1.411	19.8	Assigned	Median
Gd	103.7	1.464	4.125	0.3549	52	104.2	10.41	103.7	Assigned	Median
Hf	1.387	0.05533	0.1056	0.5239	37	1.353	0.5518	1.387	Assigned	Median
Ho	16.13	0.174	0.8487	0.205	50	16.21	1.155	16.13	Assigned	Median
In	0.02	0.0007863	0.002882	0.2728	8	0.01992	0.00279	0.02	Provisional	Median
La	468.6	5.658	14.85	0.3809	69	465.6	55.55	468.6	Provisional	Median
Li	6.506	0.1388	0.3926	0.3535	32	6.506	0.7851	6.48	Assigned	Robust Mean
Lu	3.41	0.03076	0.2268	0.1357	50	3.41	0.2175	3.41	Assigned	Robust Mean
Mo	1.2	0.03165	0.09338	0.339	43	1.236	0.265	1.2	Assigned	Median
Nb	8	0.1765	0.4679	0.3771	51	7.862	1.768	8	Assigned	Median
Nd	426.6	3.994	13.72	0.2912	64	426.1	36.28	426.6	Assigned	Median
Ni	30.5	0.452	1.459	0.3099	71	33.02	8.162	31.08	Provisional	Mode
Pb	77	0.7731	3.203	0.2414	68	76.24	8.881	77	Assigned	Median
Pr	96.58	1.23	3.883	0.3168	53	97.75	8.281	96.8	Assigned	Mode
Rb	4.96	0.135	0.3117	0.433	61	5.541	1.166	5.487	Provisional	Mode
Sb	2.982	0.1604	0.2023	0.7928	38	2.898	0.904	2.982	Provisional	Median
Sc	9.715	0.135	0.5519	0.2446	51	10.25	1.491	9.832	Assigned	Mode
Sm	88.88	0.9002	3.618	0.2488	57	89.13	7.431	88.88	Assigned	Median
Sn	0.5569	0.02654	0.04865	0.5456	26	0.6217	0.1681	0.6	Provisional	Mode
Sr	734	8.13	21.75	0.3738	74	728.6	53.13	732.7	Assigned	Mode
Ta	0.28	0.01222	0.02712	0.4506	32	0.2715	0.09548	0.28	Provisional	Median
Tb	14.35	0.1483	0.7687	0.1929	49	14.45	1.068	14.35	Assigned	Median
Th	11.1	0.134	0.618	0.2168	60	11.23	1.309	11.1	Assigned	Median
Tl	0.17	0.002663	0.01775	0.15	31	0.1737	0.028	0.17	Assigned	Median
Tm	4.879	0.05363	0.3074	0.1744	48	4.879	0.3715	4.89	Assigned	Robust Mean
U	29.76	0.324	1.429	0.2268	63	29.94	3.022	29.9	Assigned	Mode
V	81.03	0.8275	3.345	0.2474	70	81.35	9.215	81.03	Assigned	Median
W	1.28	0.0556	0.09864	0.5636	33	1.573	0.5758	1.358	Assigned	Mode
Y	643	5.532	19.43	0.2847	73	641.6	54.73	643	Assigned	Median
Yb	25.3	0.2239	1.245	0.1799	56	25.5	2.07	25.3	Assigned	Median
Zn	33	0.5525	1.559	0.3543	71	32.65	5.107	33	Assigned	Median
Zr	54.85	1.65	2.401	0.6871	66	52.27	17.11	54	Provisional	Mode

Table 3 - GeoPT46A Z-scores for Phosphate rock, POLC-1. 11/12/2019

Lab Code	**G2**	**G4**	**G5**	**G6**	**G9**	**G10**	**G11**	**G12**	**G13**	**G14**	**G16**	**G17**	**G18**
SiO2	**-0.72**	0.41	0.00	**-1.09**	-1.30	-0.14	0.11	2.85	-1.30	**1.49**	6.60	1.68	1.69
TiO2	*	*-1.64*	*0.45*	***42.22***	*-1.64*	*-1.51*	*-0.41*	*174.20*	*-0.04*	***1.64***	*-9.63*	*14.22*	*-4.10*
Al2O3	**-4.22**	-0.37	0.12	**1.49**	-0.37	0.09	0.37	9.19	-0.12	**-1.74**	10.92	4.79	0.74
Fe2O3T	**-1.19**	-0.03	0.42	*	-1.66	-0.68	0.03	-5.59	-0.71	**3.42**	2.22	25.04	0.08
MnO	**-0.29**	2.40	-0.42	*	*	-0.33	0.55	-1.07	0.32	**8.04**	1.24	*	-0.37
MgO	**-6.46**	0.23	-0.23	*	-0.69	-0.55	-0.92	*	-1.38	**2.77**	2.31	1.29	-0.46
CaO	**0.68**	0.33	0.13	**-83.82**	0.63	0.00	-0.43	-1.93	-0.44	**4.53**	-3.62	-6.14	-1.31
K2O	***-2.45***	*0.31*	*-2.76*	***-11.67***	*0.31*	*0.00*	*0.31*	*-6.08*	*0.46*	***0.62***	*14.14*	*-2.30*	*-1.23*
P2O5	**-1.02**	0.59	-0.34	*	0.80	0.18	-4.11	-2.13	-0.28	**-4.81**	-2.96	0.32	3.88
LOI	*16.64*	*-1.82*	*-2.60*	***-55.16***	*0.17*	*-0.64*	*-2.71*	*	*0.72*	**5.75**	*2.49*	*1.81*	*2.04*
As	***-2.31***	*	*	*	*	*-0.37*	*	*-5.44*	*8.25*	***-0.73***	*	*6.92*	*-2.33*
Ba	**0.59**	*	*	*	*	3.36	44.49	8.38	0.43	**3.03**	*	-6.30	0.87
Be	*	*	*	*	*	-0.69	*	*	0.62	*	*	-2.73	*
Bi	*	*	*	*	*	-0.41	*	142.28	0.65	*	*	*	*
C(tot)	*	*	*	*	*	*0.63*	*	*	*0.42*	*	*	*	*
Ce	**-4.42**	*	*	**3.02**	*	-1.60	*	15.14	2.01	**-0.71**	*	-4.23	*
Co	**-1.49**	*	*	*	*	0.47	*	*	-0.10	*	*	-1.92	1.84
Cr	**1.84**	*	*	*	*	0.28	*	0.83	0.14	**-1.11**	*	-1.87	0.56
Cs	**1437.62**	*	*	*	*	0.00	*	*	*	**2639.72**	*	*	*
Cu	***11.13***	*	*	*	*	*0.89*	*	*15.34*	*0.21*	***37.53***	*	*	*1.86*
Dy	*	*	*	**0.23**	*	-1.28	*	9.19	0.92	*	*	-1.94	*
Er	*	*	*	**-0.32**	*	-0.82	*	*	1.41	*	*	-1.20	*
Eu	*	*	*	**1.93**	*	-1.12	*	*	0.74	*	*	-1.74	*
Gd	*	*	*	**5.53**	*	-1.23	*	15.43	1.25	*	*	-1.34	*
Hf	*	*	*	*	*	1.86	*	*	*	*	*	*	*
Ho	*	*	*	**0.03**	*	-0.88	*	*	0.87	*	*	-1.46	*
In	*	*	*	*	*	*	*	*	*	*	*	*	*
La	***-2.01***	*	*	***3.53***	*	*-1.64*	*	*10.89*	*1.49*	***2.32***	*	*-3.08*	*
Li	*	*	*	*	*	*	*	*	1.05	*	*	*	*
Lu	*	*	*	**0.04**	*	-1.08	*	*	0.51	*	*	-0.63	*
Mo	**3.21**	*	*	*	*	0.21	*	*	0.21	**115.65**	*	13.34	*
Nb	**7.91**	*	*	*	*	-0.84	*	3.10	-2.64	**0.00**	*	*	*
Nd	**-2.45**	*	*	**5.13**	*	-1.78	*	15.21	1.91	*	*	-3.56	*
Ni	***6.86***	*	*	*	*	*-0.07*	*	*47.82*	*0.34*	***13.37***	*	*-4.50*	*-2.23*
Pb	**-1.75**	*	*	*	*	0.30	*	-0.22	1.84	**-0.31**	*	5.09	-0.47
Pr	*	*	*	**0.88**	*	-1.37	*	4.05	1.21	*	*	-2.18	*
Rb	***0.45***	*	*	*	*	*0.39*	*	*11.61*	*1.14*	***12.96***	*	*-2.12*	*
Sb	***6.51***	*	*	*	*	*0.79*	*	*	*-2.23*	*	*	*	*
Sc	**30.78**	*	*	*	*	-0.65	*	*	-1.05	**42.19**	*	*	7.51
Sm	**-3.53**	*	*	**-0.56**	*	-1.47	*	30.70	0.90	*	*	-2.36	*
Sn	*	*	*	*	*	*	*	*	*	*	*	*	*
Sr	**-1.73**	*	*	*	*	0.57	-0.35	-1.95	1.06	**-1.38**	*	*	-1.15
Ta	*	*	*	*	*	*	*	*	*	*	*	*	*
Tb	*	*	*	**3.51**	*	-0.87	*	*	0.68	*	*	-0.88	*
Th	*	*	*	*	*	-1.08	*	-1.13	0.65	**87.21**	*	-0.87	*
Tl	*	*	*	*	*	*	*	*	0.25	*	*	*	*
Tm	*	*	*	**-0.50**	*	-0.83	*	*	0.88	*	*	-1.18	*
U	**-1.93**	*	*	*	*	-0.44	*	-3.35	0.99	**6.47**	*	-0.96	0.78
V	**2.32**	*	*	*	*	0.44	*	6.87	-0.65	**6.87**	*	-11.90	0.59
W	**54.94**	*	*	*	*	3.04	*	*	1.12	*	*	*	*
Y	**-2.14**	*	*	**-5.45**	*	-0.36	*	-2.65	-0.13	**0.15**	*	0.82	-0.64
Yb	**-3.30**	*	*	**0.24**	*	-1.10	*	*	1.44	**-16.31**	*	-1.46	*
Zn	**2.82**	*	*	*	*	1.09	*	-2.76	0.13	**0.00**	*	-1.00	-0.64
Zr	***0.98***	*	*	*	*	*-0.01*	*	*-3.38*	*-10.16*	***-2.44***	*	*	*-2.26*

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

Table 3 - GeoPT46A Z-scores for Phosphate rock, POLC-1. 11/12/2019

Lab Code	G19	G20	G21	G22	G23	G24	G25	G26	G27	G28	G29	G30	G31
SiO2	**-1.33**	3.30	5.88	**0.06**	**0.00**	-2.29	**-1.66**	-1.85	**-4.92**	**-1.94**	0.61	0.47	-0.19
TiO2	***-0.82***	*-0.29*	*2.05*	***-0.82***	***-1.55***	*	***-0.82***	*-1.15*	***6.56***	***-2.27***	*1.64*	*0.21*	*-0.41*
Al2O3	**-4.97**	1.91	5.21	**-0.99**	**2.48**	-3.35	**-1.49**	-0.50	**13.41**	**-0.47**	-1.24	1.99	-0.12
Fe2O3T	**-4.78**	-4.41	4.52	**-0.74**	**-0.17**	-0.26	**-1.41**	-1.44	**16.57**	**-2.37**	1.40	-0.76	-0.31
MnO	**-3.99**	-1.53	1.71	**1.10**	**-0.29**	0.55	**-0.75**	-0.84	**5.26**	**-1.84**	1.10	-13.62	-0.14
MgO	**0.00**	2.72	9.22	**2.31**	**-1.38**	0.23	**-1.84**	-0.92	**11.07**	**-1.24**	-1.84	-0.23	0.46
CaO	**-1.22**	1.36	-3.75	**1.97**	**-0.41**	*	**-0.71**	-0.65	**-1.50**	**-2.41**	2.14	-0.25	-4.92
K2O	***0.62***	*7.53*	*0.31*	*-1.23*	***-2.45***	*-4.45*	***-2.45***	*-1.23*	***3.69***	***-1.35***	*0.62*	*-2.30*	*-1.84*
P2O5	**-0.25**	-0.44	-1.36	**-2.31**	**2.06**	*	**-0.28**	-0.12	**-6.38**	**-4.65**	3.24	47.49	4.50
LOI	***-3.54***	*	*-0.61*	***-0.88***	***2.21***	*-0.06*	***1.88***	*	***7.74***	***-1.22***	*0.88*	*1.88*	*-0.39*
As	***0.42***	*0.08*	*	*-1.55*	*	*	***-6.24***	*	***-0.34***	*	*1.68*	*0.42*	*
Ba	**6.57**	1.05	-0.28	1.64	**-4.54**	*	**1.49**	-0.54	**3.94**	*	-0.92	*	*
Be	**0.27**	-0.24	0.24	*	*	*	*	*	*	*	1.54	*	*
Bi	**0.68**	0.00	*	*	*	*	*	*	*	*	-0.41	*	*
C(tot)	*	*	*	*	*	*	*	*0.00*	*	***0.00***	*	*	*
Ce	**1.17**	1.93	0.23	-3.00	**-0.75**	*	**6.15**	-0.39	**0.28**	*	1.63	*	*
Co	**-1.23**	-0.19	-0.17	*	**2.24**	*	**5.83**	*	**4.90**	*	1.02	-4.62	*
Cr	**2.85**	-0.39	-0.56	*	**-4.45**	*	**7.79**	-0.28	**3.39**	*	0.28	-4.45	*
Cs	**0.98**	-0.98	0.00	*	**-1.47**	*	*	*	**873.36**	*	-0.74	*	*
Cu	***-1.65***	*-0.17*	*0.02*	*13.13*	***4.65***	*	***-2.87***	*-0.49*	***1.17***	*	*-0.11*	*-4.72*	*
Dy	**1.16**	1.09	-0.12	*	**-4.71**	*	*	*	*	*	-1.33	*	*
Er	**1.70**	1.46	-0.03	*	**-1.54**	*	*	*	*	*	-1.58	*	*
Eu	**1.01**	0.73	*	*	**-1.59**	*	*	*	*	*	-0.29	*	*
Gd	**2.37**	1.78	*	*	**-0.66**	*	*	*	*	*	-0.01	*	*
Hf	**1.54**	*	*	*	**3.06**	*	*	*	*	*	-0.79	*	*
Ho	**1.48**	0.76	-0.13	*	**-1.44**	*	*	*	*	*	-1.17	*	*
In	*	*	*	*	*	*	*	*	*	*	*	*	*
La	***1.43***	*1.98*	*0.25*	*	***-1.93***	*	***7.57***	*-1.57*	***1.39***	*	*1.25*	*	*
Li	**-0.40**	-3.42	0.78	*	*	*	*	*	*	*	-1.34	*	*
Lu	**0.71**	0.53	-0.04	*	**-2.07**	*	*	*	*	*	-1.06	*	*
Mo	**0.62**	*	-0.37	*	**21.95**	*	**-2.14**	*	**2.14**	*	-1.29	*	*
Nb	**-0.02**	*	*	**12.82**	-1.96	*	**0.00**	*	**-6.84**	*	-0.31	*	*
Nd	**1.93**	2.48	0.20	*	**-4.64**	*	**-0.05**	*	**-0.26**	*	2.51	*	*
Ni	***0.40***	*-0.32*	*-0.31*	*13.88*	***12.00***	*	***-1.71***	*-2.23*	***-6.03***	*	*-1.14*	*-3.94*	*
Pb	**-0.56**	1.61	-0.69	*	**-4.31**	*	**0.00**	*	**2.56**	*	2.03	-4.37	*
Pr	**2.25**	2.00	0.04	*	**-1.46**	*	*	*	*	*	-0.82	*	*
Rb	***0.65***	*-0.63*	*-0.53*	*0.06*	*-1.54*	*	***3.34***	*	***8.47***	*	*1.95*	*	*
Sb	***21.97***	*0.02*	*-1.69*	*	*	*	***-4.36***	*	*	*	*0.02*	*	*
Sc	**-1.42**	-0.15	0.17	*	**0.23**	*	*	*	**161.97**	*	1.18	*	*
Sm	**1.30**	0.68	0.07	*	**-2.62**	*	**0.31**	*	**-4.86**	*	1.46	*	*
Sn	***3.08***	*5.07*	*-0.89*	*	*	*	*	*	*	*	*-0.72*	*	*
Sr	**2.15**	1.64	-0.12	**0.09**	**-0.09**	*	**-1.01**	*	**-1.50**	*	1.35	*	*
Ta	***2.86***	*	*	*	***-0.74***	*	*	*	*	*	*0.11*	*	*
Tb	**1.18**	1.08	*	*	**-1.76**	*	*	*	*	*	1.01	*	*
Th	**-2.68**	0.49	-0.40	*	**-0.97**	*	**-1.78**	*	**-3.88**	*	0.36	*	*
Tl	**2.44**	*	0.00	*	*	*	*	*	*	*	0.00	*	*
Tm	**0.97**	0.62	0.07	*	**-1.36**	*	*	*	*	*	0.61	*	*
U	**0.47**	-0.42	-0.13	*	**-1.09**	*	**-0.53**	*	**1.36**	*	-0.07	*	*
V	**1.91**	0.01	-0.12	**1.48**	**1.19**	*	**3.58**	-0.15	**5.40**	*	0.90	-5.24	*
W	**0.72**	-0.25	*	*	**1.32**	*	**139.08**	*	**160.37**	*	0.38	*	*
Y	**-0.15**	1.55	-0.33	**2.57**	**0.00**	*	**-0.31**	-0.46	**-0.75**	*	-2.04	*	*
Yb	**0.90**	1.11	0.40	*	**-3.14**	*	**-0.25**	*	*	*	-0.40	*	*
Zn	**2.01**	-0.00	0.90	0.64	**1.92**	*	**0.64**	0.32	**3.33**	*	-1.57	-5.13	*
Zr	***-1.30***	*	*9.40*	***2.14***	***3.81***	*	***-0.36***	*-1.22*	***0.39***	**-22.83**	*-1.67*	*	*

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

Table 3 - GeoPT46A Z-scores for Phosphate rock, POLC-1. 11/12/2019

Lab Code	G32	G34	G35	G36	G38	G39	G40	G41	G42	G43	G44	G47	G48
SiO2	-3.26	**-6.96**	-1.27	**-1.16**	**-0.94**	0.19	**-8.07**	-0.33	-0.08	-1.27	-2.10	-0.44	**-9.56**
TiO2	*3.28*	***-3.28***	*-0.41*	***-0.82***	***-0.82***	*0.82*	***4.10***	*0.82*	*-2.87*	*	*3.16*	*-1.64*	***-15.57***
Al2O3	19.49	**-0.99**	-0.12	**0.00**	**0.50**	0.12	**4.72**	-0.12	-0.74	-1.24	0.05	1.49	**-10.92**
Fe2O3T	10.81	**1.85**	-0.87	**-0.85**	**2.41**	-0.26	**0.61**	-0.59	1.49	-0.09	-3.82	0.70	**15.00**
MnO	-2.69	**-5.84**	-0.14	**-0.29**	**-1.21**	0.32	**3.41**	0.09	4.71	*	-3.13	0.32	**14.98**
MgO	17.75	**19.83**	-0.23	**0.00**	**1.84**	0.23	**4.15**	-0.92	1.61	-0.23	-0.42	-1.61	**2.77**
CaO	1.51	**1.24**	0.18	**-1.28**	**0.41**	0.41	**3.78**	-0.66	1.73	-0.53	-0.58	0.81	**3.63**
K2O	*0.31*	***3.69***	*-1.23*	***0.62***	***6.77***	*0.31*	***3.69***	*0.31*	*-1.23*	*0.31*	*-2.76*	*3.38*	***-2.45***
P2O5	-3.78	**3.08**	-0.28	**-0.28**	**1.91**	0.76	**2.40**	0.45	0.89	0.15	-0.28	0.12	**4.50**
LOI	*0.50*	***1.88***	*-3.32*	***6.30***	***0.11***	*-2.16*	*0.77*	*-3.15*	*-0.61*	*-0.17*	*-1.05*	*-1.38*	***2.10***
As	*-3.95*	*	*-3.77*	***-1.44***	***-1.60***	*0.58*	*	*	*-1.94*	*	*	*	*
Ba	-4.45	**-3.13**	4.19	**-1.46**	**-1.07**	-0.09	**7.39**	*	1.00	*	-6.76	*	**0.98**
Be	-3.87	*	-1.46	**-0.55**	**0.48**	-0.72	*	*	*	*	*	*	**-0.07**
Bi	-1.71	*	*	**0.82**	*	-0.61	*	*	*	*	*	*	*
C(tot)	*	*	*	*	*	*-0.42*	*	*	*-2.32*	*	*	*	*
Ce	-6.24	**-5.74**	10.69	**-1.50**	**-1.05**	-0.52	**0.04**	*	-0.57	*	*	*	**8.44**
Co	-3.55	**-4.94**	-1.46	**-0.06**	**0.02**	0.08	*	*	1.77	*	2.92	*	**-0.34**
Cr	-3.89	**1.67**	-1.34	**1.72**	**0.28**	-0.11	*	*	5.62	*	-0.28	*	**-0.33**
Cs	-0.74	*	26.48	**-0.49**	*	0.74	*	*	1300.23	*	*	*	**-4.91**
Cu	*-4.49*	***-0.05***	*-3.08*	***2.68***	***0.23***	*0.26*	***24.38***	*	*2.18*	*	*-1.43*	*	***-2.49***
Dy	-6.01	**-3.97**	7.15	**-1.05**	**-0.33**	0.56	*	*	*	*	*	*	**-0.45**
Er	-4.04	**-3.83**	7.14	**-1.92**	**0.16**	0.77	*	*	*	*	*	*	**-0.53**
Eu	-3.37	**-3.76**	2.68	**-0.40**	**-0.30**	0.69	*	*	*	*	*	*	**-0.60**
Gd	-4.09	**-4.53**	6.34	**-2.06**	**-0.17**	0.46	*	*	*	*	*	*	**0.07**
Hf	-3.73	*	-0.23	**-0.35**	**-0.73**	-6.33	*	*	*	*	*	*	**1.07**
Ho	-3.02	**-3.68**	6.10	**-0.38**	**-0.03**	0.52	*	*	*	*	*	*	**-0.03**
In	*	*	*	*	*	*1.21*	*	*	*	*	*	*	*
La	*-6.01*	***-4.01***	*4.58*	***-0.44***	***-1.25***	*-2.65*	***-1.05***	*	*-1.29*	*	*	*	***6.83***
Li	-3.19	*	11.70	**2.12**	*	-0.26	*	*	*	*	*	*	*
Lu	-2.89	**0.84**	5.95	**-0.66**	**-0.53**	0.40	*	*	*	*	*	*	**0.26**
Mo	3.21	*	-1.40	**0.54**	**0.00**	-0.75	*	*	4.82	*	*	*	*
Nb	0.00	*	*	**-2.48**	**-0.66**	-0.89	*	*	-3.10	*	10.69	*	**0.38**
Nd	-5.71	**-4.49**	4.50	**-1.21**	**-0.48**	1.18	**-1.65**	*	-1.97	*	*	*	**0.90**
Ni	*-2.91*	***-1.03***	*-2.24*	***-0.21***	***-0.55***	*-0.17*	*	*	*-2.26*	*	*18.68*	*	***3.91***
Pb	-8.43	*	3.45	**0.78**	**1.09**	0.31	*	*	-1.80	*	-0.62	*	**4.75**
Pr	-4.45	**-6.59**	4.03	**-0.77**	**-0.61**	0.76	*	*	*	*	*	*	**0.88**
Rb	*-1.54*	***67.49***	*22.72*	***-0.42***	***-0.51***	*2.07*	*	*	*1.99*	*	*-4.75*	*	***-2.85***
Sb	*-2.43*	*	*2.86*	***-0.80***	***2.07***	*-1.17*	*	*	*-3.17*	*	*	*	*
Sc	-2.46	**-4.92**	11.14	**0.70**	**-0.03**	0.98	*	*	3.07	*	*	*	**-0.19**
Sm	-3.99	**-3.56**	3.58	**-0.71**	**0.48**	0.54	*	*	-0.23	*	*	*	**0.61**
Sn	*-1.30*	*	*1.81*	***-0.35***	***0.89***	*-0.59*	*	*	*	*	*	*	*
Sr	-3.54	**-3.50**	2.94	**0.09**	**-0.09**	0.18	**3.13**	0.53	-1.48	*	-0.12	-0.02	*
Ta	*0.00*	*	*0.87*	***1.11***	***3.32***	*-3.32*	*	*	*	*	*	*	***1.47***
Tb	-3.55	**-3.06**	5.45	**-1.37**	**-0.72**	0.46	*	*	*	*	*	*	**0.72**
Th	-5.66	**14.40**	15.40	**-0.16**	**0.16**	0.44	*	*	0.73	*	-0.89	*	**-0.65**
Tl	-1.69	*	3.34	*	*	-0.20	*	*	*	*	*	*	*
Tm	-2.89	**-2.86**	5.66	**-0.75**	*	0.51	*	*	*	*	*	*	**1.21**
U	-7.27	**-6.13**	6.01	**-0.81**	**0.10**	0.26	*	*	0.29	*	*	*	**1.36**
V	-3.14	**-3.30**	-1.42	**-0.19**	**0.32**	0.40	**2.98**	*	-0.26	*	-7.18	*	**-5.48**
W	-0.41	*	1.69	**0.30**	**-4.36**	1.17	*	*	15.81	*	*	*	*
Y	-4.97	**-9.21**	17.18	**1.54**	**0.67**	0.69	**3.24**	*	-1.09	*	15.93	-5.48	**13.58**
Yb	-3.74	**-3.46**	7.88	**-1.13**	**-0.41**	-0.04	*	*	-0.24	*	*	*	**0.32**
Zn	-6.09	**-3.21**	-2.15	**2.24**	**-1.35**	-0.48	*	*	0.03	*	-9.62	*	**-4.68**
Zr	*-4.84*	***5.06***	*-1.57*	***-0.56***	***0.52***	*-11.07*	*	*	*-1.70*	*	*52.92*	*	***0.31***

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

Table 3 - GeoPT46A Z-scores for Phosphate rock, POLC-1. 11/12/2019

Lab Code	G49	G50	G53	G55	G56	G58	G59	G60	G61	G62	G65	G66	G67
SiO2	0.55	*	-2.07	0.28	0.75	**0.44**	**-0.39**	0.20	0.21	2.07	0.06	*	-0.52
TiO2	*-0.78*	*	*0.82*	*-1.69*	*3.28*	***1.22***	***6.56***	*-0.56*	*1.44*	*-0.65*	*0.82*	*	*0.26*
Al2O3	-0.15	**-2.98**	8.94	-1.08	0.99	**0.25**	**-0.25**	-0.47	1.92	-0.99	-0.74	*	-0.70
Fe2O3T	-0.71	**0.84**	0.08	-0.38	0.92	**0.39**	**-0.62**	-0.09	-1.07	-0.10	-0.14	*	-0.63
MnO	-0.07	**1.56**	*	-2.09	-1.76	**2.03**	**0.64**	0.14	-0.19	0.71	0.32	*	-0.42
MgO	0.62	**-2.31**	5.76	-1.61	0.00	**-0.46**	**4.15**	-0.03	-0.12	-0.05	0.00	*	-0.09
CaO	0.07	**-5.00**	-1.51	-0.89	0.41	**0.06**	**-2.59**	0.66	-0.69	-0.72	0.52	*	0.04
K2O	*0.92*	***-2.45***	*1.85*	*	*0.31*	***-5.52***	***3.69***	*-0.26*	*-0.46*	*-2.61*	*0.31*	*	*0.60*
P2O5	-0.21	*	0.96	0.19	1.31	-2.74	**-0.86**	1.72	-1.40	-0.63	0.18	*	*
LOI	*-0.16*	*	*-3.70*	*-1.77*	***0.99***	***3.10***	***3.21***	*-2.84*	*1.22*	*	*-3.65*	*	*-2.10*
As	*1.64*	*	*	*2.45*	*	*	***3.05***	*0.18*	*0.01*	*-0.74*	*0.11*	*0.80*	*
Ba	-1.56	**1.12**	-0.73	-0.37	-9.77	**-1.52**	**0.08**	-0.43	-0.98	0.07	-1.37	1.90	-0.79
Be	*	*	0.58	*	*	**2.12**	**-0.69**	-0.44	2.38	-0.06	-0.58	-0.75	*
Bi	*	*	*	1.49	*	*	*	*	-0.20	0.04	0.41	-0.41	*
C(tot)	*	*	*	*0.00*	*	*	***-4.65***	*1.15*	*	*	*0.63*	*	*-20.48*
Ce	-3.07	**6.60**	-0.75	0.26	7.75	**-0.57**	**-1.87**	-0.17	0.37	2.23	-1.22	*	*
Co	*	**0.02**	0.04	-0.56	**-0.63**	**-0.07**	**-0.70**	1.07	0.73	0.69	-0.10	-0.86	*
Cr	21.98	**1.07**	-0.56	0.06	-2.23	**-3.68**	**1.17**	1.19	-0.87	1.45	-0.56	-1.38	*
Cs	*	**-0.05**	0.25	-0.15	*	**-0.83**	*	0.10	5.40	-0.29	0.25	-0.37	*
Cu	*2.51*	***-0.09***	*0.92*	*-0.26*	***6.53***	***8.25***	***0.61***	*-0.33*	*0.59*	*1.24*	*-0.02*	*54.47*	*
Dy	*	**-0.72**	-0.49	1.27	*	**-1.29**	**-0.39**	-0.28	0.53	0.89	0.21	1.27	*
Er	*	**-1.16**	-0.59	1.64	*	**-1.31**	**0.79**	0.00	-0.08	1.09	0.26	1.21	*
Eu	*	**-0.83**	-0.50	0.77	*	**-0.58**	**-0.70**	0.00	-0.10	0.34	-0.64	0.76	*
Gd	*	**-0.17**	-1.06	1.13	*	**-1.08**	**0.80**	0.00	-0.55	1.05	-0.02	3.15	*
Hf	16.73	**2.96**	-0.89	*	*	**-0.15**	**1.73**	-1.07	*	-0.47	-6.09	*	*
Ho	*	**-0.28**	-0.49	1.11	*	**-1.11**	**-0.50**	-0.03	-0.54	0.42	0.84	0.61	*
In	*	*	*	*	*	*	*	*-0.09*	*0.00*	*	*0.17*	*	*
La	*-2.24*	***5.47***	*-0.86*	*0.32*	*-1.43*	***0.14***	***-0.71***	*0.09*	*-0.04*	*0.08*	*-2.31*	*	*
Li	*	*	-0.26	0.03	**1.26**	*	*	-0.77	3.04	-0.16	-0.77	-2.63	*
Lu	*	**0.26**	-0.51	0.85	*	**-0.71**	**-0.35**	-0.22	-0.34	0.25	0.09	0.07	*
Mo	*	**-0.54**	0.00	-0.41	*	**-6.03**	**-3.21**	-0.64	*	0.48	-0.32	-0.43	*
Nb	*	**0.28**	-2.46	1.50	*	**-1.82**	**-2.37**	-0.53	*	-0.46	0.00	-7.30	*
Nd	0.05	**-0.53**	-1.15	0.52	*	**-0.69**	**-1.07**	0.38	0.34	0.28	-0.13	2.20	*
Ni	*1.99*	***4.90***	*-0.51*	*-0.17*	***1.71***	***7.08***	***-0.21***	*1.03*	*7.41*	*1.37*	*-0.51*	*30.68*	*
Pb	-0.67	**1.34**	-0.31	0.02	**-7.80**	**-0.45**	**1.03**	0.83	0.45	-5.40	-0.47	0.00	0.59
Pr	*	**-0.24**	-0.46	0.41	*	**-1.41**	**-2.57**	-0.01	0.54	0.79	-0.36	1.60	*
Rb	*1.11*	***0.03***	*-0.42*	*-0.21*	*	***-0.16***	*	*-0.38*	*2.22*	*1.80*	*-0.10*	*	*
Sb	*-1.91*	*	*-0.45*	*	*	***4.64***	***-8.31***	*0.04*	*	*0.00*	*-2.28*	*0.04*	*
Sc	*	**1.39**	-0.19	1.42	*	*	*	-0.08	-0.89	-0.17	-0.19	0.01	*
Sm	*	**-0.84**	-0.67	0.71	*	**-0.78**	**-0.44**	-0.04	0.06	-0.31	-0.38	1.45	*
Sn	*	*	*	*	*	*	*	*-0.07*	*	*1.16*	*1.47*	*-0.57*	*
Sr	0.02	**4.76**	0.37	0.71	-11.66	**-0.07**	*	-0.15	2.83	-1.07	1.45	*	0.32
Ta	*	***2.40***	*	*0.05*	*	***-7.04***	***-8.48***	*-0.60*	*	*-0.17*	*-1.47*	*	*
Tb	*	**-0.03**	-0.49	0.72	*	**-0.34**	**0.07**	-0.38	-0.00	-0.12	0.00	1.01	*
Th	-0.32	**-0.13**	-0.08	1.67	*	**-0.21**	**0.49**	-0.22	1.13	8.03	-0.36	0.24	*
Tl	*	*	0.00	*	*	**-0.34**	**0.00**	0.04	0.28	0.11	0.00	-0.17	*
Tm	*	**0.16**	-0.62	0.67	*	**-1.11**	**0.33**	-0.17	-0.46	-0.09	0.05	0.26	*
U	-1.11	**-0.16**	-1.67	1.62	*	**-0.18**	**0.73**	0.07	1.58	-7.65	1.06	-0.27	*
V	5.67	**0.10**	-0.15	-0.04	**0.89**	**-0.11**	**2.26**	0.67	-0.39	0.66	-1.05	*	-1.92
W	*	*	-0.41	11.33	*	**0.79**	*	-0.44	*	-0.35	-0.41	-2.34	*
Y	-2.21	**7.75**	-0.98	0.72	*	**0.70**	**-5.15**	0.12	1.43	0.31	0.00	*	*
Yb	*	**0.18**	-0.52	1.28	*	**-0.93**	**0.96**	-0.22	-0.35	0.77	-0.44	0.40	*
Zn	1.15	**-2.39**	*	5.00	**54.51**	**5.77**	**-1.22**	-0.59	-0.54	0.26	-1.28	-1.22	*
Zr	*-3.88*	***-1.47***	*-0.18*	*	*205.12*	***-4.01***	***0.02***	*-0.66*	*	*-1.64*	*0.66*	*-7.28*	*2.38*

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

Table 3 - GeoPT46A Z-scores for Phosphate rock, POLC-1. 11/12/2019

Lab Code	G68	G70	G71	G72	G74	G75	G76	G77	G78	G79	G80	G82	G84
SiO2	-0.03	1.52	-27.46	-0.83	2.68	*	0.97	2.43	-0.33	*	0.29	-0.08	1.55
TiO2	-0.29	0.58	-13.11	-1.80	6.97	*	0.45	0.17	-10.41	*	-1.27	-0.65	0.82
Al2O3	0.37	0.22	-24.33	5.71	-5.09	*	1.70	0.50	-3.62	*	-0.12	-0.50	-0.37
Fe2O3T	-0.42	0.02	1.17	2.07	-2.33	*	3.32	1.06	-0.04	*	-0.34	-1.15	0.03
MnO	1.59	*	-6.30	1.10	-23.50	*	1.64	1.56	1.56	3.81	-2.22	-0.61	-0.37
MgO	-0.23	0.83	*	0.28	2.08	*	1.48	-2.31	-0.42	*	-0.30	-0.23	1.38
CaO	0.05	0.35	-9.14	5.66	-4.84	*	0.70	2.59	1.51	*	-1.27	-0.22	-3.54
K2O	-2.30	-1.53	6.77	-6.45	3.38	*	1.69	-0.92	0.31	*	-1.38	1.54	6.45
P2O5	0.18	1.16	-23.14	-0.96	0.22	*	0.40	0.25	-0.02	*	5.94	0.23	0.00
LOI	0.00	0.32	3.32	8.63	0.83	*	1.60	5.53	-5.97	*	0.28	-0.77	-1.05
As	-0.56	*	*	*	*	*	0.31	*	2.28	1.09	*	-0.88	*
Ba	-2.53	*	*	-1.71	-6.57	0.04	1.26	*	-3.11	0.91	-0.15	-0.41	0.95
Be	*	*	*	1.58	*	0.00	*	*	6.23	*	*	*	-0.10
Bi	*	*	*	*	*	*	*	*	31.80	*	*	*	*
C(tot)	*	0.00	*	*	*	*	-0.43	-3.38	*	*	*	*	*
Ce	0.81	*	*	-31.37	*	-0.19	1.00	*	4.64	1.35	0.64	-0.20	1.03
Co	0.22	*	*	-0.07	-6.78	-0.06	0.92	*	6.24	1.38	-2.83	*	0.58
Cr	-0.42	*	58.98	-0.67	5.01	-0.45	-0.65	*	-4.74	1.36	1.39	0.83	0.58
Cs	*	*	*	*	*	0.00	*	*	2.45	*	*	*	2.45
Cu	0.68	*	99.54	-0.56	1.39	-0.49	6.52	*	6.05	-4.72	-1.90	2.33	0.16
Dy	0.37	*	*	0.30	*	0.21	0.59	*	3.73	*	-2.43	*	-0.15
Er	0.34	*	*	-0.26	*	0.24	0.92	*	3.39	*	-0.05	*	-0.40
Eu	0.25	*	*	1.52	*	0.39	0.44	*	3.22	*	*	*	-0.00
Gd	0.88	*	*	0.07	*	0.16	1.01	*	5.18	*	-1.54	*	-0.57
Hf	*	*	*	-3.57	*	-0.55	0.00	*	-2.18	*	12.37	*	2.43
Ho	0.16	*	*	0.60	*	0.22	0.36	*	4.53	*	-4.79	*	0.34
In	*	*	*	*	*	*	*	*	0.69	*	*	*	*
La	0.65	*	*	0.16	-13.69	-0.73	0.80	*	4.21	2.07	-1.64	-0.79	0.45
Li	*	*	*	*	*	0.60	*	*	1.82	*	7.00	*	*
Lu	0.42	*	*	1.10	*	-0.13	0.25	*	2.71	*	*	*	-0.02
Mo	*	*	*	0.54	*	*	1.76	*	3.86	0.37	*	*	1.07
Nb	-0.21	*	*	2.14	19.23	0.10	0.30	*	-2.07	*	*	*	0.43
Nd	-1.26	*	*	1.99	*	-0.10	1.06	*	4.29	*	-0.35	*	0.17
Ni	0.17	*	10.63	-0.36	-3.94	-0.03	-1.92	*	6.03	-0.15	-4.63	0.79	1.23
Pb	-2.19	*	2.19	5.43	-5.93	0.73	2.01	*	-2.08	0.24	*	-0.34	-3.20
Pr	0.11	*	*	1.01	*	-0.60	0.48	*	1.92	*	-0.85	*	0.24
Rb	1.35	*	3.34	-0.77	118.75	0.00	2.40	*	4.94	1.97	*	*	2.79
Sb	-3.91	*	*	*	*	*	0.24	*	4.59	*	*	*	*
Sc	-0.29	*	*	*	*	-0.10	0.30	*	7.35	7.42	*	*	0.09
Sm	0.11	*	*	0.86	*	0.17	0.76	*	4.29	*	1.81	*	-0.08
Sn	*	*	*	*	*	*	*	*	15.27	*	*	*	0.44
Sr	-0.55	*	-5.47	-4.32	-6.39	0.46	1.28	-2.67	-2.25	-0.73	-0.69	-0.74	-0.19
Ta	*	*	*	1.70	*	0.18	-0.42	*	10.32	*	*	*	0.37
Tb	0.16	*	*	0.98	*	0.16	-0.02	*	0.80	*	-1.53	*	-0.10
Th	1.05	*	*	0.08	*	0.49	0.93	*	4.92	-0.62	*	*	0.49
Tl	*	*	*	*	*	*	*	*	1.46	*	*	*	-1.97
Tm	0.41	*	*	*	*	0.26	0.37	*	2.99	*	*	*	-0.29
U	0.40	*	-0.53	1.78	*	0.22	0.99	*	8.43	0.50	*	-1.14	-0.09
V	0.86	*	-2.10	-0.84	2.83	-0.26	1.86	*	-0.58	1.99	*	-0.14	0.94
W	*	*	169.50	4.05	*	*	*	*	13.89	*	*	*	1.62
Y	-0.80	*	-9.06	1.18	*	0.21	0.96	-0.67	-0.56	0.33	-1.36	-0.64	1.65
Yb	0.56	*	*	2.31	*	0.64	0.53	*	2.94	*	-0.12	*	-0.04
Zn	0.48	*	10.26	-1.13	4.81	-1.35	-0.20	*	-2.30	0.42	0.96	0.42	0.73
Zr	0.34	*	6.72	-13.57	6.49	-1.26	-1.27	*	-11.42	-0.20	12.94	-1.01	1.76

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

Table 3 - GeoPT46A Z-scores for Phosphate rock, POLC-1. 11/12/2019

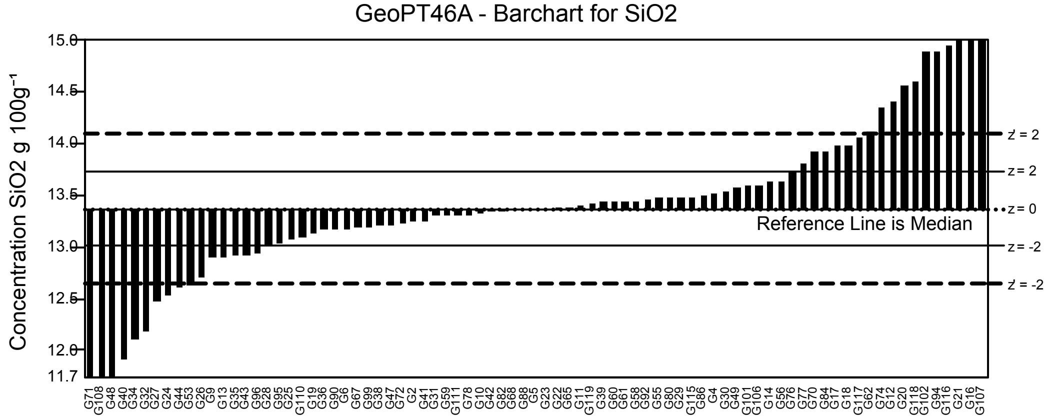
Lab Code	G86	G88	G90	G92	G94	G95	G96	G99	G101	G102	G103	G104	G106
SiO2	0.72	-0.04	-1.16	0.27	8.45	-1.88	-1.19	-0.52	1.27	4.19	*	*	0.64
TiO2	-3.28	-1.55	83.29	0.45	1.64	-0.82	-0.90	-0.41	1.15	-4.59	*	*	0.82
Al2O3	-0.50	-0.10	1.24	1.02	1.74	0.99	-0.25	-0.62	2.98	-11.01	*	*	0.74
Fe2O3T	0.39	-0.61	3.85	-0.36	-0.74	2.19	-1.38	0.08	0.28	1.94	*	*	1.15
MnO	8.04	-0.01	0.18	-0.35	3.41	*	-1.72	0.32	0.73	1.59	*	-0.29	0.55
MgO	2.77	-1.71	20.29	-1.38	0.46	5.07	-0.69	0.00	-2.31	3.00	*	*	1.15
CaO	2.41	0.94	-0.63	-0.00	3.18	-0.04	-2.80	-0.17	0.00	-0.72	*	*	1.16
K2O	0.62	-1.84	0.62	*	6.77	-2.45	1.85	-1.23	3.69	10.14	*	*	-1.23
P2O5	-0.03	-1.41	-1.38	2.02	-8.23	-0.74	-1.20	0.37	-1.36	-0.28	*	*	0.18
LOI	3.76	-1.28	6.74	-1.38	-1.33	2.54	2.16	-2.93	*	-1.93	*	*	0.00
As	-3.09	*	2.42	*	4.20	*	*	-0.37	3.20	15.53	*	*	*
Ba	0.21	-2.67	0.59	-0.70	-0.48	*	-1.37	-0.34	1.62	1.96	-2.39	0.34	-1.24
Be	*	0.64	*	-0.45	0.21	*	0.00	0.24	0.82	*	-2.01	0.14	*
Bi	*	*	*	*	*	*	*	*	*	293.11	3.42	*	*
C(tot)	*	*	*	*	*	-1.65	*	0.42	*	*	*	*	*
Ce	-8.85	-1.53	1.43	0.01	2.14	*	-0.92	-0.27	5.70	-0.76	0.35	0.87	-3.06
Co	-1.35	0.26	1.52	0.33	0.62	*	-2.11	-0.06	1.00	*	6.46	0.30	*
Cr	0.00	2.25	21.14	2.14	1.37	*	*	0.00	0.28	22.12	*	-0.83	-2.23
Cs	677.10	0.79	1854.67	*	-0.69	*	0.74	*	*	*	-0.34	0.00	*
Cu	-3.80	-1.17	-2.87	3.31	-1.48	*	-2.84	0.92	2.64	-5.47	-1.79	-1.64	*
Dy	*	-0.80	*	0.00	-0.29	*	0.49	-0.42	-1.36	11.99	-0.81	0.68	*
Er	*	-0.62	*	0.14	-0.57	*	0.36	0.06	0.05	*	-0.55	-0.27	*
Eu	*	0.21	*	-0.47	-0.23	*	0.50	-0.25	-1.39	*	-1.27	0.29	*
Gd	-16.17	-0.84	*	-1.41	-0.23	*	0.48	-0.41	0.07	*	-2.76	0.31	*
Hf	*	-4.06	*	0.54	0.08	*	*	0.06	*	*	-9.29	-7.36	*
Ho	*	-0.57	*	0.14	-0.09	*	0.49	-0.33	-1.10	*	-0.68	0.21	*
In	*	*	*	*	*	*	*	*	*	*	*	*	*
La	-6.30	-2.33	2.92	0.14	2.02	*	1.07	-0.35	3.93	-0.64	-2.08	1.44	-2.65
Li	*	-1.31	*	*	0.57	*	0.50	-0.39	0.70	*	1.06	-0.19	*
Lu	*	-0.60	*	-0.00	-0.99	*	0.26	-0.29	-0.00	*	-0.36	0.35	*
Mo	*	*	*	0.75	-0.66	*	0.16	-1.07	19.49	-4.82	-2.30	-0.43	*
Nb	2.14	-2.87	8.55	-1.02	0.02	*	11.75	-0.64	*	-4.06	*	-1.56	*
Nd	-6.54	0.01	-2.96	-0.07	1.39	*	1.26	0.05	-1.51	-1.07	-1.64	0.90	0.12
Ni	7.20	1.79	8.57	0.10	0.12	*	2.57	-0.51	12.15	4.04	5.39	0.07	4.97
Pb	3.43	-2.33	-6.24	0.16	-2.29	*	-1.40	0.47	-1.25	0.05	*	-1.22	7.18
Pr	*	0.33	*	0.01	1.60	*	1.38	-0.12	-1.26	*	-2.77	0.06	*
Rb	12.96	0.88	32.21	-0.24	-0.48	*	6.48	0.22	*	1.03	-1.16	0.32	*
Sb	*	*	*	*	4.34	*	0.29	0.29	*	*	-4.81	-3.22	*
Sc	*	-0.42	58.50	-0.65	2.78	*	1.44	0.26	0.15	10.22	0.21	-0.26	*
Sm	*	-0.23	*	-0.59	-0.71	*	0.53	-0.27	-1.88	5.64	-1.52	-2.65	*
Sn	*	*	*	*	1.26	*	*	*	*	*	-6.47	3.97	*
Sr	-3.77	-0.53	-1.29	0.07	1.00	*	-2.21	0.69	-1.93	0.15	0.83	0.60	-1.01
Ta	*	-1.97	*	*	-4.35	*	*	-0.37	*	*	-0.92	-4.79	*
Tb	*	-0.84	*	-0.05	-0.48	*	0.10	-0.34	0.62	*	-0.86	0.72	*
Th	1.46	-0.51	7.93	0.00	-0.19	*	-0.08	0.00	-1.41	-7.04	2.04	0.49	*
Tl	*	*	*	*	-0.06	*	0.56	0.28	0.56	299.39	*	-0.56	*
Tm	*	-0.62	*	-0.19	-0.03	*	0.52	-0.26	-1.07	*	-0.72	0.10	*
U	*	0.28	-1.93	-0.18	2.27	*	-0.97	0.26	-0.05	-1.35	3.51	-0.46	*
V	-0.01	1.68	*	0.43	1.03	*	-4.34	0.44	-3.22	-0.36	-2.37	0.50	5.67
W	*	*	*	*	0.00	*	*	*	*	*	*	0.71	*
Y	-8.70	-2.85	0.98	1.63	1.99	*	0.26	-0.57	3.19	-0.94	-0.92	-0.36	-2.65
Yb	*	-0.46	*	-0.24	-0.37	*	0.44	-0.18	0.04	10.32	-0.04	0.24	*
Zn	0.00	1.33	2.56	-0.06	-1.11	*	0.96	-0.32	-6.41	-1.83	-6.44	-3.46	1.92
Zr	3.39	-6.94	1.31	0.75	3.50	*	*	1.70	-7.43	2.40	-19.68	-15.89	2.32

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

Table 3 - GeoPT46A Z-scores for Phosphate rock, POLC-1. 11/12/2019

Lab Code	G107	G108	G109	G110	G111	G112	G113	G114	G115	G116	G117	G118	G119
SiO2	13.43	-26.52	*	-1.49	-0.17	*	*	*	0.30	4.34	1.88	6.80	0.14
TiO2	-5.73	1.89	*	-0.82	-0.41	*	*	6.44	2.05	1.44	0.33	-6.47	-0.41
Al2O3	-4.22	3.23	*	-1.99	0.87	*	*	-0.19	16.39	1.42	0.37	0.99	0.25
Fe2O3T	-3.77	1.17	*	1.62	0.14	*	*	2.32	6.60	0.78	-0.82	0.05	0.31
MnO	-3.52	1.01	*	0.18	-1.30	*	*	-0.96	7.03	-0.10	-0.86	-0.75	-6.50
MgO	0.92	1.38	*	0.46	0.23	*	*	-0.86	22.13	1.61	-0.69	3.69	-0.23
CaO	1.50	0.73	*	0.94	0.66	*	*	-2.23	0.95	-0.25	0.83	-1.73	0.53
K2O	*	0.62	*	0.62	0.31	*	*	5.81	3.38	-0.15	0.31	-23.96	-1.23
P2O5	2.53	-19.20	*	-2.71	0.25	*	*	-2.80	1.23	3.65	0.62	-6.41	1.16
LOI	-4.53	-4.09	*	0.33	-1.77	*	*	*	*	*	0.22	2.21	-2.82
As	*	*	-9.78	0.84	-0.88	*	17.65	-18.77	*	*	-1.55	4.62	3.81
Ba	6.88	-0.82	-3.38	0.98	1.13	-0.09	3.09	-0.10	4.53	0.35	0.23	-2.87	*
Be	-0.34	*	*	*	0.72	*	1.06	0.70	*	0.62	-0.10	-4.18	-2.16
Bi	2.45	*	*	*	*	*	-0.16	0.29	*	1.47	*	0.00	*
C(tot)	*	*	*	*	-4.22	*	*	*	*	-2.68	*	3.59	*
Ce	-3.64	-1.43	8.29	2.89	0.86	-0.28	1.65	-0.49	-6.13	0.03	0.30	-5.21	*
Co	-2.23	*	-7.45	0.09	0.55	*	3.70	0.66	*	1054.36	-1.03	-4.22	-1.75
Cr	6.69	2.23	-7.96	-0.56	*	*	-1.59	-0.45	*	1084.15	0.28	-7.68	5.01
Cs	*	-0.98	-1.47	*	*	0.49	1.18	-0.19	*	0.29	*	0.00	*
Cu	-0.69	8.41	-7.00	7.47	*	*	1.95	-0.15	57.76	-0.73	4.20	0.23	-0.68
Dy	-0.39	2.05	5.87	*	1.55	0.12	2.08	0.82	*	0.71	-0.36	-0.15	*
Er	-1.36	0.44	3.61	*	1.30	-0.51	1.76	0.04	*	-0.18	-0.69	0.69	*
Eu	-2.86	1.35	94.20	*	0.59	-0.15	1.68	0.11	*	0.09	0.39	-0.60	*
Gd	-0.90	0.53	15.34	*	-0.80	-2.18	2.53	-0.66	*	0.93	0.28	-0.17	*
Hf	*	0.79	*	*	37.94	4.28	-11.31	5.34	*	0.15	0.54	*	*
Ho	*	1.70	82.68	*	0.63	-0.43	1.55	0.03	*	0.34	-0.43	-0.15	*
In	-2.43	*	*	*	*	*	*	*	*	0.00	*	-1.04	*
La	-3.74	-0.54	5.61	4.07	0.82	-0.09	3.81	-0.81	-5.07	0.00	0.11	-5.49	*
Li	*	*	*	*	-1.41	*	0.39	-0.37	*	0.20	*	-1.29	*
Lu	-1.68	0.04	0.79	*	1.59	-0.35	0.92	-0.66	*	0.45	-0.09	-0.00	*
Mo	*	*	*	*	*	*	-6.18	-1.35	*	-0.18	*	2.46	*
Nb	*	-0.77	*	*	*	0.32	-15.28	0.18	121.81	1.10	0.00	0.26	*
Nd	-2.09	-0.02	8.48	-2.89	0.41	0.10	3.11	-0.27	-1.81	0.46	0.05	-0.63	*
Ni	-0.87	1.03	-7.47	1.03	*	*	3.28	3.66	*	1.40	-0.17	3.08	1.20
Pb	1.25	0.04	-1.87	0.00	0.05	*	1.72	-0.21	*	0.10	-1.25	0.62	-0.47
Pr	-3.24	-0.20	7.32	*	0.83	-0.09	2731.92	0.00	4.69	0.56	-0.18	-0.38	*
Rb	3.40	1.73	*	-9.49	1.19	-0.61	8.55	-0.16	*	0.85	0.06	1.99	*
Sb	25.29	*	-2.38	*	-0.08	*	-6.09	*	*	-0.28	0.79	-0.01	10.18
Sc	2.31	0.34	*	*	0.08	*	0.20	-0.87	*	0.88	0.26	-4.10	*
Sm	-2.15	1.27	3.90	*	1.04	-0.51	2.36	0.00	*	0.88	0.24	-0.35	*
Sn	5.92	*	1.09	*	2.50	*	-10.05	-0.27	*	0.18	4.55	-0.35	*
Sr	-1.43	1.06	-5.56	2.21	0.48	0.18	5.97	0.93	0.94	0.89	0.76	6.80	-1.33
Ta	*	0.00	*	*	*	4.98	-8.44	2.64	*	-0.15	*	5.16	*
Tb	-0.46	1.38	94.51	*	2.11	-0.62	1.25	0.58	*	-0.05	0.49	*	*
Th	-3.06	0.91	6.31	7.93	*	0.16	-1.46	0.34	*	-0.04	0.00	-12.60	*
Tl	*	*	-3.38	*	0.84	*	-3.72	0.90	*	-1.61	0.84	-0.56	259.96
Tm	-2.27	0.46	2.70	*	0.70	-0.08	1.01	-0.21	*	0.35	-0.58	-0.23	*
U	-2.35	0.05	9.83	-2.63	2.25	-0.48	0.59	0.18	*	1.24	0.26	0.59	*
V	-0.45	2.08	-11.19	-0.91	*	*	-15.90	-0.02	*	0.53	0.44	-1.45	-1.20
W	*	*	*	*	*	*	-1.46	1.50	*	-1.68	3.65	-0.10	*
Y	-2.57	2.16	-1.54	2.52	0.90	0.44	3.66	1.29	-0.08	1.51	-0.21	1.60	*
Yb	-1.77	-0.33	5.86	*	2.65	0.16	1.74	0.42	*	0.52	-0.44	0.32	*
Zn	0.90	0.00	-8.91	0.64	1.41	*	7.61	-2.44	*	2.26	-0.96	-6.09	-0.32
Zr	6.18	2.14	*	8.39	*	1.24	-20.90	6.02	*	0.83	-0.80	-10.43	*

Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.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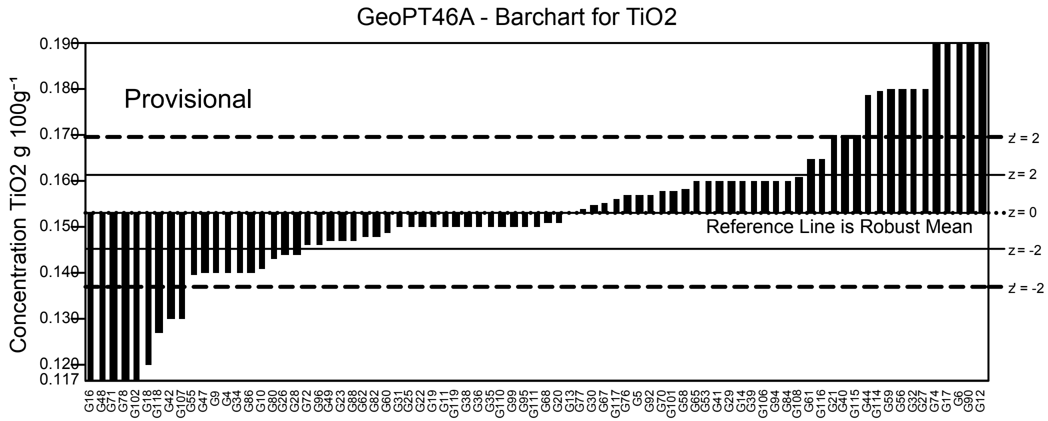
GeoPT46A - Barchart for TiO2
Provisional
Concentration TiO2 g 100g⁻¹
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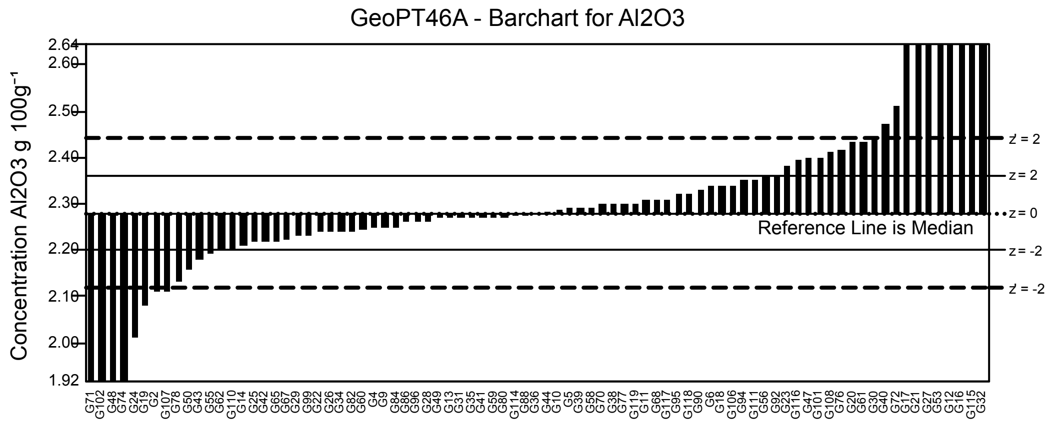
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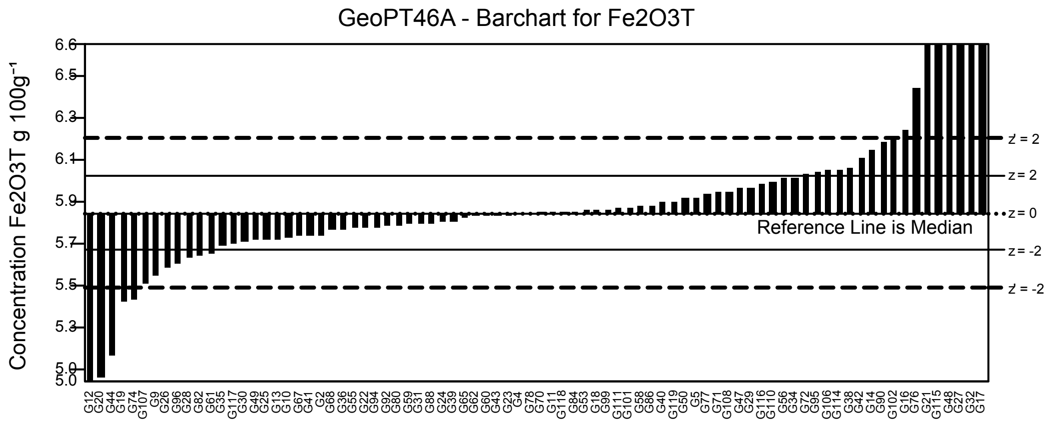
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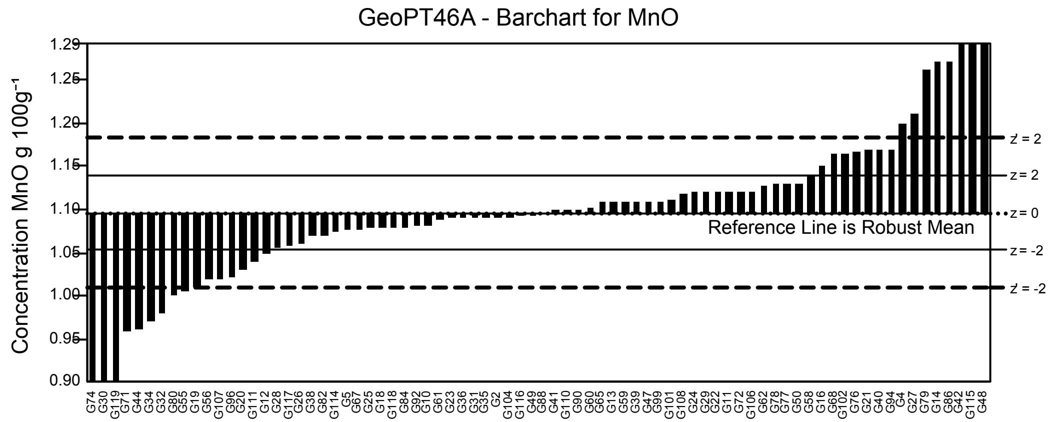
GeoPT46A - Barchart for MnO
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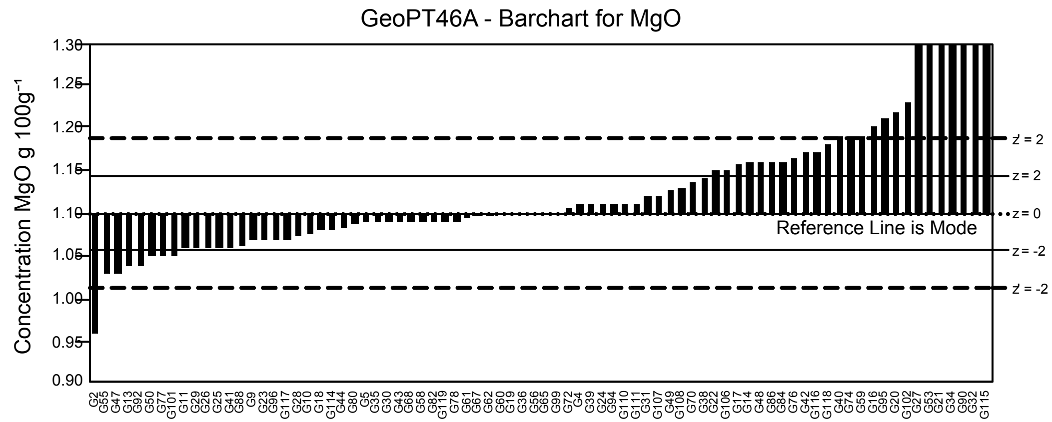
GeoPT46A - Barchart for MgO
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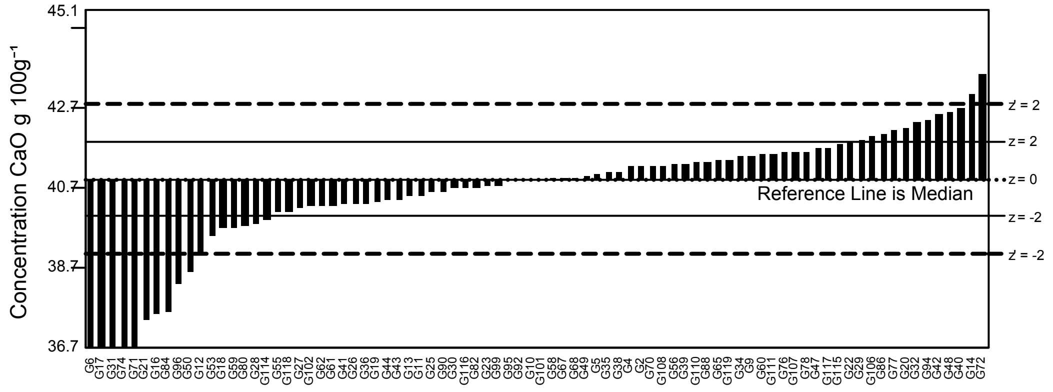
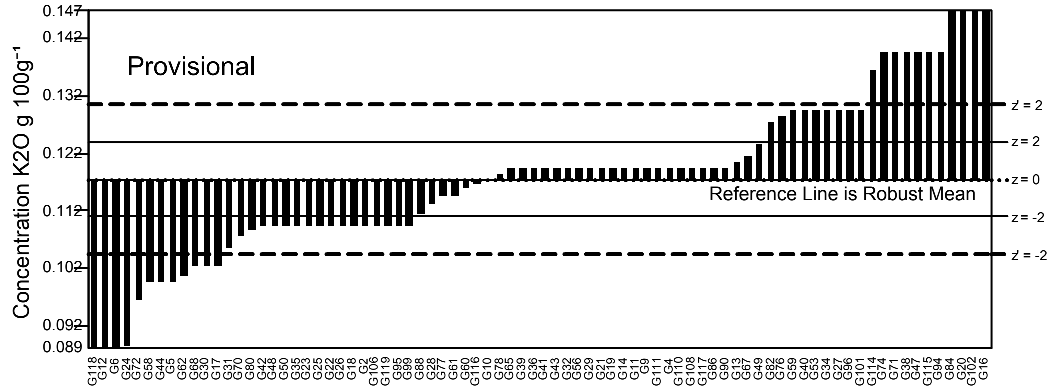
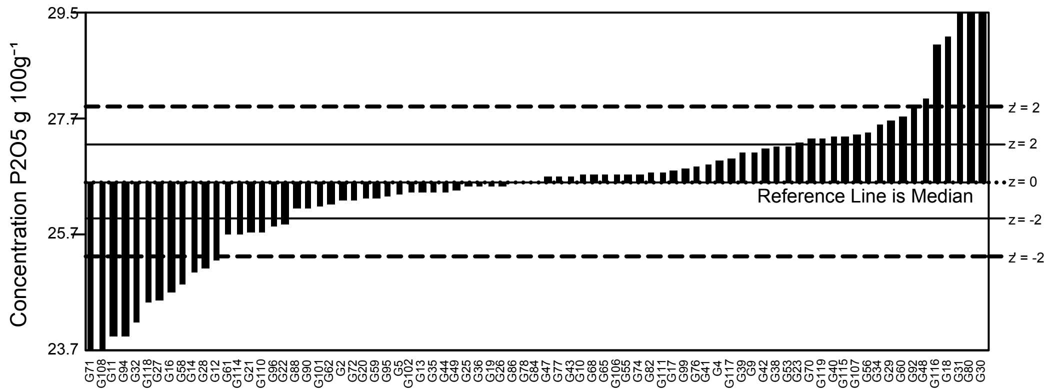
GeoPT46A - Barchart for CaO



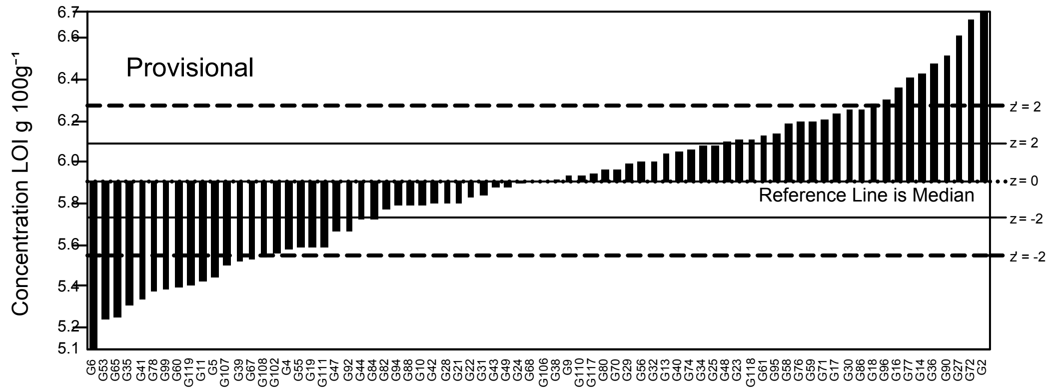
GeoPT46A - Barchart for K2O



GeoPT46A - Barchart for P2O5



GeoPT46A - Barchart for LOI



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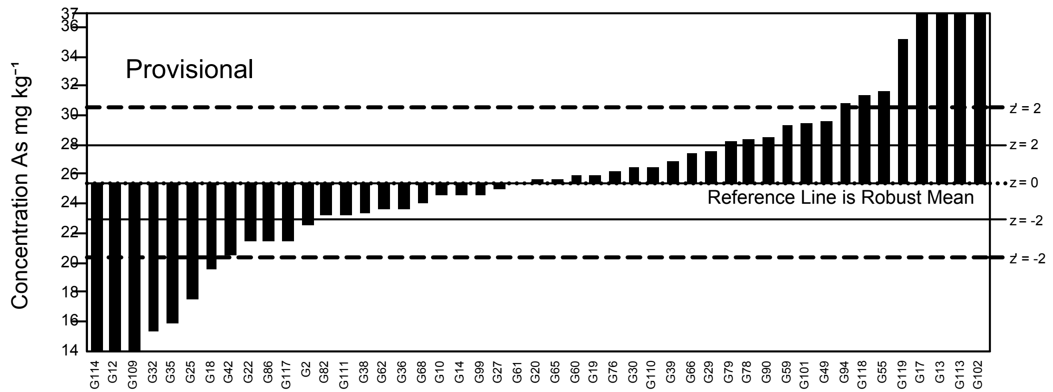
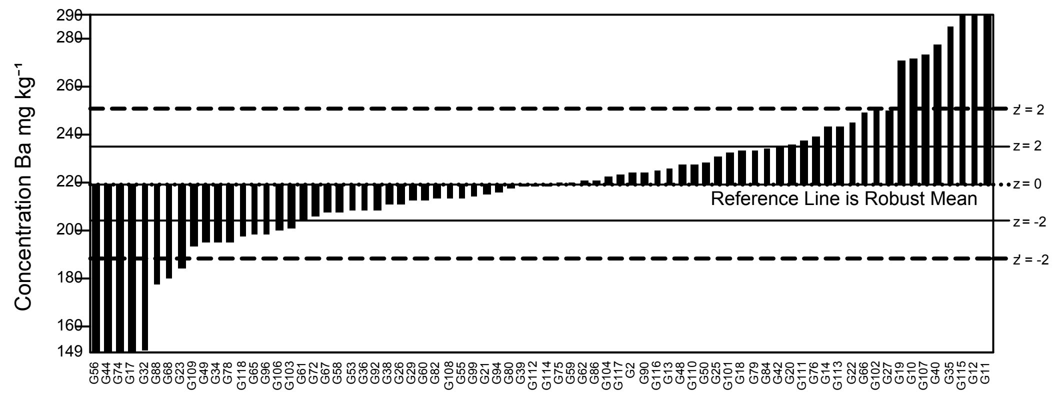


GeoPT46A - Barchart for Ba



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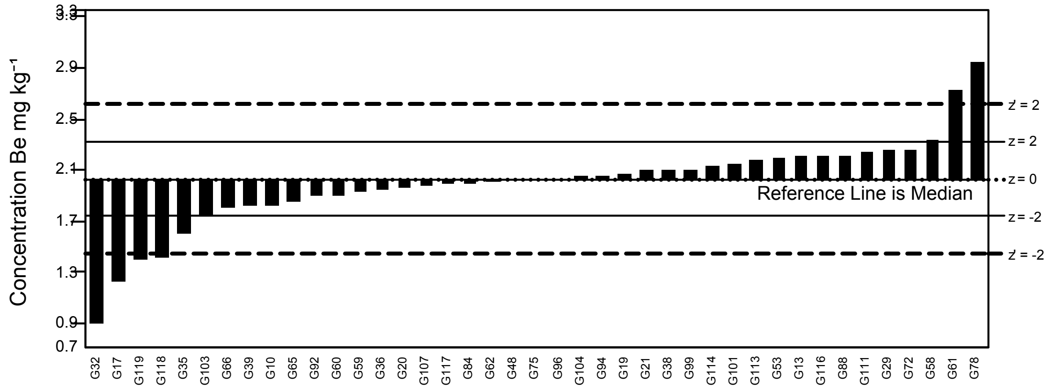

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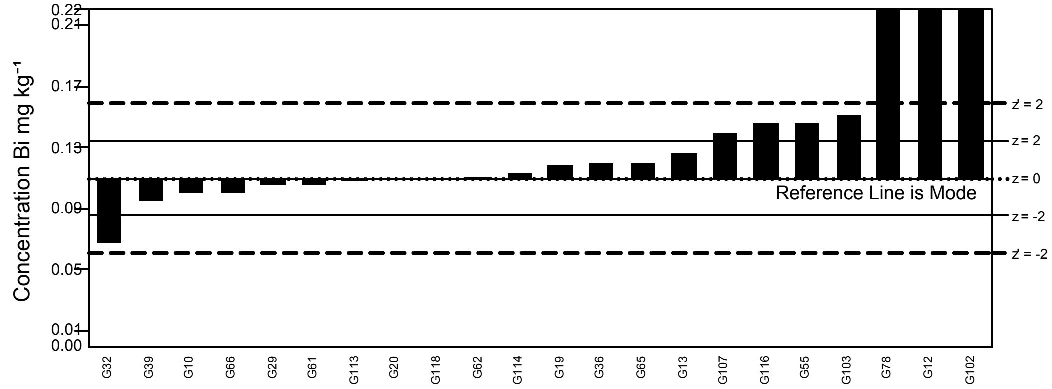
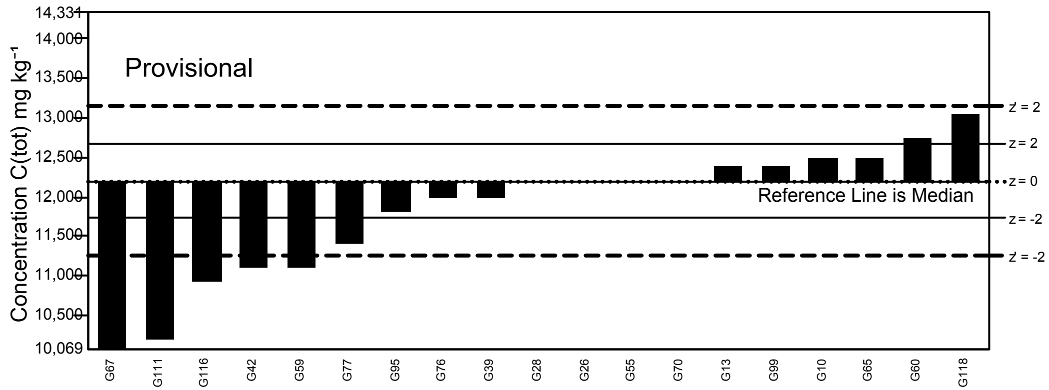


GeoPT46A - Barchart for C(tot)



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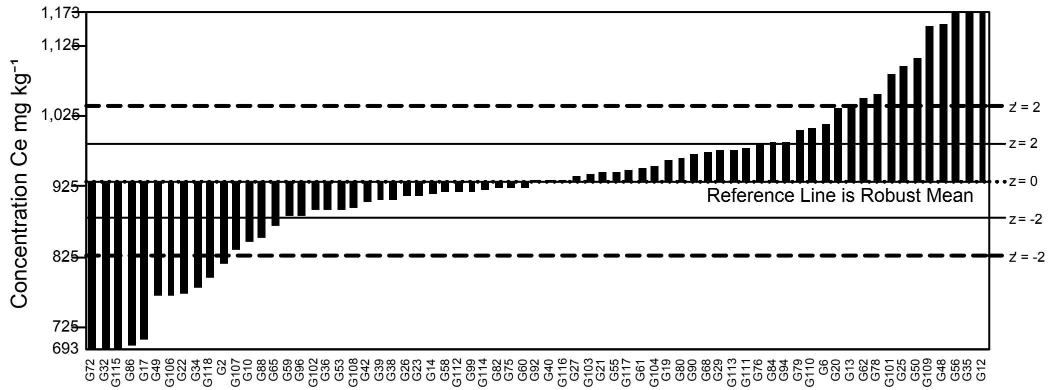
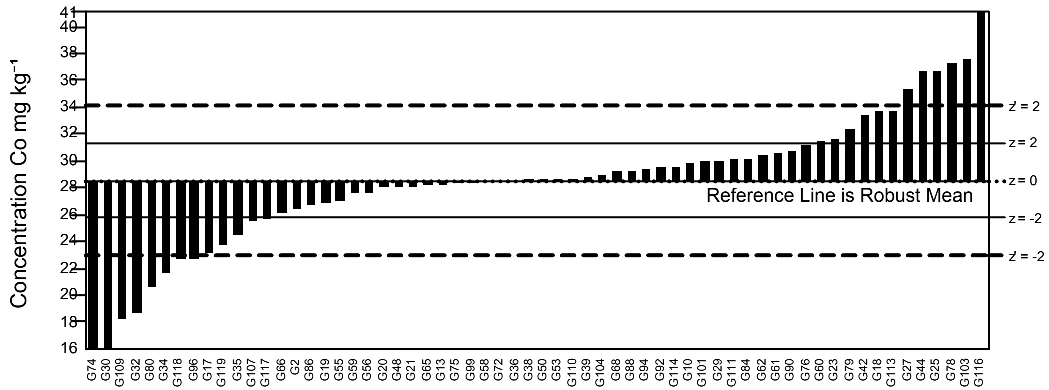


GeoPT46A - Barchart for Co



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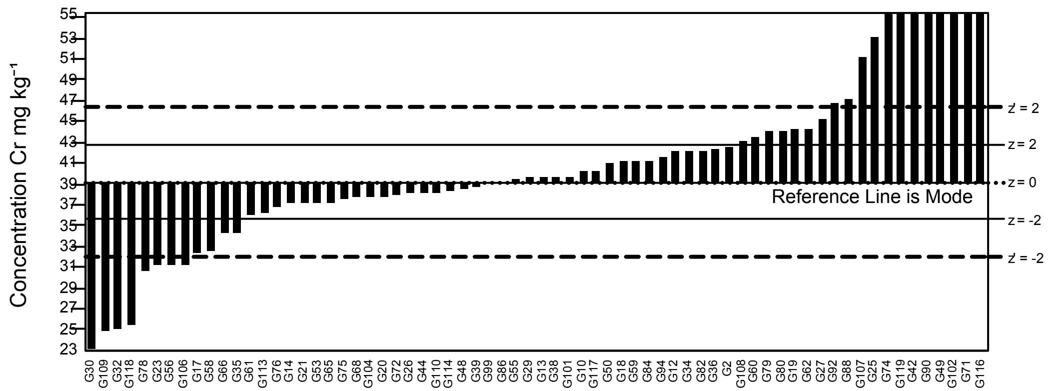
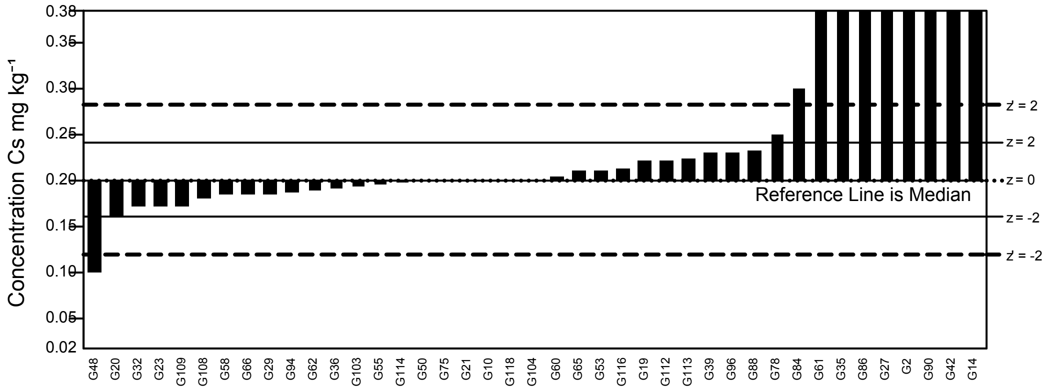
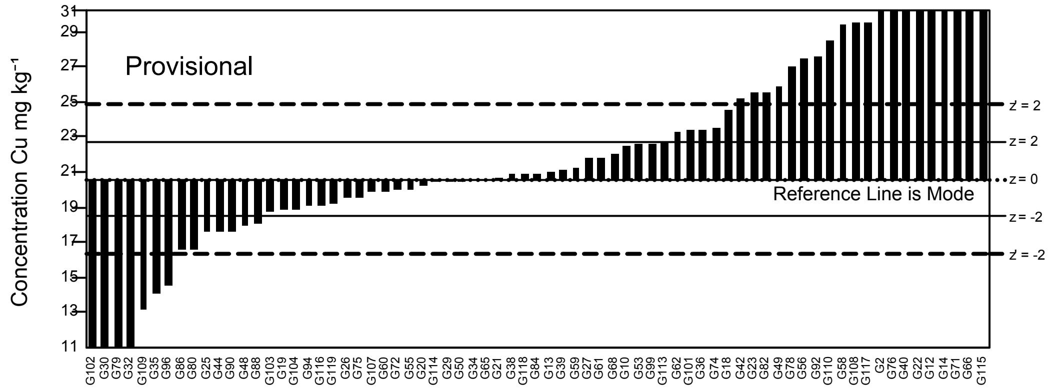


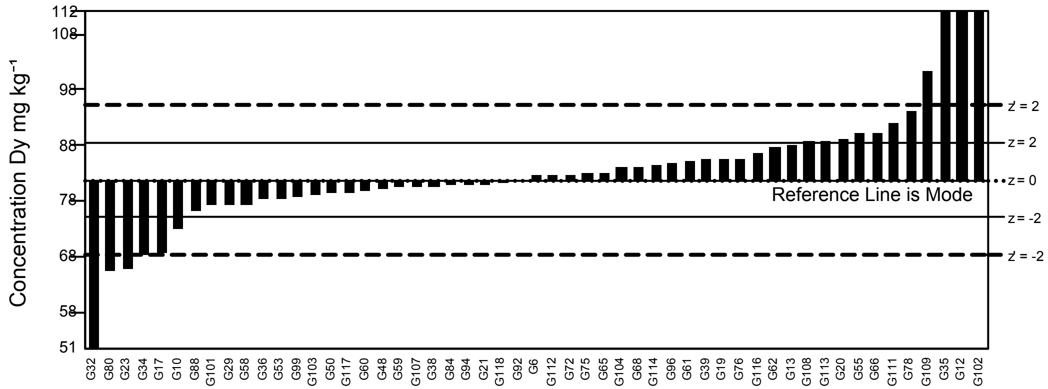
GeoPT46A - Barchart for Cs



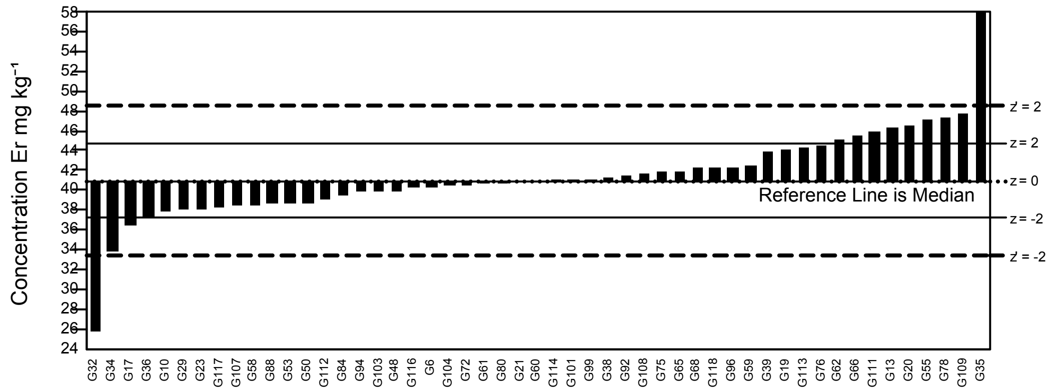
GeoPT46A - Barchart for Cu



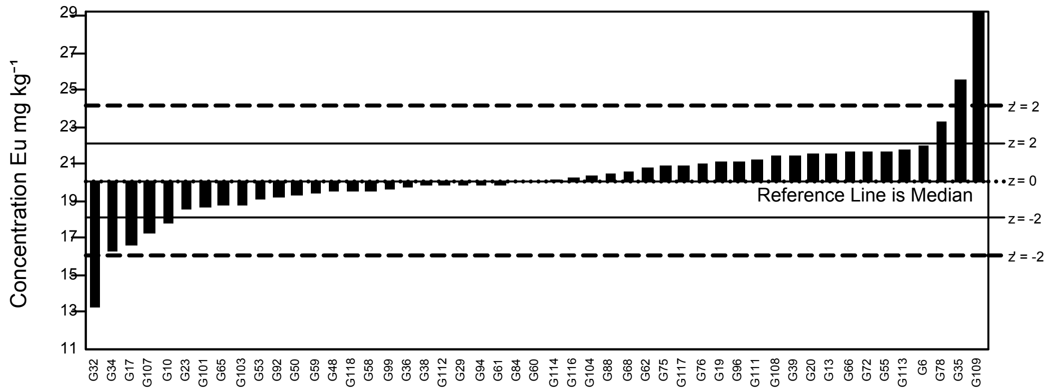
GeoPT46A - Barchart for Dy



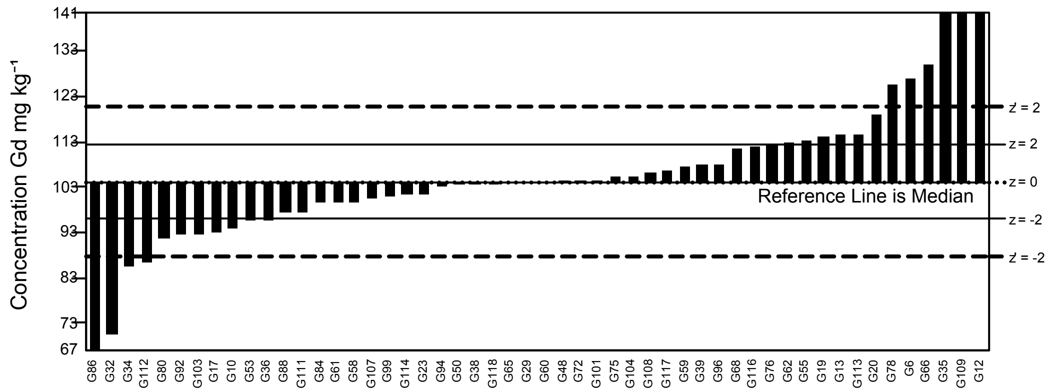
GeoPT46A - Barchart for Er



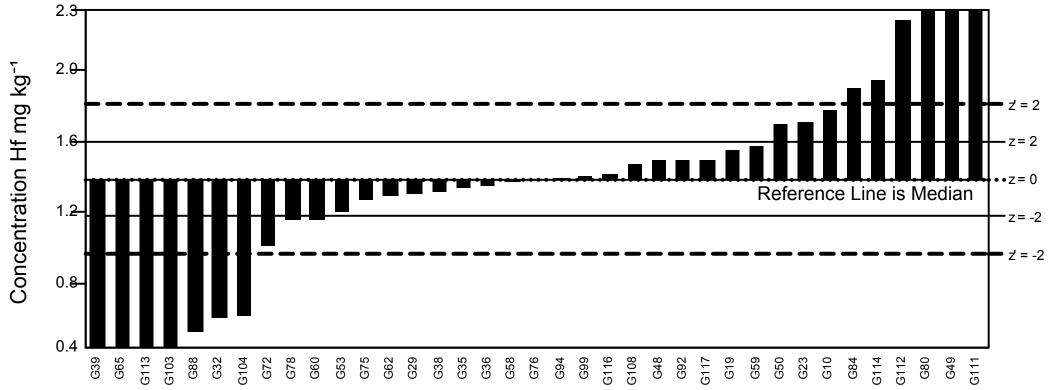
GeoPT46A - Barchart for Eu



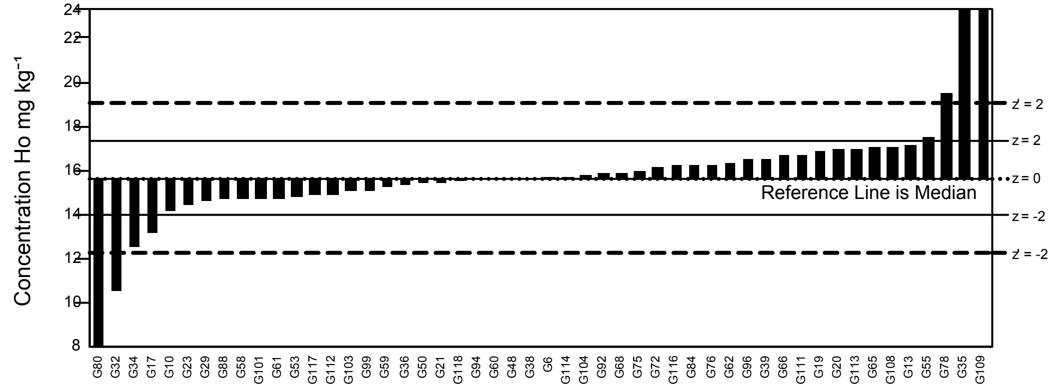
GeoPT46A - Barchart for Gd



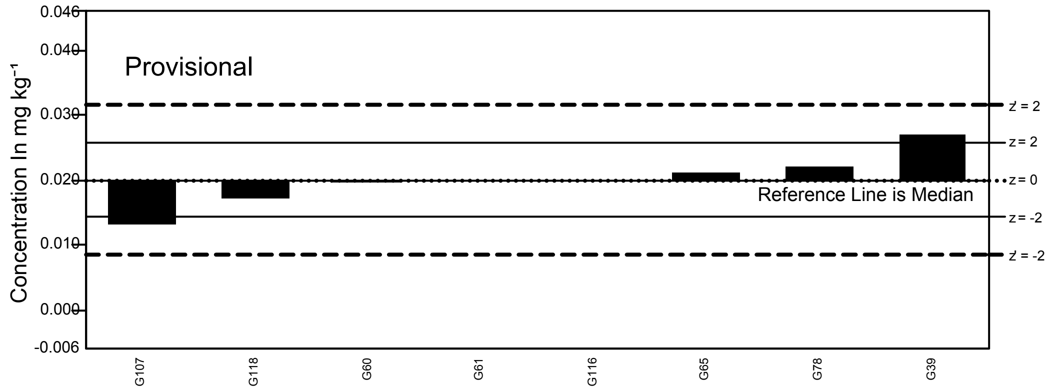
GeoPT46A - Barchart for Hf



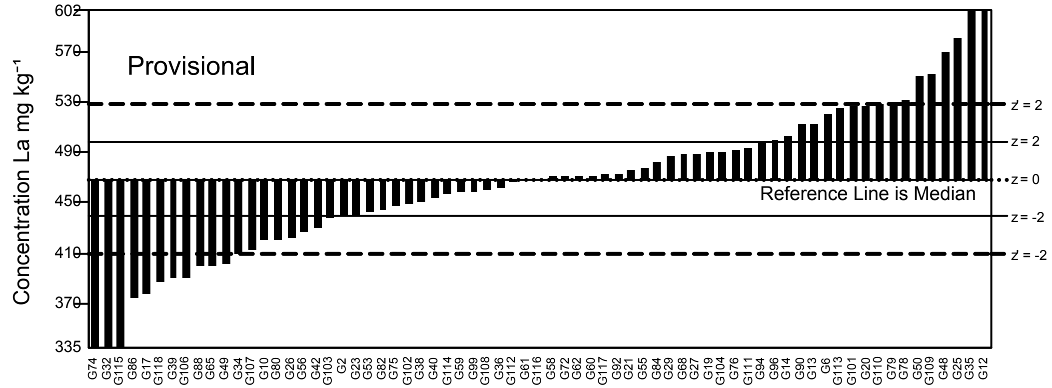
GeoPT46A - Barchart for Ho



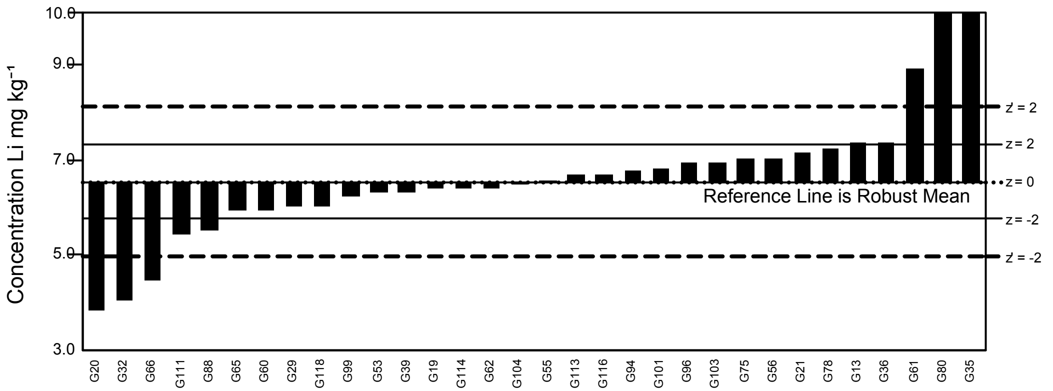
GeoPT46A - Barchart for In



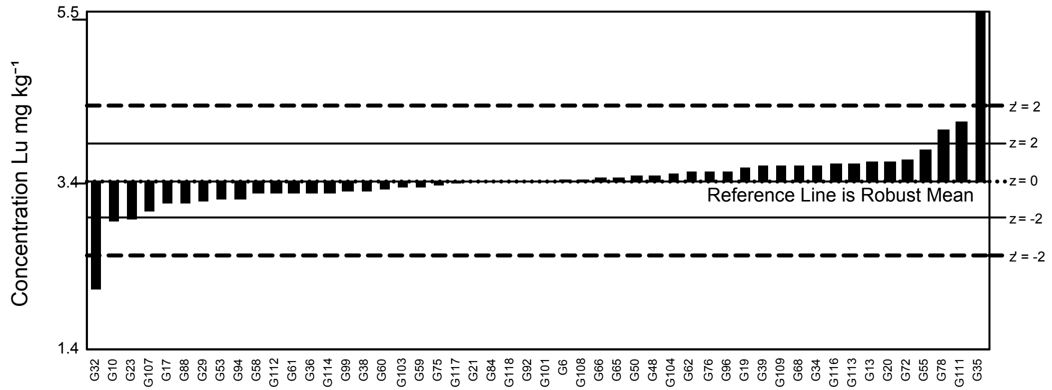
GeoPT46A - Barchart for La

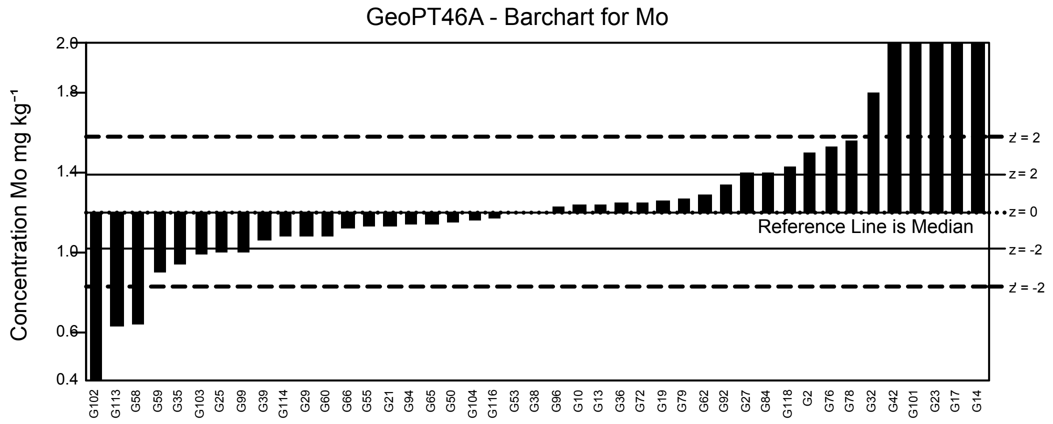


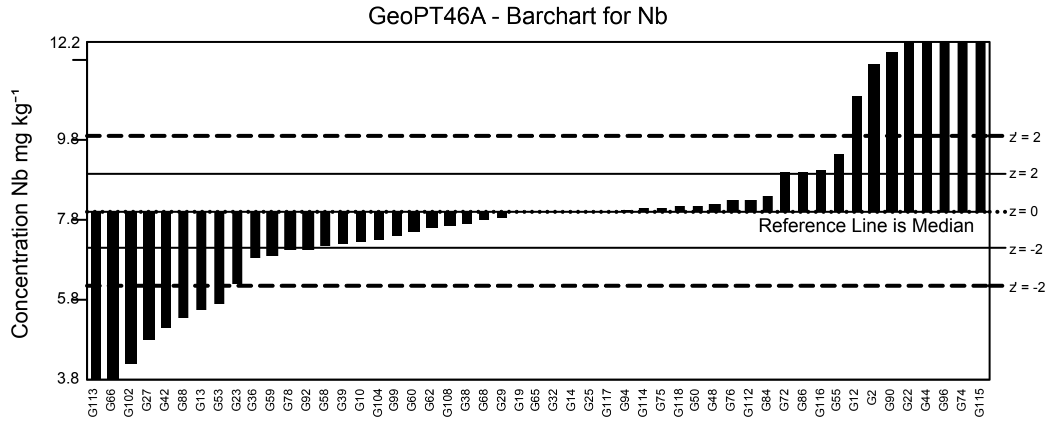
GeoPT46A - Barchart for Li

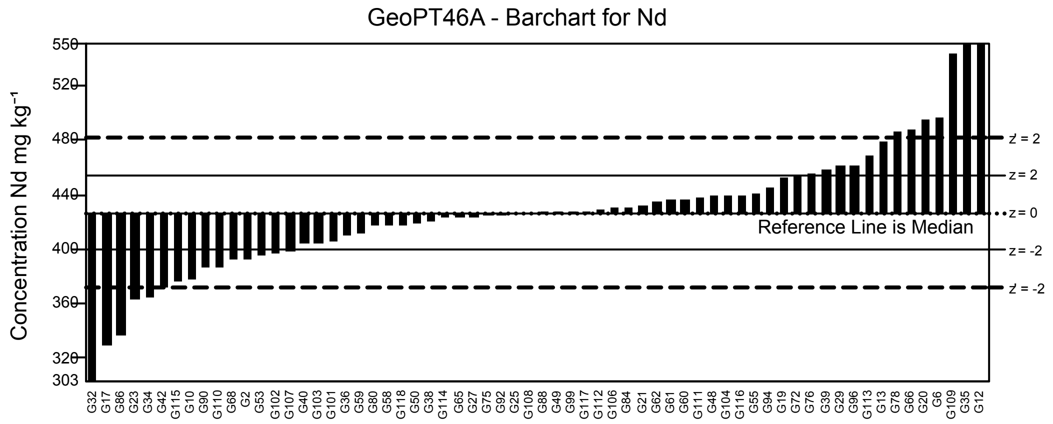


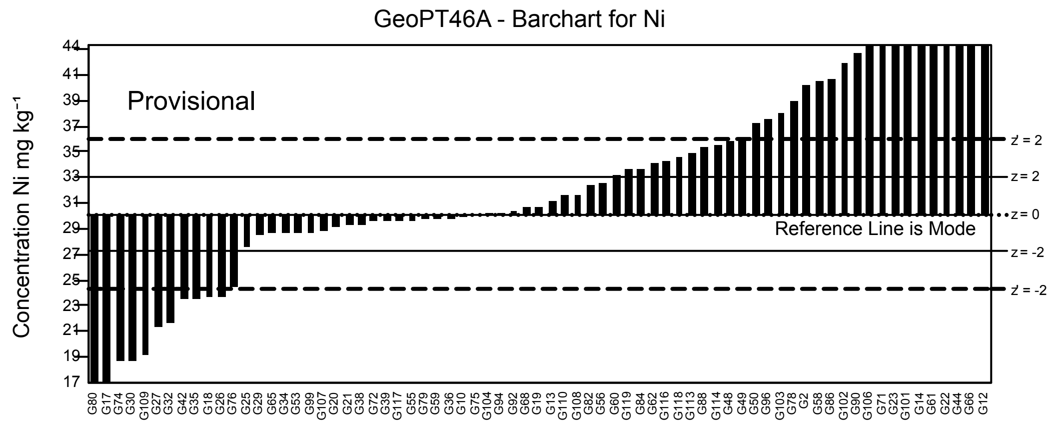
GeoPT46A - Barchart for Lu

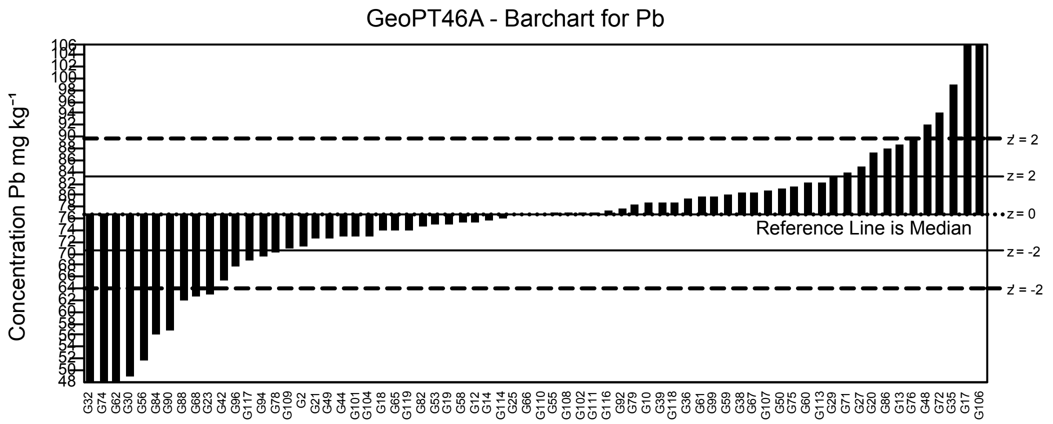


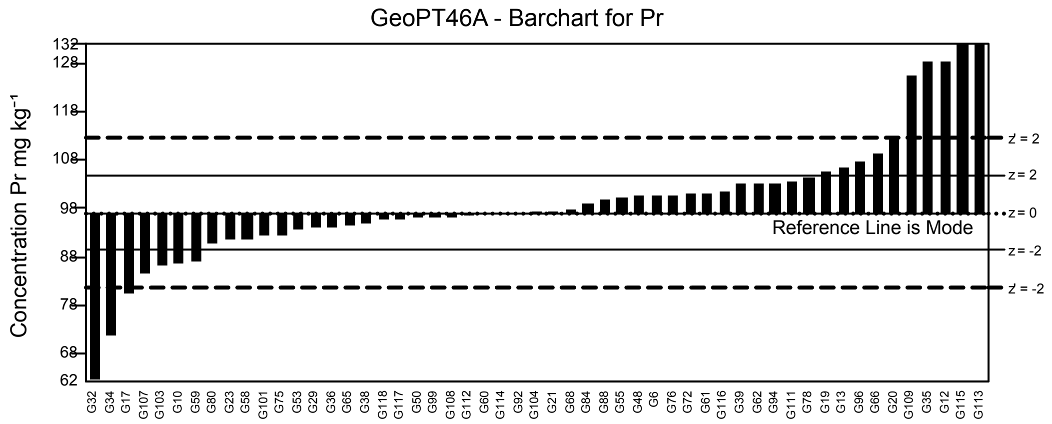

GeoPT46A - Barchart for Mo
Concentration Mo mg kg⁻¹
Reference Line is Median

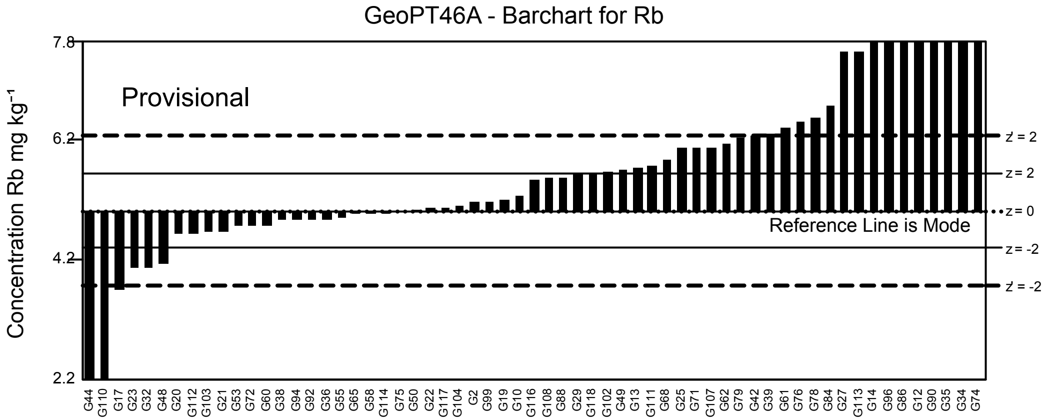

GeoPT46A - Barchart for Nb
Concentration Nb mg kg⁻¹
Reference Line is Median

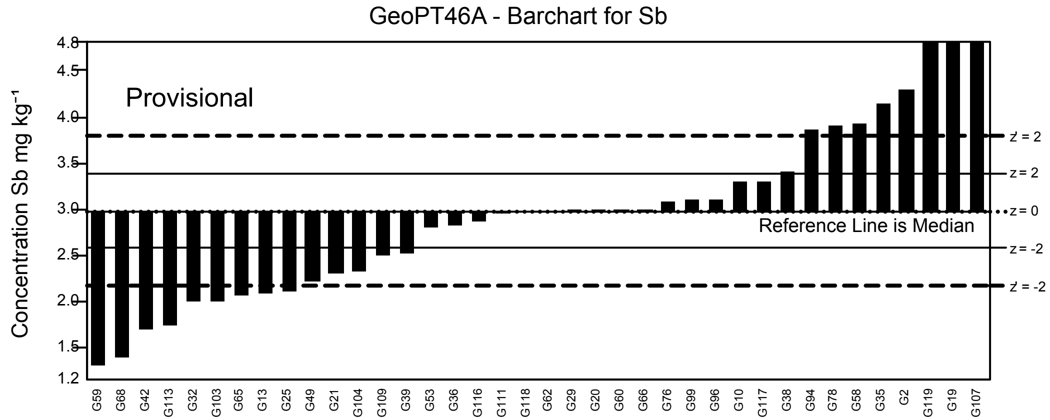

GeoPT46A - Barchart for Nd
Concentration Nd mg kg⁻¹
Reference Line is Median

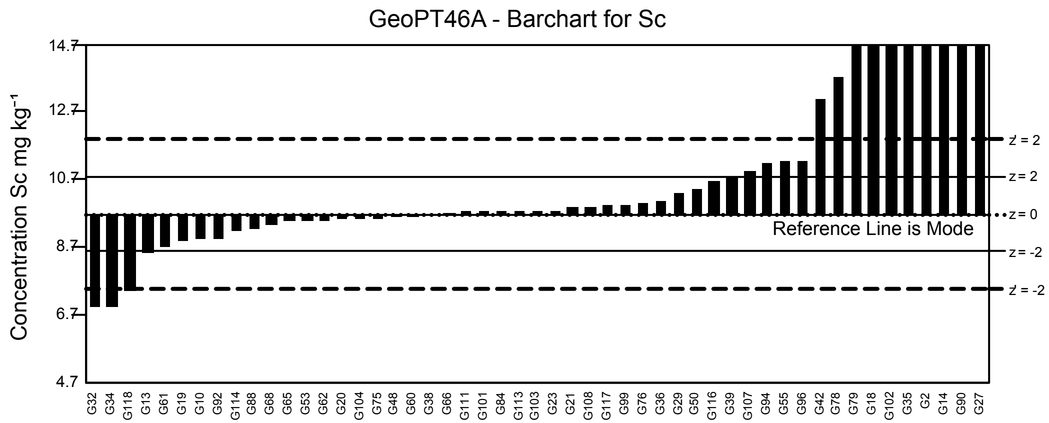

GeoPT46A - Barchart for Ni
Concentration Ni mg kg⁻¹
Provisional
Reference Line is Mode

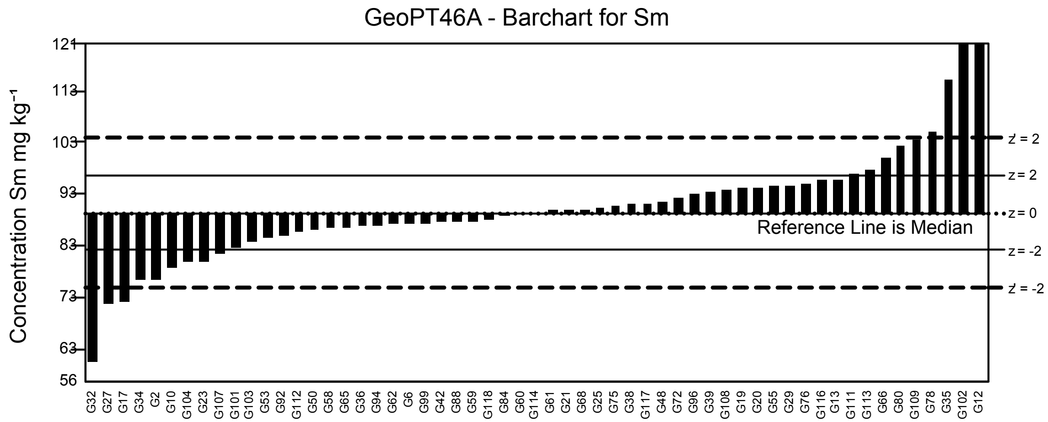

GeoPT46A - Barchart for Pb
Concentration Pb mg kg⁻¹
Reference Line is Median

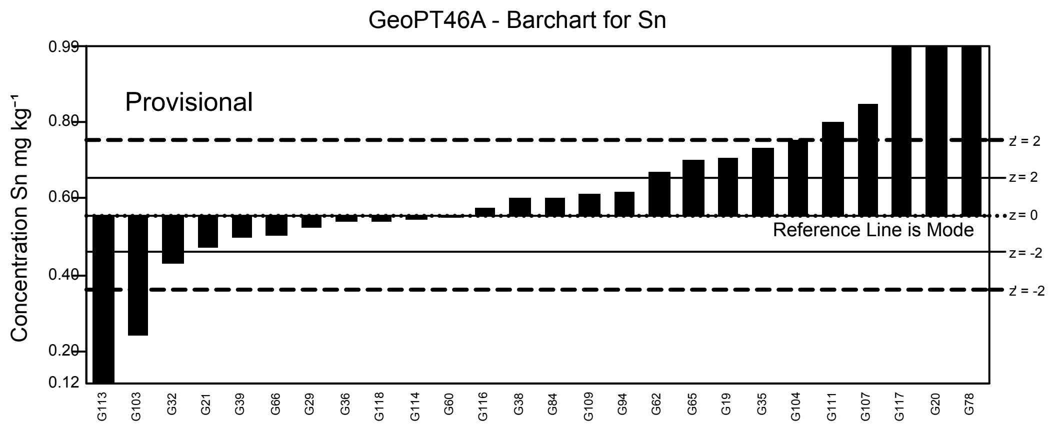

GeoPT46A - Barchart for Pr
Concentration Pr mg kg⁻¹
Reference Line is Mode

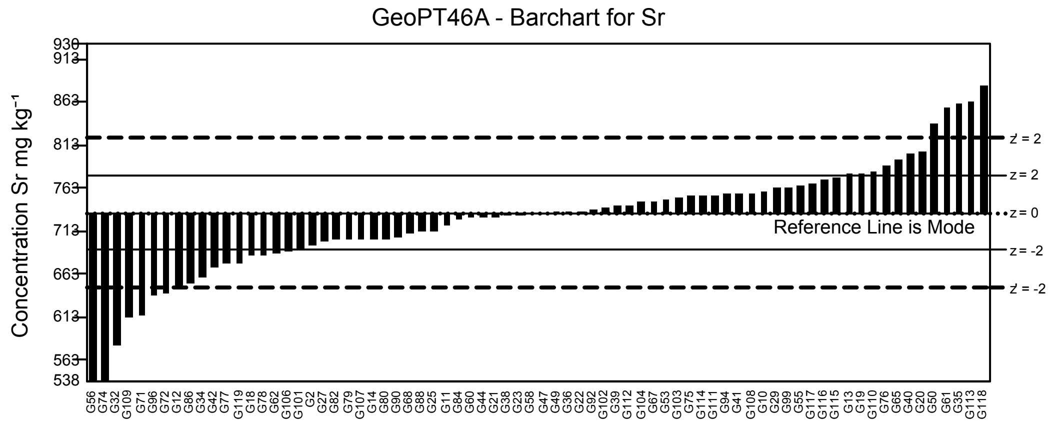

GeoPT46A - Barchart for Rb
Provisional
Concentration Rb mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

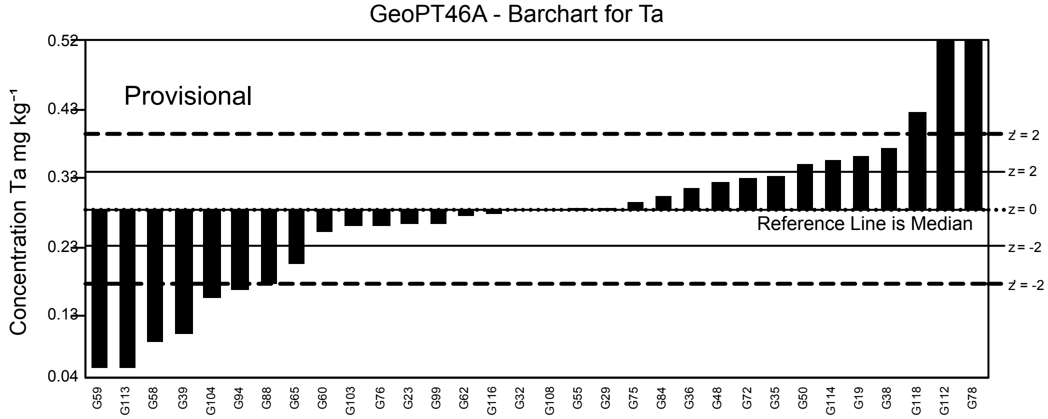

GeoPT46A - Barchart for Sb
Provisional
Concentration Sb mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

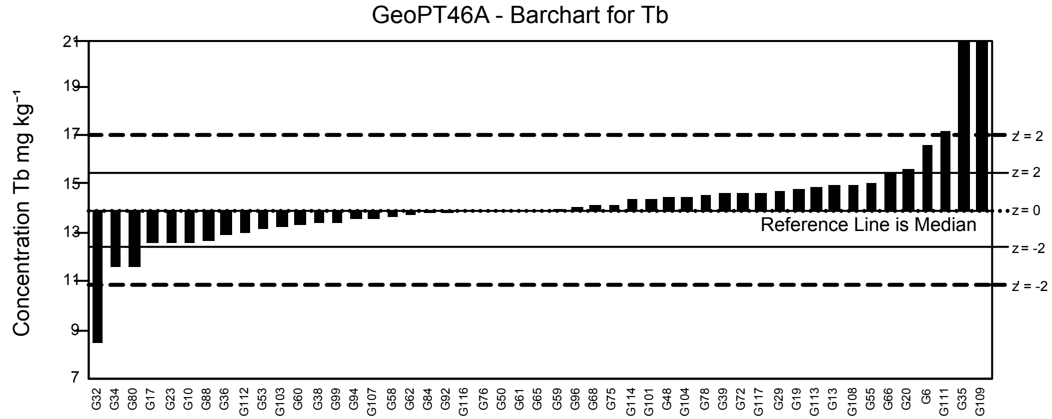

GeoPT46A - Barchart for Sc
Concentration Sc mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

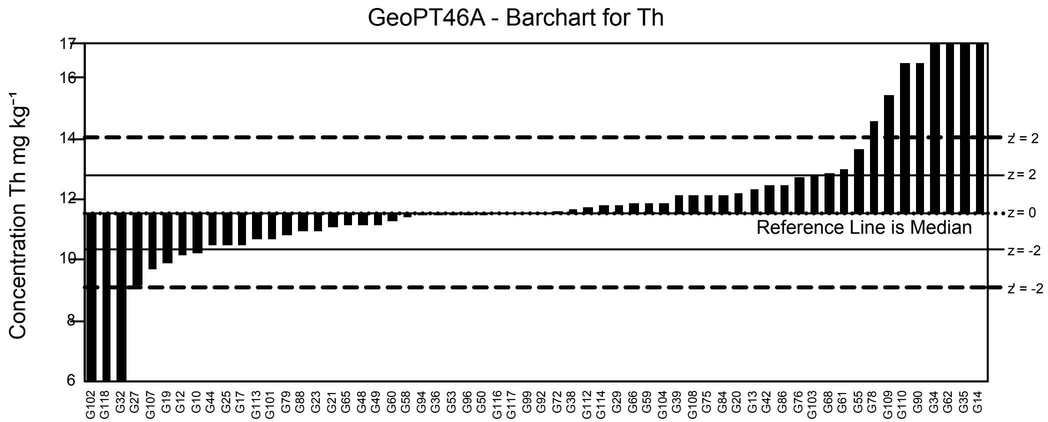

GeoPT46A - Barchart for Sm
Concentration Sm mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

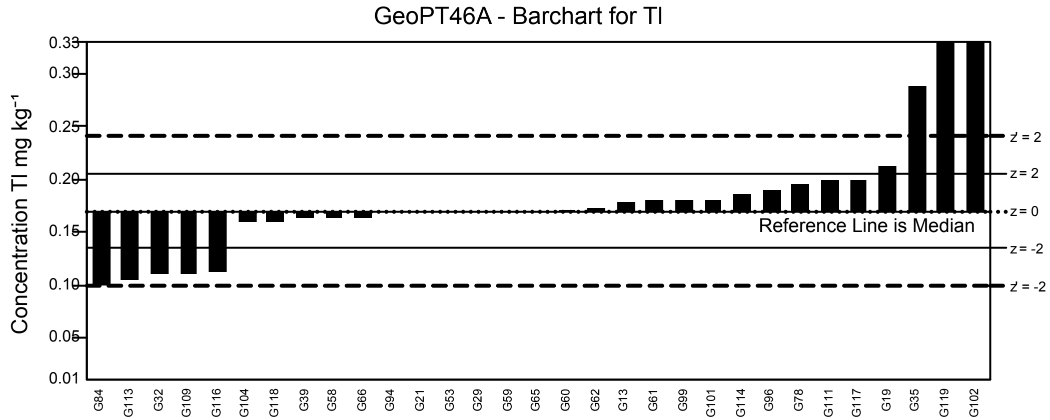

GeoPT46A - Barchart for Sn
Provisional
Concentration Sn mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

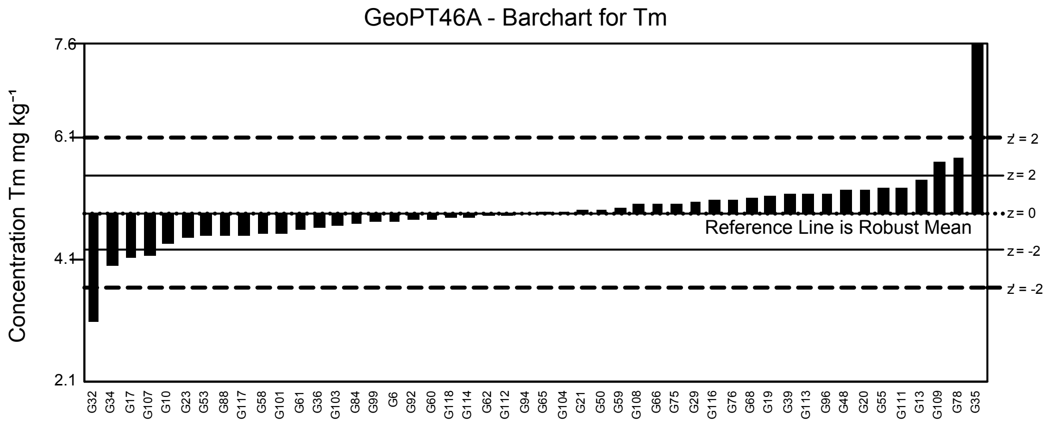

GeoPT46A - Barchart for Sr
Concentration Sr mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

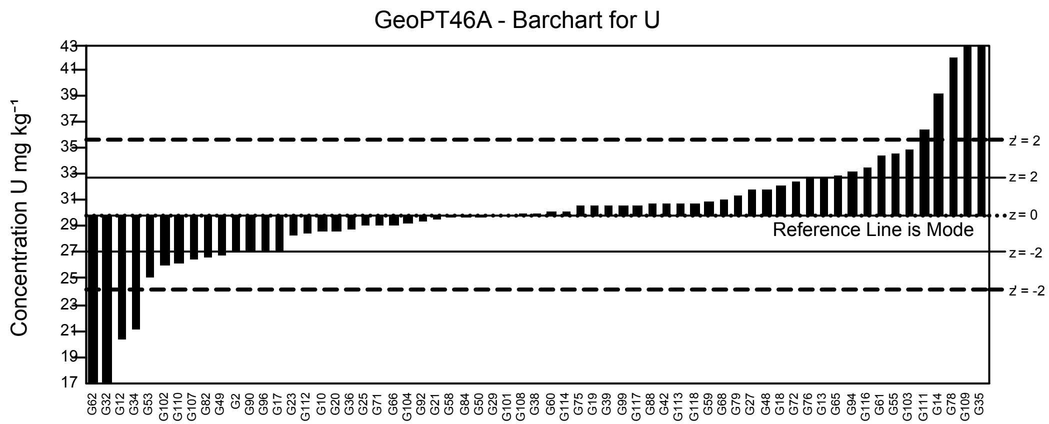

GeoPT46A - Barchart for Ta
Provisional
Concentration Ta mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2


GeoPT46A - Barchart for Tb
Concentration Tb mg kg⁻¹
Reference Line is Median


GeoPT46A - Barchart for Th
Concentration Th mg kg⁻¹
Reference Line is Median


GeoPT46A - Barchart for Tl
Concentration Tl mg kg⁻¹
Reference Line is Median


GeoPT46A - Barchart for Tm
Concentration Tm mg kg⁻¹
Reference Line is Robust Mean


GeoPT46A - Barchart for U
Concentration U mg kg⁻¹
Reference Line is Mode

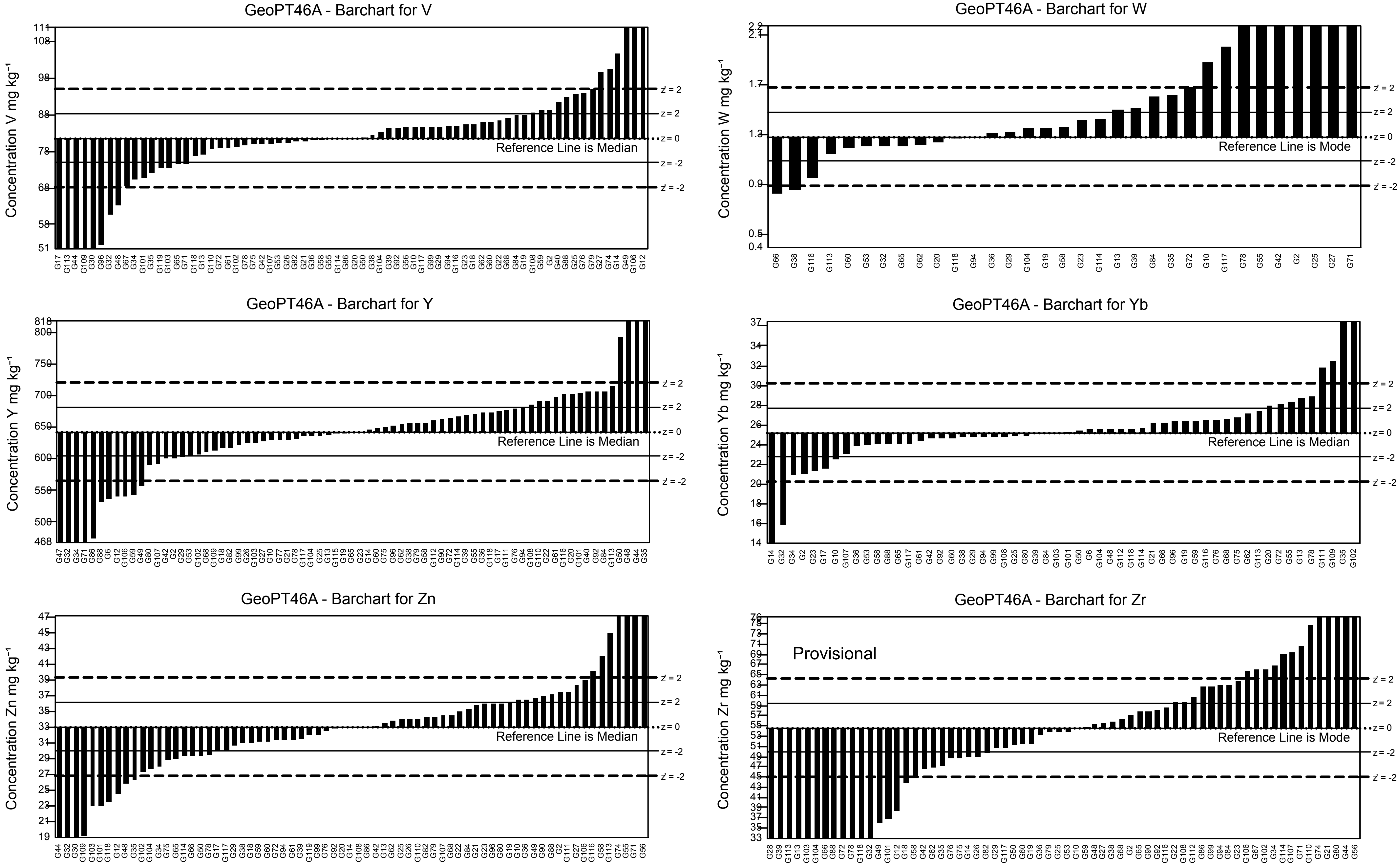
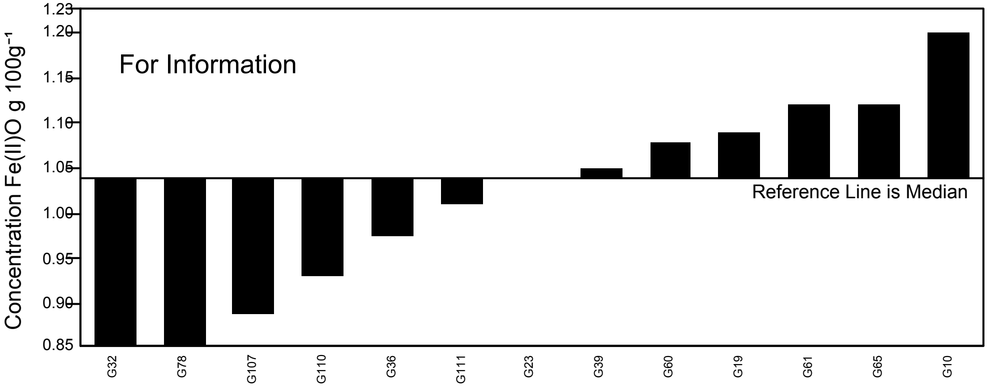
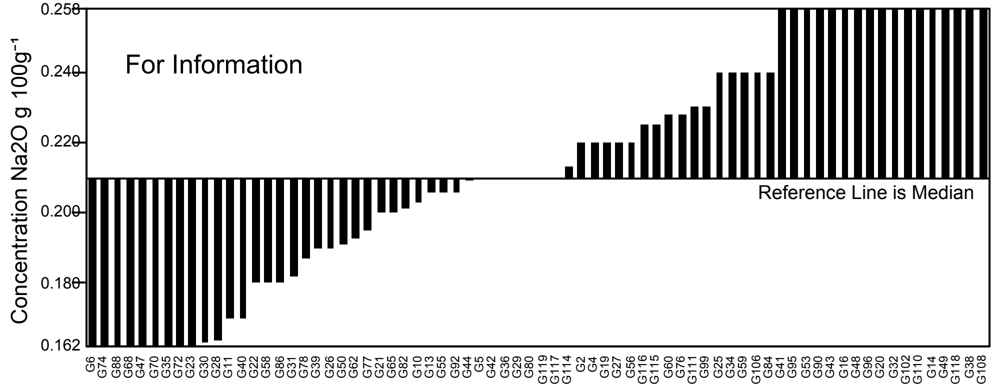


Figure 1: GeoPT46A - Phosphate rock, POLC-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for -2<z<2 for pure geochemistry labs (solid lines) and -2<z'<2 for applied geochemistry labs (pecked lines).

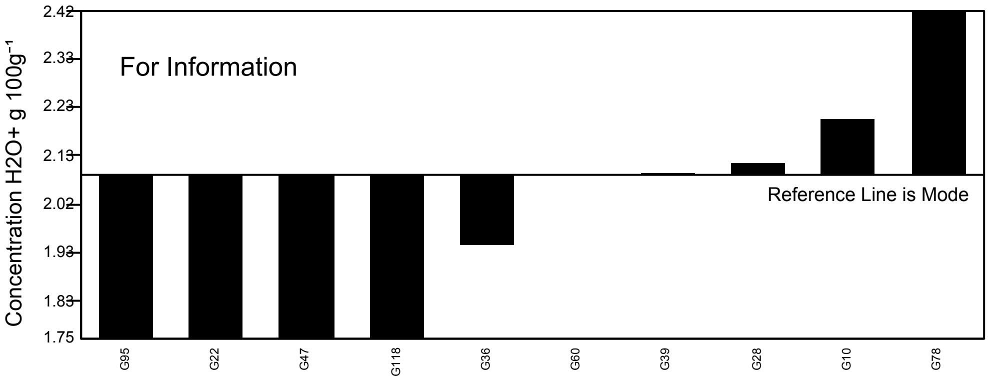
GeoPT46A - Barchart for Fe(II)O



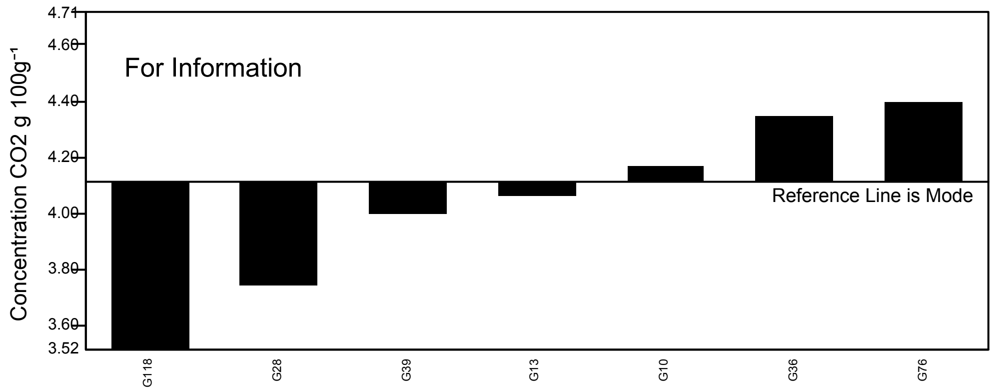
GeoPT46A - Barchart for Na2O



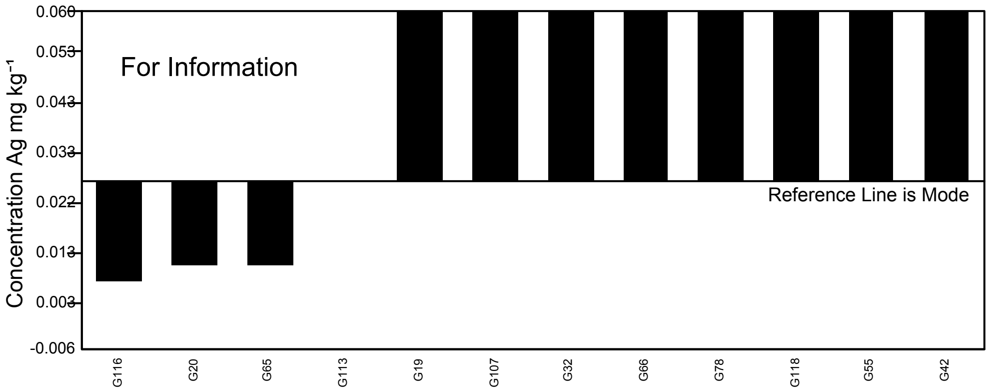
GeoPT46A - Barchart for H2O+



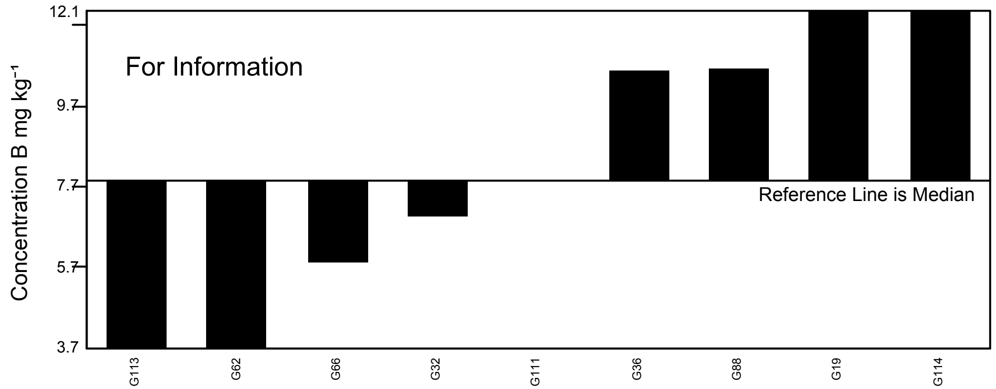
GeoPT46A - Barchart for CO2

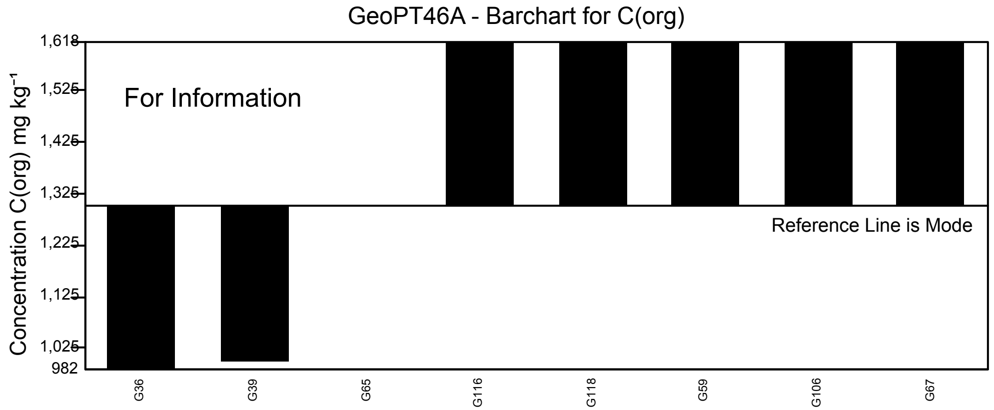


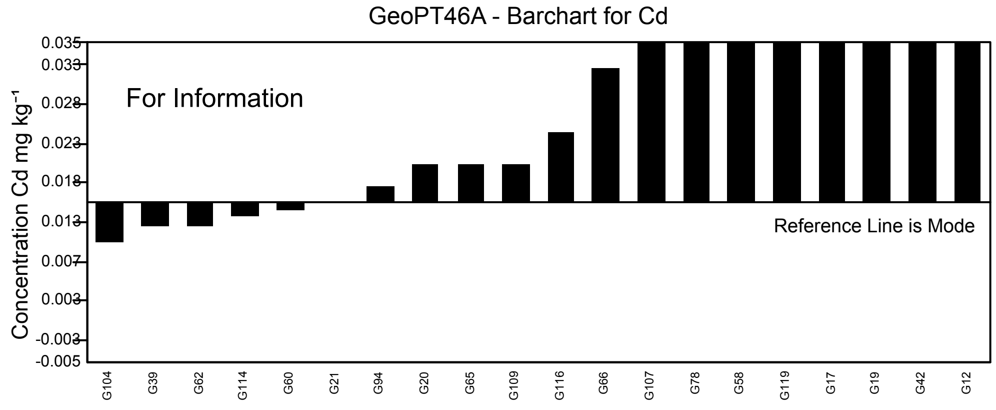
GeoPT46A - Barchart for Ag

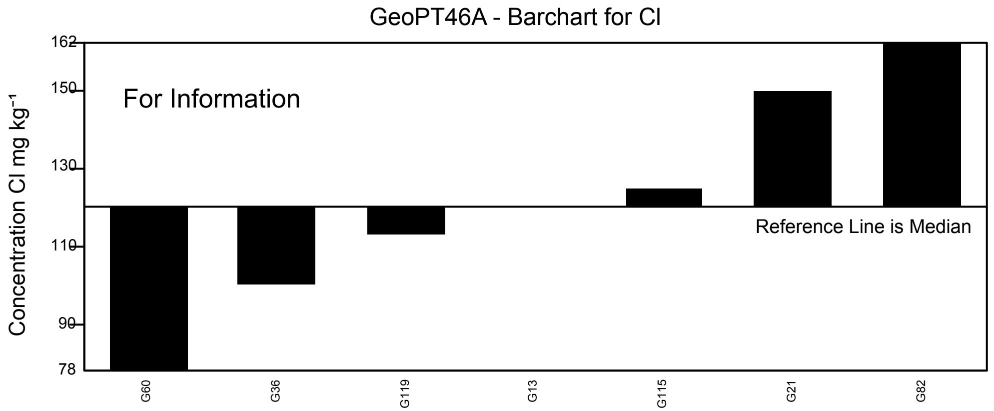


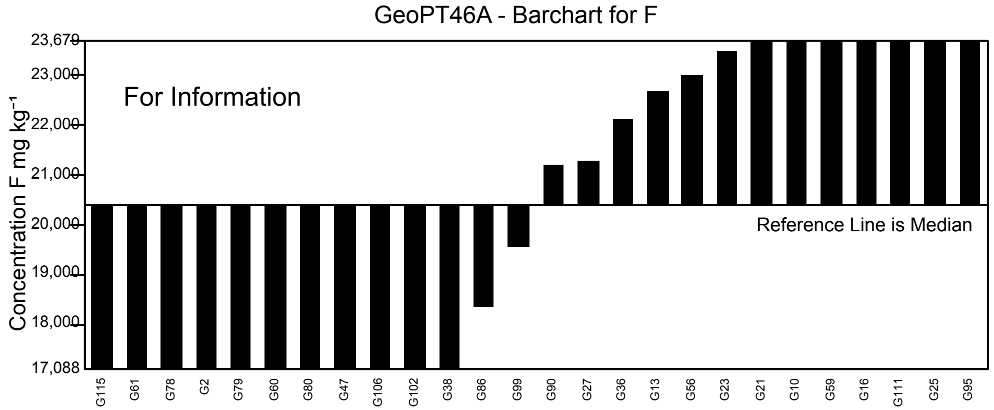
GeoPT46A - Barchart for B

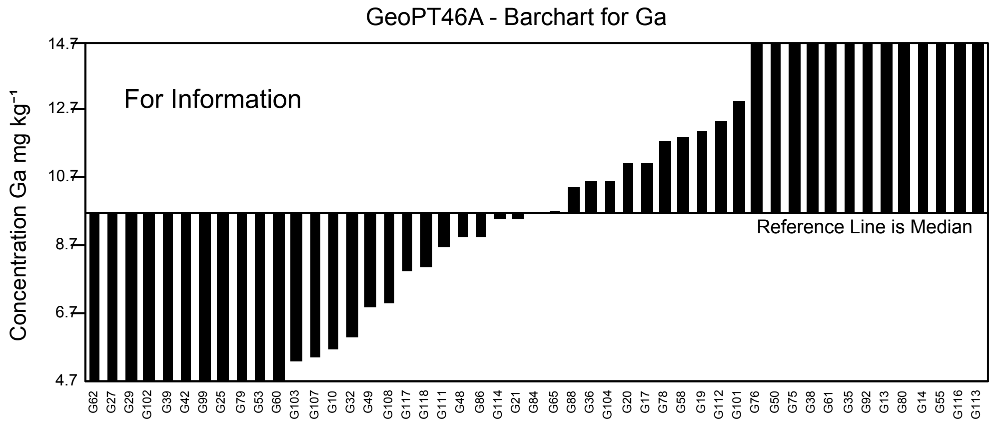


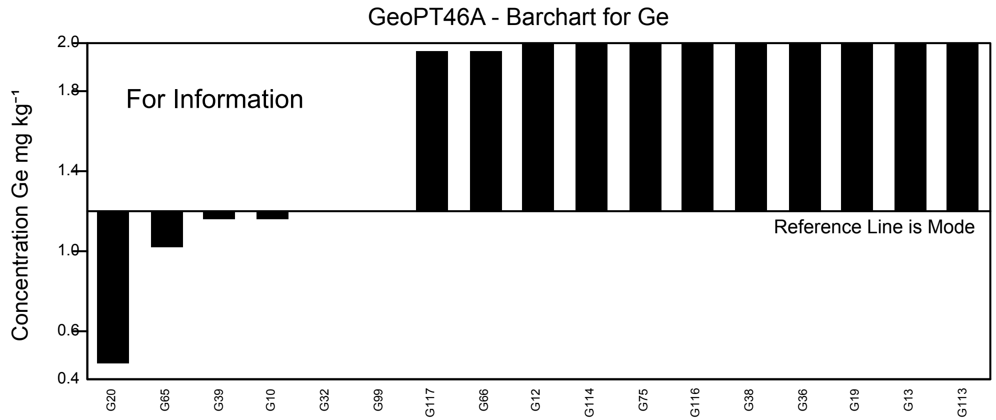

GeoPT46A - Barchart for C(org)
For Information
Reference Line is Mode
Concentration C(org) mg kg⁻¹
G36 G39 G65 G116 G118 G59 G106 G67

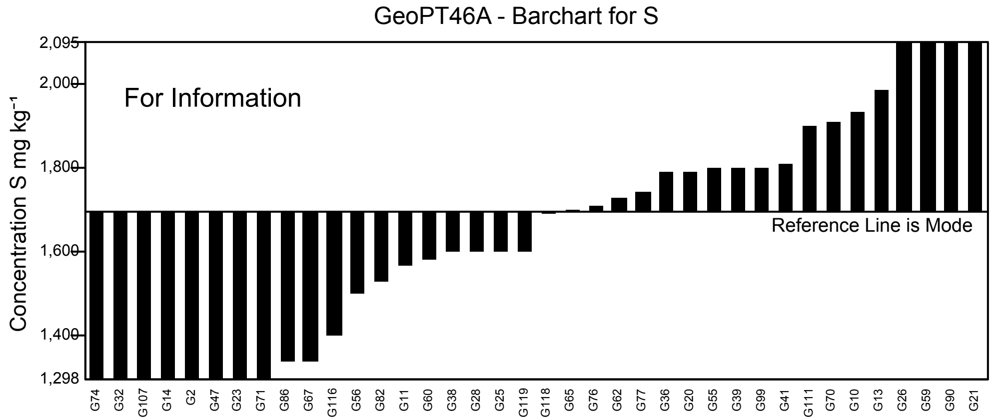

GeoPT46A - Barchart for Cd
For Information
Reference Line is Mode
Concentration Cd mg kg⁻¹
G104 G39 G62 G114 G60 G21 G94 G20 G65 G109 G116 G66 G107 G78 G58 G119 G17 G19 G42 G12

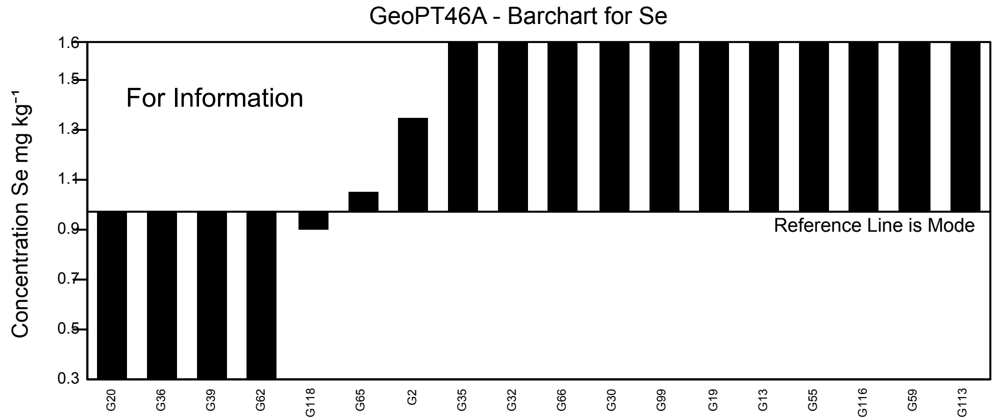

GeoPT46A - Barchart for Cl
For Information
Reference Line is Median
Concentration Cl mg kg⁻¹
G60 G36 G119 G13 G115 G21 G82


GeoPT46A - Barchart for F
For Information
Reference Line is Median
Concentration F mg kg⁻¹
G115 G61 G78 G2 G79 G60 G80 G47 G106 G102 G38 G86 G99 G90 G27 G36 G13 G56 G23 G21 G10 G59 G16 G111 G25 G95


GeoPT46A - Barchart for Ga
For Information
Reference Line is Median
Concentration Ga mg kg⁻¹


GeoPT46A - Barchart for Ge
For Information
Reference Line is Mode
Concentration Ge mg kg⁻¹
G20 G65 G39 G10 G32 G99 G117 G66 G12 G114 G75 G116 G38 G36 G19 G13 G113





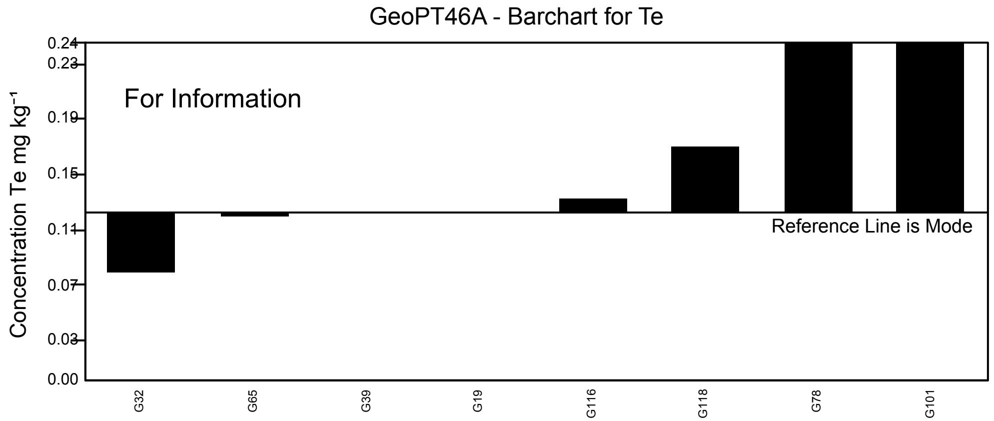
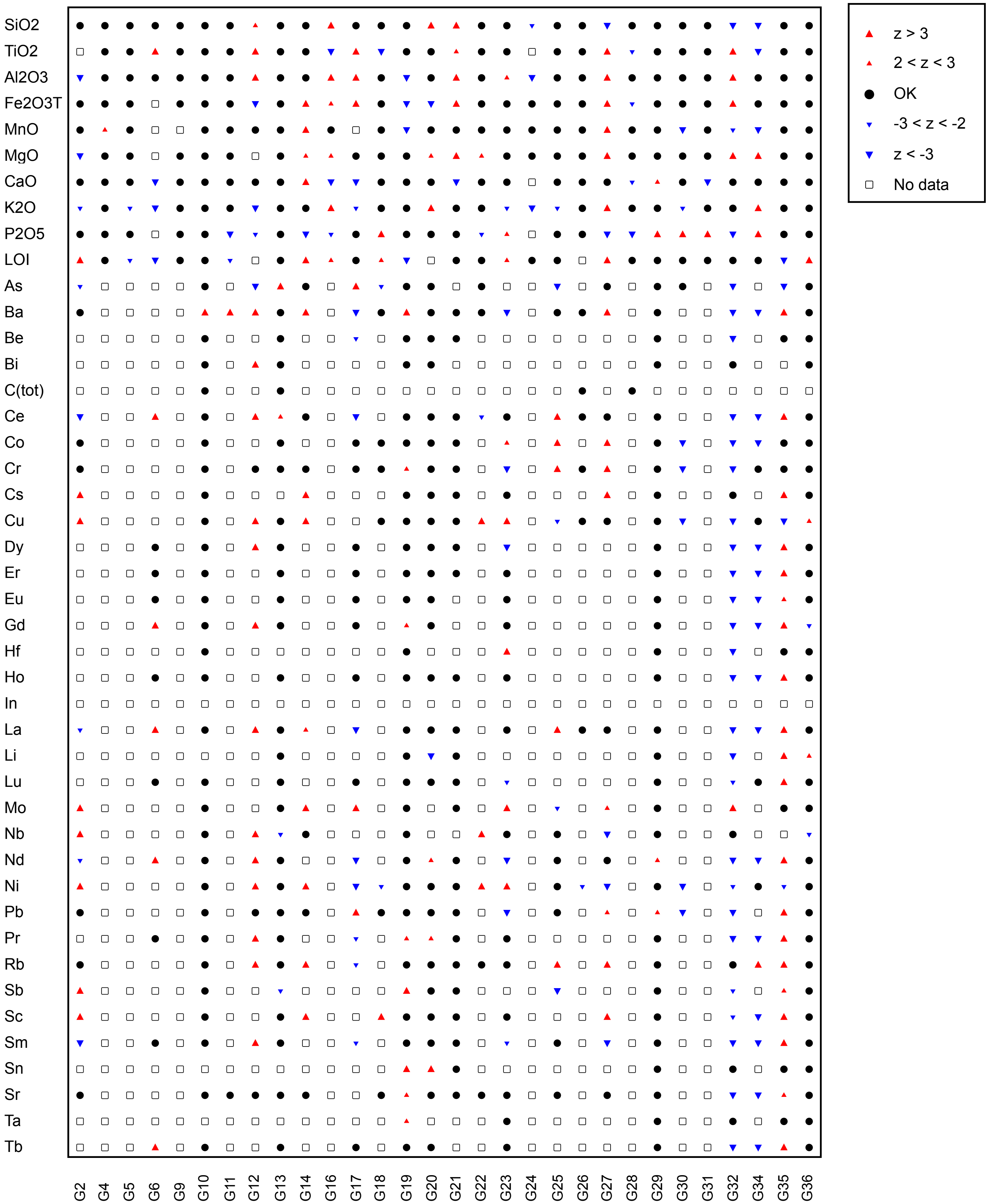


Figure 2: GeoPT46A - Phosphate rock, POLC-1. Data distribution charts provided for information only for elements for which values could not be assigned.

Multiple Z-Score Chart for GeoPT46A



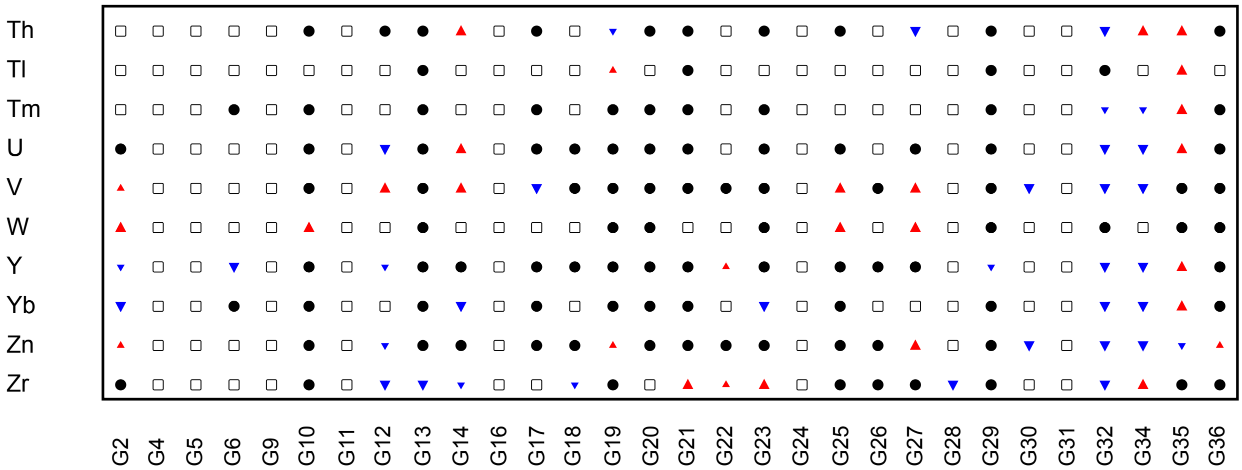
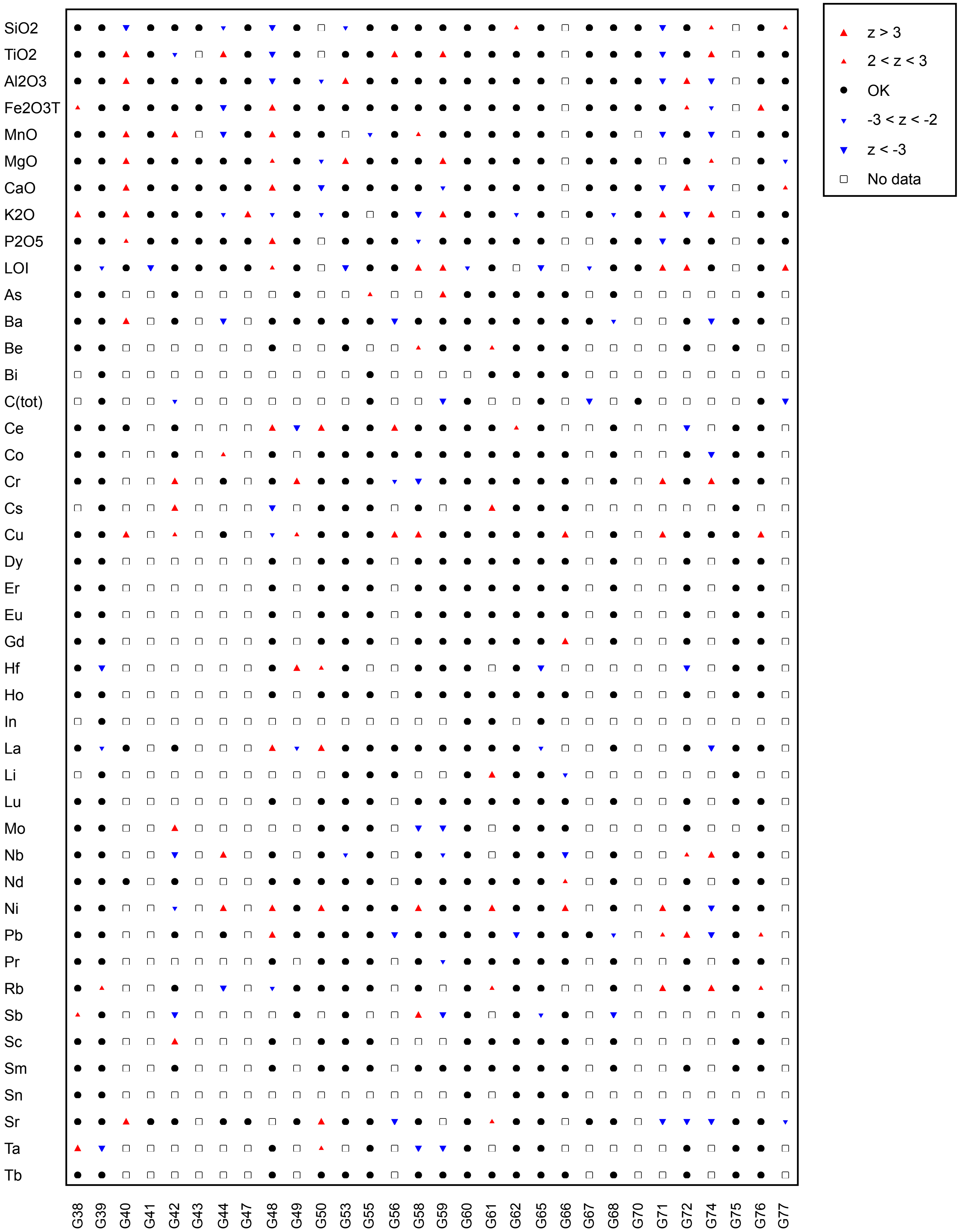


Figure 3: GeoPT46A - Phosphate rock, POLC-1. Multiple z-score charts for laboratories participating in the GeoPT46 A round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT46A



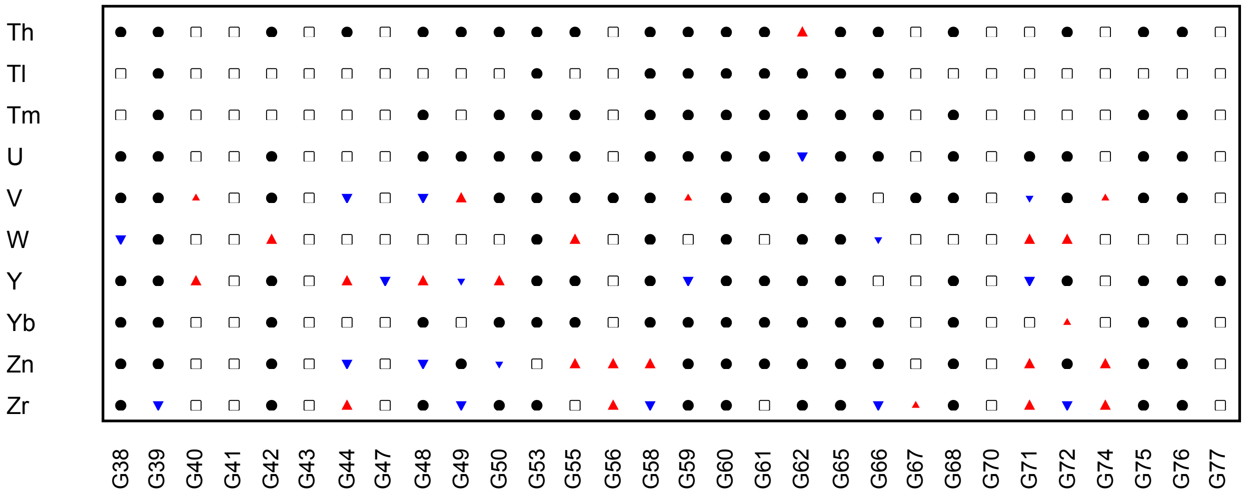
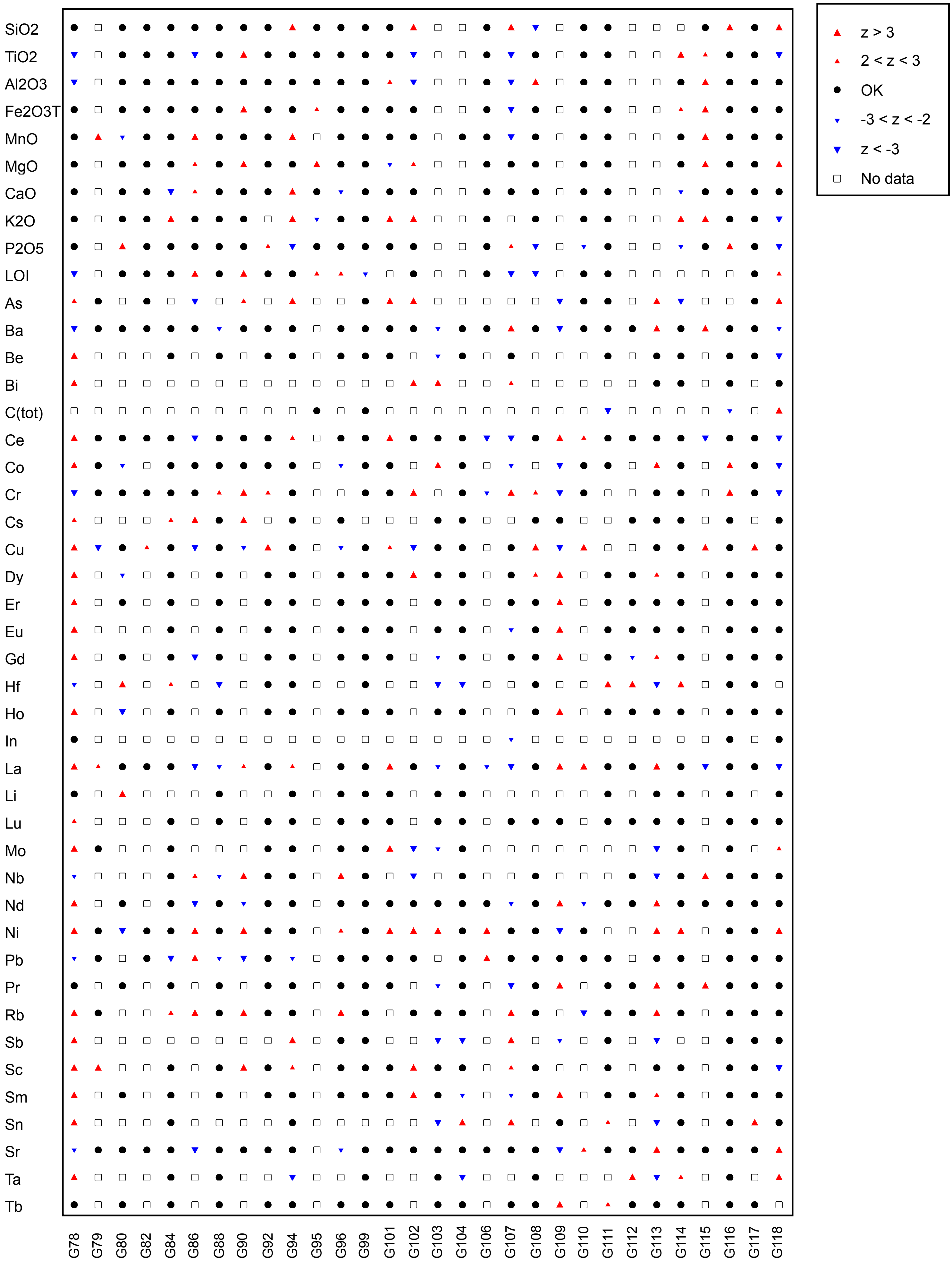


Figure 3: GeoPT46A - Phosphate rock, POLC-1. Multiple z-score charts for laboratories participating in the GeoPT46 A round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT46A



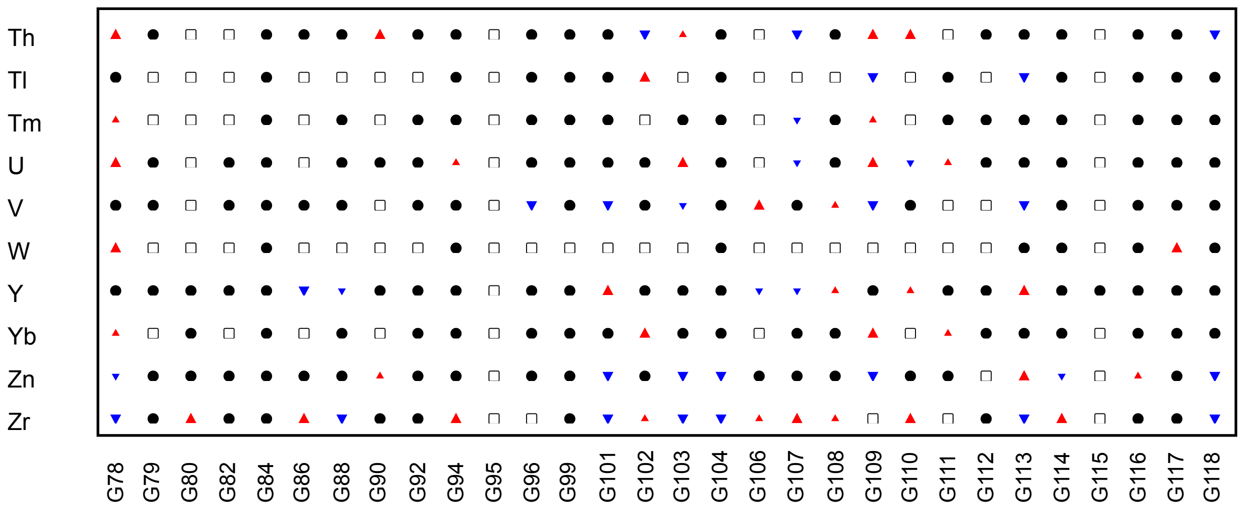


Figure 3: GeoPT46A - Phosphate rock, POLC-1. Multiple z-score charts for laboratories participating in the GeoPT46 A round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT46A

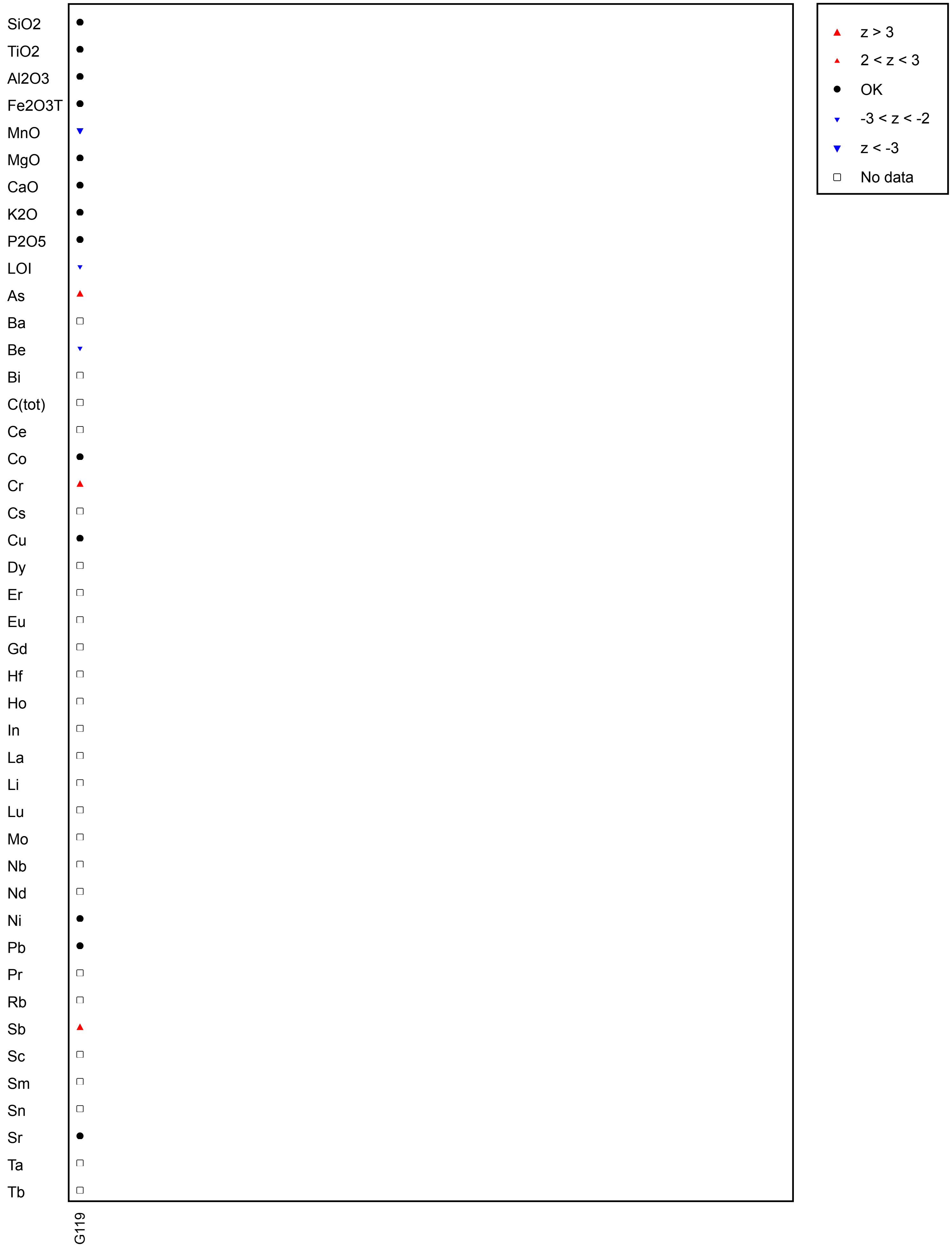


Figure 3: GeoPT46A - Phosphate rock, POLC-1. Multiple z-score charts for laboratories participating in the GeoPT46 A round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).