Geo*PT*54A — AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES — REPORT ON ROUND 54A (Basalt, CSQ-1) / February 2024

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Abstract

Results are presented for Round 54A of the Geo*PT* Proficiency Testing programme for analytical geochemistry laboratories organised by the International Association of Geoanalysts (IAG). The test material distributed in this round was the Basalt, CSQ-1. In this report, the data contributed by 93 laboratories are listed, together with an assessment of consensus values, consequent *z*-scores and a series of charts to show for each analyte the distribution of contributed results and the overall performance of participating laboratories.

Introduction

This fifty-fourth round of Geo*PT*, the international proficiency testing programme for geoanalytical laboratories, was conducted in a similar manner to earlier rounds (reports listed in the Appendix). The programme is designed to be a key part of the routine quality assurance procedures employed by an analytical geochemistry laboratory. It is organised by the International Association of Geoanalysts and is conducted in accordance with a published protocol (IAG, 2020). The overall aim of the programme is to provide participating laboratories with information on their performance in the form of *z*-scores for each reported measurement result so that individual laboratories can decide whether the quality of their data is satisfactory in relation both to their chosen fitness-for-purpose criteria and to the performance of other laboratories participating in this round. In circumstances where a *z*-score from a reported result is unsatisfactory, a participating laboratory is encouraged to investigate for unsuspected analytical bias and to take corrective action when it appears justified.

Steering Committee for Round 54A:

P.C. Webb (administrator and results assessor), P.J. Potts (results reviewer), C.J.B. Gowing (distribution manager), M. Thompson (statistical advisor), J. Enzweiler (arranging supply of CSQ-1 material).

Timetable for Round 54A:

Distribution of sample: October 2023
Results accepted from: 20th November 2023
Results submission deadline: 17th January 2024
Release of report: March 2024

Geo*PT*54A Test Material Details

The Basalt test material, CSQ-1, is in fact, the certified reference material (CRM) known as Basalt Ribeirão Preto BRP-1, which was provided by the Geological Survey of Brazil, as arranged by Prof. Jacinta Enzweiler of the Institute of Geosciences, University of Campinas, Sao Paolo, Brazil. Supplied in 70 x 55 g portions, it was repackaged at BGS Keyworth under the direction of Dr Charles Gowing, whereby portions were combined and divided to provide 140 packets of test material in a form suitable for distribution to participating laboratories.

The homogeneity of the test material Basalt Ribeirão Preto, BRP-1, was established prior to its certification and details were reported by Cotta et al. (2007). It was therefore considered that this material was sufficiently homogeneous to be suitable for use in this proficiency test.

Submission of Results

For Geo*PT*54A (CSQ-1), a total of 3309 measurement results were submitted by 93 laboratories and are listed in Table 1. We are disappointed that the number of laboratories reporting is lower in comparison with the last round of Geo*PT*. The average number of measurement results submitted by participating laboratories is also lower than usual, but greater than for the companion round, Geo*PT*54. Of the measurements submitted, 1635 results were designated by their originators as data quality 1 (see the ***z*-score analysis section** below for explanation of data quality) and are shown in **bold**, whereas 1674 results were specified as data quality 2 and are shown underlined. Results from all laboratories submitting data were used to assess consensus values for each measurand.

Anomalies in reporting were recognised as follows: **Three laboratories** appear to have **reported in error their results for BNA-1, the subject of Geo*PT*54**. **Two other laboratories** appear to have reported all major element some trace element results for **material that does not resemble CSQ-1**. **Two laboratories** reported some results in **units of g/100g instead of mg/kg**: one for **Corg and Ctot**, another for **all six trace elements reported**, which is **counter to our instructions** and would result in any z-scores being hugely inflated. Only two laboratories reported values of '0' (i.e. zero) in this round.

As a result of **incorrect reporting, we must remind our participants that measurement results for all constituents listed as elemental mass fractions should be reported in mg/kg**. **We also ask you NOT to report zeros** unless it is a genuine result from a LOI determination. Please be aware that **erroneous results cannot be altered or removed once they have been submitted** and that corresponding ***z*-scores will be adversely affected**.

Assigned values and results summary

Following procedures described in earlier rounds, and detailed fully in the Geo*PT* protocol (IAG, 2020), 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 its true composition. Values were credited with assigned status on the basis that: i) sufficient laboratories (15 or more) had contributed data for effective estimation of the consensus, ii) visual assessment gave confidence that a substantial proportion of the results distribution was symmetrically disposed about the consensus value, iii) the ratio of the uncertainty in the location estimate to the target precision was an acceptably small value (<0.5), and iv) an evaluation of measurement results by analytical procedure – including both the method of analysis and the form of sample preparation – indicated either that no significant procedural bias was discernible amongst measurement results from which the consensus was derived or that sufficient data judged to be unbiased was available from which the consensus value was determined. Where these criteria were largely, but not fully met, or where obvious anomalies in the dataset could be accommodated by judicious selection of the consensus, values were credited with 'provisional' rather than 'assigned' status.

Data assessments involved an examination of barcharts showing the distribution of results contributed for each measurand (as presented in Figures 1 and 2). In addition, a variety of plots, permitting discrimination of data by method of measurement and by sample preparation procedure, as developed by Thomas Meisel using the statistical package 'R' and made available using the Shiny App (*https://www.shinyapps.io*), were also examined. This approach has enabled us, when necessary, to refine the selection of consensus values by taking account of data distributions according to measurement procedure. As notified to participants in 2022, the facility now exists for participants to inspect for themselves Geo*PT* data distributions in a similar way using Shiny App graphics through the link: *https://geoanalyst.shinyapps.io/GeoPTcommon2/*. This package permits viewing of all data submitted according to: (i) the principle of measurement, (ii) the method of sample preparation, and (iii) the chosen fitness-for-purpose criterion, using several forms of graphic display.

Consensus values derived from the contributed data are listed in Table 2. They were provided in 5 instances by the Huber robust mean, a procedure that provides limited accommodation of outliers, but is unreliable when a dataset is skewed. In such circumstances, the median is often a more robust estimator of the consensus and was employed in 35 cases. For more severely skewed and strongly tailed datasets, even the median may not be a suitable estimator and a mode can often provide a more effective means of estimating the location of the consensus. In this round the use of a mode as a consensus estimator was preferred in 15 cases, and in 11 of those, the distribution of data was sufficiently compatible with the conditions outlined above

to justify the designation as an assigned value. Although the choice of a mode may sometimes be used to 'fine tune' the location of the consensus, the use of modes in this round was more often necessary because some datasets were skewed or means and medians appeared to be significantly affected by gross outliers. Sometimes the source of the skew can be attributed to a known analytical problem. The procedure used to determine modes was mostly as 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 can provide a robust estimate of the consensus location that represents the most coherent part of the data distribution where the data are often symmetrically disposed, although the dataset as a whole may be asymmetric.

Table 2 lists consensus values conferred with assigned or provisional status for 11 major components and 45 trace elements in Geo*PT*54A (CSQ-1). Barcharts for datasets from which these consensus values were derived are shown in Figure 1. Statistical data, consensus values and status designations are listed in full in Table 2 for the 56 analytes: SiO_2, TiO_2, Al_2O_3, Fe_2O_3T, Fe(II)O*, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5, Ba, Be, Bi*, Cd*, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Ga, Gd, Hf, Ho, In*, La, Li, Lu, Mo, Nb, Nd, Ni, Pb, Pr, Rb, S*, Sb*, Sc, Sm, Sn*, Sr, Ta, Tb, Th, Tl, Tm, U, V, W*, Y, Yb, Zn and Zr. Of these, the measurands of the 8 analytes marked '*' were credited only with provisional status. Provisional status was conferred because either: i) a relatively small number of results (less than 15, but at least 8) 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, or iv) the dataset was affected by bias in one or more methods employed but the remaining data defined a viable consensus.

Bar charts for the 9 analytes: H_2O^+, LOI, Ag, As, C(tot), Cl, F, Ge and Se 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 highly dispersed for a sufficiently reliable determination of a consensus for the estimation of *z*-scores.

The barcharts for Basalt CSQ-1 exhibit more regular distributions of data than observed for the companion test material, the Tholeiitic Basalt, BNA-1 of Round 54, largely because many more measurands are present at higher mass fractions and consequently are less affected by the poor relative precision of measurements made close to detection limits.

It is observed that results from XRF powder pellets are sometimes biased in relation to those provided by other methods including XRF fusion disc results. This applies in particular to MgO (Figure 0.1) where values for six out of eight laboratories are considerably lower than those derived by other methods. Fe_2O_3 results by XRF on powder pellets are also low and CaO results slightly low. However, results for Al_2O_3 are significantly high, as are most of the K_2O results. Several of these observations are similar to those noted for powder pellet / XRF determinations of the Tholeiitic Basalt, BNA-1 in Round 54. Clearly the

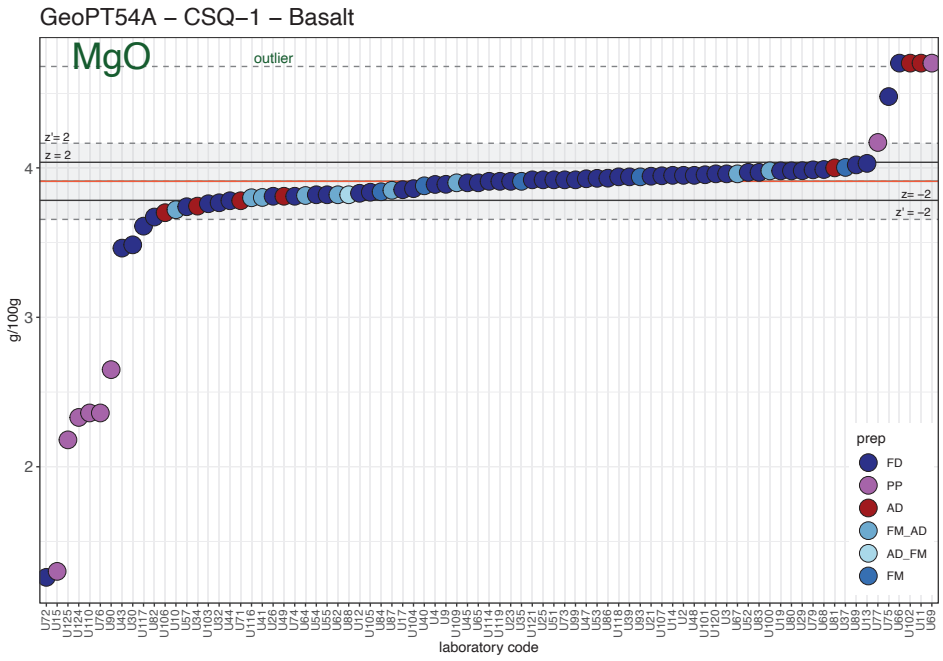

Figure 0.1 A sequential data distribution plot for CSQ-1 showing sorted Mg results distinguished according to method of sample preparation where powder pellet (PP) data is markedly out of kilter with other data. Key to sample preparation: FD – Fusion disc, PP – Powder pellet, AD – Acid digestion, FM_AD – Fusion followed by acid digestion, FM – Fusion melt, AD_FM – Acid digestion and fusion of residue. Results marked as outliers have their reported magnitude suppressed – in this case they appear mostly to be measurements of other materials.

measurement of major elements by XRF on powder pellets appears to be less reliable than competing techniques.

Powder pellet results for several trace elements also exhibited bias relative to results from other methods. Powder pellets are known to suffer from difficulties in assessing corrections for X-ray attenuation in individual mineral grains that differ in their properties from the average composition of the sample which is assumed when corrections for x-ray attenuation and enhancement are applied (Meisel et al., 2022). Bias of powder pellet results to lower values than the consensus provided by other methods is observed for Nb and to higher values for Pb. Both consensus values were nevertheless credited with assigned status, given the expectation that more confidence could be apportioned to results derived by other methods. Figure 0.2 shows in a 'ridges' plot how the powder pellet results for Pb range to higher values than those obtained by other methods, especially by ICP-MS and acid digestion. This effect may be a result of both poor precision and line interferences associated with measurement of Pb by XRF combined with suppression of results at lower values. For Cr many XRF powder pellet results are substantially high, but several are low, as illustrated in Figure 0.3. This effect may be a result of applying an 'average' mass absorption correction that does not account adequately for such effects in grains of individual mineral species.

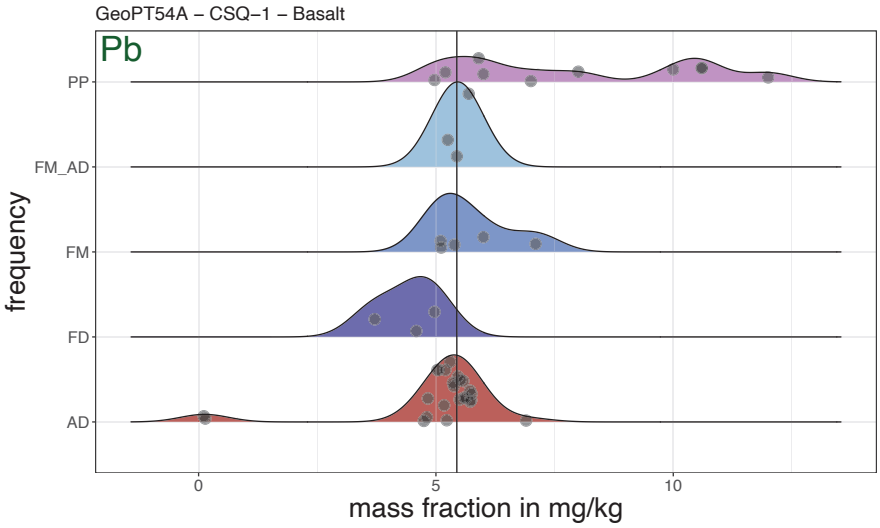

Figure 0.2 A 'ridges' plot for Pb in CSQ-1 in which smoothed distributions of results according to method of sample preparation show that the majority of powder pellet results range to higher values than results by other methods: PP – Powder pellet (XRF), FM_AD – Fusion followed by acid digestion, FM – Fusion melt, FD – Fusion disc (XRF), AD – Acid digestion.

The presence of significant high tails resulting in skewed datasets necessitated the use of modes as consensus values as has already been noted. For Ce, Cr, Pb and U a substantial proportion of the high tail is made up of dispersed XRF results, especially those made using powder pellets, but in each case a sufficiently convincing consensus is provided by coherent results from other methods to permit assigned status to be conferred. High tails for Cd (Figure 0.4), Mo and W comprise a mixture of XRF, ICP-MS and ICP-AES/OES data, although the XRF results are generally the more extreme. In such cases where there are both coherent

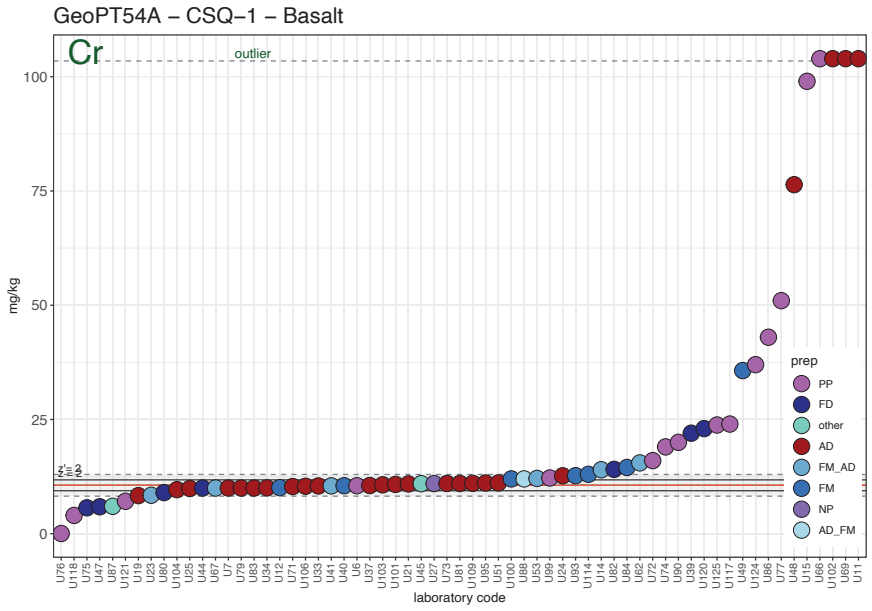

Figure 0.3 A sequential data distribution plot for CSQ-1 of sorted Cr results distinguished according to method of sample preparation showing results of powder pellet measurements largely biased to high mass fractions. Key to sample preparation: PP – Powder pellet (XRF), FD – Fusion disc (XRF), other – unspecified, AD – Acid digestion, FM_AD – Fusion followed by acid digestion, FM – Fusion melt, NP – nano-pellet, AD_FM – Acid digestion and fusion of residue. Results marked as outliers have their reported magnitude suppressed – in this case they appear mostly to be measurements of other materials.

data and data responsible for high tails by ICP-MS, it suggests that some laboratories using this method are performing poorly in relation to many others, particularly as it is expected that ICP-MS detection limits would be an order of magnitude smaller than those of XRF.

As is often the case, some sets of results, including those of TiO_2, MnO, K_2O, P_2O_5 and Cr feature stepped distributions caused by over-rounding of some of the contributed data. We continue to recommend that for proficiency testing purposes all measurements should be quoted to **at least one decimal place more than would be routinely presented** to a client. This recommendation would enable our statistical procedures to define consensus values more precisely. It is especially relevant to distributions of major element components and trace elements when reported at low mass fractions.

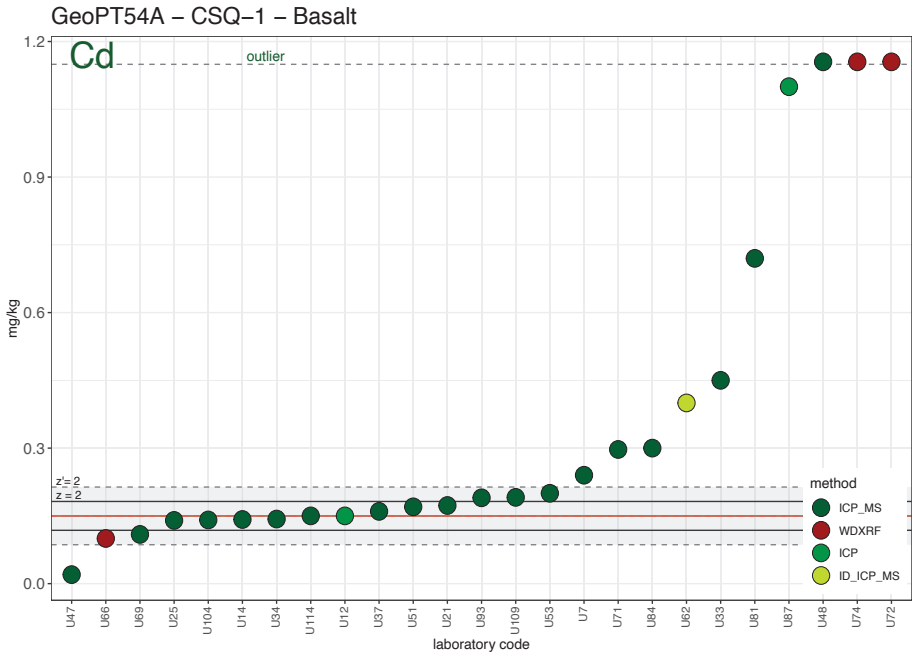

Figure 0.4 A sequential data distribution plot for CSQ-1 showing sorted Cd results distinguished according to method of measurement where ICP-MS measurement results contribute (with other techniques) to a significantly large tail to high values alongside data defining a satisfactory consensus. Key to methods: ICP-MS – Inductively coupled plasma - mass spectrometry; WDXRF – Wavelength dispersive XRF; ICP – Inductively coupled plasma - atomic/optical emission spectrometry; ID_ICP_MS – Isotope dilution – inductively coupled plasma - mass spectrometry. Results marked as outliers have their reported magnitude suppressed.

Z-score analysis

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

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

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

The **standard deviation for proficiency** (σ_{pt}) – also referred to as the target precision – for each measurand assessed was calculated from a modified form of the Horwitz function as follows:

$$\sigma_{pt} = \mathrm{k}.x_{pt}^{0.8495}$$

Where x_{pt} is the mass fraction of the element; the factor k = 0.01 for pure geochemistry laboratories (quality 1) and k = 0.02 for applied geochemistry laboratories (quality 2). *Z*-scores were calculated for each elemental measurement submitted by each laboratory from:

$$z_i = [x_i - x_{pt}] / \sigma_{pt}$$

Where x_i is the contributed measurement result, x_{pt} is the assigned (or provisional) value and σ_{pt} is the target standard deviation (all as mass fractions). *Z*-scores for results contributed to Geo*PT*54A are listed in Table 3. Those of results designated as data **quality 1** are shown in **bold**: those of data <u>quality 2</u> are shown <u>underlined</u>. *Z*-scores derived from *provisional value*s 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 participating laboratory). If the *z*-score for an element falls outside this range, more especially if it is outside the

range –3<z<3, laboratories are advised to examine their procedures, and if necessary, take appropriate action to ensure that their 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 from your laboratory 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 55, the test materials for which will be distributed during March 2024.

Acknowledgements

The authors once again thank Andrea Mills (BGS) for much-valued assistance in distributing these samples and Thomas Meisel (Montanuniversität Leoben, Austria) for both maintaining and continuing to improve the system and developing procedures that involve the package 'R' and the Shiny App. which has greatly assisted in the investigation of data according to analytical procedure, has provided the graphics featured in Figures 0.1, 0.2, 0.3 and 0.4. as well as facilitating the analysis of datasets involving modes derived according to Thompson (2017).

References

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References of more general relevance

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Potts P.J., Thompson M. and Webb, P.C. (2015) The reliability of assigned values from the Geo*PT* proficiency testing programme from an evaluation of data for six test materials that have been characterised as certified reference materials. *Geostandards and Geoanalytical Research*, **39**, 407–417.

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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.

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**, 217–22.

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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.

ADDENDUM
— IMPORTANT NOTICES TO ANALYSTS

Explicit advice to analysts for reporting of procedures involving ignition and fusion

Note that some laboratories are still listing their procedure for determining LOI as the same as that employed for major elements, rather than providing separate, specific details. We must remind analysts that it is important to provide information that is appropriate for every analyte. Indeed, analysts reporting measurement results for procedures involving fusion, sintering or ignition, and in particular, LOI determinations, should specify the correct method used and give details both of the temperature used and where appropriate, the end-point criterion, e.g., the duration of ignition. This information should be supplied in the description of the relevant **Procedure,** as **Additional Details**.

We recommend that details of gravimetric procedures are 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.

Notice of new procedural coding

The facility to use the new **analytical technique and sample preparation codes** available for this round has had poor take-up. For the future, where relevant, please revise your procedure definition to specify the codes **LA-ICP-MS for laser ablation-ICP-MS measurement and either NP for nano-particulate pellets or FD for glass discs** to provide more accurate definitions of procedures in subsequent rounds.

Participant access to graphical displays of Geo*PT* data distributions

As previously reported, participants can view their data according to analytical procedure online, using the Shiny App implementation produced and arranged by Thomas Meisel:
https://www.geoanalyst.shinyapps.io/GeoPTcommon2

Appendix 1

Publication status of proficiency testing reports.

Previous reports are available for download from the IAG website (*http://www.geoanalyst.org/*).

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

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

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

Geo*PT*4
Thompson M., Potts P.J., Kane J.S., Webb P.C. and Watson J.S. (1999b)
Geo*PT*4. International proficiency test for analytical geochemistry laboratories - Report on round 4. Published in the electronic version of Geostandards Newsletter: The Journal of Geostandards and Geoanalysis (Summer 2000).

Geo*PT*5
Thompson M., Potts P.J., Kane J.S., and Wilson S. (1999c)
Geo*PT*5. International proficiency test for analytical geochemistry laboratories - Report on round 5. Published in the electronic version of Geostandards Newsletter: The Journal of Geostandards and Geoanalysis (Summer 2000).

Geo*PT*6
Potts P.J., Thompson M., Kane J.S., Webb P.C. and Carignan J. (2000)
GEO*PT*6 - an international proficiency test for analytical geochemistry laboratories - report on round 6 (OU-3: Nanhoron microgranite) and 6A (CAL-S: CRPG limestone). International Association of Geoanalysts, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. Unpublished report.

Geo*PT*13
Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and Kasper 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. Unpublished report.

Appendix 1 (Cont'd)

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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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 (Toleiitic Basalt, TLM-1) / August 2014. International Association of Geoanalysts, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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.

Appendix 1 (Cont'd)

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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. 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, Keyworth. Unpublished report.

Geo*PT*46
Webb, P.C., Potts, P.J., Thompson, M. and Gowing, C.J.B. (2020)
Geo*PT*46 – an international proficiency test for analytical geochemistry laboratories – report on round 46 (Granodiorite, HG-1) / January 2020. International Association of Geoanalysts, Keyworth. Unpublished report.

Geo*PT*46A
Webb, P.C., Potts, P.J., Thompson, M. Gowing, C.J.B. and Wilson, S.A. (2020)
Geo*PT*46A – an international proficiency test for analytical geochemistry laboratories – report on round 46A (Phosphate rock, POLC-1) / January 2020. International Association of Geoanalysts, Keyworth. Unpublished report.

Geo*PT*47
Webb, P.C., Potts, P.J., Thompson, M. and Gowing, C.J.B. (2020)
Geo*PT*47 – an international proficiency test for analytical geochemistry laboratories – report on round 47 (Silty Soil BIM-1) / December 2020. International Association of Geoanalysts, Keyworth. Unpublished report.

Geo*PT*47A
Webb, P.C., Potts, P.J., Thompson, M. and Gowing, C.J.B. (2020)
Geo*PT*47A – an international proficiency test for analytical geochemistry laboratories – report on round 47A (Silty Soil, NES-1) / December 2020. International Association of Geoanalysts, Keyworth. Unpublished report.

Geo*PT*48
Webb, P.C., Potts, P.J., Thompson, M., Gowing, C.J.B., Glodny, J., Wiedenbeck, M. (2021)
Geo*PT*48 – an international proficiency test for analytical geochemistry laboratories – report on round 48 (Monzonite, MzBP-1) / April 2021. International Association of Geoanalysts, Keyworth. Unpublished report.

Geo*PT*49
Webb, P.C., Potts, P.J., Thompson, M., Gowing, C.J.B., and Wilson, S.A. (2021)
Geo*PT*49 – an international proficiency test for analytical geochemistry laboratories – report on round 49 (Basalt, BVA-1) / July 2021. International Association of Geoanalysts, Keyworth. Unpublished report.

Geo*PT*50
Webb, P.C., Potts, P.J., Thompson, M., and Gowing, C.J.B. (2022)
Geo*PT*50 – an international proficiency test for analytical geochemistry laboratories – report on round 50 (Calcified sediment, CSd-1) / January 2022. International Association of Geoanalysts, Keyworth. Unpublished report.

Geo*PT*51
Webb, P.C., Potts, P.J., Thompson, M., Gowing, C.J.B. and Renno, A.D. (2022)
Geo*PT*51 – an international proficiency test for analytical geochemistry laboratories – report on round 51 (Leucomonzogranite, GMN-1) / July 2022. International Association of Geoanalysts, Keyworth. Unpublished report.

Geo*PT*51A
Webb, P.C., Potts, P.J., Thompson, M. and Gowing, C.J.B. (2022)
Geo*PT*51A – an international proficiency test for analytical geochemistry laboratories – report on round 51A (Granite, MEG-1) / July 2022. International Association of Geoanalysts, Keyworth. Unpublished report.

Geo*PT*52
Webb, P.C., Potts, P.J., Gowing, C.J.B., Thompson, M., Wind, J., (2023)
Geo*PT*52 – an international proficiency test for analytical geochemistry laboratories – report on round 52 (Metalliferous Shale, EMS-1) / January 2023. International Association of Geoanalysts, Keyworth. Unpublished report.

Geo*PT*53
Webb, P.C., Potts, P.J., Gowing, C.J.B., Thompson, M., Wiedenbeck, M., Glodney, J. (2023) Geo*PT*53 – an international proficiency test for analytical geochemistry laboratories – report on round 53 (Tonalite, TLB-1) / July 2023. International Association of Geoanalysts, Keyworth. Unpublished report.

Table 1 - GeoPT54A Contributed data for Basalt, CSQ-1. 17/01/2024

Lab Code		U1	U2	U3	U4	U6	U7	U8	U9	U10	U11	U12	U13	U14
SiO2	g 100g^{-1}		50.62	49.89	50.5			54.4	50.46	52.19		50.54	50.1	50.26
TiO2	g 100g^{-1}		3.88	3.922	3.864	3.898		3.69	3.84	4.048	0.9	3.86	3.98	3.86
Al2O3	g 100g^{-1}		12.27	12.32	12.5				12.71	12.19	14.5	12.31	12.78	12.43
Fe2O3T	g 100g^{-1}		15.61	15.86	15.59			15.2	15.42	15.17	11.2	15.61	15.56	15.96
Fe(II)O	g 100g^{-1}				11.14									
MnO	g 100g^{-1}			0.232	0.23	0.211		0.19	0.21		0.17	0.22	0.22	0.22
MgO	g 100g^{-1}		3.95	3.96	3.889				3.89	3.72	10.2	3.83	4.03	3.95
CaO	g 100g^{-1}		8.17	7.971	7.967			7.73	7.74	7.739	13	7.9	7.79	7.87
Na2O	g 100g^{-1}		2.74	2.66	2.711				2.55	2.781	1.68	2.76	2.87	2.77
K2O	g 100g^{-1}		1.54	1.494	1.516			1.49	1.49	1.572	0.04	1.55	1.5	1.54
P2O5	g 100g^{-1}		0.684	0.662	0.65				0.59	0.601	0.03	0.63	0.65	0.64
H2O+	g 100g^{-1}				1.8									
CO2	g 100g^{-1}													
LOI	g 100g^{-1}		0.54	0.55	0.516				0.6	0.625		0.42	0.4	0.55
Ag	mg kg^{-1}						0.14							0.072
As	mg kg^{-1}						2.63							0.54
Au	mg kg^{-1}													
B	mg kg^{-1}													
Ba	mg kg^{-1}	547		482	534.2	633.1	553	606	600	564.5	5.82	550.960		525
Be	mg kg^{-1}			1.9	1.46		1.77				0.092	1.78		1.54
Bi	mg kg^{-1}						0.03							0.023
Br	mg kg^{-1}													
C(org)	mg kg^{-1}													100
C(tot)	mg kg^{-1}				492									200
Cd	mg kg^{-1}						0.24					0.15		0.142
Ce	mg kg^{-1}	92.94		97.4	94.9	119.9	95.1	101			1.68	91.37		88.2
Cl	mg kg^{-1}													
Co	mg kg^{-1}			36	40.51	38.02	39.5				58.8	34.94		38.3
Cr	mg kg^{-1}					10.5	10				548	10.08		14
Cs	mg kg^{-1}	0.36			0.4		0.39				0.005	0.35		0.35
Cu	mg kg^{-1}			152	157.1	172.6	162	171			112	158.730	200	162.5
Dy	mg kg^{-1}	8.54		8.99	9.52		8.44				2.46	8.15		8.45
Er	mg kg^{-1}	4.14		4.51	4.64		4.15				1.63	4.05		4.18
Eu	mg kg^{-1}	3.37		3.51	3.73		3.34				0.49	3.25		3.05
F	mg kg^{-1}													
Ga	mg kg^{-1}			23.5	25.3	24.89	27.9				15.4	23.93		25.9
Gd	mg kg^{-1}	10.38		11	10.65		10.5				1.73	10.07		10.5
Ge	mg kg^{-1}			2.15	1.3		7.48					15.98		0.24
Hf	mg kg^{-1}	7.96		9.69	7.6		7.65				0.57	5.84		8.09
Hg	mg kg^{-1}													
Ho	mg kg^{-1}	1.63		1.62	2.13		1.57				0.55	1.55		1.61
In	mg kg^{-1}					0.040								0.113
Ir	mg kg^{-1}													
La	mg kg^{-1}	42.16		43.3	42	38	41.5	45.4			0.56	39.93		39.7
Li	mg kg^{-1}						7.74				2.87	7.67		7.1
Lu	mg kg^{-1}	0.5		0.508	0.461		7.65				0.24	0.48		0.44
Mo	mg kg^{-1}				1.54	1.24	1.4				0.18	1.45		1.46
Nb	mg kg^{-1}	31.22		28.8	27.3	28.33	26.1				0.52	29.4		30.6
Nd	mg kg^{-1}	51.95		53.2	53.5		48.8	54.2			2.26	49.78		50.1
Ni	mg kg^{-1}			24.3	23.5	23.4	22.2				239	20.42		23
Pb	mg kg^{-1}	5.44			5.6	4.97	5.63				0.11	5.39		4.81
Pd	mg kg^{-1}													
Pr	mg kg^{-1}	12.29		12.5	13.1		11.8				0.35	11.47		11.55
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	35.6		33.8	34.36	35.2	34.8	39			0.18	33.28		35.7
Re	mg kg^{-1}													0.001
Ru	mg kg^{-1}													
S	mg kg^{-1}				404					410				400
Sb	mg kg^{-1}						0.09							0.07
Sc	mg kg^{-1}	29		34.4		24.3	28.6				42.2	28.36		28.6
Se	mg kg^{-1}						4.41							28.6
Sm	mg kg^{-1}	11.5		11.3	10.69		10.5				1.03	10.65		10.85
Sn	mg kg^{-1}			2.2	2.6		2.38				0.24	2.59		2.28
Sr	mg kg^{-1}	504		495	485.6	478.440	514	523	450	516.1	110	483.350	500	495
Ta	mg kg^{-1}	1.93		1.9	1.98		1.79				0.038	1.88		1.77
Tb	mg kg^{-1}	1.55		1.6	1.96		1.41				0.34	1.86		1.46
Te	mg kg^{-1}						0.01							0.005
Th	mg kg^{-1}	4		4.05	3.62	4.22	3.67				0.024	3.88		3.81
Tl	mg kg^{-1}						0.13				0.021	0.11		0.093
Tm	mg kg^{-1}	0.6		0.577	0.63		0.56				0.24	0.54		0.55
U	mg kg^{-1}	0.82		0.863	0.79		0.81				0.01	0.81		0.79
V	mg kg^{-1}			399	411.9	381.930	407		400		307	371.2		440
W	mg kg^{-1}						0.78				0.23	0.51		0.438
Y	mg kg^{-1}	42.75		41.3	37.67	39.51	38.8				14.8	39.98		38.1
Yb	mg kg^{-1}	3.46		3.59	3.63		3.38				1.59	3.36		3.33
Zn	mg kg^{-1}			159	141.1	140.740	140	137			68.8	121.8	200	151.5
Zr	mg kg^{-1}	313		308	299	311.060	311	316	300		13.4	343.290	500	313

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

Table 1 - GeoPT54A Contributed data for Basalt, CSQ-1. 17/01/2024

Lab Code		U15	U16	U17	U19	U21	U23	U24	U25	U26	U27	U28	U29	U30
SiO2	g 100g-1	38		50.479	48.58	50.114	50.23		50.05	49.95	50.9		50.515	46.22
TiO2	g 100g-1	3.7		3.818	4.09	3.832	3.8		3.85	3.85	3.95		3.865	3.396
Al2O3	g 100g-1	7.7		12.368	12.03	12.447	12.56		12.38	12.49	12.2		12.437	11.8
Fe2O3T	g 100g-1	15		15.596	16.44	15.64	15.94		15.67	15.95	15.92		15.614	17.2
Fe(II)O	g 100g-1					10.81			10.95	10.31	3.558			
MnO	g 100g-1	0.21		0.218	0.24	0.212	0.213		0.21	0.213	0.232		0.219	0.195
MgO	g 100g-1	1.3		3.854	3.98	3.944	3.91		3.92	3.81			3.981	3.485
CaO	g 100g-1	7.5		7.913	8.4	7.853	7.93		7.94	7.84	8.085		7.921	8.271
Na2O	g 100g-1			2.738	2.59	2.823	2.47		2.8	2.78	2.965		2.788	2.619
K2O	g 100g-1	1.6		1.529	1.56	1.495	1.54		1.5	1.53	1.551		1.556	1.569
P2O5	g 100g-1	1.8		0.635	0.61	0.605	0.625		0.657	0.624	1.04		0.64	0.628
H2O+	g 100g-1	0.6			0.7								0.53	
CO2	g 100g-1													
LOI	g 100g-1			0.65	1.22	0.395	0.96		0.4				0.59	
Ag	mg kg-1							0.236	0.065		0.107			
As	mg kg-1								0.61					
Au	mg kg-1				0.006	0.001								
B	mg kg-1													
Ba	mg kg-1	680		547.4	536	549.3	488	558.6	600	556	522.1			
Be	mg kg-1				1.58	1.61		1.94	1.6					
Bi	mg kg-1				1.05				0.021		0.014			
Br	mg kg-1													
C(org)	mg kg-1				0.02									
C(tot)	mg kg-1				0.02	198								
Cd	mg kg-1					0.173			0.14					
Ce	mg kg-1		88.3	99.2	88.44	92.62	98.37	93.6	95.3	91.9	97.93	91.758		
Cl	mg kg-1	170			42.5									
Co	mg kg-1			37.5		39.603	39.78	25.97	41.1	37	37.72			
Cr	mg kg-1	99			8.34	10.9	8.42	12.68	9.9		10.98			
Cs	mg kg-1					0.372	0.26	0.374	0.38		0.315			
Cu	mg kg-1	170		164.7	131.6	159.360		178.220	161	176	154.5			
Dy	mg kg-1		8.265		7.45	8.479	8.87	8.6	8.67	8.34	8.934	8.351		
Er	mg kg-1		1.495		13.08	4.287	4.55	4.153	4.5	4.2	4.412	4.221		
Eu	mg kg-1		3.57		2.77	3.436	3.76	3.253	3.38	3.35	3.446	3.311		
F	mg kg-1				639	814			740					
Ga	mg kg-1			23.4	20.75	24.548	25.23	26.05	26.6	23.4	25.74			
Gd	mg kg-1		5.63		7.59	10.462	11.01	10.53	10.6	10.5	10.73	10.009		
Ge	mg kg-1										2.097			
Hf	mg kg-1				6.94	8.306	8.41	8.05	8.54		8.814			
Hg	mg kg-1													
Ho	mg kg-1		1.43			1.614	1.701	1.589	1.62		1.695	1.617		
In	mg kg-1					0.117			0.13		0.130			
Ir	mg kg-1					0.000								
La	mg kg-1		41.7		41.68	41.87	43.22	42.035	42.3	39.3	44.55	40.158		
Li	mg kg-1				7.45	6.52		6.996	7.4		7.063			
Lu	mg kg-1		0.5			0.509	0.534	0.510	0.55		0.530	0.485		
Mo	mg kg-1				1.2	1.534		1.417	1.57					
Nb	mg kg-1			28.5	34.47	29.859	26.43	31.76	31.3		32.94			
Nd	mg kg-1		50.65		52.25	53.49	55.116	51.32	53.9		52.94	54.867		
Ni	mg kg-1			23.5	15.39	24.01	20.1	17.5	23	23	22.26			
Pb	mg kg-1					5.03	5.69	5.72	5.3		6.128			
Pd	mg kg-1					0.001								
Pr	mg kg-1		11.9		5.07	12.187	12.5	12.231	12.3		12.29	12.291		
Pt	mg kg-1				0.015	0.001								
Rb	mg kg-1	33		34.4	15.05	35.83	33.1	36.37	37.4	35.3	16.48			
Re	mg kg-1													
Ru	mg kg-1					0.000								
S	mg kg-1				401	370.030								
Sb	mg kg-1					0.055		0.057						
Sc	mg kg-1	150			25.23	29.25	25	29.3	30.2	27.9	30.73	29.94		
Se	mg kg-1								0.248					
Sm	mg kg-1		10.22		11.24	11.23	11.85	11.01	11.7	10.6	11.81	11.31		
Sn	mg kg-1					2.03		2.58	2.6					
Sr	mg kg-1	500		494.2	496	483.7		814	544	480	515.7			
Ta	mg kg-1					1.87	2.06	1.969	1.7		1.829			
Tb	mg kg-1		1.6		2.85	1.522	1.652	1.6	1.61		1.586	1.516		
Te	mg kg-1				9.7									
Th	mg kg-1	5.2			3.96	3.709		3.997	4.03		4.228			
Tl	mg kg-1					0.112		0.124	0.111					
Tm	mg kg-1		0.23			0.579	0.59	0.584	0.58	0.55	0.623	0.565		
U	mg kg-1					0.794	0.85	0.818	0.88		0.506			
V	mg kg-1	400		414.2	417	418.410	458	397.9	461	388	435.4			
W	mg kg-1				1.7	0.431		0.458	0.5					
Y	mg kg-1		39.8	40.1	38.5	41.762	20.72	44.09	41.7	41.2	45.24	39.238		
Yb	mg kg-1		3.205		3.6	3.570		3.466	3.52	3.5	3.642	3.412		
Zn	mg kg-1	130		143.7	137	143.9	136	134	151	142	153.4			
Zr	mg kg-1	320		324.4	333	328.3	336	346.4	354	308	357			

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

Table 1 - GeoPT54A Contributed data for Basalt, CSQ-1. 17/01/2024

Lab Code		U32	U33	U34	U35	U37	U39	U40	U41	U43	U44	U45	U47	U48
SiO2	g 100g-1	49.38			48.79	50.56	50.74	51.36	51.061	50.716	50.67	50.83	50.602	50.55
TiO2	g 100g-1	3.894		3.605	3.747	3.821	4.086	3.83	3.907	3.897	3.856	3.89	3.814	3.84
Al2O3	g 100g-1	12.070		12.01	12.9	12.53	12.28	12.81	12.296	12.268	12.62	12.48	12.28	12.42
Fe2O3T	g 100g-1	15.757		15.4	15.77	15.79	15.83	15.09	15.581	15.718	15.62	15.72	15.87	15.64
Fe(II)O	g 100g-1									10.57				10.23
MnO	g 100g-1	0.217		0.213	0.217	0.227	0.22	0.21	0.218	0.224	0.2	0.22	0.216	0.214
MgO	g 100g-1	3.767		3.744	3.91	4.003	3.94	3.88	3.802	3.463	3.78	3.9	3.927	3.95
CaO	g 100g-1	7.916			7.9	7.857	8.05	7.48	8.007	7.778	7.68	7.95	7.997	7.88
Na2O	g 100g-1	2.629		2.579	2.76		2.66	2.81	2.641	2.245	2.58	2.73	2.784	2.74
K2O	g 100g-1	1.528		1.5	1.56	1.621	1.54	1.53	1.443	1.61	1.49	1.54	1.551	1.54
P2O5	g 100g-1	0.633		0.533	0.64	0.598	0.633	0.64	0.64	0.649	0.65	0.62	0.636	0.634
H2O+	g 100g-1													
CO2	g 100g-1													
LOI	g 100g-1				1.24		0.16	0.41	0.68	0.656		0.51	0.94	0.58
Ag	mg kg-1					0.115							0.012	0.323
As	mg kg-1		1.38	0.889		0.263							0.74	0.617
Au	mg kg-1													
B	mg kg-1													14.97
Ba	mg kg-1		568.6	561.5	599	550.7	552	564.5	543.430	565.250	561	553.6	548.3	587.2
Be	mg kg-1		1.81	1.746	2	1.752		1.8	1.78			1.816		2.168
Bi	mg kg-1			0.027		0.025							0.015	0.051
Br	mg kg-1													
C(org)	mg kg-1													
C(tot)	mg kg-1													
Cd	mg kg-1		0.45	0.143		0.16							0.02	1.966
Ce	mg kg-1		96.03	91.76	90.3	91.8	96	95.4	85.09		82.68	95.38	86.533	87.44
Cl	mg kg-1												38	
Co	mg kg-1		40.66	37.61	36	34.75	30	39.8	37.12	21.43	65.29	39.73		46.21
Cr	mg kg-1		10.45	10.03		10.55	22	10.5	10.47		10	10.96	5.9	76.38
Cs	mg kg-1		0.39	0.372		0.364		0.5				0.323	0.4	0.380
Cu	mg kg-1		178.930	164.8	160	146.8	150	160.1	141	163.230	143	118	114.4	190.3
Dy	mg kg-1		8.54	8.483	8.3	8.555		8.5	8.47		7.16	8.384	8.264	7.255
Er	mg kg-1		4.27	4.208	3.9	4.259		4.3	4.24		3.77	4.211	4.12	3.639
Eu	mg kg-1		3.4	3.363	3.22	3.325		3.5	3.48		3.41	3.365	3.427	2.962
F	mg kg-1						671							
Ga	mg kg-1		28.8		26	24.13	23	24.5	24.45		25.11	24.47	24.93	30.27
Gd	mg kg-1		10.78	10.36	9.3	10.27	7	10.5	10.25		11.28	10.15	10.362	9.367
Ge	mg kg-1		2.47		1	1.38					1.57		1.83	14.67
Hf	mg kg-1		8.08	8.047	7.3		8	8.4	7.72			8.085	7.7	7.015
Hg	mg kg-1													
Ho	mg kg-1		1.63	1.605	1.5	1.597		1.7	1.58		1.17	1.56	1.563	1.34
In	mg kg-1			0.120		0.119								
Ir	mg kg-1													
La	mg kg-1		42.86	40.93	40.2	41.58	52	44.6	40.75		50.19	41.1	40.66	39.2
Li	mg kg-1		7.06	6.798		6.983						6.587		11.38
Lu	mg kg-1		0.5	0.498	0.52	0.484		0.5	0.51		0.45	0.487	0.299	0.405
Mo	mg kg-1		1.83	1.457	2	1.555		1.8	1.08				1.532	1.687
Nb	mg kg-1		31.52	29.1	26	29.13	21	30.6	26.08		27		32.517	32.34
Nd	mg kg-1		52.31	50.78	49.1	50.32	67	54.2	50.62		45.35	49.89	50.604	46.84
Ni	mg kg-1		24.85	22.23	20	21.37	23	21.4	16.6		21	25.87	22.9	38.39
Pb	mg kg-1		5.6	5.577		4.745		7.1	5.25			5.9	3.71	6.9
Pd	mg kg-1													
Pr	mg kg-1		12.75	11.95	12.1	12.2		12.6	11.79		10.64	11.62	11.771	10.78
Pt	mg kg-1													
Rb	mg kg-1		36.72	35.27	33	36.97	39	36.2	33.89		32	35.59	35.93	40.15
Re	mg kg-1													
Ru	mg kg-1													
S	mg kg-1						285	7985		387.120				
Sb	mg kg-1		0.046			0.059							0.09	19.89
Sc	mg kg-1		30.96	30.2	28	28.43	24		28.2	29.35	25.55	29.21	27.154	22.04
Se	mg kg-1													1.971
Sm	mg kg-1		11.25	10.88	10.6	10.83		11.3	10.87		10.52	11.01	9.939	9.655
Sn	mg kg-1		1.81		2	2.565		2.5					2.26	66.74
Sr	mg kg-1		517.720	493.6	514	515.2	481	505.1	488.090	533.750	496	490.8	507.6	558.4
Ta	mg kg-1		0.78		1.8			2.1	1.82			1.821	4.271	3.929
Tb	mg kg-1		1.56	1.521	1.4	1.485		1.6	1.48		1.54	1.418	1.265	1.303
Te	mg kg-1													0.128
Th	mg kg-1		3.62	3.933	3.6	3.903	4	4.2	3.95			3.786	3.81	9.687
Tl	mg kg-1		0.093	0.116	0.1	0.106		0.1					0.097	0.148
Tm	mg kg-1		0.58	0.579	0.54	0.58		0.6	0.56		0.5	0.541	0.51	0.470
U	mg kg-1		0.79	0.822	0.8	0.861		0.9	0.87			0.73	0.775	3.067
V	mg kg-1		415.1	393.1	420	408.2	429	409.7	388.5	437	393	372.3	396.010	572.9
W	mg kg-1		0.28					0.9						1.758
Y	mg kg-1		44.7	42.52	38	41.43	42	44.3	42.3		48	40.07	41.773	39.18
Yb	mg kg-1		3.5	3.489	3.2	3.492		3.6	3.53		3.29	3.507	2.849	2.92
Zn	mg kg-1		153.3	149.2	130	136.2	148	165.3	130.3	154.910	145	142.4	72.2	134.7
Zr	mg kg-1		330.2	318.7	332		289	311.9	260.670		306	305.2	288.150	324

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

Table 1 - GeoPT54A Contributed data for Basalt, CSQ-1. 17/01/2024

Lab Code		U49	U51	U52	U53	U54	U55	U57	U62	U64	U65	U66	U67	U68
SiO2	g 100g-1	50	50.21	50.7	50.03	50.29	50.46	49.2	50.3	50.632	50.42	44.76	49.5	50.72
TiO2	g 100g-1	3.94	3.84	3.8	3.84	3.78	3.83	3.71	3.85	3.748	3.94	0.86	3.86	3.806
Al2O3	g 100g-1	12.5	12.36	12.6	12.28	12.13	12.46	12.14	12.5	12.286	12.4	20.01	12.5	12.49
Fe2O3T	g 100g-1	15.2	15.48	14.9	15.77	15.86	15.53	15.25	15.6	15.554	15.7	10.7	16.1	15.638
Fe(II)O	g 100g-1													
MnO	g 100g-1	0.213	0.219	0.2	0.21	0.23	0.21	0.21	0.22	0.213	0.212	0.17	0.223	0.223
MgO	g 100g-1	3.81	3.92	3.97	3.93	3.82	3.82	3.74	3.82	3.815	3.9	8.66	3.96	3.989
CaO	g 100g-1	7.6	7.94	7.81	7.82	7.95	7.69	7.86	8.26	7.802	7.72	13.33	8.06	7.925
Na2O	g 100g-1	2.75	2.72	2.87	2.67	2.63	2.87	2.76	2.75	2.741	2.69	2.49	2.8	2.777
K2O	g 100g-1	1.52	1.5	1.51	1.52	1.56	1.56	1.47	1.53	1.547	1.53	0.03	1.54	1.525
P2O5	g 100g-1	0.637	0.625	0.62	0.65	0.6	0.63	0.62	0.65	0.641	0.65	0.02	0.63	0.629
H2O+	g 100g-1													
CO2	g 100g-1													
LOI	g 100g-1	0.5	0.68			0.67	0.8	-0.5	0.5	0.910	0.65	0.91		0.49
Ag	mg kg-1	0.6	0.8						0.4			0.4		
As	mg kg-1	1.44	1.37						0.75			1.7		10
Au	mg kg-1													
B	mg kg-1		2.06											
Ba	mg kg-1	530	583		543		572	563	640			451	542	552
Be	mg kg-1	1.75	1.69		1.51				1.6	1.867		3.6		
Bi	mg kg-1		0.027											
Br	mg kg-1													
C(org)	mg kg-1													
C(tot)	mg kg-1													
Cd	mg kg-1		0.17		0.2				0.4			0.1		
Ce	mg kg-1	100	93.1		96.1			108	92	94.323		91.6	89	113
Cl	mg kg-1	99												
Co	mg kg-1	35.8	39.19		38		40	43	36.7	38.663		54	40	37
Cr	mg kg-1	35.7	11.12		12.1				15.5			226	10	
Cs	mg kg-1		0.366		0.4				0.3			0.5		23
Cu	mg kg-1		164		155		190	179	165	168.180		239	148	163
Dy	mg kg-1	9.3	8.393		9				9.06	8.478		7.72		
Er	mg kg-1	4.6	4.31		4.5				4.37	4.195		3.9		
Eu	mg kg-1	3.8	3.41		3.5				3.18	3.366		3.16		
F	mg kg-1	920												
Ga	mg kg-1	25	27.75		20.9		12		26.2	25.181		33.8		25
Gd	mg kg-1	12	10.94		10.7				12	10.416		10		
Ge	mg kg-1								0.3			3.34		
Hf	mg kg-1	11	7.72		8.3		11		10.4	8.215		7.24		
Hg	mg kg-1													
Ho	mg kg-1	1.7	1.584		1.6				1.82	1.601		1.44		
In	mg kg-1													
Ir	mg kg-1													
La	mg kg-1	43	42.25		43.2			49	42	41.901		41.65	39	33
Li	mg kg-1	8.6	5.94		6.7				10	6.823				
Lu	mg kg-1		0.515		0.54				0.45	0.496		0.45		
Mo	mg kg-1	6	1.53						1.54			3.4		5
Nb	mg kg-1	31	31.18		30		28	33	32			41.6		27
Nd	mg kg-1	55	51.34		53				54.2	51.073		49.2		45
Ni	mg kg-1	46	23.11		24		19	22	22.5	23.61		84.5	23	19
Pb	mg kg-1		5.201						5.54	5.743		5.2		
Pd	mg kg-1													
Pr	mg kg-1	13	11.92		12.3				12.1	12.163		11.6		
Pt	mg kg-1													
Rb	mg kg-1	35	39		35.7		34	37	32	35.071		36.7		41
Re	mg kg-1													
Ru	mg kg-1													
S	mg kg-1								200					
Sb	mg kg-1		0.055									0.1		
Sc	mg kg-1	30	31.18		29		30	31	26	29.34		26.5		18
Se	mg kg-1								0.4			2.4		
Sm	mg kg-1	12	11.05		11				12.2	10.956		10.6		
Sn	mg kg-1		2.53		3.1				2.49					
Sr	mg kg-1	480	492		513		468	504	510	494.1		523		474
Ta	mg kg-1	3	1.941		1.99							4.48		
Tb	mg kg-1	1.7	1.444		1.4				1.58	1.524		1.41		
Te	mg kg-1				0.09									
Th	mg kg-1	4.8	3.918		4		17		4.8			3.11		5
Tl	mg kg-1		0.11		0.12									
Tm	mg kg-1		0.56		0.57				0.61			0.51		
U	mg kg-1	1	0.806		0.84				155			0.6		
V	mg kg-1	500	400		406		395	417	403	397.330		552	401	411
W	mg kg-1											0.39		
Y	mg kg-1	40	40.57		41		39	43	41	42.73		41.2	38	40
Yb	mg kg-1	4	3.49		3.6				3.44	3.456		3.14		
Zn	mg kg-1	150	137		149		120	142	190	147.530		150	146	142
Zr	mg kg-1	270	310		337		308	311	381	323		203	318	310

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

Table 1 - GeoPT54A Contributed data for Basalt, CSQ-1. 17/01/2024

Lab Code		U69	U71	U72	U73	U74	U75	U76	U77	U79	U80	U81	U82	U83
SiO2	g 100g-1	48.505	49.16	15.69	49.89	50.16	48.329	51.61	51.58	50.494	49.84		52.204	50.05
TiO2	g 100g-1	0.778	3.7	1.21	3.825	3.98	3.877	3.44	4.02	3.847	3.84	2.98	3.888	3.92
Al2O3	g 100g-1	15.493	12.08	3.88	12.34	12.25	12.39	12.76	12.99	12.310	12.26	12.6	12.356	12.19
Fe2O3T	g 100g-1	11.621	15.21	4.87	15.56	15.58	15.969	14.19	14.58	15.706	14.37	15.5	16.141	15.5
Fe(II)O	g 100g-1									10.35				
MnO	g 100g-1	0.2	0.207	0.064	0.217	0.22	0.23	0.21	0.2	0.213	0.222	0.2	0.222	0.21
MgO	g 100g-1	11.198	3.78	1.26	3.92	3.81	4.477	2.36	4.17	3.987	3.98	4	3.671	3.97
CaO	g 100g-1	12.95	7.76	2.45	7.87	8.07	7.871	8.03	6.91	7.811	7.91	8.38	7.985	7.86
Na2O	g 100g-1	1.768	2.67	0.86	2.65	2.76	2.853	4.67	3.02	2.700	2.59	2.73	2.473	2.86
K2O	g 100g-1	0.064	1.6	0.461	1.51	1.54	1.614	1.57	1.68	1.507	1.5	1.53	1.523	1.54
P2O5	g 100g-1	0.292	0.621	0.2	0.63	0.64	0.615	0.82	0.67	0.621	0.63	0.38		0.63
H2O+	g 100g-1													
CO2	g 100g-1												0.088	
LOI	g 100g-1			0.12	0.56	0.77	1.367			0.284	2.19		1.16	0.77
Ag	mg kg-1												0.126	
As	mg kg-1	0.069					6.108						1.142	
Au	mg kg-1													
B	mg kg-1													
Ba	mg kg-1	5.912	543	665	528	485	681.214	0.07	615	554	543	583	553.079	538
Be	mg kg-1									1.76		1.69		
Bi	mg kg-1	0.007												
Br	mg kg-1						6.679							
C(org)	mg kg-1													
C(tot)	mg kg-1												240.5	
Cd	mg kg-1	0.109	0.297	9.4		2						0.72		
Ce	mg kg-1	0.823	90.1	106	89.8	124	93.798		91	92.3	93.16	96.9	89.953	
Cl	mg kg-1													
Co	mg kg-1	53.487	37.73	40	41	24	33.969	0.01	38	37.7		38.9	39.837	
Cr	mg kg-1	488.888	10.33	16	11	19	5.677	0.05	51	10	9	11	14.085	10
Cs	mg kg-1		0.34		0.36	29				0.37	0.37	0.49	3.801	
Cu	mg kg-1	109.836	156.7	164	166	179	152.644		186	164	176	187	148.934	156
Dy	mg kg-1	1.187	8.04		8.02					8.7	9.46	8.72	7.632	
Er	mg kg-1	0.805	3.91		3.79					4.22	4.67	4.35	3.762	
Eu	mg kg-1	0.241	3.26		3.23					3.43	3.48	3.54	3.126	
F	mg kg-1				445									
Ga	mg kg-1	14.944	23.94	25	24	24	21.641			25.3	25.17		26.376	
Gd	mg kg-1	0.867	10.25		9.8					10.4	11.84	10.7	9.574	
Ge	mg kg-1	2.257										1.78		
Hf	mg kg-1		11.88	8.1	7.71		5.869			8.23	8.65	8.47	7.2	
Hg	mg kg-1													
Ho	mg kg-1	0.262	1.52		1.49					1.62	1.81	1.62	1.412	
In	mg kg-1													
Ir	mg kg-1													
La	mg kg-1	0.327	39.92	51	40.7	38	40.643			42.4	44.21	43.1	40.506	
Li	mg kg-1	3.159	6.86		7.31					6.57		6.71		
Lu	mg kg-1	0.117	0.493		0.46					0.5	0.55	0.51	0.427	
Mo	mg kg-1	0.351	1.46							1.43	1.36	2.56	1.85	
Nb	mg kg-1		31.17	30	30.9	29	27.991		24	31.3	31.69	32.4	30.489	
Nd	mg kg-1	1.076	51.97	55	49.2		53.445			51.3	53.6	52.2	48.08	
Ni	mg kg-1	211.409	24.78	24	24	38	26.894		34	20.6	32.3	23.3	24.385	22
Pb	mg kg-1	0.141	5.36		4.83	7	4.586			5.46	4.97	5.75	6.526	
Pd	mg kg-1													
Pr	mg kg-1	0.175	12.33		12					12.5	12.4	12.7	11.342	
Pt	mg kg-1													
Rb	mg kg-1		35.13	35	35.5	40	33.398		31	35.6	35.7	34.8		
Re	mg kg-1													
Ru	mg kg-1	0.229												
S	mg kg-1							0.05					460.140	
Sb	mg kg-1	13.577											0.171	
Sc	mg kg-1	21.587	28.67	28	32	27	28.599			29.6	32.69	32.3	30.011	
Se	mg kg-1	0.077												
Sm	mg kg-1	0.542	10.95		10.5		8.086			11.3	11.94	11.2	10.462	
Sn	mg kg-1									2.61		2.61		
Sr	mg kg-1	112.358	520.4	474	492	496	473.182	0.05	472	484	478.3	516	500.113	507
Ta	mg kg-1		1.91		1.83					1.95	2.03	1.39	1.652	
Tb	mg kg-1	0.171	1.49		1.4					1.57	1.7	1.52	1.323	
Te	mg kg-1													
Th	mg kg-1	0.074	3.68		3.74	5	5.305			3.94	4.26	3.96	3.378	
Tl	mg kg-1									0.12		0.11		
Tm	mg kg-1	0.117	0.559		0.52					0.57	0.63	0.58	0.495	
U	mg kg-1	0.021	0.777		0.73	6	4.651			0.82	0.8	0.84	0.685	
V	mg kg-1	341.880	399	418	441	364	378.243	0.04		392	398	400	400.647	394
W	mg kg-1						7.454					0.4		
Y	mg kg-1	6.234	42.21	40	41.7	41	39.348		28	42.5	39	44.1	42.018	38
Yb	mg kg-1	0.77	3.29	14	3.19					3.51	3.7	3.57	3.01	
Zn	mg kg-1	74.733	139.4	141	162	139	130.861		139	155	143	142	170.441	143
Zr	mg kg-1		246.4	314	325	315	304.211		250	310	353.320	324	294.858	287

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

Table 1 - GeoPT54A Contributed data for Basalt, CSQ-1. 17/01/2024

Lab Code		U84	U86	U87	U88	U89	U90	U93	U95	U99	U100	U101	U102	U103
SiO2	g 100g-1	48.3	50.101	49.08	50.76	50.3	52.27	**50.55**		**50.09**	50.8	**50.667**	49.24	**49.45**
TiO2	g 100g-1	3.74	3.768	3.73	3.76	3.79	3.48	**3.78**		**3.89**	3.61	**3.824**	0.83	**3.78**
Al2O3	g 100g-1	12.43	12.246	12.11	12.33	12.7	12.94	**12.37**		**12.44**	13	**12.246**	15.43	**12.07**
Fe2O3T	g 100g-1	15.6	15.483	15.53	15.42	15.4	14.5	**15.62**		**15.67**	16	**15.458**	10.6	**15.52**
Fe(II)O	g 100g-1				10.56			**10.653**						
MnO	g 100g-1	0.22	0.225	0.22	0.21	0.217	0.18	**0.22**		**0.22**	0.214	**0.213**	0.17	**0.219**
MgO	g 100g-1	3.84	3.931	3.85	3.82	4.02	2.65	**3.94**		**3.92**	3.98	**3.954**	10.1	**3.76**
CaO	g 100g-1	7.74	7.752	7.89	7.85	7.83	7.76	**8.07**		**7.58**	7.71	**7.906**	11.49	**7.62**
Na2O	g 100g-1	2.84	2.738	2.41	2.68	2.69	2.57	**2.81**		**2.87**	2.85	**2.743**	1.51	**2.75**
K2O	g 100g-1	1.59	1.546	1.5	1.55	1.48	1.5	**1.53**		**1.52**	1.61	**1.524**	0.04	**1.48**
P2O5	g 100g-1	0.22	0.632	0.66	0.62	0.631	0.62	**0.65**		**0.61**	0.638	**0.639**	0.02	**0.608**
H2O+	g 100g-1							**1.230**						
CO2	g 100g-1													
LOI	g 100g-1	0.82	0.737	0.81	0.36	0.577	1.1	**0.37**		**0.35**	0.5	**0.812**		**0.95**
Ag	mg kg-1													
As	mg kg-1			1.27						**3.2**				**1.36**
Au	mg kg-1													
B	mg kg-1							**2.556**						
Ba	mg kg-1	712			554		597	**549**	548	**617.8**	559	**558.3**	6.2	**529**
Be	mg kg-1			0.18			1.88	**1.7**	1.85			**1.724**		**1.6**
Bi	mg kg-1											**0.027**	11.4	
Br	mg kg-1													
C(org)	mg kg-1													
C(tot)	mg kg-1													
Cd	mg kg-1	0.3		1.1				**0.19**						
Ce	mg kg-1		99		90		92.7	**87**	91.3	**113.1**	91.9	**93.46**		**91.8**
Cl	mg kg-1			15				**79**						
Co	mg kg-1	44.7	22	18.4	37		45	**37.2**	38.4	**44.5**	37.7	**40.57**	42.1	**38.8**
Cr	mg kg-1	14.5	43	6	12		20	**12.7**	11.1	**12.2**	12	**10.79**	373.1	**10.7**
Cs	mg kg-1							**0.33**	0.37			**0.362**		
Cu	mg kg-1	169.4	173	144	161		198	**165**	159	**163.5**	150	**156.6**	101.2	**162**
Dy	mg kg-1				8		8.38	**7.84**	8.45		8.44	**8.66**		**8.32**
Er	mg kg-1				3.8		4.05	**3.82**	4.17		4.29	**4.43**		**4.31**
Eu	mg kg-1				3.4		3.48	**3.18**	3.22		3.31	**3.316**		**3.42**
F	mg kg-1							**935**						
Ga	mg kg-1		25				26	**24.9**	24.8	**23.2**	25.8	**25.44**		23.7
Gd	mg kg-1				10		10.45	**9.02**	10.3		10.8	**10.1**		**10.9**
Ge	mg kg-1						1.49	**1.89**	2.01		2.03			1.5
Hf	mg kg-1		6				8.1	**7.3**	7.81	**8**	8.04	**7.825**		**7.93**
Hg	mg kg-1			0.007				**0.008**						
Ho	mg kg-1				1.3		1.5	**1.51**	1.56		1.67	**1.617**		**1.55**
In	mg kg-1						0.11	**0.12**						
Ir	mg kg-1													
La	mg kg-1		44		40.6		42.6	**40.7**	40.6	**188.5**	41.6	**42.05**		**42.8**
Li	mg kg-1						5.61	**6.859**	7.05			**7**	4.1	
Lu	mg kg-1				0.5		0.52	**0.47**	0.49		0.46	**0.494**		**0.47**
Mo	mg kg-1						1.65	**1.43**		**0.7**	2.33	**1.472**		**1.4**
Nb	mg kg-1				28		32	**25.4**	31.1	**27.6**	29.8	**29.95**		**29.3**
Nd	mg kg-1				51		51.87	**47.5**	49.3	**57.5**	50.5	**50.79**		**51.1**
Ni	mg kg-1	25.2	40	11.3	25		65	**21.6**	25.1	**20.3**	28		152.7	**23.1**
Pb	mg kg-1	5.1	8	1.8			12	**5.11**	5.52	**10.6**	6	**5.227**		**5.38**
Pd	mg kg-1													
Pr	mg kg-1				11		12.32	**11.1**	11.5		12.1	**12.18**		**11.3**
Pt	mg kg-1													
Rb	mg kg-1	33.1	44		27		35.21	**34**	35.2	**36.6**	30.6	**37.87**		33.5
Re	mg kg-1													
Ru	mg kg-1													
S	mg kg-1			287				**422**			0.09		1389	
Sb	mg kg-1			0.77				**0.09**				**0.053**		
Sc	mg kg-1				26		24	**30.01**	28.8	**26.4**	28.8	**31.024**	38.4	29.7
Se	mg kg-1			0.38										**5.7**
Sm	mg kg-1				11.6		10.72	**10.3**	11	**7**	10.9	**11.32**		**11.4**
Sn	mg kg-1	2.22	3	0.11				**2.26**			2.5	**2.099**		2.62
Sr	mg kg-1	569.1	498		483		493	**487**	499	**486.9**	480	**529.650**	97.3	**520**
Ta	mg kg-1						1.74	**1.98**	1.95		2	**1.715**		**1.66**
Tb	mg kg-1				1.6		1.52	**1.36**	1.5		1.54	**1.391**		**1.53**
Te	mg kg-1			12										
Th	mg kg-1		7				4.1	**3.62**	3.87	**4.8**	4.23	**3.83**		**4.05**
Tl	mg kg-1			0.27			0.11							
Tm	mg kg-1				0.5		0.58	**0.532**	0.57		0.6	**0.556**		**0.56**
U	mg kg-1				1.86		0.98	**0.78**	0.81	**1.8**	0.89	**0.768**		**0.81**
V	mg kg-1	449.4	405	196	382		390	**380**	398	**409.6**	416	**428.820**	280.9	**435**
W	mg kg-1						0.73	**1.2**		**47.3**	0.71	**0.57**		2.96
Y	mg kg-1				39		45	**38.4**	42.8	**40.6**	39.8	**41.12**	11	**41.5**
Yb	mg kg-1				3.6		3.41	**3.26**	3.47		3.51	**3.293**		**3.51**
Zn	mg kg-1	137.2	155	81	141		137	**154**	142	**139.8**	140	**154.040**	67	**152**
Zr	mg kg-1				311		325	**291**	315	**317.5**	317	**324.990**	17.1	**295**

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

Table 1 - GeoPT54A Contributed data for Basalt, CSQ-1. 17/01/2024

Lab Code		U104	U105	U106	U107	U109	U110	U114	U116	U117	U118	U119	U120	U121
SiO2	g 100g-1	**50.1**	49.191	**49.52**	50.403	**50.4**	47.71	50.16	**49**	**50.39**	50.59	49.11	**46.84**	51.69
TiO2	g 100g-1	**3.774**	3.714	**3.7**	3.811	**3.775**	3.65	3.89	**3.7**	**3.85**	3.89	3.805	**3.62**	3.87
Al2O3	g 100g-1	**12.18**	14.056	**12.34**	12.382	**12.27**	13.5	12.46	**12**	**12.39**	12.43	12.44	**11.51**	12.76
Fe2O3T	g 100g-1	**15.67**	14.85	**15.91**	15.649	**15.7**	14.36	15.67	**15.3**	**15.52**	16.2	15.4	**15.91**	15.89
Fe(II)O	g 100g-1									**10.24**				
MnO	g 100g-1	**0.219**	0.213	**0.22**	0.217	**0.212**	0.194	0.22	**0.216**	**0.216**	0.224	0.208	**0.216**	0.22
MgO	g 100g-1	**3.861**	3.837	**3.7**	3.947	**3.9**	2.36	3.91	**3.8**	**3.61**	3.94	3.91	**3.96**	3.92
CaO	g 100g-1	**7.806**	7.994	**7.91**	7.836	**7.91**	7.533	7.89	**7.73**	**7.8**	8.09	7.61	**8.12**	7.76
Na2O	g 100g-1	**2.619**	3.073	**2.74**	2.728	**2.74**	3.38	2.75	**2.65**	**3.01**	2.73	2.58	**2.39**	2.78
K2O	g 100g-1	**1.521**	1.449	**1.48**	1.55	**1.613**	1.62	1.52	**1.45**	**1.54**	1.53	1.43	**1.51**	1.53
P2O5	g 100g-1	**0.624**	0.653	**0.632**	0.645	**0.668**	0.852	0.652	**0.638**	**0.62**	0.646	0.64	**0.6**	0.63
H2O+	g 100g-1								**1.58**	**1.57**				
CO2	g 100g-1								**0.016**	**0.14**				
LOI	g 100g-1	**0.69**	**0.591**				0.744	0.57			0.45			0.54
Ag	mg kg-1	**0.101**												
As	mg kg-1	**0.736**								13				
Au	mg kg-1													
B	mg kg-1													
Ba	mg kg-1	**577.2**	557	**567.1**		**548.5**	580	565.4		**537**	573	488	**612**	531.1
Be	mg kg-1	**1.452**		**2.17**		**1.67**		2.1						
Bi	mg kg-1	**0.025**												
Br	mg kg-1													
C(org)	mg kg-1													
C(tot)	mg kg-1	**255**	**250**								221		**22705**	
Cd	mg kg-1	**0.141**				**0.191**		0.15						
Ce	mg kg-1	**90.16**		**94.01**		**86.91**		91.9		**74**	98		**81**	115.8
Cl	mg kg-1	**108**					180			69				
Co	mg kg-1	**37.78**		**40.08**		**37.78**		40.9		**48**	34	31		
Cr	mg kg-1	**9.648**		**10.39**		**11.03**		13		**24**	4		**23**	7.1
Cs	mg kg-1	**0.342**				**0.356**		0.35						
Cu	mg kg-1	**152.7**	146	**165**	149	**152.960**	225	164		**184**	159	115	**174**	157.2
Dy	mg kg-1	**8.383**		**8.6**		**8.23**		8.56						
Er	mg kg-1	**4.255**		**4.22**		**4.09**		4.37						
Eu	mg kg-1	**3.405**		**3.43**		**3.282**		3.28						
F	mg kg-1									947				
Ga	mg kg-1	**28.08**	16	**24.86**		**23.68**		23.79		**25**	25		**14**	19.7
Gd	mg kg-1	**10.18**		**10.49**		**10.13**		10.31						
Ge	mg kg-1							1.5						
Hf	mg kg-1	**7.618**		**8.22**		**7.04**		8.4		**11**	9.2			
Hg	mg kg-1													
Ho	mg kg-1	**1.599**		**1.633**		**1.59**		1.63						
In	mg kg-1							0.12						
Ir	mg kg-1													
La	mg kg-1	**40.29**		**41.46**		**40.2**		43.1		**33**	57	52	**57**	41.2
Li	mg kg-1	**6.095**		**7.33**		**6.71**		6.4						
Lu	mg kg-1	**0.512**		**0.5**		**0.483**		0.48						
Mo	mg kg-1	**1.468**	21	**2.71**		**1.426**		1.5		**2**				
Nb	mg kg-1	**19.74**	23	**31.06**		**30.51**		29.91		**28**	29		**28**	28.1
Nd	mg kg-1	**50.28**		**52.66**		**50.1**		49.19		**40**	44			
Ni	mg kg-1	**21.82**	22	**23.03**		**22**		21.8		**20**	26		**44**	19.8
Pb	mg kg-1	**5.172**		**5.72**		**5.06**		5.5		**6**	10			10.6
Pd	mg kg-1													
Pr	mg kg-1	**11.83**		**12.34**		**12.04**		12.4			8			
Pt	mg kg-1													
Rb	mg kg-1	**35.46**	29	**36.84**		**34.03**		34.68		**39**	33	38	**34**	36.4
Re	mg kg-1													
Ru	mg kg-1													
S	mg kg-1	**568**	**440**				399	400		226	402		**539**	
Sb	mg kg-1	**0.068**				**0.066**								
Sc	mg kg-1	**30.23**		**29.85**		**24.69**		27.4		**24**				26.4
Se	mg kg-1													
Sm	mg kg-1	**11.15**		**11.16**		**10.85**		10.71			8			
Sn	mg kg-1	**1.705**				**2.9**		3						
Sr	mg kg-1	**505.7**	656	**507.9**	504	**489.2**	489	495.5		**472**	490	453	**381**	487.6
Ta	mg kg-1	**1.203**		**1.97**		**1.883**		1.87		**1**				
Tb	mg kg-1	**1.5**		**1.54**		**1.472**		1.6						
Te	mg kg-1													
Th	mg kg-1	**4.372**		**4.074**		**3.733**		3.89		**1**				
Tl	mg kg-1	**0.109**				**0.112**		0.11						
Tm	mg kg-1	**0.572**				**0.568**		0.56						
U	mg kg-1	**0.852**		**0.825**		**0.82**		0.8		**1**				2.9
V	mg kg-1	**421.8**		**405.1**		**394.2**		425		**390**	395	366	**449**	393.7
W	mg kg-1	**0.378**		**0.514**		**0.419**								
Y	mg kg-1	**42.05**	38	**43**		**37.79**		38.78		**38**	40		**26**	43.7
Yb	mg kg-1	**3.41**		**3.543**		**3.41**		3.4						
Zn	mg kg-1	**135.7**	100	**164.1**	153	**145.4**	160	151		**131**	134	134	**146**	137
Zr	mg kg-1	**302**	337	**325.3**	306	**266.8**	283	317		**301**	297	318	**246**	293.2

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

Table 1 - GeoPT54A Contributed data for Basalt, CSQ-1. 17/01/2024

Lab Code		U124	U125	-	-	-	-	-	-	-	-	-	-	-
SiO2	g 100g^{-1}	52.09	50.15											
TiO2	g 100g^{-1}	3.66	3.57											
Al2O3	g 100g^{-1}	12.59	12.63											
Fe2O3T	g 100g^{-1}	14.91	13.82											
Fe(II)O	g 100g^{-1}													
MnO	g 100g^{-1}	0.19	0.2											
MgO	g 100g^{-1}	2.33	2.18											
CaO	g 100g^{-1}	7.54	7.73											
Na2O	g 100g^{-1}	2.57	2.95											
K2O	g 100g^{-1}	1.64	1.61											
P2O5	g 100g^{-1}	0.69	0.63											
H2O+	g 100g^{-1}													
CO2	g 100g^{-1}													
LOI	g 100g^{-1}													
Ag	mg kg^{-1}													
As	mg kg^{-1}													
Au	mg kg^{-1}													
B	mg kg^{-1}													
Ba	mg kg^{-1}	530	338.110											
Be	mg kg^{-1}													
Bi	mg kg^{-1}													
Br	mg kg^{-1}													
C(org)	mg kg^{-1}													
C(tot)	mg kg^{-1}													
Cd	mg kg^{-1}													
Ce	mg kg^{-1}													
Cl	mg kg^{-1}		68.97											
Co	mg kg^{-1}	37												
Cr	mg kg^{-1}	37	23.79											
Cs	mg kg^{-1}													
Cu	mg kg^{-1}	164												
Dy	mg kg^{-1}													
Er	mg kg^{-1}													
Eu	mg kg^{-1}													
F	mg kg^{-1}													
Ga	mg kg^{-1}	28	17.29											
Gd	mg kg^{-1}													
Ge	mg kg^{-1}		1.29											
Hf	mg kg^{-1}		8.3											
Hg	mg kg^{-1}													
Ho	mg kg^{-1}													
In	mg kg^{-1}													
Ir	mg kg^{-1}													
La	mg kg^{-1}													
Li	mg kg^{-1}													
Lu	mg kg^{-1}													
Mo	mg kg^{-1}		1.3											
Nb	mg kg^{-1}	29	13.16											
Nd	mg kg^{-1}		49.15											
Ni	mg kg^{-1}	23												
Pb	mg kg^{-1}	8	5.96											
Pd	mg kg^{-1}													
Pr	mg kg^{-1}		18.86											
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	33	24.28											
Re	mg kg^{-1}													
Ru	mg kg^{-1}													
S	mg kg^{-1}		435.150											
Sb	mg kg^{-1}													
Sc	mg kg^{-1}	35												
Se	mg kg^{-1}													
Sm	mg kg^{-1}													
Sn	mg kg^{-1}													
Sr	mg kg^{-1}	443	321.250											
Ta	mg kg^{-1}													
Tb	mg kg^{-1}													
Te	mg kg^{-1}													
Th	mg kg^{-1}	5	0.71											
Tl	mg kg^{-1}													
Tm	mg kg^{-1}													
U	mg kg^{-1}		0.54											
V	mg kg^{-1}	410	311.110											
W	mg kg^{-1}													
Y	mg kg^{-1}	39	60.3											
Yb	mg kg^{-1}													
Zn	mg kg^{-1}	141	**90.75**											
Zr	mg kg^{-1}	263	172.880											

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

Table 2 - GeoPT54A Consensus values and statistical summary for Basalt, CSQ-1.

	Consensus Value	Uncertainty of consensus value	Horwitz Target Precision	Uncertainty/ Target Precision	Number of reported results	Robust Mean of results	Robust SD of results	Median of results	Status of consensus value	Type of consensus value
	X_{pt}	$u(x_{pt})$	σ_{pt}	$u(x_{pt}) / \sigma_{pt}$	n					
	g 100g $^{-1}$	g 100g $^{-1}$	g 100g $^{-1}$			g 100g $^{-1}$	g 100g $^{-1}$	g 100g $^{-1}$		
SiO2	50.27	0.08413	0.5576	0.1509	82	50.14	0.9207	50.27	Assigned	Median
TiO2	3.838	0.015	0.0627	0.2392	86	3.801	0.1217	3.824	Assigned	Mode
Al2O3	12.39	0.02838	0.1697	0.1673	84	12.41	0.2755	12.39	Assigned	Median
Fe2O3T	15.6	0.0395	0.2063	0.1915	85	15.52	0.3974	15.6	Assigned	Median
Fe(II)O	10.56	0.1401	0.1481	0.9456	11	10.52	0.3608	10.56	Provisional	Median
MnO	0.2158	0.0009397	0.005436	0.1729	84	0.2142	0.009591	0.2158	Assigned	Median
MgO	3.91	0.01566	0.06369	0.2459	83	3.877	0.1282	3.91	Assigned	Median
CaO	7.874	0.01999	0.1154	0.1731	84	7.874	0.1832	7.87	Assigned	Robust Mean
Na2O	2.739	0.01672	0.04707	0.3553	82	2.716	0.1366	2.739	Assigned	Median
K2O	1.529	0.004896	0.02868	0.1707	85	1.529	0.04514	1.53	Assigned	Robust Mean
P2O5	0.632	0.002447	0.01354	0.1807	83	0.6315	0.02381	0.632	Assigned	Median
	mg kg $^{-1}$	mg kg $^{-1}$	mg kg $^{-1}$			mg kg $^{-1}$	mg kg $^{-1}$	mg kg $^{-1}$		
Ba	553.1	3.998	17.1	0.2338	77	555.8	36.78	553.1	Assigned	Median
Be	1.751	0.04181	0.1287	0.3248	36	1.741	0.198	1.751	Assigned	Median
Bi	0.02595	0.002235	0.003596	0.6215	14	0.02797	0.01483	0.02595	Provisional	Median
Cd	0.15	0.012	0.01596	0.7518	25	0.2648	0.1906	0.19	Provisional	Mode
Ce	91.95	0.538	3.724	0.1445	67	93.12	5.375	92.62	Assigned	Mode
Co	38.49	0.4725	1.777	0.2658	66	38.49	3.838	38.16	Assigned	Robust Mean
Cr	10.62	0.238	0.5952	0.3998	63	13.68	6.805	11	Assigned	Mode
Cs	0.364	0.006	0.0339	0.177	36	0.3715	0.04323	0.37	Assigned	Mode
Cu	162	1.995	6.025	0.3312	75	161.8	15.32	162	Assigned	Median
Dy	8.445	0.05203	0.4899	0.1062	50	8.406	0.4315	8.445	Assigned	Median
Er	4.216	0.0406	0.2715	0.1495	50	4.184	0.2933	4.216	Assigned	Median
Eu	3.365	0.02859	0.2242	0.1275	50	3.349	0.1546	3.365	Assigned	Median
Ga	24.9	0.2617	1.228	0.2132	61	24.6	2.006	24.9	Assigned	Median
Gd	10.38	0.08326	0.5838	0.1426	51	10.32	0.5847	10.38	Assigned	Median
Hf	8.049	0.09186	0.4703	0.1953	52	8.011	0.7435	8.049	Assigned	Median
Ho	1.598	0.01019	0.1191	0.08557	48	1.579	0.09776	1.598	Assigned	Median
In	0.1195	0.002762	0.01316	0.2099	10	0.1185	0.0083	0.1195	Provisional	Median
La	41.69	0.3214	1.902	0.169	66	41.83	2.345	41.69	Assigned	Median
Li	6.873	0.1197	0.4113	0.2909	33	6.873	0.6874	6.86	Assigned	Robust Mean
Lu	0.4962	0.004391	0.0441	0.09956	47	0.4896	0.03504	0.4962	Assigned	Median
Mo	1.465	0.0157	0.1106	0.1419	42	1.59	0.3833	1.515	Assigned	Mode
Nb	30.5	0.9	1.459	0.6171	62	29.35	2.632	29.6	Assigned	Mode
Nd	51.12	0.3696	2.262	0.1634	58	51.12	2.815	51.04	Assigned	Robust Mean
Ni	23.03	0.3915	1.149	0.3407	69	23.63	3.59	23.03	Assigned	Median
Pb	5.405	0.0903	0.3354	0.2693	52	5.586	0.8198	5.51	Assigned	Mode
Pr	12.1	0.08066	0.665	0.1213	51	11.97	0.6197	12.1	Assigned	Median
Rb	35.2	0.3355	1.647	0.2037	69	35	2.474	35.2	Assigned	Median
S	401	15.11	13.01	1.161	23	391.3	130.1	401	Provisional	Median
Sb	0.057	0.006	0.007016	0.8552	17	0.0925	0.05052	0.07	Provisional	Mode
Sc	28.9	0.383	1.393	0.2749	62	28.63	2.894	28.9	Assigned	Median
Sm	10.95	0.08933	0.6109	0.1462	53	10.91	0.5978	10.95	Assigned	Median
Sn	2.533	0.0491	0.1761	0.2788	30	2.424	0.4213	2.5	Provisional	Mode
Sr	494.7	2.54	15.55	0.1633	79	494.7	22.58	494.2	Assigned	Robust Mean
Ta	1.882	0.03041	0.1368	0.2222	40	1.871	0.1929	1.882	Assigned	Median
Tb	1.521	0.02097	0.1142	0.1836	49	1.513	0.1167	1.521	Assigned	Median
Th	3.91	0.0518	0.2547	0.2033	55	4.036	0.5505	3.96	Assigned	Mode
Tl	0.11	0.003874	0.01226	0.3159	23	0.1106	0.01273	0.11	Assigned	Median
Tm	0.57	0.00525	0.04962	0.1058	46	0.5585	0.0401	0.5625	Assigned	Mode
U	0.8188	0.0113	0.06749	0.1674	50	0.8357	0.1173	0.8188	Assigned	Median
V	400.3	3.095	12.99	0.2382	74	404	25.59	400.3	Assigned	Median
W	0.438	0.0345	0.03967	0.8697	23	0.7652	0.5248	0.514	Provisional	Mode
Y	40.57	0.3617	1.859	0.1946	71	40.54	2.522	40.57	Assigned	Median
Yb	3.5	0.0154	0.2318	0.06643	50	3.435	0.18	3.468	Assigned	Mode
Zn	142	1.61	5.387	0.2988	78	142.3	11.63	142	Assigned	Median
Zr	313.5	2.99	10.56	0.2832	74	309.7	24.15	311	Assigned	Mode

Table 3 - GeoPT54A Z-scores for Basalt, CSQ-1. 17/01/2024

Lab Code	U1	U2	U3	U4	U6	U7	U8	U9	U10	U11	U12	U13	U14
SiO2	*	0.31	-0.35	0.20	*	*	3.70	**0.33**	1.72	*	**0.48**	**-0.31**	-0.01
TiO2	*	0.33	0.67	0.20	0.47	*	-1.18	**0.02**	1.67	**-46.87**	**0.34**	**2.26**	0.17
Al2O3	*	-0.35	-0.21	0.32	*	*	*	**1.89**	-0.59	**12.44**	**-0.47**	**2.30**	0.12
Fe2O3T	*	0.03	0.64	-0.01	*	*	-0.96	**-0.85**	-1.03	**-21.31**	**0.07**	**-0.17**	0.88
Fe(II)O	*	*	*	*1.96*	*	*	*	*	*	*	*	*	*
MnO	*	*	1.49	1.31	-0.47	*	-2.37	**-1.07**	*	**-8.42**	**0.77**	**0.77**	0.39
MgO	*	0.31	0.39	-0.16	*	*	*	**-0.31**	-1.49	**98.76**	**-1.26**	**1.88**	0.31
CaO	*	1.28	0.42	0.40	*	*	-0.62	**-1.16**	-0.58	**44.41**	**0.23**	**-0.72**	-0.02
Na2O	*	0.01	-0.84	-0.30	*	*	*	**-4.02**	0.45	**-22.50**	**0.45**	**2.78**	0.33
K2O	*	0.20	-0.61	-0.22	*	*	-0.68	**-1.35**	0.75	**-51.90**	**0.74**	**-1.00**	0.20
P2O5	*	1.92	1.11	0.66	*	*	*	**-3.10**	-1.16	**-44.45**	**-0.15**	**1.33**	0.30
Ba	**-0.36**	*	-2.08	-0.55	2.34	**-0.00**	1.55	**2.74**	0.33	**-32.00**	**-0.12**	*	-0.82
Be	*	*	0.58	-1.13	*	**0.15**	*	*	*	**-12.89**	**0.23**	*	-0.82
Bi	*	*	*	*	*	***1.13***	*	*	*	*	*	*	*-0.41*
Cd	*	*	*	*	*	***5.64***	*	*	*	*	***0.00***	*	*-0.25*
Ce	**0.27**	*	0.73	0.40	3.75	**0.85**	1.21	*	*	**-24.24**	**-0.16**	*	-0.50
Co	*	*	-0.70	0.57	-0.13	**0.57**	*	*	*	**11.42**	**-2.00**	*	-0.05
Cr	*	*	*	*	-0.10	**-1.04**	*	*	*	**902.79**	**-0.91**	*	2.84
Cs	**-0.12**	*	*	0.53	*	**0.77**	*	*	*	**-10.60**	**-0.41**	*	-0.21
Cu	*	*	-0.83	-0.41	0.88	**0.00**	0.75	*	*	**-8.30**	**-0.54**	3.15	0.04
Dy	**0.19**	*	0.56	1.10	*	**-0.01**	*	*	*	**-12.22**	**-0.60**	*	0.01
Er	**-0.28**	*	0.54	0.78	*	**-0.24**	*	*	*	**-9.52**	**-0.61**	*	-0.07
Eu	**0.02**	*	0.32	0.81	*	**-0.11**	*	*	*	**-12.82**	**-0.51**	*	-0.70
Ga	*	*	-0.57	0.16	-0.00	**2.44**	*	*	*	**-7.74**	**-0.79**	*	0.41
Gd	**0.00**	*	0.53	0.23	*	**0.21**	*	*	*	**-14.82**	**-0.53**	*	0.10
Hf	**-0.19**	*	1.75	-0.48	*	**-0.85**	*	*	*	**-15.90**	**-4.70**	*	0.04
Ho	**0.27**	*	0.09	2.23	*	**-0.24**	*	*	*	**-8.80**	**-0.40**	*	0.05
In	*	*	*	*	*-3.01*	*	*	*	*	*	*	*	*-0.25*
La	**0.25**	*	0.42	0.08	-0.97	**-0.10**	0.98	*	*	**-21.62**	**-0.93**	*	-0.52
Li	*	*	*	*	*	**2.11**	*	*	*	**-9.73**	**1.94**	*	0.28
Lu	**0.09**	*	0.13	-0.40	*	**162.21**	*	*	*	**-5.81**	**-0.37**	*	-0.64
Mo	*	*	*	0.34	-1.02	**-0.59**	*	*	*	**-11.62**	**-0.14**	*	-0.02
Nb	**0.49**	*	-0.58	-1.10	-0.74	**-3.02**	*	*	*	**-20.56**	**-0.75**	*	0.03
Nd	**0.37**	*	0.46	0.53	*	**-1.03**	0.68	*	*	**-21.60**	**-0.59**	*	-0.23
Ni	*	*	0.55	0.20	0.16	**-0.72**	*	*	*	**187.99**	**-2.27**	*	-0.01
Pb	**0.10**	*	*	0.29	-0.65	**0.67**	*	*	*	**-15.79**	**-0.04**	*	-0.89
Pr	**0.29**	*	0.30	0.75	*	**-0.45**	*	*	*	**-17.67**	**-0.95**	*	-0.41
Rb	**0.24**	*	-0.42	-0.25	0.00	**-0.24**	1.15	*	*	**-21.26**	**-1.17**	*	0.15
S	*	*	*	*0.12*	*	*	*	*	*0.35*	*	*	*	*-0.04*
Sb	*	*	*	*	*	***4.70***	*	*	*	*	*	*	*0.93*
Sc	**0.07**	*	1.97	*	-1.65	**-0.22**	*	*	*	**9.55**	**-0.39**	*	-0.11
Sm	**0.90**	*	0.29	-0.21	*	**-0.74**	*	*	*	**-16.24**	**-0.49**	*	-0.08
Sn	*	*	*-0.94*	*0.19*	*	***-0.87***	*	*	*	***-13.02***	***0.33***	*	*-0.72*
Sr	**0.60**	*	0.01	-0.29	-0.52	**1.24**	0.91	**-2.87**	0.69	**-24.73**	**-0.73**	0.17	0.01
Ta	**0.35**	*	0.07	0.36	*	**-0.67**	*	*	*	**-13.47**	**-0.01**	*	-0.41
Tb	**0.25**	*	0.35	1.92	*	**-0.97**	*	*	*	**-10.34**	**2.97**	*	-0.27
Th	**0.35**	*	0.27	-0.57	0.61	**-0.94**	*	*	*	**-15.26**	**-0.12**	*	-0.20
Tl	*	*	*	*	*	**1.63**	*	*	*	**-7.26**	**0.00**	*	-0.69
Tm	**0.60**	*	0.07	0.60	*	**-0.20**	*	*	*	**-6.65**	**-0.60**	*	-0.20
U	**0.02**	*	0.33	-0.21	*	**-0.13**	*	*	*	**-11.98**	**-0.13**	*	-0.21
V	*	*	-0.05	0.45	-0.71	**0.51**	*	**-0.02**	*	**-7.18**	**-2.24**	*	1.53
W	*	*	*	*	*	***8.62***	*	*	*	***-5.24***	***1.82***	*	*0.00*
Y	**1.17**	*	0.20	-0.78	-0.29	**-0.95**	*	*	*	**-13.87**	**-0.32**	*	-0.66
Yb	**-0.17**	*	0.19	0.28	*	**-0.52**	*	*	*	**-8.24**	**-0.60**	*	-0.37
Zn	*	*	1.58	-0.08	-0.12	**-0.37**	-0.46	*	*	**-13.59**	**-3.75**	5.38	0.88
Zr	**-0.05**	*	-0.26	-0.69	-0.12	**-0.24**	0.12	**-1.28**	*	**-28.43**	**2.82**	8.83	-0.02

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

Table 3 - GeoPT54A Z-scores for Basalt, CSQ-1. 17/01/2024

Lab Code	U15	U16	U17	U19	U21	U23	U24	U25	U26	U27	U28	U29	U30
SiO2	-11.01	*	0.18	-3.04	-0.14	-0.08	*	-0.20	-0.29	1.12	*	0.43	-3.64
TiO2	-1.10	*	-0.16	4.01	-0.06	-0.61	*	0.09	0.09	1.78	*	0.42	-3.53
Al2O3	-13.82	*	-0.06	-2.12	0.17	1.00	*	-0.03	0.29	-1.12	*	0.28	-1.74
Fe2O3T	-1.44	*	0.00	4.09	0.11	1.67	*	0.18	0.86	1.57	*	0.09	3.89
Fe(II)O	*	*	*	*	*0.84*	*	*	*1.32*	*-0.84*	*-47.27*	*	*	*
MnO	-0.53	*	0.20	4.45	-0.39	-0.59	*	-0.53	-0.26	2.98	*	0.59	-1.91
MgO	-20.49	*	-0.44	1.10	0.27	0.00	*	0.08	-0.79	*	*	1.11	-3.34
CaO	-1.62	*	0.17	4.56	-0.09	0.49	*	0.29	-0.15	1.83	*	0.41	1.72
Na2O	*	*	-0.01	-3.17	0.89	-5.71	*	0.65	0.44	4.80	*	1.04	-1.27
K2O	1.24	*	0.00	1.09	-0.58	0.39	*	-0.50	0.02	0.78	*	0.95	0.70
P2O5	43.12	*	0.11	-1.62	-0.99	-0.52	*	0.92	-0.30	30.12	*	0.59	-0.15
Ba	3.71	*	-0.17	-1.00	-0.11	-3.81	0.32	1.37	0.09	-1.81	*	*	*
Be	*	*	*	-1.33	-0.55	*	1.47	-0.59	*	*	*	*	*
Bi	*	*	*	*284.78*	*	*	*	*-0.69*	*	*-3.41*	*	*	*
Cd	*	*	*	*	*0.72*	*	*	*-0.31*	*	*	*	*	*
Ce	*	-0.98	0.97	-0.94	0.09	1.72	0.44	0.45	-0.01	1.61	-0.05	*	*
Co	*	*	-0.28	*	0.31	0.72	-7.05	0.73	-0.42	-0.44	*	*	*
Cr	74.24	*	*	-3.83	0.24	-3.70	3.46	-0.60	*	0.60	*	*	*
Cs	*	*	*	*	0.12	-3.07	0.30	0.24	*	-1.45	*	*	*
Cu	0.66	*	0.22	-5.05	-0.22	*	2.69	-0.08	1.16	-1.24	*	*	*
Dy	*	-0.37	*	-2.03	0.03	0.87	0.32	0.23	-0.11	1.00	-0.19	*	*
Er	*	-10.02	*	32.65	0.13	1.23	-0.23	0.52	-0.03	0.72	0.02	*	*
Eu	*	0.91	*	-2.65	0.16	1.76	-0.50	0.03	-0.03	0.36	-0.24	*	*
Ga	*	*	-0.61	-3.38	-0.14	0.27	0.94	0.69	-0.61	0.68	*	*	*
Gd	*	-8.14	*	-4.78	0.07	1.08	0.26	0.19	0.10	0.60	-0.64	*	*
Hf	*	*	*	-2.36	0.27	0.77	0.00	0.52	*	1.63	*	*	*
Ho	*	-1.41	*	*	0.07	0.86	-0.08	0.09	*	0.81	0.16	*	*
In	*	*	*	*	*-0.11*	*	*	*0.40*	*	*0.81*	*	*	*
La	*	0.01	*	-0.01	0.05	0.80	0.18	0.16	-0.63	1.50	-0.81	*	*
Li	*	*	*	1.40	-0.43	*	0.30	0.64	*	0.46	*	*	*
Lu	*	0.09	*	*	0.14	0.85	0.32	0.61	*	0.76	-0.25	*	*
Mo	*	*	*	-2.40	0.31	*	-0.43	0.47	*	*	*	*	*
Nb	*	*	-0.69	2.72	-0.22	-2.79	0.86	0.27	*	1.67	*	*	*
Nd	*	-0.21	*	0.50	0.52	1.77	0.09	0.61	*	0.81	1.66	*	*
Ni	*	*	0.20	-6.65	0.43	-2.55	-4.81	-0.01	-0.01	-0.67	*	*	*
Pb	*	*	*	*	-0.56	0.85	0.94	-0.16	*	2.16	*	*	*
Pr	*	-0.30	*	-10.57	0.07	0.60	0.20	0.15	*	0.29	0.29	*	*
Rb	-0.67	*	-0.24	-12.23	0.19	-1.27	0.71	0.67	0.03	-11.36	*	*	*
S	*	*	*	*0.00*	*-1.19*	*	*	*	*	*	*	*	*
Sb	*	*	*	*	*-0.14*	*	*0.00*	*	*	*	*	*	*
Sc	43.46	*	*	-2.63	0.13	-2.80	0.29	0.47	-0.36	1.31	0.75	*	*
Sm	*	-1.19	*	0.47	0.23	1.47	0.10	0.61	-0.29	1.41	0.59	*	*
Sn	*	*	*	*	*-1.43*	*	*0.13*	*0.19*	*	*	*	*	*
Sr	0.17	*	-0.02	0.09	-0.35	*	20.53	1.59	-0.47	1.35	*	*	*
Ta	*	*	*	*	-0.04	1.30	0.64	-0.66	*	-0.38	*	*	*
Tb	*	0.69	*	11.64	0.00	1.15	0.69	0.39	*	0.57	-0.04	*	*
Th	2.53	*	*	0.19	-0.40	*	0.34	0.23	*	1.25	*	*	*
Tl	*	*	*	*	0.09	*	0.57	0.04	*	*	*	*	*
Tm	*	-6.85	*	*	0.09	0.40	0.29	0.10	-0.20	1.07	-0.10	*	*
U	*	*	*	*	-0.18	0.46	-0.02	0.45	*	-4.64	*	*	*
V	-0.01	*	0.53	1.28	0.70	4.44	-0.19	2.33	-0.47	2.70	*	*	*
W	*	*	*	*31.81*	*-0.09*	*	*0.50*	*0.78*	*	*	*	*	*
Y	*	-0.41	-0.13	-1.11	0.32	-10.68	1.89	0.30	0.17	2.51	-0.72	*	*
Yb	*	-1.27	*	0.43	0.15	*	-0.15	0.04	0.00	0.61	-0.38	*	*
Zn	-1.11	*	0.16	-0.93	0.18	-1.11	-1.48	0.84	0.00	2.12	*	*	*
Zr	0.31	*	0.52	1.85	0.70	2.13	3.12	1.92	-0.26	4.12	*	*	*

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

Table 3 - GeoPT54A Z-scores for Basalt, CSQ-1. 17/01/2024

Lab Code	U32	U33	U34	U35	U37	U39	U40	U41	U43	U44	U45	U47	U48
SiO2	-0.80	*	*	-1.33	0.26	0.83	0.97	0.70	0.79	0.35	1.00	0.59	0.49
TiO2	0.44	*	-3.72	-0.73	-0.14	3.95	-0.07	0.55	0.93	0.14	0.82	-0.39	0.02
Al2O3	-0.94	*	-2.24	1.50	0.41	-0.65	1.24	-0.28	-0.72	0.68	0.53	-0.65	0.18
Fe2O3T	0.39	*	-0.95	0.42	0.47	1.13	-1.23	-0.04	0.59	0.06	0.60	1.33	0.21
Fe(II)O	*	*	*	*	*	*	*	*	*0.07*	*	*	*	*-2.23*
MnO	0.11	*	-0.55	0.11	1.03	0.77	-0.53	0.18	1.51	-1.45	0.77	-0.04	-0.33
MgO	-1.13	*	-2.61	0.00	0.73	0.47	-0.24	-0.85	-7.02	-1.02	-0.16	0.27	0.63
CaO	0.18	*	*	0.11	-0.07	1.53	-1.71	0.58	-0.83	-0.84	0.66	1.07	0.05
Na2O	-1.17	*	-3.40	0.22	*	-1.68	0.75	-1.04	-10.49	-1.69	-0.19	0.96	0.02
K2O	-0.02	*	-1.00	0.54	1.61	0.39	0.02	-1.49	2.83	-0.68	0.39	0.78	0.39
P2O5	0.02	*	-7.32	0.30	-1.26	0.07	0.30	0.30	1.26	0.66	-0.89	0.28	0.15
Ba	*	0.91	0.49	1.34	-0.07	-0.06	0.33	-0.28	0.71	0.23	0.03	-0.28	2.00
Be	*	0.46	-0.04	0.97	0.00	*	0.19	0.11	*	*	0.50	*	3.24
Bi	*	*	*0.39*	*	*-0.13*	*	*	*	*	*	*	*-3.05*	*6.84*
Cd	*	*18.79*	*-0.44*	*	*0.31*	*	*	*	*	*	*	*-8.14*	*113.77*
Ce	*	1.09	-0.05	-0.22	-0.02	1.09	0.46	-0.92	*	-1.24	0.92	-1.46	-1.21
Co	*	1.22	-0.50	-0.70	-1.05	-4.78	0.37	-0.39	-9.60	7.54	0.70	*	4.34
Cr	*	-0.29	-0.99	*	-0.06	19.12	-0.10	-0.13	*	-0.52	0.57	-7.93	110.48
Cs	*	0.77	0.22	*	0.00	*	2.01	*	*	*	-1.21	1.06	0.47
Cu	*	2.81	0.46	-0.17	-1.26	-1.99	-0.16	-1.74	0.20	-1.58	-7.30	-7.90	4.70
Dy	*	0.19	0.08	-0.15	0.11	*	0.06	0.03	*	-1.31	-0.12	-0.37	-2.43
Er	*	0.20	-0.03	-0.58	0.08	*	0.16	0.05	*	-0.82	-0.02	-0.35	-2.12
Eu	*	0.15	-0.01	-0.32	-0.09	*	0.30	0.26	*	0.10	-0.00	0.28	-1.80
Ga	*	3.18	*	0.45	-0.31	-1.55	-0.16	-0.18	*	0.09	-0.35	0.02	4.37
Gd	*	0.69	-0.03	-0.92	-0.09	-5.79	0.10	-0.11	*	0.77	-0.39	-0.03	-1.74
Hf	*	0.07	-0.00	-0.80	*	-0.10	0.37	-0.35	*	*	0.08	-0.74	-2.20
Ho	*	0.27	0.06	-0.41	-0.00	*	0.43	-0.08	*	-1.80	-0.32	-0.29	-2.17
In	*	*	*0.06*	*	*-0.02*	*	*	*	*	*	*	*	*
La	*	0.62	-0.40	-0.39	-0.03	5.42	0.76	-0.25	*	2.23	-0.31	-0.54	-1.31
Li	*	0.46	-0.18	*	0.13	*	*	*	*	*	-0.69	*	10.96
Lu	*	0.09	0.05	0.27	-0.14	*	0.04	0.16	*	-0.52	-0.21	-4.47	-2.07
Mo	*	3.30	-0.07	2.42	0.41	*	1.51	-1.74	*	*	*	0.61	2.01
Nb	*	0.70	-0.96	-1.54	-0.47	-6.51	0.03	-1.52	*	-1.20	*	1.38	1.26
Nd	*	0.53	-0.15	-0.45	-0.18	7.02	0.68	-0.11	*	-1.28	-0.54	-0.23	-1.89
Ni	*	1.58	-0.70	-1.32	-0.72	-0.03	-0.71	-2.80	*	-0.88	2.47	-0.11	13.37
Pb	*	0.58	0.51	*	-0.98	*	2.53	-0.23	*	*	1.48	-5.05	4.46
Pr	*	0.98	-0.23	0.00	0.08	*	0.38	-0.23	*	-1.10	-0.72	-0.49	-1.98
Rb	*	0.92	0.04	-0.67	0.54	2.31	0.30	-0.40	*	-0.97	0.24	0.44	3.00
S	*	*	*	*	*	*-8.91*	*291.41*	*	*-1.07*	*	*	*	*
Sb	*	*-1.57*	*	*	*0.14*	*	*	*	*	*	*	*4.70*	*2826.70*
Sc	*	1.48	0.93	-0.32	-0.17	-3.52	*	-0.25	0.32	-1.20	0.22	-1.25	-4.92
Sm	*	0.49	-0.11	-0.29	-0.10	*	0.29	-0.07	*	-0.35	0.10	-1.65	-2.12
Sn	*	*-4.10*	*	*-1.51*	*0.09*	*	*-0.09*	*	*	*	*	*-1.55*	*364.55*
Sr	*	1.48	-0.07	0.62	0.66	-0.88	0.34	-0.21	2.51	0.04	-0.25	0.83	4.10
Ta	*	-8.05	*	-0.30	*	*	0.80	-0.22	*	*	-0.44	17.46	14.96
Tb	*	0.34	0.00	-0.53	-0.16	*	0.35	-0.18	*	0.08	-0.90	-2.24	-1.91
Th	*	-1.14	0.09	-0.61	-0.01	0.35	0.57	0.08	*	*	-0.49	-0.39	22.68
Tl	*	-1.39	0.46	-0.41	-0.16	*	-0.41	*	*	*	*	-1.06	3.12
Tm	*	0.20	0.19	-0.30	0.10	*	0.30	-0.10	*	-0.71	-0.58	-1.21	-2.01
U	*	-0.43	0.05	-0.14	0.31	*	0.60	0.38	*	*	-1.32	-0.65	33.31
V	*	1.14	-0.56	0.76	0.30	2.21	0.36	-0.45	2.82	-0.28	-2.16	-0.33	13.28
W	*	*-3.98*	*	*	*	*	*5.82*	*	*	*	*	*	*33.28*
Y	*	2.22	1.05	-0.69	0.23	0.77	1.00	0.47	*	2.00	-0.27	0.65	-0.75
Yb	*	0.00	-0.05	-0.65	-0.02	*	0.22	0.06	*	-0.45	0.03	-2.81	-2.50
Zn	*	2.10	1.34	-1.11	-0.54	1.11	2.16	-1.09	2.40	0.28	0.07	-12.96	-1.36
Zr	*	1.58	0.49	0.88	*	-2.32	-0.08	-2.50	*	-0.36	-0.79	-2.40	0.99

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

Table 3 - GeoPT54A Z-scores for Basalt, CSQ-1. 17/01/2024

Lab Code	U49	U51	U52	U53	U54	U55	U57	U62	U64	U65	U66	U67	U68
SiO2	-0.25	-0.12	0.38	-0.22	0.01	0.17	-1.93	0.04	0.64	0.13	-9.89	-0.69	0.80
TiO2	0.81	0.02	-0.31	0.01	-0.47	-0.07	-2.05	0.18	-1.44	0.81	-47.50	0.17	-0.52
Al2O3	0.32	-0.18	0.62	-0.32	-0.77	0.21	-1.47	0.65	-0.61	0.03	44.91	0.32	0.59
Fe2O3T	-0.96	-0.56	-1.69	0.42	0.64	-0.16	-1.68	0.02	-0.20	0.25	-23.73	1.22	0.20
Fe(II)O	*	*	*	*	*	*	*	*	*	*	*	*	*
MnO	-0.26	0.59	-1.45	-0.53	1.31	-0.53	-1.07	0.77	-0.53	-0.35	-8.42	0.66	1.32
MgO	-0.79	0.16	0.47	0.16	-0.71	-0.71	-2.67	-1.41	-1.49	-0.08	74.58	0.39	1.24
CaO	-1.19	0.57	-0.28	-0.23	0.33	-0.80	-0.12	3.35	-0.62	-0.67	47.27	0.81	0.44
Na2O	0.12	-0.40	1.39	-0.73	-1.16	1.39	0.45	0.23	0.04	-0.52	-5.29	0.65	0.81
K2O	-0.15	-1.00	-0.33	-0.15	0.54	0.54	-2.05	0.04	0.64	0.02	-52.25	0.20	-0.13
P2O5	0.18	-0.52	-0.44	0.66	-1.18	-0.07	-0.89	1.33	0.66	0.66	-45.19	-0.07	-0.22
Ba	-0.67	1.75	*	-0.29	*	0.55	0.58	5.08	*	*	-5.97	-0.32	-0.06
Be	-0.00	-0.47	*	-0.94	*	*	*	-1.17	0.90	*	14.36	*	*
Bi	*	*0.15*	*	*	*	*	*	*	*	*	*	*	*
Cd	*	*0.63*	*	*1.57*	*	*	*	***15.66***	*	*	***-3.13***	*	*
Ce	1.08	0.31	*	0.56	*	*	4.31	0.01	0.64	*	-0.09	-0.40	5.65
Co	-0.76	0.39	*	-0.14	*	0.42	2.54	-1.01	0.10	*	8.72	0.42	-0.84
Cr	21.07	0.84	*	1.24	*	*	*	8.20	*	*	361.84	-0.52	*
Cs	*	0.06	*	0.53	*	*	*	-1.89	*	*	4.01	*	667.80
Cu	*	0.33	*	-0.58	*	2.32	2.82	0.50	1.03	*	12.78	-1.16	0.17
Dy	0.87	-0.11	*	0.57	*	*	*	1.26	0.07	*	-1.48	*	*
Er	0.71	0.35	*	0.52	*	*	*	0.57	-0.08	*	-1.16	*	*
Eu	0.97	0.20	*	0.30	*	*	*	-0.83	0.00	*	-0.92	*	*
Ga	0.04	2.32	*	-1.63	*	-5.25	*	1.06	0.23	*	7.25	*	0.08
Gd	1.39	0.96	*	0.27	*	*	*	2.77	0.06	*	-0.65	*	*
Hf	3.14	-0.70	*	0.27	*	3.14	*	5.00	0.35	*	-1.72	*	*
Ho	0.43	-0.12	*	0.01	*	*	*	1.86	0.03	*	-1.33	*	*
In	*	*	*	*	*	*	*	*	*	*	*	*	*
La	0.34	0.29	*	0.40	*	*	1.92	0.16	0.11	*	-0.02	-0.71	-4.57
Li	2.10	-2.27	*	-0.21	*	*	*	7.60	-0.12	*	*	*	*
Lu	*	0.43	*	0.50	*	*	*	-1.05	0.00	*	-1.05	*	*
Mo	20.50	0.29	*	*	*	*	*	0.68	*	*	17.49	*	31.95
Nb	0.17	0.47	*	-0.17	*	-0.86	1.71	1.03	*	*	7.61	*	-2.40
Nd	0.86	0.10	*	0.42	*	*	*	1.36	-0.02	*	-0.85	*	-2.71
Ni	10.00	0.07	*	0.42	*	-1.75	-0.90	-0.46	0.50	*	53.51	-0.01	-3.51
Pb	*	-0.61	*	*	*	*	*	0.40	1.01	*	-0.61	*	*
Pr	0.68	-0.27	*	0.15	*	*	*	0.00	0.10	*	-0.75	*	*
Rb	-0.06	2.31	*	0.15	*	-0.36	1.09	-1.94	-0.08	*	0.91	*	3.52
S	*	*	*	*	*	*	*	***-15.45***	*	*	*	*	*
Sb	*	*-0.14*	*	*	*	*	*	*	*	*	***6.13***	*	*
Sc	0.39	1.64	*	0.04	*	0.39	0.75	-2.08	0.32	*	-1.72	*	-7.82
Sm	0.86	0.16	*	0.04	*	*	*	2.05	0.01	*	-0.57	*	*
Sn	*	*-0.01*	*	*1.61*	*	*	*	***-0.24***	*	*	*	*	*
Sr	-0.47	-0.17	*	0.59	*	-0.86	0.60	0.99	-0.04	*	1.82	*	-1.33
Ta	4.09	0.43	*	0.40	*	*	*	*	*	*	18.99	*	*
Tb	0.78	-0.67	*	-0.53	*	*	*	0.52	0.03	*	-0.97	*	*
Th	1.75	0.03	*	0.18	*	25.69	*	3.49	*	*	-3.14	*	4.28
Tl	*	0.00	*	0.41	*	*	*	*	*	*	*	*	*
Tm	*	-0.20	*	0.00	*	*	*	0.81	*	*	-1.21	*	*
U	1.34	-0.19	*	0.16	*	*	*	2284.48	*	*	-3.24	*	*
V	3.84	-0.02	*	0.22	*	-0.20	0.64	0.21	-0.23	*	11.67	0.03	0.82
W	*	*	*	*	*	*	*	*	*	*	***-1.21***	*	*
Y	-0.15	0.00	*	0.12	*	-0.42	1.31	0.23	1.16	*	0.34	-0.69	-0.31
Yb	1.08	-0.04	*	0.22	*	*	*	-0.26	-0.19	*	-1.55	*	*
Zn	0.74	-0.93	*	0.65	*	-2.04	0.00	8.91	1.03	*	1.48	0.37	0.00
Zr	-2.06	-0.33	*	1.11	*	-0.26	-0.24	6.39	0.90	*	-10.47	0.21	-0.33

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

Table 3 - GeoPT54A Z-scores for Basalt, CSQ-1. 17/01/2024

Lab Code	U69	U71	U72	U73	U74	U75	U76	U77	U79	U80	U81	U82	U83
SiO2	-1.59	**-2.00**	**-62.02**	**-0.69**	-0.10	-1.74	**2.39**	1.17	**0.39**	**-0.78**	*	1.73	-0.20
TiO2	-24.41	**-2.21**	**-41.92**	**-0.22**	1.13	0.31	**-6.36**	1.45	**0.13**	**0.02**	-6.85	0.39	0.65
Al2O3	9.14	**-1.83**	**-50.16**	**-0.29**	-0.41	0.00	**2.18**	1.77	**-0.47**	**-0.77**	0.62	-0.10	-0.59
Fe2O3T	-9.63	**-1.87**	**-51.99**	**-0.17**	-0.04	0.90	**-6.82**	-2.46	**0.53**	**-5.94**	-0.23	1.32	-0.23
Fe(II)O	*	*	*	*	*	*	*	*	***-1.42***	*	*	*	*
MnO	-1.45	**-1.62**	**-27.92**	**0.22**	0.39	1.31	**-1.07**	-1.45	**-0.50**	**1.14**	-1.45	0.57	-0.53
MgO	57.21	**-2.04**	**-41.61**	**0.16**	-0.79	4.45	**-24.34**	2.04	**1.21**	**1.10**	0.71	-1.88	0.47
CaO	21.99	**-0.98**	**-46.99**	**-0.03**	0.85	-0.01	**1.35**	-4.17	**-0.55**	**0.31**	2.19	0.48	-0.06
Na2O	-10.31	**-1.47**	**-39.92**	**-1.89**	0.22	1.21	**41.02**	2.98	**-0.84**	**-3.17**	-0.10	-2.83	1.29
K2O	-25.53	**2.48**	**-37.23**	**-0.65**	0.20	1.49	**1.44**	2.64	**-0.75**	**-1.00**	0.02	-0.10	0.20
P2O5	-12.55	**-0.81**	**-31.90**	**-0.15**	0.30	-0.63	**13.88**	1.40	**-0.83**	**-0.15**	-9.30	*	-0.07
Ba	-16.00	**-0.59**	**6.55**	**-1.47**	-1.99	3.75	**-32.34**	1.81	**0.05**	**-0.59**	0.87	0.00	-0.44
Be	*	*	*	*	*	*	*	*	**0.07**	*	-0.24	*	*
Bi	*-2.63*	*	*	*	*	*	*	*	*	*	*	*	*
Cd	*-1.28*	***9.21***	*289.75*	*	*57.95*	*	*	*	*	*	*17.85*	*	*
Ce	-12.23	**-0.50**	**3.77**	**-0.58**	4.30	0.25	*	-0.13	**0.09**	**0.32**	0.66	-0.27	*
Co	4.22	**-0.43**	**0.85**	**1.41**	-4.08	-1.27	**-21.65**	-0.14	**-0.45**	*	0.11	0.38	*
Cr	401.74	**-0.49**	**9.04**	**0.64**	7.04	-4.15	**-17.76**	33.92	**-1.04**	**-2.72**	0.32	2.91	-0.52
Cs	*	**-0.71**	*	**-0.12**	422.40	*	*	*	**0.18**	**0.18**	1.86	50.70	*
Cu	-4.33	**-0.88**	**0.33**	**0.66**	1.41	-0.78	*	1.99	**0.33**	**2.32**	2.07	-1.08	-0.50
Dy	-7.41	**-0.83**	*	**-0.87**	*	*	*	*	**0.52**	**2.07**	0.28	-0.83	*
Er	-6.28	**-1.13**	*	**-1.57**	*	*	*	*	**0.02**	**1.67**	0.25	-0.84	*
Eu	-6.97	**-0.47**	*	**-0.60**	*	*	*	*	**0.29**	**0.51**	0.39	-0.53	*
Ga	-4.05	**-0.78**	**0.08**	-0.37	-0.37	-1.33	*	*	**0.33**	**0.22**	*	0.60	*
Gd	-8.15	**-0.22**	*	**-0.99**	*	*	*	*	**0.03**	**2.50**	0.27	-0.69	*
Hf	*	**8.15**	0.05	**-0.72**	*	-2.32	*	*	**0.39**	**1.28**	0.45	-0.90	*
Ho	-5.61	**-0.65**	*	**-0.91**	*	*	*	*	**0.18**	**1.78**	0.09	-0.78	*
In	*	*	*	*	*	*	*	*	*	*	*	*	*
La	-10.87	**-0.93**	**4.89**	**-0.52**	-0.97	-0.28	*	*	**0.37**	**1.32**	0.37	-0.31	*
Li	-4.51	**-0.03**	*	**1.06**	*	*	*	*	**-0.74**	*	-0.20	*	*
Lu	-4.30	**-0.07**	*	**-0.82**	*	*	*	*	**0.09**	**1.22**	0.16	-0.78	*
Mo	-5.03	**-0.05**	*	*	*	*	*	*	**-0.32**	**-0.95**	4.95	1.74	*
Nb	*	**0.46**	**-0.34**	0.14	-0.51	-0.86	*	-2.23	**0.55**	**0.82**	0.65	-0.00	*
Nd	-11.06	**0.38**	**1.72**	**-0.85**	*	0.51	*	*	**0.08**	**1.10**	0.24	-0.67	*
Ni	81.98	**1.52**	**0.84**	**0.84**	6.52	1.68	*	4.77	**-2.12**	**8.07**	0.12	0.59	-0.45
Pb	-7.85	**-0.13**	*	**-1.71**	2.38	-1.22	*	*	**0.16**	**-1.30**	0.51	1.67	*
Pr	-8.97	**0.35**	*	**-0.15**	*	*	*	*	**0.60**	**0.45**	0.45	-0.57	*
Rb	*	**-0.04**	**-0.12**	**0.18**	1.46	-0.55	*	-1.27	**0.24**	**0.30**	-0.12	*	*
S	*	*	*	*	*	*	***-30.81***	*	*	*	*	*2.27*	*
Sb	*963.47*	*	*	*	*	*	*	*	*	*	*	*8.12*	*
Sc	-2.62	**-0.17**	**-0.65**	1.11	-0.68	-0.11	*	*	**0.50**	**2.72**	1.22	0.40	*
Sm	-8.52	**0.00**	*	**-0.74**	*	-2.34	*	*	**0.57**	**1.62**	0.20	-0.40	*
Sn	*	*	*	*	*	*	*	*	***0.44***	*	*0.22*	*	*
Sr	-12.29	**1.65**	**-1.33**	**-0.17**	0.04	-0.69	**-31.80**	-0.73	**-0.69**	**-1.05**	0.69	0.17	0.40
Ta	*	**0.21**	*	**-0.38**	*	*	*	*	**0.50**	**1.09**	-1.80	-0.84	*
Tb	-5.91	**-0.27**	*	**-1.06**	*	*	*	*	**0.43**	**1.57**	-0.00	-0.87	*
Th	-7.53	**-0.90**	*	**-0.67**	2.14	2.74	*	*	**0.12**	**1.37**	0.10	-1.05	*
Tl	*	*	*	*	*	*	*	*	**0.82**	*	0.00	*	*
Tm	-4.57	**-0.22**	*	**-1.01**	*	*	*	*	**0.00**	**1.21**	0.10	-0.76	*
U	-5.91	**-0.62**	*	**-1.32**	38.38	28.39	*	*	**0.02**	**-0.28**	0.16	-0.99	*
V	-2.25	**-0.10**	**1.36**	**3.13**	-1.40	-0.85	**-30.80**	*	**-0.64**	**-0.18**	-0.01	0.01	-0.24
W	*	*	*	*	*	*88.44*	*	*	*	*	*-0.48*	*	*
Y	-9.24	**0.88**	**-0.31**	**0.61**	0.12	-0.33	*	-3.38	**1.04**	**-0.84**	0.95	0.39	-0.69
Yb	-5.89	**-0.91**	**45.29**	**-1.34**	*	*	*	*	**0.04**	**0.86**	0.15	-1.06	*
Zn	-6.24	**-0.48**	**-0.19**	**3.71**	-0.28	-1.03	*	-0.28	**2.41**	**0.19**	0.00	2.64	0.09
Zr	*	**-6.36**	**0.05**	**1.09**	0.07	-0.44	*	-3.01	**-0.33**	**3.77**	0.50	-0.88	-1.26

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

Table 3 - GeoPT54A Z-scores for Basalt, CSQ-1. 17/01/2024

Lab Code	U84	U86	U87	U88	U89	U90	U93	U95	U99	U100	U101	U102	U103
SiO2	-1.77	-0.16	-1.07	0.43	0.02	1.79	**0.49**	*	**-0.33**	0.47	**0.70**	-0.93	**-1.48**
TiO2	-0.79	-0.56	-0.87	-0.63	-0.39	-2.86	**-0.93**	*	**0.82**	-1.82	**-0.24**	-23.99	**-0.93**
Al2O3	0.12	-0.42	-0.83	-0.18	0.91	1.62	**-0.12**	*	**0.29**	1.80	**-0.85**	8.96	**-1.89**
Fe2O3T	0.01	-0.27	-0.16	-0.43	-0.48	-2.66	**0.12**	*	**0.36**	0.98	**-0.67**	-12.11	**-0.37**
Fe(II)O	*	*	*	*0.00*	*	*	***0.63***	*	*	*	*	*	*
MnO	0.39	0.85	0.39	-0.53	0.11	-3.29	**0.77**	*	**0.77**	-0.17	**-0.46**	-4.21	**0.59**
MgO	-0.55	0.16	-0.47	-0.71	0.86	-9.89	**0.47**	*	**0.16**	0.55	**0.69**	48.59	**-2.36**
CaO	-0.58	-0.53	0.07	-0.10	-0.19	-0.49	**1.70**	*	**-2.54**	-0.71	**0.28**	15.66	**-2.20**
Na2O	1.07	-0.01	-3.49	-0.63	-0.52	-1.80	**1.51**	*	**2.78**	1.18	**0.08**	-13.05	**0.23**
K2O	1.07	0.30	-0.50	0.37	-0.85	-0.50	**0.04**	*	**-0.31**	1.42	**-0.17**	-25.95	**-1.70**
P2O5	-15.21	0.00	1.03	-0.44	-0.04	-0.44	**1.33**	*	**-1.62**	0.22	**0.52**	-22.59	**-1.77**
Ba	4.65	*	*	0.03	*	1.28	**-0.24**	-0.15	**3.78**	0.17	**0.31**	-15.99	**-1.41**
Be	*	*	-6.10	*	*	0.50	**-0.40**	0.38	*	*	**-0.21**	*	**-1.17**
Bi	*	*	*	*	*	*	*	*	*	*	***0.26***	*1581.52*	*
Cd	*4.70*	*	*29.76*	*	*	*	***2.51***	*	*	*	*	*	*
Ce	*	0.95	*	-0.26	*	0.10	**-1.33**	-0.09	**5.68**	-0.01	**0.40**	*	**-0.04**
Co	1.75	-4.64	-5.65	-0.42	*	1.83	**-0.73**	-0.03	**3.38**	-0.22	**1.17**	1.01	**0.17**
Cr	3.26	27.20	-3.88	1.16	*	7.88	**3.49**	0.40	**2.65**	1.16	**0.29**	304.48	**0.13**
Cs	*	*	*	*	*	*	**-1.00**	0.09	*	*	**-0.06**	*	*
Cu	0.61	0.91	-1.49	-0.08	*	2.99	**0.50**	-0.25	**0.25**	-1.00	**-0.90**	-5.05	**0.00**
Dy	*	*	*	-0.45	*	-0.07	**-1.23**	0.01	*	-0.01	**0.44**	*	**-0.26**
Er	*	*	*	-0.77	*	-0.30	**-1.46**	-0.08	*	0.14	**0.79**	*	**0.35**
Eu	*	*	*	0.08	*	0.26	**-0.83**	-0.32	*	-0.12	**-0.22**	*	**0.24**
Ga	*	0.04	*	*	*	0.45	**0.00**	-0.04	**-1.38**	0.37	**0.44**	*	-0.49
Gd	*	*	*	-0.33	*	0.06	**-2.33**	-0.07	*	0.36	**-0.48**	*	**0.89**
Hf	*	-2.18	*	*	*	0.05	**-1.59**	-0.25	**-0.10**	-0.01	**-0.48**	*	**-0.25**
Ho	*	*	*	-1.25	*	-0.41	**-0.74**	-0.16	*	0.30	**0.16**	*	**-0.40**
In	*	*	*	*	*	*-0.36*	***0.04***	*	*	*	*	*	*
La	*	0.61	*	-0.29	*	0.24	**-0.52**	-0.29	**77.19**	-0.02	**0.19**	*	**0.58**
Li	*	*	*	*	*	-1.54	**-0.03**	0.22	*	*	**0.31**	-3.37	*
Lu	*	*	*	0.04	*	0.27	**-0.59**	-0.07	*	-0.41	**-0.05**	*	**-0.59**
Mo	*	*	*	*	*	0.84	**-0.32**	*	**-6.91**	3.91	**0.06**	*	**-0.59**
Nb	*	*	*	-0.86	*	0.51	**-3.50**	0.21	**-1.99**	-0.24	**-0.38**	*	**-0.82**
Nd	*	*	*	-0.03	*	0.17	**-1.60**	-0.40	**2.82**	-0.14	**-0.15**	*	**-0.01**
Ni	0.94	7.39	-5.11	0.86	*	18.27	**-1.24**	0.90	**-2.38**	2.16	*	56.43	**0.06**
Pb	-0.45	3.87	-5.37	*	*	9.83	**-0.88**	0.17	**15.49**	0.89	**-0.53**	*	**-0.07**
Pr	*	*	*	-0.83	*	0.17	**-1.50**	-0.45	*	0.00	**0.12**	*	**-1.20**
Rb	-0.64	2.67	*	-2.49	*	0.00	**-0.73**	0.00	**0.85**	-1.40	**1.62**	*	-0.52
S	*	*	*-4.38*	*	*	*	***1.61***	*	*	*-15.40*	*	*37.96*	*
Sb	*	*	*50.81*	*	*	*	***4.70***	*	*	*	***-0.51***	*	*
Sc	*	*	*	-1.04	*	-1.76	**0.80**	-0.04	**-1.79**	-0.04	**1.52**	3.41	0.29
Sm	*	*	*	0.53	*	-0.19	**-1.06**	0.04	**-6.47**	-0.04	**0.61**	*	**0.74**
Sn	*-0.89*	*1.33*	*-6.88*	*	*	*	***-1.55***	*	*	*-0.09*	***-2.46***	*	*0.25*
Sr	2.39	0.11	*	-0.38	*	-0.05	**-0.49**	0.14	**-0.50**	-0.47	**2.25**	-12.77	**1.63**
Ta	*	*	*	*	*	-0.52	**0.72**	0.25	*	0.43	**-1.22**	*	**-1.62**
Tb	*	*	*	0.35	*	-0.00	**-1.41**	-0.09	*	0.08	**-1.14**	*	**0.08**
Th	*	6.06	*	*	*	0.37	**-1.14**	-0.08	**3.49**	0.63	**-0.32**	*	**0.55**
Tl	*	*	6.52	*	*	0.00	*	*	*	*	*	*	*
Tm	*	*	*	-0.71	*	0.10	**-0.77**	0.00	*	0.30	**-0.28**	*	**-0.20**
U	*	*	*	7.71	*	1.19	**-0.57**	-0.07	**14.54**	0.53	**-0.75**	*	**-0.13**
V	1.89	0.18	-7.86	-0.71	*	-0.40	**-1.56**	-0.09	**0.71**	0.60	**2.19**	-4.60	**2.67**
W	*	*	*	*	*	*3.68*	***19.21***	*	***1181.38***	*3.43*	***3.33***	*	*31.79*
Y	*	*	*	-0.42	*	1.19	**-1.17**	0.60	**0.02**	-0.21	**0.30**	-7.96	**0.50**
Yb	*	*	*	0.22	*	-0.19	**-1.04**	-0.06	*	0.02	**-0.89**	*	**0.04**
Zn	-0.45	1.21	-5.66	-0.09	*	-0.46	**2.23**	0.00	**-0.41**	-0.19	**2.23**	-6.96	**1.86**
Zr	*	*	*	-0.12	*	0.54	**-2.13**	0.07	**0.38**	0.17	**1.09**	-14.04	**-1.75**

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

Table 3 - GeoPT54A Z-scores for Basalt, CSQ-1. 17/01/2024

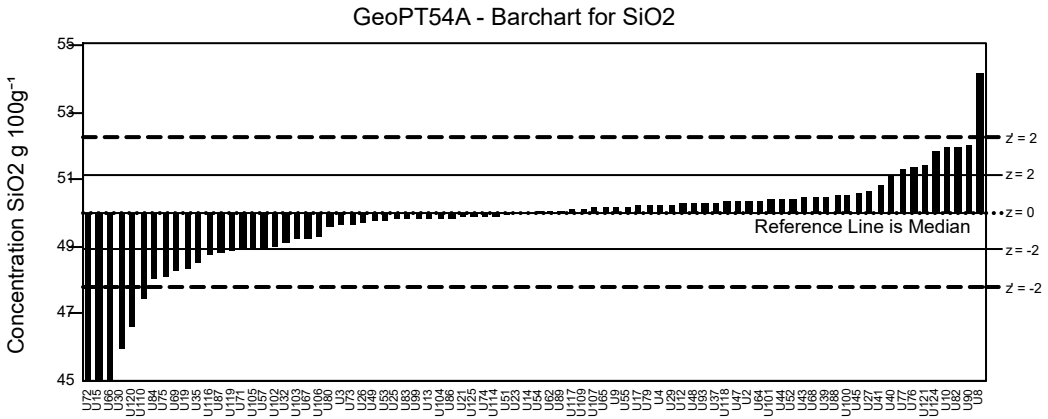
Lab Code	U104	U105	U106	U107	U109	U110	U114	U116	U117	U118	U119	U120	U121
SiO2	**-0.31**	-0.97	**-1.35**	0.11	**0.22**	-2.30	-0.10	**-2.29**	**0.21**	0.28	-1.04	**-6.16**	1.27
TiO2	**-1.03**	-0.99	**-2.21**	-0.22	**-1.01**	-1.50	0.41	**-2.21**	**0.18**	0.41	-0.27	**-3.48**	0.25
Al2O3	**-1.24**	4.91	**-0.29**	-0.02	**-0.71**	3.27	0.21	**-2.30**	**0.00**	0.12	0.15	**-5.19**	1.09
Fe2O3T	**0.36**	-1.81	**1.52**	0.13	**0.50**	-3.00	0.18	**-1.43**	**-0.37**	1.46	-0.48	**1.52**	0.71
Fe(II)O	*	*	*	*	*	*	*	*	***-2.16***	*	*	*	*
MnO	**0.59**	-0.24	**0.77**	0.08	**-0.70**	-2.01	0.39	**0.04**	**0.04**	0.75	-0.72	**0.04**	0.39
MgO	**-0.77**	-0.57	**-3.30**	0.29	**-0.16**	-12.17	0.00	**-1.73**	**-4.71**	0.24	0.00	**0.79**	0.08
CaO	**-0.59**	0.52	**0.31**	-0.16	**0.31**	-1.48	0.07	**-1.24**	**-0.64**	0.94	-1.14	**2.13**	-0.49
Na2O	**-2.55**	3.55	**0.02**	-0.12	**0.02**	6.81	0.12	**-1.89**	**5.76**	-0.10	-1.69	**-7.41**	0.44
K2O	**-0.27**	-1.39	**-1.70**	0.37	**2.94**	1.59	-0.15	**-2.75**	**0.39**	0.02	-1.72	**-0.65**	0.02
P2O5	**-0.59**	0.78	**0.00**	0.48	**2.66**	8.12	0.74	**0.44**	**-0.89**	0.52	0.30	**-2.36**	-0.07
Ba	**1.41**	0.11	**0.82**	*	**-0.27**	0.79	0.36	*	**-0.94**	0.58	-1.90	**3.45**	-0.64
Be	**-2.32**	*	**3.25**	*	**-0.63**	*	1.36	*	*	*	*	*	*
Bi	***-0.26***	*	*	*	*	*	*	*	*	*	*	*	*
Cd	***-0.56***	*	*	*	***2.57***	*	*0.00*	*	*	*	*	*	*
Ce	**-0.48**	*	**0.55**	*	**-1.35**	*	-0.01	*	**-4.82**	0.81	*	**-2.94**	3.20
Co	**-0.40**	*	**0.89**	*	**-0.40**	*	0.68	*	**5.35**	-1.26	-2.11	*	*
Cr	**-1.63**	*	**-0.39**	*	**0.69**	*	2.00	*	**22.48**	-5.56	*	**20.80**	-2.96
Cs	**-0.65**	*	*	*	**-0.24**	*	-0.21	*	*	*	*	*	*
Cu	**-1.54**	-1.33	**0.50**	-1.08	**-1.50**	5.23	0.17	*	**3.65**	-0.25	-3.90	**1.99**	-0.40
Dy	**-0.13**	*	**0.32**	*	**-0.44**	*	0.12	*	*	*	*	*	*
Er	**0.15**	*	**0.02**	*	**-0.46**	*	0.28	*	*	*	*	*	*
Eu	**0.18**	*	**0.29**	*	**-0.37**	*	-0.19	*	*	*	*	*	*
Ga	**2.59**	-3.62	**-0.03**	*	**-0.99**	*	-0.45	*	**0.08**	0.04	*	**-8.88**	-2.12
Gd	**-0.34**	*	**0.19**	*	**-0.43**	*	-0.06	*	*	*	*	*	*
Hf	**-0.92**	*	**0.36**	*	**-2.14**	*	0.37	*	**6.28**	1.22	*	*	*
Ho	**0.01**	*	**0.29**	*	**-0.07**	*	0.13	*	*	*	*	*	*
In	*	*	*	*	*	*	*0.02*	*	*	*	*	*	*
La	**-0.74**	*	**-0.12**	*	**-0.78**	*	0.37	*	**-4.57**	4.02	2.71	**8.05**	-0.13
Li	**-1.89**	*	**1.11**	*	**-0.40**	*	-0.57	*	*	*	*	*	*
Lu	**0.36**	*	**0.09**	*	**-0.30**	*	-0.18	*	*	*	*	*	*
Mo	**0.03**	88.29	**11.25**	*	**-0.35**	*	0.16	*	**4.84**	*	*	*	*
Nb	**-7.38**	-2.57	**0.38**	*	**0.01**	*	-0.20	*	**-1.71**	-0.51	*	**-1.71**	-0.82
Nd	**-0.37**	*	**0.68**	*	**-0.45**	*	-0.43	*	**-4.92**	-1.57	*	*	*
Ni	**-1.05**	-0.45	**0.00**	*	**-0.90**	*	-0.54	*	**-2.64**	1.29	*	**18.25**	-1.41
Pb	**-0.69**	*	**0.94**	*	**-1.03**	*	0.14	*	**1.77**	6.85	*	*	7.75
Pr	**-0.41**	*	**0.36**	*	**-0.09**	*	0.23	*	*	-3.08	*	*	*
Rb	**0.16**	-1.88	**1.00**	*	**-0.71**	*	-0.16	*	**2.31**	-0.67	0.85	**-0.73**	0.36
S	***12.83***	***3.00***	*	*	*	*-0.08*	*-0.04*	*	*-6.72*	*0.04*	*	***10.60***	*
Sb	***1.57***	*	*	*	***1.28***	*	*	*	*	*	*	*	*
Sc	**0.95**	*	**0.68**	*	**-3.02**	*	-0.54	*	**-3.52**	*	*	*	-0.90
Sm	**0.33**	*	**0.34**	*	**-0.16**	*	-0.20	*	*	-2.41	*	*	*
Sn	***-4.70***	*	*	*	***2.09***	*	*1.33*	*	*	*	*	*	*
Sr	**0.71**	5.19	**0.85**	0.30	**-0.35**	-0.18	0.03	*	**-1.46**	-0.15	-1.34	**-7.31**	-0.23
Ta	**-4.96**	*	**0.65**	*	**0.01**	*	-0.04	*	**-6.44**	*	*	*	*
Tb	**-0.18**	*	**0.17**	*	**-0.43**	*	0.35	*	*	*	*	*	*
Th	**1.81**	*	**0.64**	*	**-0.70**	*	-0.04	*	**-11.43**	*	*	*	*
Tl	**-0.08**	*	*	*	**0.16**	*	0.00	*	*	*	*	*	*
Tm	**0.04**	*	*	*	**-0.04**	*	-0.10	*	*	*	*	*	*
U	**0.49**	*	**0.09**	*	**0.02**	*	-0.14	*	**2.68**	*	*	*	15.42
V	**1.65**	*	**0.37**	*	**-0.47**	*	0.95	*	**-0.79**	-0.20	-1.32	**3.75**	-0.25
W	***-1.51***	*	***1.92***	*	***-0.48***	*	*	*	*	*	*	*	*
Y	**0.80**	-0.69	**1.31**	*	**-1.50**	*	-0.48	*	**-1.38**	-0.15	*	**-7.84**	0.84
Yb	**-0.39**	*	**0.19**	*	**-0.39**	*	-0.22	*	*	*	*	*	*
Zn	**-1.17**	-3.90	**4.10**	1.02	**0.63**	1.67	0.84	*	**-2.04**	-0.74	-0.74	**0.74**	-0.46
Zr	**-1.09**	1.11	**1.12**	-0.36	**-4.42**	-1.44	0.17	*	**-1.18**	-0.78	0.21	**-6.39**	-0.96

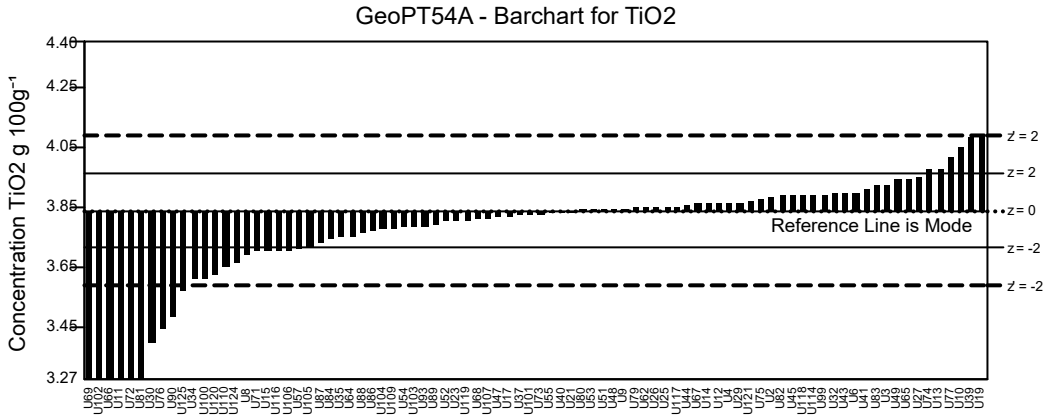
Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

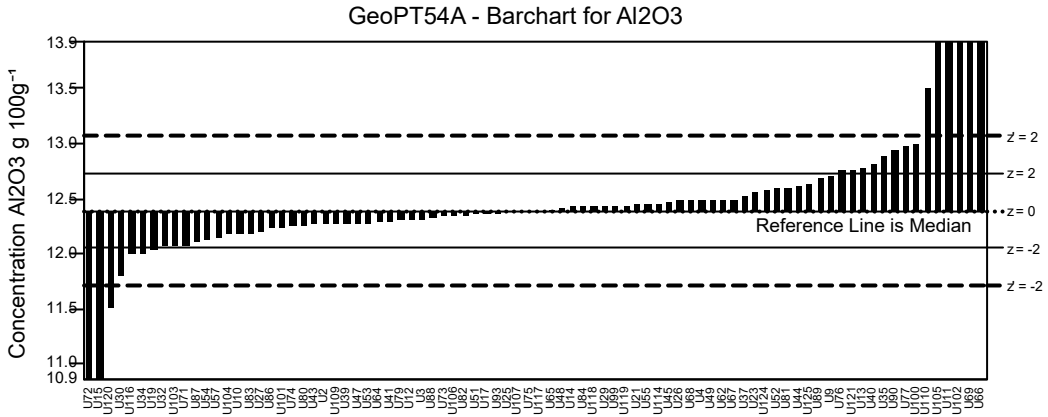
Table 3 - GeoPT54A Z-scores for Basalt, CSQ-1. 17/01/2024

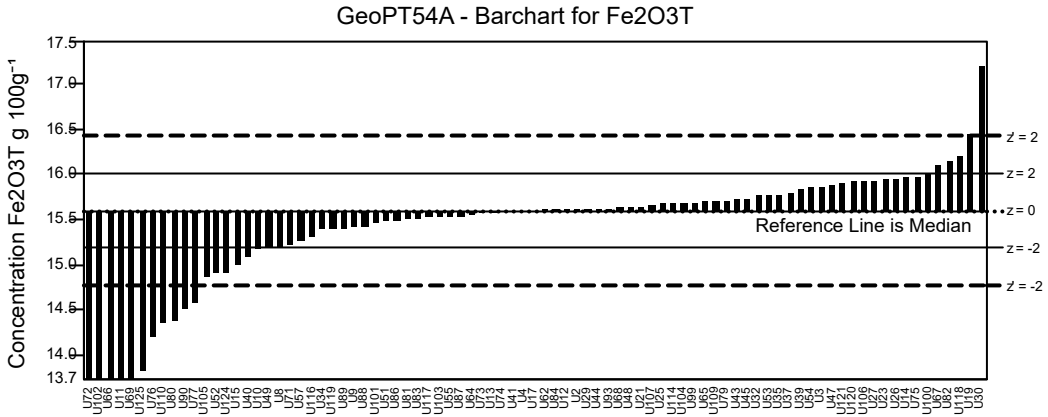
Lab Code	U124	U125
SiO2	1.63	-0.11
TiO2	-1.42	-2.14
Al2O3	0.59	0.71
Fe2O3T	-1.66	-4.30
Fe(II)O	*	*
MnO	-2.37	-1.45
MgO	-12.40	-13.58
CaO	-1.45	-0.62
Na2O	-1.80	2.24
K2O	1.94	1.42
P2O5	2.14	-0.07
Ba	-0.67	-6.29
Be	*	*
Bi	*	*
Cd	*	*
Ce	*	*
Co	-0.42	*
Cr	22.16	11.06
Cs	*	*
Cu	0.17	*
Dy	*	*
Er	*	*
Eu	*	*
Ga	1.26	-3.10
Gd	*	*
Hf	*	0.27
Ho	*	*
In	*	*
La	*	*
Li	*	*
Lu	*	*
Mo	*	-0.75
Nb	-0.51	-5.94
Nd	*	-0.44
Ni	-0.01	*
Pb	3.87	0.83
Pr	*	5.08
Rb	-0.67	-3.31
S	*	*1.31*
Sb	*	*
Sc	2.19	*
Sm	*	*
Sn	*	*
Sr	-1.66	-5.58
Ta	*	*
Tb	*	*
Th	2.14	-6.28
Tl	*	*
Tm	*	*
U	*	-2.07
V	0.37	-3.43
W	*	*
Y	-0.42	5.31
Yb	*	*
Zn	-0.09	**-9.51**
Zr	-2.39	-6.66

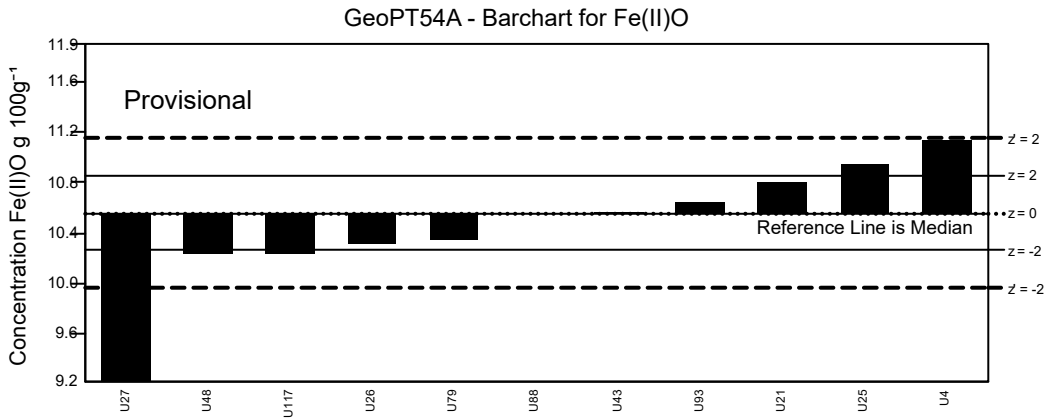
Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

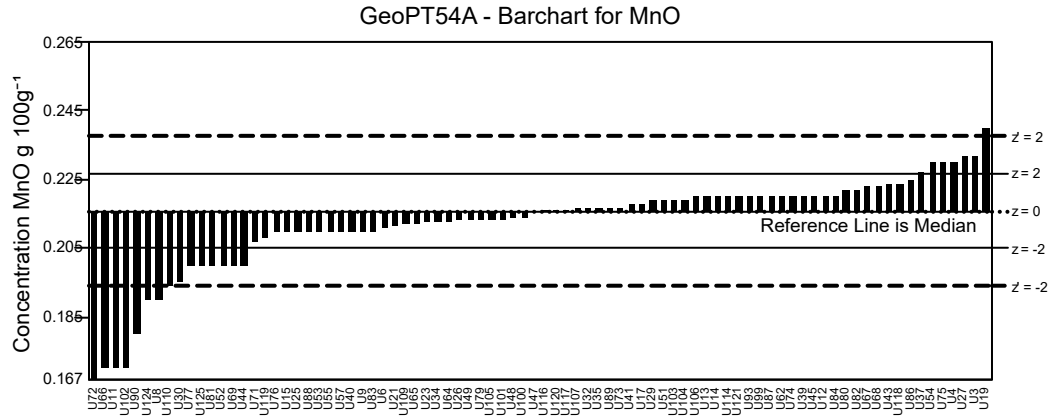

GeoPT54A - Barchart for SiO2
Concentration SiO2 g 100g⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2


GeoPT54A - Barchart for TiO2
Concentration TiO2 g 100g⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

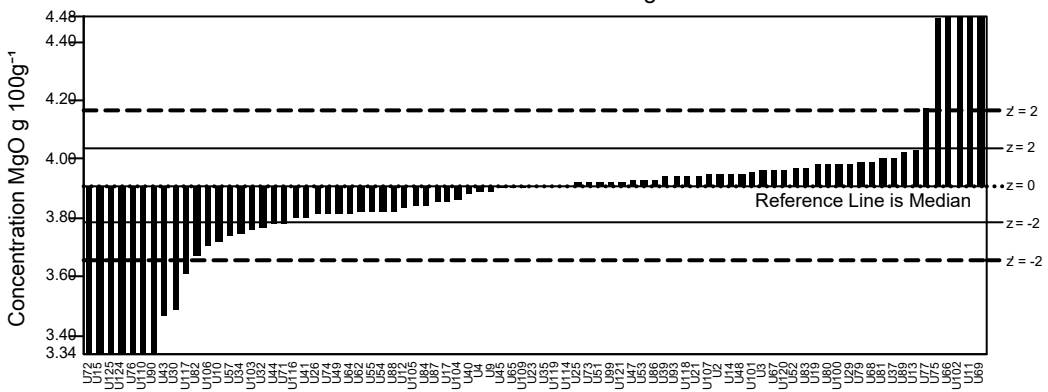

GeoPT54A - Barchart for Al2O3
Concentration Al2O3 g 100g⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2


GeoPT54A - Barchart for Fe2O3T
Concentration Fe2O3T g 100g⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

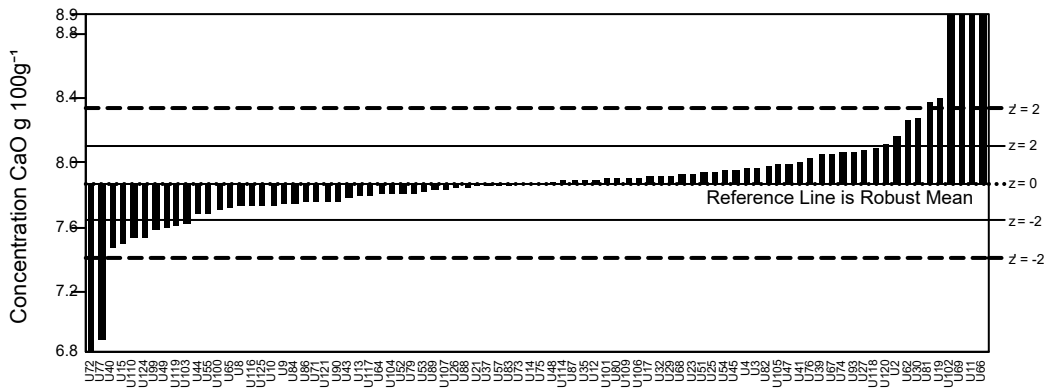

GeoPT54A - Barchart for Fe(II)O
Concentration Fe(II)O g 100g⁻¹
Provisional
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2


GeoPT54A - Barchart for MnO
Concentration MnO g 100g⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

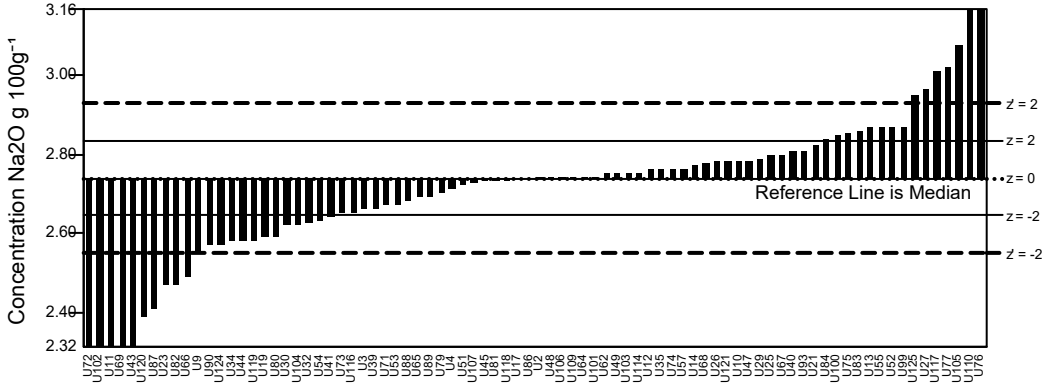
GeoPT54A - Barchart for MgO



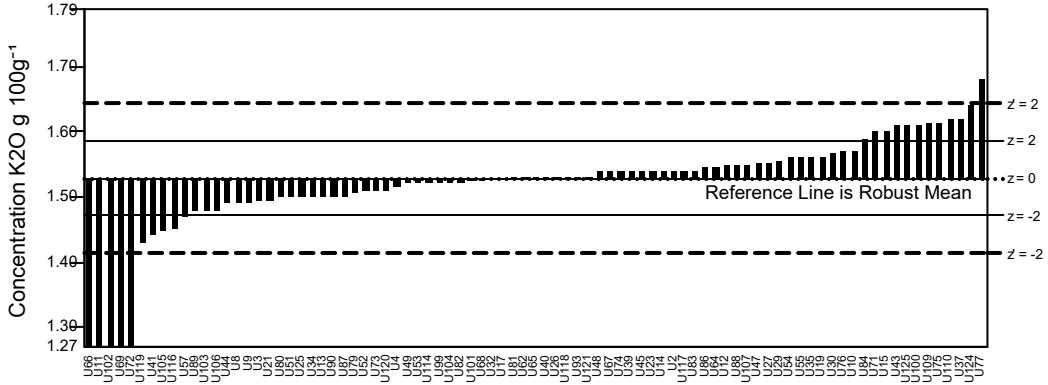
GeoPT54A - Barchart for CaO



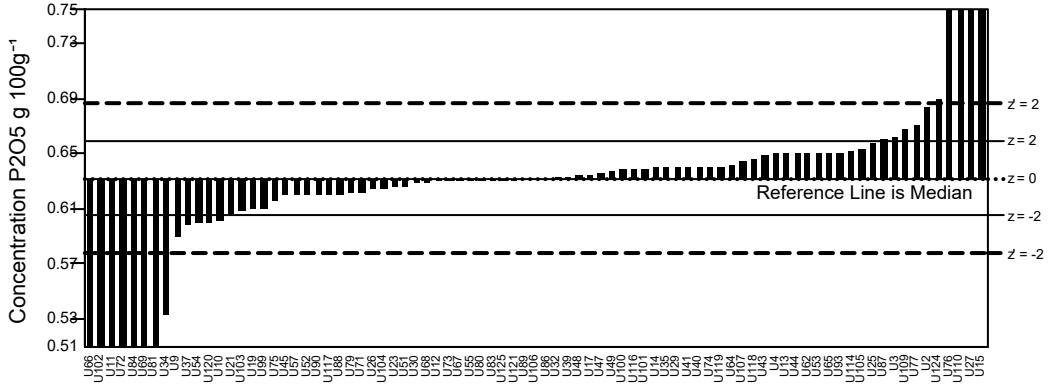
GeoPT54A - Barchart for Na2O



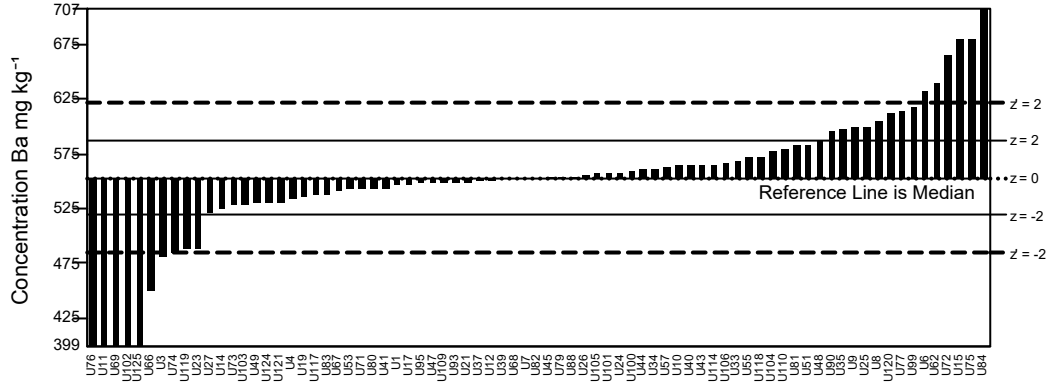
GeoPT54A - Barchart for K2O

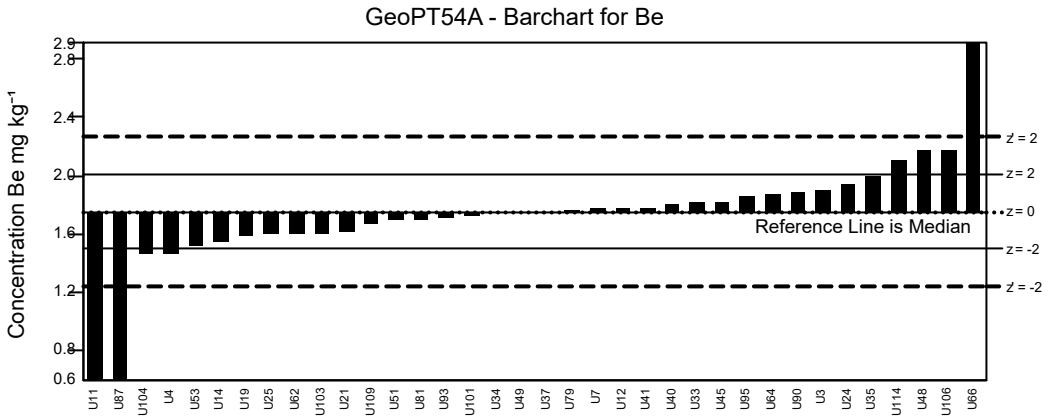


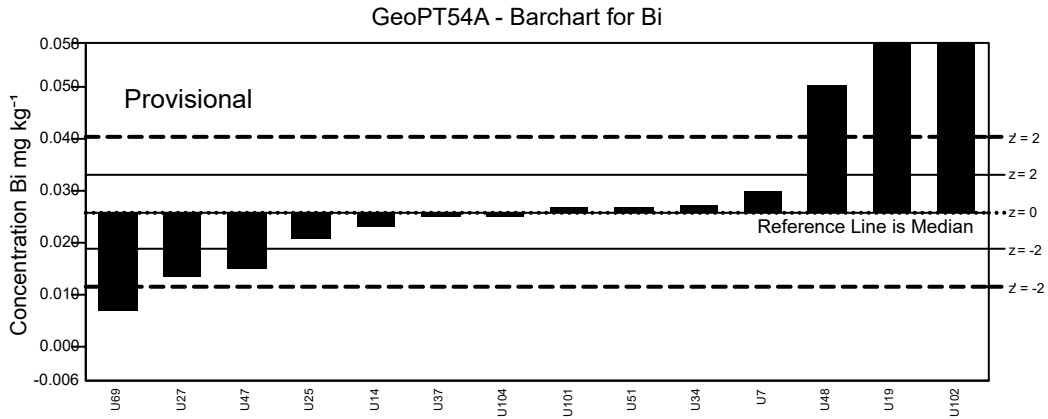
GeoPT54A - Barchart for P2O5

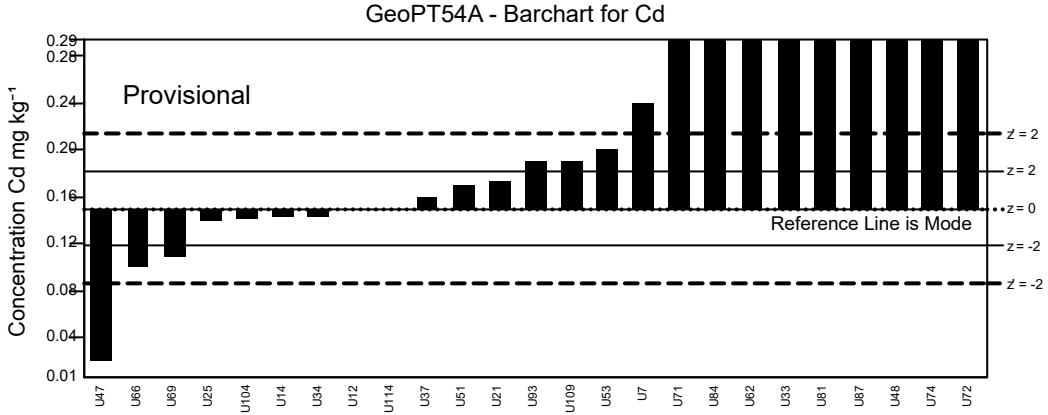


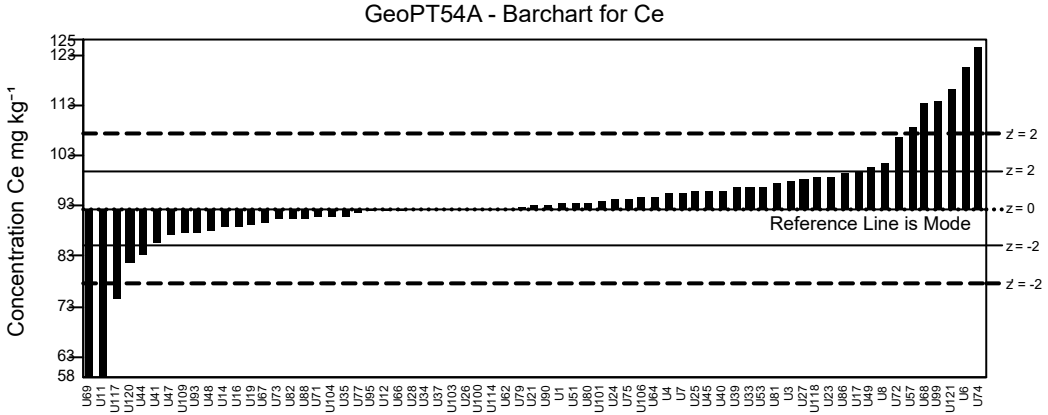
GeoPT54A - Barchart for Ba

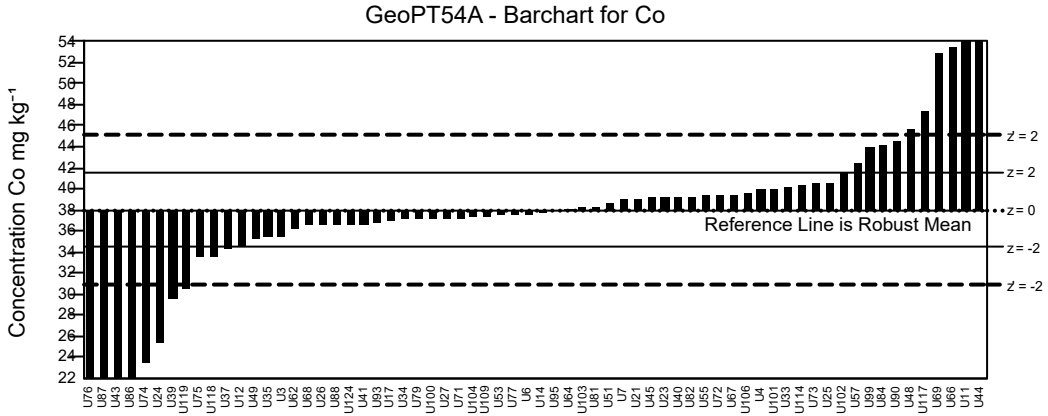


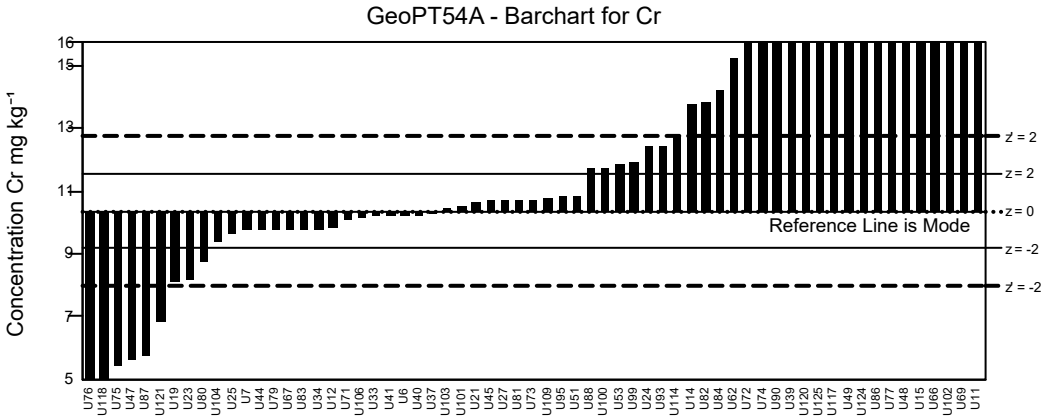

GeoPT54A - Barchart for Be
Concentration Be mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

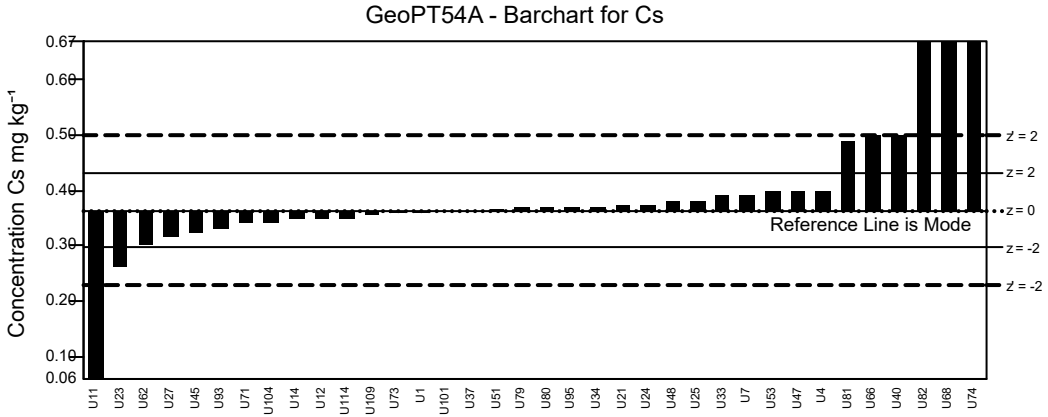

GeoPT54A - Barchart for Bi
Concentration Bi mg kg⁻¹
Provisional
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

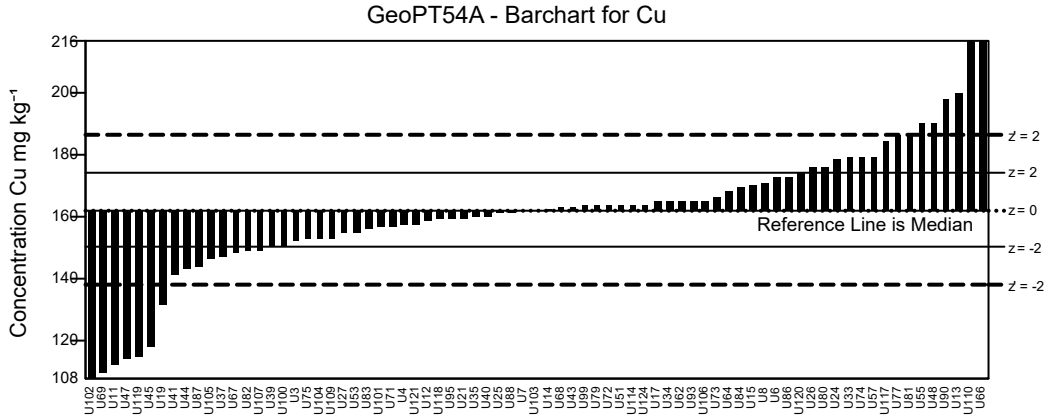

GeoPT54A - Barchart for Cd
Concentration Cd mg kg⁻¹
Provisional
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

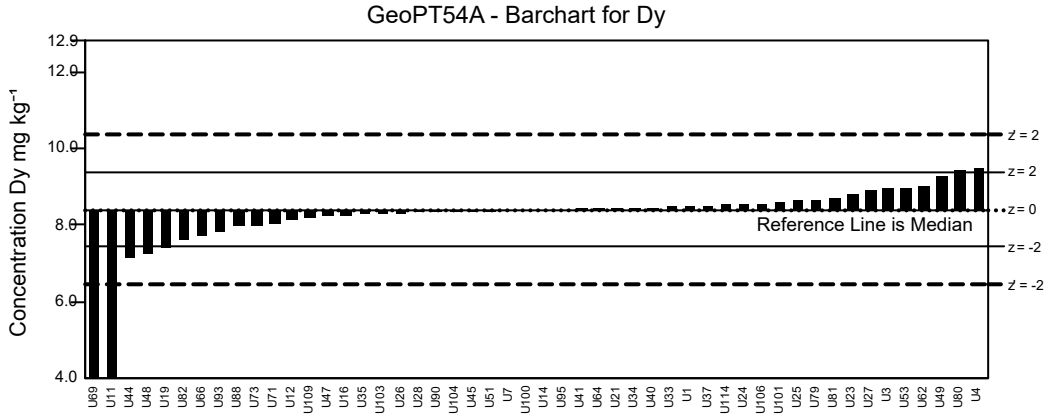

GeoPT54A - Barchart for Ce
Concentration Ce mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

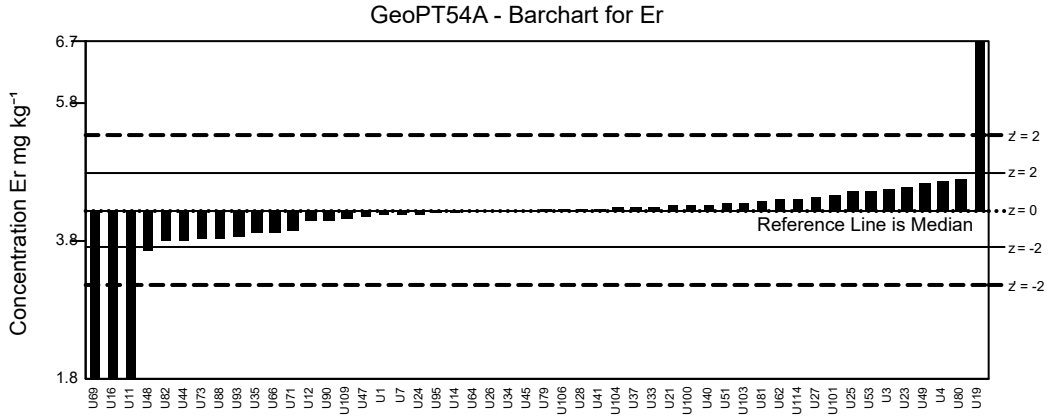

GeoPT54A - Barchart for Co
Concentration Co mg kg⁻¹
Reference Line is Robust Mean
z' = 2
z = 2
z = 0
z = -2
z' = -2

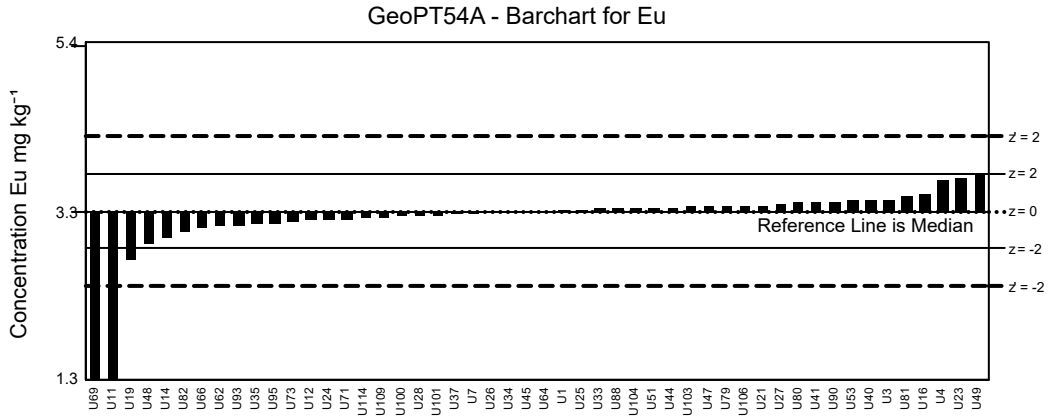

GeoPT54A - Barchart for Cr
Concentration Cr mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

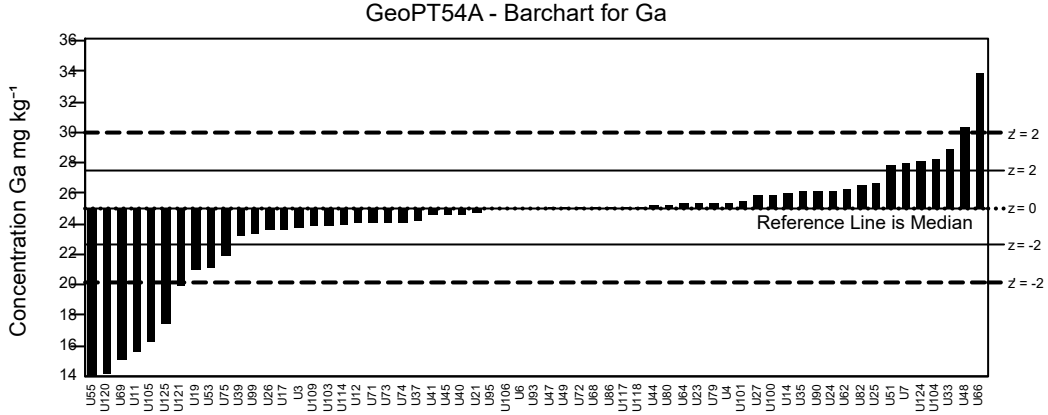

GeoPT54A - Barchart for Cs
Concentration Cs mg kg⁻¹
0.67
0.60
0.50
0.40
0.30
0.20
0.10
0.06
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2
U11 U23 U62 U27 U45 U93 U71 U104 U14 U12 U114 U109 U73 U1 U101 U37 U51 U79 U80 U95 U34 U21 U24 U48 U25 U33 U7 U53 U47 U4 U81 U66 U40 U82 U68 U74

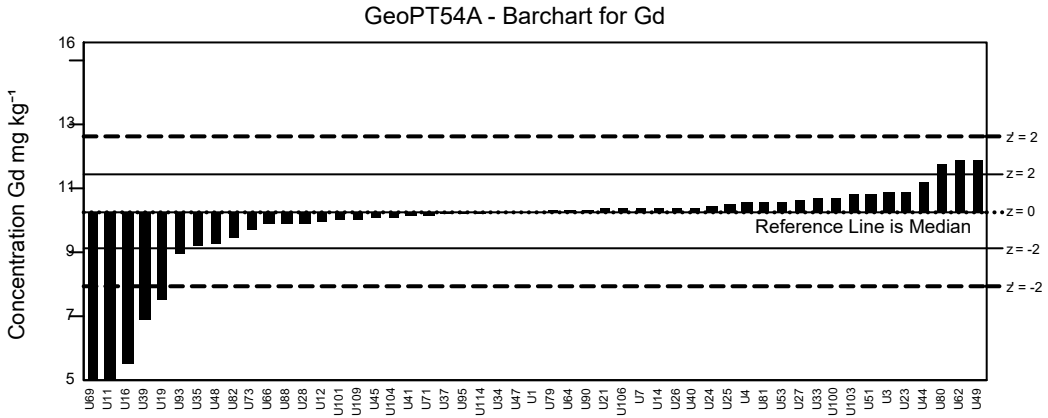

GeoPT54A - Barchart for Cu
Concentration Cu mg kg⁻¹
216
200
180
160
140
120
108
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2
U102 U69 U11 U47 U119 U45 U19 U41 U44 U87 U105 U37 U67 U62 U107 U39 U100 U3 U75 U104 U109 U27 U53 U83 U101 U71 U4 U121 U112 U118 U95 U21 U35 U40 U25 U88 U7 U103 U14 U68 U43 U99 U79 U72 U51 U114 U124 U17 U34 U92 U93 U106 U73 U64 U84 U15 U8 U6 U86 U120 U26 U80 U24 U33 U74 U57 U117 U77 U81 U55 U48 U90 U13 U110 U66

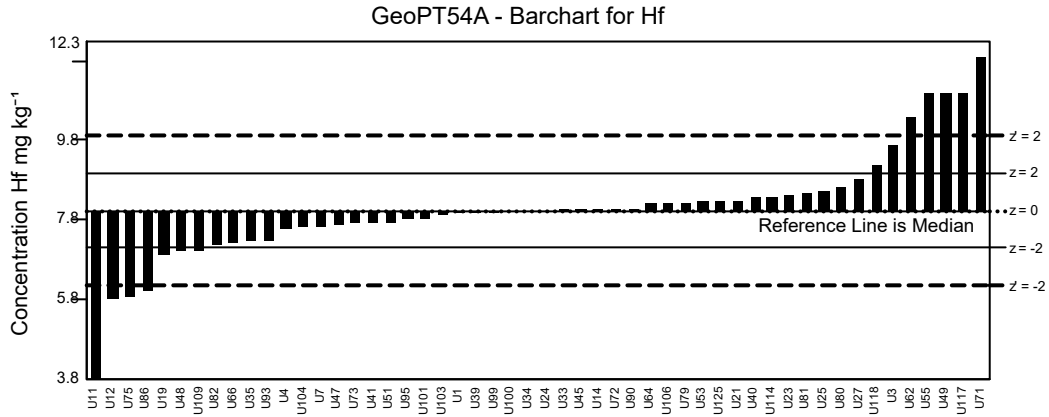

GeoPT54A - Barchart for Dy
Concentration Dy mg kg⁻¹
12.9
12.0
10.0
8.0
6.0
4.0
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2
U69 U11 U44 U48 U19 U82 U66 U93 U88 U73 U71 U12 U109 U47 U16 U35 U103 U26 U28 U90 U104 U45 U51 U7 U100 U14 U95 U41 U64 U21 U34 U40 U33 U1 U37 U114 U24 U106 U101 U25 U79 U81 U23 U27 U3 U53 U62 U49 U80 U4

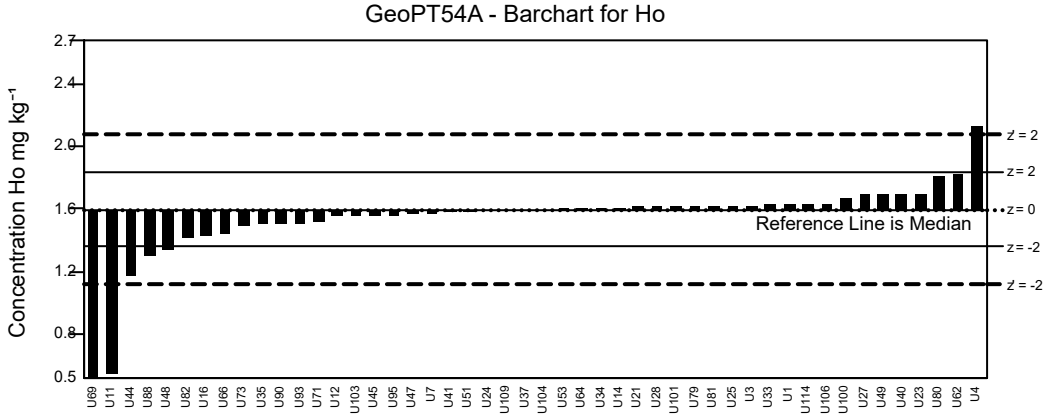

GeoPT54A - Barchart for Er
Concentration Er mg kg⁻¹
6.7
5.8
3.8
1.8
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2
U69 U16 U11 U48 U82 U44 U73 U88 U93 U35 U66 U71 U12 U90 U109 U47 U1 U7 U24 U95 U14 U64 U26 U34 U45 U79 U106 U28 U41 U104 U37 U33 U21 U100 U40 U51 U103 U81 U62 U114 U27 U101 U25 U53 U3 U23 U49 U4 U80 U19

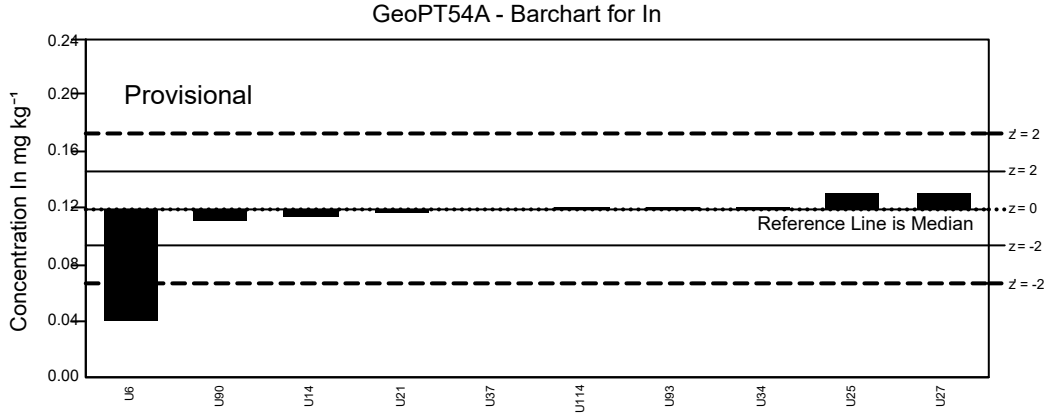

GeoPT54A - Barchart for Eu
Concentration Eu mg kg⁻¹
5.4
3.3
1.3
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2
U69 U11 U19 U48 U14 U82 U66 U62 U93 U35 U95 U73 U12 U24 U71 U114 U109 U100 U28 U101 U37 U7 U26 U34 U45 U64 U1 U25 U33 U88 U104 U51 U44 U103 U47 U79 U106 U21 U27 U80 U41 U90 U53 U40 U3 U81 U16 U4 U23 U49

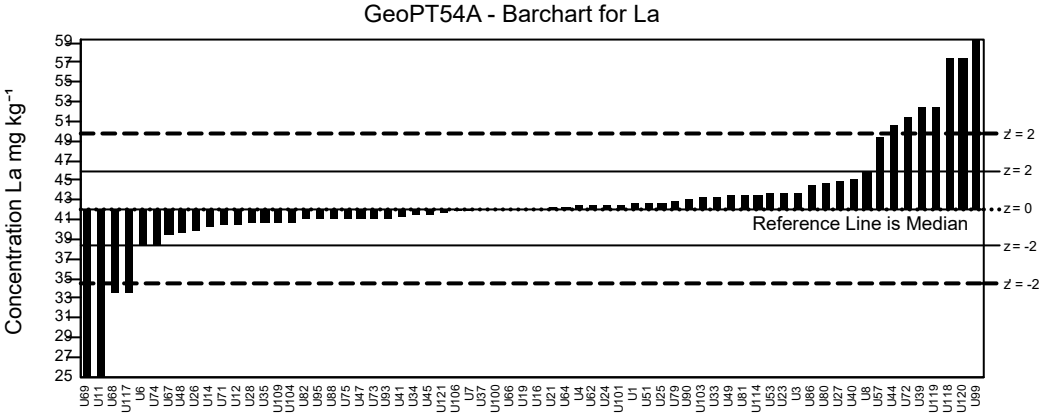

GeoPT54A - Barchart for Ga
Concentration Ga mg kg⁻¹
36
34
32
30
28
26
24
22
20
18
16
14
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2
U55 U120 U69 U11 U105 U125 U121 U19 U53 U75 U39 U99 U26 U17 U3 U109 U103 U114 U12 U71 U73 U74 U37 U41 U45 U40 U21 U95 U106 U6 U93 U47 U49 U72 U68 U86 U117 U118 U44 U80 U64 U23 U79 U4 U101 U27 U100 U14 U35 U90 U24 U62 U82 U25 U51 U7 U124 U104 U33 U48 U66

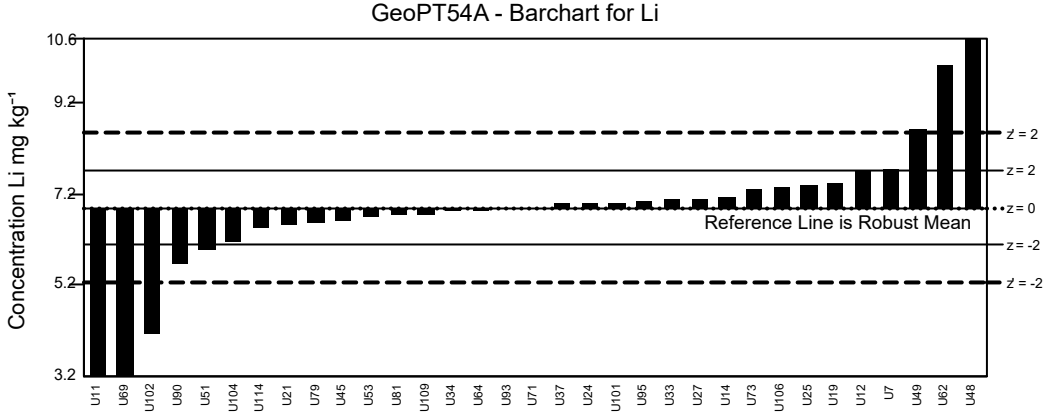

GeoPT54A - Barchart for Gd
Concentration Gd mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

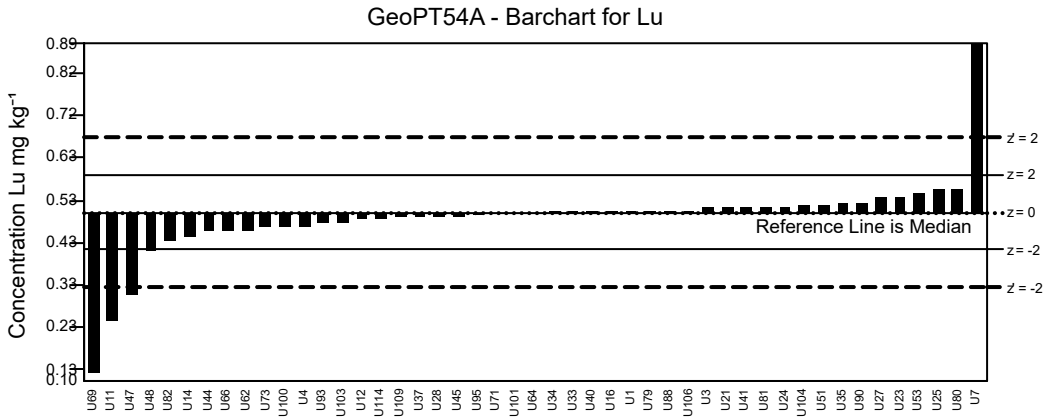

GeoPT54A - Barchart for Hf
Concentration Hf mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

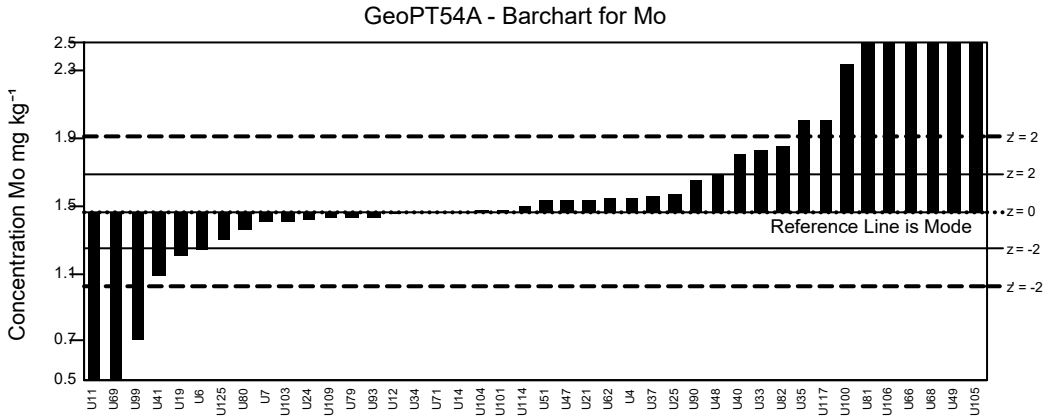

GeoPT54A - Barchart for Ho
Concentration Ho mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

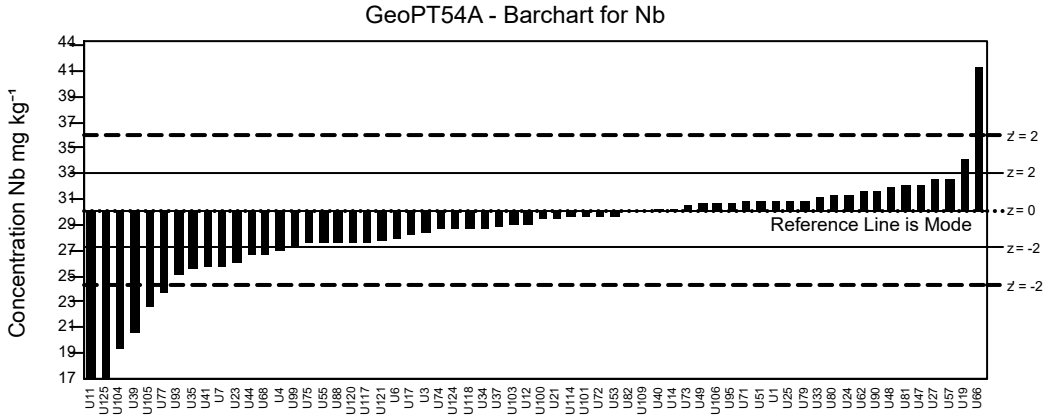

GeoPT54A - Barchart for In
Concentration In mg kg⁻¹
Provisional
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

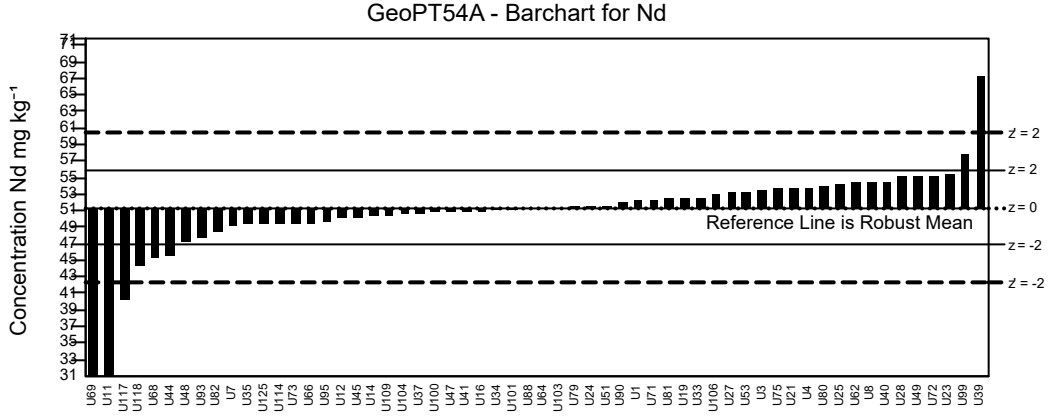

GeoPT54A - Barchart for La
Concentration La mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

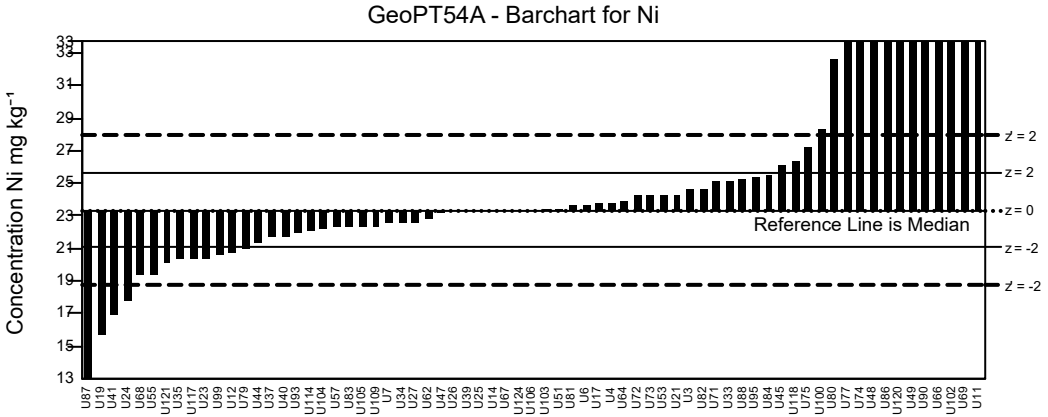

GeoPT54A - Barchart for Li
Concentration Li mg kg⁻¹
Reference Line is Robust Mean
z' = 2
z = 2
z = 0
z = -2
z' = -2

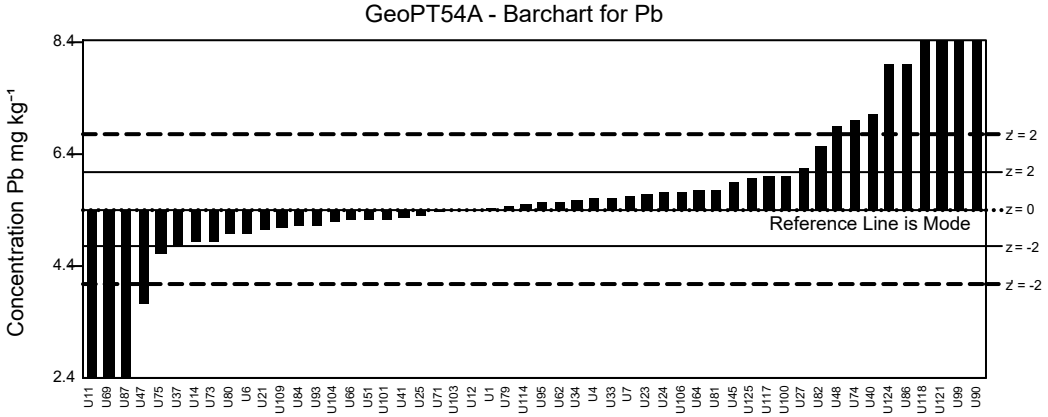

GeoPT54A - Barchart for Lu
Concentration Lu mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

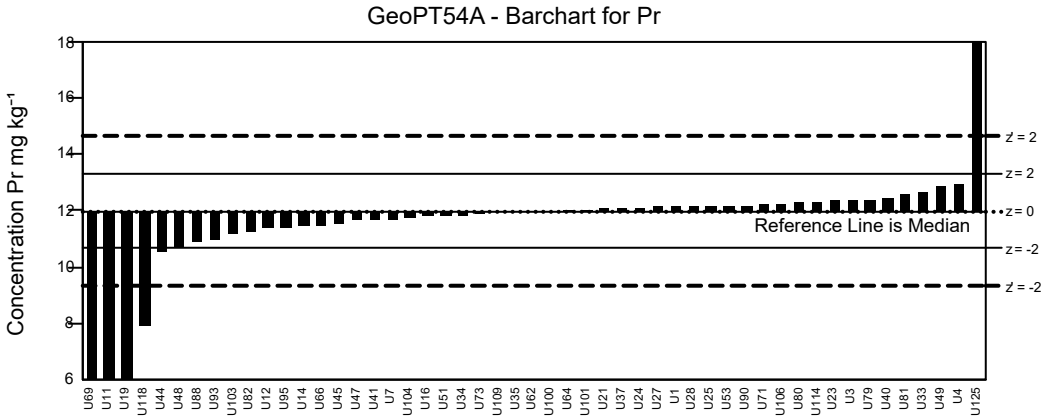

GeoPT54A - Barchart for Mo
Concentration Mo mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

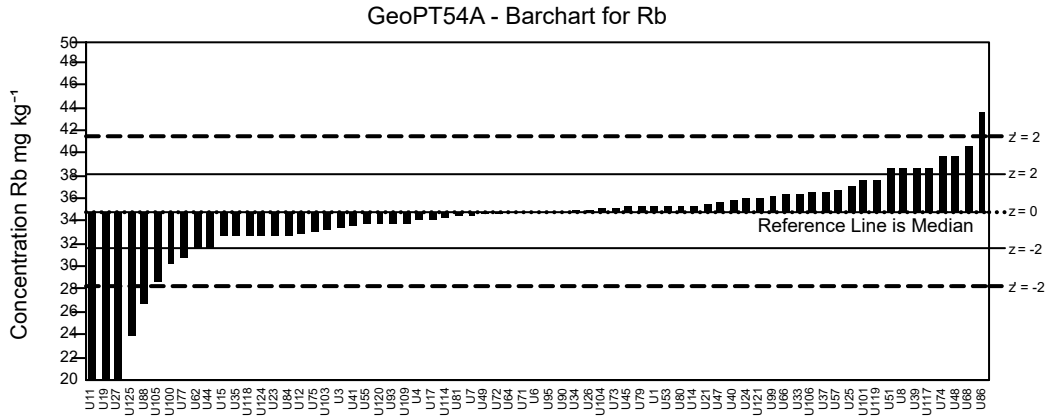

GeoPT54A - Barchart for Nb
Concentration Nb mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

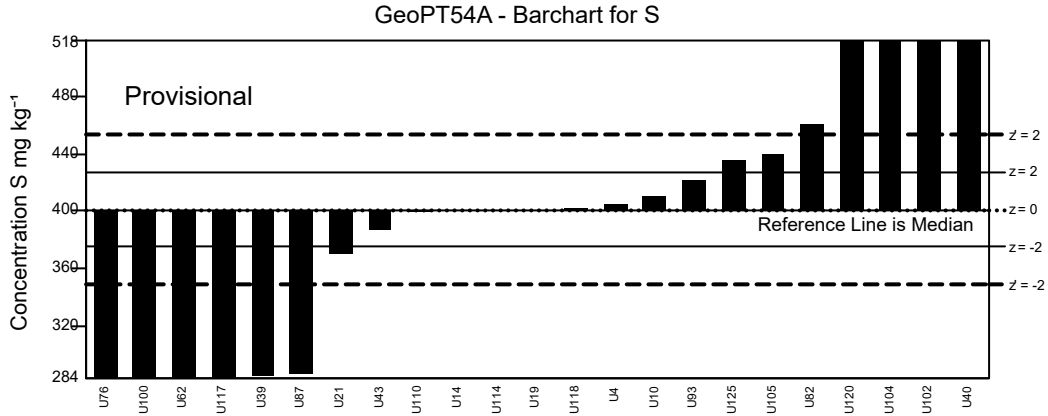

GeoPT54A - Barchart for Nd
Concentration Nd mg kg⁻¹
Reference Line is Robust Mean
z' = 2
z = 2
z = 0
z = -2
z' = -2

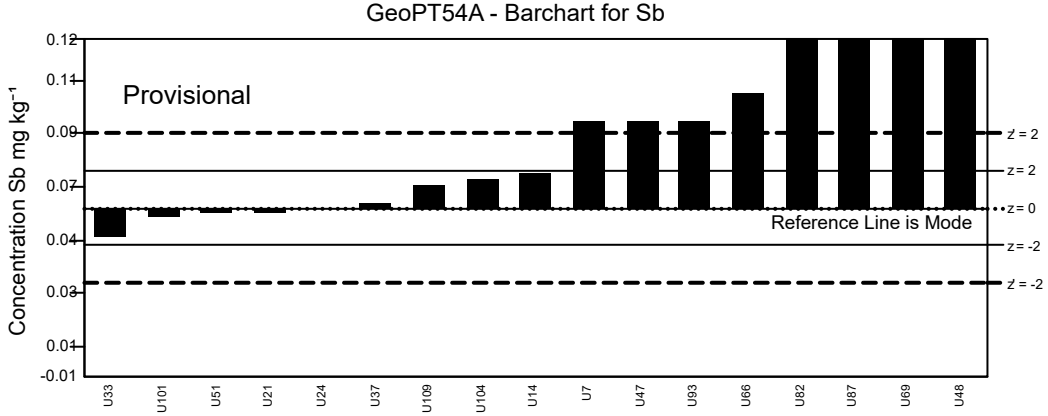

GeoPT54A - Barchart for Ni
Concentration Ni mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

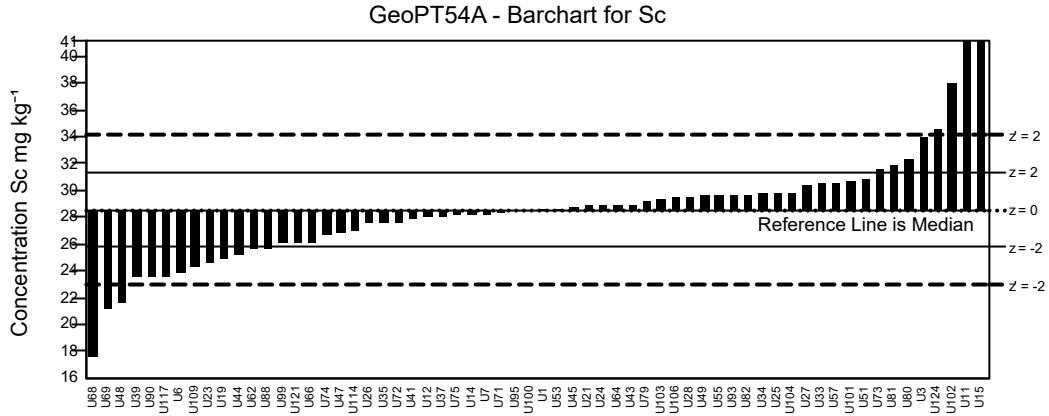

GeoPT54A - Barchart for Pb
Concentration Pb mg kg⁻¹
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

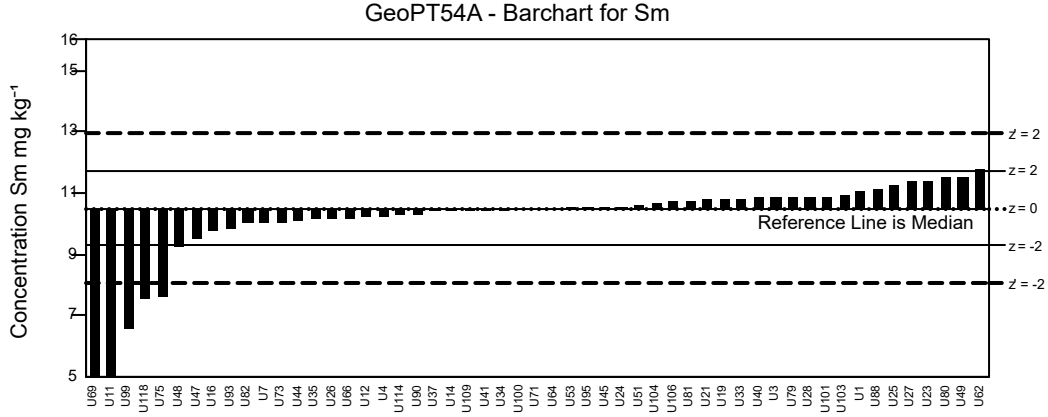

GeoPT54A - Barchart for Pr
Concentration Pr mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2


GeoPT54A - Barchart for Rb
Concentration Rb mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

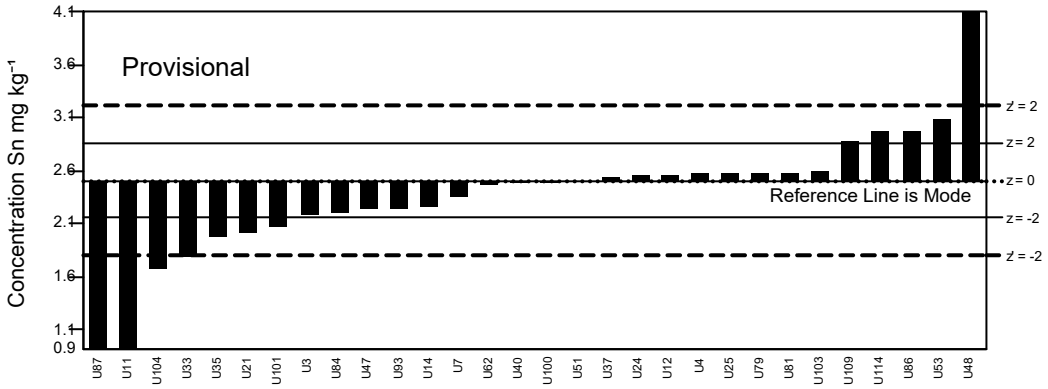

GeoPT54A - Barchart for S
Concentration S mg kg⁻¹
Provisional
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2


GeoPT54A - Barchart for Sb
Concentration Sb mg kg⁻¹
Provisional
Reference Line is Mode
z' = 2
z = 2
z = 0
z = -2
z' = -2

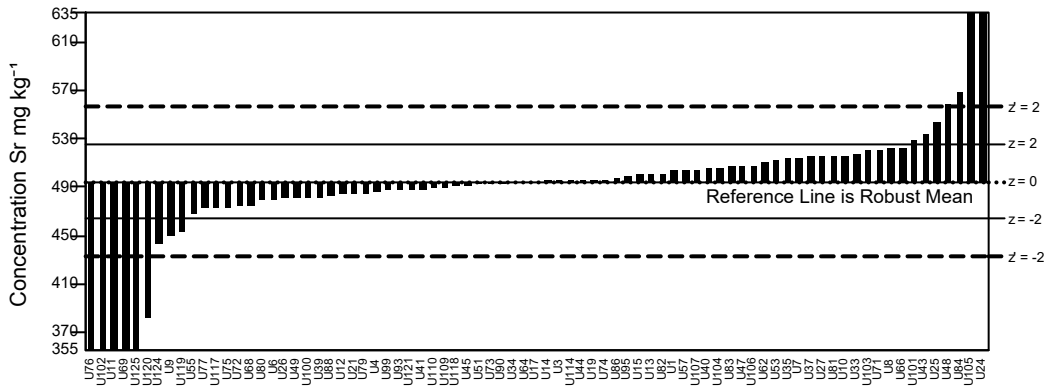

GeoPT54A - Barchart for Sc
Concentration Sc mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2


GeoPT54A - Barchart for Sm
Concentration Sm mg kg⁻¹
Reference Line is Median
z' = 2
z = 2
z = 0
z = -2
z' = -2

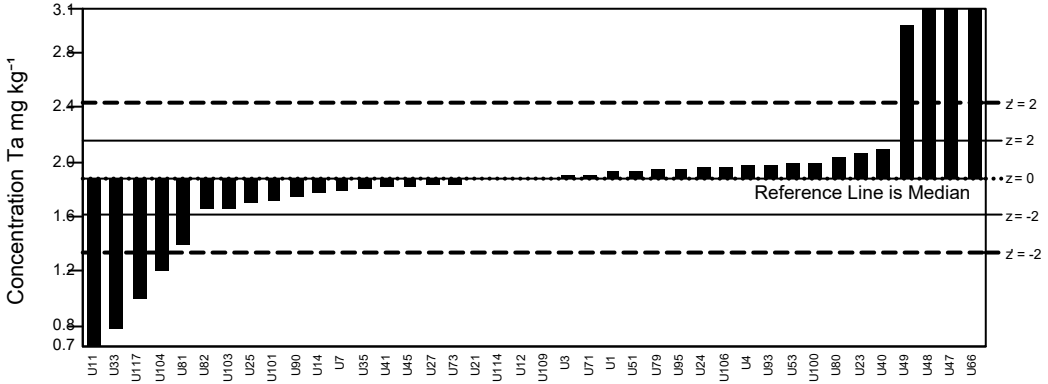
GeoPT54A - Barchart for Sn



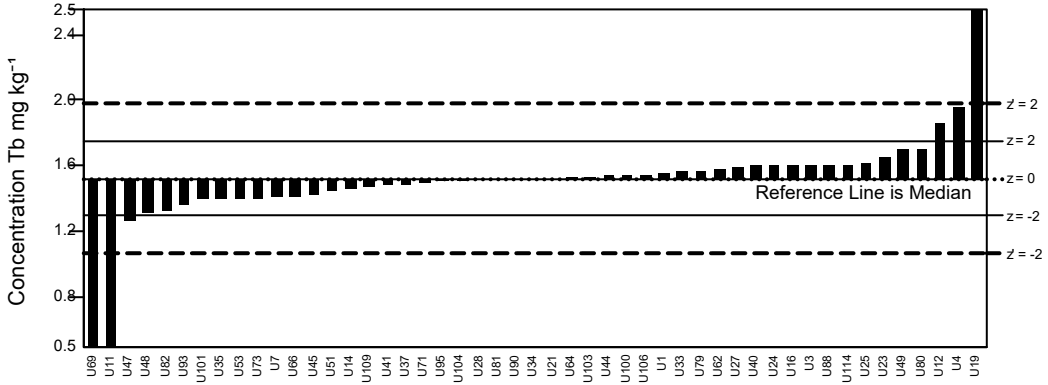
GeoPT54A - Barchart for Sr



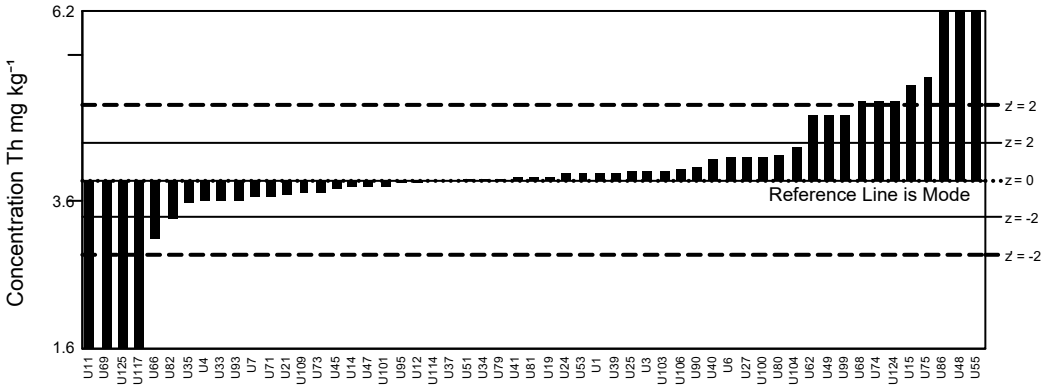
GeoPT54A - Barchart for Ta



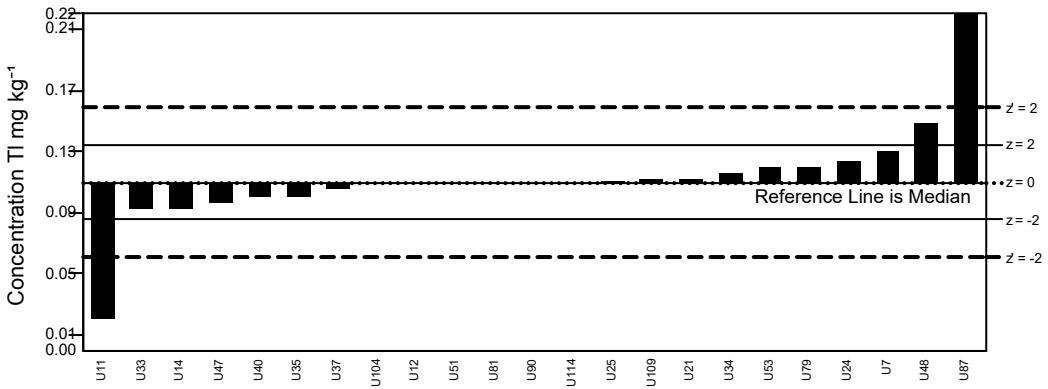
GeoPT54A - Barchart for Tb



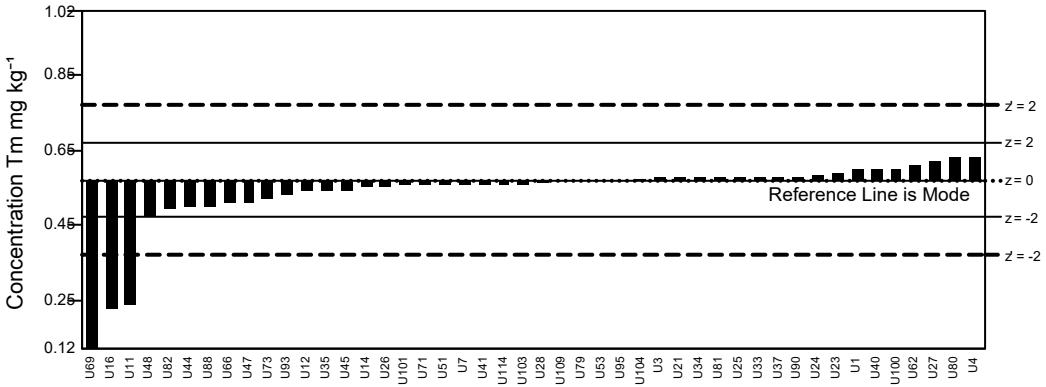
GeoPT54A - Barchart for Th



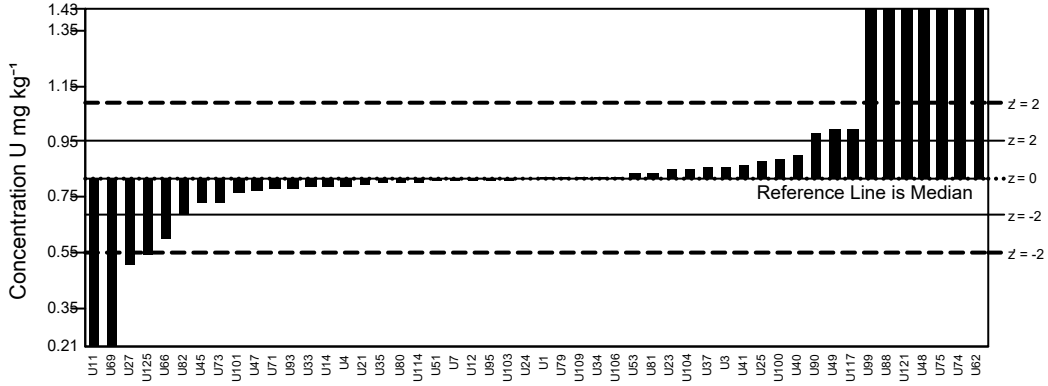
GeoPT54A - Barchart for Tl



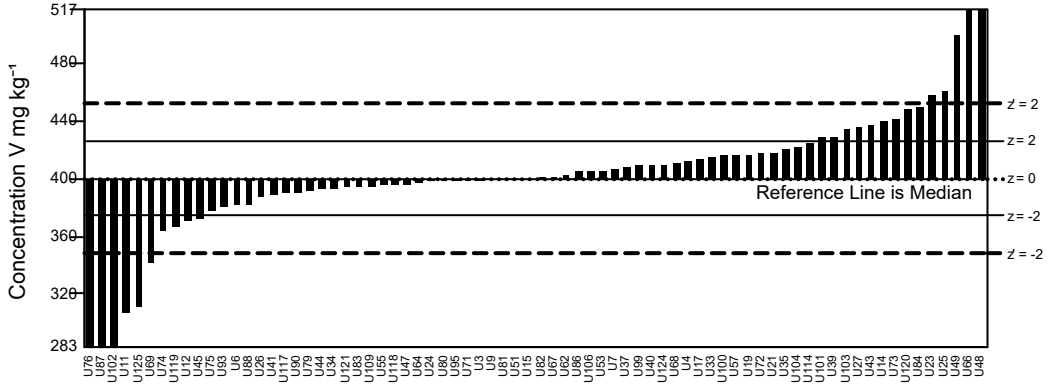
GeoPT54A - Barchart for Tm



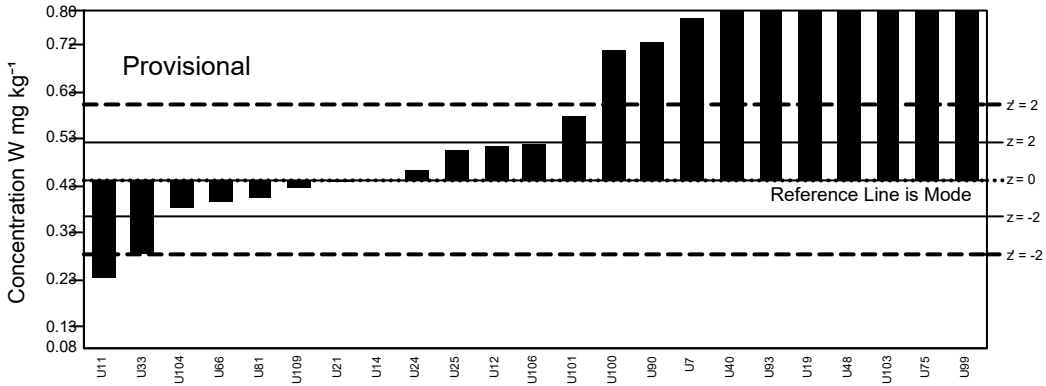
GeoPT54A - Barchart for U



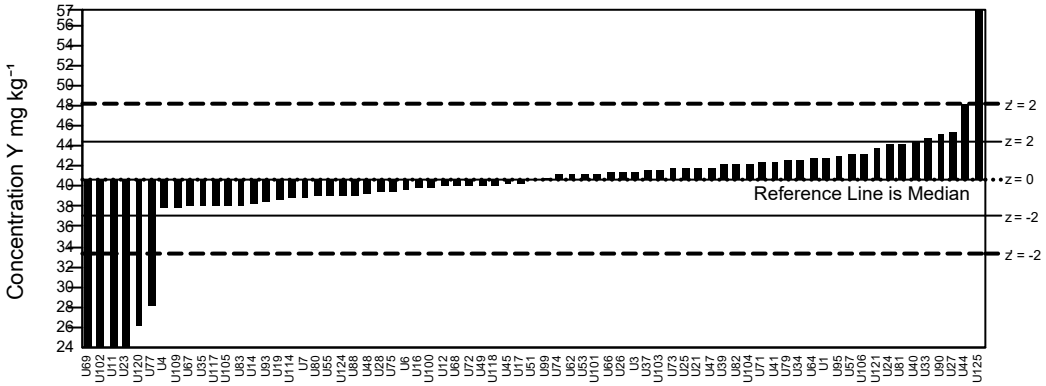
GeoPT54A - Barchart for V



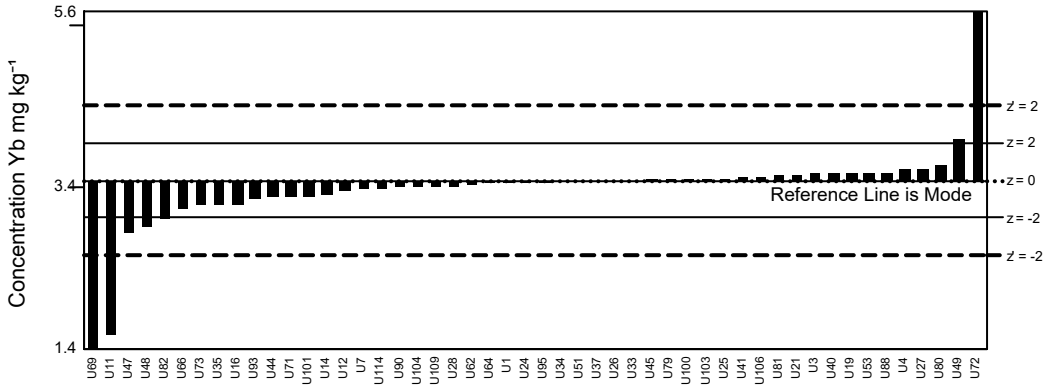
GeoPT54A - Barchart for W

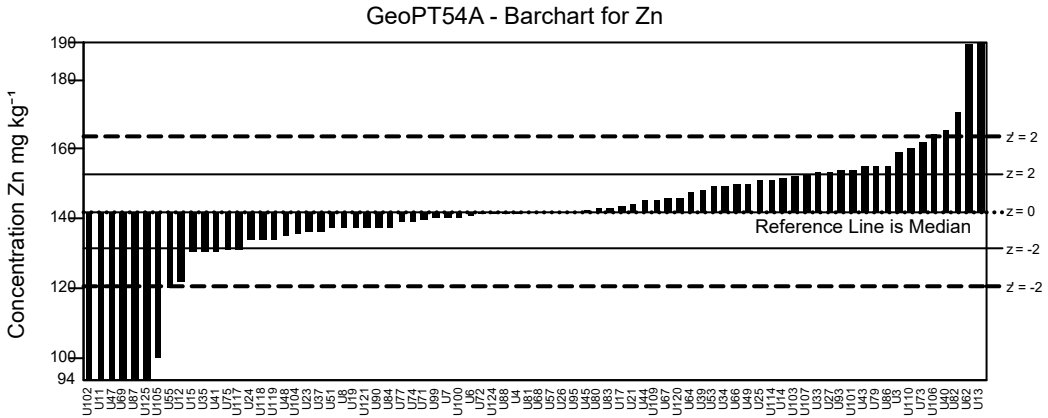


GeoPT54A - Barchart for Y



GeoPT54A - Barchart for Yb





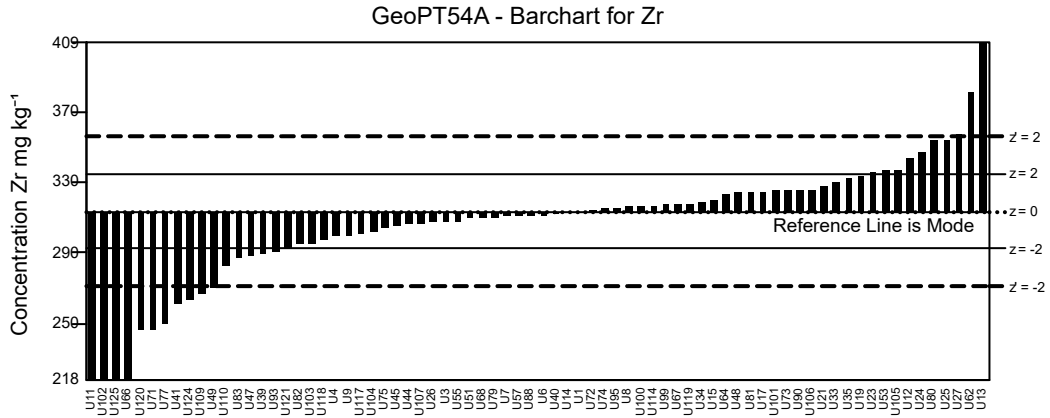
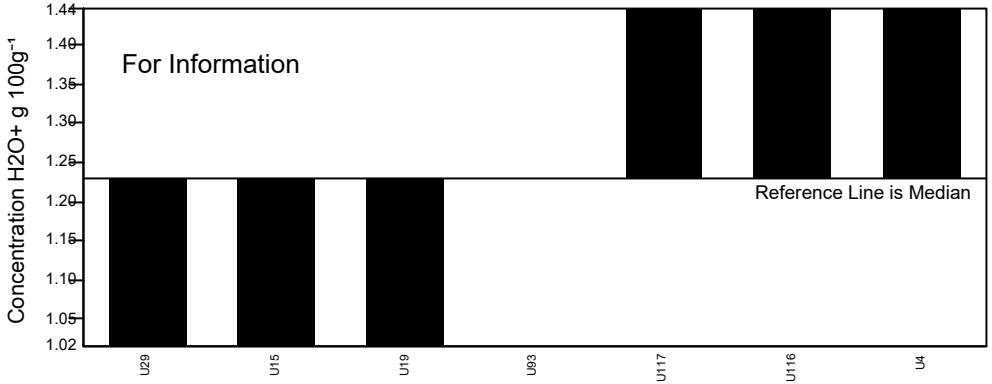
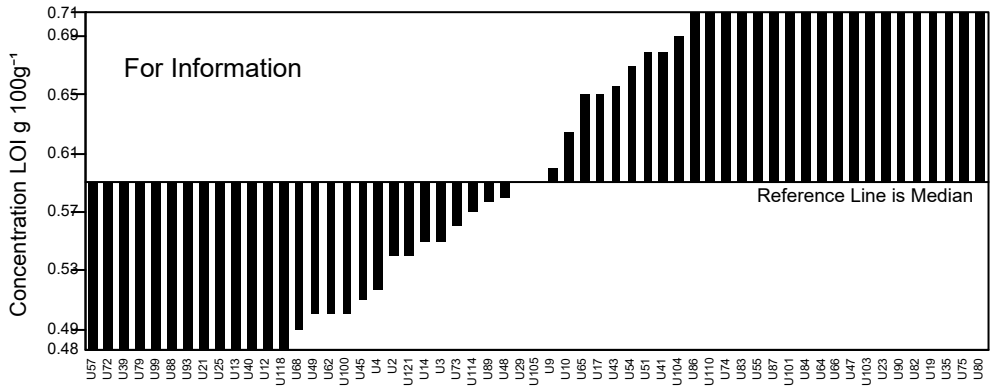


Figure 1: GeoPT54A - Basalt, CSQ-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for -2<z<2 for pure geochemistry labs (solid lines) and -2<z'<2 for applied geochemistry labs (pecked lines).

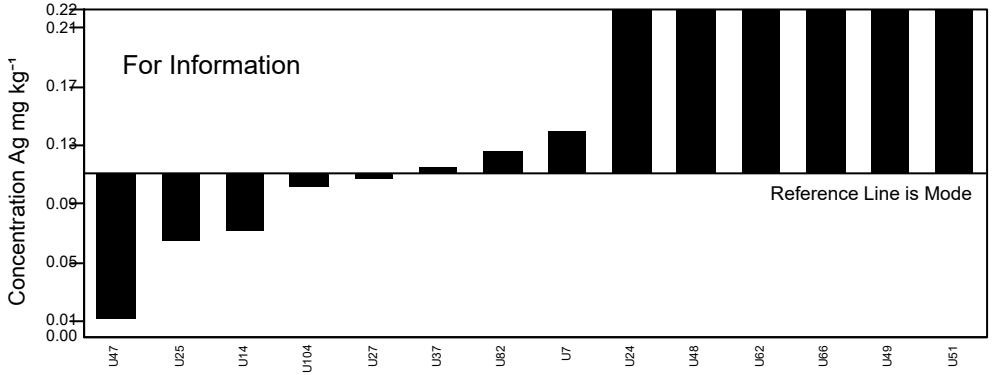
GeoPT54A - Barchart for H2O+



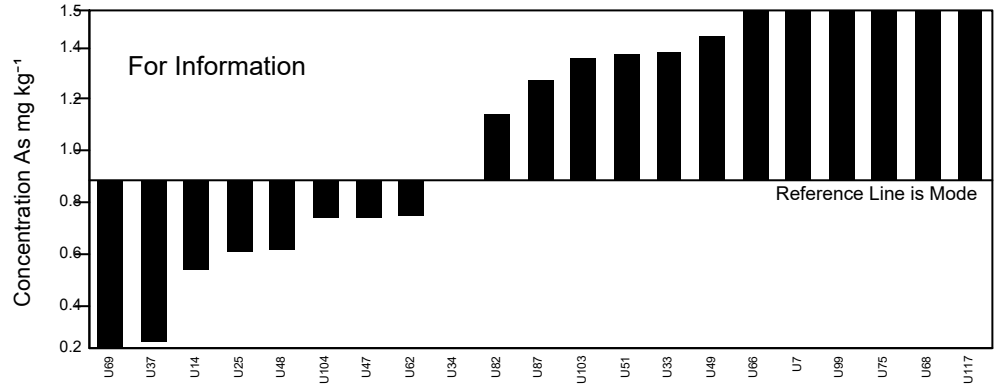
GeoPT54A - Barchart for LOI



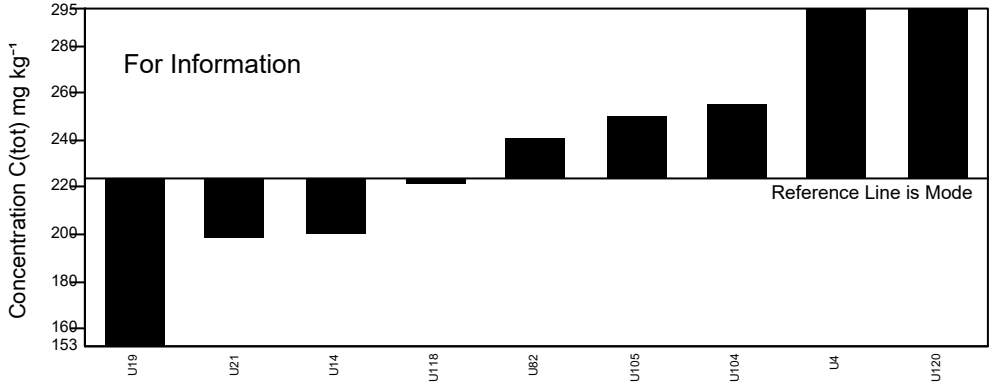
GeoPT54A - Barchart for Ag



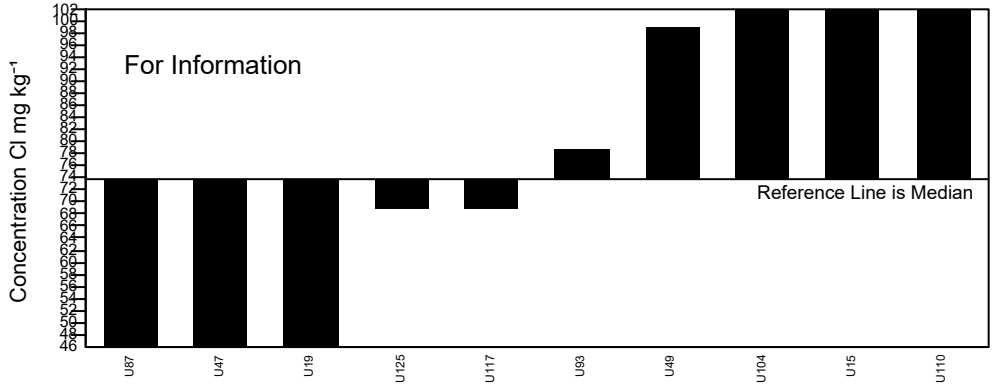
GeoPT54A - Barchart for As

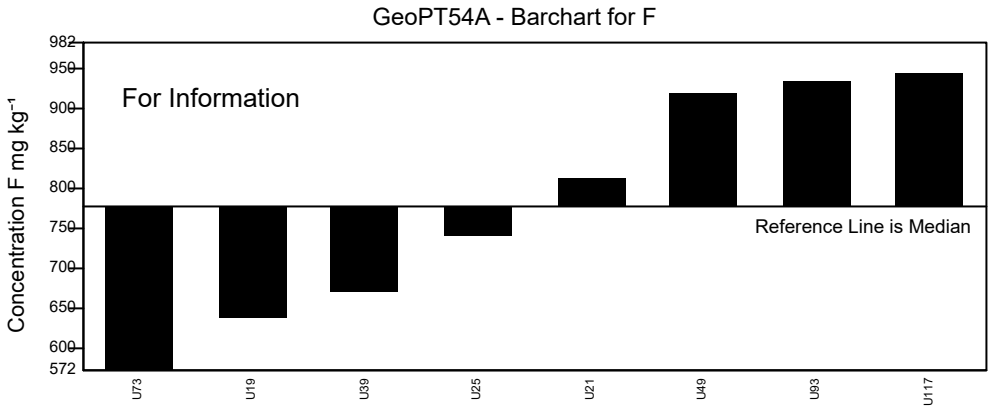


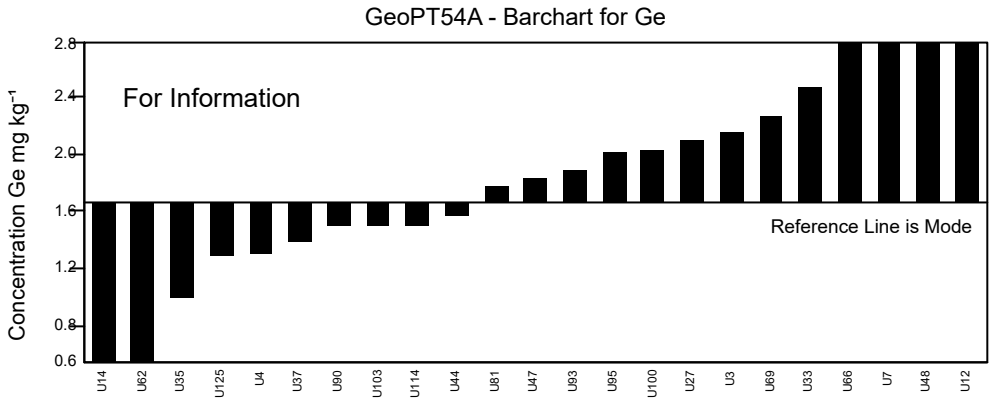
GeoPT54A - Barchart for C(tot)



GeoPT54A - Barchart for Cl







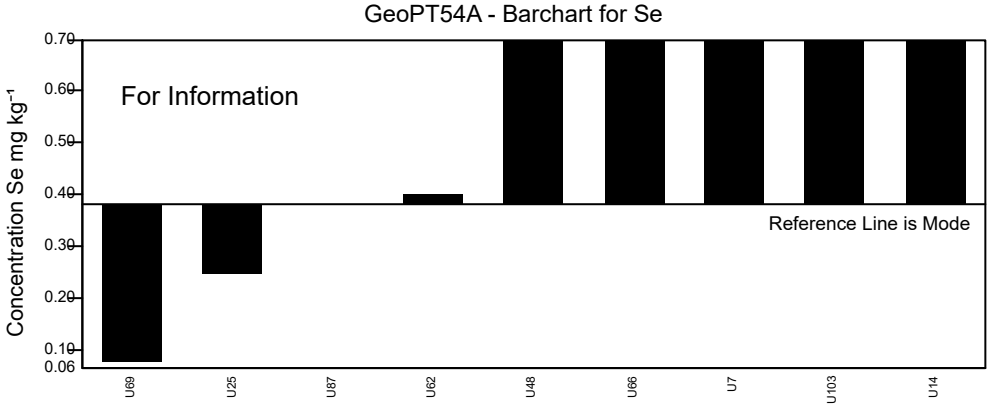
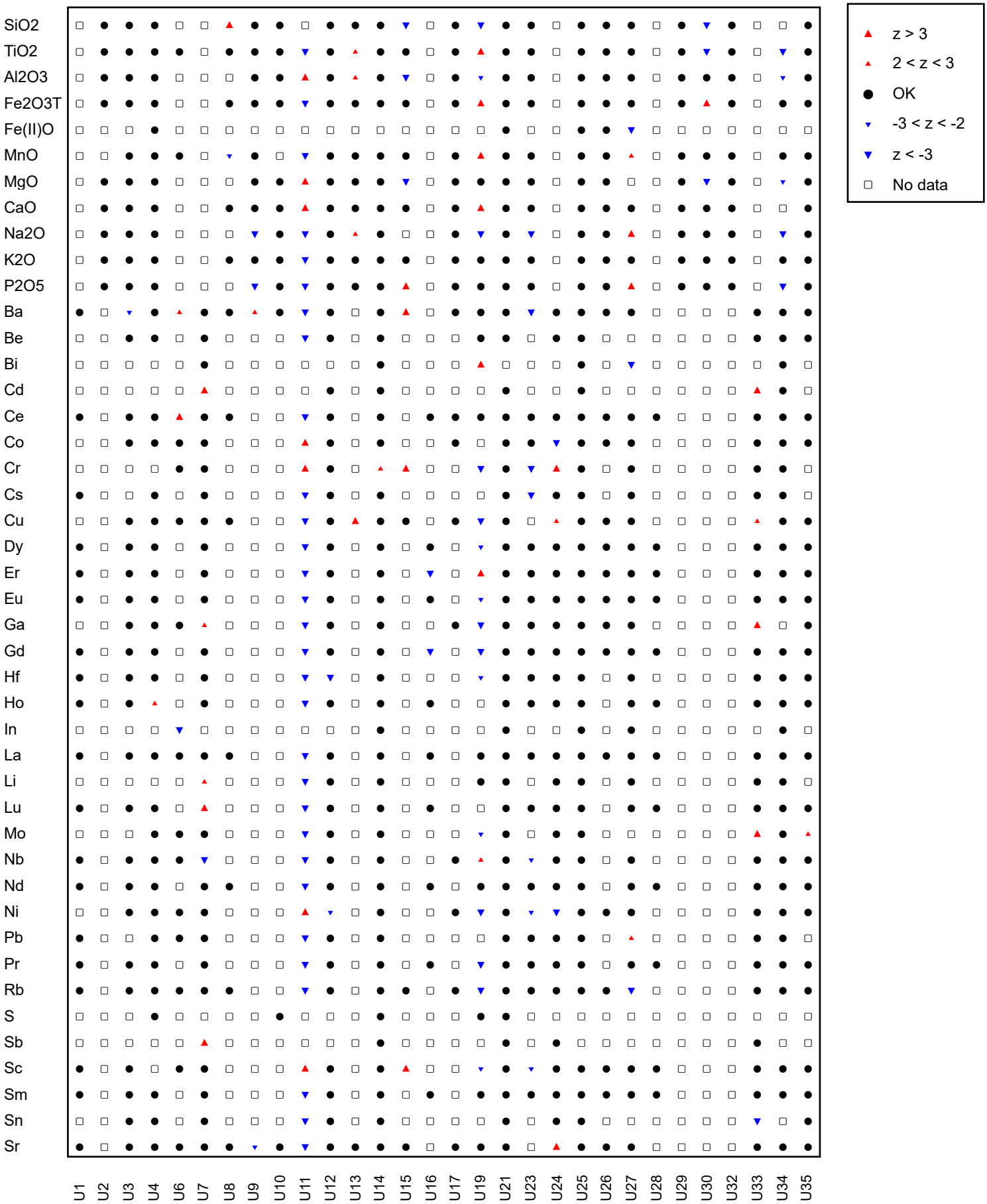


Figure 2: GeoPT54A - Basalt, CSQ-1. Data distribution charts provided for information only for elements for which values could not be assigned.

Multiple Z-Score Chart for GeoPT54A



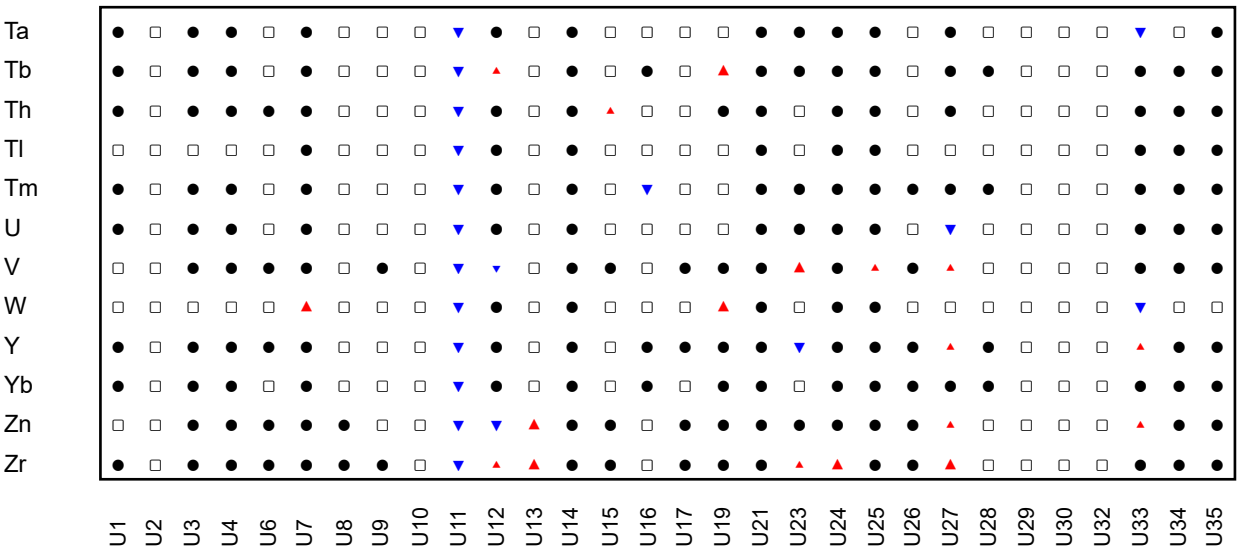
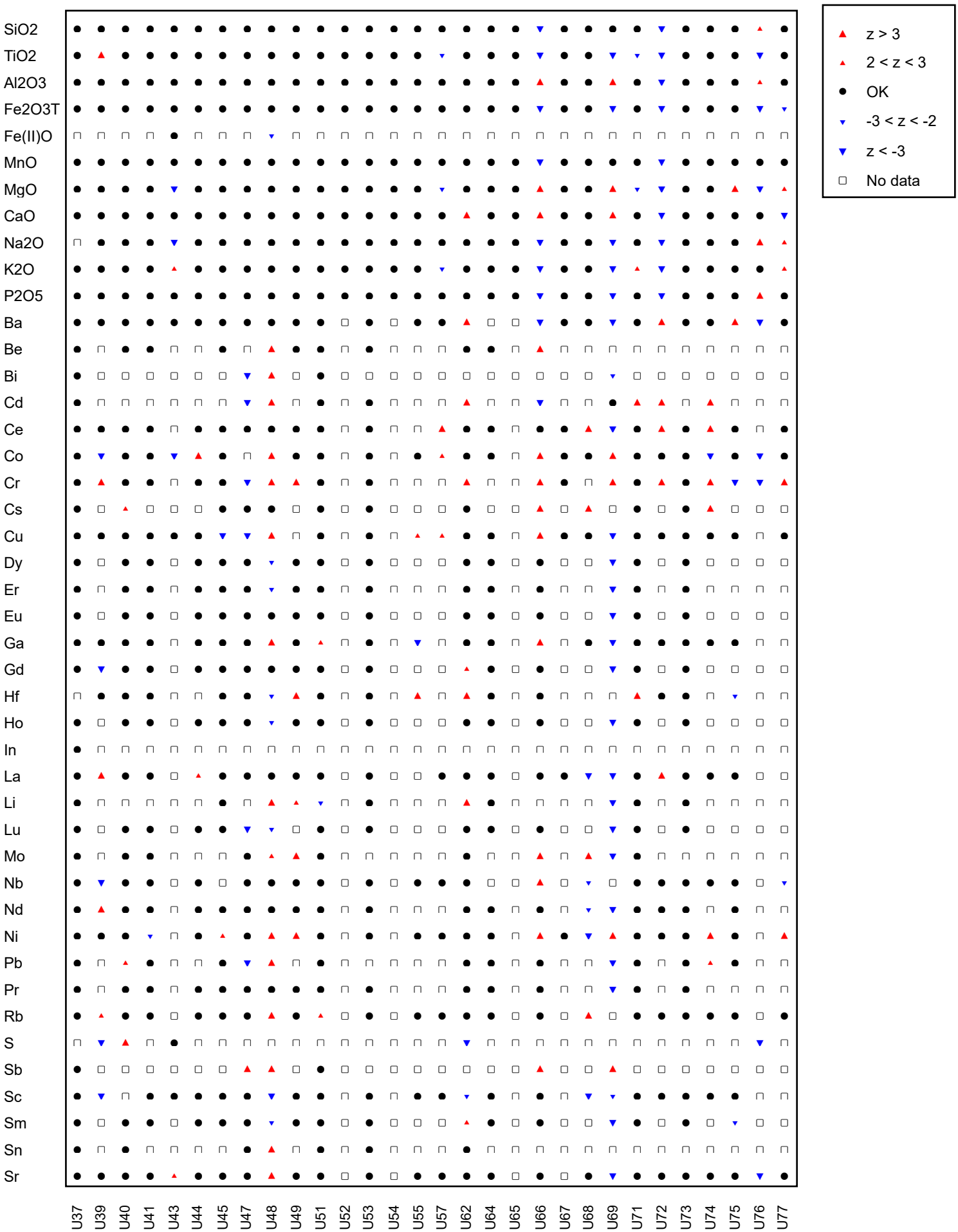


Figure 3: GeoPT54A - Basalt, CSQ-1. Multiple z-score charts for laboratories participating in the GeoPT54 A round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT54A



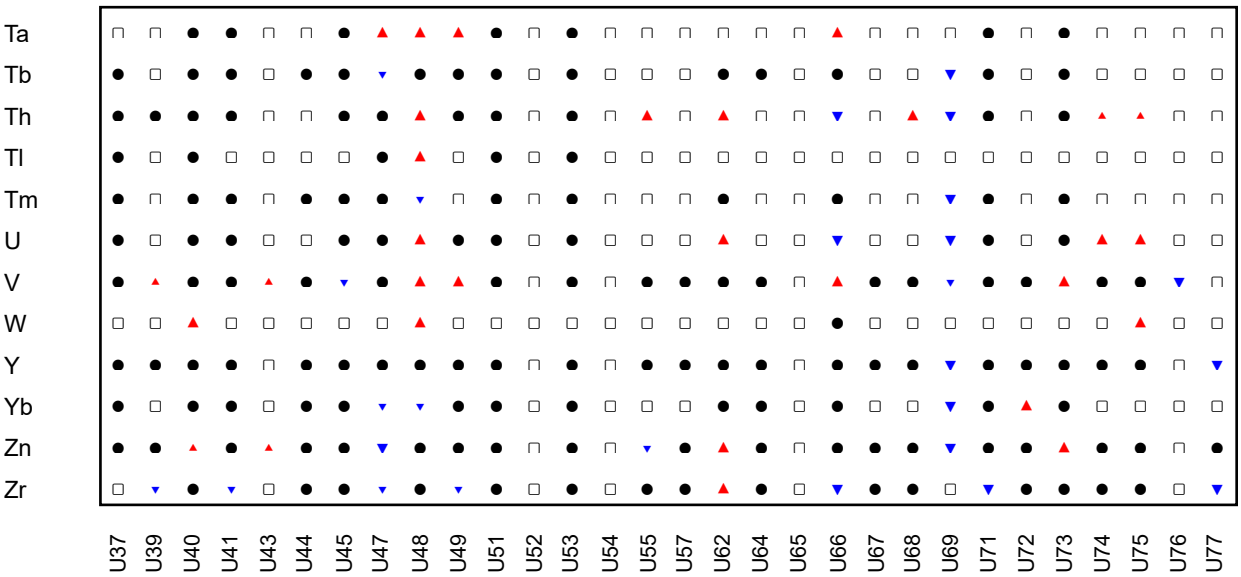
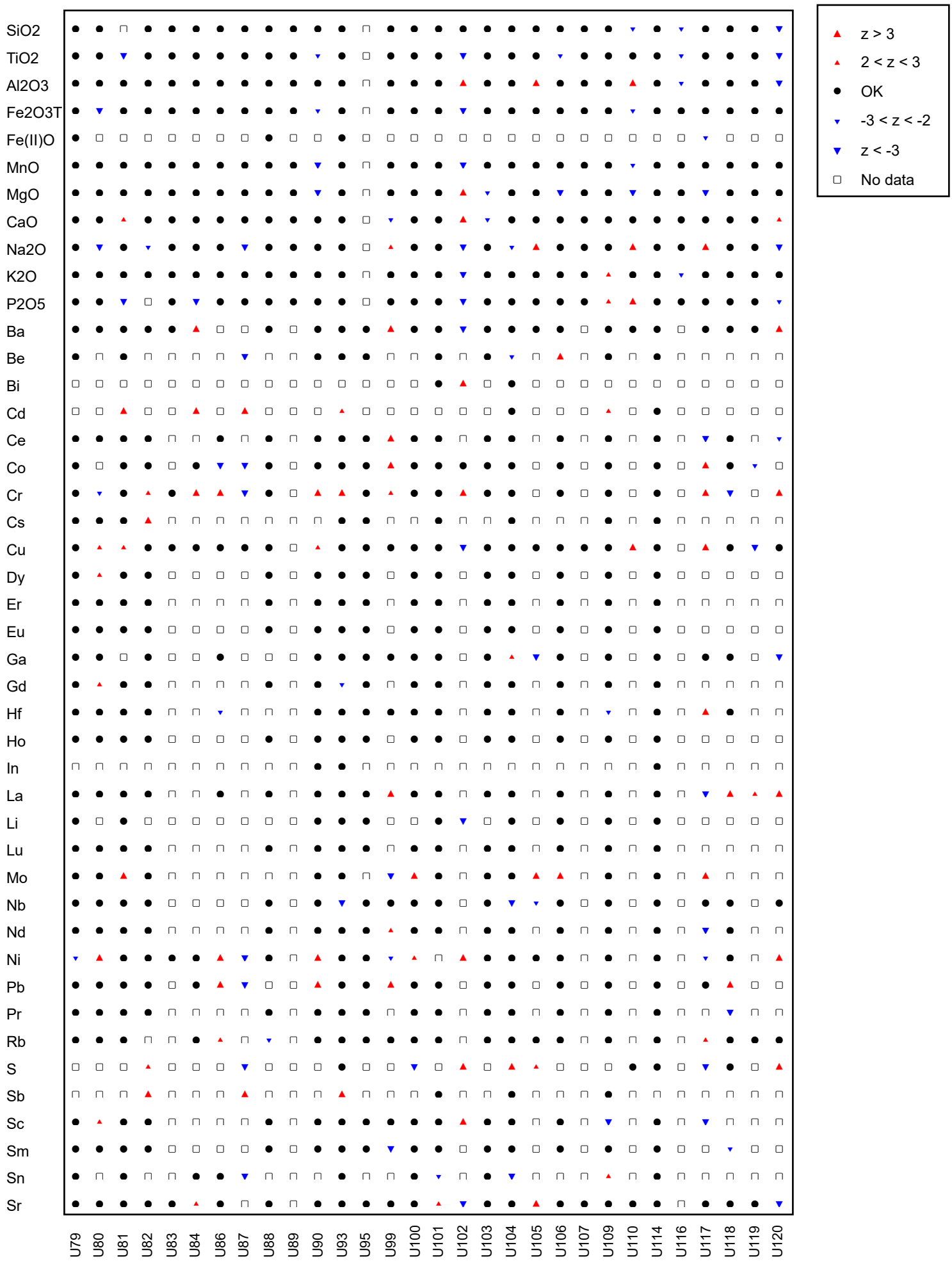


Figure 3: GeoPT54A - Basalt, CSQ-1. Multiple z-score charts for laboratories participating in the GeoPT54 A round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT54A



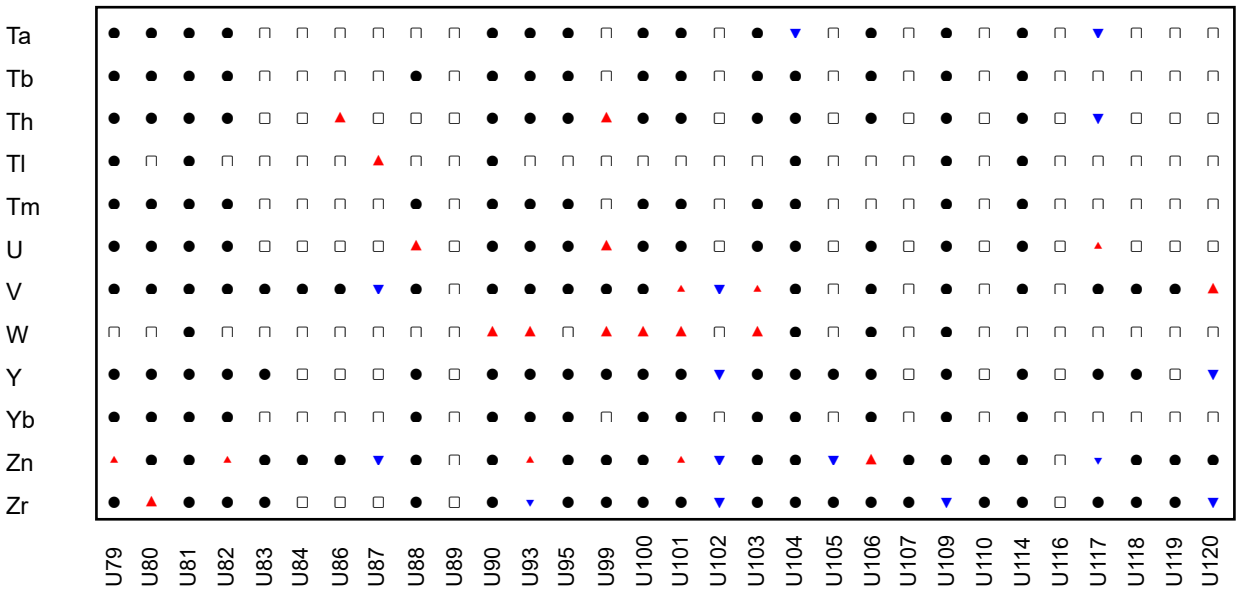


Figure 3: GeoPT54A - Basalt, CSQ-1. Multiple z-score charts for laboratories participating in the GeoPT54 A round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT54A

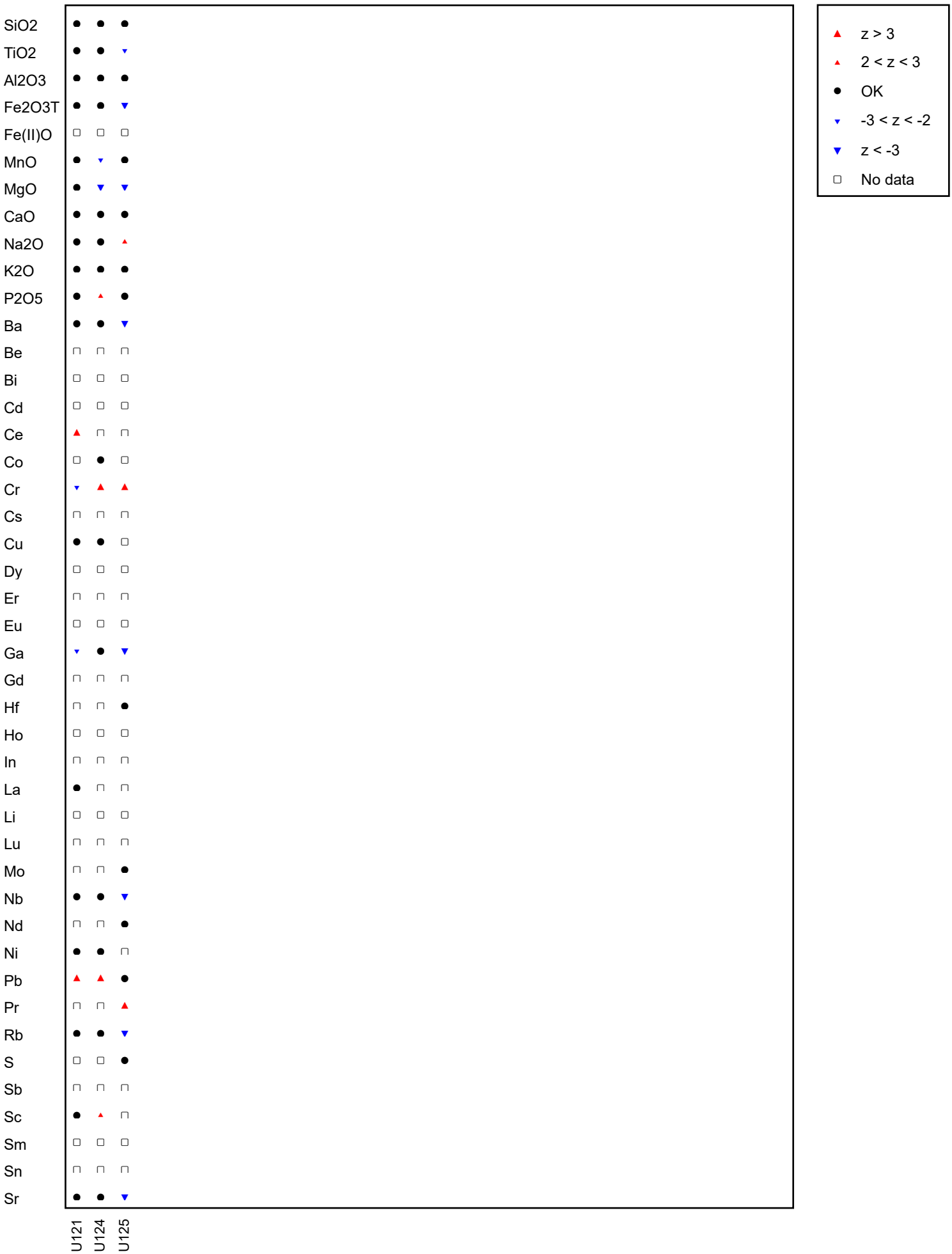


Figure 3: GeoPT54A - Basalt, CSQ-1. Multiple z-score charts for laboratories participating in the GeoPT54 A round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).