Geo*PT*54 — AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES — REPORT ON ROUND 54

(Tholeiitic Basalt, BNA-1) / February 2024

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Abstract

Results are presented for Round 54 of the Geo*PT* Proficiency Testing programme for analytical geochemistry laboratories organised by the International Association of Geoanalysts (IAG). The test material distributed was the Tholeiitic Basalt, BNA-1, collected by Drs Wiedenbeck and Sigmarsson, from a basaltic lava flow in Iceland, believed to be the source of USGS reference material, BIR-1. In this report, 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 (previous 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 (IAG) 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 54:

P.C. Webb (administrator and results assessor), P.J. Potts (results reviewer), C.J.B. Gowing (distribution manager), M. Thompson (statistical advisor), M. Wiedenbeck and O. Sigmarsson (suppliers of BNA-1 material).

Timetable for Round 54:

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

Geo*PT*54 Test Material Details

The Tholeiitic Basalt test material, BNA-1, was collected by Dr. Michael Wiedenbeck (Deutsches GeoForschungsZentrum, GFZ, Potsdam, Germany) and Dr. Olgeir Sigmarsson (University of Iceland) from a now abandoned quarry believed to be the source of the reference material USGS BIR-1 (Icelandic Basalt). The quarry is at the top of a hill located at 64°05'15"N 21°38'57"W, some 1.1 km NNE of the N1 highway and 46 km ENE from the Reykjavik airport. The material collected was processed at the British Geological Survey (BGS), Keyworth, where it was trimmed of weathered margins, crushed, ground to fine powder, homogenised, divided and packeted under the direction of Dr Charles Gowing. Note that milling was carried out in chrome steel equipment which resulted in metallic contamination, causing an elevated mass fraction of Cr.

The test material was evaluated for homogeneity by ICP-MS measurement at the BGS and an assessment of the results showed that this material was sufficiently homogeneous to be suitable for use in this proficiency test.

Submission of Results

For Geo*PT*54 (BNA-1), a total of 2964 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. This may be because mass fractions of many elements were below practical detection limits for many laboratories. Of the measurements submitted, 1530 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 1434 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: **Two laboratories appear to have reported in error, their results for CSQ-1, the subject of Round GeoPT54A**. Another laboratory appears to have reported major element and some trace element results for material that **does not resemble either CSQ-1 or BNA-1**.

Several laboratories reported some results in units of g/100g instead of mg/kg, including **one for Corg and Ctot; another for Cl;** and **two laboratories for S**, which is **counter to instructions** and would result in any z-scores being hugely inflated.

A number of laboratories reported values of '0' (i.e. zero) in this round, which, with **the exception of a value for LOI** is also contrary to instructions. However, six of the nine reported their LOI results as zero, and although those could be valid results for LOI, an examination of the distribution of results suggests that it would be surprising if more than two laboratories could have reported such a value. We believe it may be that a few analysts reported zero by default rather than reporting a negative value, which for LOI is perfectly valid.

As a result **of incorrect reporting, we must remind our participants that measurement results for all constituents listed as elements 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 (usually < 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: the principle of measurement, the method of sample preparation, and 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 8 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 20 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 22 cases, and in 11 of those, the distribution of data was sufficiently compatible with the conditions outlined above to justify the designation of 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 datasets were skewed or robust 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 9 major components and 42 trace elements in Geo*PT*54 (BNA-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 51 analytes: SiO_2, TiO_2, Al_2O_3, Fe_2O_3T, Fe(II)O*, MnO, MgO, CaO, Na_2O, Ag*, Ba, Be, Cd*, Ce, Co, Cr*, Cu, Dy, Er, Eu, Ga, Gd, Ge*, Hf, Ho, In*, La, Li, Lu, Mo*, Nb*, Nd, Ni, Pb*, Pr, Rb*, Sc, Sm, Sn*, Sr, Ta, Tb, Th*, Tm, U*, V, W*, Y, Yb, Zn and Zr. Of these, the measurands of the 14 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 12 analytes: K_2O, P_2O_5, H_2O^+, LOI, As, Bi, C(tot), Cl, Cs, S, Sb and Tl 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.

On account of low mass fractions for many trace elements in BNA-1 there were frequently fewer results than normal available for consideration and fewer elements for which assessment could be attempted. It also appears that a sizeable number of results were reported from systems that were unreliable at low mass fractions. This applies not only to some XRF measurements but also to some ICP-AES/OES and ICP-MS measurements and is a source of high tails in the data distributions for a substantial number of analytes present at particularly low mass fractions, including K_2O, P_2O_5, Ba, Ce, La, Mo, Nb, Pb, Rb, Ta, Th, U and W (see, for example, Figure

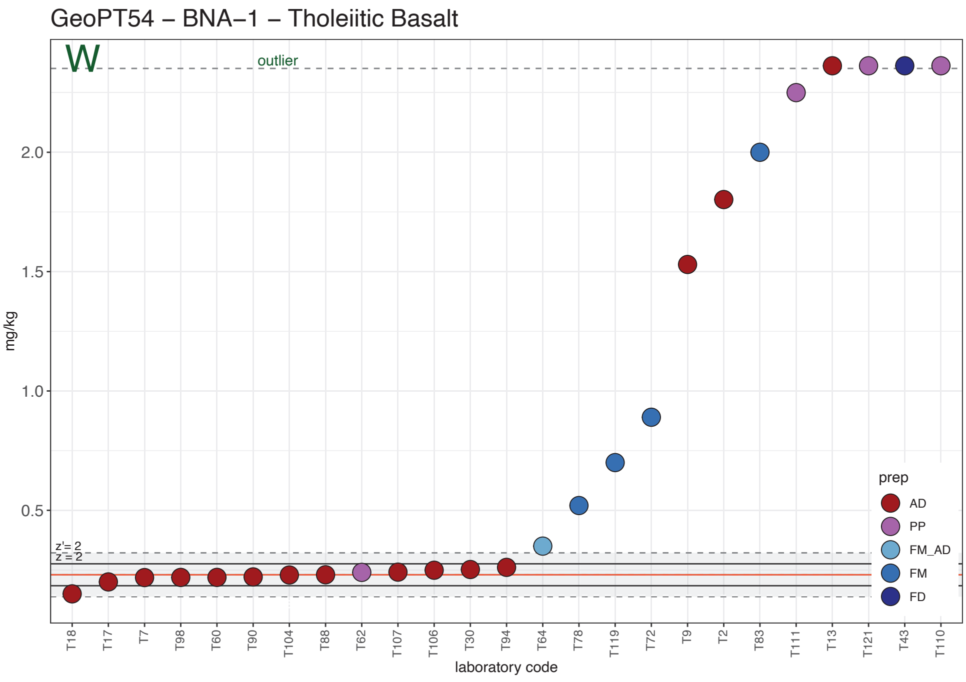

Figure 0.1 A sequential data distribution plot for BNA-1 of sorted W results distinguished according to method of sample preparation showing a convincing consensus and a significant high tail. Key to sample preparation: AD – Acid digestion, PP – Powder pellet (XRF), FM_AD – Fusion followed by acid digestion, FM – Fusion melt, FD – Fusion disc (XRF). Results marked as outliers have their true magnitude suppressed – in this case they appear mostly to be measurements of other materials.

0.1). On account of the skewed data distributions modes were used to obtain satisfactory consensus values for these analytes. In some cases, where a consensus could be recognised and based on results acquired by appropriate methods, as for Ba, Ce, La and Ta, assigned status was conferred, but in many cases provisional status was more appropriate. For K_2O and P_2O_5, however, although provisional status was an option, it was rejected on account of the extreme dispersion of the results in relation to the Horwitz parameter. Arguably, for very low mass fractions of major and minor constituents such as these, the Horwitz relationship breaks down and an alternative means of assessing the data could be attempted (e.g. Thompson et al., 2014).

It was observed that XRF powder pellet results particularly for the major elements, were frequently biased in relation to other methods and to XRF fusion disc results. Seven out of eight laboratories reporting MgO by XRF on powder pellets produced considerably underestimated values as shown in Figure 0.2. Six of nine results for Al_2O_3 were significantly high, as were all of the Na_2O results. Five Fe_2O_3 results obtained by XRF on powder pellets and most CaO results were somewhat low. Clearly, the measurement of major elements by XRF on powder pellets appears to be extremely challenging and is not to be recommended.

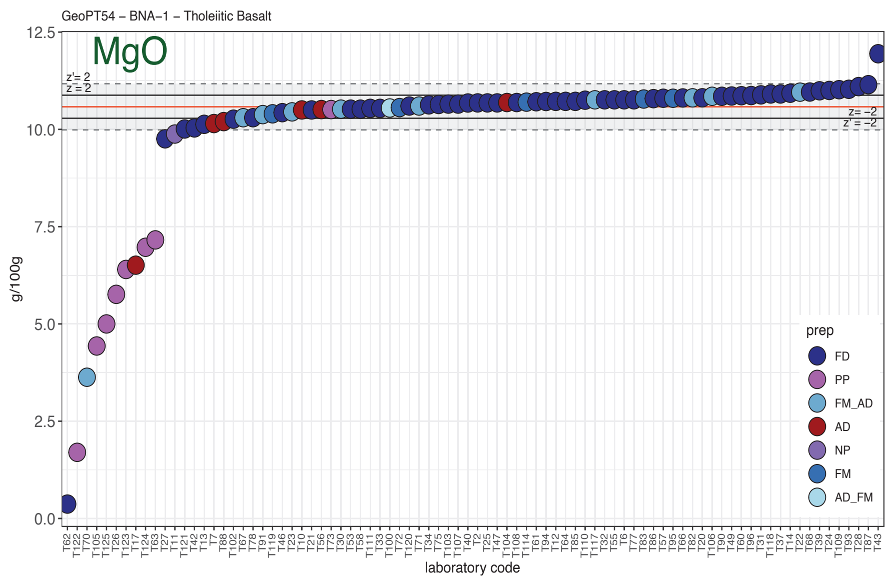

Figure 0.2 A sequential data distribution plot for BNA-1 showing sorted Mg results distinguished according to method of measurement where powder pellet (PP) data is markedly out of kilter with other data. Key to sample preparation: FD – Fusion disc, PP – Powder pellet, FM_AD – Fusion followed by acid digestion, AD – Acid digestion, NP – Nano-pellet, FM – Fusion melt, AD_FM – Acid digestion and fusion of residue.

Powder pellet results for a number of trace elements also exhibited bias relative to other methods that are expected to be more reliable. 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 (Meisel et al., 2022). Bias to lower than recognised consensus values is observed for Cr, Ni, Sc, and V. Figure 0.3 shows how the powder pellet results for Cr cluster well below values for other methods in a 'ridges' plot. This effect may be a result of applying an 'average' mass absorption correction that does not account for such effects in grains of individual mineral species.

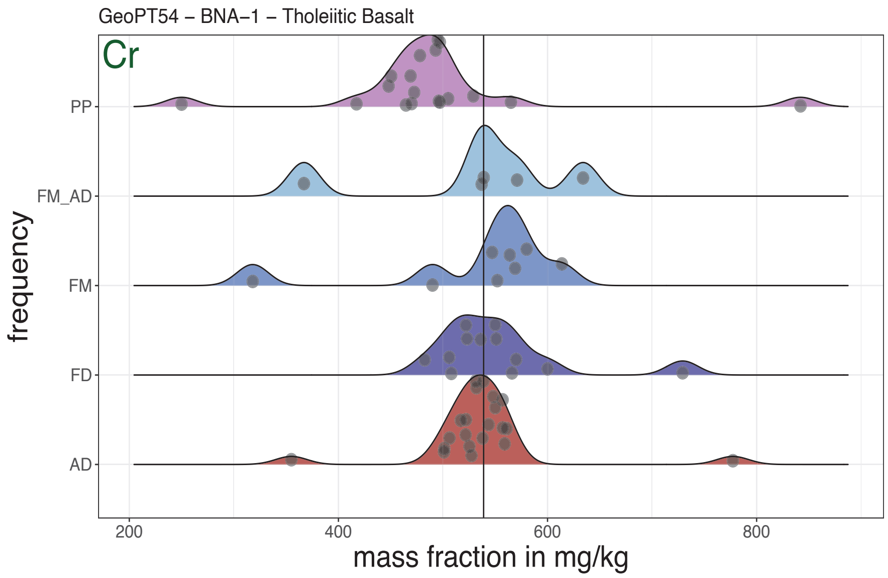

Figure 0.3 A 'ridges' plot for Cr in BNA-1 in which smoothed distributions of results according to method of sample preparation show that the majority of powder pellet results appear biased to a lower mass fraction than results by other methods: PP – Powder pellet (XRF), FM_AD – Fusion followed by acid 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 Nb, Pb and Rb, a substantial proportion of the high tail is made up of XRF results. With provisional values of 0.52 mg/kg for Nb, 0.12 mg/kg for Pb and 0.19 mg/kg for Rb, at mass fractions well below generally accepted detection limits for these analytes by XRF. In these circumstances, it is hardly surprising that poor precision XRF results would contribute to those high tails. More generally, however, high tails in this round comprise a mixture of XRF, ICP-MS and ICP-AES/OES data, especially for Ce, La, Ta, Th and U. For Mo at 0.15 mg/kg the data distribution is dominated by ICP-MS, which contributed both coherent data and data responsible for high tail (Figure 0.4). This suggests that some laboratories using this method are performing poorly in relation to many others, particularly as it would be expected for detection limits for ICP-MS to 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, Pb and Th feature notably 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, and is especially relevant to distributions of major element components and trace elements when reported at low mass fractions.

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:

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

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*54 are listed in Table 3. Those of results designated as data **quality 1** are shown in **bold**:

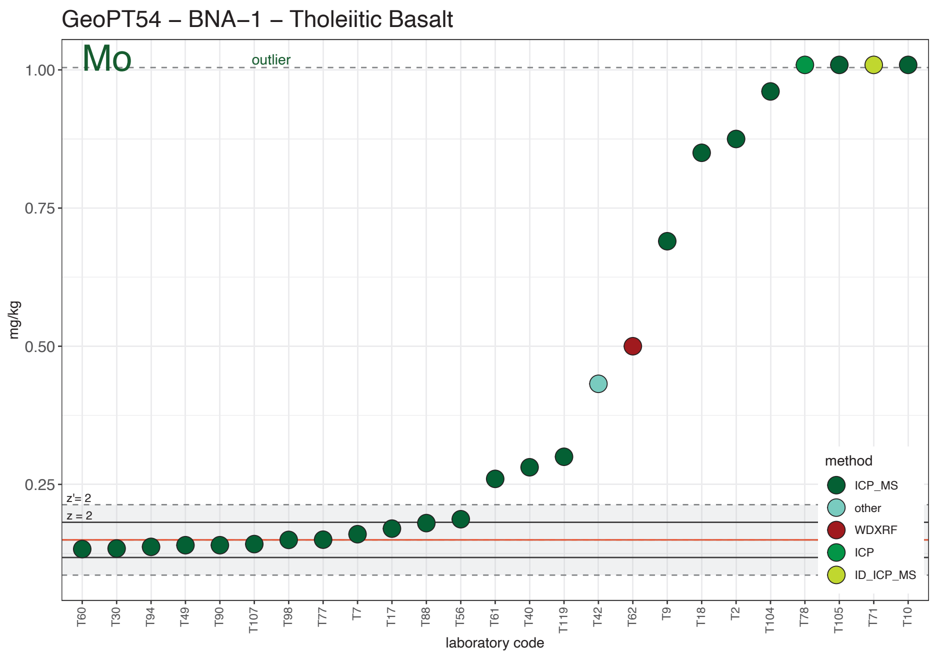

Figure 0.4 A sequential data distribution plot for BNA-1 showing sorted Mo results distinguished according to method of measurement where ICP-MS measurement results contribute (along with other techniques) to a significantly large tail to high values alongside data defining a satisfactory consensus. Key to methods: ICP-MS – Inductively coupled plasma - mass spectrometry; other = not defined; WDXRF – Wavelength dispersive XRF; ICP – Inductively coupled plasma - atomic/optical emission spectrometry; ID_ICP_MS – Isotope dilution – inductively coupled plasma - mass spectrometry.

those of data quality 2 are shown underlined. *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 material 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 by 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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ADDENDUM — IMPORTANT NOTICES TO ANALYSTS

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.

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.

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)
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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)
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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
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Geo*PT*15
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Geo*PT*17
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Geo*PT*18
Webb, P.C., Thompson M., Potts P.J. and L. Paul Bedard (2006)
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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 - GeoPT54 Contributed data for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code		T2	T6	T7	T9	T10	T11	T12	T13	T14	T16	T17	T18	T20
SiO2	g 100g^{-1}	47.3	47.74			46.9	46.57	47.04	45.7	47.53	44.1			47.25
TiO2	g 100g^{-1}	0.904	0.9	0.865		0.988	0.907	0.907	0.95	0.86	0.919	0.7		0.895
Al2O3	g 100g^{-1}	15.41	15.99	14.73		15.8	15.42	15.33	15.01	15.45		10.3		15.268
Fe2O3T	g 100g^{-1}	11.16	11.11	10.93		11.3	11.16	11.32	11.79	11.239	10.5	9.92		11.358
Fe(II)O	g 100g^{-1}	7.83												
MnO	g 100g^{-1}	0.165	0.17	0.164		0.155	0.178	0.18	0.17	0.177	0.138	0.13		0.171
MgO	g 100g^{-1}	10.68	10.76	10.15		10.5	9.88	10.72	10.13	10.929		6.51		10.812
CaO	g 100g^{-1}	12.88	12.75			12.6	13.18	12.92	13.84	13.011	12.1	10.5		13.011
Na2O	g 100g^{-1}	1.74	1.6	1.607		1.73	1.845	1.66	1.65	1.774		1.03		1.711
K2O	g 100g^{-1}	0.011		0.019			0.029	0.017	0.02	0.028	0.099	0.02		0.021
P2O5	g 100g^{-1}	0.021		0.017		0.023	0.027	0.029		0.023				0.02
H2O+	g 100g^{-1}								0.1					
CO2	g 100g^{-1}													
LOI	g 100g^{-1}		0.21						-0.12	-0.606				-0.49
Ag	mg kg^{-1}	0.061			0.03	0.9	0.041							
As	mg kg^{-1}	0.928		0.066	0.42		0.062		4.87	7				
Au	mg kg^{-1}													
B	mg kg^{-1}	12.6					0.123							
Ba	mg kg^{-1}	8.304		5.923	13.2	13	5.535	6.7	6.83			7.33	6.55	
Be	mg kg^{-1}	0.125		0.085	0.09		0.077	0.139	0.04			0.16	0.08	
Bi	mg kg^{-1}	0.029			0.01		0.004							
Br	mg kg^{-1}													
C(org)	mg kg^{-1}								0.02					
C(tot)	mg kg^{-1}								0.02					
Cd	mg kg^{-1}	0.189		0.096	0.1		0.096					0.35	0.02	
Ce	mg kg^{-1}	1.873		1.673	2.34	8.4	1.787	2.56				1.59	1.87	56.2
Cl	mg kg^{-1}					17			42					
Co	mg kg^{-1}	70.46		53.51	58.5	55	54.14	53.5		53		56.5	58.46	52.55
Cr	mg kg^{-1}	777.3	550	506.3	501	580	548.4	551	355	565		550	525.330	472.5
Cs	mg kg^{-1}	0.015			0.02		0.011			5		0.1		
Cu	mg kg^{-1}	137.8		111.7	124	270	113	111	87.62	108	113	133	123.690	109
Dy	mg kg^{-1}	2.172		2.341	2.55	2.6	2.57	2.52	2.09			2.28	2.59	
Er	mg kg^{-1}	1.425		1.565	1.65	1.9	1.695	1.76	3.12			1.42	1.7	
Eu	mg kg^{-1}	0.455		0.481	0.51		0.501	0.521	0.39			0.49	0.5	
F	mg kg^{-1}					30			54					
Ga	mg kg^{-1}	18.84			14.8	15	15.2	14.5	12.41	16			13.62	13.7
Gd	mg kg^{-1}	1.615		1.703	1.87	1.8	1.812	1.98				1.69	1.73	
Ge	mg kg^{-1}	10.96			3.71		1.343	1.72				1.19	0.4	
Hf	mg kg^{-1}	0.507		0.538	0.6		0.575	2.12	1.27			0.54	0.48	
Hg	mg kg^{-1}													
Ho	mg kg^{-1}	0.482		0.527	0.56		0.573	0.555				0.47	0.58	
I	mg kg^{-1}													
In	mg kg^{-1}			0.051			0.048							
Ir	mg kg^{-1}													
La	mg kg^{-1}	0.604		0.529	0.86		0.607	1.8	0.9			0.43	0.58	
Li	mg kg^{-1}	4.99		2.898	3.44	4.7	3.124		3.32			1.62	3.12	
Lu	mg kg^{-1}	0.201		0.230	0.24		0.259	0.243				0.18	0.25	
Mo	mg kg^{-1}	0.875		0.160	0.69	4						0.17	0.85	
Nb	mg kg^{-1}	0.611		0.497	0.83		0.520	0.559	1.1	5		0.61	0.75	
Nd	mg kg^{-1}	2.193		2.135	2.61	2.3	2.257	3.07	0.82			2.27	2.35	
Ni	mg kg^{-1}	296.3		223.6	229	210	226.9	231	159.250	204		235	254.6	219.9
Os	mg kg^{-1}													
Pb	mg kg^{-1}	0.542		0.099	2.02		0.141					0.14	0.12	
Pd	mg kg^{-1}								0.008					
Pr	mg kg^{-1}	0.340		0.336	0.45		0.360	0.513				0.38	0.37	
Pt	mg kg^{-1}								0.024					
Rb	mg kg^{-1}	0.562		0.206	0.62		0.197	0.412		8		1.07	0.18	
Re	mg kg^{-1}													
Rh	mg kg^{-1}													
Ru	mg kg^{-1}													
S	mg kg^{-1}													
Sb	mg kg^{-1}	25.68			0.13								0.006	
Sc	mg kg^{-1}	37.97		39.26	41.6	44	44.67	47.1	36.26	37		26.3	45.37	
Se	mg kg^{-1}	0.892			0.82									
Sm	mg kg^{-1}	0.932		0.977	1.12	1.2	1.087	1.16	3			0.95	1.09	
Sn	mg kg^{-1}	10.79		0.242	0.34			0.6				0.42	0.38	
Sr	mg kg^{-1}	127.4		104.4	109	100	105.1	112	105.6	104	109	87.6	111.6	106
Ta	mg kg^{-1}	0.111		0.036	1.4		0.032	0.055				0.42	0.182	
Tb	mg kg^{-1}	0.309		0.335	0.34		0.368	0.358	0.87			0.31	0.36	
Te	mg kg^{-1}	0.358			0.06									
Th	mg kg^{-1}	0.123		0.024	0.1		0.029	0.178	3.72			0.05		
Tl	mg kg^{-1}	0.011			0.03									
Tm	mg kg^{-1}	0.207		0.236	0.25		0.264	0.244				0.21	0.26	
U	mg kg^{-1}	0.063			0.07		0.009	0.068	9.31			0.03	0.005	
V	mg kg^{-1}	442.7	300	290.8	320	530	307.9	303	307	290		303	326.5	282
W	mg kg^{-1}	1.802		0.218	1.53				3.18			0.2	0.15	
Y	mg kg^{-1}	13.79		14.38	14.1	14	15.8	14.7		14		12.4	15.95	14.2
Yb	mg kg^{-1}	1.369		1.528	1.61	1.8	1.673	1.64	1.85			1.33	1.67	
Zn	mg kg^{-1}	67		68.14	86.3		69.59	79.8	62.37	67	63.6	52.2	70.8	65.7
Zr	mg kg^{-1}	14.76		13.47	13.5		14.66	15.8	15.93	17	13	14.22	14.9	69.6

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

Table 1 - GeoPT54 Contributed data for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code		T21	T22	T23	T24	T25	T26	T27	T28	T29	T30	T31	T32	T33
SiO2	$g\ 100g^{-1}$	47.18	49.572	47.8	47.2	47.35	41.74	43.66	46.7		**47.6**	**47.672**	**47.53**	**46.95**
TiO2	$g\ 100g^{-1}$	0.89	0.938	0.898	0.89	0.88	0.8	0.81	0.866		**0.893**	**0.904**	**0.9**	**0.87**
Al2O3	$g\ 100g^{-1}$	14.99	15.88	15.1	15.2	15.44	18.97	14.7	15.8		**15.2**	**15.569**	**15.51**	**14.99**
Fe2O3T	$g\ 100g^{-1}$	11.46	11.599	11.1	10.95	11.28	10.41	12.51	11.1		**11.3**	**11.293**	**11.32**	**11.28**
Fe(II)O	$g\ 100g^{-1}$													
MnO	$g\ 100g^{-1}$	0.18	0.177	0.172	0.16	0.17	0.151	0.149	0.171		**0.171**	**0.171**	**0.17**	**0.17**
MgO	$g\ 100g^{-1}$	10.5	10.957	10.45	11	10.68	5.76	9.757	11.1		**10.52**	**10.887**	**10.76**	**10.54**
CaO	$g\ 100g^{-1}$	13.12	13.919	12.5	12.9	12.67	12.71	13.64	12.9		**12.98**	**13.064**	**13.02**	**12.8**
Na2O	$g\ 100g^{-1}$	1.71	1.72	1.71	1.88	1.87	2.36	1.701	1.4		**1.721**	**1.727**	**1.66**	**1.37**
K2O	$g\ 100g^{-1}$	0.06		0.022	0.03		0.023	0.006				**0.01**	**0.02**	**0.03**
P2O5	$g\ 100g^{-1}$	0.03		0.017			0.028	0.032			**0.017**	**0.019**	**0.02**	**0.02**
H2O+	$g\ 100g^{-1}$											**0.21**		
CO2	$g\ 100g^{-1}$													
LOI	$g\ 100g^{-1}$	-0.35	-0.42				-0.508				**-0.52**	**-0.37**	-0.4	
Ag	$mg\ kg^{-1}$													
As	$mg\ kg^{-1}$													
Au	$mg\ kg^{-1}$													
B	$mg\ kg^{-1}$													
Ba	$mg\ kg^{-1}$		4.51								**5.953**		**6.063**	**23**
Be	$mg\ kg^{-1}$										**0.067**			
Bi	$mg\ kg^{-1}$													
Br	$mg\ kg^{-1}$													
C(org)	$mg\ kg^{-1}$													
C(tot)	$mg\ kg^{-1}$													**21390**
Cd	$mg\ kg^{-1}$										**0.063**			
Ce	$mg\ kg^{-1}$		1.9							**4.25**	**1.734**		**1.723**	
Cl	$mg\ kg^{-1}$													
Co	$mg\ kg^{-1}$		55.94	56		56					**54.973**		**55.66**	**47**
Cr	$mg\ kg^{-1}$		570.880	537							**537.9**		**477.2**	**508**
Cs	$mg\ kg^{-1}$										**0.002**			
Cu	$mg\ kg^{-1}$		80.1	108		139					**105.250**		**112.7**	**121**
Dy	$mg\ kg^{-1}$		2.57							**2.475**	**2.362**		**2.381**	
Er	$mg\ kg^{-1}$		1.71							**3.94**	**1.584**		**1.588**	
Eu	$mg\ kg^{-1}$		0.5							**0.48**	**0.481**		**0.486**	
F	$mg\ kg^{-1}$													
Ga	$mg\ kg^{-1}$		13.15								**14.48**		**15.98**	**10**
Gd	$mg\ kg^{-1}$		1.83							**0.895**	**1.731**		**1.699**	
Ge	$mg\ kg^{-1}$													
Hf	$mg\ kg^{-1}$		0.58								**0.551**		**0.529**	
Hg	$mg\ kg^{-1}$													
Ho	$mg\ kg^{-1}$		0.57							**0.505**	**0.543**		**0.523**	
I	$mg\ kg^{-1}$													
In	$mg\ kg^{-1}$													
Ir	$mg\ kg^{-1}$													
La	$mg\ kg^{-1}$									**1.585**	**0.549**		**0.55**	
Li	$mg\ kg^{-1}$										**2.883**		**2.853**	
Lu	$mg\ kg^{-1}$		0.25							**0.25**	**0.23**		**0.228**	
Mo	$mg\ kg^{-1}$										**0.134**			
Nb	$mg\ kg^{-1}$										**0.524**		**0.482**	**3**
Nd	$mg\ kg^{-1}$		2.33							**3.04**	**2.19**		**2.168**	
Ni	$mg\ kg^{-1}$		222.9	227		200	181				**215.5**		**228**	**211**
Os	$mg\ kg^{-1}$													
Pb	$mg\ kg^{-1}$										**0.102**			
Pd	$mg\ kg^{-1}$													
Pr	$mg\ kg^{-1}$									**0.64**	**0.35**		**0.337**	
Pt	$mg\ kg^{-1}$													
Rb	$mg\ kg^{-1}$										**0.173**		**0.179**	**12**
Re	$mg\ kg^{-1}$													
Rh	$mg\ kg^{-1}$													
Ru	$mg\ kg^{-1}$													
S	$mg\ kg^{-1}$													**150**
Sb	$mg\ kg^{-1}$										**0.004**			
Sc	$mg\ kg^{-1}$		43.1			37					**40.81**		**41.21**	
Se	$mg\ kg^{-1}$													
Sm	$mg\ kg^{-1}$		1.07							**1.145**	**1.02**		**1.022**	
Sn	$mg\ kg^{-1}$										**0.275**			
Sr	$mg\ kg^{-1}$		107.280			101	107				**104.8**		**100.5**	**132**
Ta	$mg\ kg^{-1}$										**0.042**		**0.03**	
Tb	$mg\ kg^{-1}$		0.36							**0.375**	**0.339**		**0.323**	
Te	$mg\ kg^{-1}$													
Th	$mg\ kg^{-1}$					9					**0.025**		**0.022**	
Tl	$mg\ kg^{-1}$										**0.001**			
Tm	$mg\ kg^{-1}$		0.25							**0.505**	**0.239**		**0.22**	
U	$mg\ kg^{-1}$										**0.008**		**0.006**	
V	$mg\ kg^{-1}$		308.8	298		266	356				**298.5**		**280.1**	**224**
W	$mg\ kg^{-1}$										**0.252**			
Y	$mg\ kg^{-1}$		15.4	14		14				**13.75**	**13.5**		**13.72**	**17**
Yb	$mg\ kg^{-1}$		1.7							**1.485**	**1.539**		**1.532**	
Zn	$mg\ kg^{-1}$		66.5	75		55	82				**67.22**		**64.3**	**67**
Zr	$mg\ kg^{-1}$		13.07			13					**15.41**		**12.24**	**31**

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

Table 1 - GeoPT54 Contributed data for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code		T34	T37	T39	T40	T42	T43	T46	T47	T49	T52	T53	T55	T56
SiO2	g 100g⁻¹	47.5	47.48	47.254	**47.232**	48.892	44.88	46.87	**47.03**	**47.432**		45.208	**46.96**	**46.44**
TiO2	g 100g⁻¹	0.902	0.9	0.893	**0.908**	0.909	0.89	0.899	**0.968**	**0.903**		0.848	**0.901**	**0.867**
Al2O3	g 100g⁻¹	15.55	15.4	15.288	**15.18**	15.401	15.089	15.25	**15.55**	**15.325**		17.646	**15.34**	**15.16**
Fe2O3T	g 100g⁻¹	11.27	11.44	11.182	**11.395**	11.46	11.819	11.46	**11.38**	**11.328**		10.51	**11.34**	**10.95**
Fe(II)O	g 100g⁻¹							7.9		**8.1**				
MnO	g 100g⁻¹	0.15	0.17	0.171	**0.171**	0.173	0.186	0.169	**0.165**	**0.168**		0.161	**0.173**	**0.165**
MgO	g 100g⁻¹	10.63	10.91	10.992	**10.678**	10.037	11.944	10.43	**10.68**	**10.858**		10.52	**10.76**	**10.51**
CaO	g 100g⁻¹	12.72	12.98	12.896	**13.022**	12.636	12.815	12.98	**12.94**	**12.831**		12.837	**13.02**	**12.75**
Na2O	g 100g⁻¹	1.71	1.62	1.746	**1.76**	1.559	1.906	1.75	**1.54**	**1.720**		1.838	**1.63**	**1.69**
K2O	g 100g⁻¹		0.02	0.019	**0.034**	0.083	0.019			**0.031**		0.032	**0.01**	**0.023**
P2O5	g 100g⁻¹	0.017	0.01	0.021	**0.028**		0.016		**0.03**	**0.024**		0.022	**0.036**	**0.03**
H2O+	g 100g⁻¹													
CO2	g 100g⁻¹					0.080								
LOI	g 100g⁻¹			-0.517	**-0.44**		0.181		**-0.43**	**-0.547**		**-0.55**		
Ag	mg kg⁻¹				**0.029**	0.067								
As	mg kg⁻¹				**0.22**	0.268	3.034		**6.31**					
Au	mg kg⁻¹													
B	mg kg⁻¹													
Ba	mg kg⁻¹				**8.7**	10.846	12.259		**6.75**	**5.56**	6.51			**6.02**
Be	mg kg⁻¹		0.31							**0.093**	0.094			
Bi	mg kg⁻¹				**0.006**									
Br	mg kg⁻¹						5.36							
C(org)	mg kg⁻¹													
C(tot)	mg kg⁻¹					219						**280**		
Cd	mg kg⁻¹				**0.02**									**0.056**
Ce	mg kg⁻¹		2		**2.025**	1.702			**1.521**	**1.65**	1.91		**1.56**	**1.71**
Cl	mg kg⁻¹				**0.012**				**55.66**					
Co	mg kg⁻¹	58.98	55	48		56.21	51.156	53	**509.2**	**56.17**	55.6		**57**	**54.32**
Cr	mg kg⁻¹	522	539	529	**729.2**	529.799	482.542	468		**521.670**	517	566	**559**	**557.1**
Cs	mg kg⁻¹				**0.01**					**0.005**	0.002			**0.002**
Cu	mg kg⁻¹	103	109	113	**112.6**	134.743	108.069	121		**113.540**	111	98	**116**	**108.6**
Dy	mg kg⁻¹		2.5		**3.169**	2.254			**2.297**	**2.47**	2.4		**2.3**	**2.35**
Er	mg kg⁻¹		1.6		**1.979**	1.446		1.64	**1.559**	**1.59**	1.56		**1.47**	**1.54**
Eu	mg kg⁻¹		0.49		**0.686**	0.441		0.49	**0.463**	**0.5**	0.45		**0.47**	**0.481**
F	mg kg⁻¹													
Ga	mg kg⁻¹	14.32	15.6	15	**14.631**	15.428	14.119	14.5		**15.12**	15.5		**16**	**14.51**
Gd	mg kg⁻¹		1.8		**1.752**	1.633		1.7	**1.59**	**1.76**	1.58		**1.32**	**1.64**
Ge	mg kg⁻¹	1.39		3	**1.58**						1.41			
Hf	mg kg⁻¹		0.57		**0.5**	0.505			**0.5**	**0.56**	0.54		**0.54**	**0.953**
Hg	mg kg⁻¹													
Ho	mg kg⁻¹		0.55		**0.636**	0.476		0.54	**0.516**	**0.55**	0.53		**0.51**	**0.52**
I	mg kg⁻¹													
In	mg kg⁻¹													
Ir	mg kg⁻¹													
La	mg kg⁻¹	30.15	0.85		**0.54**	0.519	3.065		**0.511**	**0.55**	0.6		**0.48**	**0.551**
Li	mg kg⁻¹		3.1							**2.8**	3.17		**3.04**	**3.08**
Lu	mg kg⁻¹		0.25		**0.32**	0.199		0.24	**0.231**	**0.23**	0.23		**0.22**	**0.227**
Mo	mg kg⁻¹				**0.281**	0.432				**0.14**				**0.187**
Nb	mg kg⁻¹				**0.844**	0.635			**0.36**	**0.48**	0.56		0.32	**0.489**
Nd	mg kg⁻¹		2.3		**3.004**	2.068			**2.107**	**2.21**	2.2		**2.04**	**2.22**
Ni	mg kg⁻¹	228	233	218	**209.8**	227.515	241.029	212	**207.9**	**225.260**	218	204	**233**	**232.9**
Os	mg kg⁻¹													
Pb	mg kg⁻¹				**0.24**	0.567				**0.118**	0.15			**0.185**
Pd	mg kg⁻¹													
Pr	mg kg⁻¹		0.36		**0.345**	0.319			**0.318**	**0.36**	0.35		**0.32**	**0.341**
Pt	mg kg⁻¹													
Rb	mg kg⁻¹				**0.24**				**0.16**	**0.22**	0.22		**0.04**	**0.153**
Re	mg kg⁻¹													
Rh	mg kg⁻¹													
Ru	mg kg⁻¹													
S	mg kg⁻¹					41.63								
Sb	mg kg⁻¹				**0.03**	0.119			**0.13**					
Sc	mg kg⁻¹	41.82	33		**50.118**	43.047	43.54	41.3	**40**	**44.31**	34.3		41	**42.32**
Se	mg kg⁻¹													
Sm	mg kg⁻¹		1.1		**0.982**	0.936		1.05	**0.988**	**1.03**	1.03		**0.96**	**1**
Sn	mg kg⁻¹				**0.58**					**0.3**				
Sr	mg kg⁻¹	107	110	102	**107.8**	110.279	104.732	102	**97.09**	**105.030**	107	97	**103**	**104.6**
Ta	mg kg⁻¹				**2.423**	0.027			**0.026**	**0.037**	0.038			**0.038**
Tb	mg kg⁻¹		0.3		**0.513**	0.285			**0.339**	**0.35**	0.33		**0.32**	**0.322**
Te	mg kg⁻¹		0.02											
Th	mg kg⁻¹				**0.05**	0.023				**0.028**	0.034		**0.02**	**0.031**
Tl	mg kg⁻¹				**0.009**					**0.008**				
Tm	mg kg⁻¹		0.26		**0.265**	0.208		0.24	**0.221**	**0.24**	0.24		**0.23**	**0.24**
U	mg kg⁻¹				**0.013**	0.01				**0.009**	0.008			**0.008**
V	mg kg⁻¹	297	301	279	**292.730**	300.123	271.830	278	**307**	**299.670**	304	322	**314**	**300.6**
W	mg kg⁻¹						8.526							
Y	mg kg⁻¹	17	13.7		**15.213**	14.381	13.872	13.5	**13.3**	**14.19**	14.8		**15**	**14.68**
Yb	mg kg⁻¹		1.6		**2.275**	1.39		1.61	**1.508**	**1.54**	1.53		**1.44**	**1.49**
Zn	mg kg⁻¹	70	70.2	76	**147.5**	80.587	63.59	63.4	**74**	**68.16**	67.2	54	**70**	**69.09**
Zr	mg kg⁻¹	9	14.8		**18.7**	12.634	12.252		**3.48**	**12.59**	14.8		**13.8**	**11.62**

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

Table 1 - GeoPT54 Contributed data for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code		T57	T58	T60	T61	T62	T63	T64	T66	T67	T68	T70	T71	T72
SiO2	g 100g^{-1}	47.46	47.12	47.188	**46.44**	**61.82**	45.96	47.48	47.449	**46.6**	47.04	53.1	**46.7**	**47.1**
TiO2	g 100g^{-1}	0.94	0.93	0.900	**0.91**	**0.076**	0.82	0.91	0.892	**0.872**	0.92	3.59	**0.89**	**0.88**
Al2O3	g 100g^{-1}	15.42	15.26	15.523	**15.14**	**12.85**	19.59	15.43	15.397	**15**	15.19	12.2	**15.3**	**15.29**
Fe2O3T	g 100g^{-1}	11.3	11.2	11.267	**10.08**	**12.24**	10.86	11.23	11.282	**10.96**	11.18	15	**11.5**	**11.17**
Fe(II)O	g 100g^{-1}			8.01										**8.168**
MnO	g 100g^{-1}	0.167	0.18	0.162	**0.173**	**0.071**	0.17	0.18	0.170	**0.167**	0.16	0.21	**0.17**	**0.17**
MgO	g 100g^{-1}	10.8	10.52	10.865	**10.71**	**0.37**	7.16	10.72	10.808	**10.3**	10.96	3.63	**10.6**	**10.56**
CaO	g 100g^{-1}	12.78	12.95	12.899	**12.91**	**0.25**	12.65	13.1	12.888	**12.6**	12.96	7.19	**12.9**	**13.14**
Na2O	g 100g^{-1}	1.69	1.81	1.796	**1.58**	**1.85**	2.02	1.67	1.711	**1.67**	1.85	2.56	**1.73**	**1.75**
K2O	g 100g^{-1}	0.02	0.03	0.027	**0.013**	**2.1**	0.03	0.02	0.02		0.02	1.45	**0.02**	
P2O5	g 100g^{-1}	0.02	0.02	0.017	**0.021**	**0.14**	0.05	0.015	0.017	**0.014**	0.017	0.6	**0.03**	
H2O+	g 100g^{-1}									**0.145**				**0.097**
CO2	g 100g^{-1}									**0.003**				
LOI	g 100g^{-1}			-0.499	1.56			-0.47			-0.43	1.15		**-0.5**
Ag	mg kg^{-1}					**0.7**							**0.04**	
As	mg kg^{-1}					**0.4**							**0.25**	
Au	mg kg^{-1}			0.001										
B	mg kg^{-1}													
Ba	mg kg^{-1}			5.6	**29.7**	**555**		1.27				549.7	**7**	**6.4**
Be	mg kg^{-1}			0.079									**0.02**	**0.08**
Bi	mg kg^{-1}						0.18					13.9		
Br	mg kg^{-1}													
C(org)	mg kg^{-1}													
C(tot)	mg kg^{-1}			117										
Cd	mg kg^{-1}		2	0.115		**0.1**							**0.2**	**0.08**
Ce	mg kg^{-1}		11	1.83	**1.958**	**2.72**		1.77					**3**	**1.67**
Cl	mg kg^{-1}													
Co	mg kg^{-1}		41	55.651		**67**	61	47.7				54.4	**56**	**53**
Cr	mg kg^{-1}		496	538.8	**523**	**842**	505	552	570		522	9.2	**55.5**	**547**
Cs	mg kg^{-1}				**0.012**	**0.08**								
Cu	mg kg^{-1}		115	109.540	**121**	**223**	126	94.1			111	147.2	**112**	**96.8**
Dy	mg kg^{-1}			2.407	**2.473**	**2.41**	2.41	2.18					**1.94**	**2.13**
Er	mg kg^{-1}			1.725	**1.61**	**1.58**	1.61	1.43					**7.3**	**1.38**
Eu	mg kg^{-1}			0.510	**0.505**	**0.49**	0.51	0.42					**0.54**	**0.445**
F	mg kg^{-1}													
Ga	mg kg^{-1}			15.356	**15.02**	**16.3**	17	12.1					**16.8**	**14.5**
Gd	mg kg^{-1}			1.855	**1.825**	**1.67**	1.9	1.61					**2.5**	**1.42**
Ge	mg kg^{-1}					**2.35**	1.28	1.32					**0.2**	**1.19**
Hf	mg kg^{-1}			0.555	**0.567**	**0.55**	0.73	0.48					**4.3**	**0.49**
Hg	mg kg^{-1}													
Ho	mg kg^{-1}			0.580	**0.556**	**0.52**	0.52	0.49					**0.77**	**0.495**
I	mg kg^{-1}													
In	mg kg^{-1}			0.053			0.05							**0.05**
Ir	mg kg^{-1}			0.000										
La	mg kg^{-1}		12	0.588	**0.671**	**1.79**		0.86					**4.3**	**0.529**
Li	mg kg^{-1}			2.8								8.7	**6.5**	**3.104**
Lu	mg kg^{-1}			0.239	**0.238**	**0.23**	0.26	0.2					**0.32**	**0.213**
Mo	mg kg^{-1}			0.133	**0.26**	**0.5**							**3**	
Nb	mg kg^{-1}			0.489	**0.6**	**41.8**	3	0.48						**0.4**
Nd	mg kg^{-1}			2.49	**2.332**	**2.54**	2.61	1.92					**3.1**	**2.01**
Ni	mg kg^{-1}		174	227.290	**238**	**255**	241	211			217	12.1	**232**	**208**
Os	mg kg^{-1}			0.000										
Pb	mg kg^{-1}		4		**0.39**	**1.9**	4						**0.48**	
Pd	mg kg^{-1}			0.007										
Pr	mg kg^{-1}			0.372	**0.379**	**0.44**	0.41	0.33					**1.5**	**0.311**
Pt	mg kg^{-1}			0.005										
Rb	mg kg^{-1}		5	0.15	**0.33**	**1.99**							**0.2**	**0.15**
Re	mg kg^{-1}													
Rh	mg kg^{-1}			0.000										
Ru	mg kg^{-1}			0.001										
S	mg kg^{-1}							0.08				1389		**157**
Sb	mg kg^{-1}					**0.1**								
Sc	mg kg^{-1}		35	41.25	**44.98**	**28.3**	36	35.8				27.3	**37.5**	**43.99**
Se	mg kg^{-1}					**0.4**								
Sm	mg kg^{-1}			1.057	**1.072**	**1.1**	1.04	0.9					**0.2**	**0.929**
Sn	mg kg^{-1}			0.22		**0.3**							**0.35**	
Sr	mg kg^{-1}		105	98.3	**100.7**	127	112	90	99		108	500.9	**115**	**102**
Ta	mg kg^{-1}			0.037	**0.14**								**0.1**	**0.04**
Tb	mg kg^{-1}			0.348	**0.36**	**0.34**	0.35	0.3					**0.43**	**0.291**
Te	mg kg^{-1}			0.034										
Th	mg kg^{-1}			0.028		**0.25**		0.05					**0.08**	**0.02**
Tl	mg kg^{-1}													
Tm	mg kg^{-1}			0.235	**0.239**	**0.23**	0.25	0.22					**0.3**	**0.213**
U	mg kg^{-1}												**0.03**	
V	mg kg^{-1}		218	308.620	**308.7**	**427**	312	280	321		290	396.9	**334**	**282**
W	mg kg^{-1}			0.219		**0.24**		0.35						**0.89**
Y	mg kg^{-1}		15	14.175	**15**	**14.6**	17	12.3			13	40.5	**13.9**	**13**
Yb	mg kg^{-1}			1.583	**1.539**	**1.51**	1.58	1.38					**1.3**	**1.38**
Zn	mg kg^{-1}		64	66.4	**65**	**84.7**	69	65	75		66	139.8	**87**	**70.2**
Zr	mg kg^{-1}		10	14.5	**14.23**	**18.4**	22	12.3				333.8	**270**	**13.2**

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

Table 1 - GeoPT54 Contributed data for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code		T73	T75	T77	T78	T80	T82	T83	T85	T86	T87	T88	T90	T91
SiO2	g 100g^{-1}	47.3	47.15	47.14	47.46		47.895	45.88	46.83	47.6	47.564		47.89	49.6
TiO2	g 100g^{-1}	0.83	0.91	0.905	0.87		0.894	0.883	0.905	0.89	0.904	0.9	0.87	0.956
Al2O3	g 100g^{-1}	16.11	15.44	15.35	15.37		15.587	15.63	15.27	15.62	15.35	14.5	15.46	15.24
Fe2O3T	g 100g^{-1}	10.45	11.31	11.2	11.21		11.177	11.86	11.61	11.34	11.311	11.2	11.34	10.95
Fe(II)O	g 100g^{-1}										8.03			
MnO	g 100g^{-1}	0.16	0.17	0.172	0.17		0.167	0.172	0.203	0.18	0.176	0.17	0.17	
MgO	g 100g^{-1}	10.51	10.64	10.76	10.3		10.811	10.78	10.72	10.79	11.149	10.2	10.85	10.38
CaO	g 100g^{-1}	12.31	12.95	13.03	12.22		12.905	13.44	13.22	12.78	12.862	13	12.9	12.7
Na2O	g 100g^{-1}	2.1	1.72	1.83	2.09		1.763	1.65	1.71	1.76	1.208	1.68	1.73	1.833
K2O	g 100g^{-1}		0.02	0.023	0.02		0.019	0.01	0.018	0.01	0.033	0.04	0.02	0.022
P2O5	g 100g^{-1}	0.05	0.011	0.025	0.03		0.023	0.03	0.019	0.01	0.018	0.03	0.02	0.016
H2O+	g 100g^{-1}													
CO2	g 100g^{-1}													
LOI	g 100g^{-1}		-0.39	0.38	-0.42		-0.469	-0.26	-0.6	-0.46			-0.42	-0.515
Ag	mg kg^{-1}			0.045	0.4								0.033	
As	mg kg^{-1}				2.27								0.17	
Au	mg kg^{-1}													
B	mg kg^{-1}													
Ba	mg kg^{-1}		7	5.9	171.8	7		5	14	7.7	6.8	5.82	6.2	6.824
Be	mg kg^{-1}		0.09	0.081	0.31		0.102					0.092	0.07	
Bi	mg kg^{-1}												0.002	
Br	mg kg^{-1}													
C(org)	mg kg^{-1}								177				100	
C(tot)	mg kg^{-1}												200	
Cd	mg kg^{-1}		0.12	0.09	0.15								0.104	
Ce	mg kg^{-1}		2.1	1.72	13.01	1.88	1.776	1.6				1.68	1.72	
Cl	mg kg^{-1}													
Co	mg kg^{-1}	47	59.3	67.5	51.54		56.472	51	53		47.78	58.8	55.6	
Cr	mg kg^{-1}	448	569	536	318			490	493	497	543.690	548	367	
Cs	mg kg^{-1}				0.05	0.01						0.005	0.01	
Cu	mg kg^{-1}	126	117	99.5	90.31		114.090	110	113	105.2	123.750	112	114	
Dy	mg kg^{-1}		2.48	2.36	3.45	2.48	2.411	2.2				2.46	2.28	
Er	mg kg^{-1}		1.69	1.57	2.11	1.54	1.627	1.5				1.63	1.54	
Eu	mg kg^{-1}		0.5	0.471	0.86	0.49	0.501	0.44				0.49	0.54	
F	mg kg^{-1}													
Ga	mg kg^{-1}		14.77	13.86	15.98		15.157	16	23	12.1		15.4	15.5	
Gd	mg kg^{-1}		1.76	1.6	2.87	1.78	1.75	1.5				1.73	1.74	
Ge	mg kg^{-1}		1.5		1.3			2					0.06	
Hf	mg kg^{-1}		0.5	0.563	1.58	0.55	0.557	0.5				0.57	0.62	
Hg	mg kg^{-1}													
Ho	mg kg^{-1}		0.55	0.527	0.8	0.54	0.552	0.5				0.55	0.53	
I	mg kg^{-1}													
In	mg kg^{-1}												0.052	
Ir	mg kg^{-1}													
La	mg kg^{-1}		0.57	0.553	5.25	0.63	0.568	0.5		6.5		0.56	0.5	
Li	mg kg^{-1}		2.8	2.56	9.27		2.917					2.87	2.6	
Lu	mg kg^{-1}		0.23	0.235	0.48	0.24	0.240	0.25				0.24	0.22	
Mo	mg kg^{-1}			0.15	1.47							0.18	0.14	
Nb	mg kg^{-1}		0.65	0.551	4.16	0.58			3	3.8		0.52	0.5	
Nd	mg kg^{-1}		2.14	2.2	8.45	2.34	2.291	2				2.26	2.1	
Ni	mg kg^{-1}	185	245	223	146.320		223.780	220	210	199.3	203.850	239	225	
Os	mg kg^{-1}													
Pb	mg kg^{-1}			0.102	3.32	0.12	0.118		9	6.7		0.11	0.13	
Pd	mg kg^{-1}													
Pr	mg kg^{-1}		0.4	0.344	1.7	0.38	0.343	0.28				0.35	0.35	
Pt	mg kg^{-1}													
Rb	mg kg^{-1}			0.184	5.19	0.4	0.275		6	4.2		0.18	0.3	
Re	mg kg^{-1}												0.001	
Rh	mg kg^{-1}													
Ru	mg kg^{-1}													
S	mg kg^{-1}		100						84				0.01	
Sb	mg kg^{-1}		0.7		0.1								0.02	
Sc	mg kg^{-1}		41.1	41.9	33.31	42.5	42.14	42		33.5	44.3	42.2	40.8	
Se	mg kg^{-1}												0.032	
Sm	mg kg^{-1}		0.97	1.04	2.4	1.06	1.061	1				1.03	0.88	
Sn	mg kg^{-1}		0.3	0.37	1.84							0.24	0.29	
Sr	mg kg^{-1}	83	111.5	107	163	105	106.6	106	112	107	113.8	110	103.5	102.1
Ta	mg kg^{-1}			0.176	0.4	0.04						0.038	0.04	
Tb	mg kg^{-1}		0.4	0.31	0.48	0.34	0.348	0.3				0.34	0.38	
Te	mg kg^{-1}												0.005	
Th	mg kg^{-1}		0.03	0.031	0.35	0.05						0.024	0.05	
Tl	mg kg^{-1}				0.14							0.021	0.002	
Tm	mg kg^{-1}		0.3	0.23	0.29	0.25		0.22				0.24	0.24	
U	mg kg^{-1}			0.008	0.35	0.02				1.8		0.01	0.05	
V	mg kg^{-1}		317	291	245.460		299.580	311	285	266.3	334.250	307	331	
W	mg kg^{-1}				0.52			2				0.23	0.221	
Y	mg kg^{-1}		13.7	13.84	19.77	14.64	14.88	13	17	14.1		14.8	13.7	
Yb	mg kg^{-1}		1.56	1.52	2.02	1.52	1.590	1.5				1.59	1.63	
Zn	mg kg^{-1}	75	70	63.5	77.06		69.49	70	65	63.3	72.98	68.8	71.6	
Zr	mg kg^{-1}	36	14	13.8	56	14	14.88	19	26	17.8		13.4	14	

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

Table 1 - GeoPT54 Contributed data for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code		T93	T94	T95	T96	T98	T100	T102	T103	T104	T105	T106	T107	T108
SiO2	g 100g^{-1}	**47.25**	**47.203**	46.97	46.87		47.9	45.971	47.23	**47.31**	50.919	47.06	**46.85**	47.06
TiO2	g 100g^{-1}	**0.918**	**0.890**	0.903	0.907		0.88	0.909	0.9	**0.869**	3.587	0.91	**0.894**	0.91
Al2O3	g 100g^{-1}	**15.41**	**15.368**	15.03	15.7		15.46	14.852	15.41	**15.56**	13.361	15.42	**15.11**	15.12
Fe2O3T	g 100g^{-1}	**11.39**	**11.247**	11.32	11.25		11.14	11.216	11.2	**11.24**	15.529	11.26	**11.45**	11.19
Fe(II)O	g 100g^{-1}						7.94		8.56			8.29		
MnO	g 100g^{-1}	**0.16**	**0.165**	0.175	0.167		0.17	0.169	0.174	**0.171**	0.384	0.17	**0.173**	
MgO	g 100g^{-1}	**11.03**	**10.717**	10.8	10.87		10.55	10.262	10.65	**10.69**	4.433	10.85	**10.65**	10.69
CaO	g 100g^{-1}	**13.11**	**12.86**	12.75	12.65		12.75	12.877	13.06	**12.9**	7.762	13.05	**12.87**	13.28
Na2O	g 100g^{-1}	**1.67**	**1.726**		1.64		1.92	1.645	1.72	**1.76**	2.61	1.79	**1.615**	1.71
K2O	g 100g^{-1}	**0.031**	**0.022**		0.03		0.04	0.032	0.02	**0.037**	1.566		**0.034**	0.02
P2O5	g 100g^{-1}	**0.02**	**0.024**		0.022		0.09	0.020	0.02	**0.027**	0.407	0.019	**0.027**	0.017
H2O+	g 100g^{-1}								0.4					
CO2	g 100g^{-1}													
LOI	g 100g^{-1}	**-0.86**	**-0.487**				0.04		-0.16	**-0.499**			**-0.45**	
Ag	mg kg^{-1}			0.03		0.010						0.027	**0.031**	
As	mg kg^{-1}										0.493		**0.101**	
Au	mg kg^{-1}													
B	mg kg^{-1}													
Ba	mg kg^{-1}	6.2	**5.961**	5.997		**5.91**	21		7.1	**5.776**	484.891	5.8	**6.26**	
Be	mg kg^{-1}			0.087							1.791		**0.092**	
Bi	mg kg^{-1}										0.027		**0.002**	
Br	mg kg^{-1}													
C(org)	mg kg^{-1}													
C(tot)	mg kg^{-1}								442				**226**	
Cd	mg kg^{-1}	6.1		0.099					0.12		0.14	0.107	**0.095**	
Ce	mg kg^{-1}		**1.754**	1.825		**1.805**			2.07	**1.702**	44.095	1.9	**1.761**	
Cl	mg kg^{-1}												**123**	
Co	mg kg^{-1}	**55**	**59.8**	53.23	46	**57.43**	51		57.34	**55.1**	34.87	55.8	**53.87**	
Cr	mg kg^{-1}	**478**	**560.950**	531.5	469	**557**	472		353.7	**527.3**	10.638	634	**501.3**	
Cs	mg kg^{-1}												**0.099**	
Cu	mg kg^{-1}	**111**	**111.690**	103.6		**114.9**	111		112.3	**109.2**	167.048	108	**104.5**	
Dy	mg kg^{-1}		**2.457**	2.465		**2.257**			2.18	**2.359**	3.868	2.57	**2.387**	
Er	mg kg^{-1}		**1.817**	1.756		**1.573**			1.8	**1.563**	1.955	1.72	**1.622**	
Eu	mg kg^{-1}		**0.494**	0.52		**0.453**			0.32	**0.473**	1.578	0.51	**0.494**	
F	mg kg^{-1}													
Ga	mg kg^{-1}	**16**	**15.76**	15.23		**14.89**			15.7	**14.55**	23.925	16.45	**16.09**	
Gd	mg kg^{-1}		**2.113**	1.855		**1.688**			1.8	**1.695**	4.775	1.98	**1.702**	
Ge	mg kg^{-1}			1.366					1.2		9.971			
Hf	mg kg^{-1}		**0.553**			**0.560**						0.64	**0.599**	
Hg	mg kg^{-1}													
Ho	mg kg^{-1}		**0.552**	0.548		**0.528**			0.63	**0.532**	0.711	0.59	**0.538**	
I	mg kg^{-1}													
In	mg kg^{-1}			0.052								0.055		
Ir	mg kg^{-1}													
La	mg kg^{-1}		**0.565**	0.577		**0.598**			0.53	**0.536**	18.842	0.565	**0.557**	
Li	mg kg^{-1}		**2.525**	3.129		**2.998**				**2.89**	6.495	3.2	**2.608**	
Lu	mg kg^{-1}		**0.23**	0.228		**0.235**			0.212	**0.227**	0.228	0.27	**0.239**	
Mo	mg kg^{-1}		**0.137**			**0.150**				**0.961**	2.436		**0.142**	
Nb	mg kg^{-1}		**0.496**	0.462		**0.542**				**0.489**		0.79	**0.672**	
Nd	mg kg^{-1}		**2.186**	2.366		**2.237**			2.22	**2.161**	23.954	2.4	**2.173**	
Ni	mg kg^{-1}	**204**		212.7	204	**231.4**	222		231.3	**222.9**	21.341	230	**215**	
Os	mg kg^{-1}													
Pb	mg kg^{-1}		**0.098**	0.121		**0.142**					5.086	0.12	**0.091**	
Pd	mg kg^{-1}													
Pr	mg kg^{-1}		**0.352**	0.358		**0.357**			0.384	**0.339**	5.554	0.37	**0.342**	
Pt	mg kg^{-1}													
Rb	mg kg^{-1}		**0.274**	0.189		**0.272**					32.591		**0.167**	
Re	mg kg^{-1}													
Rh	mg kg^{-1}													
Ru	mg kg^{-1}													
S	mg kg^{-1}										370		**82.3**	
Sb	mg kg^{-1}		**0.008**								19.405		**0.02**	
Sc	mg kg^{-1}	**38**	**46.21**	42.37		**43.08**	36			**40.7**	14.946	43.6	**41.1**	
Se	mg kg^{-1}										0.227			
Sm	mg kg^{-1}		**1.089**	1.097		**1.019**			0.76	**0.995**	5.115	1.07	**1.048**	
Sn	mg kg^{-1}		**0.162**	0.258		0.331						0.27	**0.245**	
Sr	mg kg^{-1}	**101**	**109.310**	109.3	111	**107.1**	107		99.9	**106.8**	454.490	118.5	**105.4**	
Ta	mg kg^{-1}		**0.036**			**0.047**				**0.037**			**0.049**	
Tb	mg kg^{-1}		**0.357**	0.367		**0.325**			0.33	**0.336**	0.675	0.33	**0.341**	
Te	mg kg^{-1}													
Th	mg kg^{-1}		**0.022**	0.016		**0.027**				**0.022**	2.016		**0.036**	
Tl	mg kg^{-1}												**0.001**	
Tm	mg kg^{-1}		**0.233**	0.264		**0.239**			0.33		0.254	0.24	**0.238**	
U	mg kg^{-1}		**0.005**			**0.008**	1				0.764		**0.008**	
V	mg kg^{-1}	**271**	**328.710**	311.2	225	**302.2**	291		305.3	**292.8**	438.9	351	**320.6**	
W	mg kg^{-1}		**0.261**			**0.219**				**0.229**		0.249	**0.241**	
Y	mg kg^{-1}	**14**	**14.45**	14.33		**15.07**	15		13.24	**14.18**	18.758	14.2	**14.25**	
Yb	mg kg^{-1}	7.6	**1.495**	1.693		**1.506**			1.45	**1.504**	1.571	1.58	**1.517**	
Zn	mg kg^{-1}	**67**	**73.13**	63.03	63	**57.39**	70		71.73		169.725	68.1	**64.41**	
Zr	mg kg^{-1}	**11**	**14.09**			**8.62**	48		12.87	**13.34**		16	**64**	

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

Table 1 - GeoPT54 Contributed data for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code		T109	T110	T111	T114	T115	T116	T117	T118	T119	T120	T121	T122	T123
SiO2	g 100g^{-1}	**46.77**	**47.06**	**46.87**	45.4			46.67	**46.53**	48.04	**47.44**	**47.29**	33	**46.66**
TiO2	g 100g^{-1}	**0.92**	**0.92**	**0.981**	0.93		0.840	0.86	**0.863**	0.89	**0.89**	**0.9**	0.63	**0.78**
Al2O3	g 100g^{-1}	**15.63**	**15.39**	**15.14**	15.6			14.97	**15.28**	15.57	**15.45**	**15.42**	10	**18.31**
Fe2O3T	g 100g^{-1}	**10.87**	**11.07**	**11.32**	11.2			11.6	**11.42**	10.93	**11.22**	**11.19**	11	**10.46**
Fe(II)O	g 100g^{-1}											**8.14**		
MnO	g 100g^{-1}	**0.17**	**0.17**	**0.174**	0.17		0.161	0.18	**0.171**	0.16	**0.17**	**0.169**	0.16	**0.17**
MgO	g 100g^{-1}	**11.02**	**10.75**	**10.54**	10.7			10.76	**10.91**	10.4	**10.6**	**10.01**	1.7	**6.4**
CaO	g 100g^{-1}	**12.54**	**12.35**	**12.67**	13			12.59	**13.32**	11.84	**13.18**	**12.89**	13	**13.77**
Na2O	g 100g^{-1}	**1.76**	**1.81**	**1.68**	1.77			1.56	**1.708**	1.81	**1.76**	**2.08**		**3.35**
K2O	g 100g^{-1}	0.03	**0.02**		0.02			0.03	**0.021**	0.03	**0.03**		0.072	
P2O5	g 100g^{-1}	0.02	**0.01**					0.02	**0.017**	0.02	**0.03**	**0.02**	0.94	
H2O+	g 100g^{-1}											**0.19**	0.4	
CO2	g 100g^{-1}											**0.07**		
LOI	g 100g^{-1}		**-0.64**	**-0.41**	0.03			-0.34	**-0.62**	0.01	**1**			
Ag	mg kg^{-1}													
As	mg kg^{-1}		**2.1**					0.37				16		
Au	mg kg^{-1}													
B	mg kg^{-1}													
Ba	mg kg^{-1}		**17.9**	**5.88**	8				**26**	5.8		**1**	180	
Be	mg kg^{-1}									0.2				
Bi	mg kg^{-1}													
Br	mg kg^{-1}													
C(org)	mg kg^{-1}													
C(tot)	mg kg^{-1}													
Cd	mg kg^{-1}						0.063	1.4						
Ce	mg kg^{-1}		**8.3**	**1.73**		**1.326**			**33**	2.2				
Cl	mg kg^{-1}							5				29	41	
Co	mg kg^{-1}	100	**58.2**	**56.2**	65.6		53.11	27.8	**61**	58.3	**56**	**46**	170	
Cr	mg kg^{-1}	600	**450.5**	**532**	613.7		464.6	69	**506**	563.9	**495**	**497**	250	**0.05**
Cs	mg kg^{-1}									0.1		**3**		
Cu	mg kg^{-1}	200	**109.9**	**110**	120.2		114	81	**107**	106.6	**123**	**119**	110	
Dy	mg kg^{-1}			**2.36**		**2.456**				2.4				
Er	mg kg^{-1}			**1.67**		**1.7**				1.6				
Eu	mg kg^{-1}			**0.49**		**0.467**				0.5				
F	mg kg^{-1}											105		
Ga	mg kg^{-1}		**14.5**	14			15.05		**19**	15.1		**15**		
Gd	mg kg^{-1}			**1.81**		**1.675**				1.6				
Ge	mg kg^{-1}			1.92										
Hf	mg kg^{-1}		**1.8**	**0.57**						0.6		**3**		
Hg	mg kg^{-1}							0.000						
Ho	mg kg^{-1}			**0.53**		**0.526**				0.6				
I	mg kg^{-1}													
In	mg kg^{-1}						0.013							
Ir	mg kg^{-1}													
La	mg kg^{-1}		**17.8**	**0.58**		**0.277**			**5**	0.7				
Li	mg kg^{-1}													
Lu	mg kg^{-1}			**0.23**		**0.233**				0.2				
Mo	mg kg^{-1}									0.3				
Nb	mg kg^{-1}			**0.36**						0.6		**1**		
Nd	mg kg^{-1}		**3.3**	**2.23**		**2.263**			**14**	2.4		**5**		
Ni	mg kg^{-1}	300	**188.4**	**224**	242		211.010	123	**236**	226.4	**205**	**197**		
Os	mg kg^{-1}													
Pb	mg kg^{-1}		**7.1**					0.14		0.8				
Pd	mg kg^{-1}													
Pr	mg kg^{-1}			**0.32**		**0.175**				0.4				
Pt	mg kg^{-1}													
Rb	mg kg^{-1}				0.806				**6**	1		**4**		
Re	mg kg^{-1}													
Rh	mg kg^{-1}													
Ru	mg kg^{-1}													
S	mg kg^{-1}													
Sb	mg kg^{-1}							1.6						
Sc	mg kg^{-1}		**27.7**	37.5		**41.231**	31.8		**35**		36	**31**	240	
Se	mg kg^{-1}													
Sm	mg kg^{-1}		**1.9**	**1.08**		**0.999**				1.1				
Sn	mg kg^{-1}									0.5				
Sr	mg kg^{-1}	100	**103.7**	**106**	119.5		101.560		**106**	110.2	**107**	**100**	110	
Ta	mg kg^{-1}									0.1		**1**		
Tb	mg kg^{-1}			**0.34**		**0.36**				0.3				
Te	mg kg^{-1}							5.3						
Th	mg kg^{-1}									0.1			3.8	
Tl	mg kg^{-1}							0.18						
Tm	mg kg^{-1}			**0.23**		**0.235**				0.2				
U	mg kg^{-1}		**0.8**											
V	mg kg^{-1}	300	**272**	**331**	344.9		264.770	90	**296**	316.3	283	**279**	250	
W	mg kg^{-1}		**25.5**	2.25						0.7		**5**		
Y	mg kg^{-1}		**13.7**	**14.3**		**12.965**	12.93		**15**	15.5	**14**	**13**		
Yb	mg kg^{-1}			**1.61**		**1.593**				1.6				
Zn	mg kg^{-1}	300	**64.5**	**69.4**	65.6		65.5	38	**73**	73.5	**63**	**60**	62	
Zr	mg kg^{-1}		**13.4**	**13**			10.17		**44**	14.5	**19**	**17**	14	

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

Table 1 - GeoPT54 Contributed data for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code		T124	T125	-	-	-	-	-	-	-	-	-	-	-
SiO2	$g\ 100g^{-1}$	46.79	44.21											
TiO2	$g\ 100g^{-1}$	0.87	0.74											
Al2O3	$g\ 100g^{-1}$	18.04	17.33											
Fe2O3T	$g\ 100g^{-1}$	11.68	10.43											
Fe(II)O	$g\ 100g^{-1}$													
MnO	$g\ 100g^{-1}$	0.16	0.142											
MgO	$g\ 100g^{-1}$	6.97	5											
CaO	$g\ 100g^{-1}$	12.55	12.57											
Na2O	$g\ 100g^{-1}$	2.05	2.1											
K2O	$g\ 100g^{-1}$	0.01												
P2O5	$g\ 100g^{-1}$	0.03	0.036											
H2O+	$g\ 100g^{-1}$													
CO2	$g\ 100g^{-1}$													
LOI	$g\ 100g^{-1}$													
Ag	$mg\ kg^{-1}$													
As	$mg\ kg^{-1}$		3.98											
Au	$mg\ kg^{-1}$													
B	$mg\ kg^{-1}$													
Ba	$mg\ kg^{-1}$	2	94.02											
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	$mg\ kg^{-1}$		18.97											
Co	$mg\ kg^{-1}$	51												
Cr	$mg\ kg^{-1}$	470	**417.290**											
Cs	$mg\ kg^{-1}$													
Cu	$mg\ kg^{-1}$	106	59.46											
Dy	$mg\ kg^{-1}$													
Er	$mg\ kg^{-1}$													
Eu	$mg\ kg^{-1}$													
F	$mg\ kg^{-1}$													
Ga	$mg\ kg^{-1}$	16	16.7											
Gd	$mg\ kg^{-1}$													
Ge	$mg\ kg^{-1}$		1.61											
Hf	$mg\ kg^{-1}$		5.63											
Hg	$mg\ kg^{-1}$													
Ho	$mg\ kg^{-1}$													
I	$mg\ kg^{-1}$		5.29											
In	$mg\ kg^{-1}$													
Ir	$mg\ kg^{-1}$													
La	$mg\ kg^{-1}$													
Li	$mg\ kg^{-1}$													
Lu	$mg\ kg^{-1}$													
Mo	$mg\ kg^{-1}$													
Nb	$mg\ kg^{-1}$	3	1.41											
Nd	$mg\ kg^{-1}$		13.92											
Ni	$mg\ kg^{-1}$	210	170.460											
Os	$mg\ kg^{-1}$													
Pb	$mg\ kg^{-1}$	4	1.59											
Pd	$mg\ kg^{-1}$													
Pr	$mg\ kg^{-1}$		7.81											
Pt	$mg\ kg^{-1}$													
Rb	$mg\ kg^{-1}$	1	1.28											
Re	$mg\ kg^{-1}$													
Rh	$mg\ kg^{-1}$													
Ru	$mg\ kg^{-1}$													
S	$mg\ kg^{-1}$		5.69											
Sb	$mg\ kg^{-1}$													
Sc	$mg\ kg^{-1}$	45												
Se	$mg\ kg^{-1}$													
Sm	$mg\ kg^{-1}$													
Sn	$mg\ kg^{-1}$													
Sr	$mg\ kg^{-1}$	95	78.63											
Ta	$mg\ kg^{-1}$		1.32											
Tb	$mg\ kg^{-1}$													
Te	$mg\ kg^{-1}$													
Th	$mg\ kg^{-1}$	1	2.81											
Tl	$mg\ kg^{-1}$													
Tm	$mg\ kg^{-1}$													
U	$mg\ kg^{-1}$		0.34											
V	$mg\ kg^{-1}$	274	180.180											
W	$mg\ kg^{-1}$													
Y	$mg\ kg^{-1}$	17	11.61											
Yb	$mg\ kg^{-1}$													
Zn	$mg\ kg^{-1}$	66	50.02											
Zr	$mg\ kg^{-1}$	13	9.34											

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

Table 2 - GeoPT54 Consensus values and statistical summary for Tholeiitic Basalt, BNA-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	47.14	0.07285	0.528	0.138	82	47.09	0.6429	47.14	Assigned	Median
TiO2	0.8993	0.002705	0.01828	0.148	86	0.8939	0.02964	0.8993	Assigned	Median
Al2O3	15.35	0.03459	0.2036	0.1699	84	15.35	0.317	15.38	Assigned	Robust Mean
Fe2O3T	11.24	0.02688	0.1562	0.172	85	11.24	0.2478	11.25	Assigned	Robust Mean
Fe(II)O	8.065	0.06699	0.1178	0.5686	10	8.075	0.1779	8.065	Provisional	Median
MnO	0.17	0.0006082	0.004439	0.137	84	0.1692	0.007308	0.17	Assigned	Median
MgO	10.68	0.03544	0.1495	0.237	84	10.58	0.3571	10.68	Assigned	Median
CaO	12.9	0.02985	0.1755	0.1701	84	12.86	0.26	12.9	Assigned	Median
Na2O	1.727	0.01395	0.03181	0.4387	82	1.742	0.1214	1.727	Assigned	Median
LOI	-0.42	0.02976	0.009572	3.109	50	-0.3022	0.2974	-0.42	Provisional	Median
	mg kg $^{-1}$	mg kg $^{-1}$	mg kg $^{-1}$			mg kg $^{-1}$	mg kg $^{-1}$	mg kg $^{-1}$		
Ag	0.0305	0.00225	0.004125	0.5455	15	0.04769	0.02836	0.04	Provisional	Mode
Ba	6.063	0.205	0.3697	0.5544	57	8.424	4.606	6.75	Assigned	Mode
Be	0.0855	0.0045	0.009902	0.4545	25	0.1006	0.04206	0.09	Assigned	Mode
Cd	0.09899	0.011	0.01121	0.9809	26	0.1189	0.0652	0.102	Provisional	Mode
Ce	1.761	0.0405	0.1294	0.3131	49	1.988	0.4418	1.83	Assigned	Mode
Co	55.6	0.5859	2.429	0.2412	68	55.06	4.733	55.6	Assigned	Median
Cr	533.9	14.7	16.59	0.8858	75	513.4	59.33	522	Provisional	Mode
Cu	111.8	1.08	4.399	0.2455	74	112.9	10.21	111.8	Assigned	Median
Dy	2.401	0.02243	0.1683	0.1333	47	2.401	0.1538	2.407	Assigned	Robust Mean
Er	1.616	0.02079	0.1202	0.1729	48	1.643	0.1493	1.616	Assigned	Median
Eu	0.49	0.00515	0.04363	0.118	47	0.4881	0.03055	0.49	Assigned	Median
Ga	15.12	0.1575	0.8036	0.196	57	15.18	1.13	15.12	Assigned	Median
Gd	1.731	0.02466	0.1275	0.1935	47	1.74	0.1391	1.731	Assigned	Median
Ge	1.343	0.06471	0.1028	0.6297	24	1.578	0.777	1.4	Provisional	Mode
Hf	0.56	0.01133	0.04887	0.2319	43	0.5805	0.08147	0.56	Assigned	Median
Ho	0.54	0.005479	0.04739	0.1156	46	0.5425	0.03703	0.54	Assigned	Median
In	0.05127	0.0007866	0.006413	0.1227	9	0.05094	0.002525	0.05127	Provisional	Median
La	0.563	0.00679	0.0491	0.1383	50	0.7715	0.3941	0.58	Assigned	Mode
Li	2.962	0.121	0.2012	0.6014	32	3.084	0.4378	3.06	Assigned	Mode
Lu	0.2345	0.002499	0.02333	0.1071	46	0.2345	0.01695	0.2318	Assigned	Robust Mean
Mo	0.1496	0.0148	0.01593	0.9293	25	0.4515	0.4183	0.26	Provisional	Mode
Nb	0.52	0.033	0.04589	0.7191	44	0.7098	0.3328	0.59	Provisional	Mode
Nd	2.225	0.0412	0.1578	0.2611	51	2.346	0.2968	2.263	Assigned	Mode
Ni	223.3	4.41	7.914	0.5572	74	218.2	18.86	221	Assigned	Mode
Pb	0.12	0.015	0.01321	1.136	36	0.9383	1.283	0.1675	Provisional	Mode
Pr	0.35	0.008999	0.03279	0.2745	45	0.3651	0.04457	0.3571	Assigned	Mode
Rb	0.1929	0.0154	0.01976	0.7791	42	0.7893	0.9088	0.2876	Provisional	Mode
Sc	42.14	0.413	1.919	0.2152	62	39.74	5.065	41.1	Assigned	Mode
Sm	1.041	0.01226	0.08275	0.1482	49	1.041	0.08584	1.04	Assigned	Robust Mean
Sn	0.3	0.02239	0.02876	0.7786	23	0.3444	0.1249	0.3	Provisional	Median
Sr	106.1	0.6763	4.206	0.1608	78	106.1	5.972	106	Assigned	Robust Mean
Ta	0.03755	0.00141	0.004922	0.2865	31	0.09111	0.08276	0.042	Assigned	Mode
Tb	0.34	0.005479	0.03199	0.1713	46	0.343	0.03222	0.34	Assigned	Median
Th	0.025	0.00375	0.003484	1.076	37	0.07938	0.0816	0.036	Provisional	Mode
Tm	0.24	0.002801	0.0238	0.1177	44	0.2409	0.02072	0.24	Assigned	Median
U	0.008	0.00147	0.001323	1.111	28	0.07725	0.1121	0.0165	Provisional	Mode
V	300.1	3.128	10.17	0.3075	77	300.1	27.45	300.1	Assigned	Robust Mean
W	0.229	0.0133	0.02287	0.5817	25	0.9076	1.015	0.261	Provisional	Mode
Y	14.2	0.1363	0.7616	0.179	68	14.34	1.043	14.2	Assigned	Median
Yb	1.557	0.01532	0.1165	0.1315	49	1.557	0.1072	1.54	Assigned	Robust Mean
Zn	68.58	0.7394	2.903	0.2547	76	68.58	6.446	68.12	Assigned	Robust Mean
Zr	13.8	0.301	0.7436	0.4048	64	15.05	3.857	14.16	Assigned	Mode

Table 3 - GeoPT54 Z-scores for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code	T2	T6	T7	T9	T10	T11	T12	T13	T14	T16	T17	T18	T20
SiO2	**0.29**	**1.13**	*	*	-0.23	**-1.09**	-0.10	**-2.74**	**0.73**	-2.88	*	*	0.10
TiO2	**0.26**	**0.04**	**-1.89**	*	2.43	**0.40**	0.21	**2.77**	**-2.15**	0.54	-5.45	*	-0.12
Al2O3	**0.28**	**3.13**	**-3.06**	*	1.10	**0.33**	-0.06	**-1.69**	**0.47**	*	-12.41	*	-0.21
Fe2O3T	**-0.53**	**-0.85**	**-2.01**	*	0.18	**-0.53**	0.24	**3.50**	**-0.03**	-2.38	-4.24	*	0.37
Fe(II)O	***-1.99***	*	*	*	*	*	*	*	*	*	*	*	*
MnO	**-1.13**	**0.00**	**-1.42**	*	-1.69	**1.89**	1.13	**0.00**	**1.58**	-3.60	-4.51	*	0.11
MgO	**0.01**	**0.54**	**-3.54**	*	-0.60	**-5.34**	0.14	**-3.67**	**1.67**	*	-13.94	*	0.44
CaO	**-0.10**	**-0.84**	*	*	-0.85	**1.61**	0.06	**5.37**	**0.65**	-2.27	-6.83	*	0.32
Na2O	**0.42**	**-3.98**	**-3.76**	*	0.06	**3.73**	-1.05	**-2.41**	**1.49**	*	-10.95	*	-0.24
LOI	*	***65.82***	*	*	*	*	*	***31.34***	***-19.43***	*	*	*	*-3.66*
Ag	***7.44***	*	*	***-0.12***	*105.40*	***2.57***	*	*	*	*	*	*	*
Ba	**6.06**	*	**-0.38**	**19.30**	9.38	**-1.43**	0.86	**2.07**	*	*	1.71	**1.32**	*
Be	**3.97**	*	**-0.04**	**0.45**	*	**-0.86**	2.70	**-4.60**	*	*	3.76	**-0.56**	*
Cd	***8.01***	*	***-0.28***	***0.09***	*	***-0.31***	*	*	*	*	*11.19*	***-7.04***	*
Ce	**0.87**	*	**-0.68**	**4.48**	25.66	**0.20**	3.09	*	*	*	-0.66	**0.84**	210.43
Co	**6.12**	*	**-0.86**	**1.19**	-0.12	**-0.60**	-0.43	*	**-1.07**	*	0.19	**1.18**	-0.63
Cr	***14.67***	***0.97***	***-1.66***	***-1.98***	*1.39*	***0.88***	*0.52*	***-10.78***	***1.88***	*	*0.49*	***-0.51***	*-1.85*
Cu	**5.90**	*	**-0.03**	**2.76**	17.98	**0.26**	-0.10	**-5.51**	**-0.88**	0.13	2.40	**2.69**	-0.32
Dy	**-1.36**	*	**-0.35**	**0.89**	0.59	**1.01**	0.35	**-1.85**	*	*	-0.36	**1.13**	*
Er	**-1.59**	*	**-0.42**	**0.28**	1.18	**0.66**	0.60	**12.51**	*	*	-0.81	**0.70**	*
Eu	**-0.80**	*	**-0.22**	**0.46**	*	**0.25**	0.36	**-2.29**	*	*	0.00	**0.23**	*
Ga	**4.63**	*	*	**-0.40**	-0.07	**0.10**	-0.39	**-3.37**	**1.10**	*	*	**-1.87**	-0.88
Gd	**-0.91**	*	**-0.22**	**1.09**	0.27	**0.64**	0.98	*	*	*	-0.16	**-0.01**	*
Ge	***93.59***	*	*	***23.04***	*	***0.00***	*1.83*	*	*	*	*-0.74*	***-9.18***	*
Hf	**-1.09**	*	**-0.46**	**0.82**	*	**0.30**	15.96	**14.53**	*	*	-0.20	**-1.64**	*
Ho	**-1.23**	*	**-0.28**	**0.42**	*	**0.69**	0.16	*	*	*	-0.74	**0.84**	*
In	*	*	***0.00***	*	*	***-0.48***	*	*	*	*	*	*	*
La	**0.84**	*	**-0.69**	**6.05**	*	**0.90**	12.60	**6.86**	*	*	-1.35	**0.35**	*
Li	**10.08**	*	**-0.32**	**2.38**	4.32	**0.81**	*	**1.78**	*	*	-3.34	**0.79**	*
Lu	**-1.43**	*	**-0.22**	**0.23**	*	**1.04**	0.18	*	*	*	-1.17	**0.66**	*
Mo	***45.55***	*	***0.65***	***33.93***	*120.88*	*	*	*	*	*	*0.64*	***43.98***	*
Nb	***1.99***	*	***-0.51***	***6.75***	*	***-0.01***	*0.42*	***12.64***	***97.62***	*	*0.98*	***5.01***	*
Nd	**-0.20**	*	**-0.57**	**2.44**	0.24	**0.20**	2.68	**-8.90**	*	*	0.14	**0.79**	*
Ni	**9.22**	*	**0.04**	**0.72**	-0.84	**0.45**	0.49	**-8.09**	**-2.44**	*	0.74	**3.95**	-0.22
Pb	***31.93***	*	***-1.60***	***143.88***	*	***1.61***	*	*	*	*	*0.76*	***0.00***	*
Pr	**-0.32**	*	**-0.43**	**3.05**	*	**0.30**	2.49	*	*	*	0.46	**0.61**	*
Rb	***18.67***	*	***0.68***	***21.61***	*	***0.19***	*5.54*	*	***395.00***	*	*22.19*	***-0.65***	*
Sc	**-2.17**	*	**-1.50**	**-0.28**	0.48	**1.32**	1.29	**-3.06**	**-2.68**	*	-4.13	**1.68**	*
Sm	**-1.32**	*	**-0.77**	**0.96**	0.96	**0.56**	0.72	**23.68**	*	*	-0.55	**0.59**	*
Sn	***364.72***	*	***-2.01***	***1.39***	*	*	*5.22*	*	*	*	*2.09*	***2.78***	*
Sr	**5.06**	*	**-0.41**	**0.69**	-0.73	**-0.24**	0.70	**-0.12**	**-0.50**	0.34	-2.20	**1.30**	-0.01
Ta	**14.84**	*	**-0.34**	**276.81**	*	**-1.23**	1.77	*	*	*	38.85	**29.35**	*
Tb	**-0.98**	*	**-0.17**	**0.00**	*	**0.87**	0.28	**16.57**	*	*	-0.47	**0.63**	*
Th	***28.25***	*	***-0.31***	***21.53***	*	***1.03***	*21.96*	***1060.63***	*	*	*3.59*	*	*
Tm	**-1.39**	*	**-0.17**	**0.42**	*	**1.00**	0.08	*	*	*	-0.63	**0.84**	*
U	***41.51***	*	*	***46.85***	*	***0.45***	*22.67*	***7029.13***	*	*	*8.31*	***-2.27***	*
V	**14.02**	**-0.01**	**-0.92**	**1.95**	11.30	**0.77**	0.14	**0.68**	**-0.99**	*	0.14	**2.59**	-0.89
W	***68.79***	*	***-0.47***	***56.90***	*	*	*	***129.06***	*	*	*-0.63*	***-3.45***	*
Y	**-0.53**	*	**0.24**	**-0.12**	-0.13	**2.11**	0.33	*	**-0.26**	*	-1.18	**2.30**	0.00
Yb	**-1.62**	*	**-0.25**	**0.45**	1.04	**0.99**	0.36	**2.51**	*	*	-0.98	**0.97**	*
Zn	**-0.54**	*	**-0.15**	**6.10**	*	**0.35**	1.93	**-2.14**	**-0.54**	-0.86	-2.82	**0.76**	-0.50
Zr	**1.29**	*	**-0.44**	**-0.40**	*	**1.16**	1.34	**2.86**	**4.30**	-0.54	0.28	**1.48**	37.52

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

Table 3 - GeoPT54 Z-scores for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30	T31	T32	T33
SiO2	0.03	2.30	0.62	0.05	0.19	-5.12	-3.30	-0.42	*	**0.86**	1.00	**0.73**	-0.37
TiO2	-0.25	1.06	-0.04	-0.25	-0.53	-2.72	-2.44	-0.91	*	**-0.34**	0.26	**0.04**	-1.60
Al2O3	-0.89	1.29	-0.62	-0.38	0.21	8.88	-1.60	1.10	*	**-0.75**	1.06	**0.77**	-1.79
Fe2O3T	0.69	1.14	-0.46	-0.94	0.12	-2.67	4.05	-0.46	*	**0.36**	0.32	**0.49**	0.23
Fe(II)O	*	*	*	*	*	*	*	*	*	*	*	*	*
MnO	1.13	0.74	0.23	-1.13	0.00	-2.14	-2.37	0.11	*	**0.23**	0.23	**0.00**	0.00
MgO	-0.60	0.93	-0.77	1.07	0.00	-16.45	-3.08	1.41	*	**-1.06**	1.39	**0.54**	-0.93
CaO	0.63	2.91	-1.13	0.01	-0.65	-0.53	2.12	0.01	*	**0.47**	0.95	**0.70**	-0.55
Na2O	-0.26	-0.10	-0.26	2.41	2.26	9.96	-0.40	-5.13	*	**-0.17**	0.02	**-2.09**	-11.21
LOI	*3.66*	*0.00*	*	*	*	*-4.60*	*	*	*	***-10.45***	*5.22*	*1.04*	*
Ag	*	*	*	*	*	*	*	*	*	*	*	*	*
Ba	*	-2.10	*	*	*	*	*	*	*	**-0.30**	*	**0.00**	45.81
Be	*	*	*	*	*	*	*	*	*	**-1.87**	*	*	*
Cd	*	*	*	*	*	*	*	*	*	***-3.21***	*	*	*
Ce	*	0.54	*	*	*	*	*	*	**19.24**	**-0.21**	*	**-0.29**	*
Co	*	0.07	0.08	*	0.08	*	*	*	*	**-0.26**	*	**0.02**	-3.54
Cr	*	*1.12*	*0.09*	*	*	*	*	*	*	***0.24***	*	***-3.42***	*-1.56*
Cu	*	-3.61	-0.44	*	3.09	*	*	*	*	**-1.50**	*	**0.19**	2.08
Dy	*	0.50	*	*	*	*	*	*	**0.44**	**-0.23**	*	**-0.12**	*
Er	*	0.39	*	*	*	*	*	*	**19.33**	**-0.27**	*	**-0.23**	*
Eu	*	0.11	*	*	*	*	*	*	**-0.23**	**-0.21**	*	**-0.09**	*
Ga	*	-1.23	*	*	*	*	*	*	*	**-0.80**	*	**1.07**	-6.37
Gd	*	0.39	*	*	*	*	*	*	**-6.56**	**0.00**	*	**-0.25**	*
Ge	*	*	*	*	*	*	*	*	*	*	*	*	*
Hf	*	0.20	*	*	*	*	*	*	*	**-0.18**	*	**-0.63**	*
Ho	*	0.32	*	*	*	*	*	*	**-0.74**	**0.06**	*	**-0.36**	*
In	*	*	*	*	*	*	*	*	*	*	*	*	*
La	*	*	*	*	*	*	*	*	**20.82**	**-0.29**	*	**-0.26**	*
Li	*	*	*	*	*	*	*	*	*	**-0.39**	*	**-0.54**	*
Lu	*	0.33	*	*	*	*	*	*	**0.66**	**-0.19**	*	**-0.28**	*
Mo	*	*	*	*	*	*	*	*	*	***-0.98***	*	*	*
Nb	*	*	*	*	*	*	*	*	*	***0.09***	*	***-0.83***	*54.04*
Nd	*	0.33	*	*	*	*	*	*	**5.17**	**-0.22**	*	**-0.36**	*
Ni	*	-0.03	0.23	*	-1.47	-2.67	*	*	*	**-0.99**	*	**0.59**	-1.56
Pb	*	*	*	*	*	*	*	*	*	***-1.36***	*	*	*
Pr	*	*	*	*	*	*	*	*	**8.85**	**0.00**	*	**-0.40**	*
Rb	*	*	*	*	*	*	*	*	*	***-1.01***	*	***-0.70***	*597.38*
Sc	*	0.25	*	*	-1.34	*	*	*	*	**-0.69**	*	**-0.48**	*
Sm	*	0.18	*	*	*	*	*	*	**1.26**	**-0.25**	*	**-0.23**	*
Sn	*	*	*	*	*	*	*	*	*	***-0.87***	*	*	*
Sr	*	0.14	*	*	-0.61	0.10	*	*	*	**-0.31**	*	**-1.34**	6.15
Ta	*	*	*	*	*	*	*	*	*	**0.90**	*	**-1.53**	*
Tb	*	0.31	*	*	*	*	*	*	**1.09**	**-0.03**	*	**-0.53**	*
Th	*	*	*	*	*1288.11*	*	*	*	*	***0.00***	*	***-0.86***	*
Tm	*	0.21	*	*	*	*	*	*	**11.14**	**-0.04**	*	**-0.84**	*
U	*	*	*	*	*	*	*	*	*	***0.00***	*	***-1.51***	*
V	*	0.43	-0.10	*	-1.68	2.75	*	*	*	**-0.16**	*	**-1.97**	-7.48
W	*	*	*	*	*	*	*	*	*	***1.01***	*	*	*
Y	*	0.79	-0.13	*	-0.13	*	*	*	**-0.58**	**-0.91**	*	**-0.62**	3.68
Yb	*	0.61	*	*	*	*	*	*	**-0.62**	**-0.16**	*	**-0.22**	*
Zn	*	-0.36	1.11	*	-2.34	2.31	*	*	*	**-0.47**	*	**-1.47**	-0.54
Zr	*	-0.49	*	*	-0.54	*	*	*	*	**2.17**	*	**-2.10**	23.13

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

Table 3 - GeoPT54 Z-scores for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code	T34	T37	T39	T40	T42	T43	T46	T47	T49	T52	T53	T55	T56
SiO2	0.34	0.32	0.10	0.16	1.65	-2.14	-0.26	-0.22	0.54	*	-1.83	-0.35	-1.34
TiO2	0.07	0.02	-0.17	0.48	0.27	-0.25	-0.01	3.76	0.19	*	-1.40	0.09	-1.77
Al2O3	0.48	0.11	-0.16	-0.85	0.12	-0.65	-0.25	0.97	-0.14	*	5.63	-0.07	-0.95
Fe2O3T	0.08	0.63	-0.20	0.97	0.69	1.84	0.69	0.87	0.54	*	-2.35	0.62	-1.88
Fe(II)O	*	*	*	*	*	*	-0.70	*	0.30	*	*	*	*
MnO	-2.25	0.00	0.11	0.25	0.34	1.80	-0.11	-1.22	-0.50	*	-1.01	0.68	-1.13
MgO	-0.16	0.77	1.05	-0.01	-2.15	4.23	-0.83	0.01	1.19	*	-0.53	0.54	-1.13
CaO	-0.50	0.24	-0.00	0.71	-0.74	-0.23	0.24	0.24	-0.38	*	-0.17	0.70	-0.84
Na2O	-0.26	-1.67	0.31	1.05	-2.63	2.82	0.37	-5.86	-0.20	*	1.75	-3.03	-1.15
LOI	*	*	-5.07	-2.09	*	31.40	*	-1.04	-13.22	*	-13.58	*	*
Ag	*	*	*	-0.36	4.42	*	*	*	*	*	*	*	*
Ba	*	*	*	7.13	6.47	8.38	*	1.86	-1.36	0.60	*	*	-0.12
Be	*	11.34	*	*	*	*	*	*	0.71	0.43	*	*	*
Cd	*	*	*	-7.04	*	*	*	*	*	*	*	*	-3.83
Ce	*	0.92	*	2.04	-0.23	*	*	-1.86	-0.86	0.58	*	-1.55	-0.39
Co	0.70	-0.12	-1.56	*	0.13	-0.91	-0.54	186.74	0.23	0.00	*	0.58	-0.53
Cr	-0.36	0.15	-0.15	11.77	-0.12	-1.55	-1.98	*	-0.74	-0.51	0.97	1.51	1.40
Cu	-1.01	-0.32	0.13	0.17	2.60	-0.43	1.04	*	0.38	-0.10	-1.57	0.94	-0.74
Dy	*	0.30	*	4.57	-0.44	*	*	-0.62	0.41	-0.00	*	-0.60	-0.30
Er	*	-0.07	*	3.02	-0.71	*	0.10	-0.47	-0.22	-0.23	*	-1.21	-0.63
Eu	*	0.00	*	4.49	-0.56	*	0.00	-0.63	0.23	-0.46	*	-0.46	-0.21
Ga	-0.50	0.30	-0.07	-0.61	0.19	-0.62	-0.39	*	0.00	0.24	*	1.10	-0.76
Gd	*	0.27	*	0.16	-0.38	*	-0.12	-1.11	0.23	-0.59	*	-3.22	-0.71
Ge	0.23	*	8.06	2.31	*	*	*	*	*	0.33	*	*	*
Hf	*	0.10	*	-1.23	-0.56	*	*	-1.23	0.00	-0.20	*	-0.41	8.04
Ho	*	0.11	*	2.03	-0.68	*	0.00	-0.51	0.21	-0.11	*	-0.63	-0.42
In	*	*	*	*	*	*	*	*	*	*	*	*	*
La	301.31	2.92	*	-0.47	-0.45	25.48	*	-1.06	-0.26	0.38	*	-1.69	-0.24
Li	*	0.34	*	*	*	*	*	*	-0.81	0.52	*	0.39	0.59
Lu	*	0.33	*	3.66	-0.76	*	0.12	-0.17	-0.19	-0.10	*	-0.62	-0.32
Mo	*	*	*	8.25	8.87	*	*	*	-0.60	*	*	*	2.35
Nb	*	*	*	7.06	1.25	*	*	-3.49	-0.87	0.44	*	-2.18	-0.68
Nd	*	0.24	*	4.94	-0.50	*	*	-0.75	-0.10	-0.08	*	-1.17	-0.03
Ni	0.30	0.61	-0.34	-1.71	0.27	1.12	-0.71	-1.95	0.25	-0.34	-1.22	1.22	1.21
Pb	*	*	*	9.09	16.92	*	*	*	-0.19	1.14	*	*	4.92
Pr	*	0.15	*	-0.15	-0.47	*	*	-0.99	0.31	0.00	*	-0.92	-0.27
Rb	*	*	*	2.38	*	*	*	-1.66	1.37	0.69	*	-7.74	-2.02
Sc	-0.08	-2.38	*	4.16	0.24	0.36	-0.22	-1.11	1.13	-2.04	*	-0.30	0.09
Sm	*	0.36	*	-0.71	-0.63	*	0.06	-0.64	-0.13	-0.07	*	-0.98	-0.49
Sn	*	*	*	9.74	*	*	*	*	0.00	*	*	*	*
Sr	0.10	0.46	-0.49	0.40	0.49	-0.16	-0.49	-2.15	-0.26	0.10	-1.08	-0.74	-0.36
Ta	*	*	*	484.66	-1.07	*	*	-2.35	-0.09	0.05	*	*	0.09
Tb	*	-0.63	*	5.41	-0.86	*	*	-0.03	0.31	-0.16	*	-0.63	-0.56
Th	*	*	*	7.18	-0.29	*	*	*	0.72	1.29	*	-1.44	1.72
Tm	*	0.42	*	1.05	-0.67	*	0.00	-0.80	0.00	0.00	*	-0.42	0.00
U	*	*	*	3.78	0.76	*	*	*	0.60	0.04	*	*	0.00
V	-0.15	0.04	-1.04	-0.73	0.00	-1.39	-1.09	0.68	-0.04	0.19	1.08	1.37	0.05
W	*	*	*	*	*	181.43	*	*	*	*	*	*	*
Y	1.84	-0.32	*	1.34	0.12	-0.21	-0.46	-1.18	-0.01	0.40	*	1.06	0.64
Yb	*	0.18	*	6.16	-0.72	*	0.23	-0.42	-0.15	-0.12	*	-1.01	-0.58
Zn	0.24	0.28	1.28	27.19	2.07	-0.86	-0.89	1.87	-0.14	-0.24	-2.51	0.49	0.18
Zr	-3.23	0.67	*	6.59	-0.78	-1.04	*	-13.88	-1.63	0.67	*	0.00	-2.93

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

Table 3 - GeoPT54 Z-scores for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code	T57	T58	T60	T61	T62	T63	T64	T66	T67	T68	T70	T71	T72
SiO2	0.30	-0.02	0.04	**-1.34**	**27.79**	-1.12	0.32	0.29	**-1.03**	-0.10	5.64	**-0.84**	**-0.09**
TiO2	1.11	0.84	0.01	**0.59**	**-45.05**	-2.17	0.29	-0.20	**-1.49**	0.57	73.61	**-0.51**	**-1.06**
Al2O3	0.16	-0.23	0.42	**-1.05**	**-12.30**	10.41	0.19	0.11	**-1.74**	-0.40	-7.75	**-0.26**	**-0.31**
Fe2O3T	0.18	-0.14	0.07	**-7.45**	**6.38**	-1.23	-0.04	0.12	**-1.81**	-0.20	12.02	**1.64**	**-0.47**
Fe(II)O	*	*	*-0.23*	*	*	*	*	*	*	*	*	*	***0.87***
MnO	-0.34	1.13	-0.86	**0.68**	**-22.30**	0.00	1.13	0.02	**-0.68**	-1.13	4.51	**0.00**	**0.00**
MgO	0.40	-0.53	0.62	**0.21**	**-68.94**	-11.77	0.14	0.43	**-2.53**	0.94	-23.57	**-0.53**	**-0.80**
CaO	-0.33	0.15	0.00	**0.07**	**-72.04**	-0.70	0.58	-0.03	**-1.69**	0.18	-16.26	**0.02**	**1.38**
Na2O	-0.57	1.31	1.09	**-4.61**	**3.88**	4.61	-0.89	-0.24	**-1.78**	1.94	13.10	**0.11**	**0.74**
LOI	*	*	*-4.13*	*103.43*	*	*	*-2.61*	*	*	*-0.52*	*82.01*	*	***-8.36***
Ag	*	*	*	*	***162.31***	*	*	*	*	*	*	***2.30***	*
Ba	*	*	-0.63	**63.93**	**1484.67**	*	-6.48	*	*	*	735.17	**2.53**	**0.91**
Be	*	*	-0.33	*	*	*	*	*	*	*	*	**-6.62**	**-0.56**
Cd	*	*84.76*	*0.71*	*	***0.09***	*	*	*	*	*	*	***9.01***	***-1.69***
Ce	*	35.71	0.27	**1.52**	**7.41**	*	0.03	*	*	*	*	**9.58**	**-0.70**
Co	*	-3.01	0.01	*	**4.69**	1.11	-1.63	*	*	*	-0.25	**0.16**	**-1.07**
Cr	*	*-1.14*	*0.15*	***-0.66***	***18.57***	*-0.87*	*0.55*	*1.09*	*	*-0.36*	*-15.81*	***-28.83***	***0.79***
Cu	*	0.36	-0.26	**2.08**	**25.27**	1.61	-2.02	*	*	-0.10	4.02	**0.03**	**-3.42**
Dy	*	*	0.02	**0.43**	**0.06**	0.03	-0.66	*	*	*	*	**-2.74**	**-1.61**
Er	*	*	0.45	**-0.05**	**-0.30**	-0.02	-0.77	*	*	*	*	**47.27**	**-1.96**
Eu	*	*	0.23	**0.34**	**0.00**	0.23	-0.80	*	*	*	*	**1.15**	**-1.03**
Ga	*	*	0.15	**-0.12**	**1.47**	1.17	-1.88	*	*	*	*	**2.09**	**-0.77**
Gd	*	*	0.49	**0.74**	**-0.48**	0.66	-0.47	*	*	*	*	**6.03**	**-2.44**
Ge	*	*	*	*	***9.80***	*-0.31*	*-0.11*	*	*	*	*	***-11.12***	***-1.49***
Hf	*	*	-0.05	**0.14**	**-0.20**	1.74	-0.82	*	*	*	*	**76.52**	**-1.43**
Ho	*	*	0.43	**0.34**	**-0.42**	-0.21	-0.53	*	*	*	*	**4.85**	**-0.95**
In	*	*	*0.14*	*	*	*-0.10*	*	*	*	*	*	*	***-0.20***
La	*	116.47	0.25	**2.20**	**24.99**	*	3.02	*	*	*	*	**76.11**	**-0.69**
Li	*	*	-0.40	*	*	*	*	*	*	*	14.26	**17.59**	**0.71**
Lu	*	*	0.09	**0.15**	**-0.19**	0.55	-0.74	*	*	*	*	**3.66**	**-0.92**
Mo	*	*	*-0.52*	***6.93***	***22.00***	*	*	*	*	*	*	***178.98***	*
Nb	*	*	*-0.34*	***1.74***	***899.49***	*27.02*	*-0.44*	*	*	*	*	*	***-2.61***
Nd	*	*	0.84	**0.68**	**2.00**	1.22	-0.97	*	*	*	*	**5.55**	**-1.36**
Ni	*	-3.12	0.25	**1.86**	**4.00**	1.12	-0.78	*	*	-0.40	-13.34	**1.10**	**-1.93**
Pb	*	*146.91*	*	***20.45***	***134.79***	*146.91*	*	*	*	*	*	***27.26***	*
Pr	*	*	0.34	**0.88**	**2.75**	0.92	-0.31	*	*	*	*	**35.08**	**-1.19**
Rb	*	*121.61*	*-1.09*	***6.94***	***90.92***	*	*	*	*	*	*	***0.36***	***-2.17***
Sc	*	-1.86	-0.23	**1.48**	**-7.21**	-1.60	-1.65	*	*	*	-3.87	**-2.42**	**0.96**
Sm	*	*	0.10	**0.38**	**0.72**	-0.00	-0.85	*	*	*	*	**-10.16**	**-1.35**
Sn	*	*	*-1.39*	*	***0.00***	*	*	*	*	*	*	***1.74***	*
Sr	*	-0.13	-0.93	**-1.29**	2.48	0.70	-1.92	-0.85	*	0.22	46.93	**2.11**	**-0.98**
Ta	*	*	-0.06	**20.82**	*	*	*	*	*	*	*	**12.69**	**0.50**
Tb	*	*	0.12	**0.63**	**0.00**	0.16	-0.63	*	*	*	*	**2.81**	**-1.53**
Th	*	*	*0.43*	*	***64.59***	*	*3.59*	*	*	*	*	***15.79***	***-1.44***
Tm	*	*	-0.10	**-0.04**	**-0.42**	0.21	-0.42	*	*	*	*	**2.52**	**-1.13**
U	*	*	*	*	*	*	*	*	*	*	*	***16.62***	*
V	*	-4.04	0.42	**0.84**	**12.47**	0.58	-0.99	1.03	*	-0.50	4.76	**3.33**	**-1.78**
W	*	*	*-0.22*	*	***0.48***	*	*2.65*	*	*	*	*	*	***28.91***
Y	*	0.53	-0.01	**1.06**	**0.53**	1.84	-1.24	*	*	-0.78	17.27	**-0.39**	**-1.57**
Yb	*	*	0.11	**-0.16**	**-0.41**	0.10	-0.76	*	*	*	*	**-2.21**	**-1.52**
Zn	*	-0.79	-0.38	**-1.23**	**5.55**	0.07	-0.62	1.11	*	-0.44	12.27	**6.35**	**0.56**
Zr	*	-2.56	0.47	**0.58**	**6.19**	5.51	-1.01	*	*	*	215.18	**344.55**	**-0.81**

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

Table 3 - GeoPT54 Z-scores for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code	T73	T75	T77	T78	T80	T82	T83	T85	T86	T87	T88	T90	T91
SiO2	0.15	0.00	**-0.01**	**0.60**	*	**1.42**	-1.20	-0.30	0.43	**0.79**	*	0.71	2.32
TiO2	-1.90	0.29	**0.31**	**-1.60**	*	**-0.32**	-0.45	0.16	-0.25	**0.26**	**0.04**	-0.80	1.56
Al2O3	1.86	0.21	**-0.02**	**0.08**	*	**1.15**	0.68	-0.20	0.65	**-0.02**	**-4.19**	0.26	-0.28
Fe2O3T	-2.54	0.21	**-0.28**	**-0.21**	*	**-0.43**	1.97	1.17	0.31	**0.43**	**-0.28**	0.31	-0.94
Fe(II)O	*	*	*	*	*	*	*	*	*	***-0.30***	*	*	*
MnO	-1.13	0.00	**0.45**	**0.00**	*	**-0.71**	0.23	3.72	1.13	**1.35**	**0.00**	0.00	*
MgO	-0.57	-0.13	**0.54**	**-2.53**	*	**0.88**	0.34	0.14	0.37	**3.14**	**-3.20**	0.57	-1.00
CaO	-1.67	0.15	**0.76**	**-3.86**	*	**0.04**	1.55	0.92	-0.33	**-0.20**	**0.59**	0.01	-0.56
Na2O	5.87	-0.10	**3.25**	**11.43**	*	**1.16**	-1.20	-0.26	0.53	**-16.30**	**-1.46**	0.06	1.67
LOI	*	*1.57*	***83.58***	***0.00***	*	***-5.12***	*8.36*	*-9.40*	*-2.09*	*	*	*0.00*	*-4.97*
Ag	*	*	*1.76*	***89.58***	*	*	*	*	*	*	*	*0.30*	*
Ba	*	1.27	**-0.44**	**448.26**	**2.53**	*	-1.44	10.73	2.21	**1.99**	**-0.66**	0.19	1.03
Be	*	0.23	**-0.45**	**22.67**	*	**1.71**	*	*	*	*	**0.66**	-0.78	*
Cd	*	*0.94*	*-0.40*	***4.55***	*	*	*	*	*	*	*	*0.22*	*
Ce	*	1.31	**-0.32**	**86.96**	**0.92**	**0.12**	-0.62	*	*	*	**-0.63**	-0.16	*
Co	-1.77	0.76	**4.90**	**-1.67**	*	**0.36**	-0.95	-0.54	*	**-3.22**	**1.32**	0.00	*
Cr	*-2.59*	*1.06*	***0.13***	***-13.01***	*	*	*-1.32*	*-1.23*	*-1.11*	***0.59***	***0.85***	*-5.03*	*
Cu	1.61	0.59	**-2.81**	**-4.90**	*	**0.51**	-0.21	0.13	-0.76	**2.71**	**0.03**	0.24	*
Dy	*	0.24	**-0.24**	**6.24**	**0.47**	**0.06**	-0.60	*	*	*	**0.35**	-0.36	*
Er	*	0.31	**-0.38**	**4.11**	**-0.63**	**0.09**	-0.48	*	*	*	**0.12**	-0.32	*
Eu	*	0.11	**-0.44**	**8.48**	**0.00**	**0.24**	-0.57	*	*	*	**0.00**	0.57	*
Ga	*	-0.22	**-1.57**	**1.07**	*	**0.05**	0.55	4.90	-1.88	*	**0.35**	0.24	*
Gd	*	0.11	**-1.03**	**8.93**	**0.38**	**0.15**	-0.91	*	*	*	**-0.01**	0.04	*
Ge	*	*0.76*	*	***-0.42***	*	*	*3.20*	*	*	*	*	*-6.24*	*
Hf	*	-0.61	**0.06**	**20.87**	**-0.20**	**-0.05**	-0.61	*	*	*	**0.20**	0.61	*
Ho	*	0.11	**-0.27**	**5.49**	**0.00**	**0.25**	-0.42	*	*	*	**0.21**	-0.11	*
In	*	*	*	*	*	*	*	*	*	*	*	*0.06*	*
La	*	0.07	**-0.20**	**95.46**	**1.36**	**0.10**	-0.64	*	60.46	*	**-0.06**	-0.64	*
Li	*	-0.40	**-2.00**	**31.35**	*	**-0.22**	*	*	*	*	**-0.46**	-0.90	*
Lu	*	-0.10	**0.02**	**10.52**	**0.23**	**0.22**	0.33	*	*	*	**0.23**	-0.31	*
Mo	*	*	*0.01*	***82.91***	*	*	*	*	*	*	***1.91***	*-0.30*	*
Nb	*	*1.42*	***0.68***	***79.32***	***1.31***	*	*	*27.02*	*35.74*	*	***0.00***	*-0.22*	*
Nd	*	-0.27	**-0.16**	**39.45**	**0.73**	**0.42**	-0.71	*	*	*	**0.22**	-0.40	*
Ni	-2.42	1.37	**-0.04**	**-9.73**	*	**0.06**	-0.21	-0.84	-1.52	**-2.46**	**1.98**	0.11	*
Pb	*	*	***-1.36***	***242.32***	***0.00***	***-0.18***	*	*336.22*	*249.13*	*	***-0.76***	*0.38*	*
Pr	*	0.76	**-0.18**	**41.18**	**0.92**	**-0.21**	-1.07	*	*	*	**0.00**	0.00	*
Rb	*	*	***-0.45***	***252.83***	***10.48***	***4.17***	*	*146.91*	*101.37*	*	***-0.65***	*2.71*	*
Sc	*	-0.27	**-0.13**	**-4.60**	**0.19**	**0.00**	-0.04	*	-2.25	**1.13**	**0.03**	-0.35	*
Sm	*	-0.43	**-0.01**	**16.43**	**0.23**	**0.24**	-0.25	*	*	*	**-0.13**	-0.97	*
Sn	*	*0.00*	*1.22*	***53.54***	*	*	*	*	*	*	***-2.09***	*-0.17*	*
Sr	-2.75	0.64	**0.21**	**13.52**	**-0.27**	**0.11**	-0.01	0.70	0.10	**1.83**	**0.92**	-0.31	-0.48
Ta	*	*	**28.13**	**73.64**	**0.50**	*	*	*	*	*	**0.09**	0.25	*
Tb	*	0.94	**-0.94**	**4.38**	**0.00**	**0.26**	-0.63	*	*	*	**0.00**	0.63	*
Th	*	*0.72*	***1.72***	***93.29***	***7.18***	*	*	*	*	*	***-0.29***	*3.59*	*
Tm	*	1.26	**-0.42**	**2.10**	**0.42**	*	-0.42	*	*	*	**0.00**	0.00	*
U	*	*	***0.00***	***258.43***	***9.07***	*	*	*	*677.07*	*	***1.51***	*15.87*	*
V	*	0.83	**-0.90**	**-5.37**	*	**-0.05**	0.54	-0.74	-1.66	**3.36**	**0.68**	1.52	*
W	*	*	*	***12.73***	*	*	*38.73*	*	*	*	***0.04***	*-0.17*	*
Y	*	-0.32	**-0.47**	**7.32**	**0.58**	**0.90**	-0.78	1.84	-0.06	*	**0.79**	-0.32	*
Yb	*	0.01	**-0.32**	**3.97**	**-0.32**	**0.28**	-0.25	*	*	*	**0.28**	0.31	*
Zn	1.11	0.24	**-1.75**	**2.92**	*	**0.31**	0.24	-0.62	-0.91	**1.52**	**0.08**	0.52	*
Zr	14.93	0.13	**0.00**	**56.75**	**0.27**	**1.45**	3.50	8.20	2.69	*	**-0.54**	0.13	*

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

Table 3 - GeoPT54 Z-scores for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code	T93	T94	T95	T96	T98	T100	T102	T103	T104	T105	T106	T107	T108
SiO2	**0.20**	**0.11**	-0.17	-0.26	*	0.71	-1.11	0.08	**0.31**	3.57	-0.08	**-0.56**	-0.08
TiO2	**1.02**	**-0.51**	0.10	0.21	*	-0.53	0.27	0.02	**-1.66**	73.53	0.29	**-0.29**	0.29
Al2O3	**0.28**	**0.07**	-0.79	0.85	*	0.26	-1.23	0.14	**1.01**	-4.89	0.16	**-1.20**	-0.57
Fe2O3T	**0.94**	**0.02**	0.24	0.02	*	-0.33	-0.09	-0.14	**-0.02**	13.71	0.05	**1.32**	-0.17
Fe(II)O	*	*	*	*	*	*-0.53*	*	*2.10*	*	*	*0.95*	*	*
MnO	**-2.25**	**-1.24**	0.56	-0.34	*	0.00	-0.11	0.45	**0.23**	24.10	0.00	**0.68**	*
MgO	**2.35**	**0.25**	0.40	0.64	*	-0.43	-1.39	-0.10	**0.07**	-20.88	0.57	**-0.19**	0.04
CaO	**1.21**	**-0.21**	-0.42	-0.70	*	-0.42	-0.06	0.46	**0.02**	-14.63	0.44	**-0.16**	1.09
Na2O	**-1.78**	**-0.02**	*	-1.36	*	3.04	-1.28	-0.10	**1.05**	13.89	1.00	**-3.51**	-0.26
LOI	***-45.97***	***-7.00***	*	*	*	*24.03*	*	*13.58*	***-8.25***	*	*	***-3.13***	*
Ag	*	*	*-0.06*	*	*-2.44*	*	*	*	*	*	*-0.42*	***0.12***	*
Ba	0.19	**-0.28**	-0.09	*	**-0.41**	20.20	*	1.40	**-0.78**	647.52	-0.36	**0.53**	*
Be	*	*	0.08	*	*	*	*	*	*	86.12	*	**0.66**	*
Cd	*267.56*	*	*0.00*	*	*	*	*	*0.94*	*	*1.83*	*0.36*	***-0.36***	*
Ce	*	**-0.05**	0.25	*	**0.34**	*	*	1.19	**-0.46**	163.64	0.54	**0.00**	*
Co	**-0.25**	**1.73**	-0.49	-1.98	**0.75**	-0.95	*	0.36	**-0.21**	-4.27	0.04	**-0.71**	*
Cr	***-3.37***	***1.63***	*-0.07*	*-1.95*	***1.39***	*-1.86*	*	*-5.43*	***-0.40***	*-15.77*	*3.02*	***-1.96***	*
Cu	**-0.19**	**-0.04**	-0.94	*	**0.69**	-0.10	*	0.05	**-0.60**	6.27	-0.44	**-1.67**	*
Dy	*	**0.34**	0.19	*	**-0.85**	*	*	-0.66	**-0.25**	4.36	0.50	**-0.08**	*
Er	*	**1.67**	0.58	*	**-0.36**	*	*	0.77	**-0.44**	1.41	0.43	**0.05**	*
Eu	*	**0.09**	0.34	*	**-0.84**	*	*	-1.95	**-0.39**	12.47	0.23	**0.09**	*
Ga	**1.10**	**0.80**	0.07	*	**-0.29**	*	*	0.36	**-0.71**	5.48	0.83	**1.21**	*
Gd	*	**3.00**	0.49	*	**-0.34**	*	*	0.27	**-0.28**	11.94	0.98	**-0.23**	*
Ge	*	*	*0.11*	*	*	*	*	*-0.70*	*	*41.98*	*	*	*
Hf	*	**-0.14**	*	*	**-0.00**	*	*	*	*	*	0.82	**0.80**	*
Ho	*	**0.25**	0.08	*	**-0.25**	*	*	0.95	**-0.17**	1.80	0.53	**-0.04**	*
In	*	*	*0.06*	*	*	*	*	*	*	*	*0.29*	*	*
La	*	**0.04**	0.14	*	**0.71**	*	*	-0.34	**-0.55**	186.15	0.02	**-0.12**	*
Li	*	**-2.17**	0.42	*	**0.18**	*	*	*	**-0.36**	8.78	0.59	**-1.76**	*
Lu	*	**-0.19**	-0.14	*	**0.01**	*	*	-0.48	**-0.32**	-0.14	0.76	**0.19**	*
Mo	*	***-0.79***	*	*	***0.00***	*	*	*	***50.95***	*71.78*	*	***-0.48***	*
Nb	*	***-0.52***	*-0.63*	*	***0.48***	*	*	*	***-0.68***	*	*2.94*	***3.31***	*
Nd	*	**-0.25**	0.45	*	**0.08**	*	*	-0.02	**-0.41**	68.86	0.55	**-0.33**	*
Ni	**-2.44**	*	-0.67	-1.22	**1.02**	-0.08	*	0.50	**-0.05**	-12.76	0.42	**-1.05**	*
Pb	*	***-1.67***	*0.04*	*	***1.67***	*	*	*	*	*188.02*	*0.00*	***-2.20***	*
Pr	*	**0.06**	0.12	*	**0.22**	*	*	0.52	**-0.34**	79.36	0.31	**-0.24**	*
Rb	*	***4.10***	*-0.10*	*	***4.00***	*	*	*	*	*819.60*	*	***-1.31***	*
Sc	**-2.16**	**2.12**	0.06	*	**0.49**	-1.60	*	*	**-0.75**	-7.08	0.38	**-0.54**	*
Sm	*	**0.58**	0.34	*	**-0.26**	*	*	-1.70	**-0.55**	24.62	0.18	**0.09**	*
Sn	*	***-4.80***	*-0.73*	*	*0.54*	*	*	*	*	*	*-0.52*	***-1.91***	*
Sr	**-1.22**	**0.76**	0.38	0.58	**0.23**	0.10	*	-0.74	**0.16**	41.41	1.47	**-0.17**	*
Ta	*	**-0.31**	*	*	**1.89**	*	*	*	**-0.11**	*	*	**2.33**	*
Tb	*	**0.53**	0.42	*	**-0.47**	*	*	-0.16	**-0.13**	5.24	-0.16	**0.03**	*
Th	*	***-0.86***	*-1.29*	*	***0.69***	*	*	*	***-0.86***	*285.75*	*	***3.16***	*
Tm	*	**-0.29**	0.50	*	**-0.03**	*	*	1.89	*	0.29	0.00	**-0.08**	*
U	*	***-2.12***	*	*	***-0.05***	*374.81*	*	*	*	*285.64*	*	***0.00***	*
V	**-2.86**	**2.81**	0.54	-3.69	**0.21**	-0.45	*	0.25	**-0.72**	6.82	2.50	**2.01**	*
W	*	***1.40***	*	*	***-0.45***	*	*	*	***0.00***	*	*0.44*	***0.52***	*
Y	**-0.26**	**0.33**	0.09	*	**1.15**	0.53	*	-0.63	**-0.02**	3.00	0.00	**0.07**	*
Yb	25.93	**-0.53**	0.58	*	**-0.44**	*	*	-0.46	**-0.46**	0.06	0.10	**-0.35**	*
Zn	**-0.54**	**1.57**	-0.96	-0.96	**-3.85**	0.24	*	0.54	*	17.42	-0.08	**-1.44**	*
Zr	**-3.77**	**0.39**	*	*	**-6.97**	23.00	*	-0.63	**-0.62**	*	1.48	**67.51**	*

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

Table 3 - GeoPT54 Z-scores for Tholeiitic Basalt, BNA-1. 17/01/2024

Lab Code	T109	T110	T111	T114	T115	T116	T117	T118	T119	T120	T121	T122	T123
SiO2	**-0.71**	**-0.16**	**-0.52**	-1.65	*	*	-0.45	**-1.16**	0.85	**0.56**	**0.27**	-13.40	**-0.92**
TiO2	**1.13**	**1.13**	**4.47**	0.84	*	-1.61	-1.08	**-1.99**	-0.25	**-0.51**	**0.04**	-7.37	**-6.53**
Al2O3	**1.36**	**0.18**	**-1.05**	0.61	*	*	-0.94	**-0.36**	0.53	**0.47**	**0.33**	-13.15	**14.52**
Fe2O3T	**-2.39**	**-1.11**	**0.49**	-0.14	*	*	1.14	**1.13**	-1.00	**-0.15**	**-0.34**	-0.78	**-5.02**
Fe(II)O	*	*	*	*	*	*	*	*	*	*	***0.64***	*	*
MnO	**0.00**	**0.00**	**0.90**	0.00	*	-0.99	1.13	**0.23**	-1.13	**0.00**	**-0.23**	-1.13	**0.00**
MgO	**2.28**	**0.47**	**-0.93**	0.07	*	*	0.27	**1.54**	-0.93	**-0.53**	**-4.47**	-30.02	**-28.61**
CaO	**-2.04**	**-3.12**	**-1.29**	0.29	*	*	-0.88	**2.41**	-3.01	**1.61**	**-0.04**	0.29	**4.97**
Na2O	**1.05**	**2.63**	**-1.46**	0.68	*	*	-2.62	**-0.58**	1.31	**1.05**	**11.11**	*	**51.04**
LOI	*	***-22.98***	***1.04***	*23.51*	*	*	*4.18*	***-20.90***	*22.46*	***148.36***	*	*	*
Ag	*	*	*	*	*	*	*	*	*	*	*	*	*
Ba	*	**32.01**	**-0.49**	2.62	*	*	*	**53.92**	-0.36	*	**-13.69**	235.22	*
Be	*	*	*	*	*	*	*	*	5.78	*	*	*	*
Cd	*	*	*	*	*	*-1.60*	*58.01*	*	*	*	*	*	*
Ce	*	**50.55**	**-0.24**	*	**-3.36**	*	*	**241.50**	1.70	*	*	*	*
Co	9.14	**1.07**	**0.25**	2.06	*	-0.51	-5.72	**2.22**	0.56	**0.16**	**-3.95**	23.55	*
Cr	*1.99*	***-5.02***	***-0.11***	*2.41*	*	*-2.09*	*-14.01*	***-1.68***	*0.90*	***-2.34***	***-2.22***	*-8.55*	***-32.17***
Cu	10.02	**-0.44**	**-0.42**	0.95	*	0.24	-3.51	**-1.10**	-0.60	**2.53**	**1.63**	-0.21	*
Dy	*	*	**-0.24**	*	**0.33**	*	*	*	-0.00	*	*	*	*
Er	*	*	**0.45**	*	**0.70**	*	*	*	-0.07	*	*	*	*
Eu	*	*	**0.00**	*	**-0.53**	*	*	*	0.11	*	*	*	*
Ga	*	**-0.77**	-0.70	*	*	-0.04	*	**4.83**	-0.01	*	**-0.15**	*	*
Gd	*	*	**0.62**	*	**-0.44**	*	*	*	-0.51	*	*	*	*
Ge	*	*	*2.81*	*	*	*	*	*	*	*	*	*	*
Hf	*	**25.37**	**0.20**	*	*	*	*	*	0.41	*	**49.92**	*	*
Ho	*	*	**-0.21**	*	**-0.30**	*	*	*	0.63	*	*	*	*
In	*	*	*	*	*	*-3.01*	*	*	*	*	*	*	*
La	*	**351.08**	**0.35**	*	**-5.83**	*	*	**90.37**	1.40	*	*	*	*
Li	*	*	*	*	*	*	*	*	*	*	*	*	*
Lu	*	*	**-0.19**	*	**-0.07**	*	*	*	-0.74	*	*	*	*
Mo	*	*	*	*	*	*	*	*	*4.72*	*	*	*	*
Nb	*	*	***-3.49***	*	*	*	*	*	*0.87*	*	***10.46***	*	*
Nd	*	**6.81**	**0.03**	*	**0.24**	*	*	**74.63**	0.55	*	**17.59**	*	*
Ni	4.85	**-4.41**	**0.09**	1.18	*	-0.78	-6.34	**1.60**	0.20	**-2.31**	**-3.32**	*	*
Pb	*	***528.56***	*	*	*	*	*0.76*	*	*25.75*	*	*	*	*
Pr	*	*	**-0.92**	*	**-5.34**	*	*	*	0.76	*	*	*	*
Rb	*	*	*	*15.50*	*	*	*	***293.81***	*20.42*	*	***192.62***	*	*
Sc	*	**-7.52**	-1.21	*	**-0.47**	-2.69	*	**-3.72**	*	-1.60	**-5.80**	51.54	*
Sm	*	**10.38**	**0.47**	*	**-0.51**	*	*	*	0.36	*	*	*	*
Sn	*	*	*	*	*	*	*	*	*3.48*	*	*	*	*
Sr	-0.73	**-0.57**	**-0.03**	1.59	*	-0.54	*	**-0.03**	0.49	**0.21**	**-1.45**	0.46	*
Ta	*	*	*	*	*	*	*	*	6.34	*	**195.55**	*	*
Tb	*	*	**0.00**	*	**0.63**	*	*	*	-0.63	*	*	*	*
Th	*	*	*	*	*	*	*	*	*10.76*	*	*	*541.80*	*
Tm	*	*	**-0.42**	*	**-0.21**	*	*	*	-0.84	*	*	*	*
U	*	***598.48***	*	*	*	*	*	*	*	*	*	*	*
V	-0.01	**-2.76**	**3.04**	2.20	*	-1.74	-10.33	**-0.40**	0.80	-0.84	**-2.08**	-2.46	*
W	*	***1105.20***	*44.19*	*	*	*	*	*	*10.30*	*	***208.66***	*	*
Y	*	**-0.65**	**0.14**	*	**-1.61**	-0.83	*	**1.06**	0.86	**-0.26**	**-1.57**	*	*
Yb	*	*	**0.45**	*	**0.31**	*	*	*	0.18	*	*	*	*
Zn	39.86	**-1.41**	**0.28**	-0.51	*	-0.53	-5.27	**1.52**	0.85	**-1.92**	**-2.96**	-1.13	*
Zr	*	**-0.54**	**-1.08**	*	*	-2.44	*	**40.61**	0.47	**6.99**	**4.30**	0.13	*

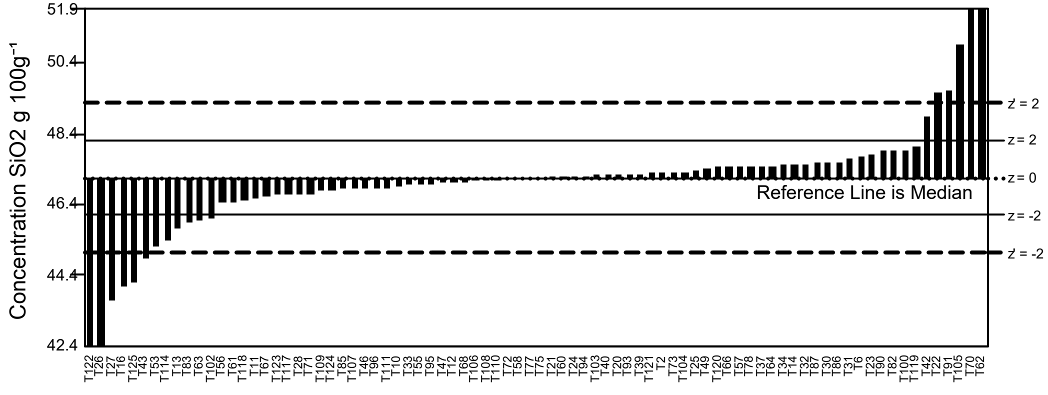
Bold entries are Data Quality 1 - Underlined entries are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

Table 3 - GeoPT54 Z-scores for Tholeiitic Basalt, BNA-1. 17/01/2024

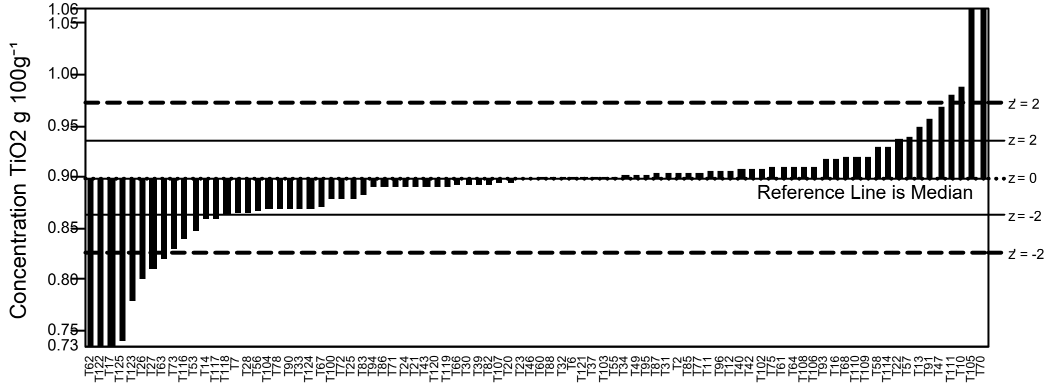
Lab Code	T124	T125
SiO2	-0.34	-2.78
TiO2	-0.80	-4.36
Al2O3	6.60	4.85
Fe2O3T	1.40	-2.60
Fe(II)O	*	*
MnO	-1.13	-3.15
MgO	-12.40	-18.99
CaO	-0.99	-0.93
Na2O	5.09	5.87
LOI	*	*
Ag	*	*
Ba	-5.49	118.95
Be	*	*
Cd	*	*
Ce	*	*
Co	-0.95	*
Cr	*-1.92*	***-7.03***
Cu	-0.66	-5.96
Dy	*	*
Er	*	*
Eu	*	*
Ga	0.55	0.98
Gd	*	*
Ge	*	*1.30*
Hf	*	51.87
Ho	*	*
In	*	*
La	*	*
Li	*	*
Lu	*	*
Mo	*	*
Nb	*27.02*	*9.70*
Nd	*	37.06
Ni	-0.84	-3.34
Pb	*146.91*	*55.66*
Pr	*	113.77
Rb	*20.42*	*27.50*
Sc	0.75	*
Sm	*	*
Sn	*	*
Sr	-1.32	-3.27
Ta	*	130.28
Tb	*	*
Th	*139.93*	*399.71*
Tm	*	*
U	*	*125.44*
V	-1.28	-5.89
W	*	*
Y	1.84	-1.70
Yb	*	*
Zn	-0.44	-3.20
Zr	-0.54	-3.00

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

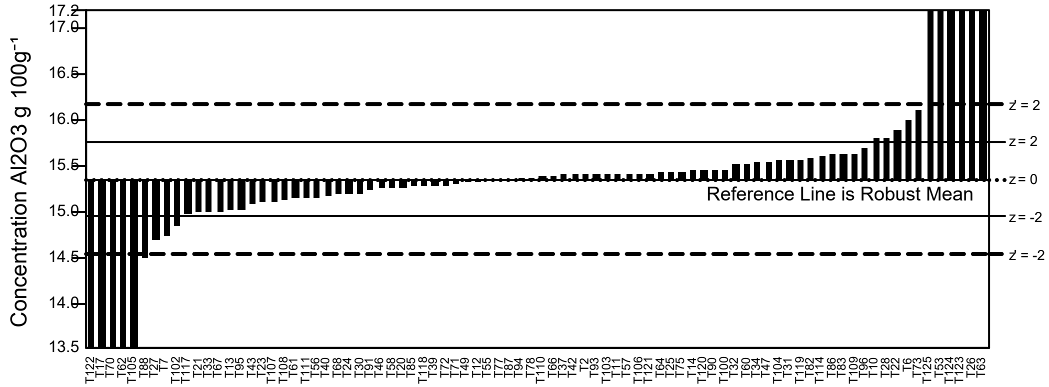
GeoPT54 - Barchart for SiO2



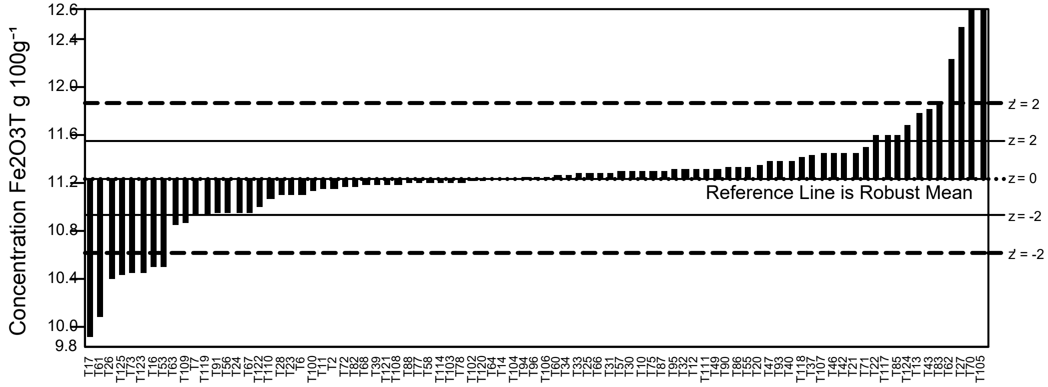
GeoPT54 - Barchart for TiO2



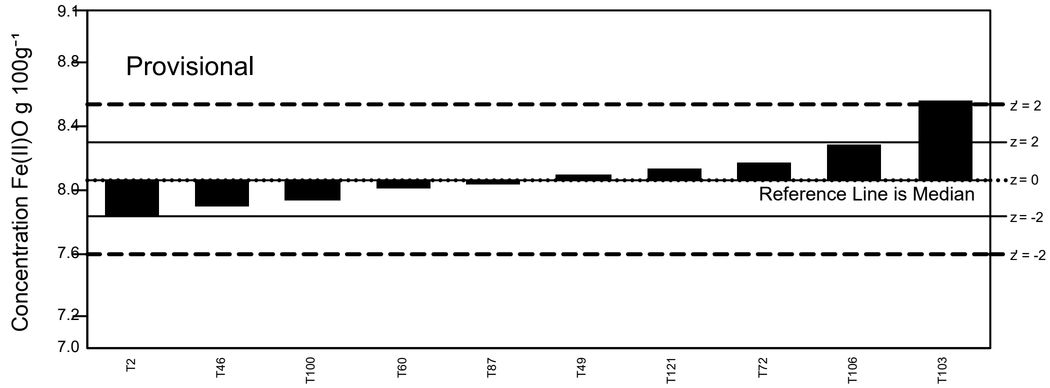
GeoPT54 - Barchart for Al2O3



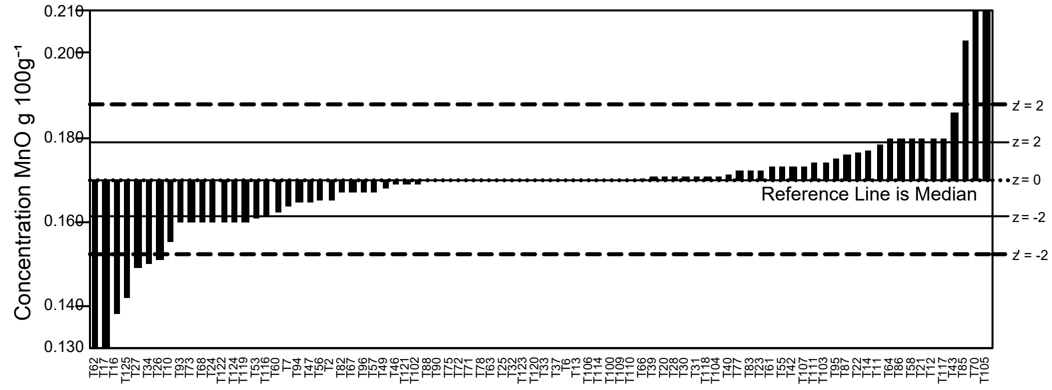
GeoPT54 - Barchart for Fe2O3T



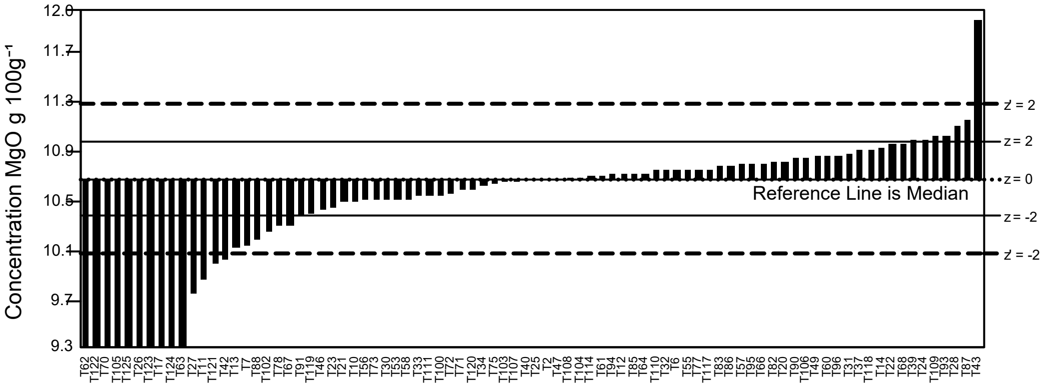
GeoPT54 - Barchart for Fe(II)O



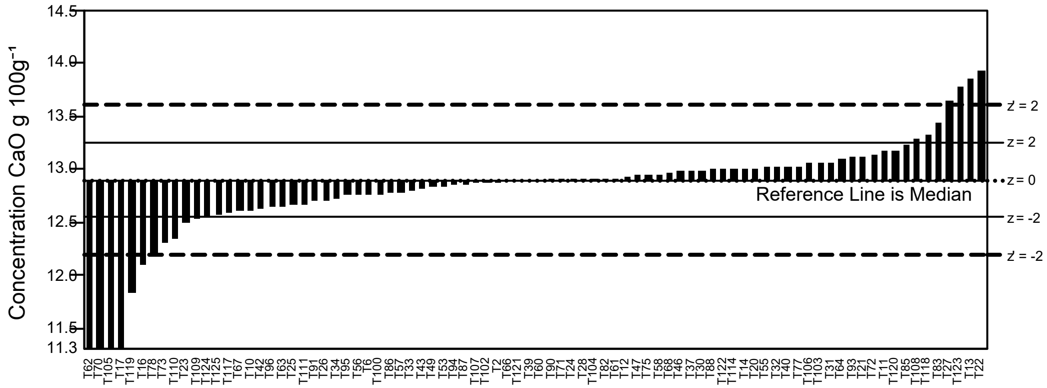
GeoPT54 - Barchart for MnO



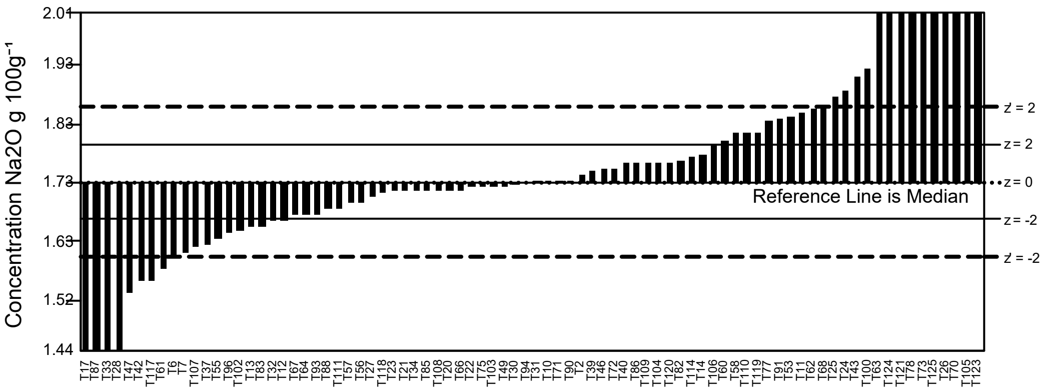
GeoPT54 - Barchart for MgO



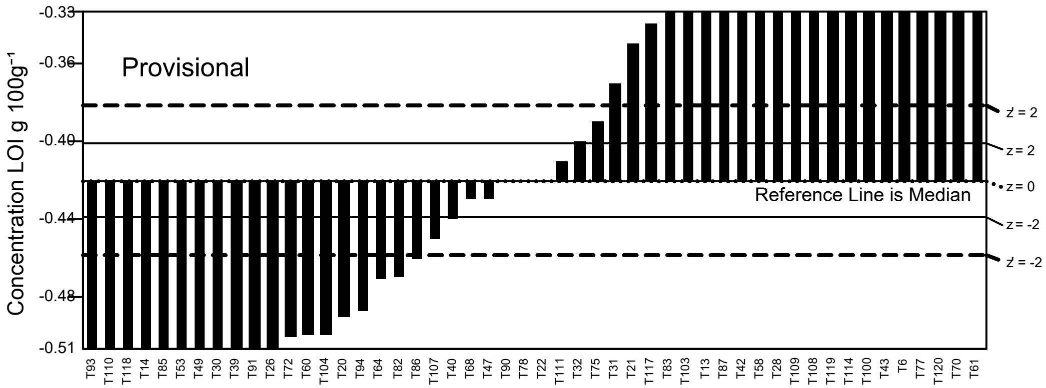
GeoPT54 - Barchart for CaO



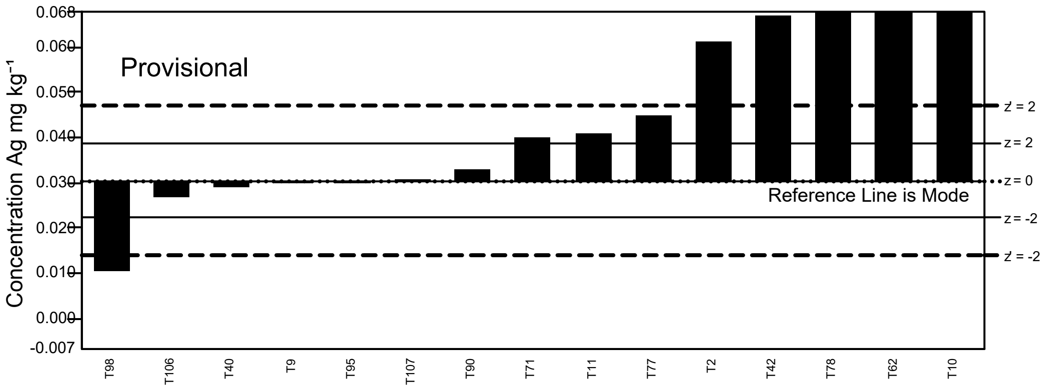
GeoPT54 - Barchart for Na2O



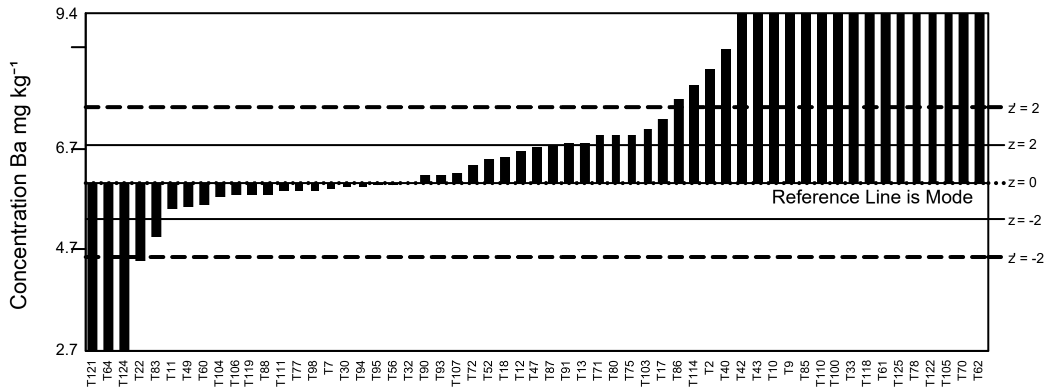
GeoPT54 - Barchart for LOI



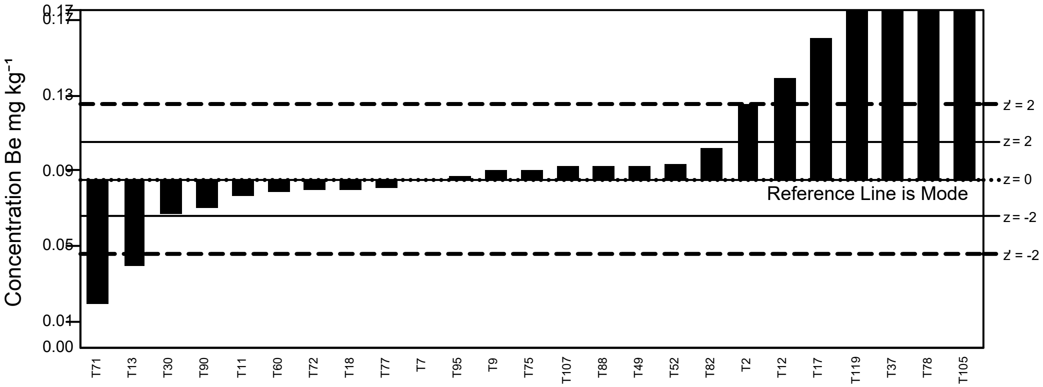
GeoPT54 - Barchart for Ag



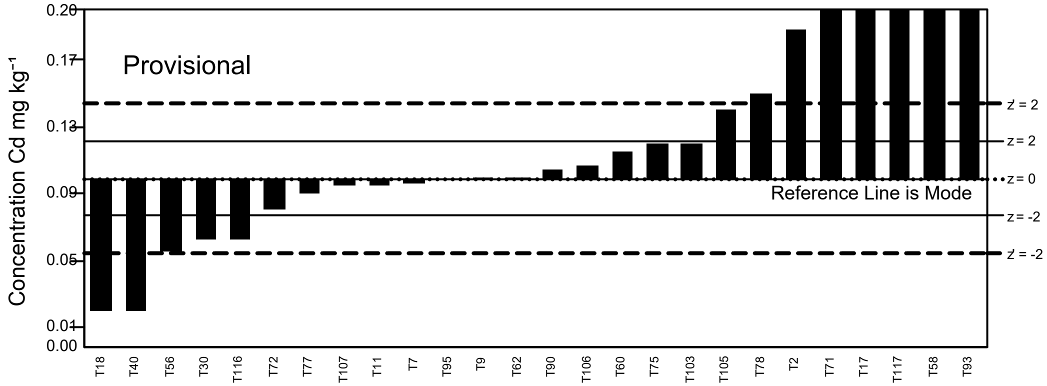
GeoPT54 - Barchart for Ba



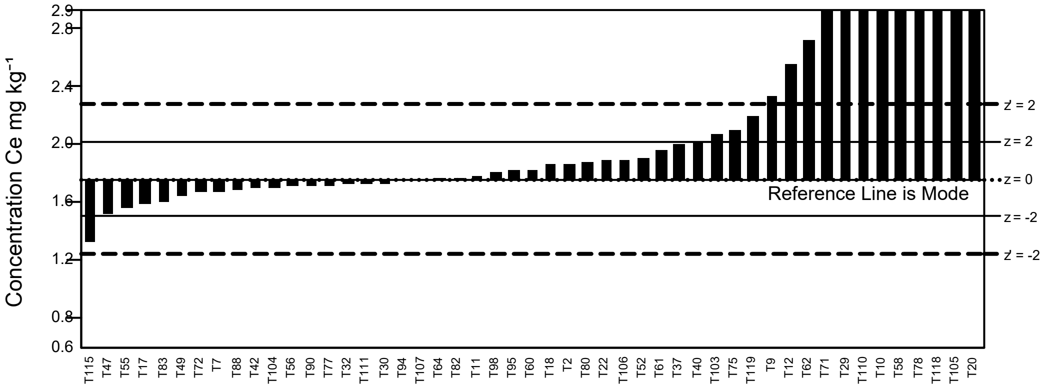
GeoPT54 - Barchart for Be



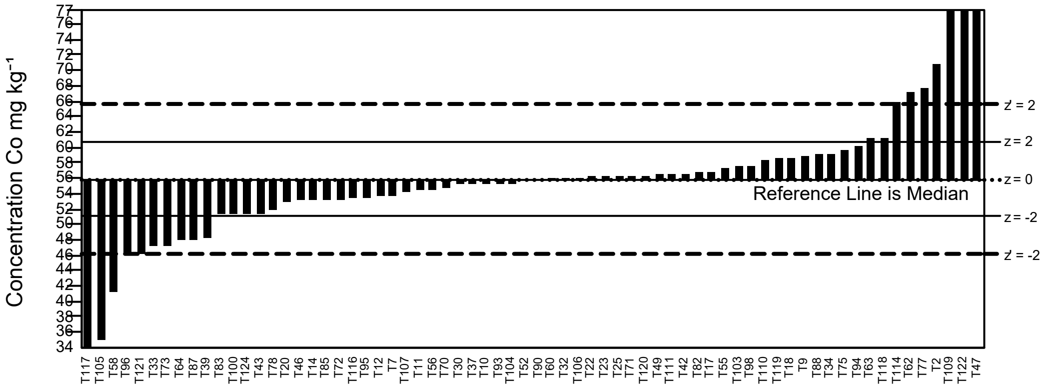
GeoPT54 - Barchart for Cd



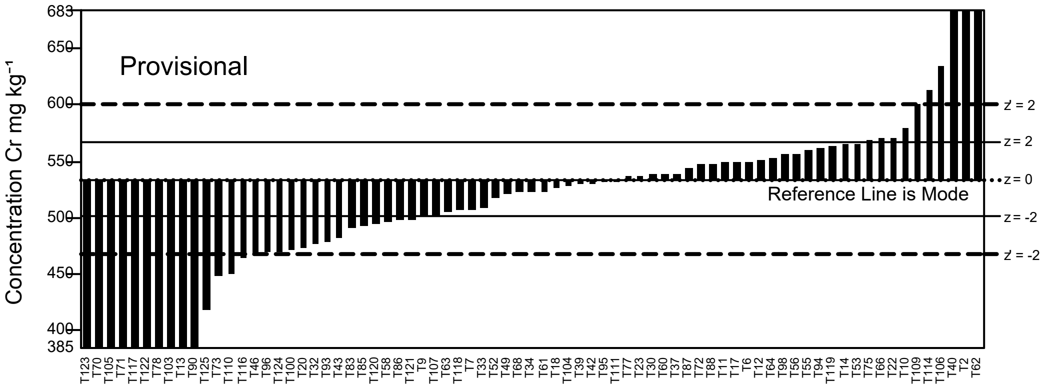
GeoPT54 - Barchart for Ce



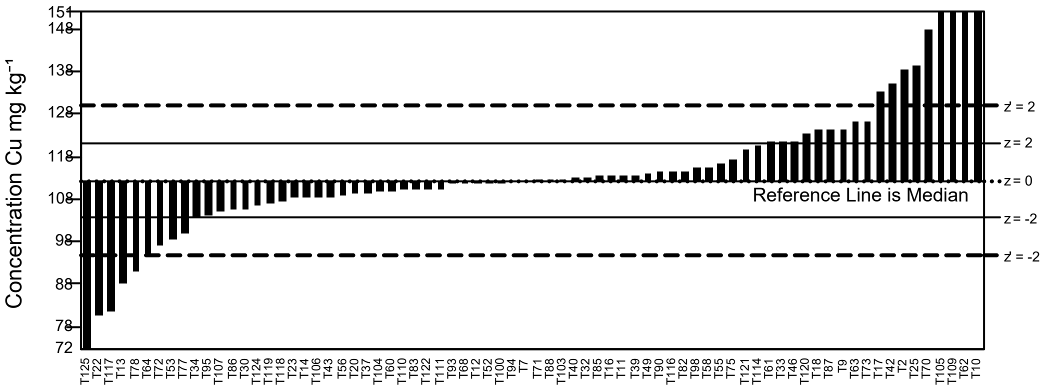
GeoPT54 - Barchart for Co

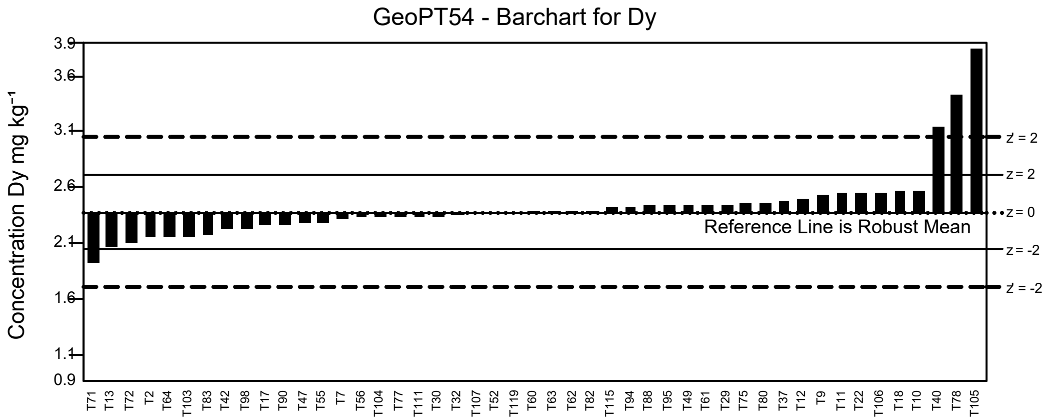


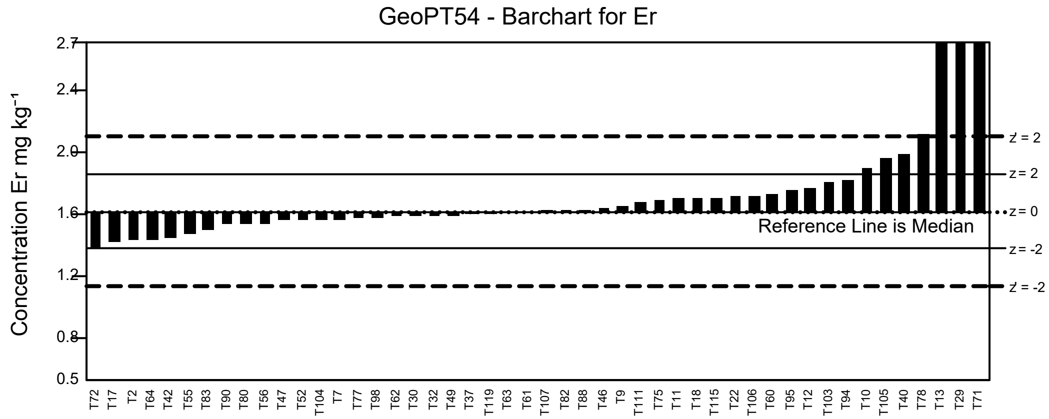
GeoPT54 - Barchart for Cr

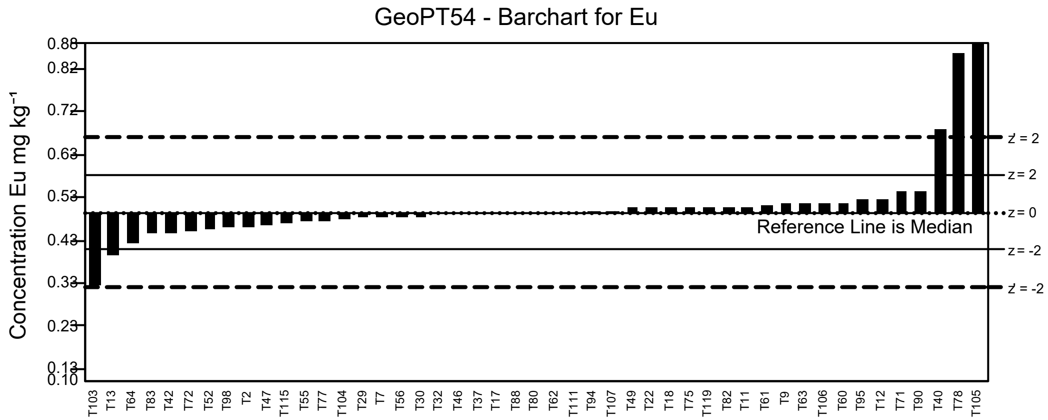


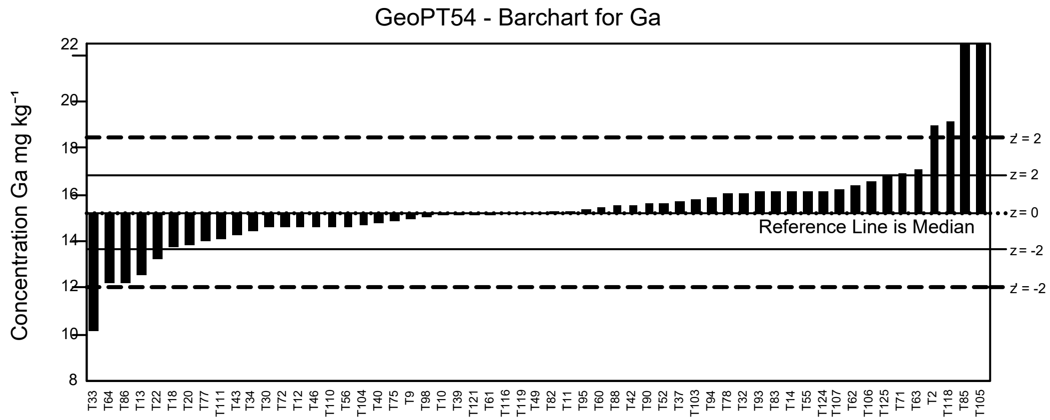
GeoPT54 - Barchart for Cu

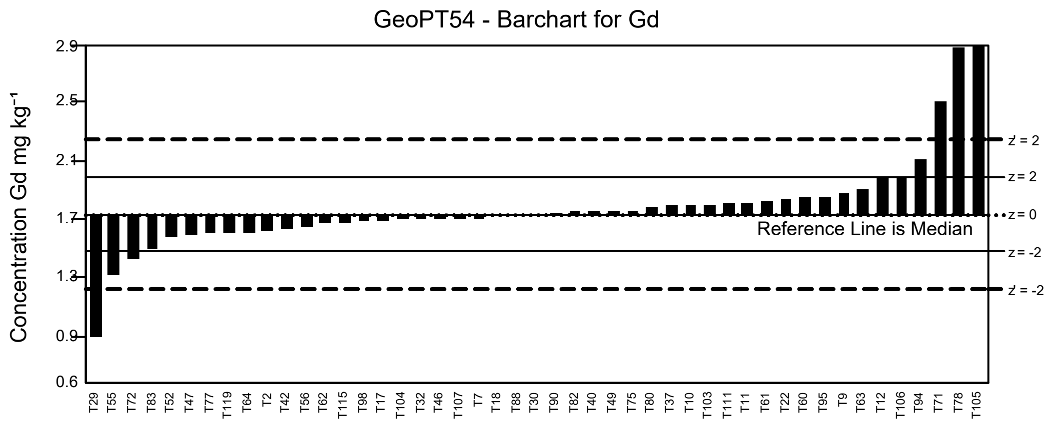


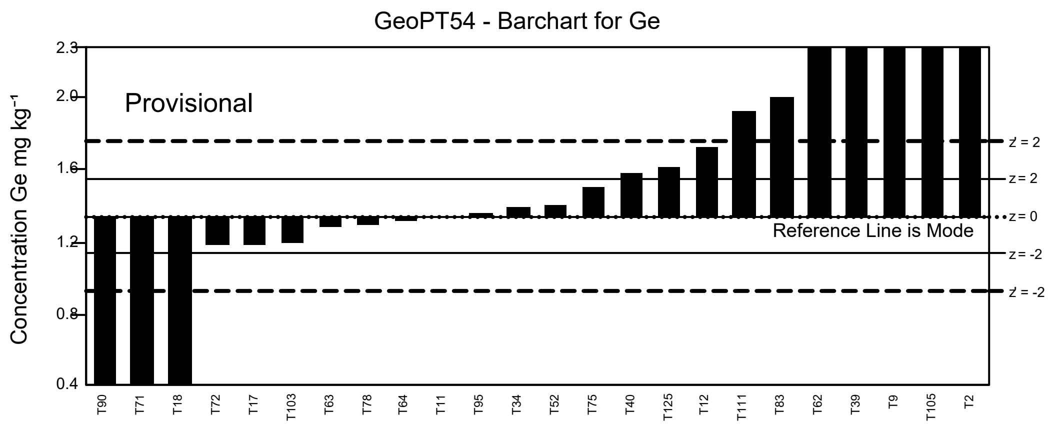

GeoPT54 - Barchart for Dy
Concentration Dy mg kg⁻¹
3.9
3.6
3.1
2.6
2.1
1.6
1.1
0.9
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Robust Mean
T71 T13 T72 T2 T64 T103 T83 T42 T98 T17 T90 T47 T55 T7 T56 T104 T77 T111 T30 T32 T107 T52 T119 T60 T63 T62 T82 T115 T94 T88 T95 T49 T61 T29 T75 T80 T37 T12 T9 T11 T22 T106 T18 T10 T40 T78 T105


GeoPT54 - Barchart for Er
Concentration Er mg kg⁻¹
2.7
2.4
2.0
1.6
1.2
0.8
0.5
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Median
T72 T17 T2 T64 T42 T55 T83 T90 T80 T56 T47 T52 T104 T7 T77 T98 T62 T30 T32 T49 T37 T119 T63 T61 T107 T82 T88 T46 T9 T111 T75 T11 T18 T115 T22 T106 T60 T95 T12 T103 T94 T10 T105 T40 T78 T13 T29 T71

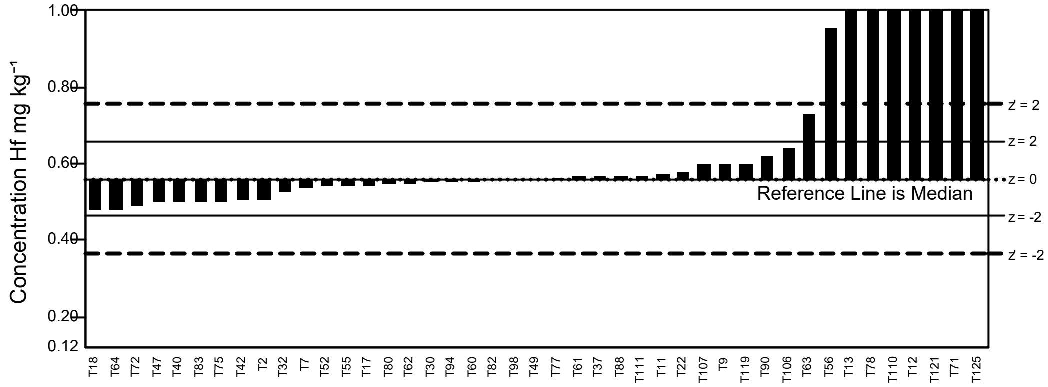

GeoPT54 - Barchart for Eu
Concentration Eu mg kg⁻¹
0.88
0.82
0.72
0.63
0.53
0.43
0.33
0.23
0.13
0.10
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Median
T103 T13 T64 T83 T42 T72 T52 T98 T2 T47 T115 T55 T77 T104 T29 T7 T56 T30 T32 T46 T37 T17 T88 T80 T62 T111 T94 T107 T49 T22 T18 T75 T119 T82 T11 T61 T9 T63 T106 T60 T95 T12 T71 T90 T40 T78 T105


GeoPT54 - Barchart for Ga
Concentration Ga mg kg⁻¹
22
20
18
16
14
12
10
8
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Median
T33 T64 T86 T13 T22 T18 T20 T77 T111 T43 T34 T30 T72 T12 T46 T110 T56 T104 T40 T75 T9 T98 T10 T39 T121 T61 T116 T119 T49 T82 T11 T95 T60 T88 T42 T90 T52 T37 T103 T94 T78 T32 T93 T83 T14 T55 T124 T107 T62 T106 T125 T71 T63 T2 T118 T85 T105

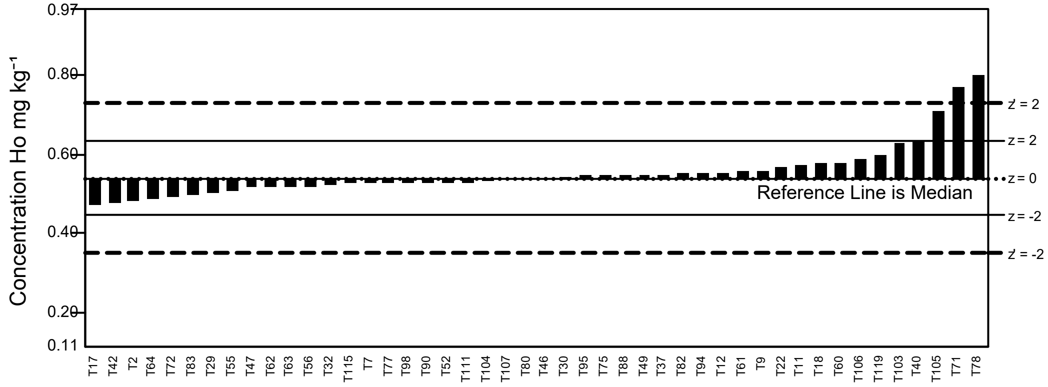

GeoPT54 - Barchart for Gd
Concentration Gd mg kg⁻¹
2.9
2.5
2.1
1.7
1.3
0.9
0.6
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Median
T29 T55 T72 T83 T52 T47 T77 T119 T64 T2 T42 T56 T62 T115 T98 T17 T104 T32 T46 T107 T7 T18 T88 T30 T90 T82 T40 T49 T75 T80 T37 T10 T103 T111 T11 T61 T22 T60 T95 T9 T63 T12 T106 T94 T71 T78 T105


GeoPT54 - Barchart for Ge
Provisional
Concentration Ge mg kg⁻¹
2.3
2.0
1.6
1.2
0.8
0.4
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Mode
T90 T71 T18 T72 T17 T103 T63 T78 T64 T11 T95 T34 T52 T75 T40 T125 T12 T111 T83 T62 T39 T9 T105 T2

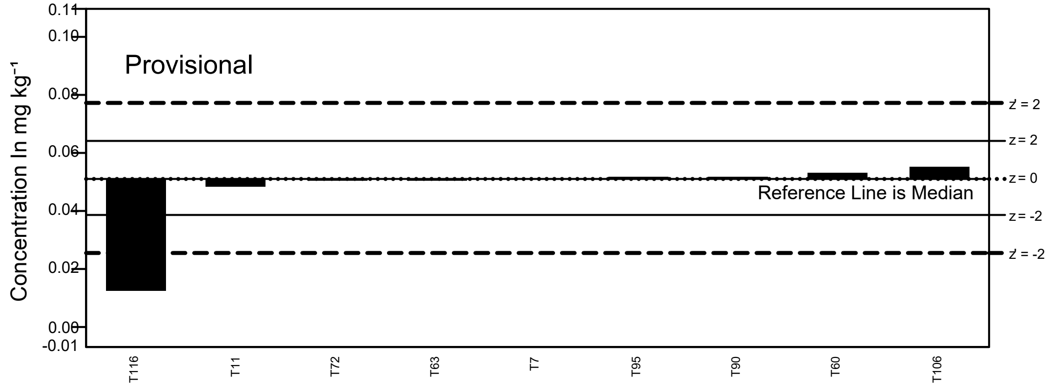
GeoPT54 - Barchart for Hf



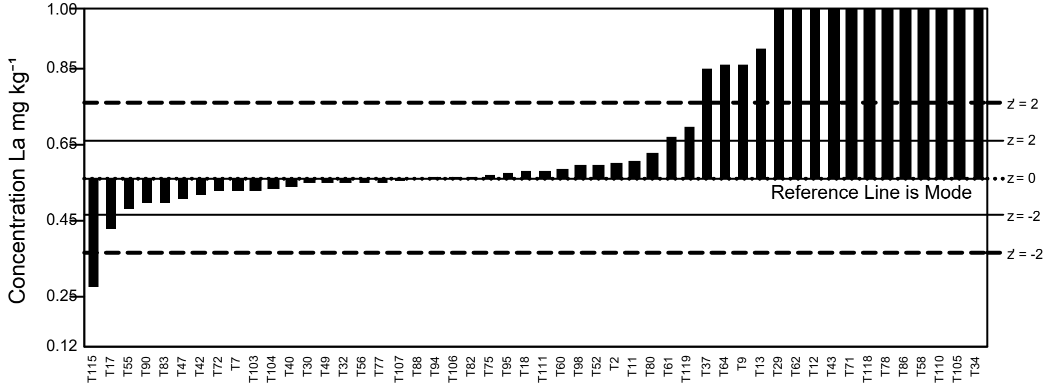
GeoPT54 - Barchart for Ho



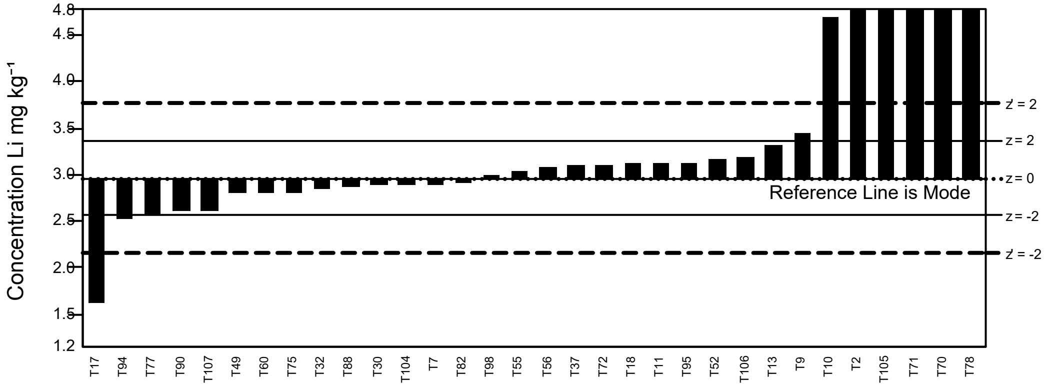
GeoPT54 - Barchart for In



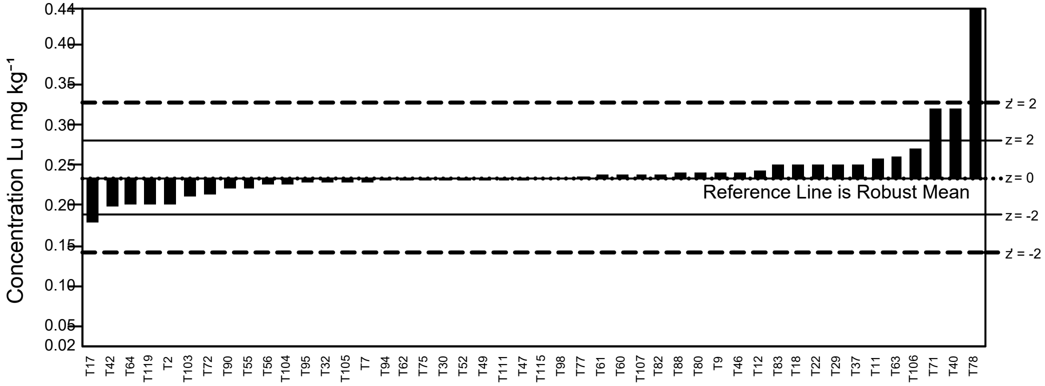
GeoPT54 - Barchart for La



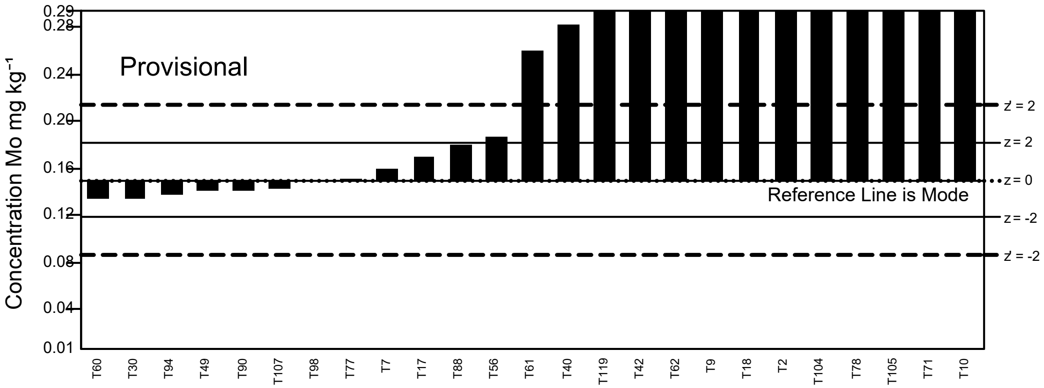
GeoPT54 - Barchart for Li



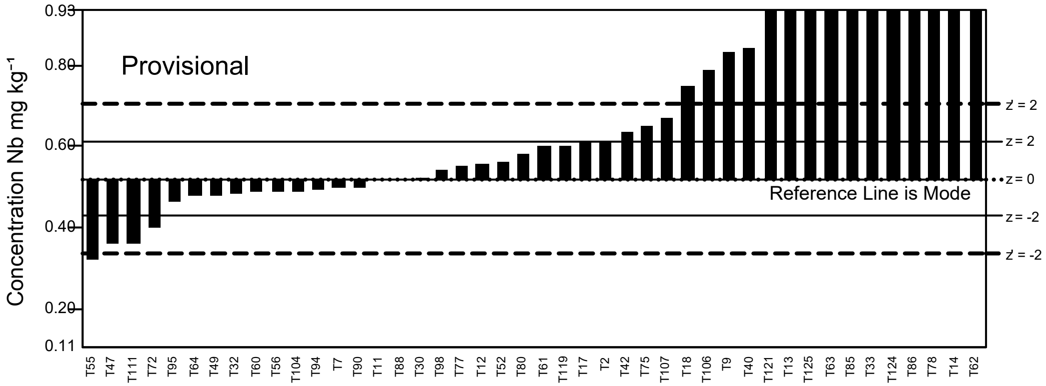
GeoPT54 - Barchart for Lu



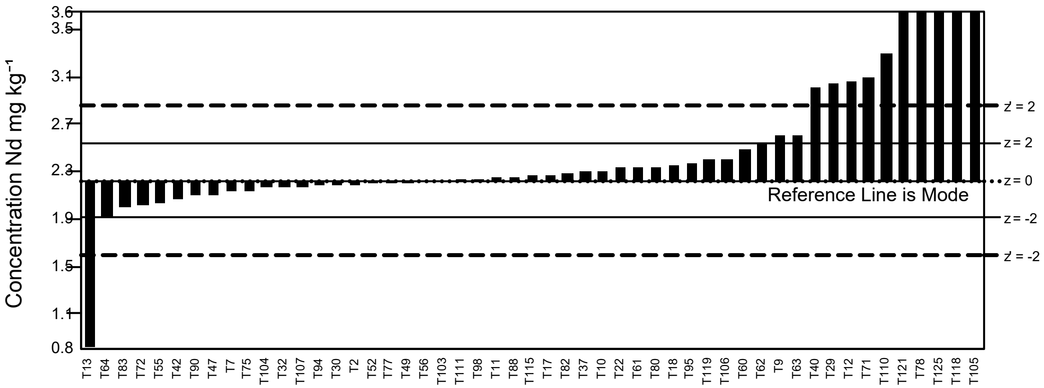
GeoPT54 - Barchart for Mo



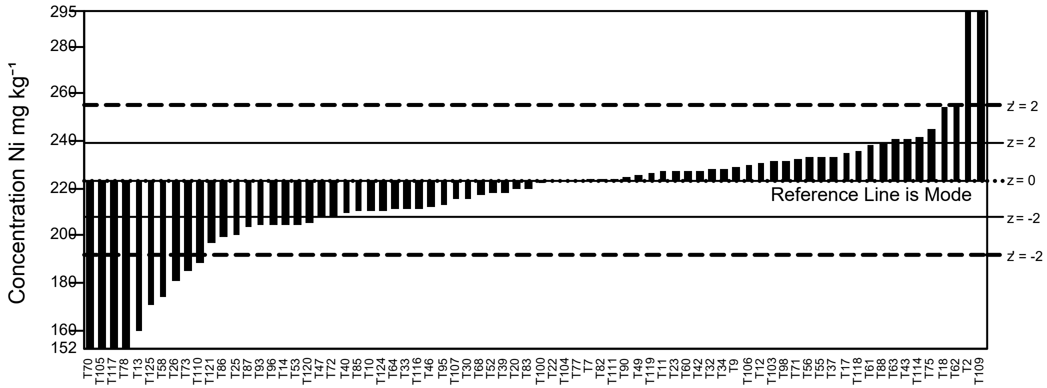
GeoPT54 - Barchart for Nb



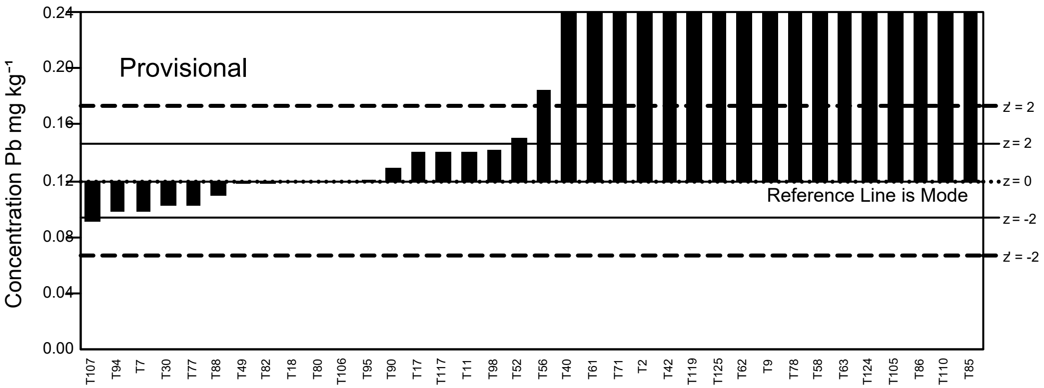
GeoPT54 - Barchart for Nd



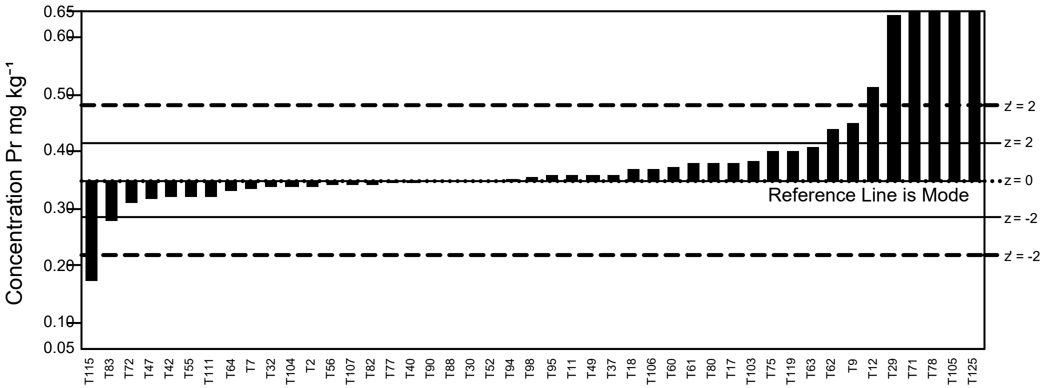
GeoPT54 - Barchart for Ni



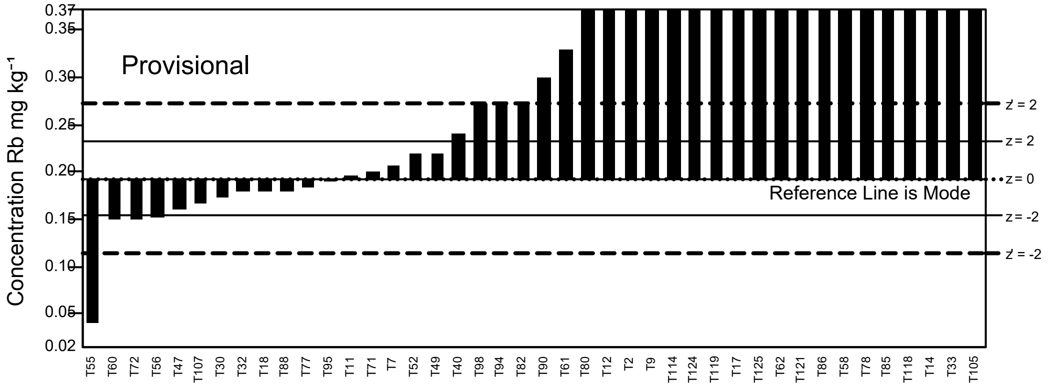
GeoPT54 - Barchart for Pb



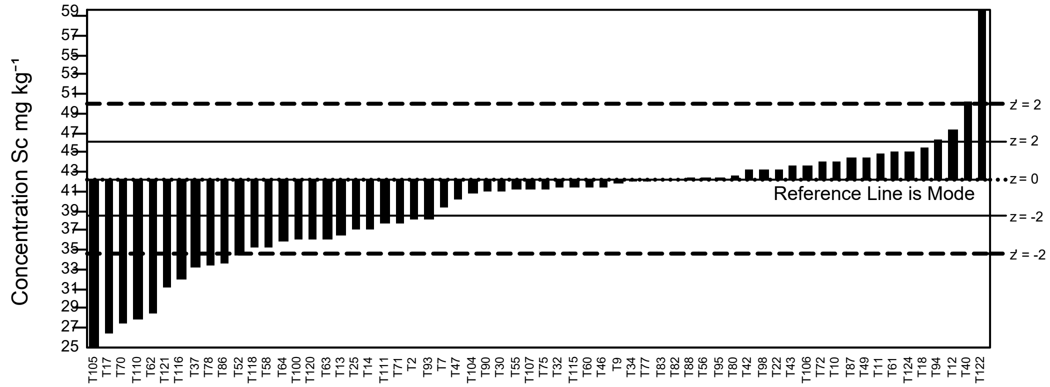
GeoPT54 - Barchart for Pr



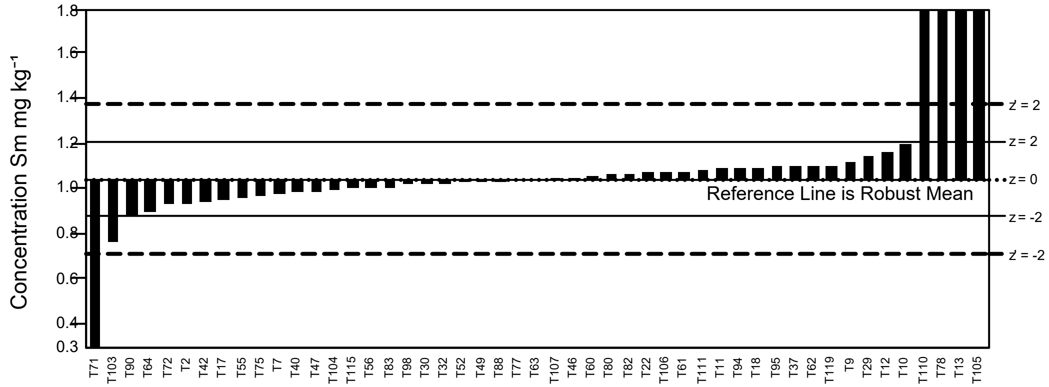
GeoPT54 - Barchart for Rb



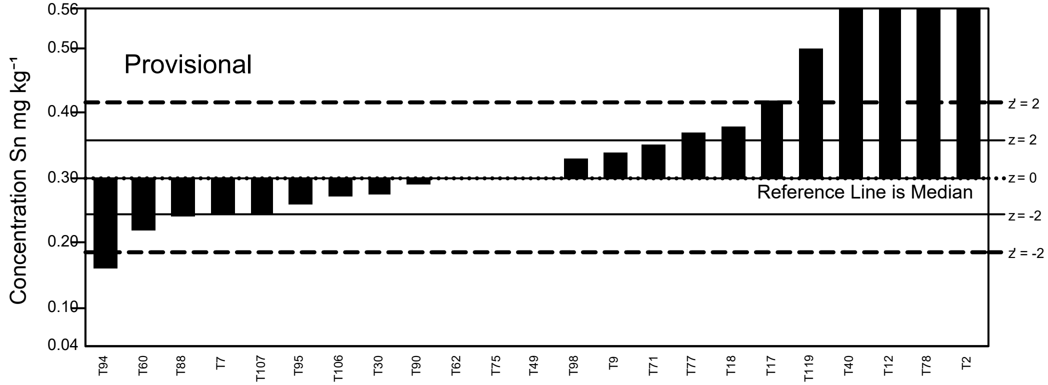
GeoPT54 - Barchart for Sc



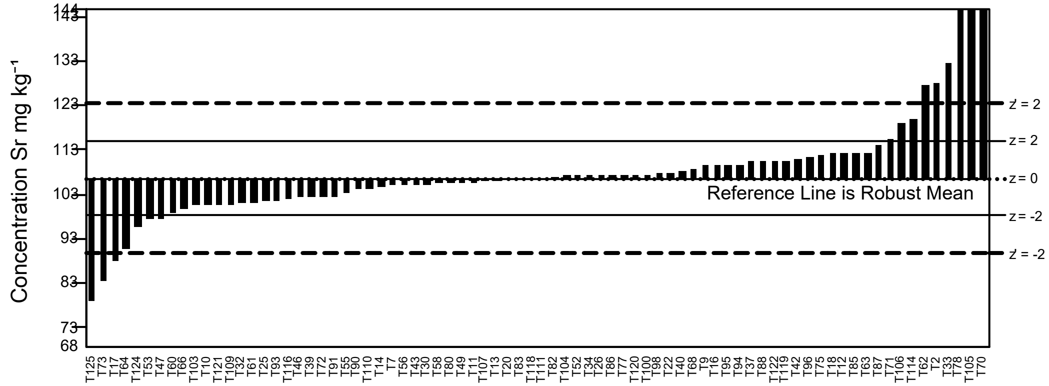
GeoPT54 - Barchart for Sm



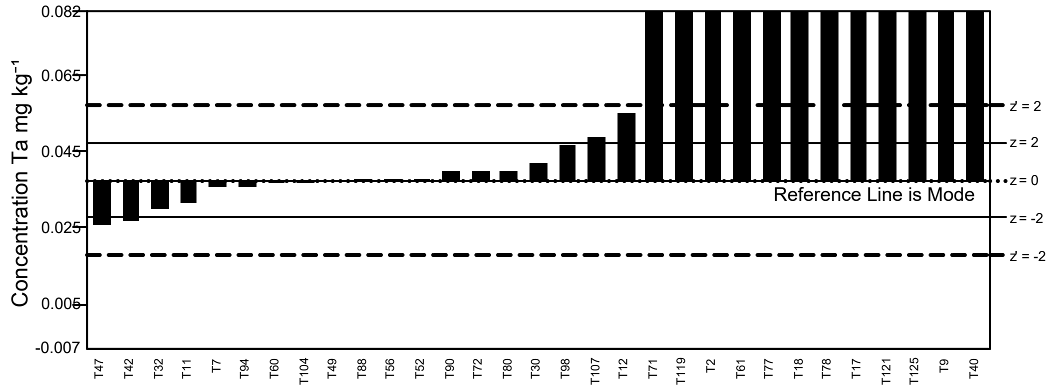
GeoPT54 - Barchart for Sn



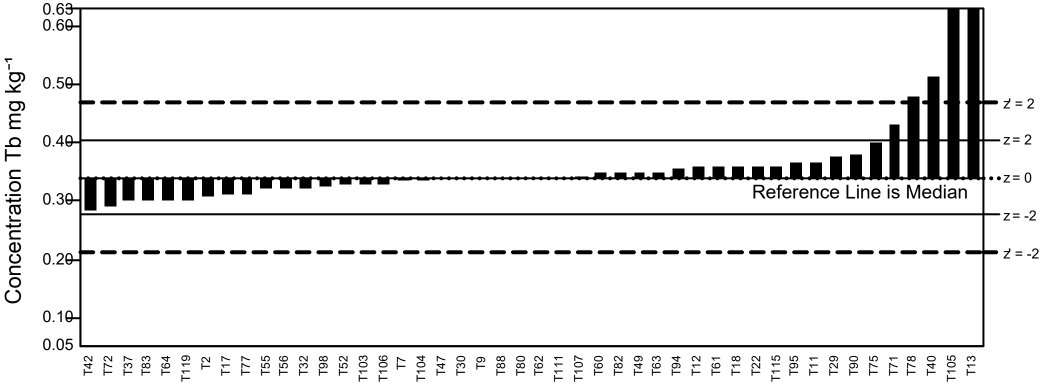
GeoPT54 - Barchart for Sr



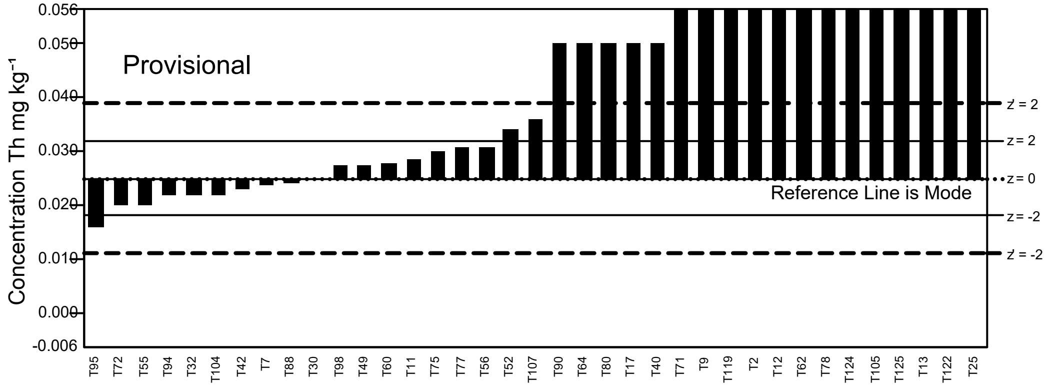
GeoPT54 - Barchart for Ta



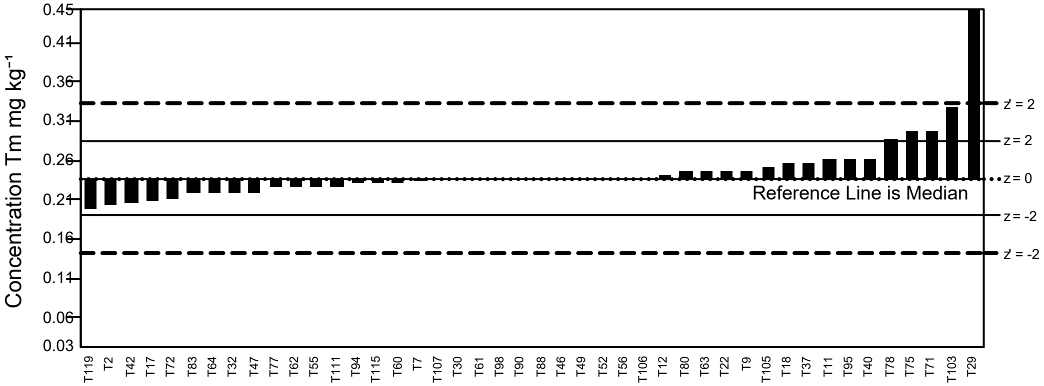
GeoPT54 - Barchart for Tb



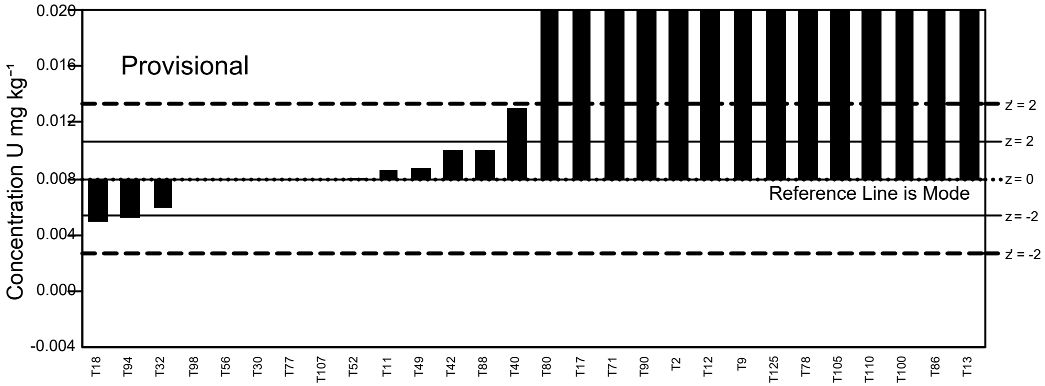
GeoPT54 - Barchart for Th



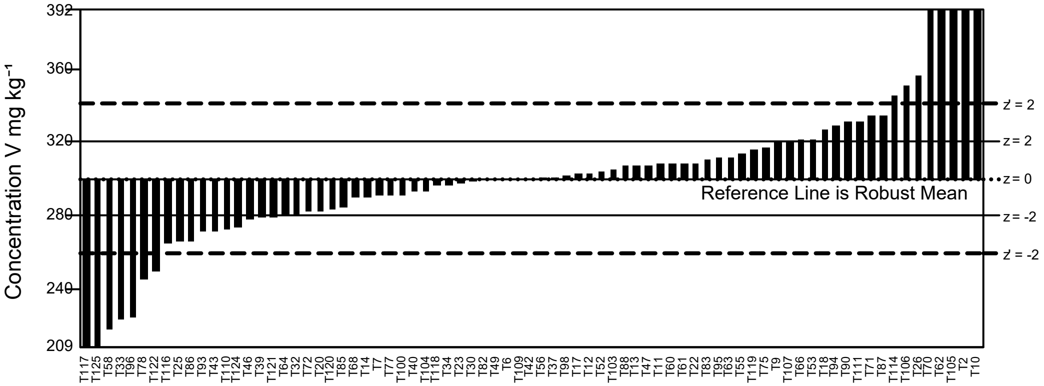
GeoPT54 - Barchart for Tm



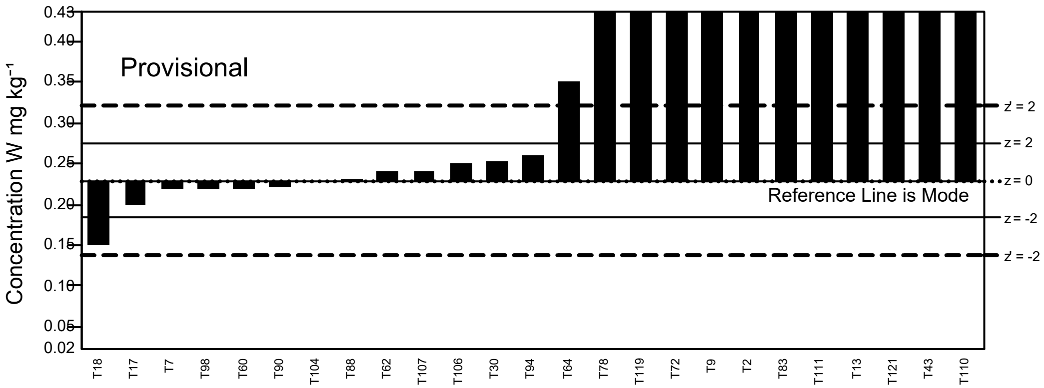
GeoPT54 - Barchart for U



GeoPT54 - Barchart for V



GeoPT54 - Barchart for W



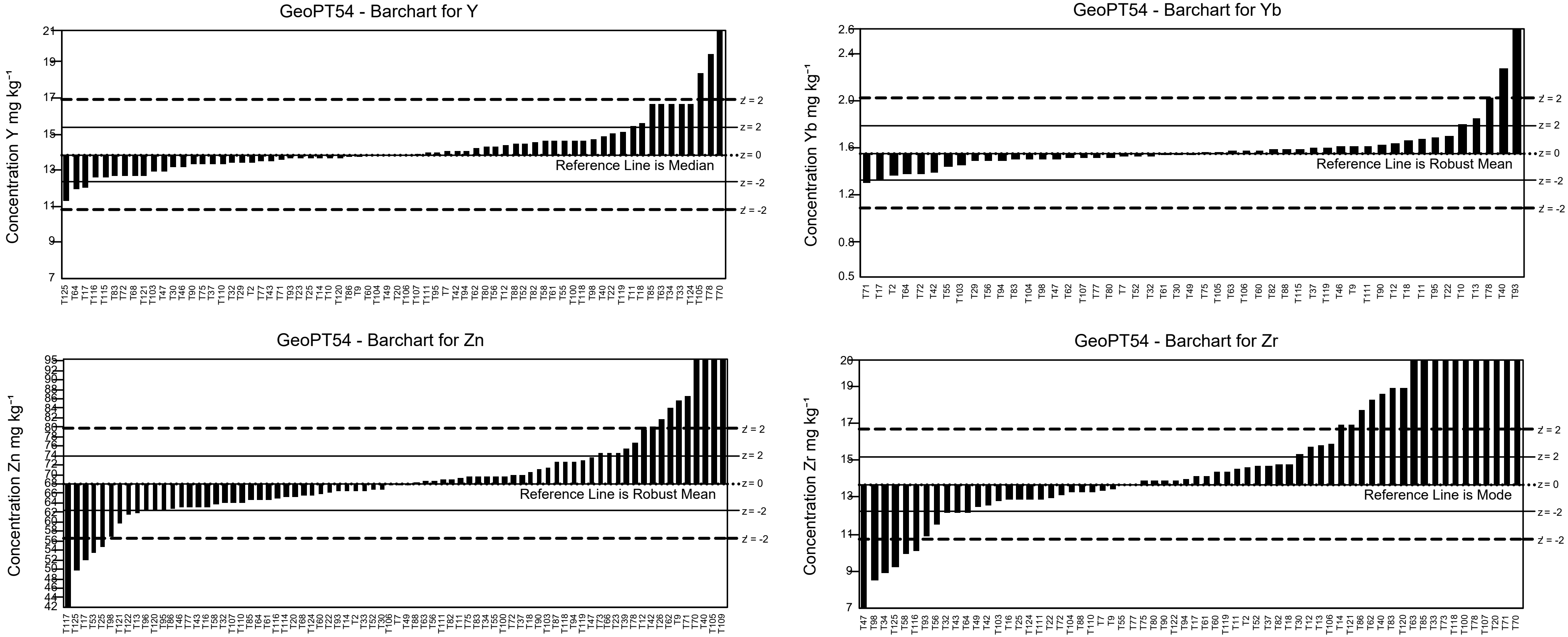
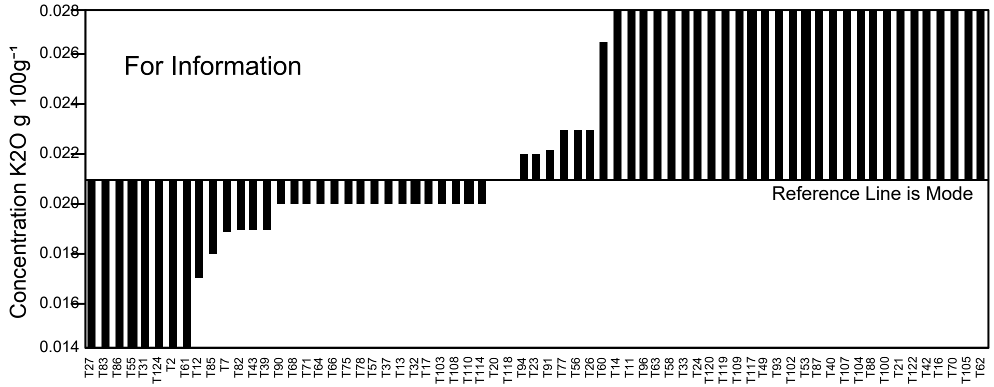
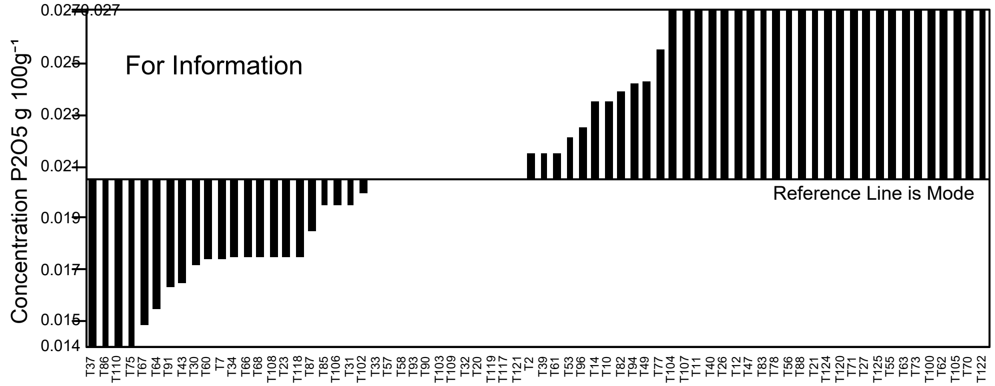


Figure 1: GeoPT54 - Tholeiitic Basalt, BNA-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for -2<z<2 for pure geochemistry labs (solid lines) and -2<z'<2 for applied geochemistry labs (pecked lines).

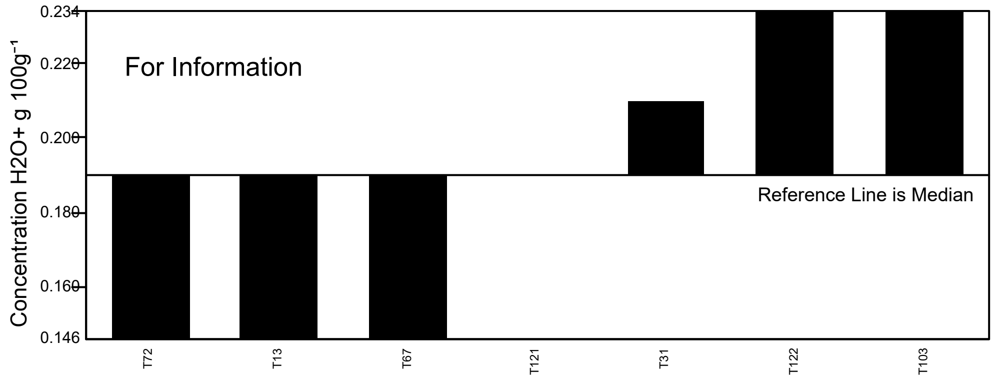
GeoPT54 - Barchart for K2O



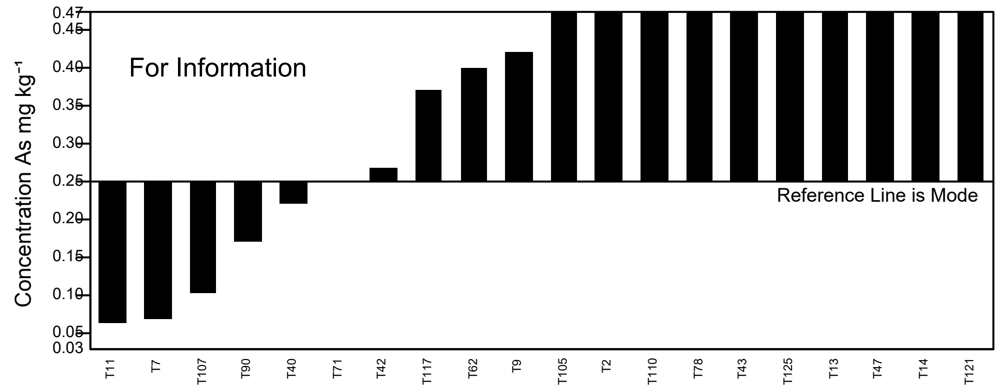
GeoPT54 - Barchart for P2O5



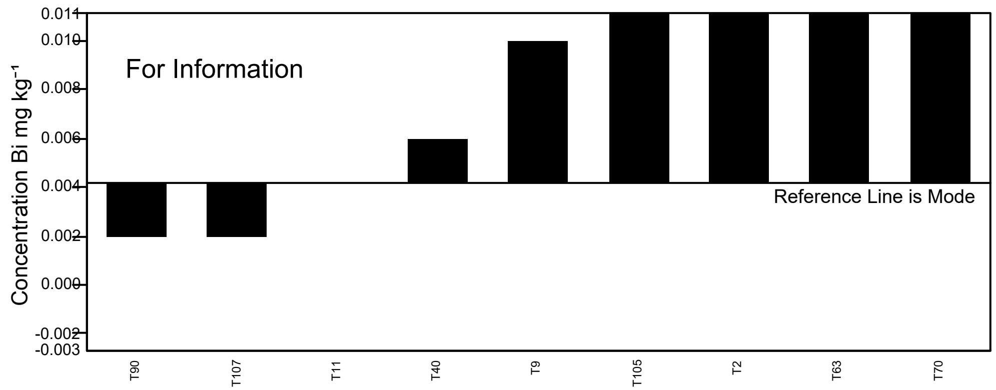
GeoPT54 - Barchart for H2O+



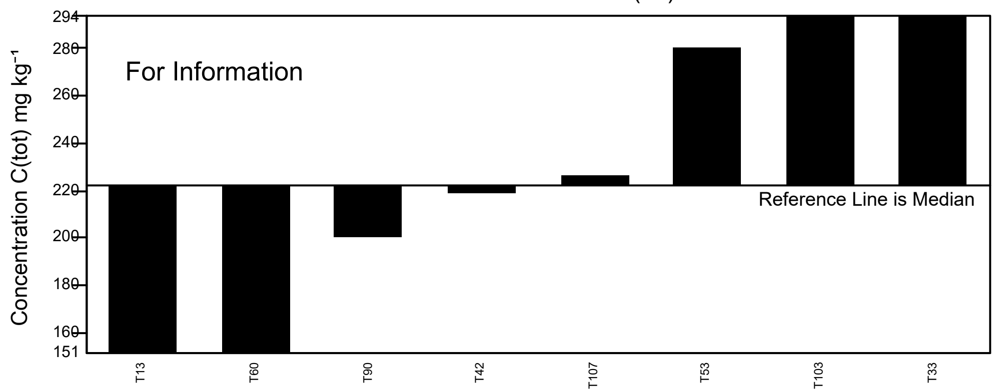
GeoPT54 - Barchart for As



GeoPT54 - Barchart for Bi



GeoPT54 - Barchart for C(tot)



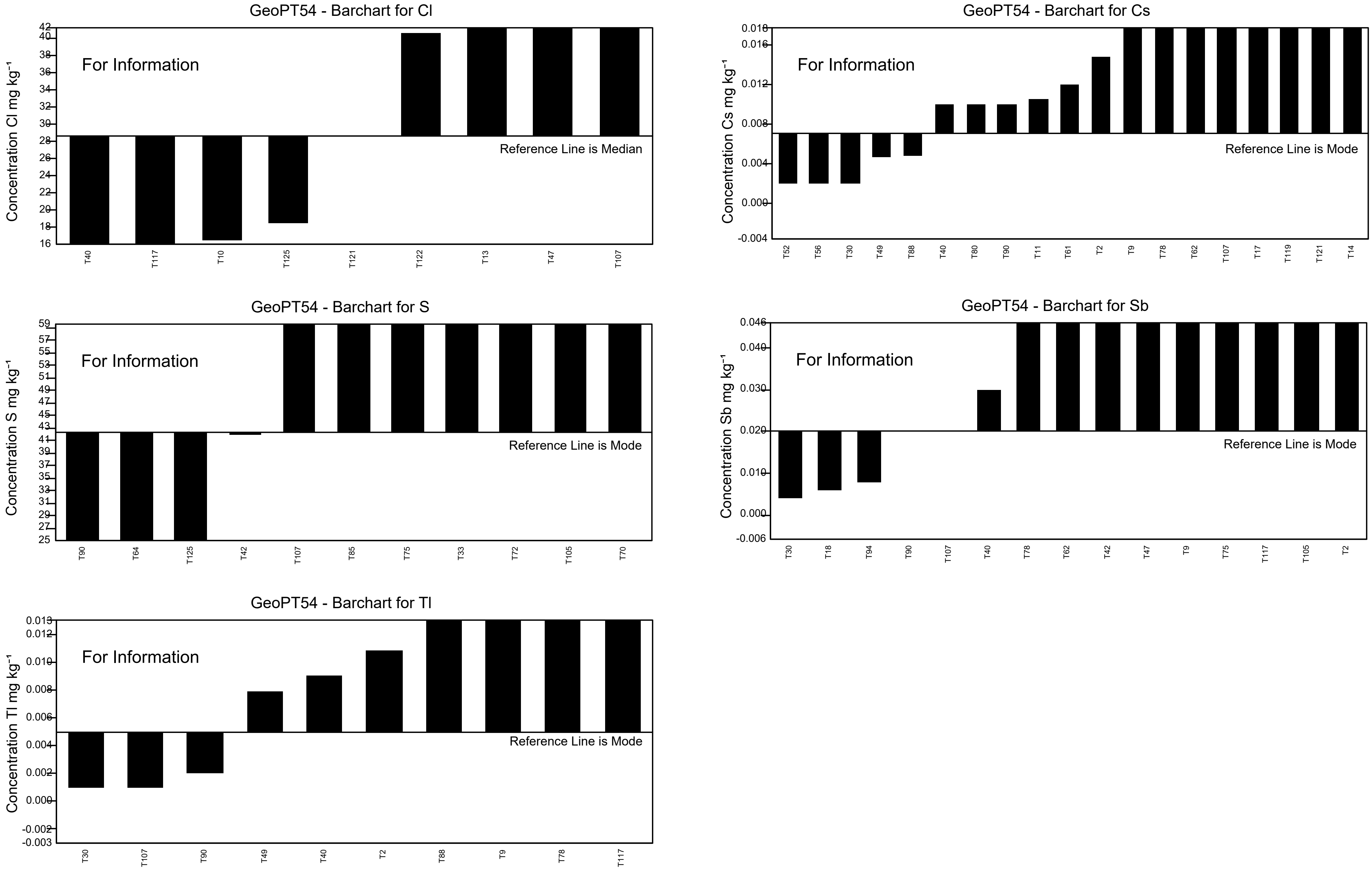
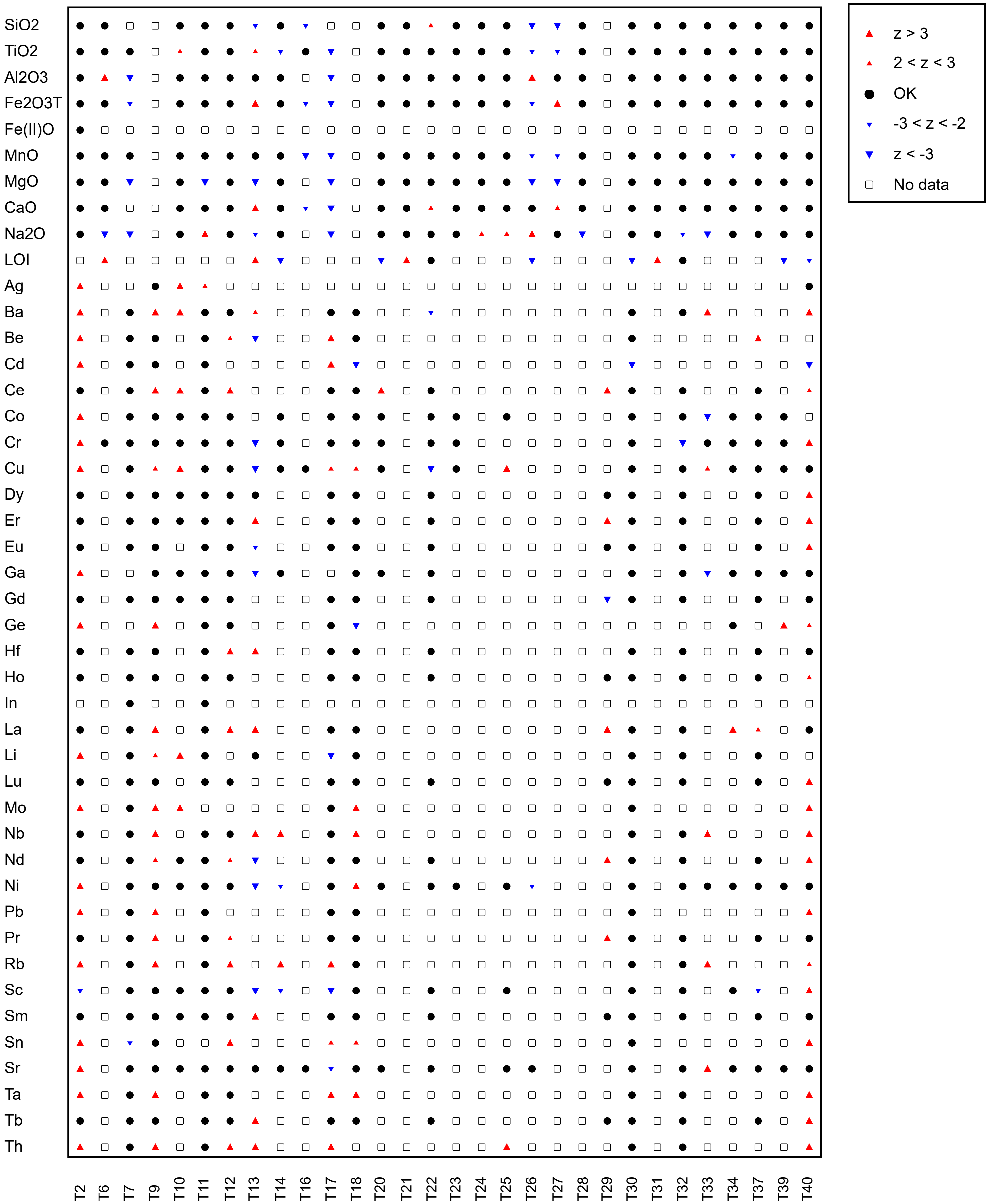


Figure 2: GeoPT54 - Tholeiitic Basalt, BNA-1. Data distribution charts provided for information only for elements for which values could not be assigned.

Multiple Z-Score Chart for GeoPT54



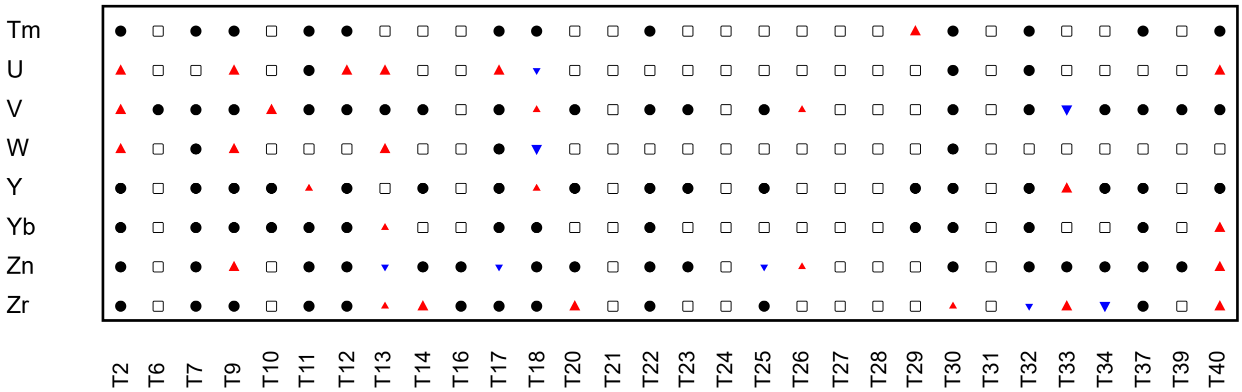
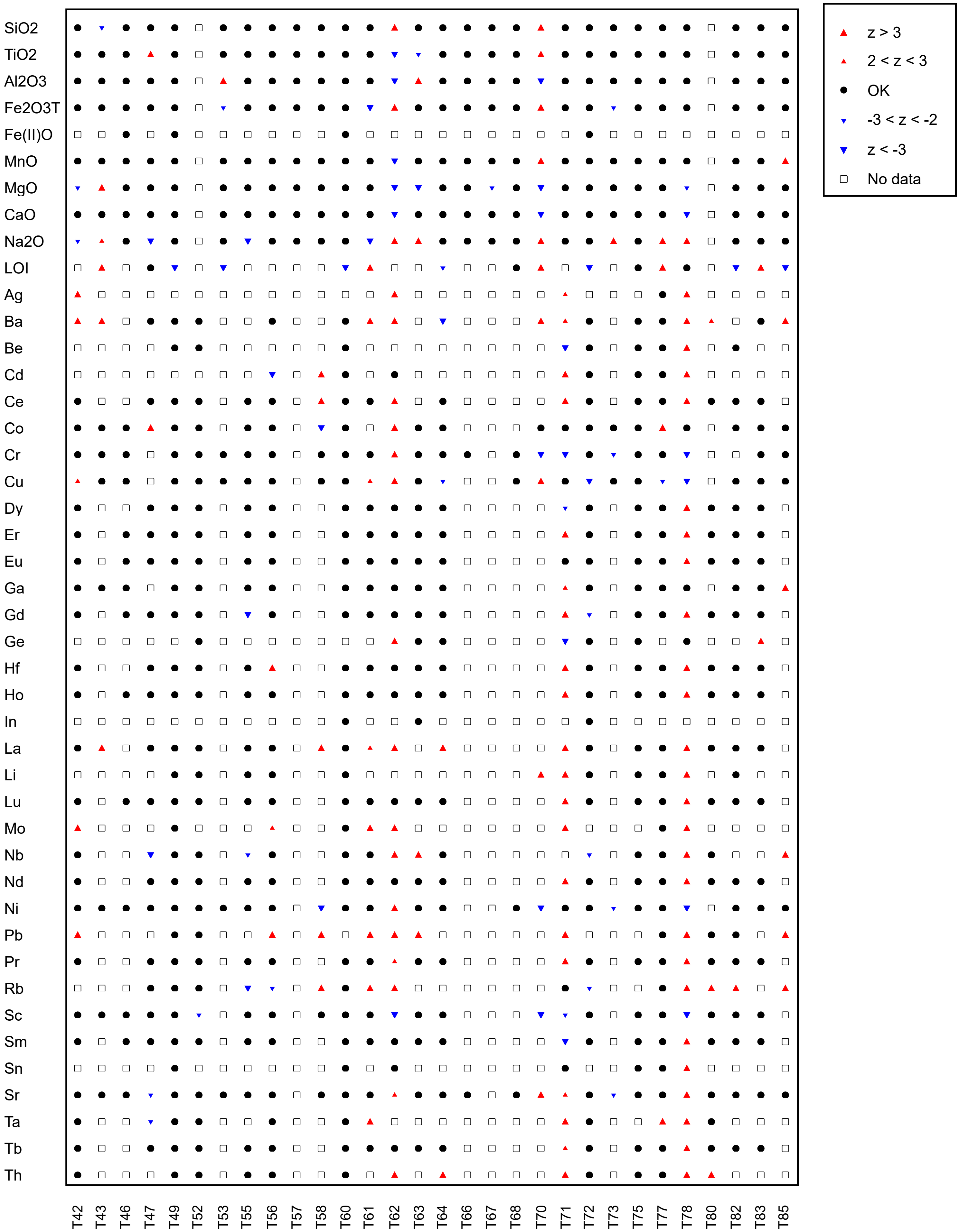


Figure 3: GeoPT54 - Tholeiitic Basalt, BNA-1. Multiple z-score charts for laboratories participating in the GeoPT54 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT54



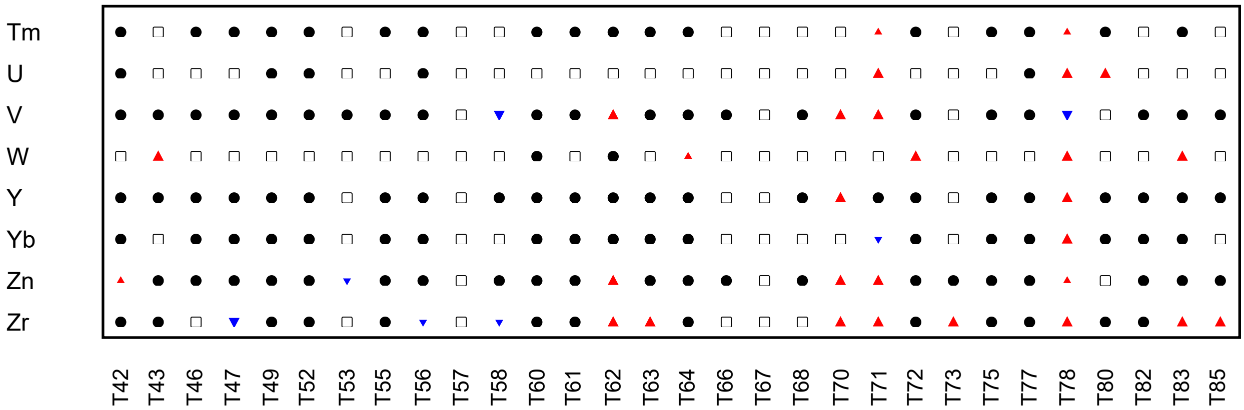
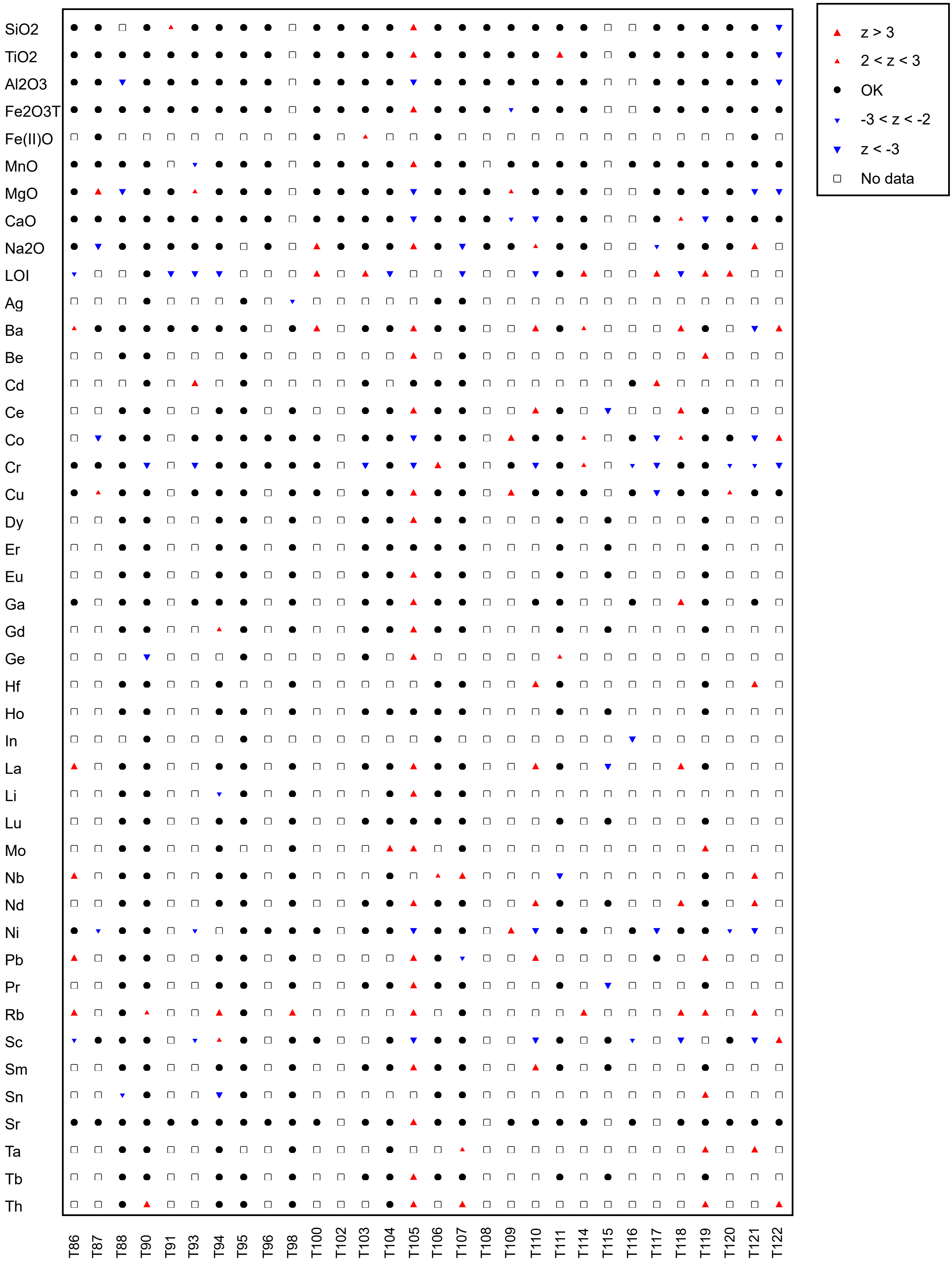
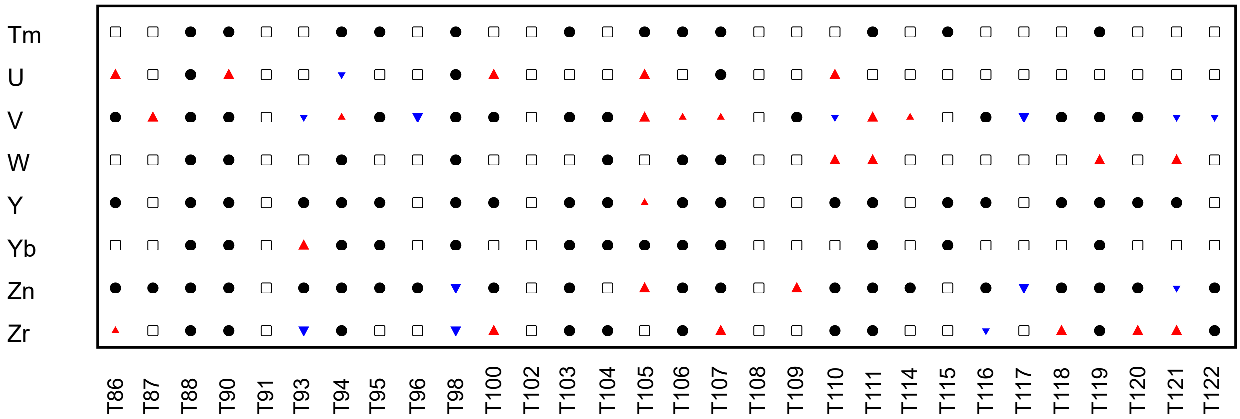


Figure 3: GeoPT54 - Tholeiitic Basalt, BNA-1. Multiple z-score charts for laboratories participating in the GeoPT54 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT54





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Multiple Z-Score Chart for GeoPT54

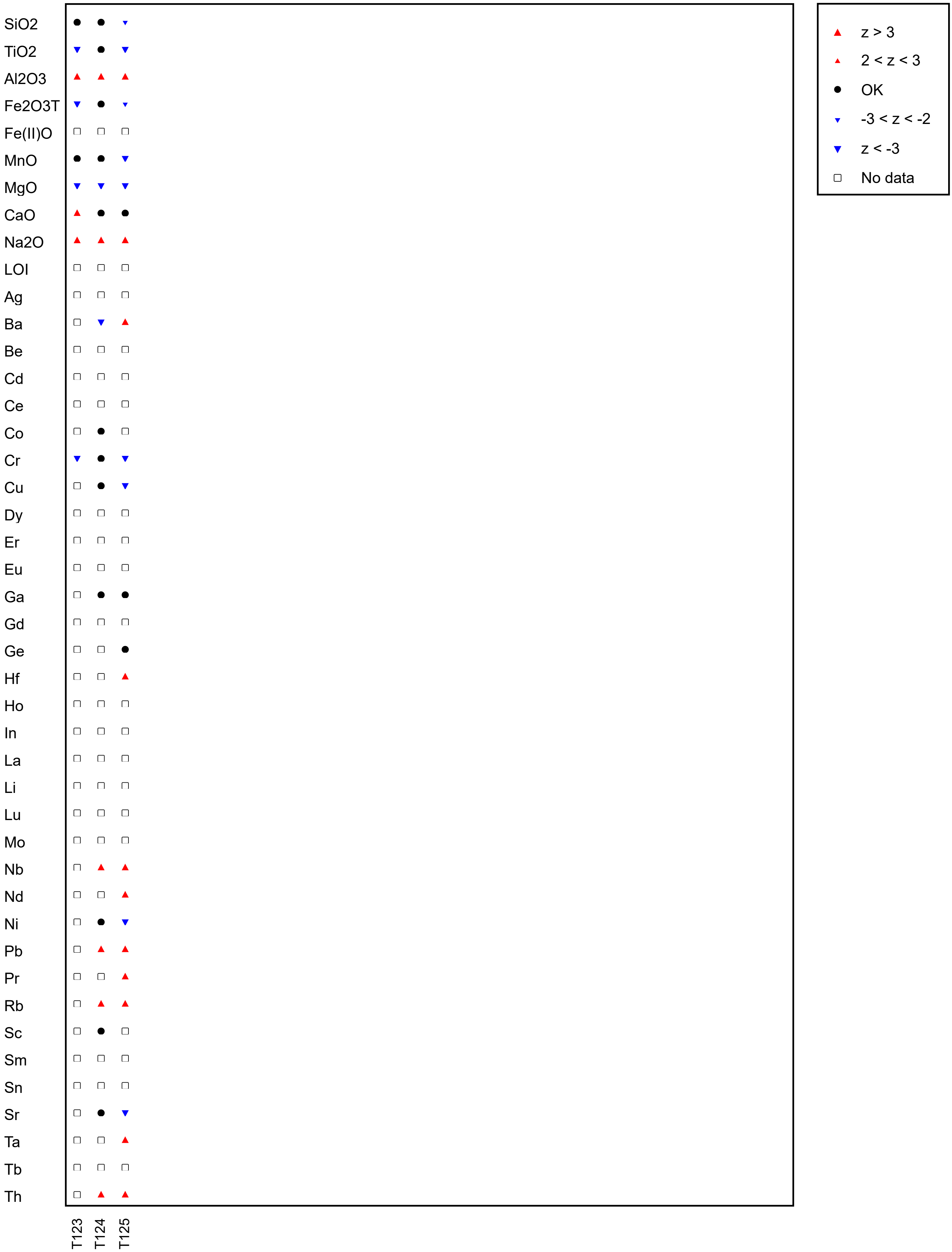

Figure 3: GeoPT54 - Tholeiitic Basalt, BNA-1. Multiple z-score charts for laboratories participating in the GeoPT54 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).