GeoPT40 — AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES — REPORT ON ROUND 40 (Silty marine shale, ShWYO-1) / January 2017

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Abstract

Results are presented for Round 40 of the International Association of Geoanalysts' Proficiency Testing programme for analytical geochemistry laboratories. The test material distributed in this routine round of Geo*PT* was a silty marine shale, ShWYO-1, supplied by Dr Stephen Wilson of the U.S. Geological Survey. In this report, the data contributed by 102 laboratories are listed, together with an assessment of consensus values, consequent *z*-scores and charts to show the distribution of contributed results and the overall performance of participating laboratories.

Introduction

This fortieth round of the international proficiency testing programme, Geo*PT*, was conducted in a similar manner to earlier rounds. The programme is designed to be part of the routine quality assurance procedures employed by analytical geochemistry laboratories. The programme is organised by the International Association of Geoanalysts and is conducted in accordance with a published protocol available at (*http://www.geoanalyst.org/documents/ GeoPT-protocol.pdf*). The overall aim of the programme is to provide participating laboratories with *z*-score information for reported elemental determinations from which the laboratory can decide whether the quality of their data is satisfactory in relation both to their chosen fitness-for-purpose criteria and to the results submitted by other laboratories contributing to the round. In circumstances where *z*-scores are unsatisfactory, a participating laboratory is encouraged to investigate for unsuspected analytical bias and to take corrective action if this appears justified.

Steering Committee for Round 40:

P.C. Webb (results coordinator), M. Thompson (statistical advisor), P.J. Potts and C.J.B. Gowing (analytical advisors), S.A. Wilson (provision of ShWYO-1).

Timetable for Round 40:

Distribution of sample: September 2016

Results submission deadline: 14th December 2016

Release of report: February 2017

Test Material details

Geo*PT*40: The silty marine shale test material, ShWYO-1, was supplied by Dr Stephen Wilson. The test material was evaluated for homogeneity by the originator, and as a result, the sample was considered suitable for use in this proficiency test.

Submission of results

3597 results were submitted for Geo*PT*40 (ShWYO-1) by 102 laboratories as listed in Table 1, where results designated as data quality 1 (see ***Z*-score analysis** section below) are shown in bold and results of data quality 2 are shown underlined. Results from all laboratories submitting data were used to assess respective assigned values. Regrettably there were three laboratories reporting in total 5 values of '0' (i.e. zero), for this round. We should emphasise that, as stated in the ***Instructions to Analysts***, such values should not be reported. These 5 values were excluded from consideration in the data assessment process.

Assigned values

Following procedures described in earlier rounds, robust statistical procedures were used to derive assigned mass fraction values [X_a] for measurands in this test sample, these values being judged to be the best available estimates of the true composition. Values were assigned on the basis that: i) sufficient laboratories had contributed data for a measurand, and ii) visual assessment gave confidence that a substantial proportion of the results distribution was symmetrically disposed. Part of this assessment involved examining bar charts of contributed data for each measurand to judge the distribution of results (presented in Figures 1 and 2). For this round it has also been possible to view data distributions according to analytical procedure and assess the comparative quality of data obtained using different procedures.

Many datasets were normally disposed and showed remarkable symmetry with relatively little dispersion of data. Consequently, in 16 cases the robust mean was used to define an appropriate consensus value. However, many other datasets were slightly skewed and some, more severely skewed. In the majority of such cases medians provided a satisfactory estimator for defining consensus values: 29 cases in all. Where the median did not provide a symmetrical distribution of data about the consensus, the mode was preferred, and was used in 10 cases for defining a consensus.

Our interpretation as to why selected data distributions were skewed is as follows: Firstly, skewed data distributions for SiO_2 and Na_2O were due largely to the use of powder pellets for analysis by XRF by a number of laboratories. Matrix corrections are difficult to assess for low atomic number major elements and frequently underestimated when analysing powder pellets by XRF. Secondly there were notable low tails to data distributions for Zr and Hf, which is thought to be due to incomplete dissolution of zircons in many cases when acid digestion was the method of sample preparation by both ICP-MS and ICP-OES/AES techniques. Thirdly, there were also high tailed data distributions for As, Co, Cs, La, Mo, Sb, and W, due in large part to extremely variable XRF data reported for mass fractions that are close to the expected detection limit for this technique. Although many of these datasets were highly skewed, it was possible to determine modes when a substantial body of data formed a clear consensus. In eight cases modes were sufficiently well defined by techniques appropriate for the mass fraction present to justify designation of assigned values. In the other two cases provisional status was allocated (see Table 2). The procedure used to determine the mode involved the estimation of the mass fraction corresponding to the maximum value of the kernel density distribution for the dataset. This provided a consensus value that represented the most coherent part of the data distribution where data were symmetrically disposed.

Table 2 lists assigned and provisional values for 10 major components and 45 trace elements in Geo*PT*40 (ShWYO-1). Bar charts for the 55 measurands of Geo*PT*40 that were judged to have satisfactory distributions to permit consensus values to be designated with assigned or provisional status are shown in Figure 1. These are: SiO_2, TiO_2, Al_2O_3, Fe_2O_3T, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5, As, Ba, Be, Bi*, C(tot)*, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Ga, Gd, Ge*,Hf, Ho, La, Li, Lu, Mo, Nb, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Sm, Sn, Sr, Ta, Tb, Th, Tl, Tm, U, V, W*, Y, Yb, Zn and Zr. Of these, provisional values were given to the 4 elements marked '*'. Instances of provisional status were recorded because either i) a relatively small number of results contributed to the consensus, or ii) the results were unduly dispersed in relation to the target value, or iii) the distribution of values was severely skewed.

Bar charts for the 15 measurands: Fe(II)O, H_2O^+, CO_2, LOI, Ag, B, C(org), Cd, Cl, F, Hg, In, S, Se and Te are plotted in Figure 2 for information only, as the data were insufficient in number, the distribution too highly skewed or too variable for the reliable determination of a consensus for the estimation of *z*-scores. It is of particular note that reported values for Hg and In were particularly consistent, with median values of 0.046 and 0.043 mg kg^{-1} respectively, but insufficient values were submitted to justify reporting *z*-scores.

Z-score analysis

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

Data quality 1 for laboratories working to a 'pure geochemistry' standard of performance, where analytical results are designed for geochemical research and where care is taken to provide data of high precision and accuracy, sometimes at the expense of a reduced sample throughput rate. For Geo*PT*40, 1595 results of data quality 1 were submitted.

Data quality 2 for laboratories working to an 'applied geochemistry' standard of performance, where, although precision and accuracy are still important, the main objective is to provide results on large numbers of samples collected, for example, as part of geochemical mapping projects or geochemical exploration programmes. For Geo*PT*40, 2002 results of data quality 2 were submitted.

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

$$H_a = k.X_a^{0.8495}$$

Where X_a is the mass fraction of the element; the factor k = 0.01 for pure geochemistry laboratories and k = 0.02 for applied geochemistry laboratories.

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

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

Where X is the contributed measurement, X_a is the assigned value and H_a is the target standard deviation (all as mass fractions). *Z*-score values for results contributed to Geo*PT*40 are listed in Table 3. Results designated as data quality 1 are shown in bold: results of data quality 2 are shown underlined. *Z*-scores derived from provisional values are shown in italics.

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

Z-score results in the range $-2<z<2$ are considered to be 'satisfactory' (in the sense that no action is called for by the participant). If the *z*-score for any element falls outside this range, especially if it is outside the range $-3<z<3$, contributing laboratories are advised to examine their procedures, and if necessary, take action to ensure that determinations are not subject to unsuspected analytical bias.

Overall performance

A summary of the overall performance of individual laboratories for this round is plotted in multiple *z*-score charts in Figure 3. In these charts, the *z*-score performance for each element is distinguished by symbols that make it simple to identify whether the results were satisfactory or gave *z*-scores that exceeded the action limits. This chart is designed to help individual laboratories to judge their overall performance in this proficiency testing round. Participants should always review their *z*-scores in accord 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 41, the test sample for which will be distributed during March 2017.

Acknowledgements

The authors thank Cynthia Turner for much-valued assistance in distributing this sample and Thomas Meisel for development of software which has greatly assisted the investigation of data according to analytical procedure.

Appendix 1

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Table 1 - GeoPT40 Contributed data for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code		W2	W3	W4	W8	W9	W11	W12	W13	W14	W15	W16	W17	W18
SiO2	$g\ 100g^{-1}$	61.91	62.47	57.43	61.8		61.5	62.98	**62.067**	**57.48**		60.267	61.98	61.19
TiO2	$g\ 100g^{-1}$	0.57	0.56	0.574	0.56		0.6	0.613	**0.559**	**0.6**		0.554	0.57	0.56
Al2O3	$g\ 100g^{-1}$	13.36	12.93	16.45	13.15		15.83	14.26	**13.1**	**15.67**		12.857	13.32	12.98
Fe2O3T	$g\ 100g^{-1}$	4.72	4.56	4.4	4.61		5.46	4.828	**4.696**	**5.19**	**4.54**	4.525	4.57	4.65
Fe(II)O	$g\ 100g^{-1}$							0.85						
MnO	$g\ 100g^{-1}$	0.04	0.04	0.034	0.041		0.05	0.050	**0.044**	**0.05**	**0.043**	0.040	0.05	0.04
MgO	$g\ 100g^{-1}$	2.75	2.79	4.68	2.81		3.39	2.936	**2.885**	**4.17**	**2.86**	2.802	2.88	2.91
CaO	$g\ 100g^{-1}$	3.78	3.97	4.28	3.87		4.05	3.984	**3.921**	**4.41**	**4.01**	3.87	3.95	3.88
Na2O	$g\ 100g^{-1}$	0.96	1		1.03		0.82	1.212	**1.031**	**0.86**		1.03	1.03	1.05
K2O	$g\ 100g^{-1}$	2.52	2.49	2.52	2.49		2.41	2.576	**2.413**	**2.42**		2.413	2.49	2.38
P2O5	$g\ 100g^{-1}$	0.17	0.18	0.319	0.18		0.22	0.178	**0.184**	**0.16**		0.171	0.176	0.17
H2O+	$g\ 100g^{-1}$													
CO2	$g\ 100g^{-1}$					3.41						2.9		
LOI	$g\ 100g^{-1}$	8.47	7.18		7.22		10.2	7	**8.25**	**8.91**		9.746	7.37	8.45
Ag	$mg\ kg^{-1}$							0.22						
As	$mg\ kg^{-1}$	13									**13.18**			
Au	$mg\ kg^{-1}$													
B	$mg\ kg^{-1}$													
Ba	$mg\ kg^{-1}$	519	607	553	580			550	**588.4**	**581**	**595.6**	607		599
Be	$mg\ kg^{-1}$							1.4	**1.71**					1.81
Bi	$mg\ kg^{-1}$							0.278	**0.37**					
Br	$mg\ kg^{-1}$													
C(org)	$mg\ kg^{-1}$											2420		
C(tot)	$mg\ kg^{-1}$					9300		10250				10330		
Cd	$mg\ kg^{-1}$						1.19	0.109	**0.27**					
Ce	$mg\ kg^{-1}$			45					**55.49**	**54.47**	**55.77**			58.2
Cl	$mg\ kg^{-1}$													
Co	$mg\ kg^{-1}$	11	17				20.1	9.4	**10.38**	**16**	**12.33**			10.8
Cr	$mg\ kg^{-1}$	66	62	117			117		**72.48**	**104**	**71.97**	79		64.6
Cs	$mg\ kg^{-1}$			10					**7.07**	**7.17**	**7.14**			7.46
Cu	$mg\ kg^{-1}$	19	23	57			34.4	21.68	**20.52**	**25**	**25.6**	25		23.7
Dy	$mg\ kg^{-1}$								**4.08**	**3.03**	**3.91**			4.09
Er	$mg\ kg^{-1}$								**2.48**	**1.76**	**2.26**			2.39
Eu	$mg\ kg^{-1}$								**1.09**	**1.03**	**1.048**			1.12
F	$mg\ kg^{-1}$													
Ga	$mg\ kg^{-1}$	14		12					**16.07**		**17.05**			15.9
Gd	$mg\ kg^{-1}$			35					**4.37**	**3.94**	**4.63**			4.59
Ge	$mg\ kg^{-1}$									**2.5**				1.41
Hf	$mg\ kg^{-1}$								**5.33**	**2.29**	**3.58**			5.11
Hg	$mg\ kg^{-1}$					0.042		0.037	**0.046**					
Ho	$mg\ kg^{-1}$								**0.87**	**0.61**	**0.785**			0.809
I	$mg\ kg^{-1}$													
In	$mg\ kg^{-1}$													
La	$mg\ kg^{-1}$			18					**28.93**	**28.72**	**28.93**			29.8
Li	$mg\ kg^{-1}$							33.23	**40.02**					42.7
Lu	$mg\ kg^{-1}$								**0.39**	**0.25**	**0.348**			0.357
Mo	$mg\ kg^{-1}$							0.968	**1.15**					
Nb	$mg\ kg^{-1}$	11		9					**12.37**	**13**	**11.52**			11.6
Nd	$mg\ kg^{-1}$			22					**25.27**	**23**	**24.82**			26.9
Ni	$mg\ kg^{-1}$	26	27				21.6	24.64	**26.82**	**34**	**33.7**	39		28.8
Pb	$mg\ kg^{-1}$	22					35.1	21.42	**19.66**	**49**	**18.8**	52		21.6
Pd	$mg\ kg^{-1}$													
Pr	$mg\ kg^{-1}$			4					**7.07**	**6.2**	**6.45**			6.91
Pt	$mg\ kg^{-1}$													
Rb	$mg\ kg^{-1}$	96		101					**96.4**	**107**	**101**			102
Re	$mg\ kg^{-1}$							0.002						
Rh	$mg\ kg^{-1}$													
S	$mg\ kg^{-1}$			8930	7500	4500		7160						
Sb	$mg\ kg^{-1}$							0.87	**0.93**					
Sc	$mg\ kg^{-1}$	14	10					9.23	**11.65**	**10.16**	**12.78**			11.5
Se	$mg\ kg^{-1}$							1.52						
Sm	$mg\ kg^{-1}$								**4.85**	**4.36**	**4.81**			5.18
Sn	$mg\ kg^{-1}$							1.982	**1.67**					
Sr	$mg\ kg^{-1}$	189	197	196	190				**183.8**	**220**	**193.120**			204
Ta	$mg\ kg^{-1}$								**0.92**	**0.34**	**0.783**			0.829
Tb	$mg\ kg^{-1}$								**0.71**	**0.56**	**0.688**			0.689
Te	$mg\ kg^{-1}$													
Th	$mg\ kg^{-1}$								**9.4**	**7.23**	**8.58**			9.29
Tl	$mg\ kg^{-1}$													
Tm	$mg\ kg^{-1}$								**0.38**	**0.26**	**0.354**			0.356
U	$mg\ kg^{-1}$								**3.18**	**2.48**	**2.91**			3.37
V	$mg\ kg^{-1}$	108	113	198			152.4	115	**114.050**	**141**	**122.7**	105		112
W	$mg\ kg^{-1}$								**1.45**					
Y	$mg\ kg^{-1}$	24		23					**22.38**	**37**	**23.03**			24.5
Yb	$mg\ kg^{-1}$								**2.59**	**1.67**	**2.23**			2.36
Zn	$mg\ kg^{-1}$	92	94	95			148.6	81.11	**97.61**	**150**	**95.37**	113		93.8
Zr	$mg\ kg^{-1}$	189		183					**188.740**	**198**	**121.7**	194		197

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

Table 1 - GeoPT40 Contributed data for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code		W20	W21	W22	W23	W24	W25	W26	W27	W28	W30	W31	W32	W34
SiO2	g 100g^{-1}	61.67	61.513	**59.3**	61.1	63.2	63.7	**63.34**	62.09	**60.92**	61.924		**62.128**	**62.52**
TiO2	g 100g^{-1}	0.567		**0.57**	0.55	0.54	0.58	**0.57**	0.56	**0.58**	0.571	**0.49**	**0.558**	**0.57**
Al2O3	g 100g^{-1}	13.11		**13.1**	12.7	12.9	13.02	**13.44**	13.29	**12.86**	13.256	**12.3**	**12.94**	**13.25**
Fe2O3T	g 100g^{-1}	4.69		**5.18**	4.38	4.51	4.68	**4.88**	4.55	**4.59**	4.673	**3.89**	**4.55**	**4.63**
Fe(II)O	g 100g^{-1}									**0.64**	0.878			
MnO	g 100g^{-1}	0.045		**0.05**	0.04		426.9	**0.045**		**0.04**	0.043	**0.036**	**0.042**	**0.04**
MgO	g 100g^{-1}	2.87		**2.86**	2.74	2.79	2.95	**2.84**	2.84	**2.74**	2.827	**2.58**	**2.776**	**2.85**
CaO	g 100g^{-1}	3.989		**4.53**	3.83	3.9	4.13	**4.04**	3.87	**3.97**	3.945		**3.903**	**3.88**
Na2O	g 100g^{-1}	1		**1.09**	1.09	1.01	1.03	**1.01**	0.72	**0.97**	1.065	**0.91**	**0.997**	**0.93**
K2O	g 100g^{-1}	2.339		**2.93**	2.4	2.43	2.52	**2.5**	2.49	**2.47**	2.465	**2.07**	**2.44**	**2.44**
P2O5	g 100g^{-1}	0.178		**0.16**	0.181	0.18	0.187	**0.181**	0.182	**0.17**	0.186		**0.181**	**0.176**
H2O+	g 100g^{-1}				4.6					**5.18**	4.453	**3.01**		
CO2	g 100g^{-1}									**4.72**				
LOI	g 100g^{-1}	7.77	7.868	**8.4**	7.4	8.02	7.2	**5.83**	7.51		7.055		**7.55**	**8.72**
Ag	mg kg^{-1}	0.6			0.6	0.14								
As	mg kg^{-1}	12		**4**	11	13	12.2			10			**10.6**	
Au	mg kg^{-1}													
B	mg kg^{-1}													
Ba	mg kg^{-1}	574			590	616	520	**631.9**	571	**613**	599.346	**494.2**	583	
Be	mg kg^{-1}				1.5	1.64					1.765	**1.57**	1.754	
Bi	mg kg^{-1}				0.9	0.37	0.2		2.12	7	0.341	**0.28**		
Br	mg kg^{-1}						0.8							
C(org)	mg kg^{-1}				0.14									
C(tot)	mg kg^{-1}				1.03						10879		9508	**9330**
Cd	mg kg^{-1}				0.1	0.13	1.2		0.15	5	0.141	**0.09**		
Ce	mg kg^{-1}	62			49.7	53.5	51.1	**53.1**	51.99	**64**	56.518	**50.37**	42.99	
Cl	mg kg^{-1}									38				
Co	mg kg^{-1}	10			10.8	10.5	12.6	**11.2**	14	**16**	11.193	**9.82**	10.09	
Cr	mg kg^{-1}	68.3			55		62.5	**67.4**		**74**	71.088		60.88	
Cs	mg kg^{-1}	6.9			7.34	7.06	11.5		7.03	**6**	7.467	**6.4**	6.819	
Cu	mg kg^{-1}	34.3		**21**	26	24.6	21.3		13	**24**	24.466	**23.7**	23.31	
Dy	mg kg^{-1}				3.58	4.4		3.6	3.59		4.223	**3.5**	3.087	
Er	mg kg^{-1}				2.8	2.61		2.1	1.94		2.477	**2.1**	1.814	
Eu	mg kg^{-1}				1.13	1.22		1	1.25		1.103	**0.95**	0.927	
F	mg kg^{-1}		690							712				
Ga	mg kg^{-1}	16.5		**16**	15.7	16.8	14.4		11	**17**	16.182	**13.8**	15.25	
Gd	mg kg^{-1}				4.4	4.86		4.5	4.21		4.515	**4.15**	3.499	
Ge	mg kg^{-1}								1.91			**1.28**	1.391	
Hf	mg kg^{-1}				2.02	5.3	6.1		3.95	**6**	4.41		2.444	
Hg	mg kg^{-1}													
Ho	mg kg^{-1}				0.72	0.9					0.832	**0.68**	0.614	
I	mg kg^{-1}						2.2							
In	mg kg^{-1}				0.05	0.059					0.055			
La	mg kg^{-1}	27.3			19.8	30	25.3	**27.6**	27.55	**32**	29.28	**24.04**	21.847	
Li	mg kg^{-1}				44	40.2			35.63		38.364	**36.8**	36.62	
Lu	mg kg^{-1}				0.34	0.38			0.31		0.358	**0.296**	0.254	
Mo	mg kg^{-1}			**5**	1.49	1.12	1.4			**4**	1.113		1.6	
Nb	mg kg^{-1}	12.8		**12**	8.1	12	10.6	**10.7**		**17**	11.283		11.22	
Nd	mg kg^{-1}	26.7			22.4	26.7	20.9	**24.4**	23.2	**28**	26.663	**22.15**	20.63	
Ni	mg kg^{-1}	27.5		**22**	26.5	26.8	24.3	**30.3**		**34**	29.269	**24.78**	29.3	
Pb	mg kg^{-1}	22		**17**	28	21	17.7			**21**	20.218	**12.4**	20.26	
Pd	mg kg^{-1}													
Pr	mg kg^{-1}				6.61	7.02			6.09		7.015	**5.84**	5.332	
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	102		**103**	96	103	94.5	**95.5**	99	**106**	107.475	**91.7**	106.1	
Re	mg kg^{-1}													
Rh	mg kg^{-1}													
S	mg kg^{-1}				0.75	0.74				3218	0.663		6420	**7170**
Sb	mg kg^{-1}	0.6			0.71	1.03	4.1			5	0.993	**0.85**	1.8	
Sc	mg kg^{-1}				9.4	11.8	11.2	**11.5**	11	**15**	10.841		13.17	
Se	mg kg^{-1}						0.6							
Sm	mg kg^{-1}	3.8			5.5	5.45		**4.6**	4.3		5.181	**4.28**	4.294	
Sn	mg kg^{-1}	1.7			2.3		3.9			**3**	2.205			
Sr	mg kg^{-1}	194		**190**	216	211	181.9	**204.7**	186	**202**	196.921	**175**	190.5	
Ta	mg kg^{-1}				1.2	0.73	0.6				0.831		0.673	
Tb	mg kg^{-1}				0.71	0.72			0.64		0.675	**0.6**	0.502	
Te	mg kg^{-1}				0.43		3.9							
Th	mg kg^{-1}	16.8		**2**	9.5	9.26	7.8	8.8	10.48	**8**	9.049	**7.84**	7.485	
Tl	mg kg^{-1}				0.5	0.66	0.5		1.38		0.646	**0.64**		
Tm	mg kg^{-1}				0.34	0.34			0.29		0.358	**0.305**	0.259	
U	mg kg^{-1}				2.92	3.25	3.9		2.61	**3**	3.258		2.556	
V	mg kg^{-1}	118			126	130	96.4	**122.7**	118	**122**	114.088	**102**	112.7	
W	mg kg^{-1}			**4**	1.3		3.4				1.441	**1.75**		
Y	mg kg^{-1}	27		**29**	22.3	24.4	21.9	**21.5**	22.36	**25**	24.695		17.24	
Yb	mg kg^{-1}				2.7	2.45	0.3	**2**	1.83		2.377		1.688	
Zn	mg kg^{-1}	97.8		**94**	107	100	89.4		97	**93**	99.353	**79**	105.7	
Zr	mg kg^{-1}	189		**180**	69.6	204	173.9	**99.3**	181	**188**	162.027		74.84	

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

Table 1 - GeoPT40 Contributed data for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code		W35	W36	W37	W38	W39	W41	W43	W44	W45	W47	W48	W50	W51
SiO2	$g\,100g^{-1}$	59.78	61.89	60.11	**60.63**	**61.21**	60.99	60.2	62.32		**61.314**	62.8	**61.82**	**62.26**
TiO2	$g\,100g^{-1}$	0.563	0.566	0.54	**0.58**	**0.554**	0.569	0.64	0.59	**0.566**	**0.565**	0.57	**0.55**	**0.57**
Al2O3	$g\,100g^{-1}$	13.23	12.71	14.05	**12.73**	**13.05**	13.07	14.6	13.12	**13.019**	**13.131**	13.9	**12.82**	**13.17**
Fe2O3T	$g\,100g^{-1}$	4.58	4.56	4.86	**4.56**	**4.587**	4.566	4.88	4.68	**4.532**	**4.915**	4.83	**4.47**	**4.71**
Fe(II)O	$g\,100g^{-1}$													
MnO	$g\,100g^{-1}$	0.042	0.043	0.044	**0.04**	**0.043**	0.039	0.043	0.044	**0.043**	**0.044**	0.045	**0.05**	**0.04**
MgO	$g\,100g^{-1}$	2.85	2.809	2.47	**2.79**	**2.87**	2.855	2.75	2.89	**3.101**	**2.866**	2.71	**2.35**	**2.77**
CaO	$g\,100g^{-1}$	3.8	3.72	3.68	**3.87**	**3.918**	3.838	4.5	4.01	**3.763**	**3.929**	3.86	**3.86**	**3.85**
Na2O	$g\,100g^{-1}$	1.1	1.04	0.58	**0.97**	**1.008**	1.048	0.84	1.04	**1.028**	**1.015**	0.82	**0.96**	**1.02**
K2O	$g\,100g^{-1}$	2.41	2.45	2.26	**2.39**	**2.401**	2.437	2.55	2.44	**2.421**	**2.461**	2.5	**2.44**	**2.43**
P2O5	$g\,100g^{-1}$	0.184	0.17	0.15	**0.18**	**0.19**	0.162	0.18	0.19		**0.182**	0.2	**0.17**	**0.19**
H2O+	$g\,100g^{-1}$													**2.68**
CO2	$g\,100g^{-1}$													
LOI	$g\,100g^{-1}$	10.1		10.09	9.32	**9.26**	7.889	7.64	8.64		**7.73**	7.59	10.13	**7.72**
Ag	$mg\,kg^{-1}$													
As	$mg\,kg^{-1}$	11			**10**	**14**				**12.6**				
Au	$mg\,kg^{-1}$													
B	$mg\,kg^{-1}$			30.7										
Ba	$mg\,kg^{-1}$	573	581	20.7	**523.5**	**557**		571	590	**575**	**579.8**	620		
Be	$mg\,kg^{-1}$			2.1					1.62					
Bi	$mg\,kg^{-1}$													
Br	$mg\,kg^{-1}$	3								0.91				
C(org)	$mg\,kg^{-1}$													
C(tot)	$mg\,kg^{-1}$		10300				9860							**1**
Cd	$mg\,kg^{-1}$			0.3				0.14						
Ce	$mg\,kg^{-1}$	54.7	57	53.1	**48.1**	**55**		55	57.2	**59.1**	**54.6**			
Cl	$mg\,kg^{-1}$					**144**		90						
Co	$mg\,kg^{-1}$	8		13.3	**9.7**	**13**		11.4	11.3	**10.6**				
Cr	$mg\,kg^{-1}$	44	68	33.5	**61.9**	**77**		71	65.2	**69.2**	**73**			
Cs	$mg\,kg^{-1}$					**9**		6.85	7.1	**6.83**	**4.2**			
Cu	$mg\,kg^{-1}$	24	25	69.9	**22.4**	**24**		21	26.6		**25.6**			
Dy	$mg\,kg^{-1}$	3.48		3.2				3.4	4.05	**4.1**	**4.34**			
Er	$mg\,kg^{-1}$	1.95		1.9				1.92	2.18					
Eu	$mg\,kg^{-1}$	1.06		1.1				1.04	1.15	**1.08**				
F	$mg\,kg^{-1}$				1509	**1093**		890						
Ga	$mg\,kg^{-1}$	13			**13.5**	**16**		17	15.6	12	**15.92**			
Gd	$mg\,kg^{-1}$	4.05		4.5				4	4.36					
Ge	$mg\,kg^{-1}$				**1.3**				1.29					
Hf	$mg\,kg^{-1}$				**3.1**				4.95	**5.2**	**5.15**			
Hg	$mg\,kg^{-1}$													
Ho	$mg\,kg^{-1}$	0.68		0.6				0.66	0.78					
I	$mg\,kg^{-1}$													
In	$mg\,kg^{-1}$													
La	$mg\,kg^{-1}$	27.8	28	27.2	**25.6**	**21**		28.3	28.9	**29**	**26.9**			
Li	$mg\,kg^{-1}$			45				38	38.6					
Lu	$mg\,kg^{-1}$	0.26		0.3				0.28	0.34	**0.319**				
Mo	$mg\,kg^{-1}$			4.2	**1**	**4**			1.11					
Nb	$mg\,kg^{-1}$	12			**10.8**	**8**		14	10.4		**10.8**			
Nd	$mg\,kg^{-1}$	25.1		24.6	**24.4**	**25**		25.4	26	**21.3**	**25.8**			
Ni	$mg\,kg^{-1}$	27	20		**26.1**	**30**		27	28.1		**27.3**			
Pb	$mg\,kg^{-1}$	18		15.6	**19.9**	**16**		19.9	20.6		**18.7**			
Pd	$mg\,kg^{-1}$													
Pr	$mg\,kg^{-1}$	6.8		6.2				6.7	7.01					
Pt	$mg\,kg^{-1}$													
Rb	$mg\,kg^{-1}$	96			**93.2**	**95**		104	99.9	**102**	**106**	120		
Re	$mg\,kg^{-1}$													
Rh	$mg\,kg^{-1}$													
S	$mg\,kg^{-1}$		7500	6120	6491	**34094**	7537	8150						
Sb	$mg\,kg^{-1}$			1.4				0.9						
Sc	$mg\,kg^{-1}$	11.4		13.3	**11.7**	**14**			12.9	**11.15**	**10.66**			
Se	$mg\,kg^{-1}$			14.3										
Sm	$mg\,kg^{-1}$	4.85		4.6				4.9	4.99	**4.95**	**4.96**			
Sn	$mg\,kg^{-1}$							2.3						
Sr	$mg\,kg^{-1}$	184		203.8	**181.5**	**177**		192	190	**194**	**202.4**	190		
Ta	$mg\,kg^{-1}$				**2.8**				0.78	**0.87**				
Tb	$mg\,kg^{-1}$	0.58		0.6				0.58	0.69	**0.64**				
Te	$mg\,kg^{-1}$													
Th	$mg\,kg^{-1}$	9.05			**7.9**	**8**			8.88	**9.22**	**8.7**			
Tl	$mg\,kg^{-1}$					**1**		0.66	0.69					
Tm	$mg\,kg^{-1}$	0.27		0.3				0.29	0.35					
U	$mg\,kg^{-1}$	3			**2.2**	**3**		3	3.14	**3.2**	**3.4**			
V	$mg\,kg^{-1}$	92	115	266.6	**113.8**	**136**		113	110	**118**	**113.5**			
W	$mg\,kg^{-1}$								1.52	1.4				
Y	$mg\,kg^{-1}$	18.2	14	19	**22.8**	**21**			21.6		**25.68**			
Yb	$mg\,kg^{-1}$	1.76		1.9				1.9	2.23	**2.07**				
Zn	$mg\,kg^{-1}$	90	94	138.2	**84.6**	**96**		93	89.6	**105**	**98.5**			
Zr	$mg\,kg^{-1}$	165	164		**180.4**	**183**		200	170	**210**	**197.1**	190		

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

Table 1 - GeoPT40 Contributed data for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code		W52	W53	W54	W55	W58	W60	W62	W63	W64	W65	W66	W67	W68
SiO2	g 100g^{-1}	**60.86**	60.938	**61.71**	57.55	**60.64**	59.79	60.68	62.87		**62.09**	**61.27**	62.01	62.72
TiO2	g 100g^{-1}	**0.55**	0.556	**0.56**	0.635	**0.58**	0.51	0.6	0.58		**0.52**	**0.570**	0.55	0.57
Al2O3	g 100g^{-1}	**12.64**	13.525	**12.98**	16.05	**12.98**	12.91	13.48	12.36		**13.03**	**13.09**	13.12	13.25
Fe2O3T	g 100g^{-1}	**4.56**	4.782	**4.82**	4.99	**4.81**	4.56	4.625	4.73		**4.61**	**4.708**	4.56	4.65
Fe(II)O	g 100g^{-1}			**0.88**	0.5			0.56						
MnO	g 100g^{-1}	**0.04**	0.049	**0.043**	0.046			0.040	0.05		**0.04**	**0.042**	0.047	0.044
MgO	g 100g^{-1}	**2.71**	3.499	**2.84**	2.91	**2.96**	2.7	2.935	2.93		**2.74**	**2.746**	2.86	2.8
CaO	g 100g^{-1}	**3.94**	3.717	**3.96**	4.26	**4.02**	4.12	3.98	3.94		**3.84**	**3.884**	3.9	3.98
Na2O	g 100g^{-1}	**1.02**	1.062	**1.02**	0.79	**0.97**	1.03	0.88	0.87			**0.916**	1.07	1.06
K2O	g 100g^{-1}	**2.32**	2.566	**2.42**	2.47	**2.46**	2.38	2.51	2.49		**2.4**	**2.442**	2.5	2.55
P2O5	g 100g^{-1}	**0.18**	0.211	**0.18**	0.159	**0.18**	0.19	0.185	0.17		**0.16**	**0.176**	0.18	0.18
H2O+	g 100g^{-1}			**3.78**					1.19					
CO2	g 100g^{-1}													
LOI	g 100g^{-1}	**10.37**	7.43	**8.29**	9.9	7.5	9.93	8.32	7.14		**9.5**		7.77	**7.04**
Ag	mg kg^{-1}				0.39						**0.07**			
As	mg kg^{-1}		10	**11.929**	9.008			11			**5.06**	**12.8**	11	
Au	mg kg^{-1}													
B	mg kg^{-1}			**67**	45.119						**89.1**			
Ba	mg kg^{-1}	**603**	160	**582.240**	535.413	630	472.8	560		**580**	**587**	**575.7**	563	
Be	mg kg^{-1}	**1.7**		**1.674**	1.38			1.78			**1.8**	**1.633**		
Bi	mg kg^{-1}		13.5	**0.339**	0.3			0.353			**0.5**			
Br	mg kg^{-1}													
C(org)	mg kg^{-1}			**2072**										
C(tot)	mg kg^{-1}			**10244**				13600						
Cd	mg kg^{-1}			**0.169**	0.105			0.173			**0.09**			
Ce	mg kg^{-1}	**54.5**		**55.648**	47.82	50	36.09	56.61		**54.44**	**54.7**	**48.7**	50	
Cl	mg kg^{-1}			**57**										
Co	mg kg^{-1}	**11**	10	**10.611**	9.635	10	12.74	10.55			**10.7**	**10.73**	11	
Cr	mg kg^{-1}	**66.5**	153	**72.066**	54.816	80	50.89	59	68		**66.4**	**61.43**	67	
Cs	mg kg^{-1}	**7.1**		**7.225**	5.899			7.78		**7.068**	**6.99**	**6.8**	6	
Cu	mg kg^{-1}	**22.4**		**25.416**	18.185	**17**		20			**23.4**	**25.13**	21	
Dy	mg kg^{-1}	**3.9**		**4.095**	3.419		3.786	3.53		**3.902**	**4.03**			
Er	mg kg^{-1}	**2.2**		**2.317**	2.042		2.266	2.27		**2.266**	**2.42**			
Eu	mg kg^{-1}	**1.1**		**1.113**	1.057		1.465			**1.2**	**1.15**			
F	mg kg^{-1}			**842**										
Ga	mg kg^{-1}	**14.8**		**16.696**	14.674		15.56	15		**15.97**	**16.1**	**15.73**	15	
Gd	mg kg^{-1}	**4.2**		**4.271**	4.145		5.555			**4.268**	**4.49**			
Ge	mg kg^{-1}			**1.555**	1.079						**1.34**			
Hf	mg kg^{-1}	**5.1**		**4.919**	3.001		5.978	5		**5.07**	**5.05**		3	
Hg	mg kg^{-1}			**0.052**				0.049				**0.047**		
Ho	mg kg^{-1}	**0.8**		**0.851**	0.684		0.736	0.699		**0.81**	**0.81**			
I	mg kg^{-1}													
In	mg kg^{-1}			**0.054**				0.061			**0.1**			
La	mg kg^{-1}	**28.5**		**29.174**	23.76	30	31.191	30.92		**28.46**	**29.4**	**26.87**	28	
Li	mg kg^{-1}		20	**42.3**	38.018			41.34			**37.7**	**37.27**		
Lu	mg kg^{-1}	**0.3**		**0.367**	0.294		0.221	0.321		**0.356**	**0.37**			
Mo	mg kg^{-1}	**1.6**	3	**1.125**	0.699						**1.3**	**1.133**		
Nb	mg kg^{-1}	**10.8**		**10.030**	9.467	**11**	13.446	10		**10.45**	**12.2**	**8.9**	10	
Nd	mg kg^{-1}	**25.1**		**24.853**	24.45		27.338	26.18		**25.29**	**25.5**	**19.23**	26	
Ni	mg kg^{-1}	**26.8**		**28.650**	22.913	**35**	22.84	30.26			**27.7**	**28**	27	
Pb	mg kg^{-1}	**13.9**		**20.258**	18.07		16.39	19.98			**22.1**	**19.53**	20	
Pd	mg kg^{-1}													
Pr	mg kg^{-1}	**6.6**		**6.558**	6.456		7.156	7.05		**6.64**	**6.73**			
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	**102.1**		**104.420**	73.607	**102**	84.431	106.7		**101.1**	**100**	**103.6**	99	
Re	mg kg^{-1}										**0.004**			
Rh	mg kg^{-1}													
S	mg kg^{-1}			**7638**		**6700**		6620	7409				3200	
Sb	mg kg^{-1}			**0.953**	0.733								0.8	
Sc	mg kg^{-1}	**10.7**		**12.02**	10.435	13	18.03	10.1		**5**	**11.7**	**10.23**	11	
Se	mg kg^{-1}			**0.65**	0.768						**0.09**	**0.717**		
Sm	mg kg^{-1}	**4.9**		**4.974**	4.79		5.3	5.42		**4.976**	**4.94**			
Sn	mg kg^{-1}	**1.1**		**1.802**	1.421			7		**2.103**			1.7	
Sr	mg kg^{-1}	**199**	120	**202.167**	172.434	**186**	211.8	213.9		**198.2**	**195**	**198**	190	
Ta	mg kg^{-1}	**0.8**		**0.874**	0.959		1.179			**0.819**	**0.88**			
Tb	mg kg^{-1}	**0.6**		**0.663**	0.55		0.64	0.71		**0.715**	**0.7**			
Te	mg kg^{-1}				0.031									
Th	mg kg^{-1}	**9.2**		**9.027**	8.601		10.164	9.28		**8.619**	**9.22**	**8.15**	9	
Tl	mg kg^{-1}	**0.7**	8		0.615			0.73			**0.86**		1	
Tm	mg kg^{-1}	**0.3**		**0.341**	0.297		0.288	0.299		**0.345**	**0.37**			
U	mg kg^{-1}	**3.1**		**3.309**	3.229		3.707	3.06		**3.173**	**3.29**	**2.923**	4	
V	mg kg^{-1}	**113.5**	101	**110.410**	102.431		93.07	120			**120**	**115**	115	
W	mg kg^{-1}	**1.5**		**1.547**	1.341		4.1			**0.998**	**1.08**		2	
Y	mg kg^{-1}	**24.3**	11	**23.324**	15.299	24	23.115	23		**23.48**	**24.3**	**24.57**	23	
Yb	mg kg^{-1}	**2.2**		**2.414**	1.928		2.151	2.03		**2.273**	**2.39**		1	
Zn	mg kg^{-1}	**121.5**		**108.042**	72.277	**105**	77.13	102			**89.7**	**98.77**	92	
Zr	mg kg^{-1}	**182.5**		**182.754**	89.937	**192**	87.15	173		**180.8**	**185**		182	

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

Table 1 - GeoPT40 Contributed data for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code		W69	W71	W72	W73	W74	W75	W76	W77	W78	W79	W80	W81	W82
SiO2	$g\ 100g^{-1}$	60.1		62.21	**61.85**	**59.98**			65.32	62.08	62.9	61.84	**62.14**	**62.14**
TiO2	$g\ 100g^{-1}$	0.59	0.53	0.591	**0.57**	**0.547**		**0.531**	0.56	0.57	0.57	0.575	**0.566**	**0.58**
Al2O3	$g\ 100g^{-1}$	14.82	11.2	14.76	**13.24**	**12.9**			11.71	13.43	13.3	13.34	**11.99**	**13.12**
Fe2O3T	$g\ 100g^{-1}$	4.52	4.37	4.71	**4.71**	**4.71**			4.36	4.69	4.72	4.55	**4.67**	**4.831**
Fe(II)O	$g\ 100g^{-1}$									1.1		0.72		**0.78**
MnO	$g\ 100g^{-1}$	0.05	0.037	0.035	**0.018**	**0.048**	0.044	**0.042**	0.037	0.054		0.041	**0.044**	0.043
MgO	$g\ 100g^{-1}$	2.94	2.52	2.9	**3.03**	**2.68**			2.46	2.97	2.92	2.94	**2.852**	**2.92**
CaO	$g\ 100g^{-1}$	4.15	3.61	4.16	**2.72**	**3.85**			4.14	4.03	3.95	3.99	**4.086**	**4.12**
Na2O	$g\ 100g^{-1}$	0.7	0.96	1.08	**0.29**				0.99	1.01	1.02	1.05	**1.046**	**1.07**
K2O	$g\ 100g^{-1}$	2.59	2.24	2.47	**6.1**	**2.44**			2.23	2.5	2.52	2.58	**2.46**	**2.54**
P2O5	$g\ 100g^{-1}$	0.2		0.188	**0.15**	**0.178**				0.18	0.19	0.2	**0.188**	**0.195**
H2O+	$g\ 100g^{-1}$					**0.76**				5.3			**3.99**	**5.07**
CO2	$g\ 100g^{-1}$			3.09					3.96	2.77			**3.66**	**2.72**
LOI	$g\ 100g^{-1}$	7.71		8.31	**7.62**	**7.73**			9.1	7.27		7.27		**8.25**
Ag	$mg\ kg^{-1}$					**0.077**			0.092	0.42				
As	$mg\ kg^{-1}$			15.63	**6.9**	**10.3**	10.54		10.52	12		11.6		
Au	$mg\ kg^{-1}$					**0.01**								
B	$mg\ kg^{-1}$			70.9								65		
Ba	$mg\ kg^{-1}$	608	538	589.7		**214**	578.540	**554.913**		590.9		615	**601.5**	494
Be	$mg\ kg^{-1}$			1.76				**1.788**		1.55		1.69		
Bi	$mg\ kg^{-1}$								0.281	0.3				
Br	$mg\ kg^{-1}$													
C(org)	$mg\ kg^{-1}$			2362		**3369**				0.27				**3468**
C(tot)	$mg\ kg^{-1}$			10807		**10266**			10796	10100		9800		**10878**
Cd	$mg\ kg^{-1}$				**0.3**	**0.055**			0.26					
Ce	$mg\ kg^{-1}$		61.5	56.96		**23.8**	56.28	**54.779**	44.54	55		57		
Cl	$mg\ kg^{-1}$			130	**51.96**					85				
Co	$mg\ kg^{-1}$	19	12.5	11.07		**9.5**	11.06	**10.457**	9.85	11				
Cr	$mg\ kg^{-1}$	66	80.5	57.1		**89**		**65.048**	80.83	58.6				
Cs	$mg\ kg^{-1}$		8.21			**6.56**	7.56	**6.804**		7.5				
Cu	$mg\ kg^{-1}$	23	27.1	31.8	**11.59**	**17.9**	21.63	**22.707**	47.9	23.02		22		
Dy	$mg\ kg^{-1}$		4.13	4.1		**2.24**		**3.967**	2.969	4.02		3.19		
Er	$mg\ kg^{-1}$		2.39	2.42		**1.24**		**2.284**	1.769	2.41		1.96		
Eu	$mg\ kg^{-1}$		1.08	1.13		**0.434**		**1.060**	0.86	1.1		1.03		
F	$mg\ kg^{-1}$			609						694				**726**
Ga	$mg\ kg^{-1}$					**13.4**	15.34	**15.876**	14.73	17				
Gd	$mg\ kg^{-1}$		4.39	4.61		**3.16**		**4.254**	3.522	4.63		4.37		
Ge	$mg\ kg^{-1}$								1.58	1				
Hf	$mg\ kg^{-1}$			5.64		**2.51**		**4.857**	4.08	5		5.3		
Hg	$mg\ kg^{-1}$									0.045				0.05
Ho	$mg\ kg^{-1}$		0.82	0.831		**0.43**		**0.785**	0.662	0.82		0.62		
I	$mg\ kg^{-1}$													
In	$mg\ kg^{-1}$					**0.054**			0.07					
La	$mg\ kg^{-1}$	34	29	29.3		**18.1**	27.61	**28.030**	24.37	30.4		30.5		
Li	$mg\ kg^{-1}$		33	43.7		**25.7**		**39.236**		38		40		
Lu	$mg\ kg^{-1}$		0.35	0.357		**0.18**		**0.348**	0.273	0.36		0.27		
Mo	$mg\ kg^{-1}$	4		1.18	**0.89**	**1.23**	0.84	**1.225**	1.409	1.12				
Nb	$mg\ kg^{-1}$	12		11.7		**13.7**	11.17	**11.344**	8.11	10		10.9		
Nd	$mg\ kg^{-1}$			26.3		**13.5**		**24.665**	20.53	24.5		24.1		
Ni	$mg\ kg^{-1}$	48	32.1	29.3	**11.86**	**25.5**	28.53	**28.636**	32.41	27		26		
Pb	$mg\ kg^{-1}$	26	21.4	17.5	**26.3**	**14.5**	19.86	**20.150**	15.799	20.38		20.6		
Pd	$mg\ kg^{-1}$					**9.94**								
Pr	$mg\ kg^{-1}$			6.85		**1.9**		**6.463**	5.17	6.45		6.46		
Pt	$mg\ kg^{-1}$					**0.428**								
Rb	$mg\ kg^{-1}$	131	97.2	109		**25.2**	101.830	**103.363**	80.07	107		101		
Re	$mg\ kg^{-1}$													
Rh	$mg\ kg^{-1}$					**0.177**								
S	$mg\ kg^{-1}$	0.72		7675	**0.81**	**5990**			8010	6690	7200		**0.487**	**7284**
Sb	$mg\ kg^{-1}$			0.93	**7.4**	**1.27**			0.79	0.9				
Sc	$mg\ kg^{-1}$			11.04		**7.64**	11.03	**11.181**	11.81	11		12.4		
Se	$mg\ kg^{-1}$				**6.1**									
Sm	$mg\ kg^{-1}$			5.19		**2.99**		**4.850**	3.9	4.7		4.52		
Sn	$mg\ kg^{-1}$					**2.2**		**1.776**	1.86	3				
Sr	$mg\ kg^{-1}$	210	169	194		**165**	193.870	**193.681**	172.8	198.6		196	**203.1**	**214**
Ta	$mg\ kg^{-1}$			1.23				**0.789**	0.581	0.9				
Tb	$mg\ kg^{-1}$		0.64	0.698		**0.2**		**0.666**	0.504	0.65		0.61		
Te	$mg\ kg^{-1}$				**1.6**	**0.12**								
Th	$mg\ kg^{-1}$	15	11.12	10.65		**6.24**	8.24	**9.015**	5.83	9.6				
Tl	$mg\ kg^{-1}$					**0.59**				0.6				
Tm	$mg\ kg^{-1}$		0.34	0.35		**0.137**		**0.342**	0.266	0.35		0.27		
U	$mg\ kg^{-1}$	6	3.38	3.39		**3.68**	2.397	**3.252**	2.855	3.43				
V	$mg\ kg^{-1}$	181	106	118.5		**157**	124.020	**108.941**	110.110	128		120		
W	$mg\ kg^{-1}$					**1.79**			3.1	2				
Y	$mg\ kg^{-1}$	27	24.2	23.4		**14.2**	22.91	**23.518**	18.41	22.9		24.2		
Yb	$mg\ kg^{-1}$		0.64	2.296		**1.42**		**2.282**	1.897	2.47		1.72		
Zn	$mg\ kg^{-1}$	96	92.4	102.8	**41.68**	**88.1**	97.67	**92.615**	50.38	98		98		
Zr	$mg\ kg^{-1}$	213		178.2		**46.9**	188.520	**180.597**	148.3	190		188	**232.9**	

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

Table 1 - GeoPT40 Contributed data for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code		W83	W84	W86	W87	W88	W89	W90	W91	W93	W94	W96	W97	W98
SiO2	$g\ 100g^{-1}$		60	60.2		61.9	63.15	60.16	61.4		61.9		62.07	57.49
TiO2	$g\ 100g^{-1}$			0.56		0.54	0.57	0.54	0.57		0.6		0.57	
Al2O3	$g\ 100g^{-1}$			12.8		13.1	13.59	12.79	13.34		13.2		13.06	13.48
Fe2O3T	$g\ 100g^{-1}$			4.53		4.5	4.65	4.6	4.6		4.5		4.65	5.22
Fe(II)O	$g\ 100g^{-1}$						0.48				0.86			
MnO	$g\ 100g^{-1}$			0.04		0.085	0.048	0.045	0.04		0.05		0.042	0.028
MgO	$g\ 100g^{-1}$		2.94	2.85		2.7	2.72	2.74	2.85		2.9		2.9	1.99
CaO	$g\ 100g^{-1}$		3.4	3.8		4	4.15	3.82	3.78		4		3.82	5.59
Na2O	$g\ 100g^{-1}$			0.99		1.13	1.02	0.97	1.03		1		0.94	2.86
K2O	$g\ 100g^{-1}$			2.36		2.55	2.47	2.38	2.43		2.5		2.43	3.61
P2O5	$g\ 100g^{-1}$			0.22		0.18	0.18	0.182	0.17		0.2		0.175	
H2O+	$g\ 100g^{-1}$					3.53								
CO2	$g\ 100g^{-1}$					2.8								
LOI	$g\ 100g^{-1}$		7.4	10		6.88	7.37	8.44	8.64		7.6		7.72	8.19
Ag	$mg\ kg^{-1}$										1.6			
As	$mg\ kg^{-1}$			11		16	1.85		15.2	11.879	12.5			
Au	$mg\ kg^{-1}$													
B	$mg\ kg^{-1}$													
Ba	$mg\ kg^{-1}$			584		595	649	586	536	492.880	597		548	
Be	$mg\ kg^{-1}$	2.296		7		1.98	1.76			1.393	1.8		1.83	
Bi	$mg\ kg^{-1}$						0.28				0.4			
Br	$mg\ kg^{-1}$													
C(org)	$mg\ kg^{-1}$													
C(tot)	$mg\ kg^{-1}$													
Cd	$mg\ kg^{-1}$						0.19				0.2	0.18		
Ce	$mg\ kg^{-1}$	61.439		54	64.1	55	64.4	49.4	56	49.463	57.3	49.9	55.5	
Cl	$mg\ kg^{-1}$													
Co	$mg\ kg^{-1}$			10.3		11.3	9.92	12	12		11.3		10.7	
Cr	$mg\ kg^{-1}$			0.007		69	68.7	60	61		76.8		67.5	
Cs	$mg\ kg^{-1}$			7.4		7.1	6.45	7.24	10	6.423	7.3	6.07	7.04	
Cu	$mg\ kg^{-1}$			25		29	24.8	23	20	20.374	26.4		22.9	
Dy	$mg\ kg^{-1}$	3.789		4	4.65	3.9	3.88	3.52		3.694	4.2	3.63	4.09	
Er	$mg\ kg^{-1}$	2.33		2.5	2.55	2.32	2.45	2.19		2.105	2.5	2.1	2.4	
Eu	$mg\ kg^{-1}$	1.196		1.1	1.85	1.06	1.17	1.06		0.940	1.1	0.98	1.09	
F	$mg\ kg^{-1}$							606						
Ga	$mg\ kg^{-1}$					17	15.2	17	14		16.7	14.3	16.1	
Gd	$mg\ kg^{-1}$	5.129		4.5	14.6	4.3	4.91	3.96		4.062	4.6	3.87	4.45	
Ge	$mg\ kg^{-1}$	1.38					2.47				2	1.5		
Hf	$mg\ kg^{-1}$	5.313		5		4.4	4.75	4.63	2	3.954	5.4		4.88	
Hg	$mg\ kg^{-1}$													
Ho	$mg\ kg^{-1}$	0.716				0.78	0.77	0.73		0.726	0.9	0.72	0.84	
I	$mg\ kg^{-1}$													
In	$mg\ kg^{-1}$						0.054							
La	$mg\ kg^{-1}$	32.789		28	54	28	32.7	26.9	44	24.73	29.6	26.8	28.9	
Li	$mg\ kg^{-1}$			42		45	33.9			33.045			35.2	
Lu	$mg\ kg^{-1}$	0.359		0.34		0.34	0.34	0.32		0.321	0.4	0.31	0.36	
Mo	$mg\ kg^{-1}$					1.25	1.26				1.6		1.17	
Nb	$mg\ kg^{-1}$			11		11.9	10.7	13.4	10	12.504	11.4	15	11.6	
Nd	$mg\ kg^{-1}$	26.53		25.3	31.3	25.3	27.8	24.7	25	22.786	26.2	22.8	25.4	
Ni	$mg\ kg^{-1}$			29		33	29.3	28	25		29.2		29.6	
Pb	$mg\ kg^{-1}$			20		19	21.8	19.1	34	15.989	22.2		20.7	
Pd	$mg\ kg^{-1}$													
Pr	$mg\ kg^{-1}$	6.572		6.7		6.6	7.01	6.49		5.828	6.8	6.03	6.6	
Pt	$mg\ kg^{-1}$													
Rb	$mg\ kg^{-1}$			105		103	89.6	94.5	99	65.704	103	85.4	99.3	
Re	$mg\ kg^{-1}$													
Rh	$mg\ kg^{-1}$													
S	$mg\ kg^{-1}$							6343			6006			
Sb	$mg\ kg^{-1}$			0.8			0.88				1	0.96		
Sc	$mg\ kg^{-1}$			10	48.5	11.7	10.3	10.63	14	11.72	13	13.4	11.4	
Se	$mg\ kg^{-1}$						0.27							
Sm	$mg\ kg^{-1}$	5.222		4.9	5.74	4.8	5.42	4.54	4	4.330	5.1	4.38	5.01	
Sn	$mg\ kg^{-1}$	1.454				1.7	1.81			1.586	2	1.64	1.75	
Sr	$mg\ kg^{-1}$			204		199	184	191	189	168.460	194		196	
Ta	$mg\ kg^{-1}$					0.75	1.66	4.15		0.750	0.8	0.88	0.82	
Tb	$mg\ kg^{-1}$	0.715		0.7	1.71	0.68	0.77	0.6		0.627	0.7	0.62	0.69	
Te	$mg\ kg^{-1}$						0.037							
Th	$mg\ kg^{-1}$					9.1	11.1	8.75	9	8.577	9.2	8.41	9.35	
Tl	$mg\ kg^{-1}$			0.6		0.65	0.67					0.44		
Tm	$mg\ kg^{-1}$	0.367				0.35	0.33	0.33		0.315		0.3	0.35	
U	$mg\ kg^{-1}$	2.914		3		3.6	4	2.95	4.6	2.859	3.5	2.95	3.41	
V	$mg\ kg^{-1}$			115		116	122	121	117		119		111	
W	$mg\ kg^{-1}$					1.5	0.99	1.36	11		1.7	1.31		
Y	$mg\ kg^{-1}$			20	27.7	25	25.2	21.7	23	21.027	21.5	19.9	24.8	
Yb	$mg\ kg^{-1}$	2.215		2.3	3.45	2.3	2.5	2.18		2.158	2.4	2.09	2.38	
Zn	$mg\ kg^{-1}$			102		102	102	98	92		102		92.8	
Zr	$mg\ kg^{-1}$			195		180	185	177	180	148.430	203		179	

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

Table 1 - GeoPT40 Contributed data for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code		W99	W100	W101	W102	W103	W105	W106	W107	W108	W111	W112	W113	W114
SiO2	g 100g^{-1}	**61.68**	**61.5**	**63.6**	60.305	62.53	**61.4**	**61.52**	61.59	61.55	61.75			54.3
TiO2	g 100g^{-1}	**0.56**	**0.48**	**0.58**	0.544	0.56	**0.56**	**0.55**	0.567	0.55	0.562	**0.607**	0.004	1.39
Al2O3	g 100g^{-1}	**13.05**	**13.75**	**13.5**	12.769	13.01	**12.96**	**13.21**	13.13	13.06	13.08		2.645	12
Fe2O3T	g 100g^{-1}	**4.59**	**4.25**	**4.76**	4.596	4.56	**4.69**	**4.59**	4.614	4.7	4.55	**4.382**	3.491	13.5
Fe(II)O	g 100g^{-1}	**0.76**	**0.98**											13.5
MnO	g 100g^{-1}	**0.043**	**0.04**	**0.05**		0.04	**0.04**	**0.042**	0.044	0.05	0.038	**0.043**	0.038	0.13
MgO	g 100g^{-1}	**2.81**	**2.75**	**2.94**	2.772	2.89	**2.77**	**2.879**	2.796	2.84	2.81		1.968	1.47
CaO	g 100g^{-1}	**3.94**	**3.56**	**4.12**	3.701	3.94	**3.84**	**3.938**	3.853	3.96	3.93		3.375	9.54
Na2O	g 100g^{-1}	**1.02**	**0.88**	**0.94**	0.941	1.02	**0.86**	**1.001**	1.032	1.03	1		0.109	
K2O	g 100g^{-1}	**2.43**	**2.1**	**2.49**	2.383	2.43	**2.43**	**2.447**	2.45	2.48	2.42		0.298	4.73
P2O5	g 100g^{-1}	**0.18**	**0.19**	**0.19**	0.174	0.18	**0.18**	**0.185**	0.183	0.2	0.183		0.148	
H2O+	g 100g^{-1}													
CO2	g 100g^{-1}													
LOI	g 100g^{-1}	**2.91**	**9.55**	**8.9**	10.01	7.09	**8.32**	**8.26**	7.343	7.55				10.34
Ag	mg kg^{-1}		**0.15**				**0.11**	**0.118**					0.089	
As	mg kg^{-1}	**11**	**10**				**13.7**	**10.112**	15.39	12		**12.2**	9.657	11.53
Au	mg kg^{-1}													
B	mg kg^{-1}												10.8	
Ba	mg kg^{-1}	**571**	**600**	**585**		591	**593**	**568.034**	564.3	599		**536.7**	226.079	528
Be	mg kg^{-1}		**1.83**				**1.63**	**1.979**					0.708	
Bi	mg kg^{-1}							**0.304**				**0.097**	0.278	
Br	mg kg^{-1}													
C(org)	mg kg^{-1}					2000			2590					
C(tot)	mg kg^{-1}					10500	**11700**		11200		10100			
Cd	mg kg^{-1}		**0.12**					**0.108**					0.13	
Ce	mg kg^{-1}	**53**	**44**			53.7	**56.9**	**53.974**	57.01	71		**50.375**	29.24	904
Cl	mg kg^{-1}													
Co	mg kg^{-1}	**9**	**9.4**	**11**			**10.5**	**12.224**	11.82			**5.8**	8.527	113
Cr	mg kg^{-1}	**62**	**60.46**	**79**		80	**69.8**	**75.568**	78.62	75		**55**	20.29	103
Cs	mg kg^{-1}					6.83		**6.611**	11.29			**7.621**		
Cu	mg kg^{-1}	**23**	**15.5**	**21**			**21.3**	**23**	21.32	20		**21**	17.105	40.26
Dy	mg kg^{-1}		**3.9**			3.9	**4.09**	**3.901**				**3.356**	2.041	27
Er	mg kg^{-1}		**2.07**			2.32	**2.4**	**2.282**				**2.08**	1.01	
Eu	mg kg^{-1}		**1.028**			1.03	**1.1**	**1.11**				**1.037**	0.701	0.84
F	mg kg^{-1}													
Ga	mg kg^{-1}	**19**		**14**		16.4	15.1	**16.367**	15.35	16		**14.6**		
Gd	mg kg^{-1}		**4.45**			4.31	**4.65**	**4.334**				**4.116**	3.221	
Ge	mg kg^{-1}												0.044	
Hf	mg kg^{-1}					5.3	7.45	**4.6**	6.325			**2.853**		
Hg	mg kg^{-1}													
Ho	mg kg^{-1}		**0.97**			0.77	**0.83**	**0.789**				**0.7**	0.381	
I	mg kg^{-1}													
In	mg kg^{-1}													
La	mg kg^{-1}	**37**	**27.58**			30.9	**29.8**	**28.254**	28.51	40		**25.214**	13.72	150
Li	mg kg^{-1}						**30.9**	**39.99**				**39.847**	23.41	
Lu	mg kg^{-1}		**0.29**			0.36	**0.36**	**0.34**				**0.296**	0.104	3.91
Mo	mg kg^{-1}		**1.37**				**1.22**	**1.235**				**0.951**	0.406	8.46
Nb	mg kg^{-1}	**12**		**11**		11.9	11.2	**11.939**	12.23	12		**12.5**	0.035	13.42
Nd	mg kg^{-1}	**22**	**24.32**			26.1	**26.4**	**25.165**	24.59			**24.187**	14.963	239
Ni	mg kg^{-1}	**28**	**24.3**	**31**			**26.9**	**30.935**	28.56	27		**23.1**	20.831	45
Pb	mg kg^{-1}	**22**	**17.66**	**20**			**19.3**	**20.205**	21.76	24		**22**	15.218	19.92
Pd	mg kg^{-1}													
Pr	mg kg^{-1}					6.93	**6.94**	**6.542**				**6.601**	3.759	
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	**107**	**65.64**	**106**		101.5	95.7	**106.069**	105.2	106		**100.4**	22.72	64
Re	mg kg^{-1}													
Rh	mg kg^{-1}													
S	mg kg^{-1}		**7700**		6442		**7800**	7700	7090		7250			
Sb	mg kg^{-1}		**1.33**				**0.9**	**0.943**				**4.4**		
Sc	mg kg^{-1}		**9.6**	**13**			13.9	**14.406**	13.25	12		**10.2**	4.634	
Se	mg kg^{-1}		**2**				**3.85**						0.669	
Sm	mg kg^{-1}		**4.22**			4.99	**5.19**	**5.126**				**4.618**	3.233	
Sn	mg kg^{-1}					2		**1.498**					0.023	9.42
Sr	mg kg^{-1}	**203**	**160**	**207**		205	184	**206.244**	202.2	201		**186.8**	115.920	189
Ta	mg kg^{-1}					0.8		**0.822**				**0.316**		
Tb	mg kg^{-1}		**0.92**			0.69	**0.71**	**0.68**				**0.582**	0.417	6.47
Te	mg kg^{-1}		**0.05**					**0.028**						
Th	mg kg^{-1}	**9**		**10**		9.18	**9.77**	**9.029**	8.36	11		**9.105**	5.523	10.87
Tl	mg kg^{-1}						**0.35**	**0.589**				**0.717**	0.208	
Tm	mg kg^{-1}		**0.33**			0.39	**0.35**	**0.344**				**0.3**	0.123	4.34
U	mg kg^{-1}					3.39	**3.58**	**4.463**		4		**5.5**	1.18	2.8
V	mg kg^{-1}	**109**	**120**			124	**128**	**140.654**	122.5	125		**102**	30.74	138
W	mg kg^{-1}					2		**1.262**					0.139	31
Y	mg kg^{-1}	**31**	**23.5**	**23**		23.5	**23.1**	**25.141**	25.47	25		**23.2**	10.37	
Yb	mg kg^{-1}		**1.75**			2.21	**2.44**	**2.236**				**2.003**	0.716	33
Zn	mg kg^{-1}	**93**	**150**	**94**			**90.8**	**101.147**	97.42	97		**85.2**	68.5	94
Zr	mg kg^{-1}	**178**		**197**		191	180	**193.512**	196.6	195		**171.3**	4.94	187.380

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

Table 1 - GeoPT40 Contributed data for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code		W116	W117	W118	W119	W120	W121	W122	W124	W125	W127	W128	-	-
SiO2	g 100g^{-1}	60.96	56.3	62.213	**61.807**	**60.58**	62.39	**57.76**	**62.02**	**62.53**	23.9	61.85		
TiO2	g 100g^{-1}	0.593	0.693	0.547	**0.564**	**0.58**	0.57	**0.55**	**0.54**	**0.56**	0.201	0.57		
Al2O3	g 100g^{-1}	13.236	12.7	13.164	**13.271**	**12.56**	13.1	**14.17**	**13.03**	**13.65**	4.01	13.1		
Fe2O3T	g 100g^{-1}	4.763	5.83	4.514		**4.8**	4.68	**4.55**	**4.7**	**4.66**	1.76	4.67		
Fe(II)O	g 100g^{-1}													
MnO	g 100g^{-1}		0.047	0.041	**0.040**	**0.04**	0.04	**0.04**	**0.04**	**0.043**	0.017	0.045		
MgO	g 100g^{-1}	2.91	2.25	2.675	**2.858**	**3.11**	2.83	**2.84**	**2.86**	**2.82**	0.434	2.83		
CaO	g 100g^{-1}	4.18	4.86	3.747	**3.902**	**4.06**	3.98	**4.41**	**3.86**	**4.01**	34.2	3.93		
Na2O	g 100g^{-1}	1.048	0.601	1.027	**0.951**	**0.97**	1.03	**0.79**	**0.99**	**0.985**	0.055	1		
K2O	g 100g^{-1}	2.462	2.74	2.387	**2.436**	**2.44**	2.47	**2.34**	**2.48**	**2.58**	0.243	2.45		
P2O5	g 100g^{-1}	0.187	0.198	0.170	**0.183**	**0.18**	0.18	**0.1**	**0.18**	**0.207**	0.091	0.181		
H2O+	g 100g^{-1}													
CO2	g 100g^{-1}			3.927										
LOI	g 100g^{-1}	7.82	11.45	7.533	**8.38**	**10.16**	7.39	**11.3**	**8.3**	**7.96**	10.1			
Ag	mg kg^{-1}			4.597			0.13							
As	mg kg^{-1}		30.1	13.39			12.3		**14**	**15.2**		12		
Au	mg kg^{-1}						0.002							
B	mg kg^{-1}													
Ba	mg kg^{-1}	592.4	556	563.9	**587**	**562**	611		**619**	**541**		558		
Be	mg kg^{-1}	1.7					1.83							
Bi	mg kg^{-1}			0.538			0.32							
Br	mg kg^{-1}								**5**					
C(org)	mg kg^{-1}			2389.200								3001		
C(tot)	mg kg^{-1}			10621.500			1.03					10700		
Cd	mg kg^{-1}			0.159			0.17							
Ce	mg kg^{-1}	53.27		54.212	**49**	**50**	54.2		**52**	**51**		55		
Cl	mg kg^{-1}		138									130		
Co	mg kg^{-1}	10.47		10.603		**11**	10.5		**9**	**10.7**		11		
Cr	mg kg^{-1}	70.4		60.962	**63**	**85**	60		**65**	**65.6**	71.2	72		
Cs	mg kg^{-1}	6.75					7.1			**42.5**		8		
Cu	mg kg^{-1}	24.5	26.36	25.474	**23**	**28**	31.5		**23**	**20.4**	73.4	24		
Dy	mg kg^{-1}	3.97		4.159		**3**	3.7							
Er	mg kg^{-1}	2.32		2.456		**2**	2.1							
Eu	mg kg^{-1}	1.06		1.102		**1**	1.1							
F	mg kg^{-1}								**553**			420		
Ga	mg kg^{-1}	15.59		16.264	**17**	**19**	15.17		**17**	**15.7**		17		
Gd	mg kg^{-1}	4.09		4.718		**5**	4.4		**6**					
Ge	mg kg^{-1}						2		**2**					
Hf	mg kg^{-1}	4.4		2.417			4.9		**6**	**4.7**		5.1		
Hg	mg kg^{-1}													
Ho	mg kg^{-1}	0.79		0.842		**1**	0.8							
I	mg kg^{-1}											6		
In	mg kg^{-1}						0.06							
La	mg kg^{-1}	27.96		28.122	**34**	**27**	28.2		**37**	**22.8**		29		
Li	mg kg^{-1}			52.253		**37**	39							
Lu	mg kg^{-1}	0.34		0.365		**0.4**	0.4							
Mo	mg kg^{-1}			1.444			1.3				51	2		
Nb	mg kg^{-1}	9.21		8.513	**12**	**11**	10.1		**11**	**10.8**		12		
Nd	mg kg^{-1}	24.5		25.13		**22**	24.8		**32**	**24.2**		26		
Ni	mg kg^{-1}	28.8		28.739	**19**	**27**	25		**21**	**26.7**	139	31		
Pb	mg kg^{-1}	19.09		19.16	**23**	**19**	21.5		**20**	**20.4**		22		
Pd	mg kg^{-1}													
Pr	mg kg^{-1}	6.37		6.645		**5.6**	6.6					7		
Pt	mg kg^{-1}													
Rb	mg kg^{-1}	96.37	134	99.499	**96**	**114**	99.7		**115**	**99.3**	16	105		
Re	mg kg^{-1}													
Rh	mg kg^{-1}													
S	mg kg^{-1}			7205.200			7300		**7668**		17600	7477		
Sb	mg kg^{-1}			1.086			0.86							
Sc	mg kg^{-1}	11.4		6.361		**10**	10.8		**15**	**11.5**		13		
Se	mg kg^{-1}						0.8					0.9		
Sm	mg kg^{-1}	4.82		5.037		**5**	4.9			5.8		5		
Sn	mg kg^{-1}	1.65		2.308			1.8							
Sr	mg kg^{-1}	185.080	272	193.773	**209**	**218**	200	**135**	**219**	**193**	1090	194		
Ta	mg kg^{-1}	0.69		0.283			0.8							
Tb	mg kg^{-1}	0.67		0.677			0.7							
Te	mg kg^{-1}													
Th	mg kg^{-1}	8.65		8.536			9		**8**	**6.8**		7		
Tl	mg kg^{-1}	0.59		0.673			0.66							
Tm	mg kg^{-1}	0.34		0.353		**0.4**	0.4							
U	mg kg^{-1}	3.13		2.839			3.3			5.1		2.7		
V	mg kg^{-1}	117.6		108.861	**145**	**101**	112		**135**	**109**	490	117		
W	mg kg^{-1}			1.198			1.3							
Y	mg kg^{-1}	21.63		22.915	**22**	**29**	21.4		**30**	**23**		24		
Yb	mg kg^{-1}	2.26		2.297		**1.5**	3							
Zn	mg kg^{-1}	102.7	165	104.507	**96**	**97**	96		**101**	**90.4**	101	100		
Zr	mg kg^{-1}	164.880	212	82.299	**182**	**168**	180		**158**	**180**		184		

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

Table 2 - GeoPT40 Assigned values and statistical summary for Silty marine shale, ShWYO-1.

	Assigned Value	Uncertainty of assigned value	Horwitz Target Value	Uncertainty/ Target	Number of reported results	Robust Mean of results	Robust SD of results	Median of results	Status of consensus value	Type of consensus value
	X_a	sdm	H_a	sdm/H_a	n					
	g 100g⁻¹	g 100g⁻¹	g 100g⁻¹			g 100g⁻¹	g 100g⁻¹	g 100g⁻¹		
SiO2	61.87	0.0849	0.6651	0.1276	88	61.46	1.189	61.7	Assigned	Mode
TiO2	0.5652	0.002057	0.01232	0.167	91	0.5652	0.01962	0.566	Assigned	Robust Mean
Al2O3	13.13	0.04131	0.1783	0.2317	90	13.13	0.3919	13.1	Assigned	Robust Mean
Fe2O3T	4.643	0.01588	0.0737	0.2155	91	4.643	0.1515	4.63	Assigned	Robust Mean
MnO	0.04304	0.0005143	0.001382	0.3721	87	0.04304	0.004797	0.043	Assigned	Robust Mean
MgO	2.85	0.02246	0.04869	0.4613	92	2.828	0.1114	2.84	Assigned	Mode
CaO	3.94	0.01399	0.06411	0.2182	91	3.949	0.1656	3.94	Assigned	Median
Na2O	1.02	0.01052	0.02034	0.5172	86	0.986	0.08286	1.004	Assigned	Mode
K2O	2.454	0.007889	0.04288	0.184	90	2.454	0.07485	2.449	Assigned	Robust Mean
P2O5	0.1809	0.001227	0.00468	0.2622	84	0.1809	0.01124	0.18	Assigned	Robust Mean
	mg kg⁻¹	mg kg⁻¹	mg kg⁻¹			mg kg⁻¹	mg kg⁻¹	mg kg⁻¹		
As	11.75	0.2949	0.6488	0.4544	48	11.75	2.043	11.9	Assigned	Robust Mean
Ba	580	3.336	17.8	0.1874	79	573.5	34.4	580	Assigned	Median
Be	1.754	0.0207	0.1289	0.1606	33	1.723	0.1852	1.754	Assigned	Median
Bi	0.3	0.02852	0.02876	0.9916	23	0.3708	0.143	0.3387	Provisional	Mode
C(tot)	10270	157.2	204.5	0.7685	25	10230	816	10270	Provisional	Median
Ce	54.47	0.4452	2.387	0.1865	71	53.81	4.584	54.47	Assigned	Median
Co	10.8	0.1378	0.6038	0.2282	66	10.97	1.336	10.8	Assigned	Median
Cr	68.29	1.21	2.893	0.4182	70	68.29	10.12	67.75	Assigned	Robust Mean
Cs	7.133	0.09636	0.4245	0.227	49	7.133	0.6745	7.1	Assigned	Robust Mean
Cu	23.53	0.4149	1.17	0.3546	74	23.53	3.569	23.16	Assigned	Robust Mean
Dy	3.9	0.05027	0.2542	0.1978	52	3.79	0.4208	3.9	Assigned	Median
Er	2.266	0.03516	0.1602	0.2194	49	2.221	0.252	2.266	Assigned	Median
Eu	1.085	0.009435	0.08572	0.1101	50	1.075	0.08441	1.085	Assigned	Median
Ga	15.73	0.1795	0.831	0.216	59	15.61	1.269	15.73	Assigned	Median
Gd	4.389	0.0545	0.281	0.1939	50	4.389	0.3854	4.38	Assigned	Robust Mean
Ge	1.41	0.05782	0.1071	0.5399	19	1.542	0.443	1.41	Provisional	Median
Hf	5.035	0.08977	0.3158	0.2843	49	4.618	1.166	4.919	Assigned	Mode
Ho	0.78	0.01326	0.06476	0.2048	45	0.7608	0.09719	0.78	Assigned	Median
La	28.43	0.3583	1.374	0.2608	72	28.43	3.04	28.38	Assigned	Robust Mean
Li	38.19	0.7684	1.766	0.4352	36	38.19	4.61	38.19	Assigned	Robust Mean
Lu	0.34	0.00574	0.03199	0.1794	49	0.3302	0.0479	0.34	Assigned	Median
Mo	1.2	0.0487	0.09338	0.5215	41	1.398	0.4994	1.25	Assigned	Mode
Nb	11.25	0.1699	0.6252	0.2717	66	11.25	1.38	11.21	Assigned	Robust Mean
Nd	25	0.1839	1.232	0.1493	65	24.76	2.015	25	Assigned	Median
Ni	27.8	0.4372	1.348	0.3243	71	27.8	3.684	27.7	Assigned	Robust Mean
Pb	20.08	0.2652	1.022	0.2594	68	20.11	2.553	20.08	Assigned	Median
Pr	6.6	0.05406	0.3974	0.1361	47	6.526	0.4492	6.6	Assigned	Median
Rb	101	0.8617	4.033	0.2137	74	100.1	7.072	101	Assigned	Median
Sb	0.9	0.04496	0.07314	0.6148	30	1.023	0.287	0.9365	Assigned	Mode
Sc	11.45	0.2289	0.6345	0.3607	64	11.61	1.706	11.45	Assigned	Median
Sm	4.9	0.05679	0.3085	0.1841	54	4.835	0.4409	4.9	Assigned	Median
Sn	1.75	0.07497	0.1287	0.5827	32	1.931	0.4558	1.806	Assigned	Mode
Sr	194.7	1.493	7.043	0.2119	80	194.7	13.35	194	Assigned	Robust Mean
Ta	0.819	0.01734	0.0675	0.2569	35	0.8286	0.1809	0.819	Assigned	Median
Tb	0.675	0.007413	0.05728	0.1294	49	0.6578	0.06846	0.675	Assigned	Median
Th	9	0.09076	0.5172	0.1755	62	8.882	1.046	9	Assigned	Median
Tl	0.655	0.01779	0.05583	0.3187	28	0.655	0.1435	0.655	Assigned	Median
Tm	0.34	0.00623	0.03199	0.1948	46	0.3276	0.04355	0.34	Assigned	Median
U	3.2	0.0544	0.2148	0.2532	57	3.229	0.4825	3.2	Assigned	Median
V	117	1.196	4.57	0.2616	73	117.8	12.28	117	Assigned	Median
W	1.4	0.08845	0.1064	0.8309	30	1.667	0.6127	1.5	Provisional	Mode
Y	23.1	0.2586	1.152	0.2246	71	23.14	2.408	23.1	Assigned	Median
Yb	2.212	0.04338	0.157	0.2763	52	2.136	0.3709	2.212	Assigned	Median
Zn	97	0.856	3.897	0.2196	75	96.64	7.861	97	Assigned	Median
Zr	183	1.502	6.683	0.2248	71	180.4	17.61	182	Assigned	Mode

Table 3 - GeoPT40 Z-scores for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code	W2	W3	W4	W8	W9	W11	W12	W13	W14	W15	W16	W17	W18
SiO2	0.03	0.45	-3.34	-0.05	*	-0.28	0.83	**0.30**	**-6.60**	*	-1.21	0.08	-0.51
TiO2	0.20	-0.21	0.36	-0.21	*	1.41	1.93	**-0.48**	**2.83**	*	-0.45	0.20	-0.21
Al2O3	0.64	-0.57	9.31	0.05	*	7.57	3.16	**-0.18**	**14.24**	*	-0.77	0.53	-0.43
Fe2O3T	0.52	-0.56	-1.65	-0.22	*	5.54	1.26	**0.72**	**7.43**	**-1.39**	-0.80	-0.49	0.05
MnO	-1.10	-1.10	-3.27	-0.74	*	2.52	2.48	**0.69**	**5.04**	**-0.03**	-1.06	2.52	-1.10
MgO	-1.03	-0.62	18.79	-0.41	*	5.55	0.88	**0.72**	**27.11**	**0.21**	-0.49	0.31	0.62
CaO	-1.25	0.23	2.65	-0.55	*	0.86	0.34	**-0.30**	**7.33**	**1.09**	-0.55	0.08	-0.47
Na2O	-1.47	-0.49	*	0.25	*	-4.92	4.72	**0.54**	**-7.87**	*	0.25	0.25	0.74
K2O	0.77	0.42	0.77	0.42	*	-0.51	1.42	**-0.96**	**-0.80**	*	-0.48	0.42	-0.86
P2O5	-1.16	-0.10	14.76	-0.10	*	4.18	-0.28	**0.69**	**-4.46**	*	-1.06	-0.52	-1.16
As	0.96	*	*	*	*	*	*	*	*	**2.20**	*	*	*
Ba	-1.71	0.76	-0.76	0.00	*	*	-0.84	**0.47**	**0.06**	**0.88**	0.76	*	0.53
Be	*	*	*	*	*	*	-1.37	**-0.34**	*	*	*	*	0.22
Bi	*	*	*	*	*	*	*-0.38*	***2.43***	*	*	*	*	*
C(tot)	*	*	*	*	*-2.36*	*	*-0.04*	*	*	*	*0.16*	*	*
Ce	*	*	-1.98	*	*	*	*	**0.43**	**0.00**	**0.54**	*	*	0.78
Co	0.17	5.13	*	*	*	7.70	-1.16	**-0.70**	**8.61**	**2.53**	*	*	0.00
Cr	-0.40	-1.09	8.42	*	*	8.42	*	**1.45**	**12.35**	**1.27**	1.85	*	-0.64
Cs	*	*	3.38	*	*	*	*	**-0.15**	**0.09**	**0.02**	*	*	0.39
Cu	-1.94	-0.23	14.30	*	*	4.65	-0.79	**-2.57**	**1.26**	**1.77**	0.63	*	0.07
Dy	*	*	*	*	*	*	*	**0.71**	**-3.42**	**0.04**	*	*	0.37
Er	*	*	*	*	*	*	*	**1.34**	**-3.16**	**-0.04**	*	*	0.39
Eu	*	*	*	*	*	*	*	**0.06**	**-0.64**	**-0.43**	*	*	0.20
Ga	-1.04	*	-2.24	*	*	*	*	**0.41**	*	**1.59**	*	*	0.10
Gd	*	*	54.46	*	*	*	*	**-0.07**	**-1.60**	**0.86**	*	*	0.36
Ge	*	*	*	*	*	*	*	*	***10.18***	*	*	*	*0.00*
Hf	*	*	*	*	*	*	*	**0.93**	**-8.69**	**-4.61**	*	*	0.12
Ho	*	*	*	*	*	*	*	**1.39**	**-2.62**	**0.08**	*	*	0.22
La	*	*	-3.79	*	*	*	*	**0.37**	**0.21**	**0.37**	*	*	0.50
Li	*	*	*	*	*	*	-1.41	**1.04**	*	*	*	*	1.28
Lu	*	*	*	*	*	*	*	**1.56**	**-2.81**	**0.25**	*	*	0.27
Mo	*	*	*	*	*	*	-1.24	**-0.54**	*	*	*	*	*
Nb	-0.20	*	-1.80	*	*	*	*	**1.79**	**2.79**	**0.43**	*	*	0.28
Nd	*	*	-1.22	*	*	*	*	**0.22**	**-1.62**	**-0.15**	*	*	0.77
Ni	-0.67	-0.30	*	*	*	-2.30	-1.17	**-0.73**	**4.60**	**4.38**	4.15	*	0.37
Pb	0.94	*	*	*	*	7.35	0.66	**-0.41**	**28.29**	**-1.25**	15.61	*	0.75
Pr	*	*	-3.27	*	*	*	*	**1.18**	**-1.01**	**-0.38**	*	*	0.39
Rb	-0.62	*	0.00	*	*	*	*	**-1.14**	**1.49**	**0.00**	*	*	0.12
Sb	*	*	*	*	*	*	-0.21	**0.41**	*	*	*	*	*
Sc	2.01	-1.14	*	*	*	*	-1.75	**0.32**	**-2.03**	**2.10**	*	*	0.04
Sm	*	*	*	*	*	*	*	**-0.16**	**-1.75**	**-0.29**	*	*	0.45
Sn	*	*	*	*	*	*	0.90	**-0.62**	*	*	*	*	*
Sr	-0.40	0.17	0.10	-0.33	*	*	*	**-1.54**	**3.60**	**-0.22**	*	*	0.66
Ta	*	*	*	*	*	*	*	**1.50**	**-7.10**	**-0.53**	*	*	0.07
Tb	*	*	*	*	*	*	*	**0.61**	**-2.01**	**0.23**	*	*	0.12
Th	*	*	*	*	*	*	*	**0.77**	**-3.42**	**-0.81**	*	*	0.28
Tl	*	*	*	*	*	*	*	*	*	*	*	*	*
Tm	*	*	*	*	*	*	*	**1.25**	**-2.50**	**0.44**	*	*	0.25
U	*	*	*	*	*	*	*	**-0.09**	**-3.35**	**-1.35**	*	*	0.40
V	-0.98	-0.44	8.86	*	*	3.87	-0.22	**-0.65**	**5.25**	**1.25**	-1.31	*	-0.55
W	*	*	*	*	*	*	*	***0.47***	*	*	*	*	*
Y	0.39	*	-0.04	*	*	*	*	**-0.63**	**12.07**	**-0.06**	*	*	0.61
Yb	*	*	*	*	*	*	*	**2.40**	**-3.45**	**0.11**	*	*	0.47
Zn	-0.64	-0.38	-0.26	*	*	6.62	-2.04	**0.16**	**13.60**	**-0.42**	2.05	*	-0.41
Zr	0.45	*	0.00	*	*	*	*	**0.86**	**2.24**	**-9.17**	0.82	*	1.05

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

Table 3 - GeoPT40 Z-scores for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code	W20	W21	W22	W23	W24	W25	W26	W27	W28	W30	W31	W32	W34
SiO2	-0.15	-0.27	**-3.86**	-0.58	1.00	1.38	**2.21**	0.17	**-1.43**	0.04	*	**0.39**	0.98
TiO2	0.07	*	**0.39**	-0.62	-1.02	0.60	**0.39**	-0.21	**1.20**	0.24	-6.10	**-0.58**	0.39
Al2O3	-0.06	*	**-0.18**	-1.21	-0.65	-0.31	**1.73**	0.44	**-1.53**	0.35	-4.67	**-1.08**	0.66
Fe2O3T	0.32	*	**7.29**	-1.78	-0.90	0.25	**3.22**	-0.63	**-0.72**	0.21	-10.21	**-1.26**	-0.17
MnO	0.71	*	**5.04**	-1.10	*	154437.06	**1.42**	*	**-2.20**	-0.01	-5.09	**-0.75**	-2.20
MgO	0.21	*	**0.21**	-1.13	-0.62	1.03	**-0.21**	-0.10	**-2.26**	-0.24	-5.55	**-1.52**	0.00
CaO	0.38	*	**9.20**	-0.86	-0.31	1.48	**1.56**	-0.55	**0.47**	0.04	*	**-0.58**	-0.94
Na2O	-0.49	*	**3.44**	1.72	-0.25	0.25	**-0.49**	-7.37	**-2.46**	1.11	-5.41	**-1.13**	-4.42
K2O	-1.34	*	**11.10**	-0.63	-0.28	0.77	**1.07**	0.42	**0.37**	0.13	-8.96	**-0.33**	-0.33
P2O5	-0.31	*	**-4.46**	0.01	-0.10	0.65	**0.02**	0.12	**-2.33**	0.55	*	**0.02**	-1.05
As	0.19	*	**-11.95**	-0.58	0.96	0.34	*	*	-1.35	*	*	**-1.78**	*
Ba	-0.17	*	*	0.28	1.01	-1.68	**2.91**	-0.25	**1.85**	0.54	-4.82	0.08	*
Be	*	*	*	-0.99	-0.44	*	*	*	*	0.04	-1.43	0.00	*
Bi	*	*	*	*10.43*	*1.22*	*-1.74*	*	*31.64*	*116.47*	*0.71*	*-0.70*	*	*
C(tot)	*	*	*	*-25.10*	*	*	*	*	*	*1.50*	*	*-1.85*	*-4.58*
Ce	1.58	*	*	-1.00	-0.20	-0.71	**-0.57**	-0.52	**3.99**	0.43	-1.72	-2.40	*
Co	-0.66	*	*	0.00	-0.25	1.49	**0.66**	2.65	**8.61**	0.33	-1.62	-0.59	*
Cr	0.00	*	*	-2.30	*	-1.00	**-0.31**	*	**1.97**	0.48	*	-1.28	*
Cs	-0.27	*	*	0.24	-0.09	5.14	*	-0.12	**-2.67**	0.39	-1.73	-0.37	*
Cu	4.60	*	**-2.16**	1.06	0.46	-0.95	*	-4.50	**0.40**	0.40	0.15	-0.09	*
Dy	*	*	*	-0.63	0.98	*	-0.59	-0.61	*	0.64	-1.57	-1.60	*
Er	*	*	*	1.67	1.07	*	-0.52	-1.02	*	0.66	-1.04	-1.41	*
Eu	*	*	*	0.26	0.79	*	-0.50	0.96	*	0.10	-1.57	-0.92	*
Ga	0.46	*	**0.32**	-0.02	0.64	-0.80	*	-2.85	**1.53**	0.27	-2.32	-0.29	*
Gd	*	*	*	0.02	0.84	*	0.20	-0.32	*	0.22	-0.85	-1.58	*
Ge	*	*	*	*	*	*	*	*2.33*	*	*	*-1.21*	*-0.09*	*
Hf	*	*	*	-4.77	0.42	1.69	*	-1.72	**3.06**	-0.99	*	-4.10	*
Ho	*	*	*	-0.46	0.93	*	*	*	*	0.40	-1.54	-1.28	*
La	-0.41	*	*	-3.14	0.57	-1.14	**-0.60**	-0.32	**2.60**	0.31	-3.19	-2.39	*
Li	*	*	*	1.64	0.57	*	*	-0.73	*	0.05	-0.79	-0.45	*
Lu	*	*	*	0.00	0.63	*	*	-0.47	*	0.28	-1.38	-1.34	*
Mo	*	*	**40.69**	1.55	-0.43	1.07	*	*	**29.98**	-0.47	*	2.14	*
Nb	1.24	*	**1.20**	-2.52	0.60	-0.52	**-0.88**	*	**9.19**	0.02	*	-0.03	*
Nd	0.69	*	*	-1.06	0.69	-1.66	**-0.49**	-0.73	**2.44**	0.68	-2.31	-1.77	*
Ni	-0.11	*	**-4.30**	-0.48	-0.37	-1.30	**1.85**	*	**4.60**	0.54	-2.24	0.56	*
Pb	0.94	*	**-3.01**	3.88	0.45	-1.16	*	*	**0.90**	0.07	-7.51	0.09	*
Pr	*	*	*	0.01	0.53	*	*	-0.64	*	0.52	-1.91	-1.60	*
Rb	0.12	*	**0.50**	-0.62	0.25	-0.81	**-1.36**	-0.25	**1.24**	0.80	-2.31	0.63	*
Sb	-2.05	*	*	-1.30	0.89	21.88	*	*	28.03	0.64	-0.68	6.15	*
Sc	*	*	*	-1.62	0.28	-0.20	**0.08**	-0.35	**5.59**	-0.48	*	1.36	*
Sm	-1.78	*	*	0.97	0.89	*	**-0.97**	-0.97	*	0.46	-2.01	-0.98	*
Sn	-0.19	*	*	2.14	*	8.36	*	*	**9.72**	1.77	*	*	*
Sr	-0.05	*	**-0.66**	1.51	1.16	-0.91	**1.43**	-0.61	**1.04**	0.16	-2.79	-0.30	*
Ta	*	*	*	2.82	-0.66	-1.62	*	*	*	0.09	*	-1.08	*
Tb	*	*	*	0.31	0.39	*	*	-0.31	*	0.00	-1.31	-1.51	*
Th	7.54	*	**-13.54**	0.48	0.25	-1.16	-0.19	1.43	**-1.93**	0.05	-2.24	-1.46	*
Tl	*	*	*	-1.39	0.04	-1.39	*	6.49	*	-0.08	-0.27	*	*
Tm	*	*	*	0.00	0.00	*	*	-0.78	*	0.28	-1.09	-1.27	*
U	*	*	*	-0.65	0.12	1.63	*	-1.37	**-0.93**	0.13	*	-1.50	*
V	0.11	*	*	0.98	1.42	-2.25	**1.25**	0.11	**1.09**	-0.32	-3.28	-0.47	*
W	*	*	***24.43***	*-0.47*	*	*9.39*	*	*	*	*0.19*	*3.29*	*	*
Y	1.69	*	**5.12**	-0.35	0.56	-0.52	**-1.39**	-0.32	**1.65**	0.69	*	-2.54	*
Yb	*	*	*	1.55	0.76	-6.09	**-1.35**	-1.22	*	0.52	*	-1.67	*
Zn	0.10	*	**-0.77**	1.28	0.38	-0.98	*	0.00	**-1.03**	0.30	-4.62	1.12	*
Zr	0.45	*	**-0.45**	-8.48	1.57	-0.68	**-12.52**	-0.15	**0.75**	-1.57	*	-8.09	*

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

Table 3 - GeoPT40 Z-scores for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code	W35	W36	W37	W38	W39	W41	W43	W44	W45	W47	W48	W50	W51
SiO2	-1.57	0.02	-1.32	**-1.86**	**-0.99**	-0.66	-1.26	0.34	*	-0.84	0.70	**-0.08**	**0.59**
TiO2	-0.09	0.03	-1.02	**1.20**	**-0.91**	0.16	3.04	1.01	**0.07**	-0.04	0.20	**-1.23**	**0.39**
Al2O3	0.28	-1.18	2.58	**-2.25**	**-0.46**	-0.17	4.12	-0.03	**-0.63**	-0.01	2.15	**-1.75**	**0.21**
Fe2O3T	-0.43	-0.56	1.47	**-1.12**	**-0.76**	-0.52	1.61	0.25	**-1.50**	3.69	1.27	**-2.34**	**0.91**
MnO	-0.38	-0.01	0.35	**-2.20**	**-0.03**	-1.50	-0.01	0.35	**-0.03**	0.69	0.71	**5.04**	**-2.20**
MgO	0.00	-0.42	-3.90	**-1.23**	**0.41**	0.05	-1.03	0.41	**5.16**	0.33	-1.44	**-10.27**	**-1.64**
CaO	-1.09	-1.72	-2.03	**-1.09**	**-0.34**	-0.80	4.37	0.55	**-2.76**	-0.17	-0.62	**-1.25**	**-1.40**
Na2O	1.97	0.49	-10.82	**-2.46**	**-0.59**	0.69	-4.42	0.49	**0.39**	-0.25	-4.92	**-2.95**	**0.00**
K2O	-0.51	-0.05	-2.26	**-1.50**	**-1.24**	-0.20	1.12	-0.16	**-0.77**	0.16	0.54	**-0.33**	**-0.56**
P2O5	0.33	-1.16	-3.30	**-0.19**	**1.95**	-2.02	-0.10	0.97	*	0.24	2.04	**-2.33**	**1.95**
As	-0.58	*	*	**-2.70**	**3.46**	*	*	*	**1.30**	*	*	*	*
Ba	-0.20	0.03	-15.71	**-3.17**	**-1.29**	*	-0.25	0.28	**-0.28**	-0.01	1.12	*	*
Be	*	*	1.34	*	*	*	*	-0.52	*	*	*	*	*
Bi	*	*	*	*	*	*	*	*	*	*	*	*	*
C(tot)	*	*0.08*	*	*	*	*-0.99*	*	*	*	*	*	*	***-50.20***
Ce	0.05	0.53	-0.29	**-2.67**	**0.22**	*	0.11	0.57	**1.94**	0.05	*	*	*
Co	-2.32	*	2.07	**-1.82**	**3.64**	*	0.50	0.41	**-0.33**	*	*	*	*
Cr	-4.20	-0.05	-6.01	**-2.21**	**3.01**	*	0.47	-0.53	**0.31**	1.63	*	*	*
Cs	*	*	*	*	**4.40**	*	-0.33	-0.04	**-0.71**	-6.91	*	*	*
Cu	0.20	0.63	19.82	**-0.97**	**0.40**	*	-1.08	1.31	*	1.77	*	*	*
Dy	-0.83	*	-1.38	*	*	*	-0.98	0.30	**0.79**	1.73	*	*	*
Er	-0.99	*	-1.14	*	*	*	-1.08	-0.27	*	*	*	*	*
Eu	-0.15	*	0.09	*	*	*	-0.26	0.38	**-0.06**	*	*	*	*
Ga	-1.64	*	*	**-2.68**	**0.32**	*	0.76	-0.08	-2.24	0.23	*	*	*
Gd	-0.60	*	0.20	*	*	*	-0.69	-0.05	*	*	*	*	*
Ge	*	*	*	***-1.03***	*	*	*	*-0.56*	*	*	*	*	*
Hf	*	*	*	**-6.13**	*	*	*	-0.13	**0.52**	0.36	*	*	*
Ho	-0.77	*	-1.39	*	*	*	-0.93	0.00	*	*	*	*	*
La	-0.23	-0.15	-0.45	**-2.06**	**-5.41**	*	-0.05	0.17	**0.42**	-1.11	*	*	*
Li	*	*	1.93	*	*	*	-0.05	0.12	*	*	*	*	*
Lu	-1.25	*	-0.63	*	*	*	-0.94	0.00	**-0.66**	*	*	*	*
Mo	*	*	16.06	**-2.14**	**29.98**	*	*	-0.48	*	*	*	*	*
Nb	0.60	*	*	**-0.72**	**-5.20**	*	2.20	-0.68	*	-0.72	*	*	*
Nd	0.04	*	-0.16	**-0.49**	**0.00**	*	0.16	0.41	**-3.00**	0.65	*	*	*
Ni	-0.30	-2.89	*	**-1.26**	**1.63**	*	-0.30	0.11	*	-0.37	*	*	*
Pb	-1.01	*	-2.19	**-0.17**	**-3.99**	*	-0.09	0.26	*	-1.35	*	*	*
Pr	0.25	*	-0.50	*	*	*	0.13	0.52	*	*	*	*	*
Rb	-0.62	*	*	**-1.93**	**-1.49**	*	0.37	-0.14	**0.25**	1.24	2.36	*	*
Sb	*	*	3.42	*	*	*	0.00	*	*	*	*	*	*
Sc	-0.04	*	1.46	**0.39**	**4.02**	*	*	1.14	**-0.47**	-1.25	*	*	*
Sm	-0.08	*	-0.49	*	*	*	0.00	0.15	**0.16**	0.19	*	*	*
Sn	*	*	*	*	*	*	2.14	*	*	*	*	*	*
Sr	-0.76	*	0.65	**-1.87**	**-2.51**	*	-0.19	-0.33	**-0.09**	1.10	-0.33	*	*
Ta	*	*	*	**29.35**	*	*	*	-0.29	**0.76**	*	*	*	*
Tb	-0.83	*	-0.65	*	*	*	-0.83	0.13	**-0.61**	*	*	*	*
Th	0.05	*	*	**-2.13**	**-1.93**	*	*	-0.12	**0.43**	-0.58	*	*	*
Tl	*	*	*	*	**6.18**	*	0.04	0.31	*	*	*	*	*
Tm	-1.09	*	-0.63	*	*	*	-0.78	0.16	*	*	*	*	*
U	-0.47	*	*	**-4.65**	**-0.93**	*	-0.47	-0.14	**0.00**	0.93	*	*	*
V	-2.74	-0.22	16.37	**-0.70**	**4.16**	*	-0.44	-0.77	**0.22**	-0.77	*	*	*
W	*	*	*	*	*	*	*	*0.56*	*0.00*	*	*	*	*
Y	-2.13	-3.95	-1.78	**-0.26**	**-1.82**	*	*	-0.65	*	2.24	*	*	*
Yb	-1.44	*	-1.00	*	*	*	-1.00	0.06	**-0.91**	*	*	*	*
Zn	-0.90	-0.38	5.29	**-3.18**	**-0.26**	*	-0.51	-0.95	**2.05**	0.38	*	*	*
Zr	-1.35	-1.42	*	**-0.39**	**0.00**	*	1.27	-0.97	**4.04**	2.11	0.52	*	*

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

Table 3 - GeoPT40 Z-scores for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code	W52	W53	W54	W55	W58	W60	W62	W63	W64	W65	W66	W67	W68
SiO2	**-1.52**	-0.70	**-0.24**	-3.25	**-1.85**	-1.56	-0.89	0.75	*	**0.33**	**-0.90**	0.11	0.64
TiO2	**-1.23**	-0.37	**-0.42**	2.84	**1.20**	-2.24	1.41	0.60	*	**-3.67**	**0.42**	-0.62	0.20
Al2O3	**-2.76**	1.10	**-0.85**	8.18	**-0.85**	-0.62	0.98	-2.17	*	**-0.57**	**-0.24**	-0.03	0.33
Fe2O3T	**-1.12**	0.94	**2.41**	2.36	**2.27**	-0.56	-0.12	0.59	*	**-0.44**	**0.89**	-0.56	0.05
MnO	**-2.20**	2.16	**-0.03**	1.07	*	*	-1.03	2.52	*	**-2.20**	**-0.54**	1.43	0.35
MgO	**-2.88**	6.66	**-0.21**	0.62	**2.26**	-1.54	0.87	0.82	*	**-2.26**	**-2.14**	0.10	-0.51
CaO	**0.00**	-1.74	**0.31**	2.50	**1.25**	1.40	0.31	0.00	*	**-1.56**	**-0.87**	-0.31	0.31
Na2O	**0.00**	1.03	**0.00**	-5.65	**-2.46**	0.25	-3.44	-3.69	*	*	**-5.13**	1.23	0.98
K2O	**-3.13**	1.30	**-0.80**	0.19	**0.14**	-0.86	0.65	0.42	*	**-1.26**	**-0.28**	0.54	1.12
P2O5	**-0.19**	3.22	**-0.19**	-2.34	**-0.19**	0.97	0.44	-1.16	*	**-4.46**	**-1.05**	-0.10	-0.10
As	*	-1.35	**0.27**	-2.12	*	*	-0.58	*	*	**-10.32**	**1.61**	-0.58	*
Ba	**1.29**	-11.79	**0.13**	-1.25	1.40	-3.01	-0.56	*	**0.00**	**0.39**	**-0.24**	-0.48	*
Be	**-0.42**	*	**-0.62**	-1.45	*	*	0.10	*	*	**0.36**	**-0.94**	*	*
Bi	*	*229.47*	***1.35***	*0.00*	*	*	*0.92*	*	*	***6.95***	*	*	*
C(tot)	*	*	***-0.11***	*	*	*	*8.15*	*	*	*	*	*	*
Ce	**0.01**	*	**0.49**	-1.39	-0.94	-3.85	0.45	*	**-0.01**	**0.10**	**-2.42**	-0.94	*
Co	**0.33**	-0.66	**-0.31**	-0.96	-0.66	1.61	-0.21	*	*	**-0.17**	**-0.12**	0.17	*
Cr	**-0.62**	14.64	**1.31**	-2.33	2.02	-3.01	-1.61	-0.05	*	**-0.65**	**-2.37**	-0.22	*
Cs	**-0.08**	*	**0.22**	-1.45	*	*	0.76	*	**-0.15**	**-0.34**	**-0.78**	-1.33	*
Cu	**-0.97**	*	**1.61**	-2.28	**-5.58**	*	-1.51	*	*	**-0.11**	**1.37**	-1.08	*
Dy	**0.00**	*	**0.77**	-0.95	*	-0.22	-0.73	*	**0.01**	**0.51**	*	*	*
Er	**-0.41**	*	**0.32**	-0.70	*	0.00	0.01	*	**0.00**	**0.96**	*	*	*
Eu	**0.17**	*	**0.33**	-0.16	*	2.22	*	*	**1.34**	**0.76**	*	*	*
Ga	**-1.12**	*	**1.16**	-0.64	*	-0.10	-0.44	*	**0.29**	**0.45**	**0.00**	-0.44	*
Gd	**-0.67**	*	**-0.42**	-0.43	*	2.07	*	*	**-0.43**	**0.36**	*	*	*
Ge	*	*	***1.35***	*-1.55*	*	*	*	*	*	***-0.65***	*	*	*
Hf	**0.21**	*	**-0.37**	-3.22	*	1.49	-0.06	*	**0.11**	**0.05**	*	-3.22	*
Ho	**0.31**	*	**1.09**	-0.74	*	-0.34	-0.63	*	**0.46**	**0.46**	*	*	*
La	**0.05**	*	**0.54**	-1.70	0.57	1.01	0.91	*	**0.03**	**0.71**	**-1.13**	-0.15	*
Li	*	-5.15	**2.33**	-0.05	*	*	0.89	*	*	**-0.28**	**-0.52**	*	*
Lu	**-1.25**	*	**0.85**	-0.72	*	-1.86	-0.30	*	**0.50**	**0.94**	*	*	*
Mo	**4.28**	9.64	**-0.80**	-2.68	*	*	*	*	*	**1.07**	**-0.72**	*	*
Nb	**-0.72**	*	**-1.96**	-1.43	**-0.40**	1.75	-1.00	*	**-1.28**	**1.52**	**-3.76**	-1.00	*
Nd	**0.08**	*	**-0.12**	-0.22	*	0.95	0.48	*	**0.24**	**0.41**	**-4.68**	0.41	*
Ni	**-0.74**	*	**0.63**	-1.81	**5.34**	-1.84	0.91	*	*	**-0.07**	**0.15**	-0.30	*
Pb	**-6.04**	*	**0.18**	-0.98	*	-1.80	-0.05	*	*	**1.98**	**-0.53**	-0.04	*
Pr	**0.00**	*	**-0.11**	-0.18	*	0.70	0.57	*	**0.10**	**0.33**	*	*	*
Rb	**0.27**	*	**0.85**	-3.40	**0.25**	-2.05	0.71	*	**0.02**	**-0.25**	**0.64**	-0.25	*
Sb	*	*	**0.72**	-1.14	*	*	*	*	*	*	*	-0.68	*
Sc	**-1.18**	*	**0.90**	-0.80	1.22	5.18	-1.06	*	**-10.16**	**0.39**	**-1.92**	-0.35	*
Sm	**0.00**	*	**0.24**	-0.18	*	0.65	0.84	*	**0.25**	**0.13**	*	*	*
Sn	**-5.05**	*	**0.40**	-1.28	*	*	20.40	*	**2.74**	*	*	-0.19	*
Sr	**0.62**	-5.30	**1.07**	-1.58	**-1.23**	1.22	1.37	*	**0.50**	**0.05**	**0.47**	-0.33	*
Ta	**-0.28**	*	**0.81**	1.04	*	2.67	*	*	**0.00**	**0.90**	*	*	*
Tb	**-1.31**	*	**-0.20**	-1.09	*	-0.31	0.31	*	**0.70**	**0.44**	*	*	*
Th	**0.39**	*	**0.05**	-0.39	*	1.13	0.27	*	**-0.74**	**0.43**	**-1.64**	0.00	*
Tl	**0.81**	65.78	*	-0.36	*	*	0.67	*	*	**3.67**	*	3.09	*
Tm	**-1.25**	*	**0.02**	-0.67	*	-0.81	-0.64	*	**0.16**	**0.94**	*	*	*
U	**-0.47**	*	**0.51**	0.07	*	1.18	-0.33	*	**-0.13**	**0.42**	**-1.29**	1.86	*
V	**-0.77**	-1.75	**-1.44**	-1.59	*	-2.62	0.33	*	*	**0.66**	**-0.44**	-0.22	*
W	***0.94***	*	***1.38***	*-0.28*	*	*12.68*	*	*	***-3.78***	***-3.01***	*	*2.82*	*
Y	**1.04**	-5.25	**0.19**	-3.39	0.39	0.01	-0.04	*	**0.33**	**1.04**	**1.28**	-0.04	*
Yb	**-0.08**	*	**1.28**	-0.91	*	-0.20	-0.58	*	**0.39**	**1.13**	*	-3.86	*
Zn	**6.29**	*	**2.83**	-3.17	**2.05**	-2.55	0.64	*	*	**-1.87**	**0.45**	-0.64	*
Zr	**-0.07**	*	**-0.04**	-6.96	**1.35**	-7.17	-0.75	*	**-0.33**	**0.30**	*	-0.07	*

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

Table 3 - GeoPT40 Z-scores for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code	W69	W71	W72	W73	W74	W75	W76	W77	W78	W79	W80	W81	W82
SiO2	-1.33	*	0.26	**-0.03**	**-2.84**	*	*	2.59	0.16	0.77	-0.02	**0.41**	**0.41**
TiO2	1.01	-1.43	1.05	**0.39**	**-1.47**	*	**-2.77**	-0.21	0.20	0.20	0.40	**0.04**	**1.20**
Al2O3	4.73	-5.42	4.57	**0.61**	**-1.30**	*	*	-3.99	0.84	0.47	0.58	**-6.41**	**-0.07**
Fe2O3T	-0.83	-1.85	0.46	**0.91**	**0.91**	*	*	-1.92	0.32	0.52	-0.63	**0.37**	**2.55**
MnO	2.52	-2.19	-2.94	**-18.12**	**3.59**	0.49	**-1.00**	-2.19	3.97	*	-0.74	**0.33**	-0.01
MgO	0.92	-3.39	0.51	**3.70**	**-3.49**	*	*	-4.01	1.23	0.72	0.92	**0.04**	**1.44**
CaO	1.64	-2.57	1.72	**-19.03**	**-1.40**	*	*	1.56	0.70	0.08	0.39	**2.28**	**2.81**
Na2O	-7.87	-1.47	1.47	**-35.89**	*	*	*	-0.74	-0.25	0.00	0.74	**1.28**	**2.46**
K2O	1.58	-2.50	0.19	**85.03**	**-0.33**	*	*	-2.61	0.54	0.77	1.47	**0.14**	**2.00**
P2O5	2.04	*	0.76	**-6.60**	**-0.62**	*	*	*	-0.10	0.97	2.04	**1.52**	**3.01**
As	*	*	2.99	**-7.48**	**-2.24**	-0.94	*	-0.95	0.19	*	-0.12	*	*
Ba	0.79	-1.18	0.27	*	**-20.56**	-0.04	**-1.41**	*	0.31	*	0.98	**1.21**	-2.42
Be	*	*	0.02	*	*	*	**0.26**	*	-0.79	*	-0.25	*	*
Bi	*	*	*	*	*	*	*	*-0.33*	*0.00*	*	*	*	*
C(tot)	*	*	*1.32*	*	***0.00***	*	*	*1.30*	*-0.41*	*	*-1.14*	*	***2.99***
Ce	*	1.47	0.52	*	**-12.85**	0.38	**0.13**	-2.08	0.11	*	0.53	*	*
Co	6.79	1.41	0.22	*	**-2.15**	0.22	**-0.57**	-0.79	0.17	*	*	*	*
Cr	-0.40	2.11	-1.93	*	**7.16**	*	**-1.12**	2.17	-1.67	*	*	*	*
Cs	*	1.27	*	*	**-1.35**	0.50	**-0.77**	*	0.43	*	*	*	*
Cu	-0.23	1.53	3.53	**-10.20**	**-4.81**	-0.81	**-0.70**	10.41	-0.22	*	-0.65	*	*
Dy	*	0.45	0.39	*	**-6.53**	*	**0.26**	-1.83	0.24	*	-1.40	*	*
Er	*	0.39	0.48	*	**-6.40**	*	**0.11**	-1.55	0.45	*	-0.95	*	*
Eu	*	-0.03	0.26	*	**-7.59**	*	**-0.29**	-1.31	0.09	*	-0.32	*	*
Ga	*	*	*	*	**-2.80**	-0.23	**0.18**	-0.60	0.76	*	*	*	*
Gd	*	0.00	0.39	*	**-4.38**	*	**-0.48**	-1.54	0.43	*	-0.03	*	*
Ge	*	*	*	*	*	*	*	*0.79*	*-1.91*	*	*	*	*
Hf	*	*	0.96	*	**-8.00**	*	**-0.56**	-1.51	-0.06	*	0.42	*	*
Ho	*	0.31	0.39	*	**-5.40**	*	**0.07**	-0.91	0.31	*	-1.24	*	*
La	2.03	0.21	0.32	*	**-7.52**	-0.30	**-0.29**	-1.48	0.72	*	0.75	*	*
Li	*	-1.47	1.56	*	**-7.08**	*	**0.59**	*	-0.05	*	0.51	*	*
Lu	*	0.16	0.27	*	**-5.00**	*	**0.25**	-1.05	0.31	*	-1.09	*	*
Mo	14.99	*	-0.11	**-3.32**	**0.32**	-1.93	**0.26**	1.12	-0.43	*	*	*	*
Nb	0.60	*	0.36	*	**3.91**	-0.07	**0.15**	-2.51	-1.00	*	-0.28	*	*
Nd	*	*	0.53	*	**-9.34**	*	**-0.27**	-1.81	-0.20	*	-0.37	*	*
Ni	7.49	1.59	0.56	**-11.82**	**-1.71**	0.27	**0.62**	1.71	-0.30	*	-0.67	*	*
Pb	2.90	0.65	-1.26	**6.09**	**-5.45**	-0.11	**0.07**	-2.09	0.15	*	0.26	*	*
Pr	*	*	0.31	*	**-11.83**	*	**-0.34**	-1.80	-0.19	*	-0.18	*	*
Rb	3.72	-0.47	0.99	*	**-18.79**	0.10	**0.59**	-2.59	0.74	*	0.00	*	*
Sb	*	*	0.21	**88.88**	**5.06**	*	*	-0.75	0.00	*	*	*	*
Sc	*	*	-0.32	*	**-6.00**	-0.33	**-0.42**	0.28	-0.35	*	0.75	*	*
Sm	*	*	0.47	*	**-6.19**	*	**-0.16**	-1.62	-0.32	*	-0.62	*	*
Sn	*	*	*	*	**3.50**	*	**0.20**	0.43	4.86	*	*	*	*
Sr	1.09	-1.82	-0.05	*	**-4.21**	-0.06	**-0.14**	-1.55	0.28	*	0.10	**1.20**	**2.75**
Ta	*	*	3.04	*	*	*	**-0.44**	-1.76	0.60	*	*	*	*
Tb	*	-0.31	0.20	*	**-8.29**	*	**-0.16**	-1.49	-0.22	*	-0.57	*	*
Th	5.80	2.05	1.60	*	**-5.34**	-0.73	**0.03**	-3.06	0.58	*	*	*	*
Tl	*	*	*	*	**-1.16**	*	*	*	-0.49	*	*	*	*
Tm	*	0.00	0.16	*	**-6.35**	*	**0.07**	-1.16	0.16	*	-1.09	*	*
U	6.52	0.42	0.44	*	**2.23**	-1.87	**0.24**	-0.80	0.54	*	*	*	*
V	7.00	-1.20	0.16	*	**8.75**	0.77	**-1.76**	-0.75	1.20	*	0.33	*	*
W	*	*	*	*	***3.66***	*	*	*7.99*	*2.82*	*	*	*	*
Y	1.69	0.48	0.13	*	**-7.73**	-0.08	**0.36**	-2.04	-0.09	*	0.48	*	*
Yb	*	-5.01	0.27	*	**-5.05**	*	**0.44**	-1.00	0.82	*	-1.57	*	*
Zn	-0.13	-0.59	0.74	**-14.19**	**-2.28**	0.09	**-1.13**	-5.98	0.13	*	0.13	*	*
Zr	2.24	*	-0.36	*	**-20.37**	0.41	**-0.36**	-2.60	0.52	*	0.37	**7.47**	*

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

Table 3 - GeoPT40 Z-scores for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code	W83	W84	W86	W87	W88	W89	W90	W91	W93	W94	W96	W97	W98
SiO2	*	-1.41	-1.26	*	0.02	**1.92**	**-2.57**	**-0.71**	*	**0.05**	*	**0.30**	**-6.59**
TiO2	*	*	-0.21	*	-1.02	**0.39**	**-2.04**	**0.39**	*	**2.83**	*	**0.39**	*
Al2O3	*	*	-0.93	*	-0.09	**2.57**	**-1.92**	**1.17**	*	**0.38**	*	**-0.40**	**1.95**
Fe2O3T	*	*	-0.76	*	-0.97	**0.10**	**-0.58**	**-0.58**	*	**-1.94**	*	**0.10**	**7.83**
MnO	*	*	-1.10	*	15.18	**3.59**	**1.42**	**-2.20**	*	**5.04**	*	**-0.75**	**-10.67**
MgO	*	0.92	0.00	*	-1.54	**-2.67**	**-2.26**	**0.00**	*	**1.03**	*	**1.03**	**-17.66**
CaO	*	-4.21	-1.09	*	0.47	**3.28**	**-1.87**	**-2.50**	*	**0.94**	*	**-1.87**	**25.74**
Na2O	*	*	-0.74	*	2.70	**0.00**	**-2.46**	**0.49**	*	**-0.98**	*	**-3.93**	**90.47**
K2O	*	*	-1.10	*	1.12	**0.37**	**-1.73**	**-0.56**	*	**1.07**	*	**-0.56**	**26.96**
P2O5	*	*	4.18	*	-0.10	**-0.19**	**0.24**	**-2.33**	*	**4.08**	*	**-1.26**	*
As	*	*	-0.58	*	3.27	**-15.26**	*	**5.31**	**0.19**	**1.15**	*	*	*
Ba	*	*	0.11	*	0.42	**3.88**	**0.34**	**-2.47**	**-4.89**	**0.95**	*	**-1.80**	*
Be	2.10	*	20.35	*	0.88	**0.05**	*	*	**-2.80**	**0.36**	*	**0.59**	*
Bi	*	*	*	*	*	***-0.70***	*	*	*	***3.48***	*	*	*
C(tot)	*	*	*	*	*	*	*	*	*	*	*	*	*
Ce	1.46	*	-0.10	2.02	**0.22**	**4.16**	**-2.12**	**0.64**	**-2.10**	**1.19**	**-1.91**	**0.43**	*
Co	*	*	-0.41	*	0.41	**-1.46**	0.99	**1.99**	*	**0.83**	*	**-0.17**	*
Cr	*	*	-11.80	*	0.12	**0.14**	**-2.87**	**-2.52**	*	**2.94**	*	**-0.27**	*
Cs	*	*	0.31	*	-0.04	**-1.61**	**0.25**	**6.75**	**-1.67**	**0.39**	**-2.50**	**-0.22**	*
Cu	*	*	0.63	*	2.34	**1.09**	**-0.45**	**-3.02**	**-2.70**	**2.45**	*	**-0.54**	*
Dy	-0.22	*	0.20	1.48	**0.00**	**-0.08**	**-1.50**	*	**-0.81**	**1.18**	**-1.06**	**0.75**	*
Er	0.20	*	0.73	0.89	**0.34**	**1.15**	**-0.47**	*	**-1.00**	**1.46**	**-1.04**	**0.84**	*
Eu	0.65	*	0.09	4.46	**-0.29**	**0.99**	**-0.29**	*	**-1.69**	**0.17**	**-1.22**	**0.06**	*
Ga	*	*	*	*	0.76	**-0.64**	0.76	**-2.08**	*	**1.17**	**-1.72**	**0.45**	*
Gd	1.32	*	0.20	18.17	**-0.32**	**1.85**	**-1.53**	*	**-1.16**	**0.75**	**-1.85**	**0.22**	*
Ge	*-0.14*	*	*	*	*	***9.90***	*	*	*	***5.51***	***0.84***	*	*
Hf	0.44	*	-0.06	*	-1.01	**-0.90**	**-1.28**	**-9.61**	**-3.42**	**1.16**	*	**-0.49**	*
Ho	-0.49	*	*	*	**0.00**	**-0.15**	**-0.77**	*	**-0.84**	**1.85**	**-0.93**	**0.93**	*
La	1.59	*	-0.15	9.31	**-0.31**	**3.11**	**-1.11**	**11.34**	**-2.69**	**0.85**	**-1.18**	**0.35**	*
Li	*	*	1.08	*	1.93	**-2.43**	*	*	**-2.92**	*	*	**-1.69**	*
Lu	0.30	*	0.00	*	**0.00**	**0.00**	**-0.63**	*	**-0.59**	**1.88**	**-0.94**	**0.63**	*
Mo	*	*	*	*	0.27	**0.64**	*	*	*	**4.28**	*	**-0.32**	*
Nb	*	*	-0.20	*	0.52	**-0.88**	**3.43**	**-2.00**	**2.00**	**0.24**	**5.99**	**0.56**	*
Nd	0.62	*	0.12	2.56	**0.24**	**2.27**	**-0.24**	**0.00**	**-1.80**	**0.97**	**-1.79**	**0.32**	*
Ni	*	*	0.45	*	1.93	**1.11**	**0.15**	**-2.08**	*	**1.04**	*	**1.34**	*
Pb	*	*	-0.04	*	-0.53	**1.69**	**-0.95**	**13.62**	**-4.00**	**2.08**	*	**0.61**	*
Pr	-0.04	*	0.13	*	**0.00**	**1.03**	**-0.28**	*	**-1.94**	**0.50**	**-1.43**	**0.00**	*
Rb	*	*	0.50	*	0.25	**-2.83**	**-1.61**	**-0.50**	**-8.75**	**0.50**	**-3.87**	**-0.42**	*
Sb	*	*	-0.68	*	*	**-0.27**	*	*	*	**1.37**	**0.82**	*	*
Sc	*	*	-1.14	29.19	0.20	**-1.81**	**-1.29**	**4.02**	**0.43**	**2.44**	**3.07**	**-0.08**	*
Sm	0.52	*	0.00	1.36	**-0.32**	**1.69**	**-1.17**	**-2.92**	**-1.85**	**0.65**	**-1.69**	**0.36**	*
Sn	-1.15	*	*	*	-0.19	**0.47**	*	*	**-1.27**	**1.94**	**-0.85**	**0.00**	*
Sr	*	*	0.66	*	0.31	**-1.51**	**-0.52**	**-0.80**	**-3.72**	**-0.09**	*	**0.19**	*
Ta	*	*	*	*	-0.51	**12.46**	24.67	*	**-1.03**	**-0.28**	**0.90**	**0.01**	*
Tb	0.35	*	0.22	9.03	**0.09**	**1.66**	**-1.31**	*	**-0.83**	**0.44**	**-0.96**	**0.26**	*
Th	*	*	*	*	0.10	**4.06**	**-0.48**	**0.00**	**-0.82**	**0.39**	**-1.14**	**0.68**	*
Tl	*	*	-0.49	*	-0.04	**0.27**	*	*	*	*	**-3.85**	*	*
Tm	0.42	*	*	*	**0.31**	**-0.31**	**-0.31**	*	**-0.78**	*	**-1.25**	**0.31**	*
U	-0.67	*	-0.47	*	0.93	**3.72**	**-1.16**	**6.52**	**-1.59**	**1.40**	**-1.16**	**0.98**	*
V	*	*	-0.22	*	-0.11	**1.09**	**0.88**	**0.00**	*	**0.44**	*	**-1.31**	*
W	*	*	*	*	*0.47*	***-3.85***	*-0.19*	***90.19***	*	***2.82***	***-0.85***	*	*
Y	*	*	-1.35	2.00	0.82	**1.82**	**-1.22**	**-0.09**	**-1.80**	**-1.39**	**-2.78**	**1.48**	*
Yb	0.01	*	0.28	3.94	**0.56**	**1.83**	**-0.21**	*	**-0.35**	**1.19**	**-0.78**	**1.07**	*
Zn	*	*	0.64	*	0.64	**1.28**	**0.26**	**-1.28**	*	**1.28**	*	**-1.08**	*
Zr	*	*	0.90	*	-0.22	**0.30**	**-0.90**	**-0.45**	**-5.17**	**2.99**	*	**-0.60**	*

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

Table 3 - GeoPT40 Z-scores for Silty marine shale, ShWYO-1. 14/12/2016

Lab Code	W99	W100	W101	W102	W103	W105	W106	W107	W108	W111	W112	W113	W114
SiO2	**-0.29**	**-0.56**	**2.60**	-1.18	0.50	**-0.71**	**-0.53**	-0.21	-0.24	-0.09	*	*	-5.69
TiO2	**-0.42**	**-6.91**	**1.20**	-0.86	-0.21	**-0.42**	**-1.23**	0.05	-0.62	-0.13	**3.40**	-22.78	33.48
Al2O3	**-0.46**	**3.47**	**2.06**	-1.02	-0.34	**-0.96**	**0.44**	-0.01	-0.20	-0.15	*	-29.41	-3.18
Fe2O3T	**-0.72**	**-5.33**	**1.59**	-0.32	-0.56	**0.64**	**-0.72**	-0.19	0.39	-0.63	**-3.54**	-7.81	60.09
MnO	**-0.03**	**-2.20**	**5.04**	*	-1.10	**-2.20**	**-0.75**	0.28	2.52	-1.82	**-0.03**	-1.82	31.46
MgO	**-0.82**	**-2.05**	**1.85**	-0.80	0.41	**-1.64**	**0.60**	-0.55	-0.10	-0.41	*	-9.06	-14.17
CaO	**0.00**	**-5.93**	**2.81**	-1.86	0.00	**-1.56**	**-0.03**	-0.68	0.16	-0.08	*	-4.41	43.68
Na2O	**0.00**	**-6.88**	**-3.93**	-1.94	0.00	**-7.87**	**-0.94**	0.29	0.25	-0.49	*	-22.40	*
K2O	**-0.56**	**-8.26**	**0.84**	-0.83	-0.28	**-0.56**	**-0.16**	-0.05	0.30	-0.40	*	-25.14	26.54
P2O5	**-0.19**	**1.95**	**1.95**	-0.74	-0.10	**-0.19**	**0.84**	0.21	2.04	0.22	*	-3.51	*
As	**-1.16**	**-2.70**	*	*	*	**3.00**	**-2.53**	2.80	0.19	*	**0.69**	-1.62	-0.17
Ba	**-0.51**	**1.12**	**0.28**	*	0.31	**0.73**	**-0.67**	-0.44	0.53	*	**-2.43**	-9.94	-1.46
Be	*	**0.59**	*	*	*	**-0.96**	**1.75**	*	*	*	*	-4.06	*
Bi	*	*	*	*	*	*	***0.14***	*	*	*	***-7.06***	*-0.38*	*
C(tot)	*	*	*	*	*0.57*	***7.01***	*	*2.28*	*	*-0.41*	*	*	*
Ce	**-0.62**	**-4.39**	*	*	-0.16	**1.02**	**-0.21**	0.53	3.46	*	**-1.72**	-5.28	177.94
Co	**-2.98**	**-2.32**	**0.33**	*	*	**-0.50**	**2.36**	0.84	*	*	**-8.28**	-1.88	84.63
Cr	**-2.17**	**-2.71**	**3.70**	*	2.02	**0.52**	**2.52**	1.79	1.16	*	**-4.59**	-8.30	6.00
Cs	*	*	*	*	-0.36	*	**-1.23**	4.90	*	*	**1.15**	*	*
Cu	**-0.45**	**-6.86**	**-2.16**	*	*	**-1.91**	**-0.45**	-0.94	-1.51	*	**-2.16**	-2.75	7.15
Dy	*	**0.00**	*	*	0.00	**0.75**	**0.00**	*	*	*	**-2.14**	-3.66	45.44
Er	*	**-1.22**	*	*	0.17	**0.84**	**0.10**	*	*	*	**-1.16**	-3.92	*
Eu	*	**-0.66**	*	*	-0.32	**0.17**	**0.29**	*	*	*	**-0.56**	-2.24	-1.43
Ga	**3.93**	*	**-2.08**	*	0.40	-0.38	**0.77**	-0.23	0.16	*	**-1.36**	*	*
Gd	*	**0.22**	*	*	-0.14	**0.93**	**-0.20**	*	*	*	**-0.97**	-2.08	*
Ge	*	*	*	*	*	*	*	*	*	*	*	*-6.38*	*
Hf	*	*	*	*	0.42	3.82	**-1.38**	2.04	*	*	**-6.91**	*	*
Ho	*	**2.93**	*	*	-0.08	**0.77**	**0.14**	*	*	*	**-1.24**	-3.08	*
La	**6.24**	**-0.62**	*	*	0.90	**1.00**	**-0.12**	0.03	4.21	*	**-2.34**	-5.35	44.25
Li	*	*	*	*	*	**-4.13**	**1.02**	*	*	*	**0.94**	-4.19	*
Lu	*	**-1.56**	*	*	0.31	**0.63**	**0.00**	*	*	*	**-1.38**	-3.69	55.80
Mo	*	**1.82**	*	*	*	**0.21**	**0.37**	*	*	*	**-2.67**	-4.25	38.87
Nb	**1.20**	*	**-0.40**	*	0.52	-0.04	**1.10**	0.78	0.60	*	**2.00**	-8.97	1.73
Nd	**-2.44**	**-0.55**	*	*	0.45	**1.14**	**0.13**	-0.17	*	*	**-0.66**	-4.07	86.86
Ni	**0.15**	**-2.60**	**2.37**	*	*	**-0.67**	**2.33**	0.28	-0.30	*	**-3.49**	-2.58	6.38
Pb	**1.88**	**-2.36**	**-0.07**	*	*	**-0.76**	**0.13**	0.82	1.92	*	**1.88**	-2.38	-0.08
Pr	*	*	*	*	0.42	**0.86**	**-0.15**	*	*	*	**0.00**	-3.57	*
Rb	**1.49**	**-8.77**	**1.24**	*	0.06	-0.66	**1.26**	0.52	0.62	*	**-0.15**	-9.70	-4.59
Sb	*	**5.88**	*	*	*	**0.00**	**0.59**	*	*	*	**47.86**	*	*
Sc	*	**-2.92**	**2.44**	*	*	1.93	**4.66**	1.42	0.43	*	**-1.97**	-5.37	*
Sm	*	**-2.20**	*	*	0.15	**0.94**	**0.73**	*	*	*	**-0.91**	-2.70	*
Sn	*	*	*	*	0.97	*	**-1.96**	*	*	*	*	-6.71	29.81
Sr	**1.18**	**-4.92**	**1.75**	*	0.73	-0.76	**1.64**	0.54	0.45	*	**-1.12**	-5.59	-0.40
Ta	*	*	*	*	-0.14	*	**0.04**	*	*	*	**-7.45**	*	*
Tb	*	**4.28**	*	*	0.13	**0.61**	**0.09**	*	*	*	**-1.62**	-2.25	50.59
Th	**0.00**	*	**1.93**	*	0.17	**1.49**	**0.06**	-0.62	1.93	*	**0.20**	-3.36	1.81
Tl	*	*	*	*	*	**-5.46**	**-1.18**	*	*	*	**1.11**	-4.00	*
Tm	*	**-0.31**	*	*	0.78	**0.31**	**0.13**	*	*	*	**-1.25**	-3.39	62.52
U	*	*	*	*	0.44	**1.77**	**5.88**	*	1.86	*	**10.71**	-4.70	-0.93
V	**-1.75**	**0.66**	*	*	0.77	**2.41**	**5.18**	0.60	0.88	*	**-3.28**	-9.44	2.30
W	*	*	*	*	*2.82*	*	***-1.30***	*	*	*	*	*-5.92*	*139.04*
Y	**6.86**	**0.35**	**-0.09**	*	0.17	**0.00**	**1.77**	1.03	0.82	*	**0.09**	-5.53	*
Yb	*	**-2.95**	*	*	-0.01	**1.45**	**0.15**	*	*	*	**-1.33**	-4.77	98.03
Zn	**-1.03**	**13.60**	**-0.77**	*	*	**-1.59**	**1.06**	0.05	0.00	*	**-3.03**	-3.66	-0.38
Zr	**-0.75**	*	**2.09**	*	0.60	-0.22	**1.57**	1.02	0.90	*	**-1.75**	-13.32	0.33

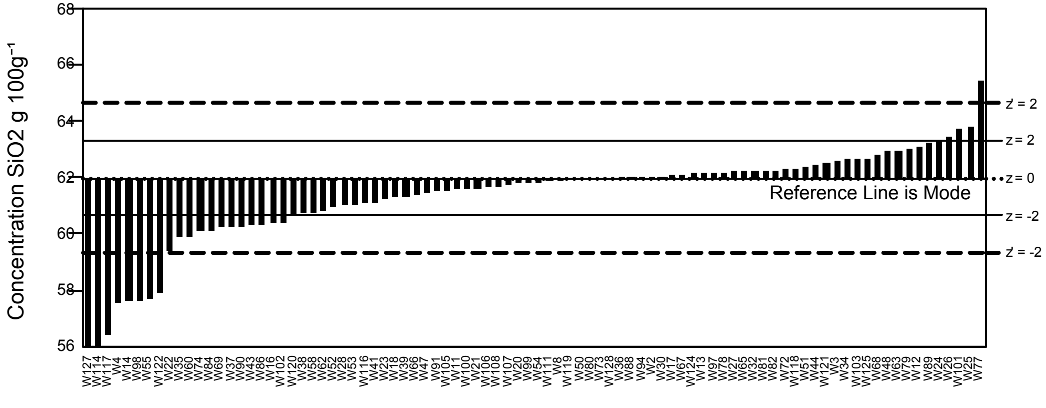
Bold entries are Data Quality 1 - <u>Underlined entries</u> are Data Quality 2 - *Entries in italics* are derived from Provisional Values.

Table 3 - GeoPT40 Z-scores for Silty marine shale, ShWYO-1. 14/12/2016

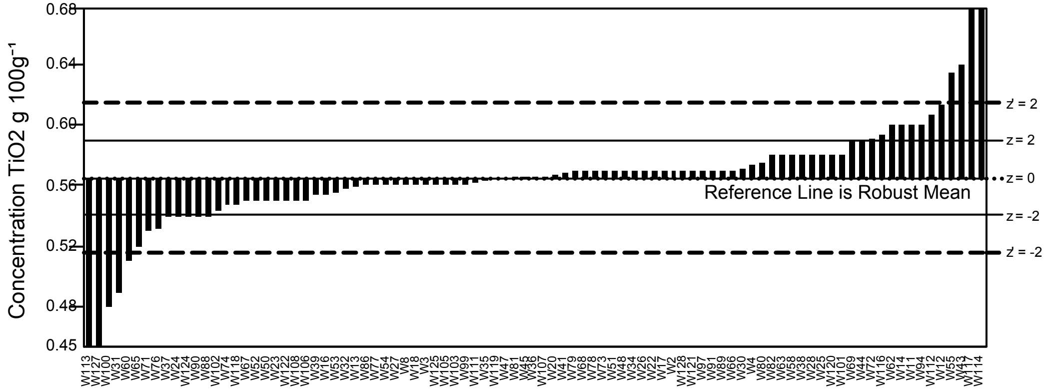
Lab Code	W116	W117	W118	W119	W120	W121	W122	W124	W125	W127	W128
SiO2	-0.68	-4.19	0.26	**-0.09**	**-1.94**	0.39	**-6.18**	**0.23**	**0.99**	-28.54	-0.02
TiO2	1.13	5.19	-0.72	**-0.09**	**1.20**	0.20	**-1.23**	**-2.04**	**-0.42**	-14.78	0.20
Al2O3	0.29	-1.21	0.09	**0.78**	**-3.21**	-0.09	**5.82**	**-0.57**	**2.91**	-25.59	-0.09
Fe2O3T	0.82	8.05	-0.87	*	**2.13**	0.25	**-1.26**	**0.78**	**0.23**	-19.56	0.18
MnO	*	1.36	-0.92	**-2.05**	**-2.20**	-1.10	**-2.20**	**-2.20**	**-0.03**	-9.31	0.71
MgO	0.62	-6.16	-1.80	**0.16**	**5.34**	-0.21	**-0.21**	**0.21**	**-0.62**	-24.81	-0.21
CaO	1.87	7.18	-1.51	**-0.59**	**1.87**	0.31	**7.33**	**-1.25**	**1.09**	236.01	-0.08
Na2O	0.69	-10.30	0.17	**-3.39**	**-2.46**	0.25	**-11.31**	**-1.47**	**-1.72**	-23.72	-0.49
K2O	0.09	3.33	-0.78	**-0.42**	**-0.33**	0.19	**-2.66**	**0.60**	**2.94**	-25.78	-0.05
P2O5	0.65	1.83	-1.21	**0.41**	**-0.19**	-0.10	**-17.29**	**-0.19**	**5.58**	-9.60	0.01
As	*	14.14	1.26	*	*	0.42	*	**3.46**	**5.31**	*	0.19
Ba	0.35	-0.67	-0.45	**0.39**	**-1.01**	0.87	*	**2.19**	**-2.19**	*	-0.62
Be	-0.21	*	*	*	*	0.29	*	*	*	*	*
Bi	*	*	*4.13*	*	*	*0.35*	*	*	*	*	*
C(tot)	*	*	*0.87*	*	*	*-25.10*	*	*	*	*	*1.06*
Ce	-0.25	*	-0.05	**-2.29**	**-1.87**	-0.06	*	**-1.03**	**-1.45**	*	0.11
Co	-0.27	*	-0.16	*	**0.33**	-0.25	*	**-2.98**	**-0.17**	*	0.17
Cr	0.36	*	-1.27	**-1.83**	**5.78**	-1.43	*	**-1.14**	**-0.93**	0.50	0.64
Cs	-0.45	*	*	*	*	-0.04	*	*	**83.32**	*	1.02
Cu	0.41	1.21	0.83	**-0.45**	**3.82**	3.41	*	**-0.45**	**-2.67**	21.31	0.20
Dy	0.14	*	0.51	*	**-3.54**	-0.39	*	*	*	*	*
Er	0.17	*	0.59	*	**-1.66**	-0.52	*	*	*	*	*
Eu	-0.15	*	0.10	*	**-0.99**	0.09	*	*	*	*	*
Ga	-0.08	*	0.32	**1.53**	**3.93**	-0.34	*	**1.53**	**-0.04**	*	0.76
Gd	-0.53	*	0.58	*	**2.17**	0.02	*	**5.73**	*	*	*
Ge	*	*	*	*	*	*2.75*	*	***5.51***	*	*	*
Hf	-1.01	*	-4.15	*	*	-0.21	*	**3.06**	**-1.06**	*	0.10
Ho	0.08	*	0.48	*	**3.40**	0.15	*	*	*	*	*
La	-0.17	*	-0.11	**4.06**	**-1.04**	-0.08	*	**6.24**	**-4.09**	*	0.21
Li	*	*	3.98	*	**-0.68**	0.23	*	*	*	*	*
Lu	0.00	*	0.39	*	**1.88**	0.94	*	*	*	*	*
Mo	*	*	1.31	*	*	0.54	*	*	*	266.65	4.28
Nb	-1.63	*	-2.19	**1.20**	**-0.40**	-0.92	*	**-0.40**	**-0.72**	*	0.60
Nd	-0.20	*	0.05	*	**-2.44**	-0.08	*	**5.68**	**-0.65**	*	0.41
Ni	0.37	*	0.35	**-6.53**	**-0.59**	-1.04	*	**-5.04**	**-0.82**	41.24	1.19
Pb	-0.48	*	-0.45	**2.86**	**-1.05**	0.70	*	**-0.07**	**0.32**	*	0.94
Pr	-0.29	*	0.06	*	**-2.52**	0.00	*	*	*	*	0.50
Rb	-0.57	4.09	-0.19	**-1.24**	**3.22**	-0.16	*	**3.47**	**-0.42**	-10.54	0.50
Sb	*	*	1.27	*	*	-0.27	*	*	*	*	*
Sc	-0.04	*	-4.01	*	**-2.29**	-0.51	*	**5.59**	**0.08**	*	1.22
Sm	-0.13	*	0.22	*	**0.32**	0.00	*	*	1.46	*	0.16
Sn	-0.39	*	2.17	*	*	0.19	*	*	*	*	*
Sr	-0.68	5.49	-0.06	**2.04**	**3.31**	0.38	**-8.47**	**3.46**	**-0.24**	63.56	-0.05
Ta	-0.96	*	-3.97	*	*	-0.14	*	*	*	*	*
Tb	-0.04	*	0.02	*	*	0.22	*	*	*	*	*
Th	-0.34	*	-0.45	*	*	0.00	*	**-1.93**	**-4.25**	*	-1.93
Tl	-0.58	*	0.16	*	*	0.04	*	*	*	*	*
Tm	0.00	*	0.21	*	**1.88**	0.94	*	*	*	*	*
U	-0.16	*	-0.84	*	*	0.23	*	*	4.42	*	-1.16
V	0.07	*	-0.89	**6.13**	**-3.50**	-0.55	*	**3.94**	**-1.75**	40.81	0.00
W	*	*	*-0.95*	*	*	*-0.47*	*	*	*	*	*
Y	-0.64	*	-0.08	**-0.96**	**5.12**	-0.74	*	**5.99**	**-0.09**	*	0.39
Yb	0.15	*	0.27	*	**-4.54**	2.51	*	*	*	*	*
Zn	0.73	8.72	0.96	**-0.26**	**0.00**	-0.13	*	**1.03**	**-1.69**	0.51	0.38
Zr	-1.36	2.17	-7.53	**-0.15**	**-2.24**	-0.22	*	**-3.74**	**-0.45**	*	0.07

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

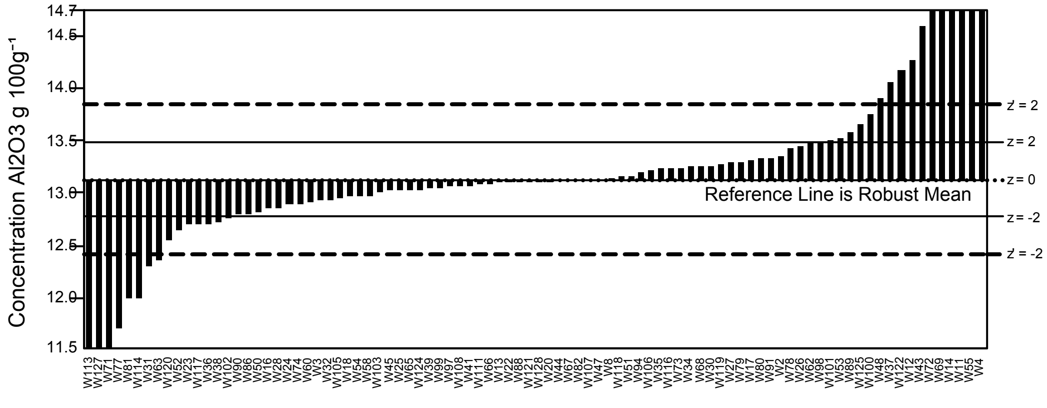
GeoPT40 - Barchart for SiO2



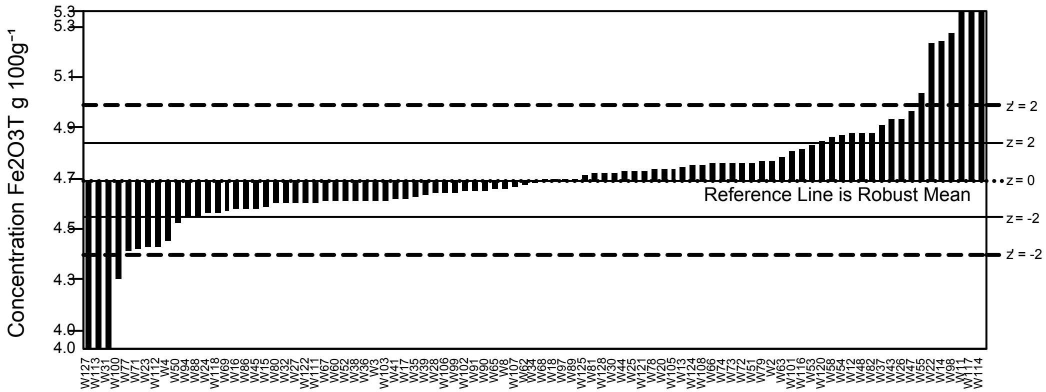
GeoPT40 - Barchart for TiO2



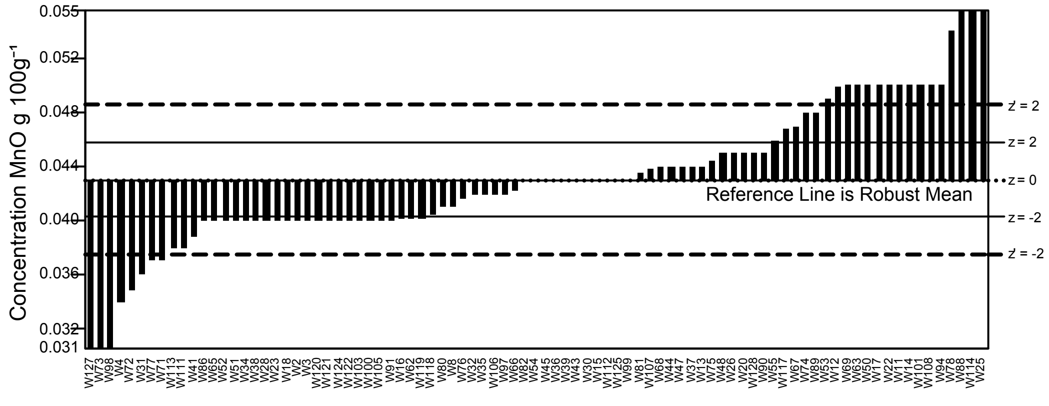
GeoPT40 - Barchart for Al2O3



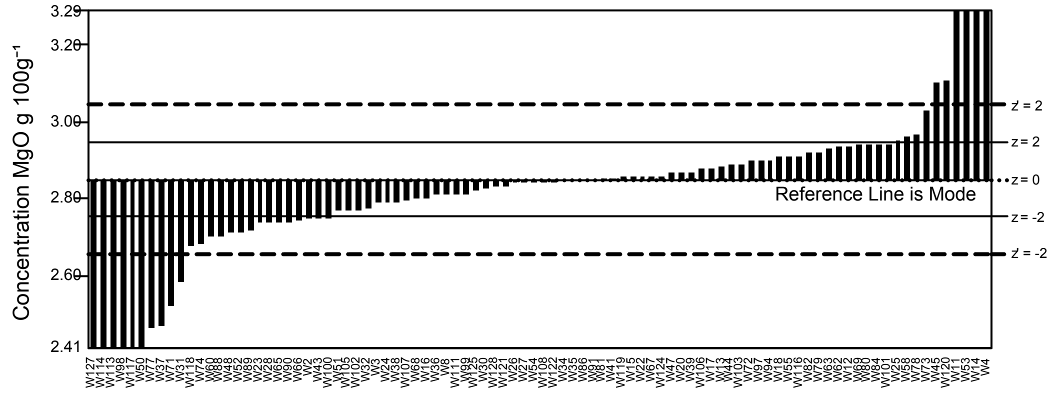
GeoPT40 - Barchart for Fe2O3T



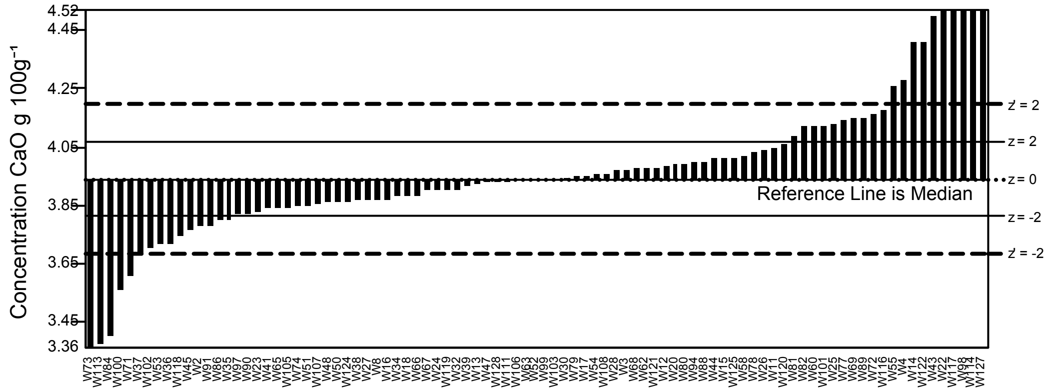
GeoPT40 - Barchart for MnO



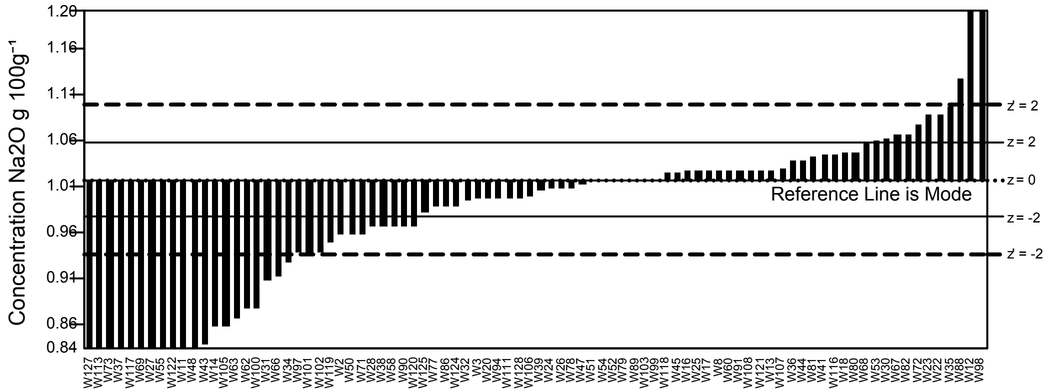
GeoPT40 - Barchart for MgO



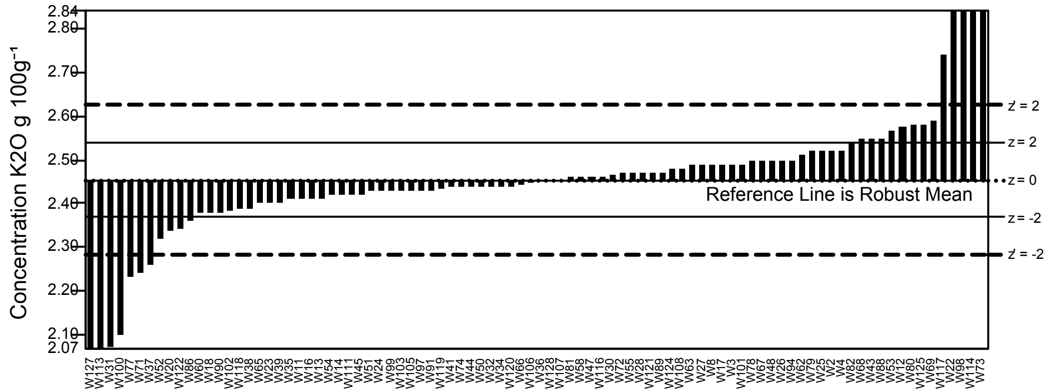
GeoPT40 - Barchart for CaO



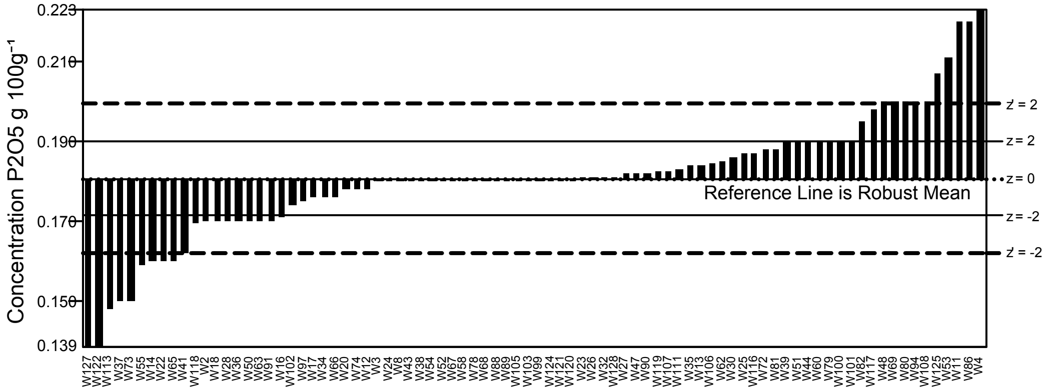
GeoPT40 - Barchart for Na2O



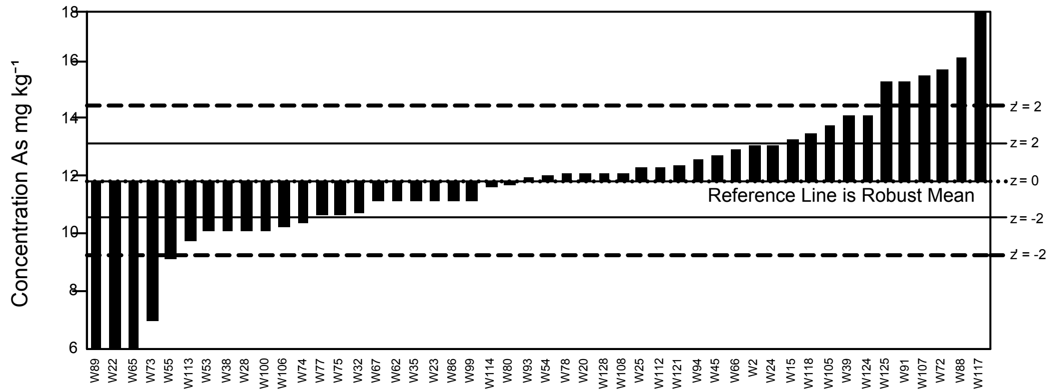
GeoPT40 - Barchart for K2O



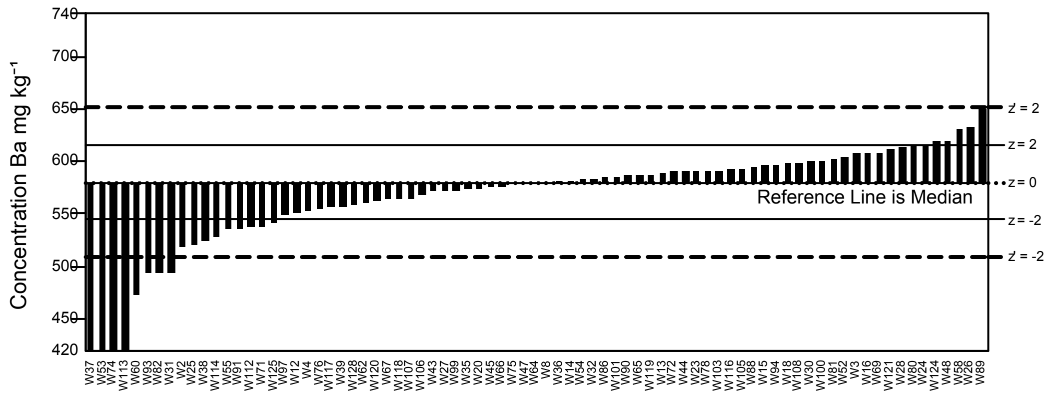
GeoPT40 - Barchart for P2O5



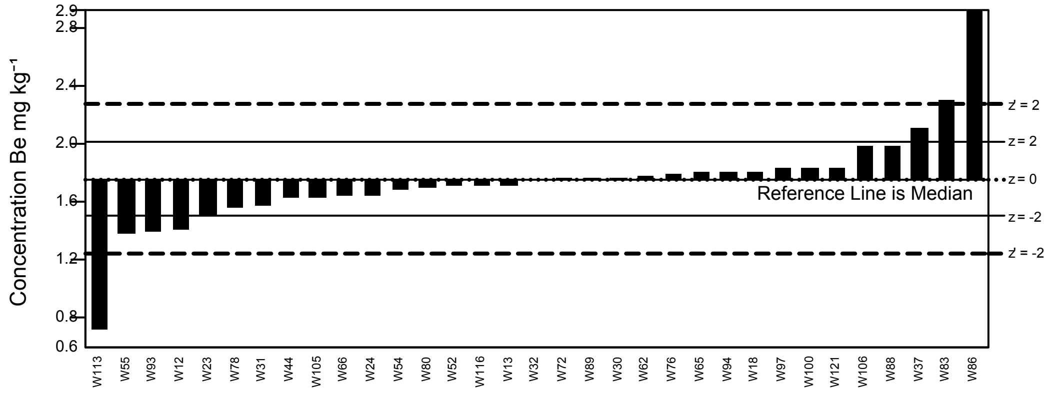
GeoPT40 - Barchart for As



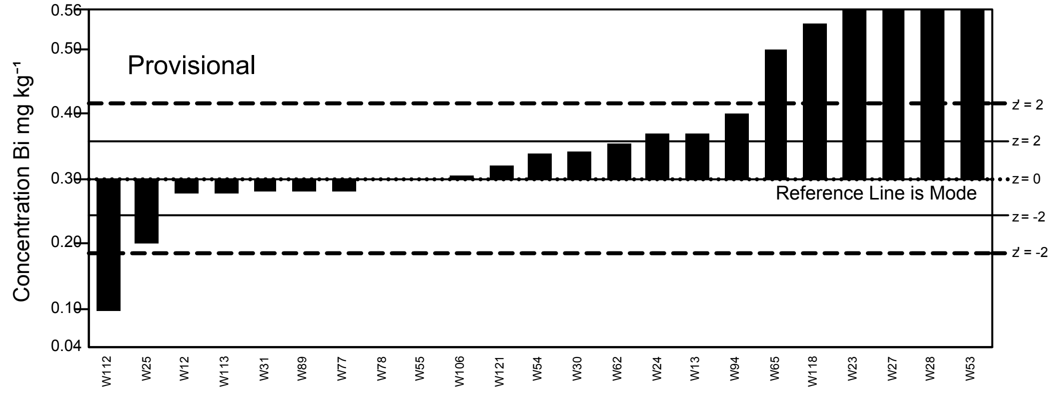
GeoPT40 - Barchart for Ba



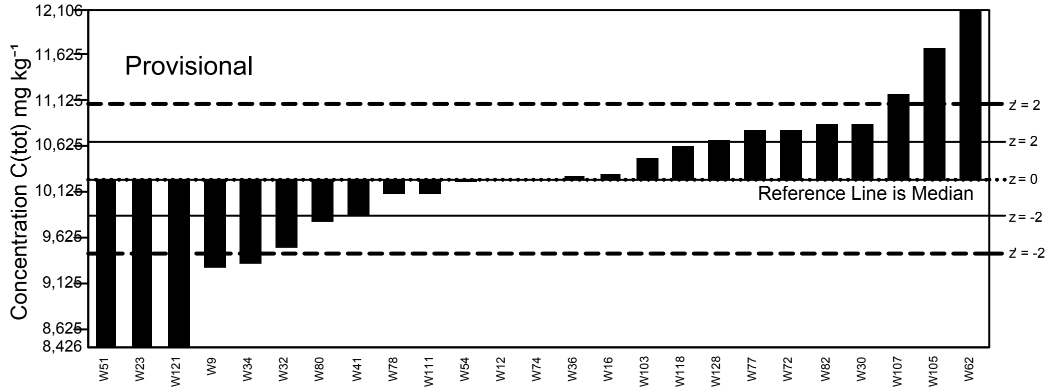
GeoPT40 - Barchart for Be



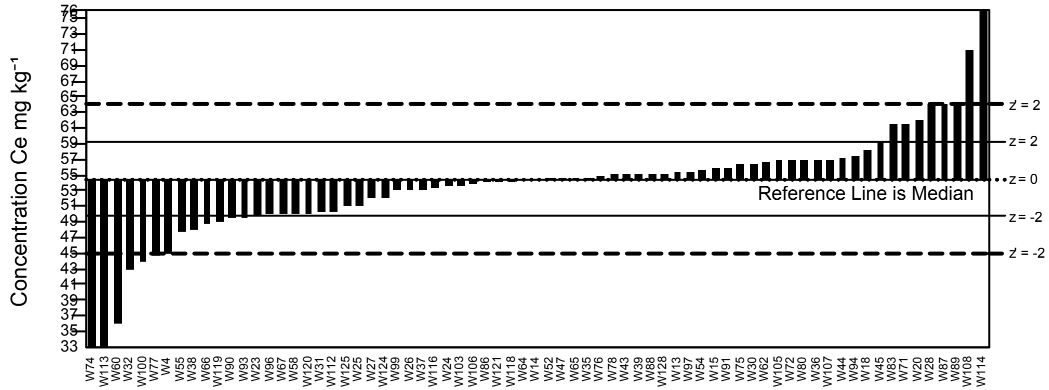
GeoPT40 - Barchart for Bi



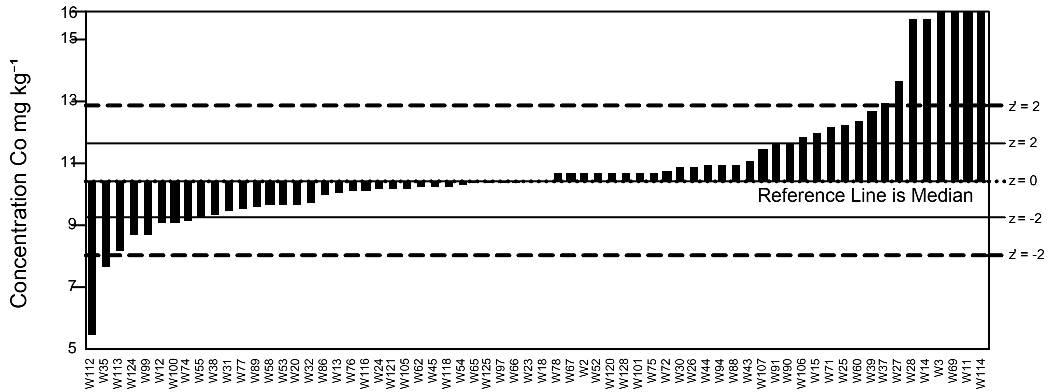
GeoPT40 - Barchart for C(tot)



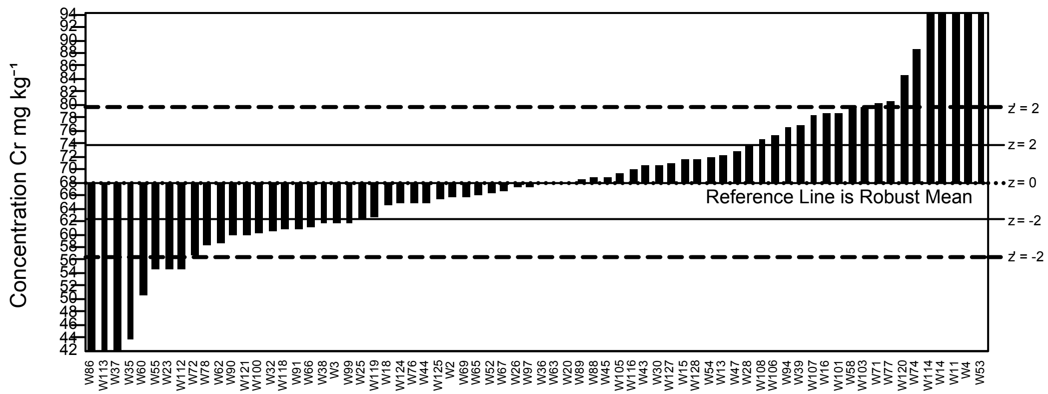
GeoPT40 - Barchart for Ce

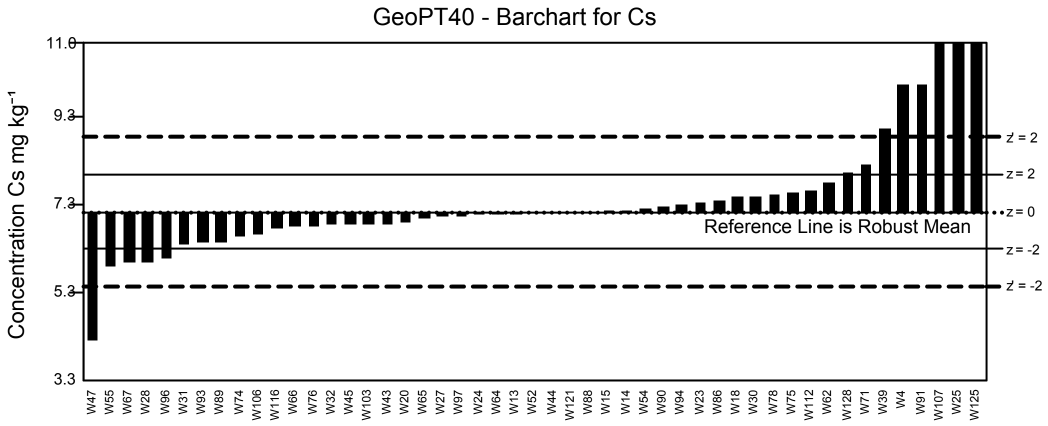


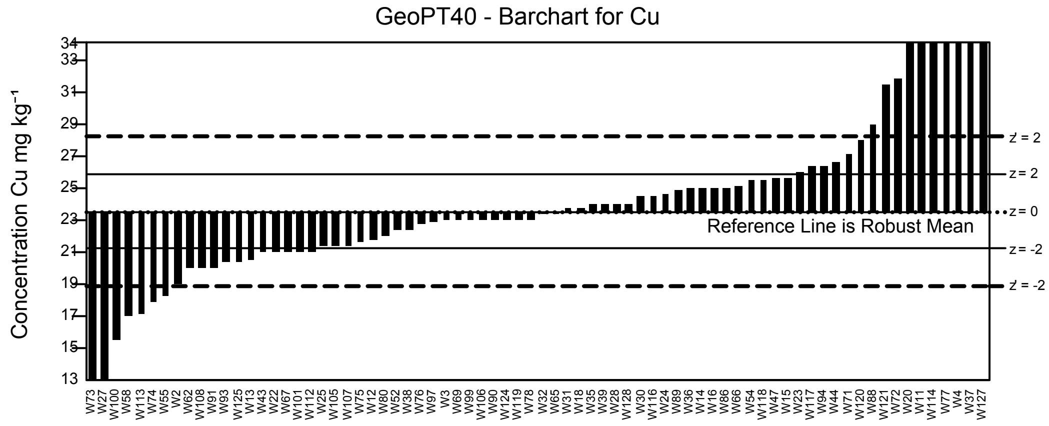
GeoPT40 - Barchart for Co

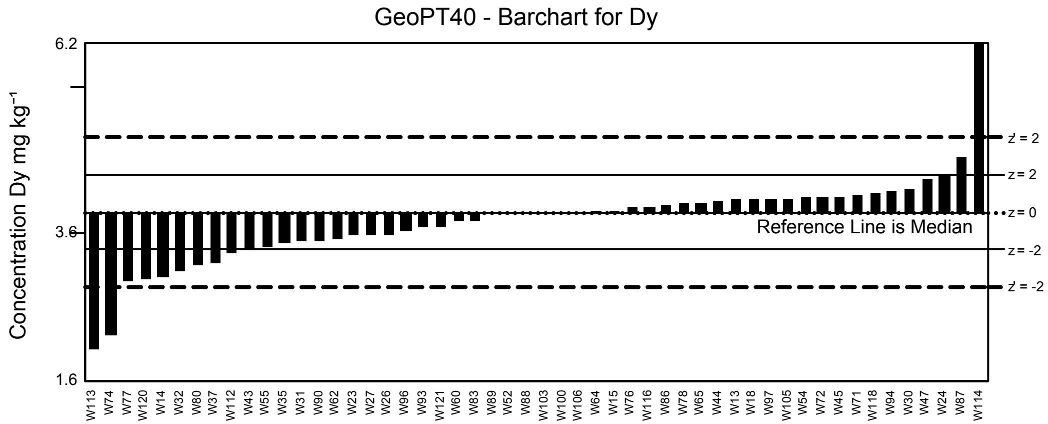


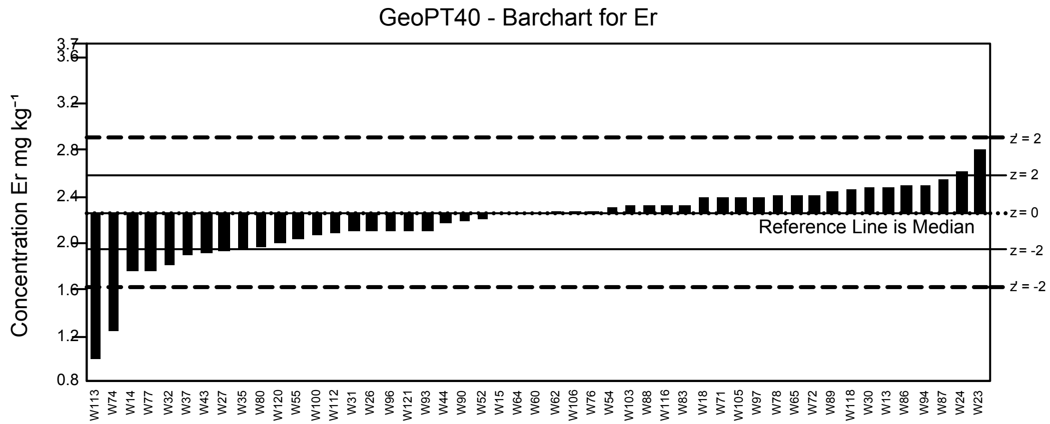
GeoPT40 - Barchart for Cr

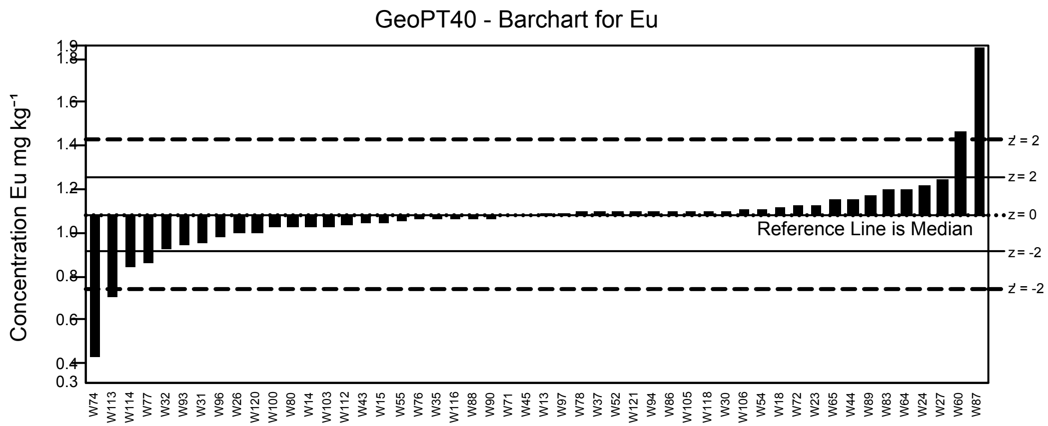


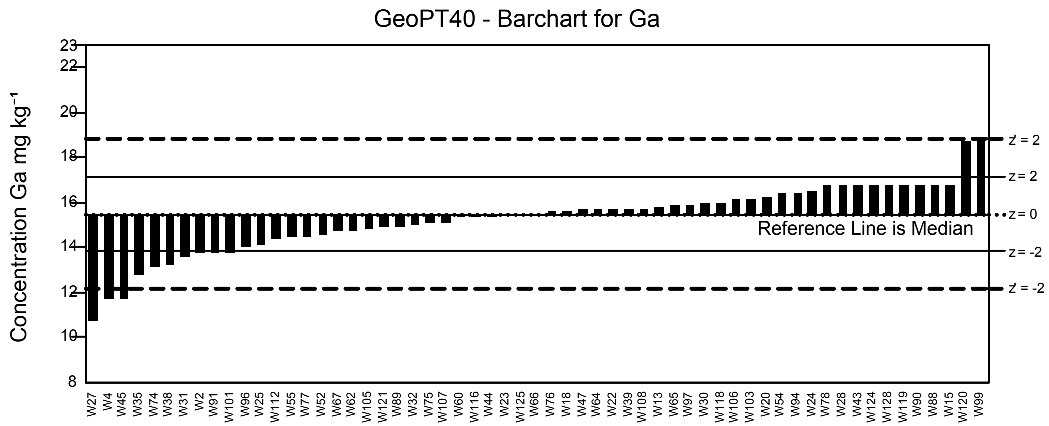

GeoPT40 - Barchart for Cs
Concentration Cs mg kg⁻¹
11.0
9.3
7.3
5.3
3.3
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Robust Mean

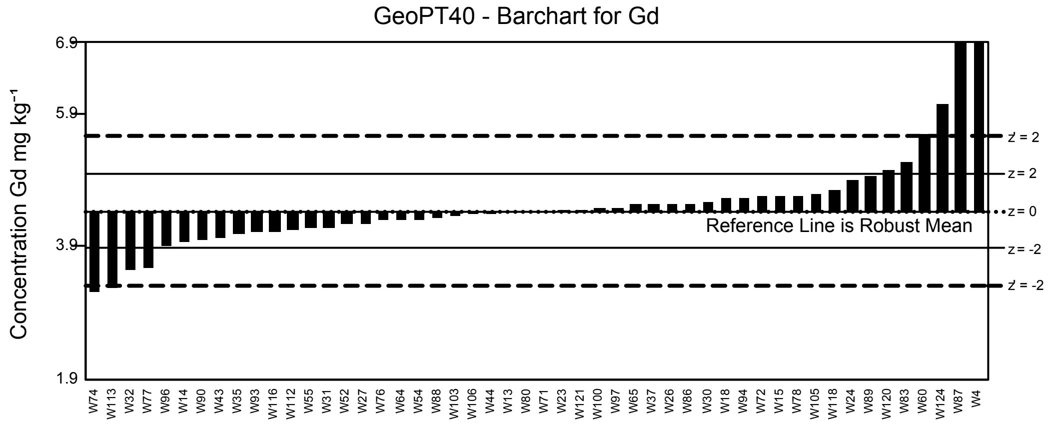

GeoPT40 - Barchart for Cu
Concentration Cu mg kg⁻¹
34
33
31
29
27
25
23
21
19
17
15
13
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Robust Mean

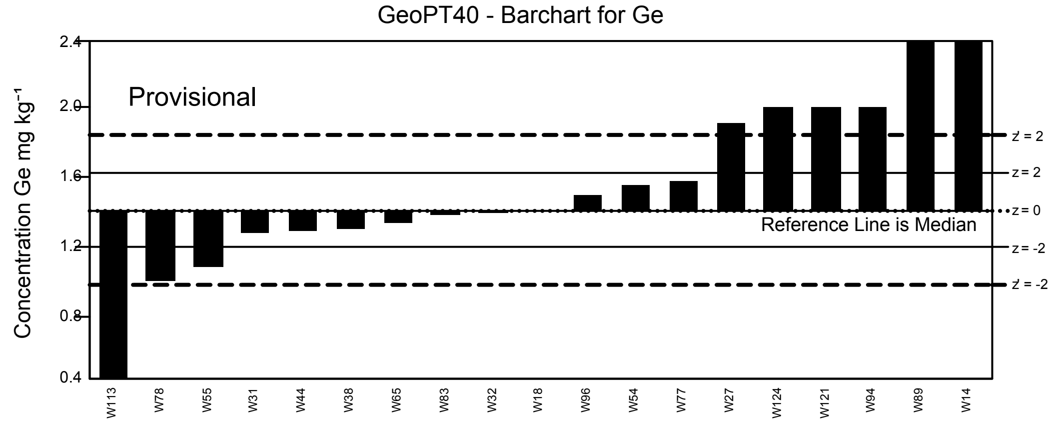

GeoPT40 - Barchart for Dy
Concentration Dy mg kg⁻¹
6.2
3.6
1.6
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Median

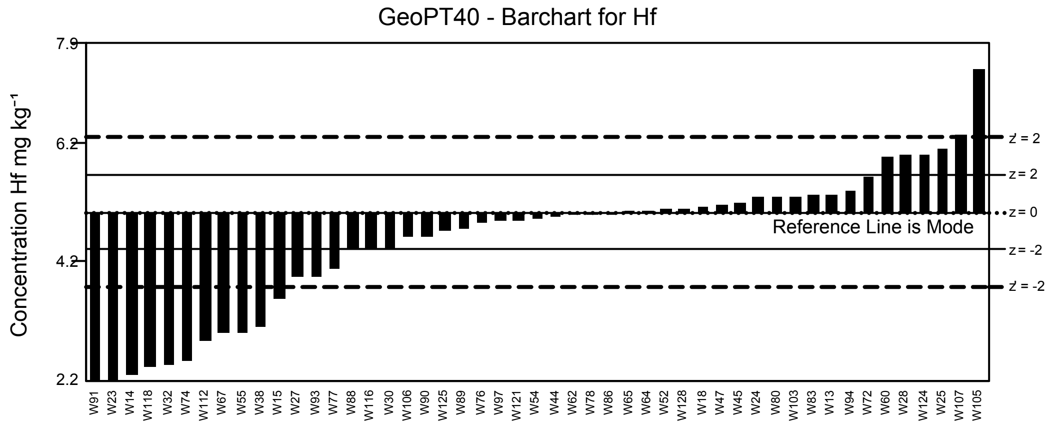

GeoPT40 - Barchart for Er
Concentration Er mg kg⁻¹
3.7
3.6
3.2
2.8
2.4
2.0
1.6
1.2
0.8
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Median

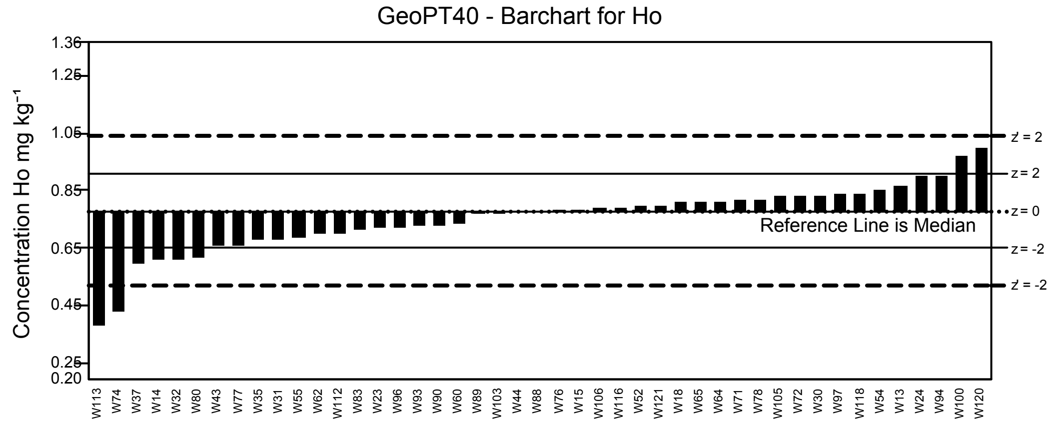

GeoPT40 - Barchart for Eu
Concentration Eu mg kg⁻¹
1.9
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.3
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Median

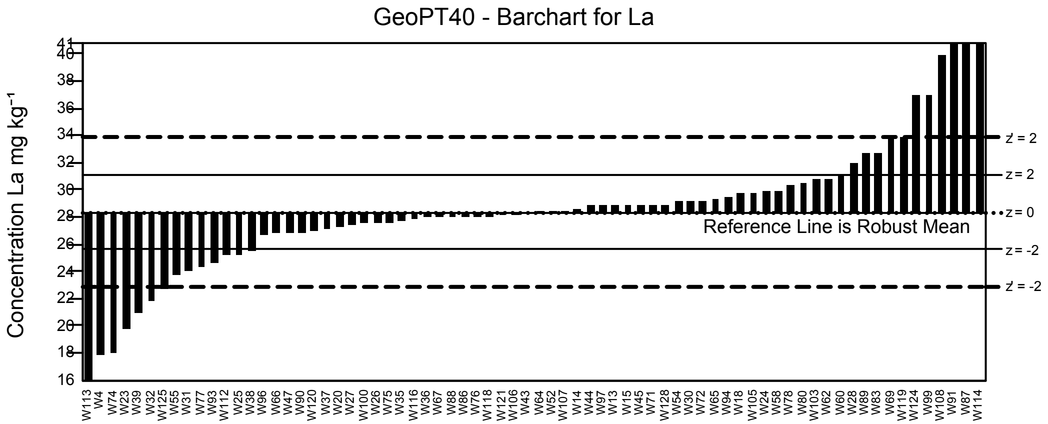

GeoPT40 - Barchart for Ga
Concentration Ga mg kg⁻¹
23
22
20
18
16
14
12
10
8
z' = 2
z = 2
z = 0
z = -2
z' = -2
Reference Line is Median

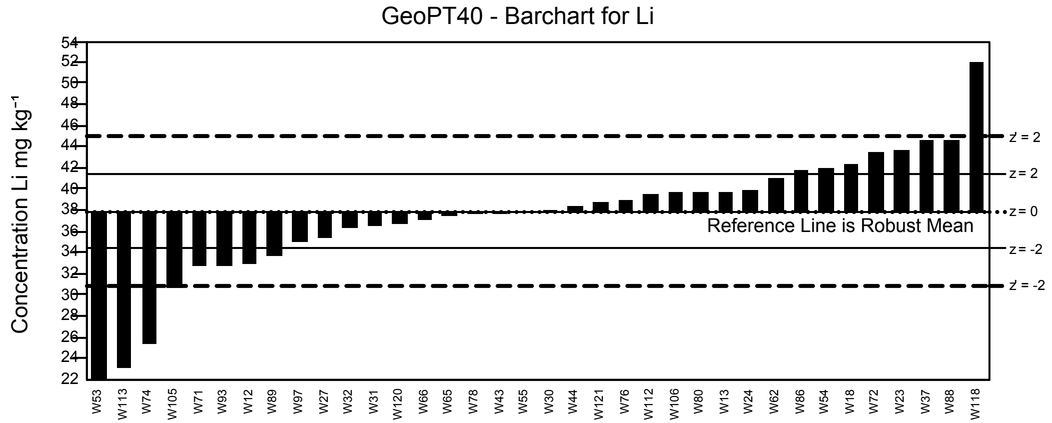

GeoPT40 - Barchart for Gd
Concentration Gd mg kg⁻¹
Reference Line is Robust Mean


GeoPT40 - Barchart for Ge
Concentration Ge mg kg⁻¹
Provisional
Reference Line is Median

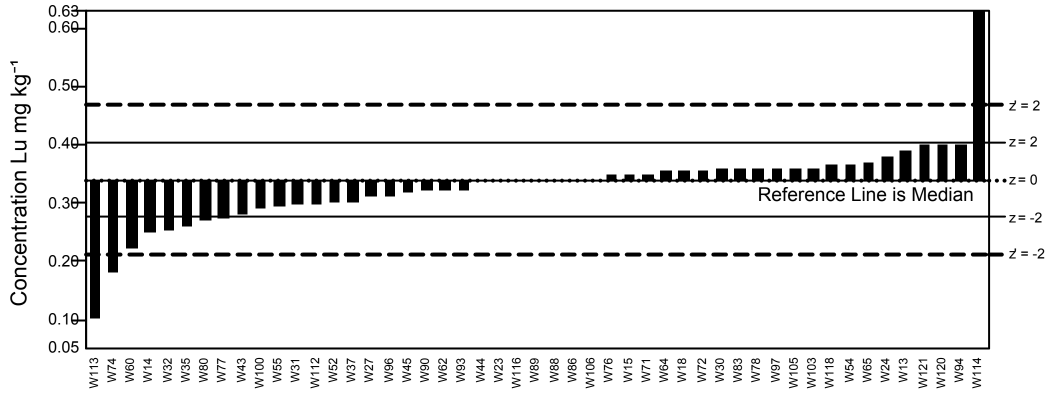

GeoPT40 - Barchart for Hf
Concentration Hf mg kg⁻¹
Reference Line is Mode


GeoPT40 - Barchart for Ho
Concentration Ho mg kg⁻¹
Reference Line is Median

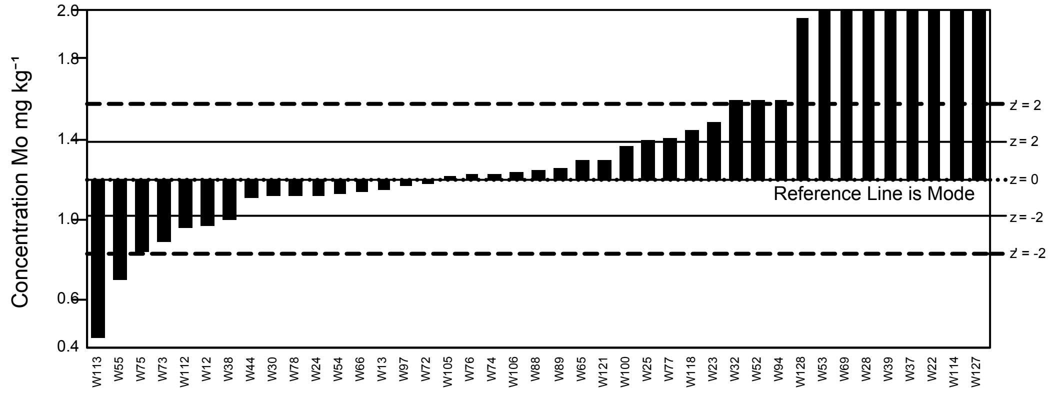

GeoPT40 - Barchart for La
Concentration La mg kg⁻¹
Reference Line is Robust Mean


GeoPT40 - Barchart for Li
Concentration Li mg kg⁻¹
Reference Line is Robust Mean

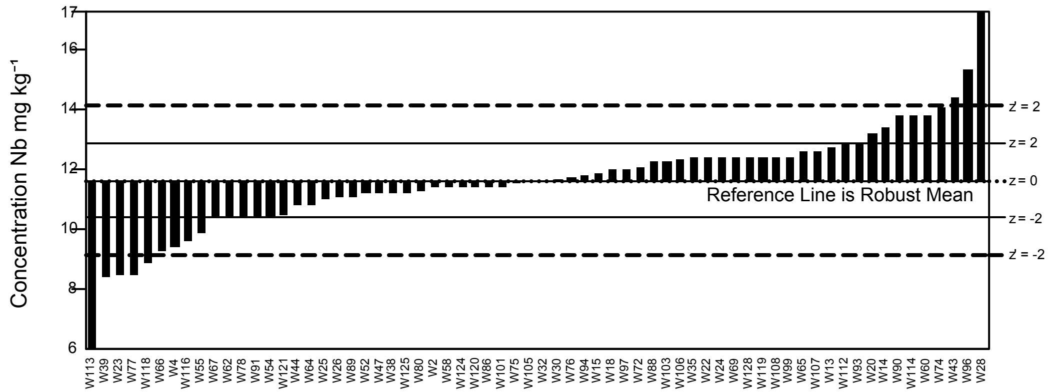
GeoPT40 - Barchart for Lu



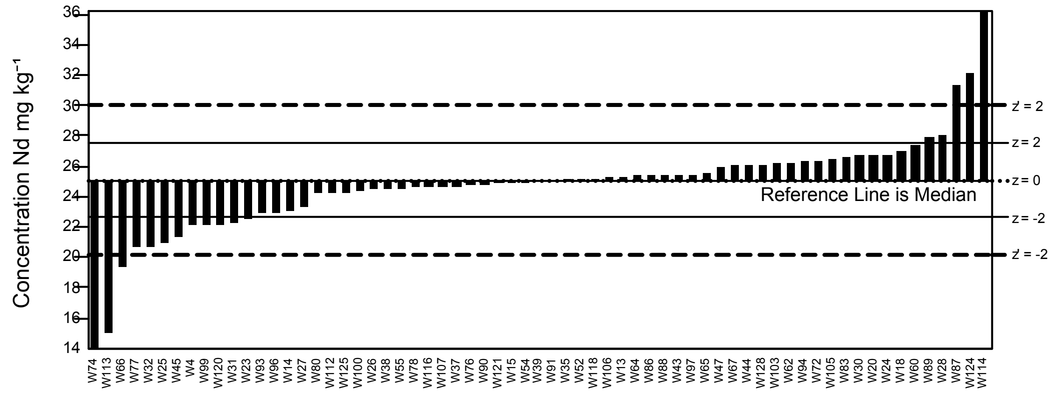
GeoPT40 - Barchart for Mo



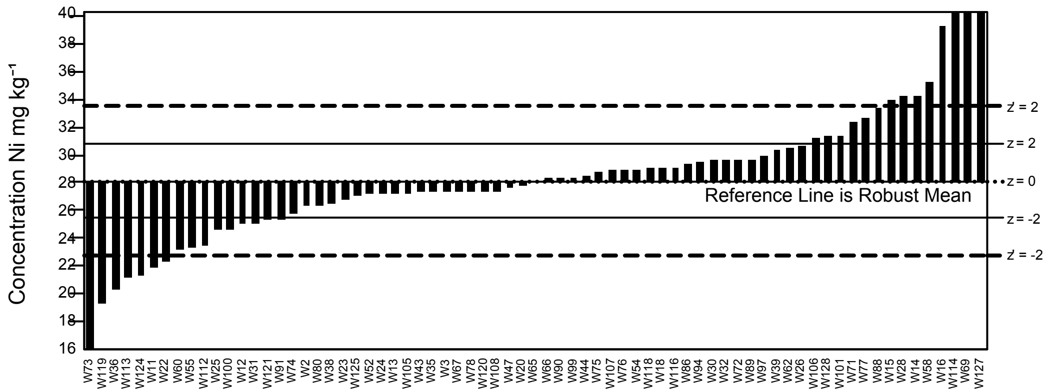
GeoPT40 - Barchart for Nb



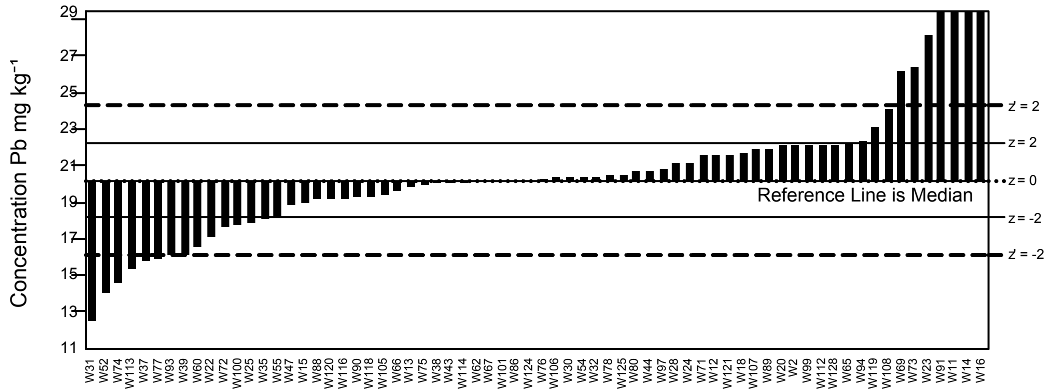
GeoPT40 - Barchart for Nd



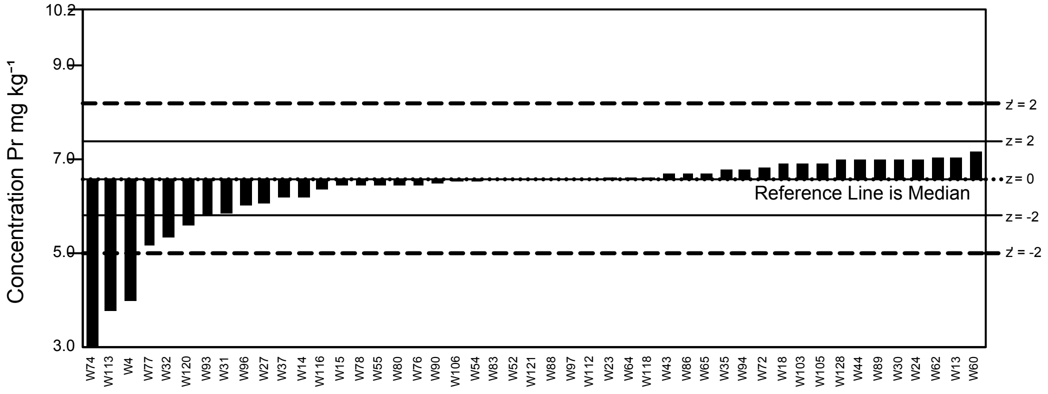
GeoPT40 - Barchart for Ni



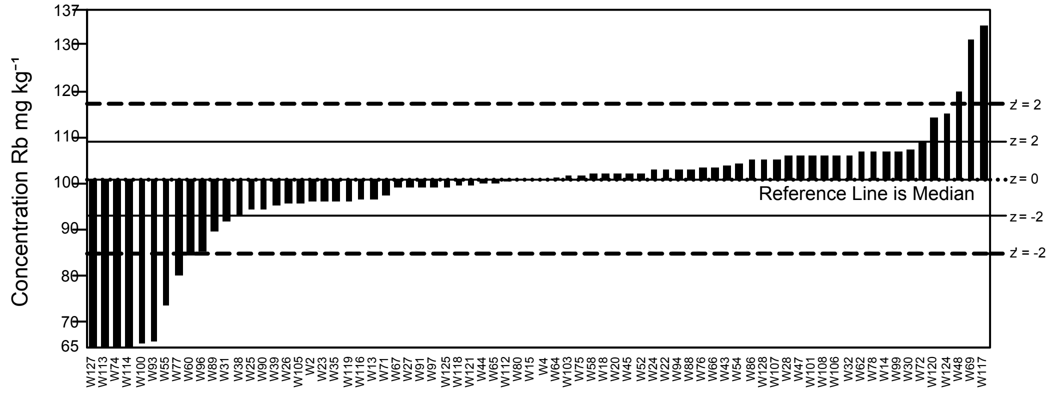
GeoPT40 - Barchart for Pb



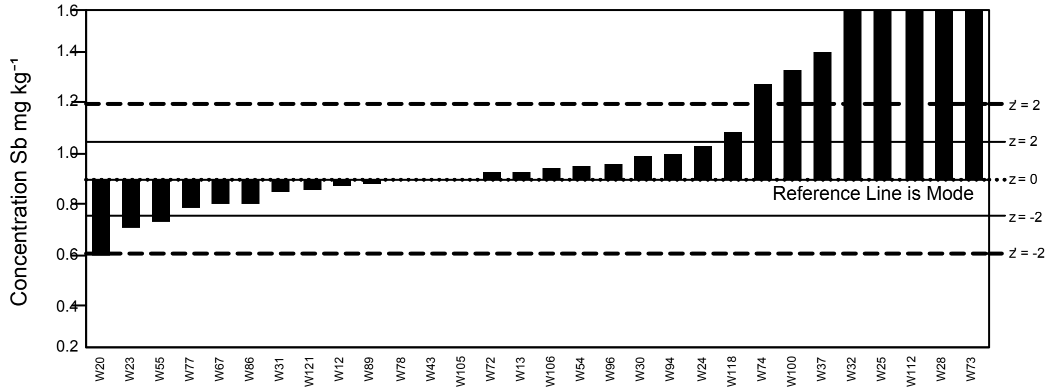
GeoPT40 - Barchart for Pr



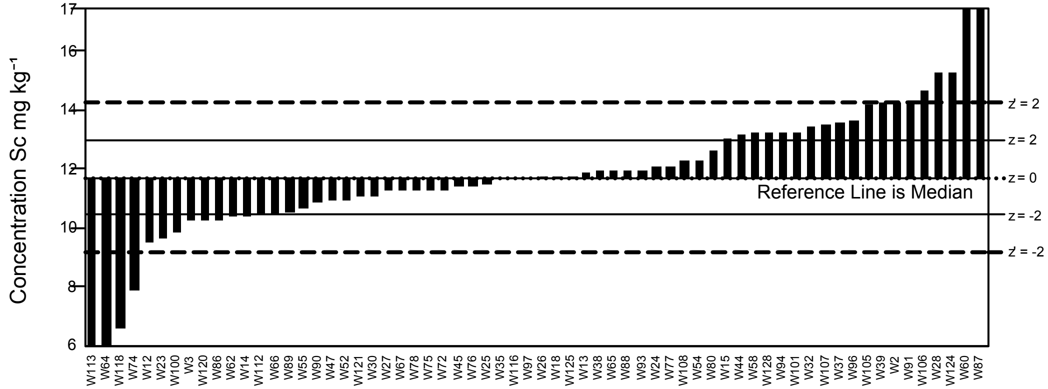
GeoPT40 - Barchart for Rb



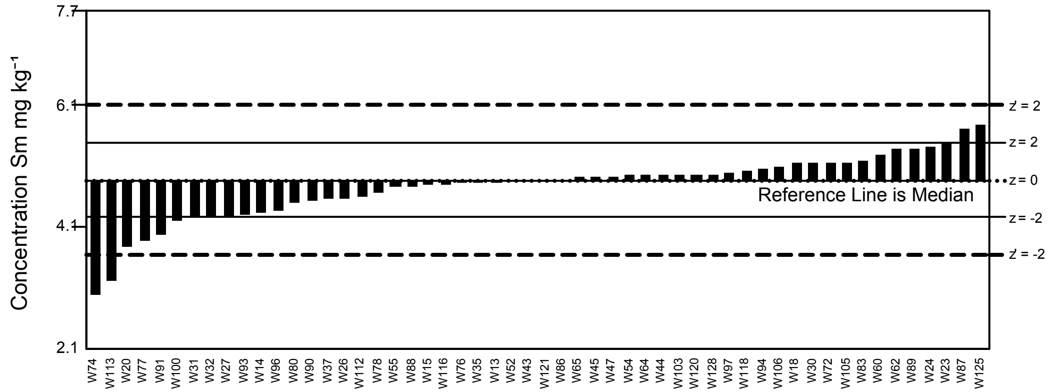
GeoPT40 - Barchart for Sb



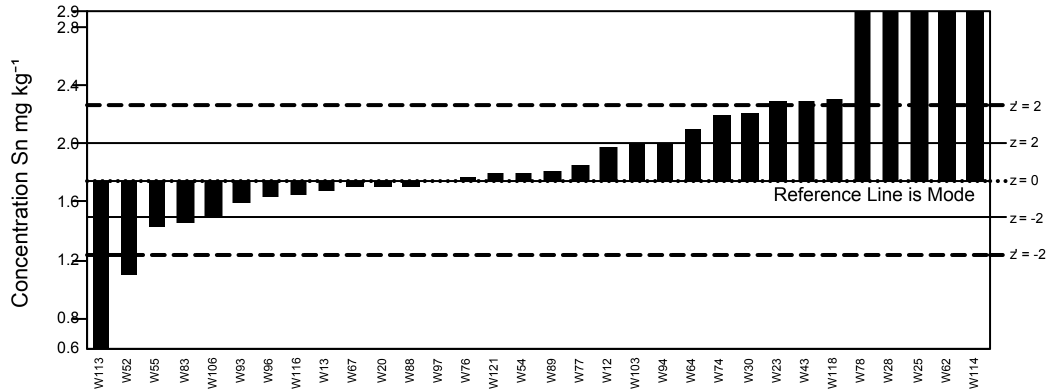
GeoPT40 - Barchart for Sc

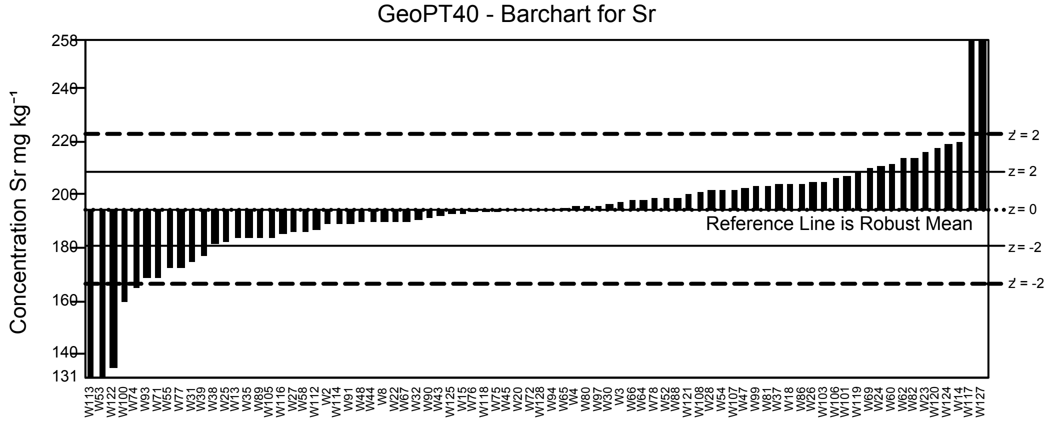


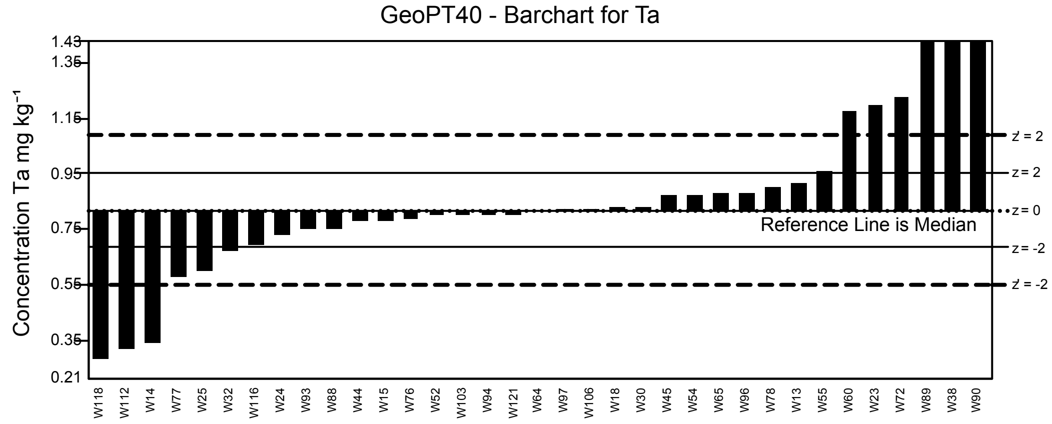
GeoPT40 - Barchart for Sm

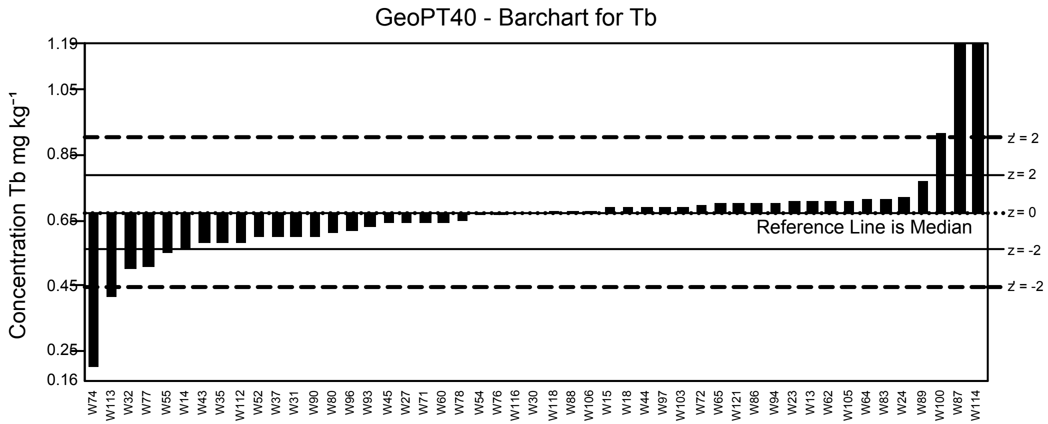


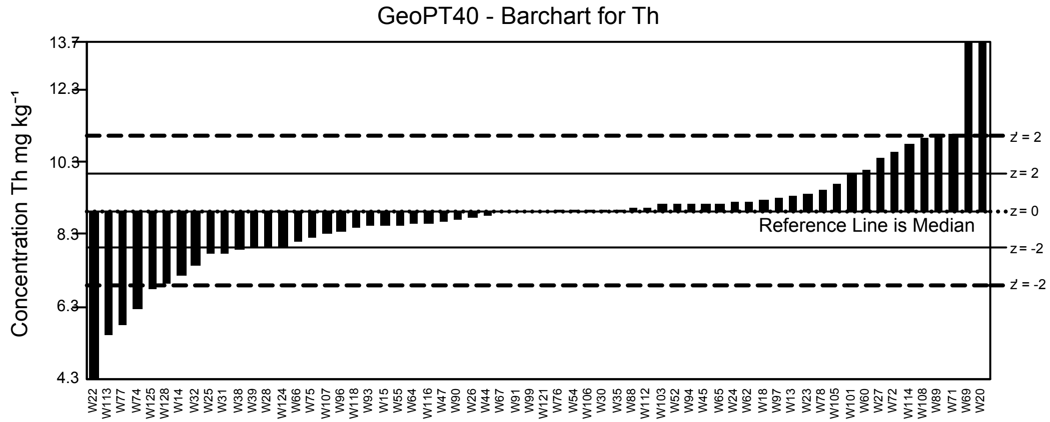
GeoPT40 - Barchart for Sn

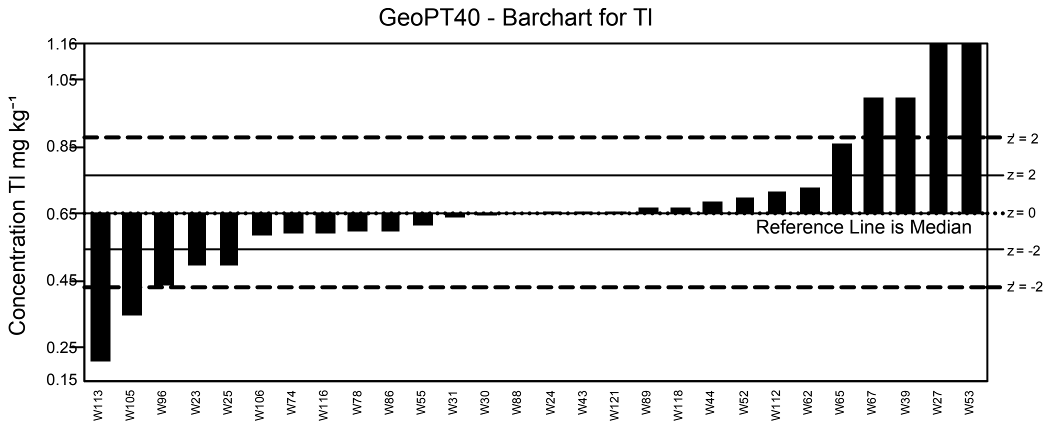


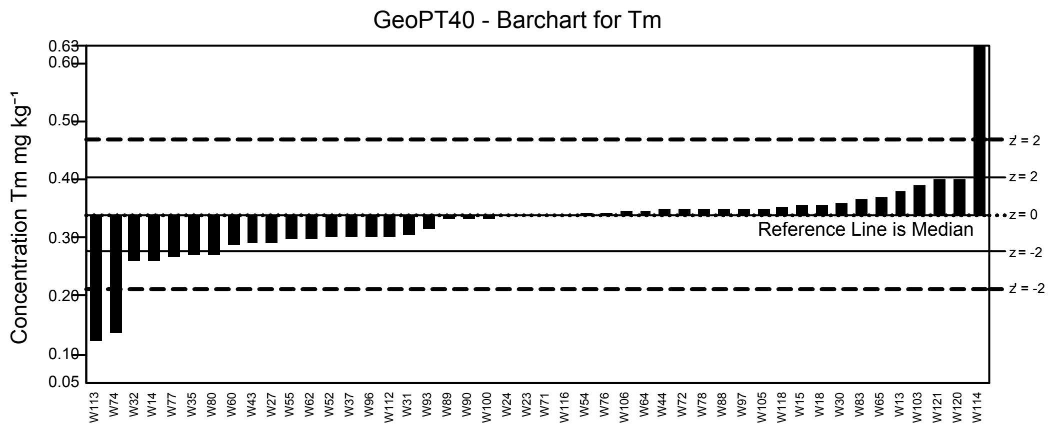

GeoPT40 - Barchart for Sr
Concentration Sr mg kg⁻¹
Reference Line is Robust Mean


GeoPT40 - Barchart for Ta
Concentration Ta mg kg⁻¹
Reference Line is Median

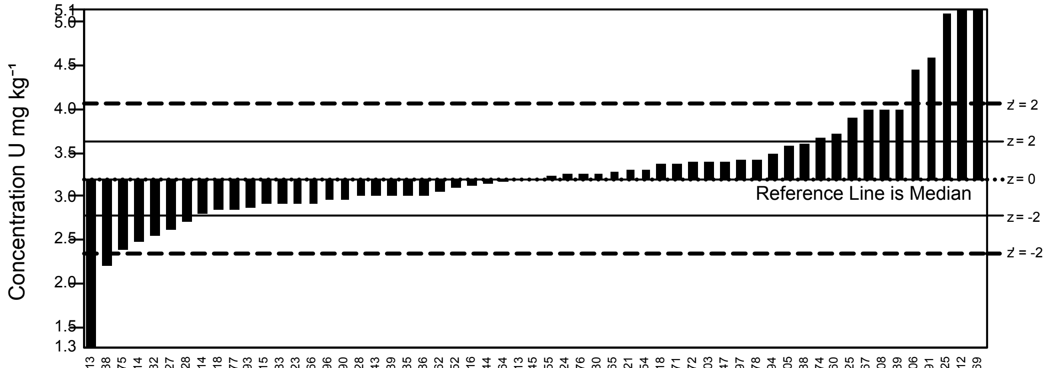

GeoPT40 - Barchart for Tb
Concentration Tb mg kg⁻¹
Reference Line is Median


GeoPT40 - Barchart for Th
Concentration Th mg kg⁻¹
Reference Line is Median

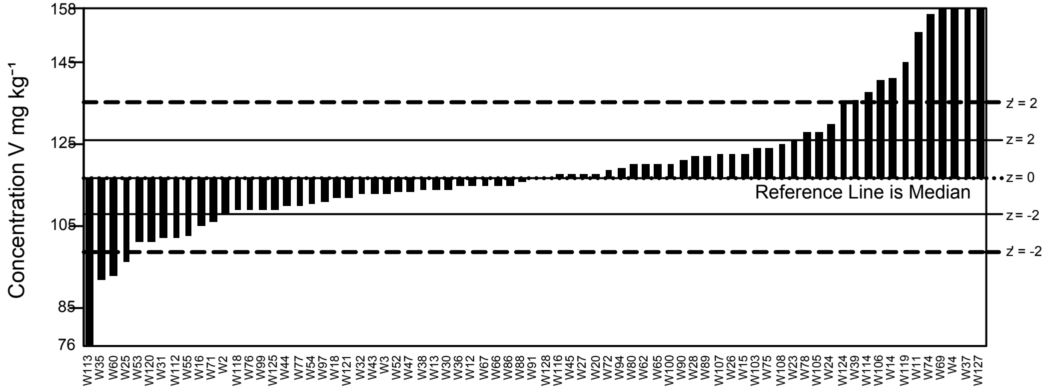

GeoPT40 - Barchart for Tl
Concentration Tl mg kg⁻¹
Reference Line is Median


GeoPT40 - Barchart for Tm
Concentration Tm mg kg⁻¹
Reference Line is Median

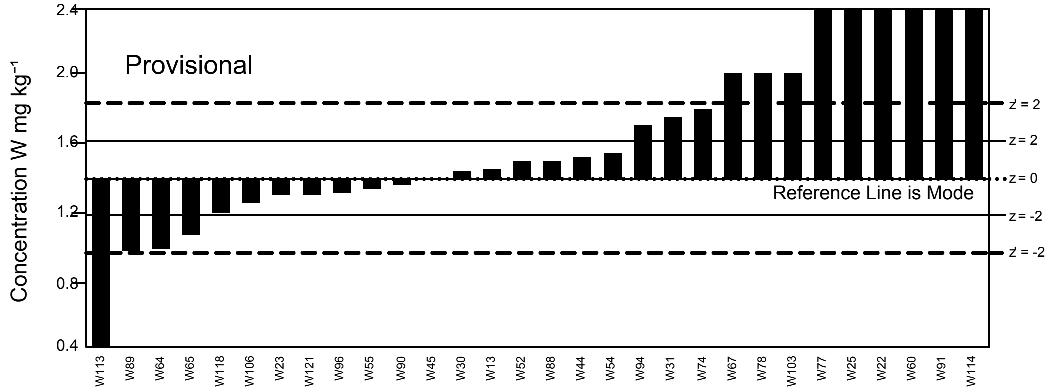
GeoPT40 - Barchart for U



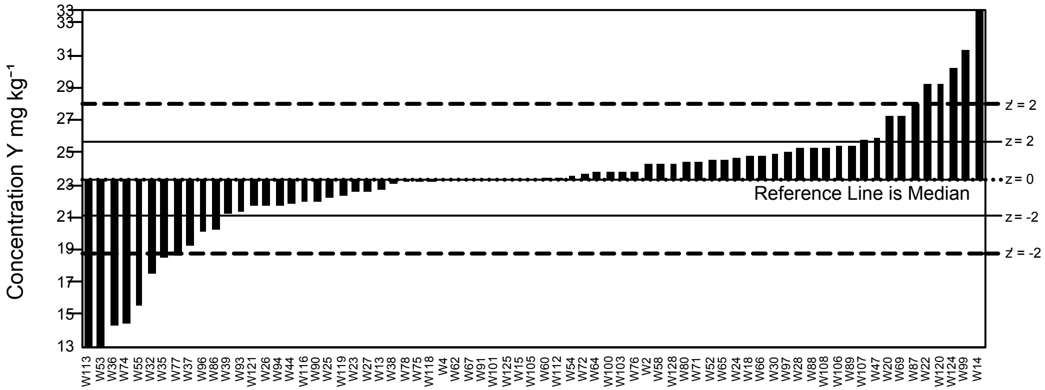
GeoPT40 - Barchart for V



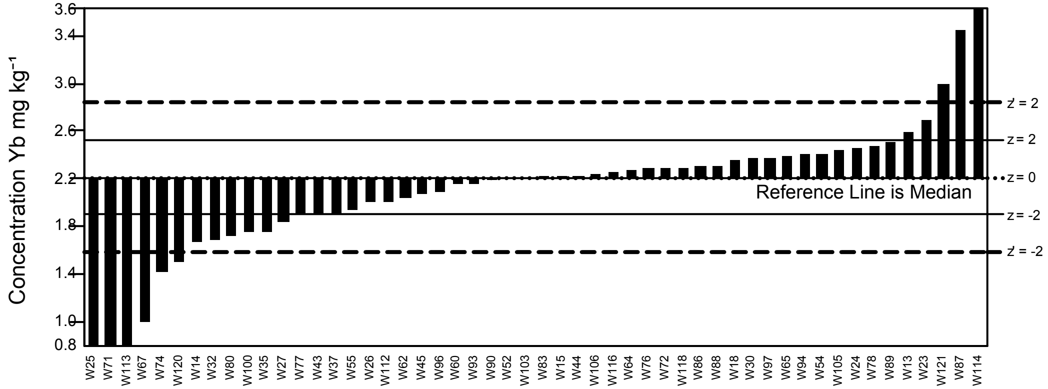
GeoPT40 - Barchart for W



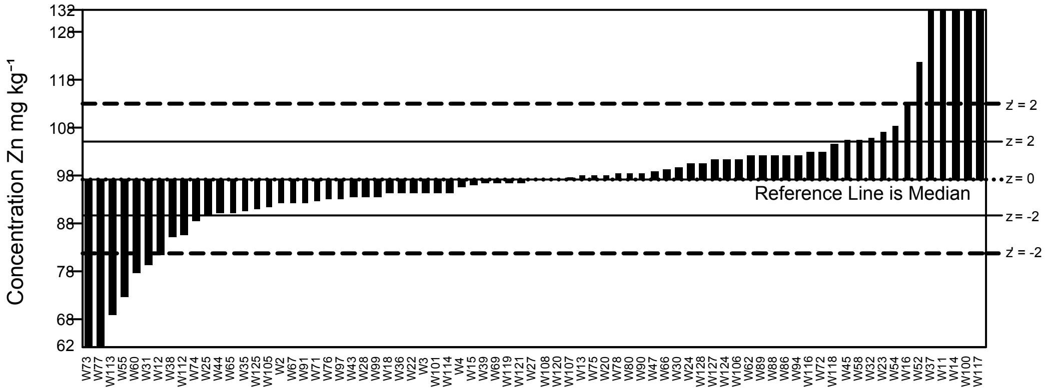
GeoPT40 - Barchart for Y



GeoPT40 - Barchart for Yb



GeoPT40 - Barchart for Zn



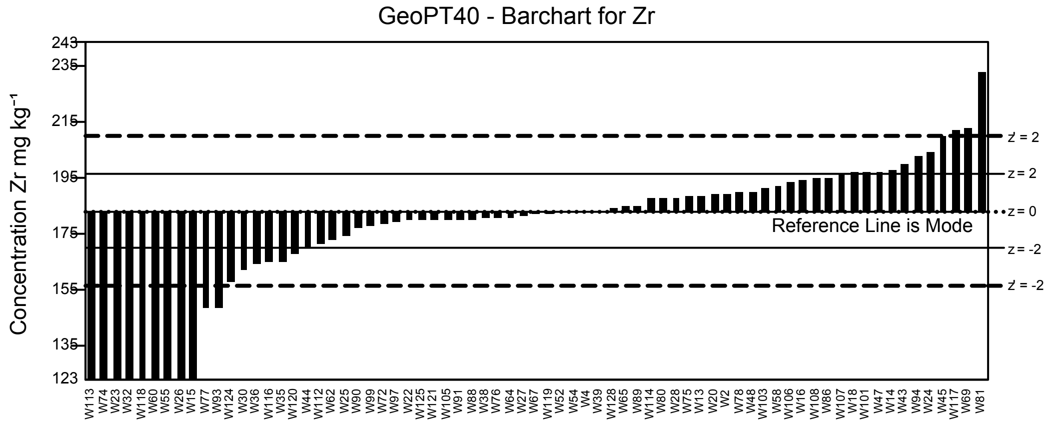
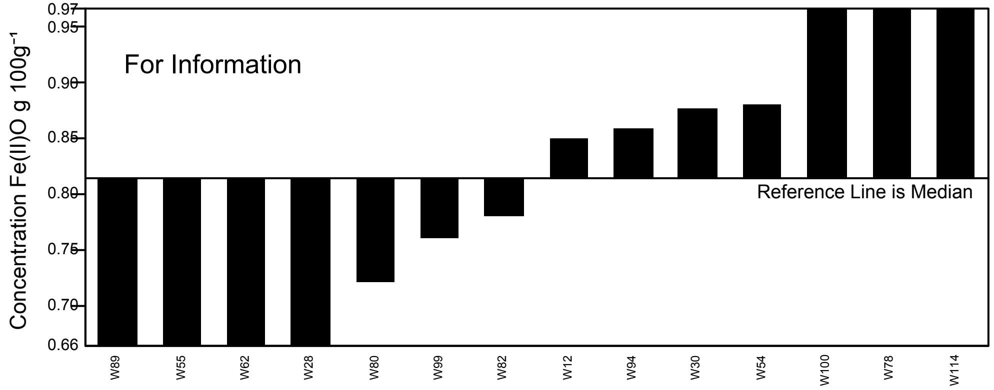
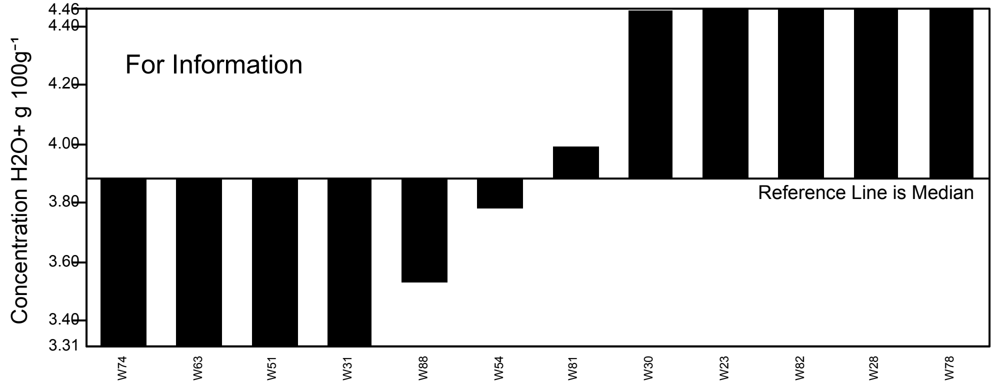


Figure 1: GeoPT40 - Silty marine shale, ShWYO-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for -2<z<2 for pure geochemistry labs (solid lines) and -2<z'<2 for applied geochemistry labs (pecked lines).

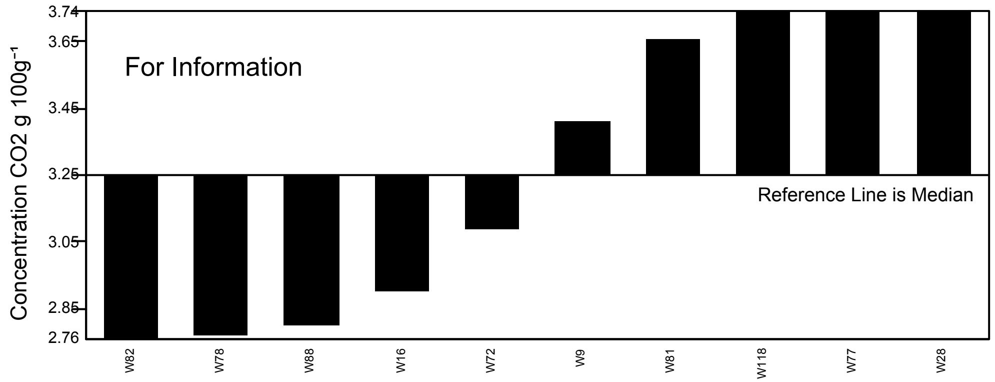
GeoPT40 - Barchart for Fe(II)O



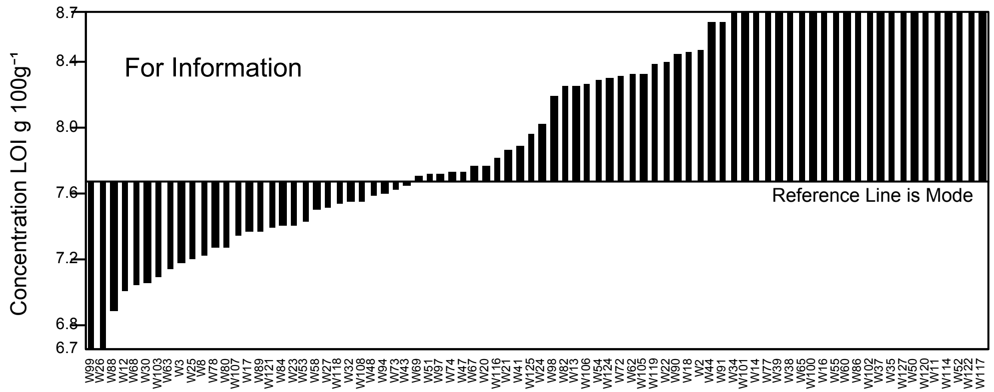
GeoPT40 - Barchart for H2O+



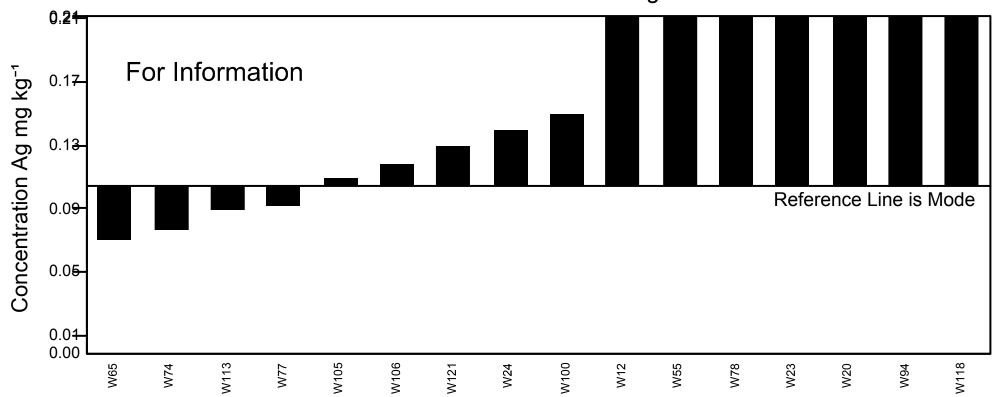
GeoPT40 - Barchart for CO2



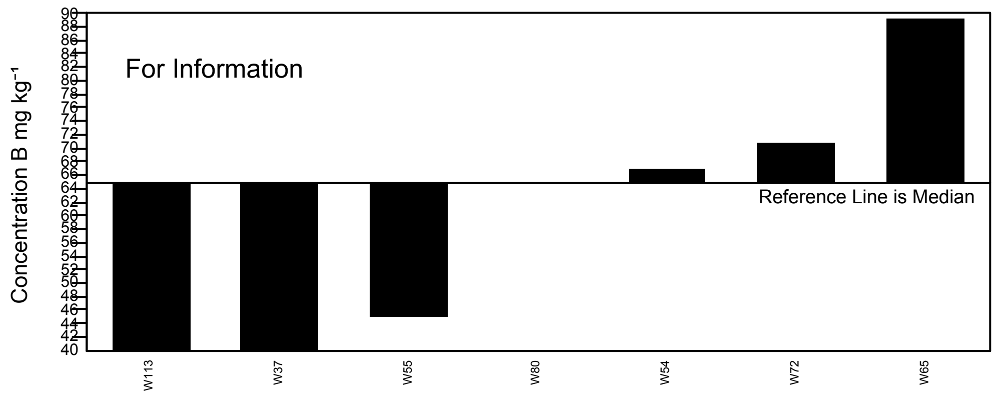
GeoPT40 - Barchart for LOI



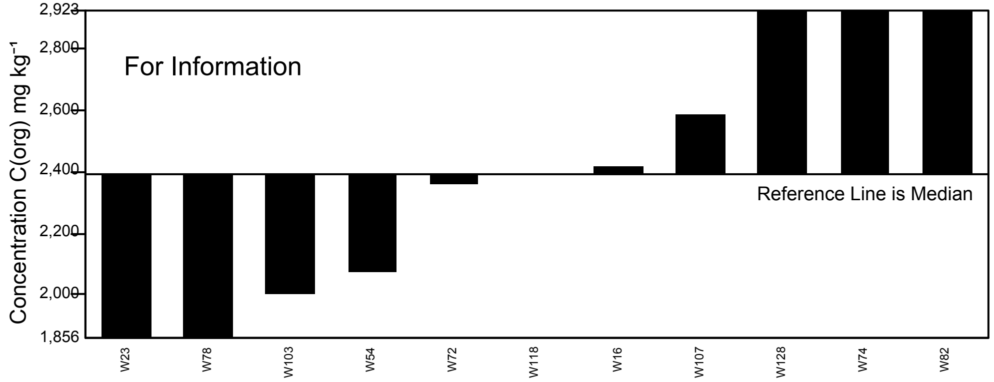
GeoPT40 - Barchart for Ag



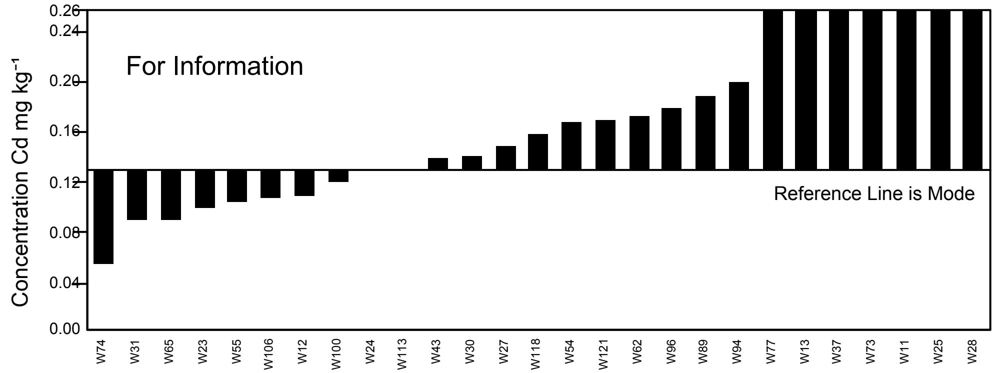
GeoPT40 - Barchart for B



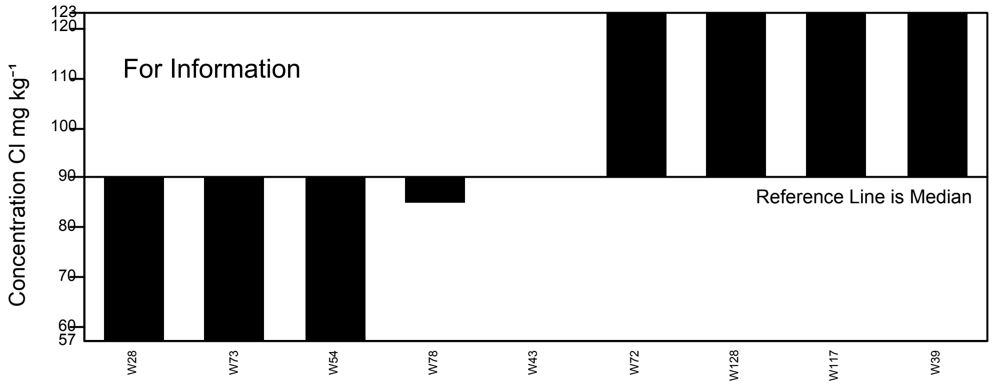
GeoPT40 - Barchart for C(org)



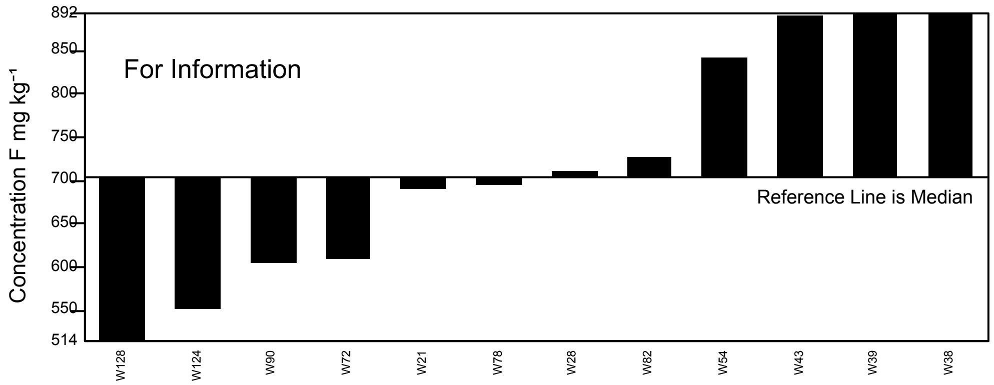
GeoPT40 - Barchart for Cd



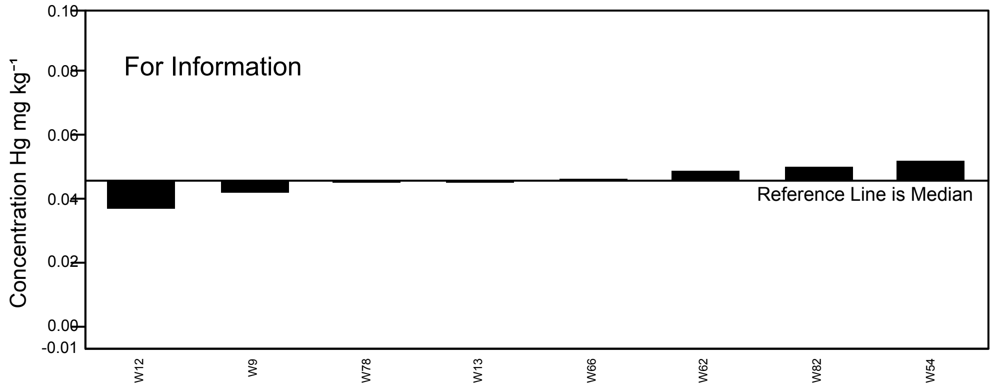
GeoPT40 - Barchart for Cl



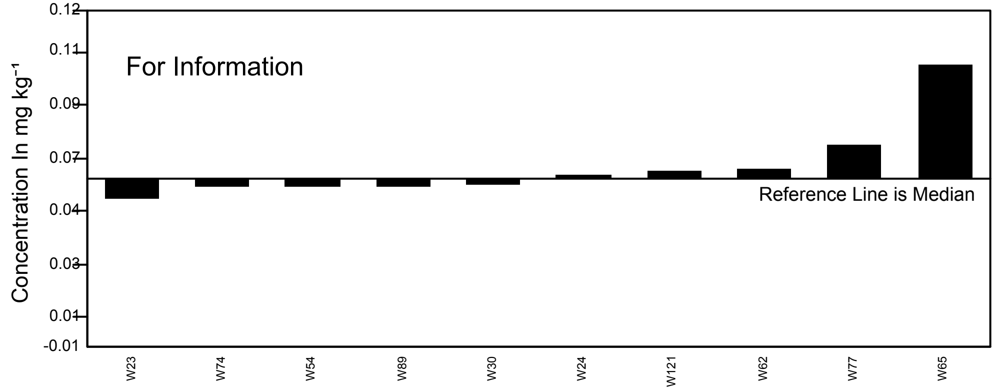
GeoPT40 - Barchart for F

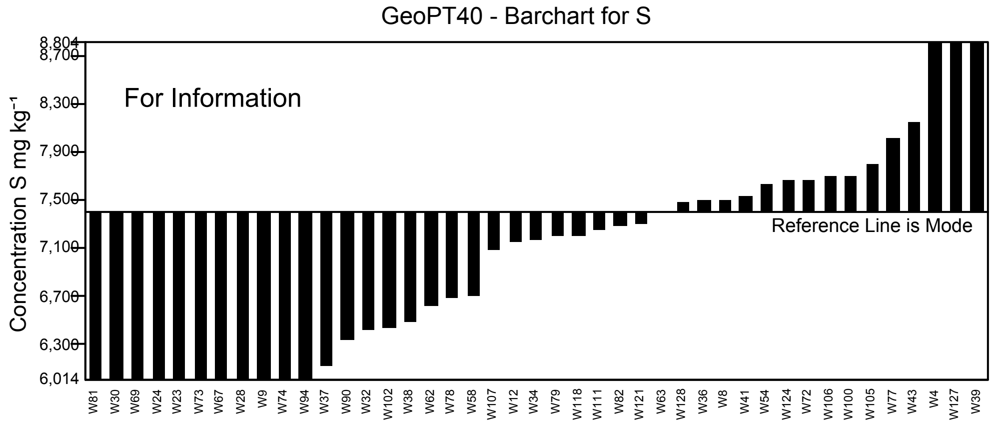


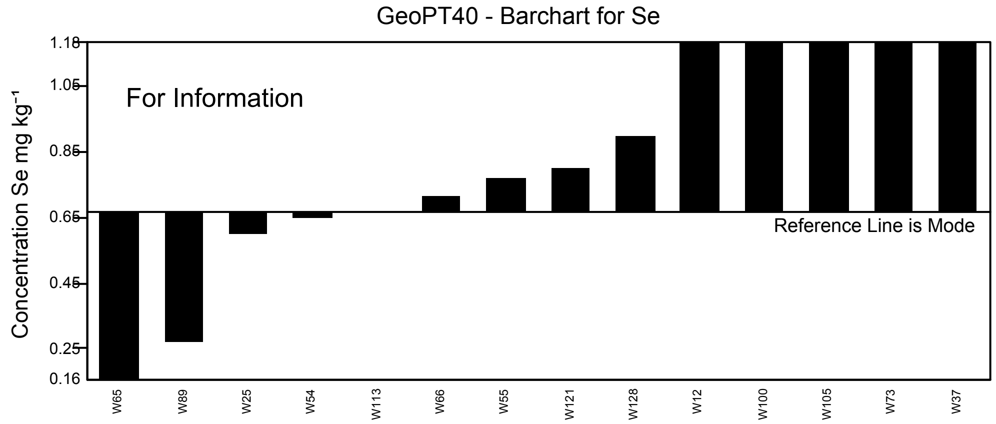
GeoPT40 - Barchart for Hg



GeoPT40 - Barchart for In







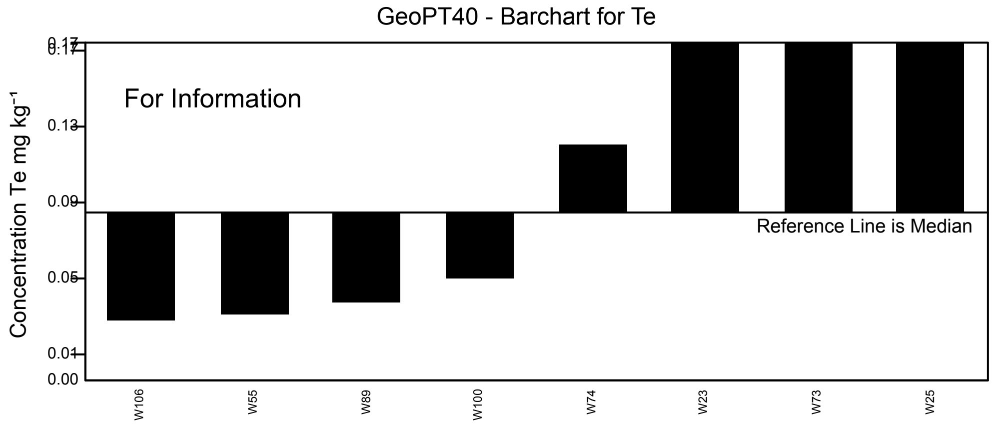


Figure 2: GeoPT40 - Silty marine shale, ShWYO-1. Data distribution charts provided for information only for elements for which values could not be assigned.

Multiple Z-Score Chart for GeoPT40

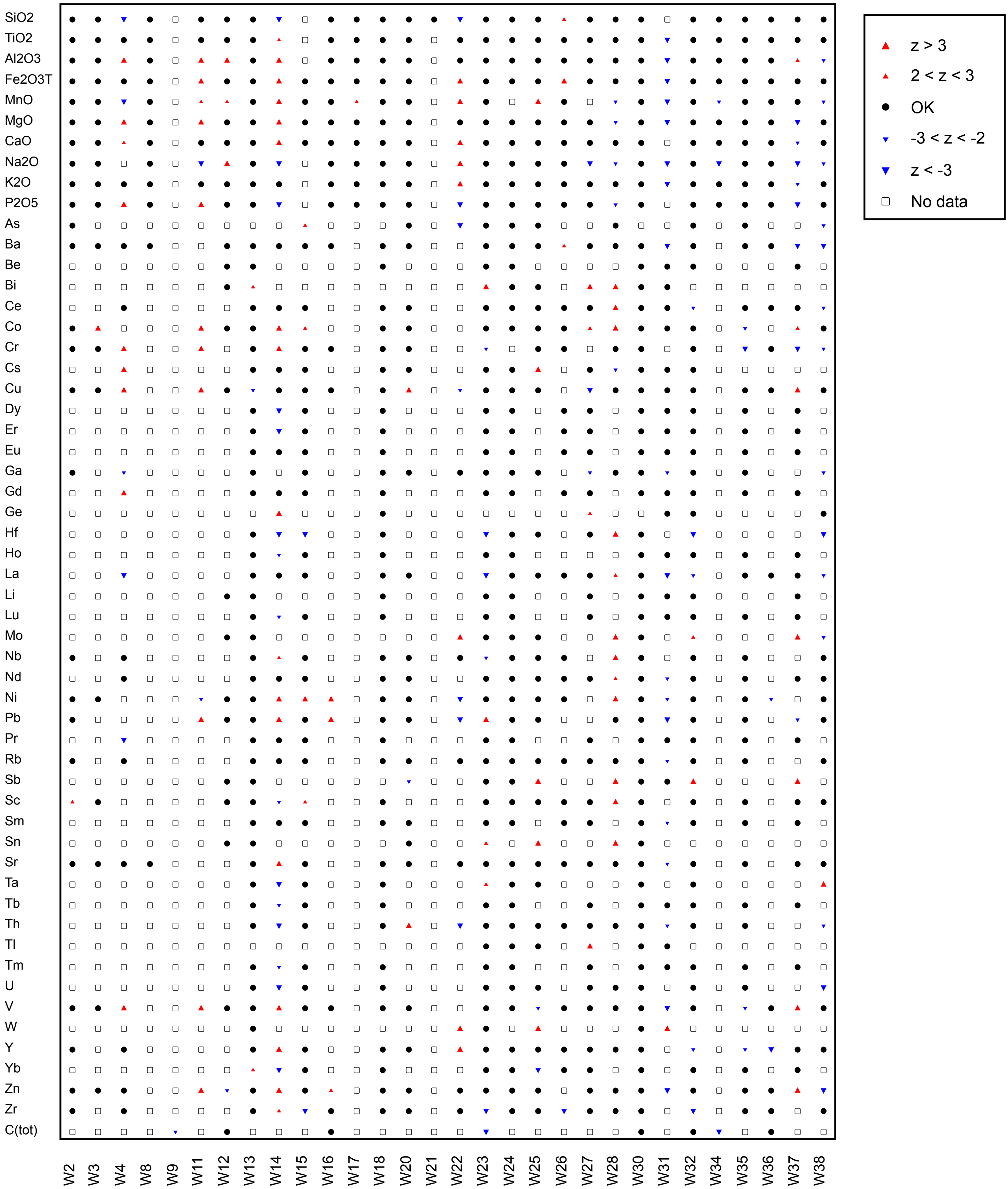


Figure 3: GeoPT40 - Silty marine shale, ShWYO-1. Multiple z-score charts for laboratories participating in the GeoPT40 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

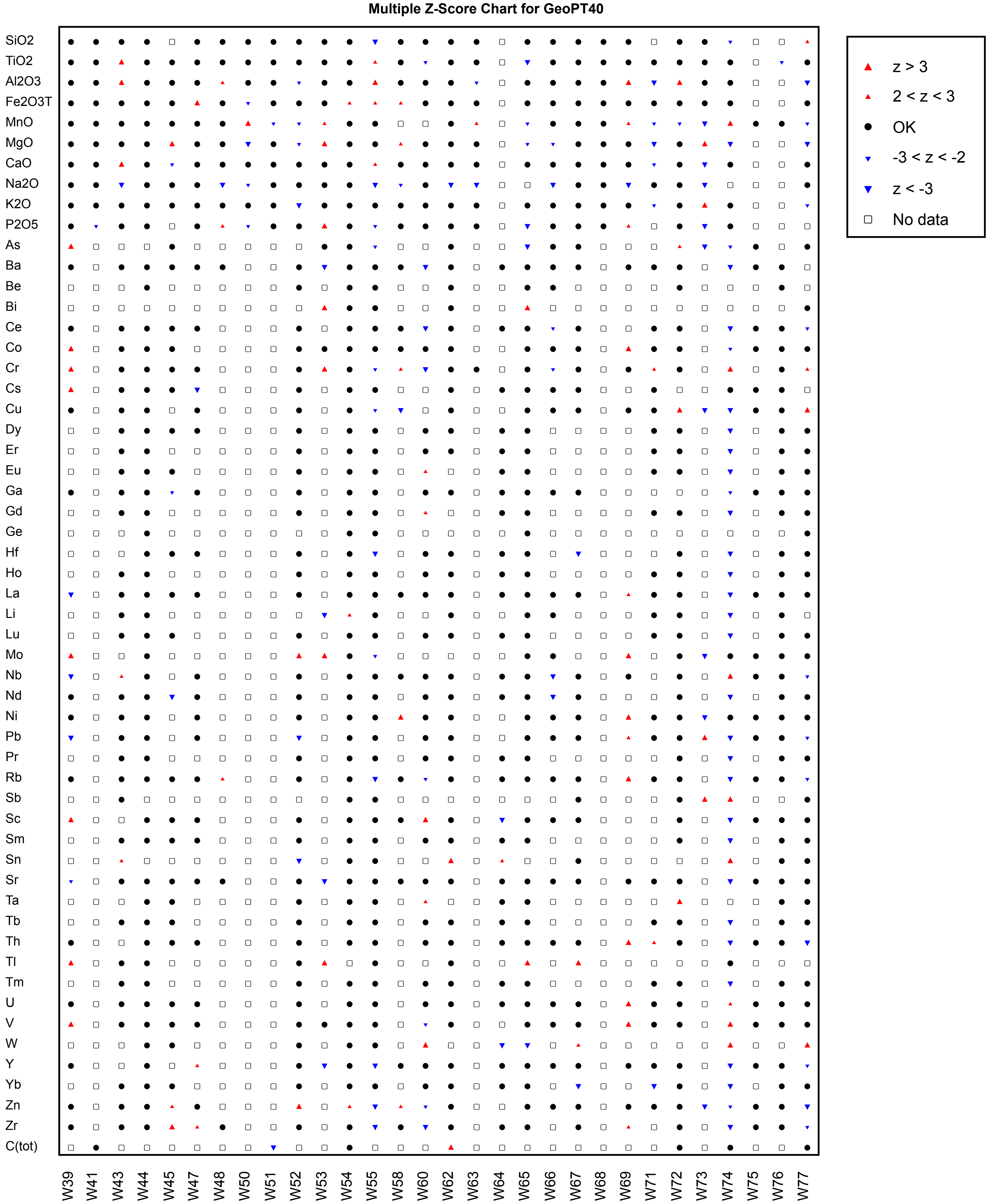


Figure 3: GeoPT40 - Silty marine shale, ShWYO-1. Multiple z-score charts for laboratories participating in the GeoPT40 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

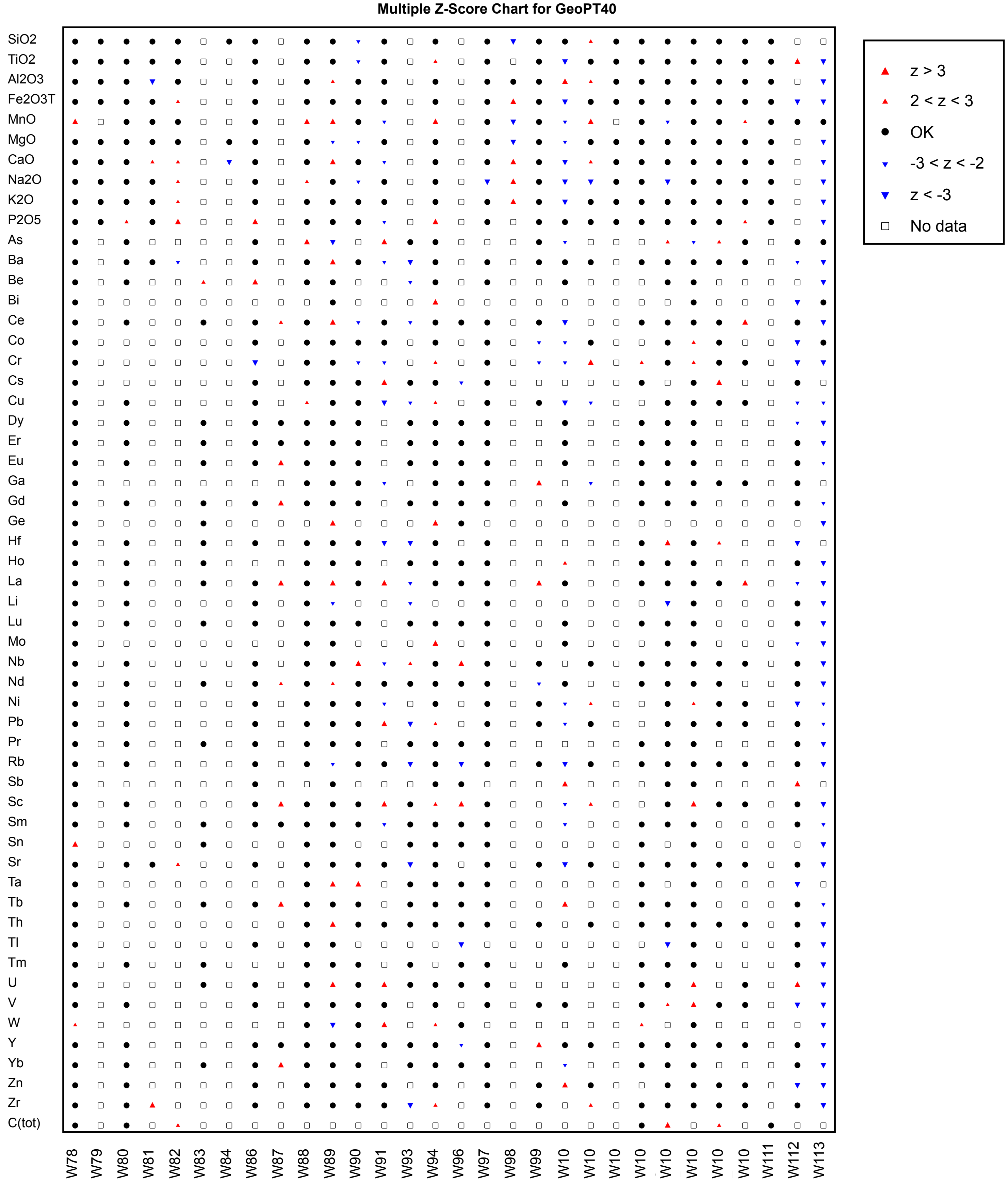


Figure 3: GeoPT40 - Silty marine shale, ShWYO-1. Multiple z-score charts for laboratories participating in the GeoPT40 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).

Multiple Z-Score Chart for GeoPT40

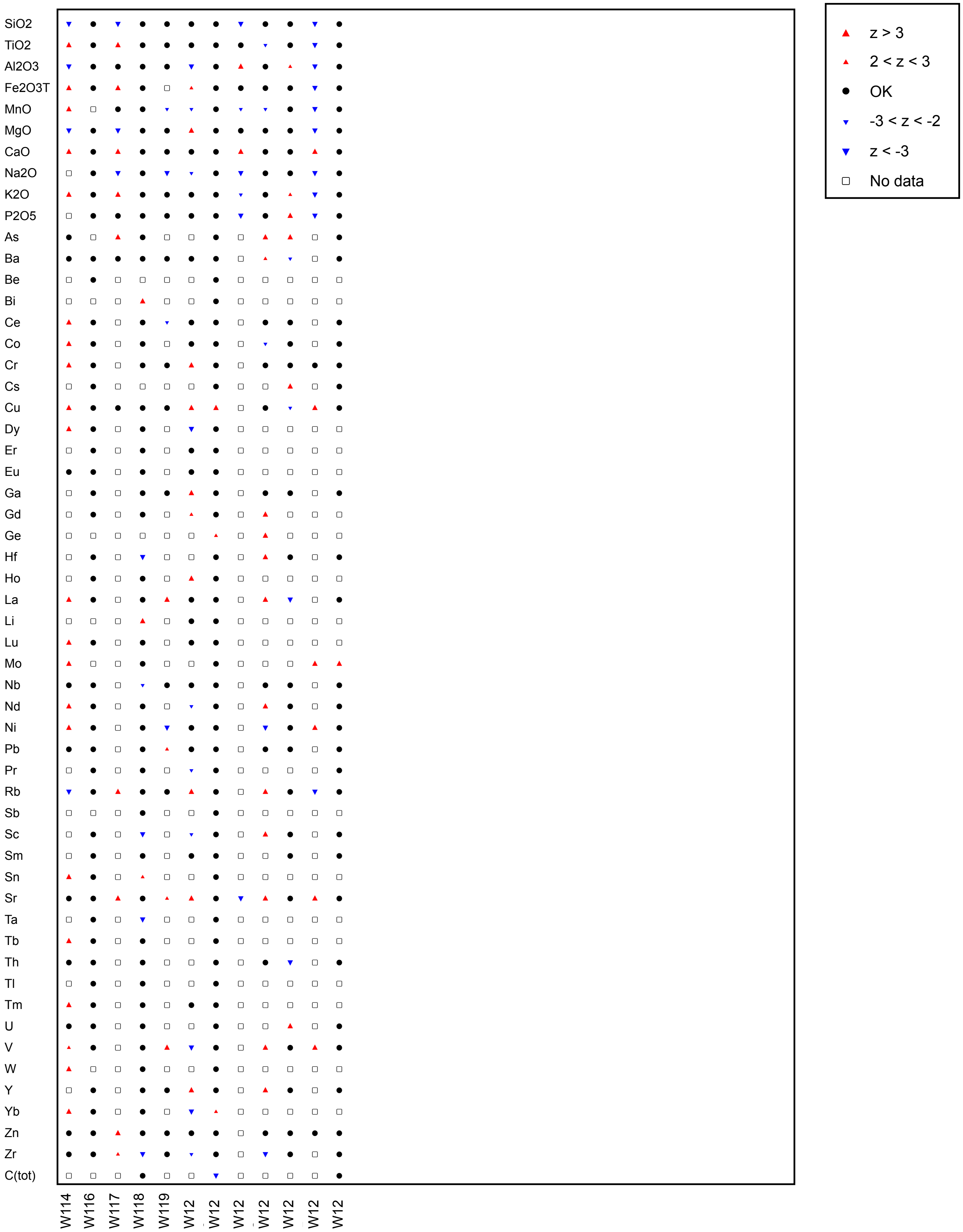


Figure 3: GeoPT40 - Silty marine shale, ShWYO-1. Multiple z-score charts for laboratories participating in the GeoPT40 round. Symbols indicate whether or not an elemental result complies with the -2<z<+2 criteria (see key).