

GeoPT 31, England - SdAR-1, River Sediment

Veranstalter: International Association of Geoanalysts and Geostandards Newsletter - GeoPT31

Ringversuchsmaterial: SdAR-1, (river sediment)

RV geschlossen: 2012 – 8

Literatur: Report - GeoPT31 Proficiency Testing Round CRB Laborcode = 4F)

Hauptelemente [MA%]

	CRB	RV	1sRV	Z-Score
Na ₂ O	1,54	1,61	0,03	-1,16
MgO	0,81	0,79	0,017	-0,50
Al ₂ O ₃	11,8	11,83	0,16	0,11
SiO ₂	72,39	71,94	0,75	1,52
P ₂ O ₅	0,163	0,16	0,004	0,32
K ₂ O	3,66	3,63	0,06	0,23
CaO	0,8	0,799	0,017	0,04
TiO ₂	0,622	0,628	0,074	-0,22
Fe ₂ O ₃ tot	4,59	4,63	0,074	-0,27
MnO	0,69	0,698	0,015	-0,25
L.O.I.*	2,31	2,62	0,04	-3,42

Spurenelemente [µg/g]

	CRB	RV	1sRV	Z-Score
As	38	36,4	1,7	0,46
Ba	785	794	23,3	-0,20
Bi	2	1,8	0,13	0,89
Br*	1	1,5	---	---
Cd	4,3	5,3	0,13	-4,52
Ce	109	111	4,3	-0,21
Co	11	10,7	0,6	0,24
Cr	98	92,7	3,8	0,71
Cu	309	302	10,2	0,34
F*	740	926	---	---
Ga	18	17,2	0,9	0,46
La	61	58,3	2,5	0,55
Mo	8	12,6	0,7	-3,30
Nb	32	34,7	1,6	-0,83
Nd	44	46,1	2,1	-0,50
Ni	30	40,8	1,9	-2,89
Pb	1045	979,3	27,8	1,18
Pr	12	12,6	0,7	-0,40
Rb	145	142,8	5,4	,21
S*	1200	1300	---	---
Sm	9	6,7	0,4	-1,54

Sr	150	152	5,7	-0,13
Th	13	18	0,9	-2,67
U	5	4,3	0,3	1,31
V	69	68	2,9	0,13
Y	37	40,9	1,9	-1,04
Zn	980	932,1	26,6	0,90
Zr	340	352,8	11,7	-0,55

Legende

CRB: Ergebnisse CRB – **RV:** Ergebnisse Ringversuch -- **1s-RV:** Standardabweichung Ringversuch

Z-Score: Differenz des Messwertes vom Mittelwert des Ringversuchs -- * Wert nicht zertifiziert

GeoPT31 — AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES — REPORT ON ROUND 31 (Modified River Sediment, SdAR-1) / July 2012

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SdAR-1, modified river sediment*

Abstract

Results are presented for GeoPT31, the subject of round thirty-one of the International Association of Geoanalysts' Proficiency Testing programme for analytical geochemistry laboratories. The sample distributed in this round was SdAR-1, a modified river sediment, supplied by Dr Stephen Wilson of the U.S. Geological Survey. In this report, contributed data are listed, together with an assessment of consensus values, consequent z-scores and charts showing the distribution of contributed results and the overall performance of participating laboratories. A problem identified in this round involves the systematic underestimation by many laboratories of values of HREEs and associated elements that tend to be hosted by refractory minerals. Special handling of skewed data distributions was necessary to obtain realistic consensus values.

Introduction

This thirty-first round of the international proficiency testing programme, GeoPT, 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 each reported elemental determination, from which a laboratory can decide whether the quality of their data is satisfactory in relation both to their chosen fitness-for-purpose criteria and the results submitted by other contributing laboratories and can choose to take corrective action if this appears justified.

Steering Committee for Round 31: P.C. Webb (results coordinator), M. Thompson (statistical advisor), P.J. Potts (analytical advisor), S. Wilson (provision of SdAR-1).

Timetable for Round 31:

Distribution of sample: March 2012.

Deadline for submission of analytical results:
15th June 2012.

Distribution of draft report: July-August 2012.

Sample details

GeoPT31: SdAR-1 is a river sediment with a modified composition designed as an environmental monitoring quality control sample and produced by the U.S.

Geological Survey under direction of Dr S. Wilson. The material was tested by the originating laboratory for suitable grain size distribution and compositional homogeneity, and as a result, was considered suitable for use in the *GeoPT* proficiency testing programme.

Submission of results

The results submitted for *GeoPT31* (SdAR-1) by 89 laboratories are listed in Table 1. All of these data were used for the assessment of the respective assigned values. Two additional sets of data were submitted late.

Assigned values

Following procedures described in earlier rounds, a robust statistical procedure was used to derive assigned concentration values [X_a], these being judged to be the best estimates of the true composition of this sample. Values were assigned on the basis that: (i) sufficient laboratories had contributed data for an element, (ii) the statistical assessment gave confidence that the results distribution showed a central portion approximating to a normal distribution. Part of this assessment involved examining a bar chart of contributed data for each element to judge the distribution of results.

In this round it was soon apparent when processing the contributed results that datasets for some elements did not conform overall to a normal distribution. In particular, there was a large step in the 'tail' of the distribution of ordered Zr values at low concentrations (Figure 1). An investigation of the procedures used in

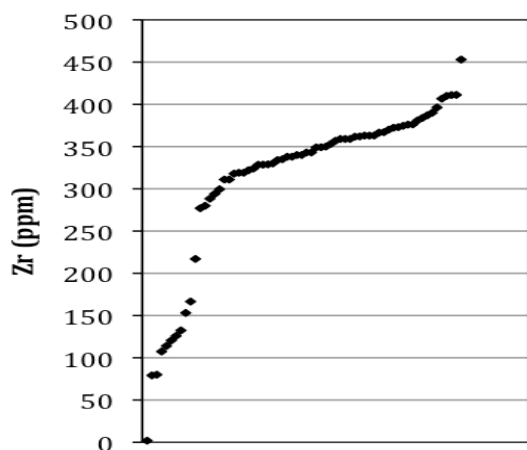


Figure 1. Zr determinations in ascending order for *GeoPT31*, SdAR-1.

these determinations revealed that almost all of the low values involved sample preparation by acid digestion. Similar patterns were also developed for REEs, especially HREEs, more determinations of which involved sample preparation by acid digestion, whereas

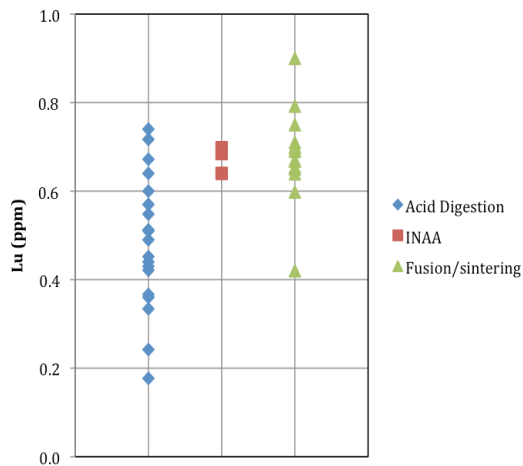


Figure 2. Breakdown of contributed Lu data by analytical technique.

some of the Zr results were obtained by XRF analysis of solid samples. A review of results in relation to procedures used revealed for many of the HREEs that acid digestion gave on average lower values than other forms of analysis (e.g. Figure 2, based on Lu). As a result, data distributions for many HREEs appear bimodal (e.g. Tm, Figure 3).

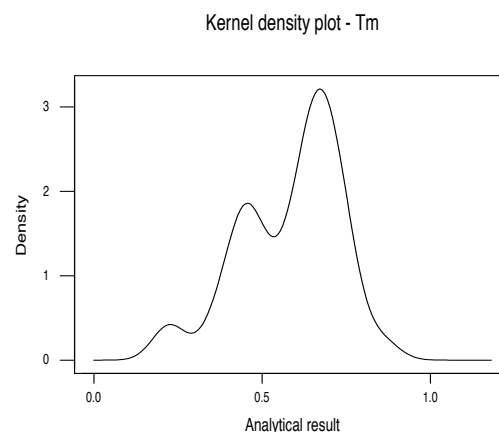


Figure 3. Kernel Density plot showing bimodality of Tm contributed data.

Principal component analysis (PCA) of REE data from laboratories that analysed all REEs revealed a spread of results (Figure 4) in a scatterplot of the first two

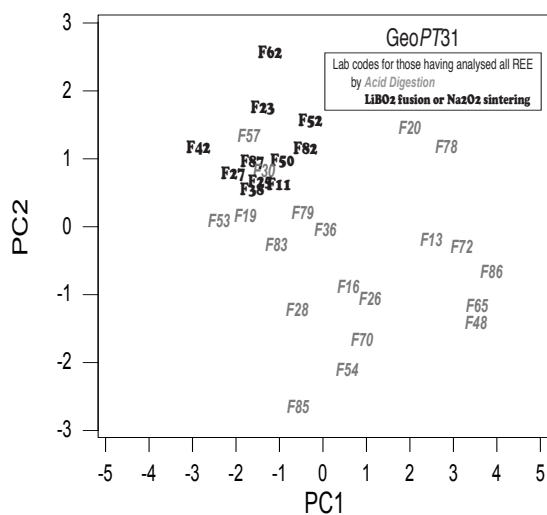


Figure 4. Principal component analysis of REE determinations on GeoPT31, SdAR-1. Sample preparation distinguished by font type.

principal component scores. Identifying sample preparation procedures shows that the tightly defined cluster (bold font) largely represents laboratories performing LiBO₂ fusions or Na₂O₂ sintering as the sample preparation procedure for their ICP-MS or ICP-OES (few) determinations. Laboratories performing acid digestion (faint italic font) form a much more diffuse cluster across the plot, but a few results overlap the cluster representing the fusion or sintering results. We regard this as further evidence for a problem with dissolution affecting many of the REE determinations, and suggests that many laboratories using acid digestion suffer variable degrees of incomplete digestion of refractory minerals, such as zircons, that tend to host REEs, and are likely to be present in the sample on account of its relatively high Zr content.

In view of the consequent bias in many datasets, the usual procedure of taking a robust mean, even a median, to derive an assigned value in these cases would produce unsatisfactory results. The ‘true’ value could be obtained only by complete dissolution, most effectively achieved in this case by fusion or sintering. However, it would be impractical at short notice to separate out datasets according to technique before running the statistical analysis. Indeed, a small number of laboratories performing acid digestions produced results compatible with the fusions. It was noticeable that a substantial number of results derived by fusion or

sintering appeared to produce a ‘flatter’ zone on most of the graphs showing ordered values. This more regular feature in the data distributions often corresponds to a mode in the dataset. Consequently we have fitted modes to achieve consensus values for Dy, Er, Ho, La, Lu, Tb, Tm, Y, Yb and Zr. The procedure used to determine the mode was based on the analysis of mixed populations detailed in Thompson (2006). Although modes have featured in the evaluation of GeoPT consensus values since round 23 for certain unusual data distributions, it has never been necessary to this extent. In view of the exceptional circumstances and, in effect, the use of a reduced dataset to derive a consensus value the resulting values are given provisional status.

GeoPT31 values

Table 2 lists assigned and provisional values for 11 major components and 46 trace elements in GeoPT31 (SdAR-1). Bar charts for the 57 elements/components of GeoPT31 that were judged to have satisfactory distributions for consensus values to be assigned, or provisional values given, are shown in Figure 5, namely: SiO₂, TiO₂, Al₂O₃, Fe₂O₃T, MnO, MgO, CaO, Na₂O, K₂O, P₂O₅, LOI*, Ag*, As*, Ba, Be, Bi*, Cd, Ce, Co, Cr, Cs, Cu*, Dy*, Er*, Eu, Ga, Gd, Ge*, Ho*, In*, La*, Li, Lu*, Mo, Nb, Nd, Ni*, Pb, Pr, Rb, Sb, Sc, Sm, Sn*, Sr, Ta, Tb*, Th, Tl, Tm*, U, V, W*, Y*, Yb*, Zn and Zr*. Of these, only provisional values could be given to the 20 marked ‘*’: this is an unusually large number, in large part for the reasons discussed above. Other instances of provisional status were recognised because either a relatively small number of measurements contributed to the consensus (Ge and In), or the degree of dispersion of the data was relatively high (LOI, Ag, As, Bi, Cu and Ni).

In 25 cases the robust mean was used to define the consensus value and in 20 cases the median value was preferred. In 12 cases the most satisfactory consensus value was provided by a mode, in many cases (HREEs, La, Y, Zr) for the reasons discussed above. Most values obtained in this way were designated provisional values.

Bar charts for the 12 elements/components: Fe(II)O, H₂O⁺, CO₂, Au, C(tot), C(org), Cl, F, Hf, Hg, S, Se and Te are plotted in Figure 6 for information only, as the data were insufficient or too variable for the reliable determination of a consensus.

Bar charts for most major elements showed well-behaved distributions of results with a central portion approximating to a normal distribution. However, as noted in past rounds several distributions (Figure 5.1) had the appearance of multimodality, largely on account of truncation of data reported at low concentrations: this applies especially to TiO₂, MgO, CaO and P₂O₅.

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 GeoPT31, 1671 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 GeoPT31, 1609 results of data quality 2 were submitted.

The target standard deviation (H_a) for each element 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 concentration of the element expressed as a *fraction*, and the factor $k = 0.01$ for pure geochemistry laboratories and $k=0.02$ for applied geochemistry laboratories.

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

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

where: X is the contributed result, X_a is the assigned value and H_a is the target standard deviation.

Z-score results for contributors to GeoPT31 are listed in Table 3. Participating laboratories are invited to assess their performance using the following criterion:–

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 $-3 < z < 3$, it would be advisable for the contributing laboratory to examine its 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 in this round is plotted in multiple z -score charts for GeoPT31 in Figure 7. 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.

It should be noted that there is strong evidence for problems with the results produced by many laboratories engaged in acid digestion procedures, which in general did not perform well for this particular sample. The reason(s) for values of HREEs and associated elements being underestimated is thought to be incomplete dissolution of refractory minerals. Further work to discover why this sample proved to be problematic and why procedures of many laboratories appear to be unprepared for such a sample will be carried out and published separately.

Participants are reminded that they 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 the GeoPT32 round, the sample for which will be distributed during September 2012.

Acknowledgements

The authors thank Liz Lomas (OU) for valued assistance in distributing both the sample and the report, and John Watson (OU) for assistance with repackaging some of the SdAR-1 samples.

Reference

Thompson, M. (2006). Using mixture models for bump-hunting in the results of proficiency tests. *Accred. Qual. Assur.*, 10, 501-505.

Appendix 1

Publication status of proficiency testing reports

GeoPT1

Thompson M., Potts P.J., Kane J.S. and Webb P.C. (1996)
GeoPT1. International proficiency test for analytical geochemistry laboratories - Report on round 1. *Geostandards Newsletter: The Journal of Geostandards and Geoanalysis*, 20, 295-325.

GeoPT2

Thompson M., Potts P.J., Kane J.S., Webb P.C. and Watson, J.S. (1998)
GeoPT2. International proficiency test for analytical geochemistry laboratories - Report on round 2. *Geostandards Newsletter: The Journal of Geostandards and Geoanalysis*, 22 127-156.

GeoPT3

Thompson M., Potts P.J., Kane J.S. and Chappell B.W. (1999a)
GeoPT3. International proficiency test for analytical geochemistry laboratories - Report on round 3. *Geostandards Newsletter: The Journal of Geostandards and Geoanalysis*, 23, 87-121.

GeoPT4

Thompson M., Potts P.J., Kane J.S., Webb P.C. and Watson J.S. (1999b)
GeoPT4. 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).

GeoPT5

Thompson M., Potts P.J., Kane J.S., and Wilson S. (1999c)
GeoPT5. 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).

GeoPT6

Potts P.J., Thompson M., Kane J.S., Webb P.C. and Carignan J. (2000)
GeoPT6 - an international proficiency test for analytical geochemistry laboratories - report on round 6 (OU-3: Nanhoron

GeoPT31 Report

microgranite) and 6A (CAL-S: CRPG limestone). International Association of Geoanalysts: Unpublished report.

GeoPT7

Potts P.J., Thompson M., Kane J.S., and Petrov L.L. (2000)
GeoPT7 - an international proficiency test for analytical geochemistry laboratories - report on round 7 (GBPG-1 Garnet-biotite plagiogneiss). International Association of Geoanalysts: Unpublished report.

GeoPT8

Potts P.J., Thompson M., Kane J.S., Webb, P.C. and Watson J.S. (2000)
GeoPT8 - an international proficiency test for analytical geochemistry laboratories - report on round 8 / February 2001 (OU-4 Penmaenmawr microdiorite). International Association of Geoanalysts: Unpublished report.

GeoPT9

Potts P.J., Thompson M., Webb, P.C. and Watson J.S. (2001)
GeoPT9 - an international proficiency test for analytical geochemistry laboratories - report on round 9 / July 2001 (OU-6 Penrhyn slate). International Association of Geoanalysts: Unpublished report.

GeoPT10

Potts P.J., Thompson M., Webb, P.C., Watson J.S. and Wang Yimin (2001)
GeoPT10 - an international proficiency test for analytical geochemistry laboratories - report on round 10 / December 2001 (CH-1 Marine sediment). International Association of Geoanalysts: Unpublished report.

GeoPT11

Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and Watson J.S. (2002)
GeoPT11 - an international proficiency test for analytical geochemistry laboratories - report on round 11 / July 2002 (OU-5 Leaton dolerite). International Association of Geoanalysts: Unpublished report.

GeoPT12

Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and Batjargal B. (2003)
GeoPT12 - an international proficiency test for analytical geochemistry laboratories - report on round 12 / January 2003 (GAS Serpentine). International Association of Geoanalysts: Unpublished report.

GeoPT13

Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and Kaspar H.U. (2003)
GeoPT13 - an international proficiency test for analytical geochemistry laboratories - report on round 13 / July 2003 (Köln Loess). International Association of Geoanalysts: Unpublished report.

GeoPT14

Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and B. Batjargal (2004)
GeoPT14 - an international proficiency test for analytical geochemistry laboratories - report on round 14 / January 2004 (OShBO - alkaline granite). International Association of Geoanalysts: Unpublished report.

GeoPT15

Potts P.J., Thompson M., Chenery S.R., Webb, P.C. and WANG Yimin (2004)
GeoPT15 - an international proficiency test for analytical geochemistry laboratories - report on round 15 / June 2004 (Ocean floor sediment MSAN). International Association of Geoanalysts: Unpublished report.

GeoPT16

Potts P.J., Thompson M., Webb, P.C. and S.Wilson (2005)
GeoPT16 - an international proficiency test for analytical geochemistry laboratories - report on round 16 / February 2005 (Nevada basalt, BNV-1). International Association of Geoanalysts: Unpublished report.

GeoPT17

Potts P.J., Thompson M., Webb, P.C. and J. Nicholas Walsh (2005)
GeoPT17 - an international proficiency test for analytical geochemistry laboratories - report on round 17 / July 2005 (Calcareous sandstone, OU-8). International Association of Geoanalysts: Unpublished report.

GeoPT18

Webb, P.C., Thompson M., Potts P.J. and L. Paul Bedard (2006)
GeoPT18 - an international proficiency test for analytical geochemistry laboratories - report on round 18 / Jan 2006 (Quartz Diorite, KPT-1). International Association of Geoanalysts: Unpublished report.

GeoPT19

Webb, P.C., Thompson M., Potts P.J. and B. Batjargal (2006)
GeoPT19 - an international proficiency test for analytical geochemistry laboratories - report on round 19 / July 2006 (Gabbro, MGR-N). International Association of Geoanalysts: Unpublished report.

GeoPT20

Webb, P.C., Thompson M., Potts P.J. and M. Burnham (2007)
GeoPT20 - an international proficiency test for analytical geochemistry laboratories - report on round 20 / Jan 2007 (Ultramafic rock, OPY-1). International Association of Geoanalysts: Unpublished report.

GeoPT21

Webb, P.C., Thompson M., Potts P.J. and B. Batjargal (2007)
GeoPT21 - 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)
GeoPT22 - an international proficiency test for analytical geochemistry laboratories - report on round 22 / January 2008 (Basalt, MBL-1). International Association of Geoanalysts: Unpublished report.

GeoPT23

Webb, P.C., Thompson, M., Potts, P.J., Watson, J.S. and Kriete, C. (2008)
GeoPT23 - 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.

GeoPT24

Webb, P.C., Thompson, M., Potts, P.J. and Watson, J.S. (2009)
GeoPT24 - an international proficiency test for analytical geochemistry laboratories - report on round 24 / January 2009 (Longmyndian greywacke, OU-10). International Association of Geoanalysts: Unpublished report.

GeoPT25

Webb, P.C., Thompson, M., Potts, P.J. and Enzweiler, J. (2009)
GeoPT25 - an international proficiency test for analytical geochemistry laboratories - report on round 25 / July 2009 (Basalt, HTP-1). International Association of Geoanalysts: Unpublished report.

GeoPT26

Webb, P.C., Thompson, M., Potts, P.J. and Loubser, M. (2010)
GeoPT26 - 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.

GeoPT27

Webb, P.C., Thompson, M., Potts, P.J. and Batjargal, B. (2010)
GeoPT27 - an international proficiency test for analytical geochemistry laboratories - report on round 27 / July 2010 (Andesite, MGL-AND). International Association of Geoanalysts: Unpublished report.

GeoPT28

Webb, P.C., Thompson, M., Potts, P.J. and Wilson, S. (2011)
GeoPT28 - an international proficiency test for analytical geochemistry laboratories - report on round 28 / January 2011 (Shale, SBC-1). International Association of Geoanalysts: Unpublished report.

GeoPT29

Webb, P.C., Thompson, M., Potts, P.J. and Wilson, S. (2011)
GeoPT29 - an international proficiency test for analytical geochemistry laboratories - report on round 29 / July 2011 (Nephelinite, NKT-1). International Association of Geoanalysts: Unpublished report.

GeoPT30

Webb, P.C., Thompson, M., Potts, P.J., Long, D. and Batjargal, B. (2012)
GeoPT30 - an international proficiency test for analytical geochemistry laboratories - report on round 30 / January 2012 (Syenite, CG-2) and 30A (Limestone, ML-2). International Association of Geoanalysts: Unpublished report.

Table 1 GeoPT31 Contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code		F01	F02	F03	F04	F05	F06	F07	F08	F09	F10
Quality		2	1	1	2	2	2	2	1	2	1
SiO ₂	% m/m	74.23	72.65	73.00	72.39	72.67	71.83	71.5	70.89	72.1	66
TiO ₂	% m/m	0.663	0.64	0.60	0.622	0.62	0.64	0.64	0.61	0.62	0.575
Al ₂ O ₃	% m/m	12.03	11.61	11.88	11.83	11.81	11.82	11.88	11.66	11.8	14.2
Fe ₂ O ₃ T	% m/m	4.988	4.67	4.66	4.59	4.57	4.85	4.65	4.65	4.57	4.25
Fe(II)O	% m/m	4.488		0.77				0.74	0.62		
MnO	% m/m	0.756	0.689	0.68	0.69	0.69	0.74	0.683	0.72	0.73	0.684
MgO	% m/m	0.783	0.83	0.72	0.79	0.83	0.74	0.82	1.06	0.79	1.35
CaO	% m/m	0.762	0.79	0.78	0.80	0.81	0.76	0.82	0.76	0.78	0.78
Na ₂ O	% m/m	1.495	1.54	1.70	1.54	1.62	1.56	1.64	1.54	1.66	
K ₂ O	% m/m	3.762	3.60	3.50	3.66	3.6	3.52	3.68	3.62	3.64	3.75
P ₂ O ₅	% m/m	0.162	0.160	0.15	0.163	0.157	0.16	0.17	0.15	0.15	1.62
H ₂ O ⁺	% m/m							0.56	2.15		
CO ₂	% m/m							1.25	1.01		0.61
LOI	% m/m	2.52	2.52	2.26	2.31	2.64	2.86	2.66	2.4	2.38	
Ag	mg kg ⁻¹				6.7						
As	mg kg ⁻¹				38			35.3			
Au	mg kg ⁻¹										
B	mg kg ⁻¹										
Ba	mg kg ⁻¹		797		785		780	804.5	769		821
Be	mg kg ⁻¹										
Bi	mg kg ⁻¹				2					3	
Br	mg kg ⁻¹				1						
C(tot)	mg kg ⁻¹	3100						3400			
C(org)	mg kg ⁻¹	2900						3400			
Cd	mg kg ⁻¹				2.3					12	6.7
Ce	mg kg ⁻¹		132		109			87.6	83		112
Cl	mg kg ⁻¹									17	65.1
Co	mg kg ⁻¹				11		50	11.8	10		
Cr	mg kg ⁻¹		78.7		98		85	97.1	91		
Cs	mg kg ⁻¹				2				7		
Cu	mg kg ⁻¹		286		309		175	274.1	281		295
Dy	mg kg ⁻¹									2	
Er	mg kg ⁻¹									2	
Eu	mg kg ⁻¹									2	
F	mg kg ⁻¹				740					922	
Ga	mg kg ⁻¹		20.6		18			14.7	17		
Gd	mg kg ⁻¹									7	
Ge	mg kg ⁻¹				5						
Hf	mg kg ⁻¹				6.8				12		
Hg	mg kg ⁻¹				0.6						
Ho	mg kg ⁻¹									1	
I	mg kg ⁻¹				4.7						
In	mg kg ⁻¹				0.8						
Ir	mg kg ⁻¹										
La	mg kg ⁻¹		82		61			64.7	47		51.5
Li	mg kg ⁻¹						36				
Lu	mg kg ⁻¹										
Mo	mg kg ⁻¹				8				17		11.6
Nb	mg kg ⁻¹		46.5		32			35.9	35		30.9
Nd	mg kg ⁻¹		49.4		44			38.8	45		49.3
Ni	mg kg ⁻¹		36.9		30		41	40.7	52		26.7
Pb	mg kg ⁻¹		1049		1045		811	962	991		1020
Pd	mg kg ⁻¹										
Pr	mg kg ⁻¹				12					10	
Pt	mg kg ⁻¹										
Rb	mg kg ⁻¹		146		145			146.1	147		142
Re	mg kg ⁻¹										
Rh	mg kg ⁻¹										
Ru	mg kg ⁻¹										
S	mg kg ⁻¹				1225		866	1257		540	387
Sb	mg kg ⁻¹				9					20	
Sc	mg kg ⁻¹				18				7		
Se	mg kg ⁻¹				16		42				
Sm	mg kg ⁻¹				7					3	
Sn	mg kg ⁻¹				45		93		3		
Sr	mg kg ⁻¹		150		150			151.5	154		147
Ta	mg kg ⁻¹										
Tb	mg kg ⁻¹									1	
Te	mg kg ⁻¹										
Th	mg kg ⁻¹				13			15.8	26		21.6
Tl	mg kg ⁻¹				0.9						
Tm	mg kg ⁻¹										
U	mg kg ⁻¹				5			6.7	5		
V	mg kg ⁻¹		71.7		69			70.5	64		213
W	mg kg ⁻¹				19						
Y	mg kg ⁻¹		45.1		37		42	33.5			41.1
Yb	mg kg ⁻¹									3	
Zn	mg kg ⁻¹		930		980		819	959.8	889		879
Zr	mg kg ⁻¹		367		340			361.7	318		362

Table 1 GeoPT31 Contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F11	F12	F12	F13	F14	F15	F16	F17	F17	F18	F19
Quality	1	1	2	1	2	2	1	1	2	2	2
SiO ₂ % m/m		72.67		71.93	70.28	71.78		69.2		71.29	72.45
TiO ₂ % m/m		0.641		0.63	0.59	0.63	0.62	0.63		0.63	0.63
Al ₂ O ₃ % m/m		11.74		12.02	12.81	11.88		11.7		11.88	11.58
Fe ₂ O ₃ T % m/m		4.783		4.54	4.83	4.60		4.52		4.62	4.57
Fe(II)O % m/m											
MnO % m/m		0.716		0.690	0.34	0.70		0.710		0.69	0.7
MgO % m/m		0.68		0.85	0.91	0.79		0.78		0.77	0.81
CaO % m/m		0.788		0.81	0.72	0.82		0.8		0.79	0.8
Na ₂ O % m/m		1.537		1.63	1.95			1.63		1.72	1.62
K ₂ O % m/m		3.621		3.58	3.9	3.63		3.6		3.77	3.63
P ₂ O ₅ % m/m		0.14		0.16	0.17	0.17		0.16		0.16	0.17
H ₂ O ⁺ % m/m											
CO ₂ % m/m										1.06	
LOI % m/m		2.69		2.57	2.73	2.55			3.0333	2.75	2.8
Ag mg kg ⁻¹		2.81		3.59				1.8			
As mg kg ⁻¹			34.5	32.9				30.08			
Au mg kg ⁻¹											
B mg kg ⁻¹											
Ba mg kg ⁻¹	784		825	1032			810.421	791.03			796
Be mg kg ⁻¹		2.06		2.4							2.88
Bi mg kg ⁻¹			4	1.38				2.39			
Br mg kg ⁻¹								0.67			
C(tot) mg kg ⁻¹				3400							
C(org) mg kg ⁻¹				1500							
Cd mg kg ⁻¹		4.66		6.08							
Ce mg kg ⁻¹	111		107	104			116.123	102.47			118
Cl mg kg ⁻¹								54.02			
Co mg kg ⁻¹	9.98		12.8	11.1			10.547	8.05			10.9
Cr mg kg ⁻¹	92.8		90	91			51.265	101.06			96
Cs mg kg ⁻¹	3.98			6.5			4.907	7.7			4.7
Cu mg kg ⁻¹	307		375	377			320.550	221.92			323
Dy mg kg ⁻¹	6.72	7.49		5.73			5.743				7.2
Er mg kg ⁻¹	4.27	4.55		3.1			3.402				4.36
Eu mg kg ⁻¹	1.33	1.33		1.22			1.594				1.35
F mg kg ⁻¹				0.14							
Ga mg kg ⁻¹	17.2		16.5	17.9				17.3			17.9
Gd mg kg ⁻¹	8.56	8.17		6.75			5.894				8.3
Ge mg kg ⁻¹				0.1							1.44
Hf mg kg ⁻¹	9.05		8.9	2.83			4.457	6.61			9.29
Hg mg kg ⁻¹											
Ho mg kg ⁻¹	1.46	1.5		1.01			1.147				1.47
I mg kg ⁻¹											
In mg kg ⁻¹				1.13							
Ir mg kg ⁻¹											
La mg kg ⁻¹	54		60.7	50.4			57.833	48.16			58.2
Li mg kg ⁻¹		22		21							32.7
Lu mg kg ⁻¹	0.65	0.71		0.42			0.512				0.64
Mo mg kg ⁻¹	17.4		11.5	14				11.4			
Nb mg kg ⁻¹	37.5		34.7	31.5			36.327	33.1			38.8
Nd mg kg ⁻¹	44.5	46.7		40.1			44.633	41.4			48.8
Ni mg kg ⁻¹	41.3	32.8		41.5			53.174	31.89			43.9
Pb mg kg ⁻¹			1002	944			987.600	961.7			978
Pd mg kg ⁻¹											
Pr mg kg ⁻¹	12.3	12.7		11.3			12.776				13.1
Pt mg kg ⁻¹											
Rb mg kg ⁻¹	133		140	126			146.079	139.92			140
Re mg kg ⁻¹											
Rh mg kg ⁻¹											
Ru mg kg ⁻¹											
S mg kg ⁻¹					860						
Sb mg kg ⁻¹			7.4	4.49				6.92			
Sc mg kg ⁻¹			7.9	7.9			7.914	7.96			8.97
Se mg kg ⁻¹		5.290									
Sm mg kg ⁻¹	8.250	8.900		7.300			8.578	4.680			8.96
Sn mg kg ⁻¹			3.1	2.8			2.872	5.36			
Sr mg kg ⁻¹	149		147	197			168.252	153.97			154
Ta mg kg ⁻¹	2.46		5.7	2.93			2.201				2.27
Tb mg kg ⁻¹	1.22	1.24		0.97			1.037				1.18
Te mg kg ⁻¹											
Th mg kg ⁻¹	17.7		18.6	15.1			16.295	13.56			18.1
Tl mg kg ⁻¹		2.35						2.45			
Tm mg kg ⁻¹	0.62	0.66		0.46			0.518				0.66
U mg kg ⁻¹	4.35	4.71		4.53			3.841	2.36			4.35
V mg kg ⁻¹	62.4		75.4	78			66.126	68.88			66.8
W mg kg ⁻¹				10.6			9.154	4.42			
Y mg kg ⁻¹	37.3		41.3	26.5			27.973	38.27			42.9
Yb mg kg ⁻¹	4.23	4.39		3.1			3.486	3.68			4.3
Zn mg kg ⁻¹			924	988			782.467	810.45			937
Zr mg kg ⁻¹	334		343				132.382	328.94			349

Table 1 GeoPT31 Contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F20	F21	F22	F23	F24	F25	F26	F27	F28	F29	F30
Quality	2	1	2	2	1	2	2	1	1	2	1
SiO ₂ % m/m		71.725	71.99	72.95	72.65	71.1	72.16	71.78		71.33	71.95
TiO ₂ % m/m		0.616	0.62	0.642	0.64	0.65	0.65	0.70	0.5357	0.61	0.634
Al ₂ O ₃ % m/m		11.771	11.97	11.73	11.93	11.6	11.66	11.69	11.8893	11.49	11.82
Fe ₂ O ₃ T % m/m		4.56	4.62	4.606	4.78	4.67	4.52	4.73	4.1745	4.66	4.65
Fe(II)O % m/m		0.652			0.80	0.9		0.62			
MnO % m/m		0.685	0.695	0.726	0.71	0.72	0.65	0.699	0.644	0.71	0.70
MgO % m/m		0.794	0.79	0.824	0.84	0.79	1.01	0.90	0.77	0.78	0.81
CaO % m/m		0.786	0.78	0.825	0.83	0.81	0.8	0.97	0.7826	0.78	0.85
Na ₂ O % m/m		1.602	1.5	1.583	1.63	1.6	1.64	1.58	1.5008	1.49	1.70
K ₂ O % m/m		3.641	3.63	3.592	3.59	3.59	3.52	3.64	3.5416	3.65	3.62
P ₂ O ₅ % m/m		0.166	0.159	0.166	0.17	0.16	0.17	0.155	0.1229	0.16	0.152
H ₂ O ⁺ % m/m					2.04	2.2	1.8	2.55			
CO ₂ % m/m					1.31	0.09	0.22	1.33			
LOI % m/m		2.9706	2.59	2.64	2.56	3.24	2.33	2.86	3.735		2.71
Ag mg kg ⁻¹	1.961	2.82			4.1	3.08	3.5	4.81	4.928		
As mg kg ⁻¹	24.147	28.3	31			43	13		32.023		
Au mg kg ⁻¹	0.049										
B mg kg ⁻¹											
Ba mg kg ⁻¹	796.145	813	768	762	780	820	840	769	831.76	800	740
Be mg kg ⁻¹	2.800	2.6		2.5		2.4	2.6	3.01	2.525		2.49
Bi mg kg ⁻¹	1.4698	2.65				1.79			1.491		
Br mg kg ⁻¹											
C(tot) mg kg ⁻¹								3640		2900	
C(org) mg kg ⁻¹								3640			
Cd mg kg ⁻¹	4.682	4.94			5.4	5.24	5.4	4.91	4.857		
Ce mg kg ⁻¹	94.194	117	104	109.9		112	110	115.0	106.088	90	113
Cl mg kg ⁻¹						80					
Co mg kg ⁻¹	9.806	11.1		10.64		11	11.3	10.7	10.313		10.0
Cr mg kg ⁻¹	92.157	96	94	92.7		68	94	85.5	91.747	110	87.1
Cs mg kg ⁻¹	4.106	4.96		4.45		5.1	5.7		4.674		4.42
Cu mg kg ⁻¹	317.770	283	316	301.8	302	332	290	273.2	268.21	270	316
Dy mg kg ⁻¹	6.101	8.1		7.73		6.99	5.6	7.64	7.595		7.46
Er mg kg ⁻¹	3.721	4.96		4.76		4.25	3.4	4.27	3.703		4.42
Eu mg kg ⁻¹	1.178	1.43		1.23		1.37	1.5	1.40	1.51		1.31
F mg kg ⁻¹		547				790		982			
Ga mg kg ⁻¹	20.977	17.4	18	18.82	22	20	15	18.3	12.658		16.7
Gd mg kg ⁻¹	6.621	8.12		7.2		7.7	7.5	6.43	9.492		7.61
Ge mg kg ⁻¹		1.47				2	1.4		1.3264		1.40
Hf mg kg ⁻¹	7.291	10.21		9.16	6	11		11.3	3.645		9.19
Hg mg kg ⁻¹						129	0.13	0.112			
Ho mg kg ⁻¹	1.183	1.55		1.54		1.46	1.2	1.54	1.212		1.49
I mg kg ⁻¹											
In mg kg ⁻¹	0.830					1.12					
Ir mg kg ⁻¹	0.013										
La mg kg ⁻¹	44.470	57.2	68	51.13		57	52	58.8	50.352	60	54.3
Li mg kg ⁻¹	26.849					30	30	27.9	29.554		27.4
Lu mg kg ⁻¹	0.570	0.7		0.7		0.67	0.44	0.70	0.452		0.64
Mo mg kg ⁻¹	12.326	13		12.31		16	13	13.8	13.156		11.6
Nb mg kg ⁻¹	35.597	40.2	32	35.15	34	38	34	33.9	25.726		39.2
Nd mg kg ⁻¹	38.877	49.76	52	45.58		46.9	46	49.1	48.546		46.0
Ni mg kg ⁻¹	42.273	40	40	41.3	29	40.2	43	32.8	41.79		40.5
Pb mg kg ⁻¹	1054.769	985.77	1072	953.3	947	1020	950	1017	897.22		1069
Pd mg kg ⁻¹	0.0030										
Pr mg kg ⁻¹	10.404	13.37		12.4		13.1	12.3	13.53	13.662		12.4
Pt mg kg ⁻¹	0.0131										
Rb mg kg ⁻¹	134.365	144.5	145	135.7	143	151	150	134.8	137.098		136
Re mg kg ⁻¹	0.001										
Rh mg kg ⁻¹	0.0060										
Ru mg kg ⁻¹	0.015										
S mg kg ⁻¹		6993				0.17		1140		1200	
Sb mg kg ⁻¹	9.812	6.5				7.3	6.5		6.349		
Sc mg kg ⁻¹		7		8	9	8.1			7.819		8.58
Se mg kg ⁻¹	16.037										
Sm mg kg ⁻¹	7.145	9.685		8.55		8.7	8.2	9.19	9.474		8.80
Sn mg kg ⁻¹	2.457	2.8		3.48		4	2.3		4.075		3.27
Sr mg kg ⁻¹	129.941	155.3	139	156.2	142	158	150	150.5	138.35		146
Ta mg kg ⁻¹	2.231	2.18		1.99		2.2			2.321		2.16
Tb mg kg ⁻¹	0.954	1.268		1.18		1.19	1	1.35	1.301		1.22
Te mg kg ⁻¹	1.141					0.78					
Th mg kg ⁻¹	16.241	19.22	24	16.11	19	18.2	19	21.7	20.023		17.5
Tl mg kg ⁻¹	2.955			2.14		2.7	3.1		2.16		2.57
Tm mg kg ⁻¹	0.573			0.71		0.71	0.45	0.68	0.495		0.66
U mg kg ⁻¹	4.198	4.35		4.1	8	4.86	3.7	4.8	4.227		4.39
V mg kg ⁻¹	62.118	71	66	58.7		64	65	58.8	74.355		60.4
W mg kg ⁻¹	6.790	9.5		10.11		11			11.109		
Y mg kg ⁻¹	32.463	44.7	31	40.31	34	41.8	34	41.76	26.91	40	43.4
Yb mg kg ⁻¹	3.640	4.607		4.63		4.3	3.2	4.56	3.026		4.25
Zn mg kg ⁻¹	895.771	982	940	974.1	828	972	960	852	887.16	960	866
Zr mg kg ⁻¹	279.942	376.3	338	356.9	319	359	330	372.3	125.88		343

Table 1 GeoPT31 Contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code		F31	F32	F33	F34	F36	F37	F38	F39	F40	F41
Quality		2	2	2	2	1	1	2	1	2	2
SiO ₂	% m/m	71.860	72.37	71.95	72.309		66	71.36		72.31	72.3
TiO ₂	% m/m	0.618	0.65	0.637	0.624		0.571	0.632		0.639	0.64
Al ₂ O ₃	% m/m	11.756	11.89	11.79	12.348		11.7	11.73		11.76	11.9
Fe ₂ O ₃ T	% m/m	4.610	4.71	4.65	4.762		4.43	4.62		4.63	4.67
Fe(II)O	% m/m				0.89						
MnO	% m/m	0.715	0.71	0.734	0.693		0.663	0.719	0.677	0.716	0.68
MgO	% m/m	0.767	0.83	0.81	0.608		1.02	0.819		0.801	0.81
CaO	% m/m	0.791	0.8	0.79	0.799		0.77	0.79	0.81	0.828	0.79
Na ₂ O	% m/m	1.632	1.61	1.58	1.622		0.68	1.56		1.59	1.42
K ₂ O	% m/m	3.726	3.62	3.50	3.608		3.61	3.62		3.74	3.65
P ₂ O ₅	% m/m	0.158	0.17	0.17	0.163		0.151	0.165	0.17	0.160	0.16
H ₂ O ⁺	% m/m										
CO ₂	% m/m										
LOI	% m/m	2.431	2.82	2.75	2.46			2.62			2.47
Ag	mg kg ⁻¹	4.0					2.5		2.83		
As	mg kg ⁻¹	32.8	31	50			38	25			
Au	mg kg ⁻¹								0.081		
B	mg kg ⁻¹										
Ba	mg kg ⁻¹	781.3	756	804	897	771.4	856.3	762			780
Be	mg kg ⁻¹		2.65					3.12	2.86		
Bi	mg kg ⁻¹										
Br	mg kg ⁻¹		2.18								
C(tot)	mg kg ⁻¹										
C(org)	mg kg ⁻¹										
Cd	mg kg ⁻¹	4.7					12.5		2.88		
Ce	mg kg ⁻¹	109.0	118.1	128	62.71	110.5	127.5	117.1	120		
Cl	mg kg ⁻¹		123								
Co	mg kg ⁻¹	13.1	10.92	10	1	10.03		11.15	20		
Cr	mg kg ⁻¹	84.1	90.3	92	116	92.57	83.6	96.12	96		
Cs	mg kg ⁻¹	3.8	5.1			4.55	19.5	5.11			
Cu	mg kg ⁻¹	305.5	266.4	324	254	283.3	309.8	316	383		210
Dy	mg kg ⁻¹		7.5		3.128	6.73		7.21			
Er	mg kg ⁻¹		4.5		1.651	3.67		4.35			
Eu	mg kg ⁻¹		1.37		0.865	1.227		1.31			
F	mg kg ⁻¹										
Ga	mg kg ⁻¹	15.4	16.3	18		17.29	14.4	17.6			
Gd	mg kg ⁻¹		8.3		3.628	7.72		7.91			
Ge	mg kg ⁻¹										
Hf	mg kg ⁻¹	8.7	11.1	12		5.1	17.1	8.45			
Hg	mg kg ⁻¹			0.113							
Ho	mg kg ⁻¹		1.6		0.661	1.267		1.52			
I	mg kg ⁻¹	0.7									
In	mg kg ⁻¹	0.6									
Ir	mg kg ⁻¹										
La	mg kg ⁻¹	56.0	57.1	65	29.856	52.24	65.8	56.9	58.7		
Li	mg kg ⁻¹							28.6			
Lu	mg kg ⁻¹		0.7		0.242	0.548		0.654			
Mo	mg kg ⁻¹	12.3	10.7	11			6.7		11.6	10.4	
Nb	mg kg ⁻¹	33.8	39.9	40		38.6	31.2	33			
Nd	mg kg ⁻¹	46.5	49.1	35	25.212	46.9	24.1	47.12		45	
Ni	mg kg ⁻¹	32.3	36	40	10	41.61	32.4	31.5		46	
Pb	mg kg ⁻¹	997.5	1053	1002	873	940.5	927.1	886		1050	
Pd	mg kg ⁻¹								0.018		
Pr	mg kg ⁻¹		13.2		66.82	12.84		12.55			
Pt	mg kg ⁻¹								0.015		
Rb	mg kg ⁻¹	139.8	145.1	134	470	146.42	136.5	143.8			140
Re	mg kg ⁻¹										
Rh	mg kg ⁻¹										
Ru	mg kg ⁻¹										
S	mg kg ⁻¹		2700				1256				
Sb	mg kg ⁻¹	5.9					9.6	6.46			
Sc	mg kg ⁻¹	8.5	8.2			8.93		8.3		7.85	
Se	mg kg ⁻¹		0.67							1.480	
Sm	mg kg ⁻¹	6.8	9.07		4.624	8.570		8.86			
Sn	mg kg ⁻¹	3.1					4.9		9.7		
Sr	mg kg ⁻¹	148.6	149.1	148	301	151.19	138.8	156.7		202	150
Ta	mg kg ⁻¹		2.3			1.651		2.12			
Tb	mg kg ⁻¹				0.546	1.17		1.19			
Te	mg kg ⁻¹	0.5									
Th	mg kg ⁻¹	17.8	19.2		4	17.53	24.8	17.55			
Tl	mg kg ⁻¹	2.8					3.5	2.38			
Tm	mg kg ⁻¹				0.231	0.569		0.664			
U	mg kg ⁻¹	2.0	4.5			4.15	3.9	4.21			
V	mg kg ⁻¹	63.4	68.2	63	84	70.92	69.9	68.9		67.2	
W	mg kg ⁻¹	11.2		10				6.1			
Y	mg kg ⁻¹	41.8	45.4	47	37	35.7	36.3	41.08		42	
Yb	mg kg ⁻¹	3.0	4.6		1.595	3.56	8.5	4.44		4.27	
Zn	mg kg ⁻¹	953.1	975.1	968	2268	707.8	896.1	877		1078	940
Zr	mg kg ⁻¹	366.5	411.2	384	217	166.54	328.5	311		381	390

Table 1 GeoPT31 Contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F42	F43	F44	F45	F46	F47	F48	F49	F50	F51	F51
Quality	2	1	2	1	1	2	1	2	2	1	2
SiO ₂ % m/m		70.92	71.85		72.66	70.281		72.04	72.37	72.0	
TiO ₂ % m/m		0.61	0.62	0.55	0.618	0.596	0.61	0.62	0.692	0.653	
Al ₂ O ₃ % m/m		11.26	11.62	11.67	11.73	11.726	21.98	11.73	11.94	11.870	
Fe ₂ O ₃ T % m/m		4.72	4.62	4.33	4.546	4.632	8.75	4.554	4.613	4.715	
Fe(II)O % m/m		0.82							0.806		
MnO % m/m		0.710	0.71	0.690	0.689	0.913	0.59	0.669	1.022		0.676
MgO % m/m		0.80	0.73	0.55	0.78	0.68		0.813	0.702		0.858
CaO % m/m		0.81	0.81	0.68	0.787	1.066		0.789	0.818		0.858
Na ₂ O % m/m		1.62	1.63	1.5	1.579	1.360		1.665	1.543	1.701	
K ₂ O % m/m		3.68	3.61	3.6	3.563	3.470		3.755	3.736	3.312	
P ₂ O ₅ % m/m		0.16	0.16		0.161	0.112		0.155	0.153		0.164
H ₂ O ⁺ % m/m		1.8103				1.51					
CO ₂ % m/m		1.16		1.12				0.99	0.44		
LOI % m/m		3.03	2.77		2.57	3.087	2.62	2.66	2.39		2.95
Ag mg kg ⁻¹							4.39				4.1
As mg kg ⁻¹			40	34.8			38		14.43		48.0
Au mg kg ⁻¹				0.25							11.0
B mg kg ⁻¹											
Ba mg kg ⁻¹		152.4		747			719		798		845
Be mg kg ⁻¹		0.8					2.34		2.65		2.8
Bi mg kg ⁻¹		1.9					1.87				2.630
Br mg kg ⁻¹											
C(tot) mg kg ⁻¹								2700	2367		
C(org) mg kg ⁻¹									1200		
Cd mg kg ⁻¹	4.8	5.37				5.16					6.710
Ce mg kg ⁻¹	118	90.5		99.1		115			109.8	119.49	
Cl mg kg ⁻¹				55.6							
Co mg kg ⁻¹		9.83	15	9.1		9.00			31.42		10.0
Cr mg kg ⁻¹		82	90	83				59	92		106
Cs mg kg ⁻¹	5	2		4.1		4.41			4.482		5.0
Cu mg kg ⁻¹		324.3	270	384		276			209		328
Dy mg kg ⁻¹	7.96	3.39		7.2		4.68			7.043		7.68
Er mg kg ⁻¹	4.93	1.61				2.56			4.11		4.93
Eu mg kg ⁻¹	1.38	0.72		1.1		1.04			1.346	1.42	
F mg kg ⁻¹								1420			880.0
Ga mg kg ⁻¹	16.86	4.24							18.2	17.33	
Gd mg kg ⁻¹	7.67	5.42				5.92			7.102	8.71	
Ge mg kg ⁻¹	1.46								1.268		
Hf mg kg ⁻¹	9.96	0.05		6.1					10.04		13.52
Hg mg kg ⁻¹											0.099
Ho mg kg ⁻¹	1.63	0.6		1.2			0.90		1.457	1.68	
I mg kg ⁻¹											
In mg kg ⁻¹		1.036		0.99							
Ir mg kg ⁻¹				0.000066							
La mg kg ⁻¹	59.1	41.53		52		50.5			53.19		60.00
Li mg kg ⁻¹		10.62				25.4				30.0	
Lu mg kg ⁻¹	0.74	0.177		0.64		0.36			0.697	0.75	
Mo mg kg ⁻¹				8.5		10.4		16	12.09	41161	
Nb mg kg ⁻¹	32.2	2.25							37.12		37.41
Nd mg kg ⁻¹	49	35.1		42.3		45.9			45.73	50	
Ni mg kg ⁻¹		39.8	50	72.3		34.3		36	39.32		37.0
Pb mg kg ⁻¹			1000			1010		942	542.8		860
Pd mg kg ⁻¹											
Pr mg kg ⁻¹	13.3	9.65					12.7		12.17	12.66	
Pt mg kg ⁻¹											
Rb mg kg ⁻¹	128	15.45		123			126		150.8	145.0	
Re mg kg ⁻¹											
Rh mg kg ⁻¹				0.000098							
Ru mg kg ⁻¹				0.000136							
S mg kg ⁻¹			1185	1499				1100	1100		
Sb mg kg ⁻¹	6.14	4.17		6.3					3.933		4.620
Sc mg kg ⁻¹	8.4	2.33		7.9							6.69
Se mg kg ⁻¹											
Sm mg kg ⁻¹	8.91	6.120		7.600		7.74			8.463	9.53	
Sn mg kg ⁻¹	3.1	1.49							3.565		4.3
Sr mg kg ⁻¹		24.12	180	223		113			150.6		175.0
Ta mg kg ⁻¹	2.47	0.01		2.2					2.803		2.47
Tb mg kg ⁻¹	1.31	0.66		1.01			0.83		1.214	1.31	
Te mg kg ⁻¹											
Th mg kg ⁻¹	19.36	10.56		16.5		19.6			19.48	20.65	
Tl mg kg ⁻¹	2.3	0.863				2.35					2.1
Tm mg kg ⁻¹	0.74	0.217				0.35			0.638	0.75	
U mg kg ⁻¹	4.84	1.76		4		4.51			4.826	4.90	
V mg kg ⁻¹		23		74		61.2			72		75.0
W mg kg ⁻¹	7.05	3.4		11.6		12.4			289		11.0
Y mg kg ⁻¹	39.7	15.63				21.7			40.58		40.73
Yb mg kg ⁻¹	4.88	1.37		4.2		2.38			4.304	4.95	
Zn mg kg ⁻¹			820	693		861		919	813.9		910
Zr mg kg ⁻¹	359	1.88		80				373	374.6		387.00

Table 1 GeoPT31 Contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F52	F53	F54	F55	F56	F57	F58	F59	F60	F61	
Quality	2	1	2	2	1	1	1	1	1	2	
SiO ₂ % m/m	72.82	72.001	71.87	68.64	71.589	71.892	73.67	69.2		86.85	72.42
TiO ₂ % m/m	0.65	0.6150	0.639	0.61	0.626	0.618	0.61	0.54	0.606		0.628
Al ₂ O ₃ % m/m	11.8	11.589	12.14	13.36	11.799	11.896	11.96	12.15	11.413		11.96
Fe ₂ O ₃ T % m/m	4.7	4.688	4.61	4.24	5.106	4.557	4.63	4.16	4.648		4.628
Fe(II)O % m/m											
MnO % m/m	0.69	0.6696	0.738	0.71	0.694	0.700	0.694	0.64	0.676		0.725
MgO % m/m	0.75	0.819	0.89	1.01	0.76	0.84	0.80	0.91	0.75		0.846
CaO % m/m	0.78	0.799	0.79	0.87	0.792	0.778	0.78	0.73	0.99		0.815
Na ₂ O % m/m	1.38	1.628	1.53	1.66	1.666	1.612	1.32	1.45	1.599		1.63
K ₂ O % m/m	3.49	3.675	3.65	4.04	3.698	3.646	3.55	3.65	3.634		3.761
P ₂ O ₅ % m/m	0.16	0.1657	0.179	0.22	0.155	0.163	0.166	0.08			0.163
H ₂ O ⁺ % m/m											
CO ₂ % m/m							2.42				
LOI % m/m	2.65	2.53	2.48	3.9	2.51	2.539		3.23			2.523
Ag mg kg ⁻¹						3.044			4.22		3.6
As mg kg ⁻¹	34	42.6	40.3	20	53.7	38.814	27		40.3		35.2
Au mg kg ⁻¹	0.32								0.227		
B mg kg ⁻¹											
Ba mg kg ⁻¹	781	793.6	778	800	793.7	774.784	810	862	859		779.5
Be mg kg ⁻¹	2	2.472	2.5			2.259					2.28
Bi mg kg ⁻¹	2.3		1.8			0.158	4.1				1.77
Br mg kg ⁻¹						2.25			1.28		
C(tot) mg kg ⁻¹			3400								
C(org) mg kg ⁻¹											
Cd mg kg ⁻¹	7.7	7.082	5.44			5.961					5.1
Ce mg kg ⁻¹	104	124.0	126.7			109.76	106		127		106.5
Cl mg kg ⁻¹			65								
Co mg kg ⁻¹	9	9.870	11.8	8	8.2	11.035	13	6	10.9		10.97
Cr mg kg ⁻¹	98	96.4	97	105	89.5	99.15	108	101	94.8		
Cs mg kg ⁻¹	4.4	4.903	4.88			4.834	7.8		5.06		
Cu mg kg ⁻¹	274	290.5	355	240	257.2	324.132	292	261		264	306.3
Dy mg kg ⁻¹	7.5	7.272	5.76			7.417			8.67		7.27
Er mg kg ⁻¹	4.3	4.588	3.16			4.627					4.37
Eu mg kg ⁻¹	1.2	1.391	1.24	11		1.322			1.32		1.37
F mg kg ⁻¹			830								
Ga mg kg ⁻¹	16	16.78	20	16	17.8	16.767	16	20	16.5		
Gd mg kg ⁻¹	7.2	7.896	7.62			7.341					7.93
Ge mg kg ⁻¹	4.1										
Hf mg kg ⁻¹	8	10.49				10.551			10.3		
Hg mg kg ⁻¹	0.11		0.129								
Ho mg kg ⁻¹	1.5	1.578	1.1			1.496					1.37
I mg kg ⁻¹											
In mg kg ⁻¹									1.01		
Ir mg kg ⁻¹											
La mg kg ⁻¹	51.2	60.05	59.4			54.656	57		57.5		48.32
Li mg kg ⁻¹	28	29.26	31.7			29.766					31
Lu mg kg ⁻¹	0.69	0.672	0.44			0.717			0.685		0.65
Mo mg kg ⁻¹	11.9	13.33	13.7		14.6	11.159	11			18.6	13.22
Nb mg kg ⁻¹	33	33.60	33.6	31	35	36.151	33	37			
Nd mg kg ⁻¹	44.6	51.62	51.2			46.557	47		58.8		46.4
Ni mg kg ⁻¹	34	36.14	44	28	39.2	38.424	34	30		68.5	44.5
Pb mg kg ⁻¹	954	926.8	989	118	981.2		934	1066			948.3
Pd mg kg ⁻¹						1017.4					
Pr mg kg ⁻¹	11.4	13.91	13.8			12.568					12.77
Pt mg kg ⁻¹											
Rb mg kg ⁻¹	141	128.0	154.7	100	148.6	146.9	145	132	145		
Re mg kg ⁻¹											
Rh mg kg ⁻¹											
Ru mg kg ⁻¹											
S mg kg ⁻¹			848	494							
Sb mg kg ⁻¹	6.2	7.056	6.21			6.345			6.81		8.07
Sc mg kg ⁻¹	10	8.613	7.7			8.316	8.6	10	8.72		
Se mg kg ⁻¹	1.3										
Sm mg kg ⁻¹	7.6	9.135	9.22			8.745			8.720		8.41
Sn mg kg ⁻¹	2.3	2.778	2.81			2.994					2.8
Sr mg kg ⁻¹	149	153.4	161.7	86	156	157.65	151	139	168		155.1
Ta mg kg ⁻¹	1.7	2.280	1.42			2.398			2.21		
Tb mg kg ⁻¹	1.1	1.206	0.97			1.231			1.19		1.22
Te mg kg ⁻¹	1.1		0.85			0.786					
Th mg kg ⁻¹	16	17.75			25.6	20.573	19	20	19.4		17.46
Tl mg kg ⁻¹	2.6		2.67			2.603	5.5				2.56
Tm mg kg ⁻¹	0.67	0.675	0.45			0.718					
U mg kg ⁻¹	5.2	4.618	3.31		5.6	4.534	3.7		3.98		4.52
V mg kg ⁻¹	63	59.70	64	77	76.3	71.4	72	67	70.8		64.4
W mg kg ⁻¹	9.7		12			9.719	5.8		10.4		
Y mg kg ⁻¹	38	40.00	28.8	31	38.1	42.506	39	34			38.66
Yb mg kg ⁻¹	3.7	4.302	2.96			4.628	4.3		4.39		4.16
Zn mg kg ⁻¹	904	860.8	1027	660	859.8	932.081	959	653	914		961.9
Zr mg kg ⁻¹	340	406.7	359	294	338	349.2	319	311	350		

Table 1 GeoPT31 Contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code		F62	F63	F64	F65	F66	F67	F68	F69	F70	F71	F72
Quality		1	1	1	1	2	2	2	2	2	1	1
SiO ₂	% m/m	71.7	70.517	72.47		71.74	72.27	71.46	71.8	71.84	73.01	71.28
TiO ₂	% m/m	0.63	0.631	0.61		0.63	0.655	0.630	0.640	0.63	0.66	0.597
Al ₂ O ₃	% m/m	11.7	11.751	11.43		11.73	11.8	11.67	11.97	11.85	12.17	12.65
Fe ₂ O ₃ T	% m/m	4.8	4.627	4.6		4.65	4.65	4.601	4.75	4.61	4.36	4.345
Fe(II)O	% m/m	1.04										0.7
MnO	% m/m	0.702	0.700	0.620		0.69	0.67	0.680	0.743	0.72	0.73	0.863
MgO	% m/m	0.81	0.81	0.90		0.79	0.83	0.754	0.803	0.81	1.13	1.06
CaO	% m/m	0.8	0.829	0.82		0.77	0.82		0.795	0.79	0.75	0.805
Na ₂ O	% m/m	1.62	1.582	1.65		1.58	1.62		1.68	1.63	1.6	1.87
K ₂ O	% m/m	3.62	3.516	3.78		3.52	3.67		3.57	3.7	3.64	3.54
P ₂ O ₅	% m/m	0.15	0.166	0.15		0.171	0.17		0.159	0.161	0.19	0.182
H ₂ O ⁺	% m/m	1.97										
CO ₂	% m/m											
LOI	% m/m	2.52		2.86			2.4	2.62	2.67	2.31	3.03	2.86
Ag	mg kg ⁻¹		3.7							3.39		3.534
As	mg kg ⁻¹	35.4	40.5	161.9			39.2			38		29.846
Au	mg kg ⁻¹											
B	mg kg ⁻¹	14					13					6.623
Ba	mg kg ⁻¹	724	780.67	728.8	985.471	804	806		847	760	781	683.304
Be	mg kg ⁻¹	2.19	2.433				2.7			2.4		1.747
Bi	mg kg ⁻¹	1.08	1.733			1.68				1.7		1.315
Br	mg kg ⁻¹											
C(tot)	mg kg ⁻¹	3070					3380					
C(org)	mg kg ⁻¹	1810					2380					
Cd	mg kg ⁻¹	4.95	5.6				4.6		5.27	5.1		3.694
Ce	mg kg ⁻¹	101	125		106.716	122.5	136		115.7	117	120	94.788
Cl	mg kg ⁻¹	64										
Co	mg kg ⁻¹	10.2	11	4.7		10.4	10		6.10	12	11	9.302
Cr	mg kg ⁻¹	101	93.067	158.6		83	85		98.7	90	94	70.349
Cs	mg kg ⁻¹	4.53	4.787		4.746	4.76				4.9		4.272
Cu	mg kg ⁻¹	313	327.333	262.5		321	304		337	326	302	239.965
Dy	mg kg ⁻¹	7.54	8.617		4.83	7.84	7			5.8	5.6	5.088
Er	mg kg ⁻¹	4.69	5.593		2.48		4.1			3	3.9	2.945
Eu	mg kg ⁻¹	1.27	1.347		1.187	1.37	1.3			1.3	1.4	1.220
F	mg kg ⁻¹	880										
Ga	mg kg ⁻¹	17.9	18.333						13.7	17.4		14.994
Gd	mg kg ⁻¹	7.09	8.2		5.724	8.4	7			7.2	7	7.004
Ge	mg kg ⁻¹	1.45								1.1		1.219
Hf	mg kg ⁻¹	9.85	10.9		2.784	10.9				3.6		3.720
Hg	mg kg ⁻¹	0.124	0.11									
Ho	mg kg ⁻¹	1.56	1.8		0.882		1.39			1.1	0.9	0.967
I	mg kg ⁻¹											
In	mg kg ⁻¹	0.94								1		
Ir	mg kg ⁻¹											
La	mg kg ⁻¹	49.7	59.1	45.4	50.181		66		60.6	57	58	45.455
Li	mg kg ⁻¹	30	26.733		27.147		28		29.9	29	29	26.549
Lu	mg kg ⁻¹	0.792	0.698		0.334	0.71	0.65			0.43	0.6	0.421
Mo	mg kg ⁻¹	13.4	14		12.389	13.45				13.8		12.639
Nb	mg kg ⁻¹	32.5	34	29.3	30.544	37.7	33.4		33.1	46		34.199
Nd	mg kg ⁻¹	42.1	52.6		43.017	51.3	44		48.8	50	51	40.464
Ni	mg kg ⁻¹	38.1	41.6	39.1		39.2			42.6	40	43	32.914
Pb	mg kg ⁻¹	1018	1025.33		954.899	991	966	1000		920	970	751.343
Pd	mg kg ⁻¹											
Pr	mg kg ⁻¹	11.3			11.742		12.2		14.4	14	11	11.193
Pt	mg kg ⁻¹											
Rb	mg kg ⁻¹	137	139.33	141.1		146.5	134			148	140	119.871
Re	mg kg ⁻¹									0.001		
Rh	mg kg ⁻¹											
Ru	mg kg ⁻¹											
S	mg kg ⁻¹	1310								1260		
Sb	mg kg ⁻¹	6.62	7.247			6.88				7		5.366
Sc	mg kg ⁻¹	8.87	7.9				7.9		8.35	7.7	7.6	7.251
Se	mg kg ⁻¹	0.38										
Sm	mg kg ⁻¹	8.05	9.740		7.655		7.8			9	10	7.740
Sn	mg kg ⁻¹	2.87								3		2.922
Sr	mg kg ⁻¹	152	156.33	148.5	145.12	160.5	151		147.0	155	127	130.506
Ta	mg kg ⁻¹	2.17	2.437		1.662					2.7		2.030
Tb	mg kg ⁻¹	1.19	1.253		0.903		1.2			1	1.1	0.846
Te	mg kg ⁻¹									0.8		0.562
Th	mg kg ⁻¹	14.8	19.8		15.029					17.5	16	13.758
Tl	mg kg ⁻¹		2.75		2.724					2.4		2.135
Tm	mg kg ⁻¹	0.733	0.737		0.399		0.78			0.45		0.435
U	mg kg ⁻¹	4.16	4.803		3.218	4.44				4.9	3.8	3.473
V	mg kg ⁻¹	63.2	65.667	139.6			68		68.0	80	60	60.859
W	mg kg ⁻¹	10.1	12.467							9.9		9.905
Y	mg kg ⁻¹	47.6	47.067	42.2	22.897	41.6	37			29	26	25.063
Yb	mg kg ⁻¹	5.02	4.813		2.42				3.32	3.2	3.2	2.833
Zn	mg kg ⁻¹	951	989	921.5		1010	950			960	946	584.266
Zr	mg kg ⁻¹	411	288.33	328.6	79.114		324		120.5	114	277	107.419

Table 1 GeoPT31 Contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F73	F74	F75	F75	F76	F77	F78	F79	F80	F81	F82
Quality	1	2	1	2	2	2	2	1	1	2	2
SiO ₂ % m/m	71.84				72.06	72.187		72.2	28.4	71.94	67.43
TiO ₂ % m/m	0.63	0.628		0.472	0.65	0.624		0.62	0.27	0.643	0.596
Al ₂ O ₃ % m/m	11.77	12.06		12.789	11.76	11.74		11.94	0.05	11.92	11.41
Fe ₂ O ₃ T % m/m	4.65	4.62		4.351	4.77	4.690		4.49	1.95	4.77	4.469
Fe(II)O % m/m											
MnO % m/m	0.680	0.68		0.817	0.69	0.595		0.700	0.330	0.68	0.698
MgO % m/m	0.68	0.76		0.819	0.693	0.839		0.79		0.8	0.82
CaO % m/m	0.83	0.78		0.76	0.83	0.819		0.77	0.39	0.855	0.871
Na ₂ O % m/m	1.6	1.76		1.59	1.61	1.609		1.57		1.57	1.678
K ₂ O % m/m	3.57	3.7		3.988	3.63	3.637		3.71	1.68	3.6	3.699
P ₂ O ₅ % m/m	0.14	0.16		0.153	0.162	0.166		0.16	0.0661		0.17
H ₂ O ⁺ % m/m				0.49							
CO ₂ % m/m											
LOI % m/m	2.55			2.71	2.68	2.490		2.56	2.55	2.76	1.04
Ag mg kg ⁻¹		3.87									3.603
As mg kg ⁻¹	23	40		38.92		61.0		68.9	54.302		38.86
Au mg kg ⁻¹											
B mg kg ⁻¹											
Ba mg kg ⁻¹	804	847.71		824.6	790	836.0	800.5	653	860.470	776	799
Be mg kg ⁻¹		2.61		2.62					2.324		2.721
Bi mg kg ⁻¹				1.43							1.476
Br mg kg ⁻¹											
C(tot) mg kg ⁻¹											
C(org) mg kg ⁻¹											
Cd mg kg ⁻¹		5.79		5.52					5.064	9	5.64
Ce mg kg ⁻¹	112			153.64		106.0	93.8	106	116.146		105.9
Cl mg kg ⁻¹											
Co mg kg ⁻¹	10	11.19		10.55				13.1	13.060	46	11.03
Cr mg kg ⁻¹		97		98.9	90	107.0		77.3	91.330	87	94.04
Cs mg kg ⁻¹				4.62							4.573
Cu mg kg ⁻¹	270	324		339.88		316.0		331	316.799	295	322.8
Dy mg kg ⁻¹				9.8			5.63	6.6			6.85
Er mg kg ⁻¹				5.85			3.36	3.64			4.38
Eu mg kg ⁻¹				1.71			1.09	1.36			1.235
F mg kg ⁻¹											
Ga mg kg ⁻¹	16			18.43		17.0		17.4		935	14.23
Gd mg kg ⁻¹				10.17			5.72	7.57		20	7.101
Ge mg kg ⁻¹											
Hf mg kg ⁻¹	9									8	8.867
Hg mg kg ⁻¹			0.1079						0.138		
Ho mg kg ⁻¹				1.97			1.15	1.38			1.41
I mg kg ⁻¹											
In mg kg ⁻¹											
Ir mg kg ⁻¹											
La mg kg ⁻¹	70			75.59		62.0	44.4	50.3	59.949		53.32
Li mg kg ⁻¹				28.48				31.3		34	29.19
Lu mg kg ⁻¹				0.90			0.49	0.57			0.639
Mo mg kg ⁻¹	11	14.15		13.19				11.3			12.49
Nb mg kg ⁻¹	34					34.0		38.1			37.94
Nd mg kg ⁻¹	40			65.93			39.06	49.1			45.49
Ni mg kg ⁻¹	30	45.6		44.98		33.0		48.2	36.145	42	47.59
Pb mg kg ⁻¹	948	1056.1		1072.38		1003.0		890	1055.027		1102
Pd mg kg ⁻¹											
Pr mg kg ⁻¹				17.81			10.51	12.2			12.15
Pt mg kg ⁻¹											
Rb mg kg ⁻¹	114			167.19		152.0		148	150.578		146.4
Re mg kg ⁻¹											
Rh mg kg ⁻¹											
Ru mg kg ⁻¹											
S mg kg ⁻¹		1230			220				197.6		
Sb mg kg ⁻¹				7.09							6.676
Sc mg kg ⁻¹	13			7.04		11.0					
Se mg kg ⁻¹											
Sm mg kg ⁻¹	7.000			11.72			7.26	8.500			8.166
Sn mg kg ⁻¹											3.222
Sr mg kg ⁻¹	151	150		163	149	158.0	153	152	130.070	152	155.1
Ta mg kg ⁻¹				2.21							2.049
Tb mg kg ⁻¹				1.64			0.92	1.31			1.079
Te mg kg ⁻¹				1.04							
Th mg kg ⁻¹	16			24.48		19.0		17.8			15.36
Tl mg kg ⁻¹		2.57		2.25					1.722		2.196
Tm mg kg ⁻¹				0.86			0.5	0.59			0.653
U mg kg ⁻¹	5	2.96		3.05		5.0		3.77			4.391
V mg kg ⁻¹	76	66		64.91	68	68.0		72.9	72.400		65.14
W mg kg ⁻¹				11.46				15.7			10.85
Y mg kg ⁻¹	43			55.12		41.0		36.3		37	36.18
Yb mg kg ⁻¹				5.91			3.56	4.04			4.291
Zn mg kg ⁻¹	894	996		1039.08	951	879.0		938	1024.199	919	1012.5
Zr mg kg ⁻¹	370			396.29	410	376.0		453		322	299.5

Table 1 GeoPT31 Contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code		F83	F83	F84	F85	F86	F87	F88	F89	F90*	F91*
Quality		1	2	1	2	1	1	1	2	2	2
SiO ₂	% m/m	71.59			72.29		71.659		72.35	72.36	72.42
TiO ₂	% m/m	0.644			0.62	0.63	0.6263	0.596	0.64	0.62	0.62
Al ₂ O ₃	% m/m	11.49			11.63		11.678	11.782	11.69	11.69	11.86
Fe ₂ O ₃ T	% m/m	4.65			4.6	4.656	4.753	5.265	4.62	4.65	4.67
Fe(II)O	% m/m	1.80									1.18
MnO	% m/m	0.693			0.701	0.719	0.7073	0.674	0.7	0.78	0.71
MgO	% m/m	0.80			0.81	0.81	0.811		0.8	0.86	0.83
CaO	% m/m	0.83			0.8	0.8041	0.811	0.727	0.81	0.8	0.86
Na ₂ O	% m/m	1.60			1.61	1.827	1.618	1.457	1.65	1.64	1.68
K ₂ O	% m/m	3.63			3.6	3.905	3.659	3.554	3.66	3.72	3.72
P ₂ O ₅	% m/m	0.164			0.181		0.1656		0.16	0.159	0.17
H ₂ O*	% m/m										2.09
CO ₂	% m/m										
LOI	% m/m	2.81			2.59		2.620		2.5	4.647	2.48
Ag	mg kg ⁻¹				5.3						
As	mg kg ⁻¹				35					34	36.5
Au	mg kg ⁻¹				0.32						
B	mg kg ⁻¹										
Ba	mg kg ⁻¹	785		833	788	737.3	789.2	780.21	792	769	785
Be	mg kg ⁻¹				2.9						2.73
Bi	mg kg ⁻¹				1.5					1.5	1.78
Br	mg kg ⁻¹										
C(tot)	mg kg ⁻¹	2730								2600	
C(org)	mg kg ⁻¹										
Cd	mg kg ⁻¹				5.4			5		6.7	1.39
Ce	mg kg ⁻¹	112		96	103	105	116.379	110.84		99	112
Cl	mg kg ⁻¹		62								
Co	mg kg ⁻¹		10		12.5			8.773		12.1	9.84
Cr	mg kg ⁻¹	101		93	91	89.46	92.9	95.035	87	92.1	88.2
Cs	mg kg ⁻¹	5.27			4.93		4.634	4.35		8.4	4.63
Cu	mg kg ⁻¹	302		284	298	359.6	318.6		275	262.6	300
Dy	mg kg ⁻¹	6.75			5.5	4.79	7.739	6.718			6.96
Er	mg kg ⁻¹	3.89			3.34	2.681	4.379	4.079			3.98
Eu	mg kg ⁻¹	1.38			1.9	1.035	1.379	1.371			1.31
F	mg kg ⁻¹		787								
Ga	mg kg ⁻¹			15	19.4		16.4	16.87		16.3	18.6
Gd	mg kg ⁻¹	7.60			9.59	5.652	7.452	7.555			7.48
Ge	mg kg ⁻¹										
Hf	mg kg ⁻¹	6.69			10.3		8.785	8.246		7.9	7.87
Hg	mg kg ⁻¹				0.15						0.10
Ho	mg kg ⁻¹	1.42			1.07	0.9194	1.579	1.341			1.44
I	mg kg ⁻¹										
In	mg kg ⁻¹				1.02						
Ir	mg kg ⁻¹										
La	mg kg ⁻¹	57.7		58	58.6	50.23	53.871			47.3	53.3
Li	mg kg ⁻¹				35	33.97					30.8
Lu	mg kg ⁻¹	0.60			0.51	0.3666	0.668	0.598			0.61
Mo	mg kg ⁻¹				12			13.567		11.3	12.8
Nb	mg kg ⁻¹	37.5		36	40		35.429	35.245		32.9	36.6
Nd	mg kg ⁻¹	50.3			52	42.57	45.327	44.553		42.1	47.0
Ni	mg kg ⁻¹	31		34	44	44.28	43.4		36	31	39.3
Pb	mg kg ⁻¹	1346		993	999	894.6	1006.8	929.208	1010	925	961
Pd	mg kg ⁻¹										
Pr	mg kg ⁻¹	13.7			13.3	11.65	12.498	12.233			12.9
Pt	mg kg ⁻¹										
Rb	mg kg ⁻¹	151		150	154		142.785	135.66		142	149
Re	mg kg ⁻¹										
Rh	mg kg ⁻¹										
Ru	mg kg ⁻¹										
S	mg kg ⁻¹		1033			1435				1210	
Sb	mg kg ⁻¹									8.4	3.58
Sc	mg kg ⁻¹	8.77		8.2	9	7.534	8.105			7	9.12
Se	mg kg ⁻¹									0.6	
Sm	mg kg ⁻¹	9.21			9.3	7.161	8.699	8.387		7.5	8.59
Sn	mg kg ⁻¹									5	2.73
Sr	mg kg ⁻¹	161		156	165	158	152.2	154.659	146	150	154
Ta	mg kg ⁻¹	2.04					2.104	2.015			1.83
Tb	mg kg ⁻¹	1.16			1.23	0.8013	1.246				1.15
Te	mg kg ⁻¹									4.2	
Th	mg kg ⁻¹	18.2		20	14.9	15.96	17.823	18.286		14.3	16.6
Tl	mg kg ⁻¹				2.35			1.726		1.9	4.75
Tm	mg kg ⁻¹	0.62			0.45	0.392	0.682	0.611			0.65
U	mg kg ⁻¹	4.44		4.7	3.4	3.196	4.408	4.21		4.1	4.21
V	mg kg ⁻¹	69		72	69		69.0	70.255		55	64.3
W	mg kg ⁻¹				18			9.271		7.7	10.4
Y	mg kg ⁻¹	39.1		44	32	26.41	40.554		43	37.5	39.9
Yb	mg kg ⁻¹	3.83			2.9	2.485	4.226	3.929		2.9	4.05
Zn	mg kg ⁻¹	896		921	1008	943.3	994.3	912.84	1010	915.2	892
Zr	mg kg ⁻¹	363		363	335	153.1	363.1	353.1		325.1	321

*submitted late *submitted late

Table 2 GeoPT31 Assigned values and statistical summary of contributed data for the modified river sediment, SdAR-1

	Assigned value	Uncertainty of assigned value	Horwitz Target value	Uncertainty /Target	Number of reported results	Median of results	Robust mean of results	Status of consensus value	Type of consensus value
	X_a	s_{dm}	H_a	s_{dm}/H_a	n				
	% m/m	% m/m	% m/m			% m/m	% m/m		
SiO ₂	71.94	0.076	0.7559	0.1005	72	71.935	71.8871	assigned	median
TiO ₂	0.628	0.002	0.0135	0.1477	80	0.628	0.6251	assigned	median
Al ₂ O ₃	11.80	0.0188	0.1627	0.1155	78	11.7958	11.8086	assigned	median
Fe ₂ O ₃ T	4.629	0.0131	0.0735	0.1786	79	4.628	4.6291	assigned	robust mean
MnO	0.698	0.003	0.0147	0.2025	80	0.6965	0.6975	assigned	robust mean
MgO	0.807	0.0067	0.0167	0.4027	76	0.8088	0.8067	assigned	robust mean
CaO	0.799	0.0032	0.0165	0.1964	78	0.7995	0.7988	assigned	robust mean
Na ₂ O	1.610	0.0068	0.03	0.2272	74	1.6095	1.599	assigned	median
K ₂ O	3.633	0.0098	0.0598	0.1645	77	3.63	3.6325	assigned	robust mean
P ₂ O ₅	0.16	0.001	0.004	0.233	73	0.16	0.161	assigned	median
LOI	2.62	0.0235	0.0453	0.5195	67	2.62	2.6469	provisional	median
	mg kg⁻¹	mg kg⁻¹	mg kg⁻¹			mg kg⁻¹	mg kg⁻¹		
Ag	3.6	0.1649	0.2375	0.6943	25	3.6	3.639	provisional	median
As	36.43	1.3983	1.6963	0.8244	44	36.7	36.4337	provisional	robust mean
Ba	794.3	4.435	23.255	0.191	73	792	794.263	assigned	robust mean
Be	2.518	0.0528	0.1753	0.3011	33	2.5	2.5183	assigned	robust mean
Bi	1.77	0.089	0.1299	0.6851	25	1.77	1.8674	provisional	median
Cd	5.27	0.1007	0.3282	0.3067	37	5.27	5.4074	assigned	median
Ce	110.9	1.424	4.365	0.326	64	110.67	110.855	assigned	robust mean
Co	10.71	0.2297	0.5997	0.383	61	10.7	10.7147	assigned	robust mean
Cr	92.67	0.9398	3.7491	0.2507	68	92.75	92.6738	assigned	robust mean
Cs	4.762	0.0818	0.3012	0.2717	43	4.76	4.7621	assigned	robust mean
Cu	302	3.894	10.227	0.381	71	302	299.627	provisional	median
Dy	7.315	0.1392	0.4337	0.321	47	7	6.7233	provisional	mode
Er	4.326	0.1139	0.2776	0.4105	44	4.105	3.9214	provisional	mode
Eu	1.338	0.016	0.1024	0.1567	48	1.338	1.3232	assigned	median
Ga	17.17	0.2603	0.8954	0.2907	53	17.29	17.1729	assigned	robust mean
Gd	7.5	0.1105	0.443	0.2495	45	7.5	7.3878	assigned	median
Ge	1.429	0.1065	0.1083	0.9826	15	1.4	1.4293	provisional	robust mean
Ho	1.480	0.0325	0.1116	0.2915	45	1.39	1.3202	provisional	mode
In	1	0.0268	0.08	0.3353	11	1	0.9666	provisional	median
La	58.25	0.4887	2.5269	0.1934	63	57	55.7176	provisional	mode
Li	29.14	0.499	1.4032	0.3556	33	29.19	29.1433	assigned	robust mean
Lu	0.669	0.0102	0.0569	0.179	46	0.64	0.598	provisional	mode
Mo	12.6	0.3	0.7	0.4	48	12.4	12.6	assigned	robust mean
Nb	34.7	0.4517	1.6275	0.2775	57	34.7	35.0251	assigned	median
Nd	46.08	0.6057	2.0709	0.2925	60	46.2	46.0804	assigned	robust mean
Ni	40.80	0.7547	1.8677	0.4041	69	39.8	38.9043	provisional	mode
Pb	979.3	8.217	27.783	0.296	65	987.6	979.27	assigned	robust mean
Pr	12.55	0.1658	0.686	0.2416	45	12.55	12.5338	assigned	median
Rb	142.8	1.081	5.413	0.2	63	142.785	141.402	assigned	median
Sb	6.667	0.2091	0.4008	0.5217	31	6.62	6.6669	assigned	robust mean
Sc	8.2	0.0913	0.4778	0.191	45	8.2	8.2158	assigned	median
Sm	8.525	0.1447	0.4939	0.2929	50	8.525	8.3321	assigned	median
Sn	2.939	0.058	0.2	0.292	30	3.05	3.301	provisional	mode
Sr	151.5	0.781	5.692	0.137	73	151.5	151.944	assigned	median
Ta	2.202	0.053	0.1564	0.3388	34	2.2007	2.2022	assigned	robust mean
Tb	1.213	0.012	0.0942	0.127	44	1.185	1.1263	provisional	mode
Th	17.97	0.3534	0.9305	0.3798	57	17.8227	17.9681	assigned	robust mean
Tl	2.435	0.0749	0.1703	0.4398	31	2.4	2.4349	assigned	robust mean
Tm	0.662	0.0132	0.0563	0.2335	39	0.62	0.5903	provisional	mode
U	4.277	0.0947	0.2749	0.3444	56	4.37	4.2772	assigned	robust mean
V	68.27	0.7505	2.892	0.2595	64	68.1	68.2742	assigned	robust mean
W	10.29	0.48	0.58	0.829	32	10.255	10.293	provisional	robust mean
Y	40.90	0.6977	1.8713	0.3728	65	39	37.7544	provisional	mode
Yb	4.28	0.1	0.275	0.3636	51	4.16	3.87	provisional	mode
Zn	932.1	7.58	26.641	0.285	71	932.081	923.911	assigned	median
Zr	352.8	6.826	11.672	0.585	66	341.5	334.831	provisional	mode

Table 3 GeoPT31 Z-scores for contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F01	F02	F03	F04	F05	F06	F07	F08	F08	F09	F10
Quality	2	1	1	2	2	2	2	1	2	1	2
SiO ₂	1.52	0.95	1.41	0.30	0.49	-0.07	-0.29	-1.38	*	0.22	-3.93
TiO ₂	1.28	0.89	-2.08	-0.22	-0.30	0.33	0.45	-1.34	*	-0.59	-1.97
Al ₂ O ₃	0.71	-1.14	0.52	0.11	0.04	0.07	0.26	-0.83	*	0.03	7.39
Fe ₂ O ₃ T	2.44	0.56	0.44	-0.27	-0.40	1.50	0.14	0.28	*	-0.80	-2.58
MnO	1.99	-0.58	-1.19	-0.25	-0.25	1.33	-0.49	1.53	*	2.21	-0.46
MgO	-0.71	1.40	-5.20	-0.50	0.70	-2.04	0.40	15.20	*	-1.00	16.30
CaO	-1.13	-0.53	-1.14	0.04	0.34	-1.09	0.64	-2.35	*	-1.14	-0.57
Na ₂ O	-1.91	-2.32	3.02	-1.16	0.18	-0.78	0.51	-2.32	*	1.69	*
K ₂ O	1.08	-0.54	-2.21	0.23	-0.27	-0.92	0.40	-0.21	*	0.13	0.98
P ₂ O ₅	0.20	-0.08	-2.45	0.32	-0.40	0.00	1.14	-2.45	*	-2.45	172.81
LOI	-1.10	-2.21	-7.94	-3.42	0.22	2.59	0.44	-4.85	*	-5.30	*
Ag	*	*	*	6.53	*	*	*	*	*	*	*
As	*	*	*	0.46	*	*	-0.33	*	*	*	*
Ba	*	0.12	*	-0.20	*	-0.31	0.22	-1.09	*	*	0.58
Be	*	*	*	*	*	*	*	*	*	*	*
Bi	*	*	*	0.89	*	*	*	*	4.73	*	*
Cd	*	*	*	-4.52	*	*	*	*	10.25	*	2.18
Ce	*	4.84	*	-0.21	*	*	-2.66	-6.38	*	*	0.13
Co	*	*	*	0.24	*	32.75	0.90	-1.19	*	*	*
Cr	*	-3.73	*	0.71	*	-1.02	0.59	-0.45	*	*	*
Cs	*	*	*	-4.59	*	*	*	7.43	*	*	*
Cu	*	-1.56	*	0.34	*	-6.21	-1.36	-2.05	*	*	-0.34
Dy	*	*	*	*	*	*	*	*	-6.13	*	*
Er	*	*	*	*	*	*	*	*	-4.19	*	*
Eu	*	*	*	*	*	*	*	*	3.23	*	*
Ga	*	3.83	*	0.46	*	*	-1.38	-0.19	*	*	*
Gd	*	*	*	*	*	*	*	*	-0.56	*	*
Ge	*	*	*	16.48	*	*	*	*	*	*	*
Ho	*	*	*	*	*	*	*	*	-2.15	*	*
In	*	*	*	-1.25	*	*	*	*	*	*	*
La	*	9.40	*	0.55	*	*	1.28	-4.45	*	*	-1.33
Li	*	*	*	*	*	2.44	*	*	*	*	*
Lu	*	*	*	*	*	*	*	*	*	*	*
Mo	*	*	*	-3.30	*	*	*	6.40	*	*	-0.70
Nb	*	7.25	*	-0.83	*	*	0.37	0.18	*	*	-1.17
Nd	*	1.60	*	-0.50	*	*	-1.76	-0.52	*	*	0.78
Ni	*	-2.09	*	-2.89	*	0.05	-0.03	5.99	*	*	-3.78
Pb	*	2.51	*	1.18	*	-3.03	-0.31	0.42	*	*	0.73
Pr	*	*	*	-0.40	*	*	*	*	-1.86	*	*
Rb	*	0.59	*	0.21	*	*	0.31	0.78	*	*	-0.07
Sb	*	*	*	2.91	*	*	*	*	16.63	*	*
Sc	*	*	*	10.25	*	*	*	-2.51	*	*	*
Sm	*	*	*	-1.54	*	*	*	*	-5.59	*	*
Sn	*	*	*	105.21	*	225.28	*	0.30	*	*	*
Sr	*	-0.26	*	-0.13	*	*	0.00	0.44	*	*	-0.40
Ta	*	*	*	*	*	*	*	*	*	*	*
Tb	*	*	*	*	*	*	*	*	-1.13	*	*
Th	*	*	*	-2.67	*	*	-1.17	8.63	*	*	1.95
Tl	*	*	*	-4.51	*	*	*	*	*	*	*
Tm	*	*	*	*	*	*	*	*	*	*	*
U	*	*	*	1.31	*	*	4.41	2.63	*	*	*
V	*	1.18	*	0.13	*	*	0.38	-1.48	*	*	25.02
W	*	*	*	7.51	*	*	*	*	*	*	*
Y	*	2.25	*	-1.04	*	0.29	-1.98	*	*	*	0.05
Yb	*	*	*	*	*	*	*	*	-2.33	*	*
Zn	*	-0.08	*	0.90	*	-2.12	0.52	-1.62	*	*	-1.00
Zr	*	1.22	*	-0.55	*	*	0.38	-2.98	*	*	0.39

Table 3 GeoPT31 Z-scores for contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F11	F12	F12	F13	F14	F15	F16	F17	F17	F18	F19
Quality	1	1	2	1	2	2	1	1	2	2	2
SiO ₂	*	0.97	*	-0.01	-1.09	-0.10	*	-3.62	*	-0.43	0.34
TiO ₂	*	0.97	*	0.15	-1.41	0.07	-0.57	0.15	*	0.07	0.07
Al ₂ O ₃	*	-0.34	*	1.38	3.12	0.26	*	-0.59	*	0.26	-0.66
Fe ₂ O ₃ T	*	2.09	*	-1.21	1.37	-0.20	*	-1.48	*	-0.06	-0.40
MnO	*	1.26	*	-0.51	-12.14	0.09	*	0.85	*	-0.25	0.09
MgO	*	-7.73	*	2.60	3.10	-0.50	*	-1.60	*	-1.10	0.10
CaO	*	-0.65	*	0.68	-2.38	0.64	*	0.08	*	-0.27	0.04
Na ₂ O	*	-2.42	*	0.68	5.68	*	*	0.68	*	1.84	0.18
K ₂ O	*	-0.19	*	-0.88	2.24	-0.02	*	-0.54	*	1.15	-0.02
P ₂ O ₅	*	-4.81	*	-0.08	1.14	1.14	*	-0.08	*	-0.04	1.14
LOI	*	1.54	*	-1.10	1.21	-0.77	*	*	4.56	1.43	1.99
Ag	*	-3.33	*	-0.04	*	*	*	-7.58	*	*	*
As	*	*	-0.57	-2.08	*	*	*	-3.75	*	*	*
Ba	-0.44	*	0.66	10.22	*	*	0.70	-0.14	*	*	0.04
Be	*	-2.61	*	-0.68	*	*	*	*	*	*	1.03
Bi	*	*	8.58	-3.00	*	*	*	4.77	*	*	*
Cd	*	-1.86	*	2.47	*	*	*	*	*	*	*
Ce	0.03	*	-0.44	-1.57	*	*	1.21	-1.92	*	*	0.82
Co	-1.23	*	1.74	0.64	*	*	-0.28	-4.44	*	*	0.15
Cr	0.03	*	-0.36	-0.45	*	*	-11.04	2.24	*	*	0.44
Cs	-2.60	*	*	5.77	*	*	0.48	9.76	*	*	-0.10
Cu	0.49	*	3.57	7.33	*	*	1.81	-7.83	*	*	1.03
Dy	-1.37	0.40	*	-3.65	*	*	-3.63	*	*	*	-0.13
Er	-0.20	0.81	*	-4.42	*	*	-3.33	*	*	*	0.06
Eu	-0.08	-0.08	*	-1.15	*	*	2.50	*	*	*	0.06
Ga	0.03	*	-0.38	0.81	*	*	*	0.14	*	*	0.41
Gd	2.39	1.51	*	-1.69	*	*	-3.63	*	*	*	0.90
Ge	*	*	*	-12.27	*	*	*	*	*	*	0.05
Ho	-0.18	0.18	*	-4.21	*	*	-2.99	*	*	*	-0.05
In	*	*	*	1.63	*	*	*	*	*	*	*
La	-1.68	*	0.49	-3.10	*	*	-0.16	-3.99	*	*	-0.01
Li	*	-5.09	*	-5.80	*	*	*	*	*	*	1.27
Lu	-0.34	0.72	*	-4.38	*	*	-2.76	*	*	*	-0.26
Mo	7.00	*	-0.80	2.10	*	*	*	-1.70	*	*	*
Nb	1.72	*	0.00	-1.97	*	*	1.00	-0.98	*	*	1.26
Nd	-0.76	0.30	*	-2.89	*	*	-0.70	-2.26	*	*	0.66
Ni	0.27	-4.29	*	0.37	*	*	6.62	-4.77	*	*	0.83
Pb	*	*	0.41	-1.27	*	*	0.30	-0.63	*	*	-0.02
Pr	-0.36	0.22	*	-1.82	*	*	0.33	*	*	*	0.40
Rb	-1.81	*	-0.26	-3.10	*	*	0.61	-0.53	*	*	-0.26
Sb	*	*	0.91	-5.43	*	*	*	0.63	*	*	*
Sc	*	*	-0.31	-0.63	*	*	-0.60	-0.50	*	*	0.81
Sm	-0.56	0.76	*	-2.48	*	*	0.11	-7.79	*	*	0.44
Sn	*	*	0.40	-0.70	*	*	-0.34	12.11	*	*	*
Sr	-0.44	*	-0.40	7.99	*	*	2.94	0.43	*	*	0.22
Ta	1.65	*	11.18	4.65	*	*	0.00	*	*	*	0.22
Tb	0.08	0.29	*	-2.58	*	*	-1.87	*	*	*	-0.17
Th	-0.29	*	0.34	-3.08	*	*	-1.80	-4.74	*	*	0.07
Tl	*	-0.50	*	*	*	*	*	0.09	*	*	*
Tm	-0.74	-0.03	*	-3.58	*	*	-2.56	*	*	*	-0.02
U	0.26	1.57	*	0.92	*	*	-1.59	-6.97	*	*	0.13
V	-2.03	*	1.23	3.36	*	*	-0.74	0.21	*	*	-0.25
W	*	*	*	0.53	*	*	-1.97	-10.13	*	*	*
Y	-1.92	*	0.11	-7.69	*	*	-6.91	-1.40	*	*	0.54
Yb	-0.18	0.40	*	-4.29	*	*	-2.89	-2.18	*	*	0.04
Zn	*	*	-0.15	2.10	*	*	-5.62	-4.57	*	*	0.09
Zr	-1.61	*	-0.42	*	*	*	-18.89	-2.05	*	*	-0.16

Table 3 GeoPT31 Z-scores for contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F20	F21	F22	F23	F24	F25	F26	F27	F28	F29	F30
Quality	2	1	2	2	1	2	2	1	1	2	1
SiO ₂	*	-0.28	0.04	0.67	0.95	-0.55	0.15	-0.21	*	-0.40	0.02
TiO ₂	*	-0.89	-0.30	0.52	0.89	0.82	0.82	5.35	-6.85	-0.67	0.45
Al ₂ O ₃	*	-0.15	0.54	-0.20	0.83	-0.60	-0.42	-0.65	0.57	-0.94	0.15
Fe ₂ O ₃ T	*	-0.94	-0.06	-0.16	2.05	0.28	-0.74	1.37	-6.18	0.21	0.28
MnO	*	-0.85	-0.08	0.97	0.85	0.76	-1.61	0.10	-3.62	0.42	0.17
MgO	*	-0.76	-0.50	0.52	2.00	-0.50	6.10	5.60	-2.12	-0.80	0.20
CaO	*	-0.77	-0.57	0.79	1.89	0.34	0.04	10.36	-0.98	-0.57	3.10
Na ₂ O	*	-0.25	-1.83	-0.44	0.68	-0.16	0.51	-0.98	-3.63	-1.99	3.02
K ₂ O	*	0.14	-0.02	-0.34	-0.71	-0.36	-0.94	0.13	-1.52	0.15	-0.21
P ₂ O ₅	*	1.34	-0.16	0.67	2.29	-0.04	1.14	-1.26	-8.86	-0.04	-1.97
LOI	*	7.74	-0.33	0.22	-1.32	6.84	-3.20	5.30	24.60	*	1.99
Ag	-3.45	-3.28	*	*	2.11	-1.10	-0.21	5.10	5.59	*	*
As	-3.62	-4.80	-1.60	*	*	1.94	-6.91	*	-2.60	*	*
Ba	0.04	0.81	-0.57	-0.69	-0.61	0.55	0.98	-1.09	1.61	0.12	-2.33
Be	0.80	0.47	*	-0.05	*	-0.34	0.23	2.80	0.04	*	-0.16
Bi	-1.16	6.77	*	*	*	0.08	*	*	-2.15	*	*
Cd	-0.90	-1.01	*	*	0.40	-0.05	0.20	-1.10	-1.26	*	*
Ce	-1.91	1.41	-0.79	-0.11	*	0.13	-0.10	0.95	-1.09	-2.39	0.49
Co	-0.76	0.64	*	-0.06	*	0.24	0.49	-0.02	-0.67	*	-1.19
Cr	-0.07	0.89	0.18	0.00	*	-3.29	0.18	-1.91	-0.25	2.31	-1.49
Cs	-1.09	0.66	*	-0.52	*	0.56	1.56	*	-0.29	*	-1.14
Cu	0.77	-1.86	0.68	-0.01	0.00	1.47	-0.59	-2.82	-3.30	-1.56	1.37
Dy	-1.40	1.81	*	0.48	*	-0.37	-1.98	0.75	0.65	*	0.33
Er	-1.09	2.28	*	0.78	*	-0.14	-1.67	-0.20	-2.25	*	0.34
Eu	-0.78	0.90	*	-0.53	*	0.16	0.79	0.61	1.68	*	-0.27
Ga	2.12	0.25	0.46	0.92	5.39	1.58	-1.21	1.26	-5.04	*	-0.53
Gd	-0.99	1.40	*	-0.34	*	0.23	0.00	-2.42	4.50	*	0.25
Ge	*	0.38	*	*	*	2.63	-0.14	*	-0.95	*	-0.27
Ho	-1.33	0.63	*	0.27	*	-0.09	-1.26	0.54	-2.40	*	0.09
In	-1.06	*	*	*	*	0.75	*	*	*	*	*
La	-2.73	-0.41	1.93	-1.41	*	-0.25	-1.24	0.22	-3.12	0.35	-1.56
Li	-0.82	*	*	*	*	0.31	0.31	-0.89	0.29	*	-1.24
Lu	-0.87	0.54	*	0.27	*	0.01	-2.02	0.54	-3.82	*	-0.51
Mo	-0.20	0.60	-2.60	-0.20	*	2.50	0.30	1.80	0.80	*	-1.40
Nb	0.28	3.38	-0.83	0.14	-0.43	1.01	-0.22	-0.49	-5.51	*	2.77
Nd	-1.74	1.78	1.43	-0.12	*	0.20	-0.02	1.46	1.19	*	-0.04
Ni	0.39	-0.43	-0.22	0.13	-6.32	-0.16	0.59	-4.29	0.53	*	-0.16
Pb	1.36	0.23	1.67	-0.47	-1.16	0.73	-0.53	1.36	-2.95	*	3.23
Pr	-1.56	1.20	*	-0.11	*	0.40	-0.18	1.43	1.62	*	-0.22
Rb	-0.78	0.32	0.21	-0.65	0.04	0.76	0.67	-1.48	-1.05	*	-1.25
Sb	3.92	-0.42	*	*	*	0.79	-0.21	*	-0.79	*	*
Sc	*	-2.51	*	-0.21	1.67	-0.10	*	*	-0.80	*	0.80
Sm	-1.40	2.35	*	0.03	*	0.18	-0.33	1.35	1.92	*	0.56
Sn	-1.21	-0.70	*	1.35	*	2.65	-1.60	*	5.68	*	1.65
Sr	-1.89	0.67	-1.10	0.41	-1.67	0.57	-0.13	-0.18	-2.31	*	-0.97
Ta	0.09	-0.14	*	-0.68	*	-0.01	*	*	0.76	*	-0.27
Tb	-1.37	0.59	*	-0.17	*	-0.12	-1.13	1.46	0.94	*	0.08
Th	-0.93	1.35	3.24	-1.00	1.11	0.12	0.55	4.01	2.21	*	-0.50
Tl	1.53	*	*	-0.87	*	0.78	1.95	*	-1.61	*	0.79
Tm	-0.79	*	*	0.43	*	0.43	-1.88	0.32	-2.96	*	-0.03
U	-0.14	0.26	*	-0.32	13.54	1.06	-1.05	1.90	-0.18	*	0.41
V	-1.06	0.94	-0.39	-1.66	*	-0.74	-0.57	-3.28	2.10	*	-2.72
W	-3.02	-1.37	*	-0.16	*	0.61	*	*	1.41	*	*
Y	-2.25	2.03	-2.64	-0.16	-3.69	0.24	-1.84	0.46	-7.47	-0.24	1.34
Yb	-1.16	1.19	*	0.64	*	0.04	-1.96	1.02	-4.56	*	-0.11
Zn	-0.68	1.87	0.15	0.79	-3.91	0.75	0.52	-3.01	-1.69	0.52	-2.48
Zr	-3.12	2.01	-0.63	0.18	-2.90	0.27	-0.98	1.67	-19.44	*	-0.84

Table 3 GeoPT31 Z-scores for contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F31	F32	F33	F34	F36	F37	F38	F38	F39	F40	F41
Quality	2	2	2	2	1	1	1	2	1	2	2
SiO ₂	-0.05	0.29	0.01	0.25	*	-7.85	-0.76	*	*	0.25	0.24
TiO ₂	-0.37	0.82	0.32	-0.15	*	-4.23	0.30	*	*	0.41	0.45
Al ₂ O ₃	-0.12	0.29	-0.01	1.70	*	-0.59	-0.40	*	*	-0.11	0.32
Fe ₂ O ₃ T	-0.13	0.55	0.14	0.90	*	-2.71	-0.12	*	*	0.01	0.28
MnO	0.59	0.42	1.24	-0.15	*	-2.34	1.46	*	-1.39	0.63	-0.59
MgO	-1.19	0.70	0.02	-5.96	*	12.80	0.74	*	*	-0.17	0.10
CaO	-0.23	0.04	-0.14	0.01	*	-1.74	-0.53	*	0.68	0.88	-0.27
Na ₂ O	0.38	0.01	-0.58	0.21	*	-31.02	-1.65	*	*	-0.33	-3.16
K ₂ O	0.78	-0.10	-1.08	-0.20	*	-0.38	-0.21	*	*	0.90	0.15
P ₂ O ₅	-0.28	1.14	1.12	0.32	*	-2.21	1.11	*	2.29	-0.04	-0.04
LOI	-2.08	2.21	1.46	-1.77	*	*	0.00	*	*	*	-1.65
Ag	0.84	*	*	*	*	-4.63	*	*	-3.24	*	*
As	-1.07	-1.60	4.00	*	*	0.92	-6.74	*	*	*	*
Ba	-0.28	-0.82	0.20	2.21	-0.98	2.67	-1.39	*	*	*	-0.31
Be	*	0.38	*	*	*	*	3.43	*	1.95	*	*
Bi	*	*	*	*	*	*	*	*	*	*	*
Cd	-0.87	*	*	*	*	22.03	*	*	-7.28	*	*
Ce	-0.21	0.83	1.99	-5.51	-0.08	3.81	1.43	*	2.10	*	*
Co	1.99	0.17	-0.60	-8.10	-1.14	*	0.73	*	15.48	*	*
Cr	-1.14	-0.32	-0.06	3.11	-0.03	-2.42	0.92	*	0.89	*	*
Cs	-1.60	0.56	*	*	-0.70	48.94	1.16	*	*	*	*
Cu	0.17	-1.74	1.08	-2.35	-1.83	0.76	1.37	*	7.92	*	-4.50
Dy	*	0.21	*	-4.83	-1.35	*	-0.24	*	*	*	*
Er	*	0.31	*	-4.82	-2.36	*	0.09	*	*	*	*
Eu	*	0.16	*	-2.31	-1.08	*	-0.27	*	*	*	*
Ga	-0.99	-0.49	0.32	*	0.13	-3.10	0.48	*	*	*	*
Gd	*	0.90	*	-4.37	0.50	*	0.93	*	*	*	*
Ge	*	*	*	*	*	*	*	*	*	*	*
Ho	*	0.54	*	-3.67	-1.91	*	0.36	*	*	*	*
In	-2.50	*	*	*	*	*	*	*	*	*	*
La	-0.44	-0.23	1.34	-5.62	-2.38	2.99	-0.53	*	0.18	*	*
Li	*	*	*	*	*	*	-0.39	*	*	*	*
Lu	*	0.27	*	-3.76	-2.13	*	-0.27	*	*	*	*
Mo	-0.20	-1.40	-1.30	*	*	-8.60	*	-0.70	-3.20	*	*
Nb	-0.28	1.60	1.47	*	2.40	-2.15	-1.04	*	*	*	*
Nd	0.10	0.73	-2.68	-5.04	0.40	-10.61	0.50	*	-0.52	*	*
Ni	-2.28	-1.29	-0.35	-8.25	0.43	-4.50	-4.98	*	2.78	*	*
Pb	0.33	1.33	0.41	-1.91	-1.40	-1.88	-3.36	*	2.55	*	*
Pr	*	0.47	*	39.56	0.42	*	0.00	*	*	*	*
Rb	-0.28	0.21	-0.81	30.23	0.67	-1.16	0.19	*	*	*	-0.26
Sb	-0.96	*	*	*	*	7.32	-0.52	*	*	*	*
Sc	0.31	0.00	*	*	1.53	*	0.21	*	-0.73	*	*
Sm	-1.75	0.55	*	-3.95	0.09	*	0.68	*	*	*	*
Sn	0.40	*	*	*	*	9.81	*	16.91	*	*	*
Sr	-0.26	-0.21	-0.33	13.13	-0.05	-2.23	0.91	*	8.87	*	-0.13
Ta	*	0.31	*	*	-3.52	*	-0.53	*	*	*	*
Tb	*	*	*	-3.54	-0.45	*	-0.24	*	*	*	*
Th	-0.09	0.66	*	-7.51	-0.47	7.34	-0.45	*	*	*	*
Tl	1.07	*	*	*	*	6.25	-0.32	*	*	*	*
Tm	*	*	*	-3.82	-1.65	*	0.04	*	*	*	*
U	-4.14	0.41	*	*	-0.46	-1.37	-0.24	*	*	*	*
V	-0.84	-0.01	-0.91	2.72	0.91	0.56	0.22	*	-0.37	*	*
W	0.78	*	-0.47	*	*	*	-7.23	*	*	*	*
Y	0.24	1.20	1.63	-1.04	-2.78	-2.46	0.10	*	0.59	*	*
Yb	-2.33	0.58	*	-4.88	-2.62	15.34	0.58	*	-0.04	*	*
Zn	0.39	0.81	0.68	25.07	-8.42	-1.35	-2.07	*	5.48	*	0.15
Zr	0.59	2.50	1.34	-5.82	-15.96	-2.08	-3.58	*	2.42	*	1.59

Table 3 GeoPT31 Z-scores for contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F42	F43	F44	F45	F46	F47	F48	F49	F50	F51	F51
Quality	2	1	2	1	1	2	1	2	2	1	2
SiO ₂	*	-1.34	-0.06	*	0.96	-1.09	*	0.07	0.29	0.09	*
TiO ₂	*	-1.34	-0.30	-5.79	-0.74	-1.19	-1.34	-0.30	2.38	1.86	*
Al ₂ O ₃	*	-3.29	-0.54	-0.77	-0.40	-0.21	62.59	-0.20	0.44	0.46	*
Fe ₂ O ₃ T	*	1.24	-0.06	-4.07	-1.13	0.02	56.06	-0.51	-0.11	1.17	*
MnO	*	0.85	0.42	-0.51	-0.58	7.32	-7.30	-0.97	11.02	*	-0.73
MgO	*	-0.40	-2.30	-15.41	-1.54	-3.80	*	0.19	-3.14	*	1.54
CaO	*	0.68	0.34	-7.19	-0.71	8.09	*	-0.30	0.58	*	1.79
Na ₂ O	*	0.35	0.34	-3.65	-1.02	-4.16	*	0.93	-1.11	3.05	*
K ₂ O	*	0.79	-0.19	-0.54	-1.16	-1.36	*	1.02	0.86	-5.36	*
P ₂ O ₅	*	-0.08	-0.04	*	0.16	-5.72	*	-0.63	-0.87	*	0.43
LOI	*	9.05	1.65	*	-1.10	5.15	0.00	0.44	-2.54	*	3.64
Ag	*	*	*	*	*	*	3.33	*	*	*	1.05
As	*	*	1.05	-0.96	*	*	0.92	*	-6.49	*	3.41
Ba	*	-27.60	*	-2.03	*	*	-3.24	*	0.08	*	1.09
Be	*	-9.80	*	*	*	*	-1.02	*	0.38	*	0.80
Bi	*	1.00	*	*	*	*	0.77	*	*	*	3.31
Cd	-0.72	0.30	*	*	*	*	-0.34	*	*	*	2.19
Ce	0.82	-4.66	*	-2.69	*	*	0.95	*	-0.12	1.98	*
Co	*	-1.48	3.57	-2.69	*	*	-2.86	*	17.26	*	-0.60
Cr	*	-2.85	-0.36	-2.58	*	*	*	-4.49	-0.09	*	1.78
Cs	0.40	-9.17	*	-2.20	*	*	-1.17	*	-0.47	*	0.40
Cu	*	2.18	-1.56	8.02	*	*	-2.54	*	-4.55	*	1.27
Dy	0.74	-9.05	*	-0.27	*	*	-6.08	*	-0.31	*	0.42
Er	1.09	-9.79	*	*	*	*	-6.36	*	-0.39	*	1.09
Eu	0.21	-6.03	*	-2.32	*	*	-2.91	*	0.04	0.80	*
Ga	-0.17	-14.44	*	*	*	*	*	*	0.57	0.18	*
Gd	0.19	-4.70	*	*	*	*	-3.57	*	-0.45	2.73	*
Ge	0.14	*	*	*	*	*	*	*	-0.74	*	-1.98
Ho	0.67	-7.89	*	-2.51	*	*	-5.20	*	-0.10	1.79	*
In	*	0.45	*	-0.13	*	*	*	*	*	*	*
La	0.17	-6.62	*	-2.47	*	*	-3.07	*	-1.00	*	0.35
Li	*	-13.20	*	*	*	*	-2.67	*	*	0.61	*
Lu	0.62	-8.66	*	-0.51	*	*	-5.44	*	0.24	1.42	*
Mo	*	*	*	-5.90	*	*	-3.20	2.50	-0.40	59877.10	*
Nb	-0.77	-19.94	*	*	*	*	*	*	0.74	*	0.83
Nd	0.70	-5.30	*	-1.83	*	*	-0.09	*	-0.08	1.89	*
Ni	*	-0.54	2.46	16.86	*	*	-3.48	-1.29	-0.40	*	-1.02
Pb	*	*	0.37	*	*	*	1.11	-0.67	-7.86	*	-2.15
Pr	0.55	-4.23	*	*	*	*	0.22	*	-0.28	0.16	*
Rb	-1.37	-23.53	*	-3.66	*	*	-3.10	*	0.74	0.41	*
Sb	-0.66	-6.23	*	-0.92	*	*	*	*	-3.41	*	-2.55
Sc	0.21	-12.28	*	-0.63	*	*	*	*	*	*	-1.58
Sm	0.39	-4.87	*	-1.87	*	*	-1.59	*	-0.06	2.03	*
Sn	0.40	-7.25	*	*	*	*	*	*	1.57	*	3.40
Sr	*	-22.38	2.50	12.56	*	*	-6.76	*	-0.08	*	2.06
Ta	0.86	-14.02	*	-0.01	*	*	*	*	1.92	*	0.86
Tb	0.52	-5.87	*	-2.15	*	*	-4.06	*	0.01	1.03	*
Th	0.75	-7.96	*	-1.58	*	*	1.75	*	0.81	2.88	*
Tl	-0.40	-9.23	*	*	*	*	-0.50	*	*	*	-0.98
Tm	0.69	-7.90	*	*	*	*	-5.54	*	-0.21	1.56	*
U	1.02	-9.16	*	-1.01	*	*	0.85	*	1.00	2.27	*
V	*	-15.65	*	1.98	*	*	-2.45	*	0.64	*	1.16
W	-2.80	-11.89	*	2.26	*	*	3.64	*	240.41	*	0.61
Y	-0.32	-13.50	*	*	*	*	-10.26	*	-0.08	*	-0.04
Yb	1.09	-10.58	*	-0.29	*	*	-6.91	*	0.04	2.44	*
Zn	*	*	-2.10	-8.97	*	*	-2.67	-0.25	-2.22	*	-0.41
Zr	0.27	-30.07	*	-23.37	*	*	*	0.87	0.93	*	1.47

Table 3 GeoPT31 Z-scores for contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F52	F53	F54	F55	F56	F57	F58	F59	F60	F60	F61
Quality	2	1	2	2	1	1	1	1	1	2	2
SiO ₂	0.59	0.09	-0.04	-2.18	-0.46	-0.06	2.30	-3.62	*	9.87	0.32
TiO ₂	0.82	-0.97	0.41	-0.67	-0.15	-0.74	-1.04	-6.53	-1.63	*	0.00
Al ₂ O ₃	0.01	-1.27	1.06	4.81	0.02	0.62	1.01	2.18	-2.35	*	0.50
Fe ₂ O ₃ T	0.48	0.80	-0.13	-2.65	6.49	-0.98	0.07	-6.38	0.26	*	-0.01
MnO	-0.25	-1.89	1.38	0.42	-0.24	0.17	-0.23	-3.90	-1.46	*	0.93
MgO	-1.70	0.74	2.50	6.10	-2.80	2.24	-0.61	6.20	-3.52	*	1.18
CaO	-0.57	0.01	-0.27	2.16	-0.41	-1.26	-1.41	-4.16	11.57	*	0.49
Na ₂ O	-3.83	0.62	-1.33	0.84	1.89	0.08	-9.62	-5.32	-0.35	*	0.34
K ₂ O	-1.19	0.71	0.15	3.41	1.09	0.23	-1.45	0.29	0.02	*	1.07
P ₂ O ₅	-0.04	1.27	2.21	7.06	-1.26	0.63	1.29	-19.02	*	*	0.32
LOI	0.33	-1.99	-1.54	14.12	-2.43	-1.79	*	13.46	*	*	-1.07
Ag	*	*	*	*	*	-2.34	*	*	2.61	*	0.00
As	-0.72	3.64	1.14	-4.84	10.18	1.40	-5.56	*	2.28	*	-0.36
Ba	-0.29	-0.03	-0.35	0.12	-0.02	-0.84	0.68	2.91	2.78	*	-0.32
Be	-1.48	-0.26	-0.05	*	*	-1.48	*	*	*	*	-0.68
Bi	2.04	*	0.12	*	*	-12.41	17.94	*	*	*	0.00
Cd	3.70	5.52	0.26	*	*	2.11	*	*	*	*	-0.26
Ce	-0.79	3.01	1.82	*	*	-0.25	-1.11	*	3.70	*	-0.50
Co	-1.43	-1.41	0.90	-2.26	-4.19	0.53	3.81	-7.86	0.31	*	0.21
Cr	0.71	0.99	0.58	1.64	-0.85	1.73	4.09	2.22	0.57	*	*
Cs	-0.60	0.47	0.20	*	*	0.24	10.09	*	0.99	*	*
Cu	-1.37	-1.12	2.59	-3.03	-4.38	2.16	-0.98	-4.01	*	-1.86	0.21
Dy	0.21	-0.10	-1.79	*	*	0.24	*	*	3.12	*	-0.05
Er	-0.05	0.94	-2.10	*	*	1.08	*	*	*	*	0.08
Eu	-0.67	0.52	-0.48	47.16	*	-0.16	*	*	-0.18	*	0.16
Ga	-0.66	-0.44	1.58	-0.66	0.70	-0.45	-1.31	3.16	-0.75	*	*
Gd	-0.34	0.89	0.14	*	*	-0.36	*	*	*	*	0.49
Ge	12.33	*	*	*	*	*	*	*	*	*	*
Ho	0.09	0.88	-1.70	*	*	0.14	*	*	*	*	-0.49
In	*	*	*	*	*	*	*	*	0.13	*	*
La	-1.39	0.71	0.23	*	*	-1.42	-0.49	*	-0.30	*	-1.96
Li	-0.41	0.08	0.91	*	*	0.44	*	*	*	*	0.66
Lu	0.18	0.05	-2.02	*	*	0.84	*	*	0.28	*	-0.17
Mo	-0.50	1.10	0.80	*	2.90	-2.10	-2.30	*	*	4.40	0.50
Nb	-0.52	-0.68	-0.34	-1.14	0.18	0.89	-1.04	1.41	*	*	*
Nd	-0.36	2.68	1.24	*	*	0.23	0.44	*	6.14	*	0.08
Ni	-1.82	-2.50	0.86	-3.43	-0.86	-1.27	-3.64	-5.79	*	7.41	0.99
Pb	-0.46	-1.89	0.18	-15.50	0.07	*	-1.63	3.12	*	*	-0.56
Pr	-0.84	1.98	0.91	*	*	0.03	*	*	*	*	0.16
Rb	-0.17	-2.73	1.10	-3.95	1.07	0.76	0.41	-1.99	0.41	*	*
Sb	-0.58	0.97	-0.57	*	*	-0.80	*	*	0.36	*	1.75
Sc	1.88	0.86	-0.52	*	0.00	0.24	0.84	3.77	1.09	*	*
Sm	-0.94	1.24	0.70	*	*	0.45	*	*	0.39	*	-0.12
Sn	-1.60	-0.81	-0.32	*	*	0.27	*	*	*	*	-0.35
Sr	-0.22	0.33	0.90	-5.75	0.79	1.08	-0.09	-2.20	2.90	*	0.32
Ta	-1.61	0.50	-2.50	*	*	1.25	*	*	0.05	*	*
Tb	-0.60	-0.07	-1.29	*	*	0.19	*	*	-0.24	*	0.04
Th	-1.06	-0.23	*	*	8.20	2.80	1.11	2.18	1.54	*	-0.27
Tl	0.48	*	0.69	*	*	0.99	17.99	*	*	*	0.37
Tm	0.07	0.23	-1.88	*	*	0.99	*	*	*	*	*
U	1.68	1.24	-1.76	*	4.81	0.93	-2.10	*	-1.08	*	0.44
V	-0.91	-2.96	-0.74	1.51	2.78	1.08	1.29	-0.44	0.87	*	-0.67
W	-0.51	*	1.47	*	*	-0.99	-7.75	*	0.18	*	*
Y	-0.77	-0.48	-3.23	-2.64	-1.50	0.86	-1.01	-3.69	*	*	-0.60
Yb	-1.05	0.08	-2.40	*	*	1.27	0.07	*	0.40	*	-0.22
Zn	-0.53	-2.68	1.78	-5.11	-2.71	0.00	1.01	-10.48	-0.68	*	0.56
Zr	-0.55	4.62	0.27	-2.52	-1.27	-0.31	-2.90	-3.58	-0.24	*	*

Table 3 GeoPT31 Z-scores for contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F62	F63	F64	F65	F66	F67	F68	F69	F70	F71	F72
Quality	1	1	1	1	2	2	2	2	2	1	1
SiO ₂	-0.31	-1.88	0.71	*	-0.13	0.22	-0.31	-0.09	-0.06	1.42	-0.87
TiO ₂	0.15	0.22	-1.34	*	0.07	1.00	0.07	0.45	0.07	2.38	-2.34
Al ₂ O ₃	-0.59	-0.28	-2.25	*	-0.20	0.01	-0.39	0.54	0.17	2.30	5.25
Fe ₂ O ₃ T	2.33	-0.03	-0.40	*	0.14	0.14	-0.19	0.82	-0.13	-3.66	-3.86
MnO	0.31	0.17	-5.26	*	-0.25	-0.93	-0.59	1.54	0.76	2.21	11.20
MgO	0.20	0.20	5.60	*	-0.50	0.70	-1.58	-0.11	0.10	19.40	15.20
CaO	0.08	1.83	1.29	*	-0.87	0.64	*	-0.11	-0.27	-2.95	0.38
Na ₂ O	0.35	-0.92	1.35	*	-0.49	0.18	*	1.18	0.34	-0.32	8.69
K ₂ O	-0.21	-1.95	2.47	*	-0.94	0.31	*	-0.52	0.56	0.13	-1.55
P ₂ O ₅	-2.45	1.34	-2.45	*	1.26	1.14	*	-0.16	0.08	7.02	5.13
LOI	-2.21	*	5.30	*	*	-2.43	0.00	0.55	-3.42	9.05	5.30
Ag	*	0.42	*	*	*	*	*	*	-0.44	*	-0.28
As	-0.61	2.40	73.97	*	*	0.82	*	*	0.46	*	-3.88
Ba	-3.02	-0.59	-2.82	8.22	0.21	0.25	*	1.13	-0.74	-0.57	-4.77
Be	-1.87	-0.49	*	*	*	0.52	*	*	-0.34	*	-4.40
Bi	-5.31	-0.28	*	*	-0.35	*	*	*	-0.27	*	-3.50
Cd	-0.97	1.01	*	*	*	-1.02	*	0.00	-0.26	*	-4.80
Ce	-2.26	3.24	*	-0.95	1.33	2.88	*	0.56	0.70	2.10	-3.68
Co	-0.86	0.48	-10.03	*	-0.26	-0.60	*	-3.85	1.07	0.48	-2.36
Cr	2.22	0.10	17.58	*	-1.29	-1.02	*	0.80	-0.36	0.35	-5.95
Cs	-0.77	0.08	*	-0.05	0.00	*	*	*	0.23	*	-1.63
Cu	1.08	2.48	-3.86	*	0.93	0.10	*	1.71	1.17	0.00	-6.07
Dy	0.52	3.00	*	-5.73	0.61	-0.36	*	*	-1.75	-3.95	-5.14
Er	1.31	4.56	*	-6.65	*	-0.41	*	*	-2.39	-1.54	-4.98
Eu	-0.66	0.09	*	-1.47	0.16	-0.19	*	*	-0.19	0.61	-1.15
Ga	0.81	1.30	*	*	*	*	*	-1.94	0.13	*	-2.43
Gd	-0.93	1.58	*	-4.01	1.02	-0.56	*	*	-0.34	-1.13	-1.12
Ge	0.19	*	*	*	*	*	*	*	-1.52	*	-1.94
Ho	0.72	2.87	*	-5.36	*	-0.40	*	*	-1.70	-5.20	-4.60
In	-0.75	*	*	*	*	*	*	*	0.00	*	*
La	-3.38	0.34	-5.08	-3.19	*	1.53	*	0.47	-0.25	-0.10	-5.06
Li	0.61	-1.72	*	-1.42	*	-0.41	*	0.27	-0.05	-0.10	-1.85
Lu	2.16	0.51	*	-5.89	0.36	-0.17	*	*	-2.10	-1.22	-4.36
Mo	1.20	2.10	*	-0.30	0.60	*	*	*	0.90	*	0.10
Nb	-1.35	-0.43	-3.32	-2.55	0.92	-0.40	*	-0.49	3.47	*	-0.31
Nd	-1.92	3.15	*	-1.48	1.26	-0.50	*	0.66	0.95	2.38	-2.71
Ni	-1.45	0.43	-0.91	*	-0.43	*	*	0.48	-0.22	1.18	-4.23
Pb	1.39	1.66	*	-0.88	0.21	-0.24	0.37	*	-1.07	-0.33	-8.20
Pr	-1.82	*	*	-1.18	*	-0.26	*	1.35	1.06	-2.26	-1.98
Rb	-1.07	-0.64	-0.31	*	0.34	-0.81	*	*	0.48	-0.52	-4.23
Sb	-0.12	1.45	*	*	0.27	*	*	*	0.42	*	-3.25
Sc	1.40	-0.63	*	*	*	-0.31	*	0.16	-0.52	-1.26	-1.99
Sm	-0.96	2.46	*	-1.76	*	-0.73	*	*	0.48	2.99	-1.59
Sn	-0.35	*	*	*	*	*	*	*	0.15	*	-0.09
Sr	0.09	0.85	-0.53	-1.12	0.79	-0.04	*	-0.40	0.31	-4.30	-3.69
Ta	-0.21	1.50	*	-3.45	*	*	*	*	1.59	*	-1.10
Tb	-0.24	0.43	*	-3.29	*	-0.07	*	*	-1.13	-1.20	-3.89
Th	-3.40	1.97	*	-3.16	*	*	*	*	-0.25	-2.12	-4.52
Tl	*	1.85	*	1.70	*	*	*	*	-0.10	*	-1.76
Tm	1.26	1.33	*	-4.67	*	1.05	*	*	-1.88	*	-4.03
U	-0.43	1.91	*	-3.85	0.30	*	*	*	1.13	-1.74	-2.93
V	-1.75	-0.90	24.66	*	*	-0.05	*	-0.05	2.03	-2.86	-2.56
W	-0.33	3.75	*	*	*	*	*	*	-0.34	*	-0.67
Y	3.58	3.30	0.70	-9.62	0.19	-1.04	*	*	-3.18	-7.96	-8.46
Yb	2.69	1.94	*	-6.76	*	*	*	-1.75	-1.96	-3.93	-5.26
Zn	0.71	2.14	-0.40	*	1.46	0.34	*	*	0.52	0.52	-13.06
Zr	4.99	-5.52	-2.07	-23.45	*	-1.23	*	-9.95	-10.23	-6.50	-21.02

Table 3 GeoPT31 Z-scores for contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F73	F74	F75	F76	F77	F78	F79	F80	F81	F82	F83
Quality	1	2	2	2	2	2	1	1	2	2	1
SiO ₂	-0.13	*	*	0.08	0.17	*	0.35	-57.59	0.00	-2.98	-0.46
TiO ₂	0.15	0.00	-5.79	0.82	-0.15	*	-0.59	-26.58	0.56	-1.19	1.19
Al ₂ O ₃	-0.16	0.81	3.05	-0.11	-0.17	*	0.89	-72.19	0.38	-1.19	-1.88
Fe ₂ O ₃ T	0.28	-0.06	-1.89	0.96	0.41	*	-1.89	-36.45	0.96	-1.09	0.28
MnO	-1.19	-0.59	4.06	-0.25	-3.48	*	0.17	-24.96	-0.59	0.02	-0.31
MgO	-7.61	-1.40	0.37	-3.41	0.97	*	-1.00	*	-0.20	0.40	-0.40
CaO	1.89	-0.57	-1.17	0.95	0.61	*	-1.74	-24.74	1.70	2.19	1.89
Na ₂ O	-0.32	2.51	-0.33	0.01	-0.01	*	-1.32	*	-0.66	1.14	-0.32
K ₂ O	-1.04	0.56	2.97	-0.02	0.04	*	1.30	-32.64	-0.27	0.56	-0.04
P ₂ O ₅	-4.81	-0.04	-0.87	0.20	0.67	*	-0.08	-22.31	*	1.14	0.87
LOI	-1.54	*	0.99	0.66	-1.43	*	-1.32	-1.54	1.54	-17.43	4.19
Ag	*	0.57	*	*	*	*	*	*	*	0.01	*
As	-7.92	1.05	0.73	*	7.24	*	19.14	10.53	*	0.72	*
Ba	0.42	1.15	0.65	-0.09	0.90	0.13	-6.07	2.85	-0.39	0.10	-0.40
Be	*	0.26	0.29	*	*	*	*	-1.11	*	0.58	*
Bi	*	*	-1.31	*	*	*	*	*	*	-1.13	*
Cd	*	0.79	0.38	*	*	*	*	-0.63	5.68	0.56	*
Ce	0.26	*	4.90	*	-0.56	-1.95	-1.11	1.21	*	-0.57	0.26
Co	-1.19	0.40	-0.14	*	*	*	3.98	3.91	29.42	0.26	*
Cr	*	0.58	0.83	-0.36	1.91	*	-4.10	-0.36	-0.76	0.18	2.22
Cs	*	*	-0.24	*	*	*	*	*	*	-0.31	1.69
Cu	-3.13	1.08	1.85	*	0.68	*	2.84	1.45	-0.34	1.02	0.00
Dy	*	*	2.87	*	*	-1.94	-1.65	*	*	-0.54	-1.30
Er	*	*	2.74	*	*	-1.74	-2.47	*	*	0.10	-1.57
Eu	*	*	1.82	*	*	-1.21	0.21	*	*	-0.50	0.41
Ga	-1.31	*	0.70	*	-0.10	*	0.25	*	1.58	-1.64	*
Gd	*	*	3.01	*	*	-2.01	0.16	*	*	-0.45	0.23
Ge	*	*	*	*	*	*	*	*	*	*	*
Ho	*	*	2.19	*	*	-1.48	-0.90	*	*	-0.31	-0.54
In	*	*	*	*	*	*	*	*	*	*	*
La	4.65	*	3.43	*	0.74	-2.74	-3.14	0.67	*	-0.97	-0.22
Li	*	*	-0.24	*	*	*	1.54	*	1.73	0.02	*
Lu	*	*	2.03	*	*	-1.58	-1.74	*	*	-0.27	-1.22
Mo	-2.30	1.10	0.40	*	*	*	-1.90	*	*	-0.10	*
Nb	-0.43	*	*	*	-0.22	*	2.09	*	*	1.00	1.72
Nd	-2.94	*	4.79	*	*	-1.70	1.46	*	*	-0.14	2.04
Ni	-5.79	1.28	1.12	*	-2.09	*	3.96	-2.50	0.32	1.82	-5.25
Pb	-1.13	1.38	1.68	*	0.43	*	-3.21	2.73	*	2.21	13.20
Pr	*	*	3.83	*	*	-1.49	-0.51	*	*	-0.29	1.68
Rb	-5.32	*	2.25	*	0.85	*	0.96	1.44	*	0.33	1.52
Sb	*	*	0.53	*	*	*	*	*	*	0.01	*
Sc	10.05	*	-1.21	*	2.93	*	*	*	*	*	1.19
Sm	-3.09	*	3.23	*	*	-1.28	-0.05	*	*	-0.36	1.39
Sn	*	*	*	*	*	*	*	*	*	0.71	*
Sr	-0.09	-0.13	1.01	-0.22	0.57	0.13	0.09	-3.77	0.04	0.32	1.67
Ta	*	*	0.03	*	*	*	*	*	*	-0.49	-1.04
Tb	*	*	2.27	*	*	-1.55	1.03	*	*	-0.71	-0.56
Th	-2.12	*	3.50	*	0.55	*	-0.18	*	*	-1.40	0.25
Tl	*	0.40	-0.54	*	*	*	*	-4.19	*	-0.70	*
Tm	*	*	1.76	*	*	-1.44	-1.28	*	*	-0.08	-0.74
U	2.63	-2.40	-2.23	*	1.31	*	-1.85	*	*	0.21	0.59
V	2.67	-0.39	-0.58	-0.05	-0.05	*	1.60	1.43	*	-0.54	0.25
W	*	*	1.01	*	*	*	9.33	*	*	0.48	*
Y	1.12	*	3.80	*	0.03	*	-2.46	*	-1.04	-1.26	-0.96
Yb	*	*	2.96	*	*	-1.31	-0.87	*	*	0.02	-1.64
Zn	-1.43	1.20	2.01	0.36	-1.00	*	0.22	3.46	-0.25	1.51	-1.35
Zr	1.47	*	1.86	2.45	0.99	*	8.58	*	-1.32	-2.28	0.87

Table 3 GeoPT31 Z-scores for contributed data for modified river sediment, SdAR-1 (June 2012)

Lab code	F83	F84	F85	F86	F87	F88	F89	F90*	F91*
Quality	2	1	2	1	1	1	2	2	2
SiO ₂	*	*	0.23	*	-0.36	*	0.27	0.28	0.32
TiO ₂	*	*	-0.30	0.15	-0.13	-2.38	0.45	-0.30	-0.30
Al ₂ O ₃	*	*	-0.51	*	-0.73	-0.08	-0.33	-0.33	0.20
Fe ₂ O ₃ T	*	*	-0.20	0.37	1.68	8.65	-0.06	0.14	0.28
MnO	*	*	0.12	1.44	0.66	-1.60	0.09	2.80	0.42
MgO	*	*	0.10	0.32	0.27	*	-0.20	1.60	0.70
CaO	*	*	0.04	0.32	0.75	-4.34	0.34	0.04	1.85
Na ₂ O	*	*	0.01	7.26	0.29	-5.09	0.68	0.51	1.18
K ₂ O	*	*	-0.27	4.55	0.44	-1.31	0.23	0.73	0.73
P ₂ O ₅	*	*	2.45	*	1.24	*	-0.04	-0.12	1.19
LOI	*	*	-0.33	*	0.00	*	-1.32	22.36	-1.54
Ag	*	*	3.58	*	*	*	*		
As	*	*	-0.42	*	*	*	*	-0.72	0.02
Ba	*	1.67	-0.14	-2.45	-0.22	-0.60	-0.05	-0.54	-0.20
Be	*	*	1.09	*	*	*	*		0.60
Bi	*	*	-1.04	*	*	*	*	-1.04	0.04
Cd	*	*	0.20	*	*	-0.82	*	2.18	-5.91
Ce	*	-3.40	-0.90	-1.34	1.27	0.00	*	-1.36	0.13
Co	-0.60	10.48	1.49	*	*	-3.24	*	1.15	-0.73
Cr	*	0.09	-0.22	-0.86	0.07	0.63	-0.76	-0.08	-0.60
Cs	*	*	0.28	*	-0.43	-1.37	*	6.04	-0.22
Cu	*	-1.76	-0.20	5.63	1.62	*	-1.32	-1.93	-0.10
Dy	*	*	-2.09	-5.82	0.98	-1.38	*		-0.41
Er	*	*	-1.78	-5.93	0.19	-0.89	*		-0.62
Eu	*	*	2.74	-2.96	0.40	0.32	*		-0.14
Ga	*	-2.43	1.24	*	-0.90	-0.34	*	-0.49	0.80
Gd	*	*	2.36	-4.17	-0.11	0.12	*		-0.02
Ge	*	*	*	*	*	*	*		
Ho	*	*	-1.84	-5.02	0.89	-1.25	*		-0.18
In	*	*	0.13	*	*	*	*		
La	*	-0.10	0.07	-3.17	-1.73	*	*	-2.17	-0.98
Li	*	*	2.09	3.44	*	*	*		0.59
Lu	*	*	-1.40	-5.32	-0.02	-1.25	*		-0.52
Mo	*	*	-0.40	*	*	1.40	*	-0.94	0.15
Nb	*	0.80	1.63	*	0.45	0.33	*	-0.55	0.58
Nd	*	*	1.43	-1.70	-0.36	-0.74	*	-0.96	0.22
Ni	*	-3.64	0.86	1.86	1.41	*	-1.29	-2.62	-0.40
Pb	*	0.49	0.36	-3.05	0.99	-1.80	0.55	-0.98	-0.33
Pr	*	*	0.55	-1.31	-0.08	-0.46	*		0.26
Rb	*	1.33	1.04	*	0.00	-1.32	*	-0.07	0.57
Sb	*	*	*	*	*	*	*	2.16	-3.85
Sc	*	0.00	0.84	-1.39	-0.20	*	*	-1.26	0.96
Sm	*	*	0.78	-2.76	0.35	-0.28	*	-1.04	0.07
Sn	*	*	*	*	*	*	*	5.16	-0.52
Sr	*	0.79	1.19	1.14	0.12	0.56	-0.48	-0.13	0.22
Ta	*	*	*	*	-0.62	-1.20	*		-1.19
Tb	*	*	0.09	-4.37	0.35	*	*		-0.33
Th	*	2.18	-1.65	-2.16	-0.16	0.34	*	-1.97	-0.74
Tl	*	*	-0.25	*	*	-4.16	*	-1.57	6.80
Tm	*	*	-1.88	-4.79	0.36	-0.90	*		-0.11
U	*	1.54	-1.60	-3.93	0.47	-0.24	*	-0.32	-0.12
V	*	1.29	0.13	*	0.26	0.68	*	-2.29	-0.69
W	*	*	6.65	*	*	-1.76	*	-2.24	0.09
Y	*	1.66	-2.38	-7.74	-0.18	*	0.56	-0.91	-0.27
Yb	*	*	-2.51	-6.53	-0.20	-1.28	*	-2.51	-0.42
Zn	*	-0.42	1.43	0.42	2.34	-0.72	1.46	-0.32	-0.75
Zr	*	0.87	-0.76	-17.11	0.88	0.03	*	-1.19	-1.36

*submitted late *submitted late

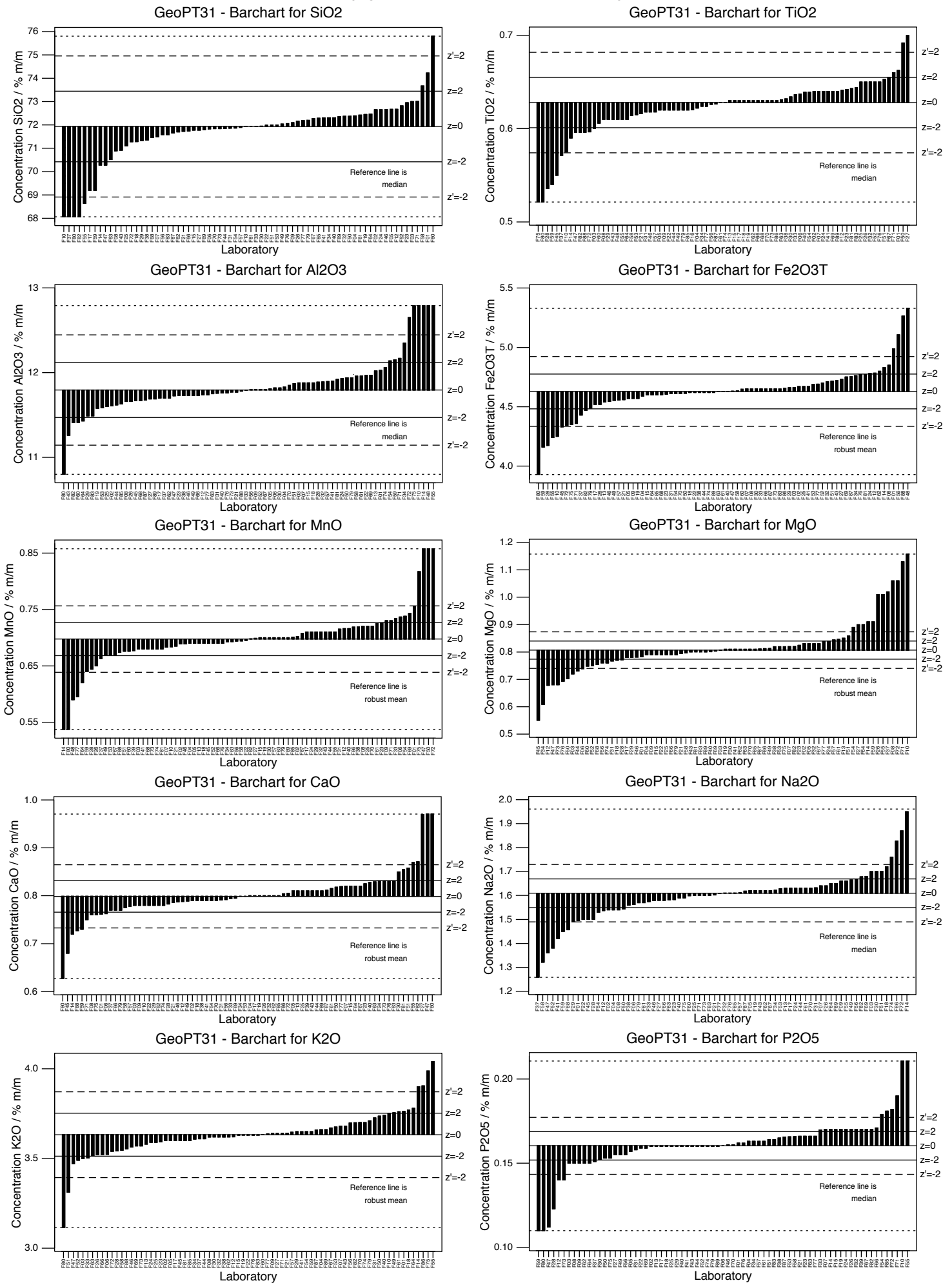


Figure 5.1: GeoPT31, SdAR-1, modified river sediment. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

GeoPT31 - Barchart for LOI

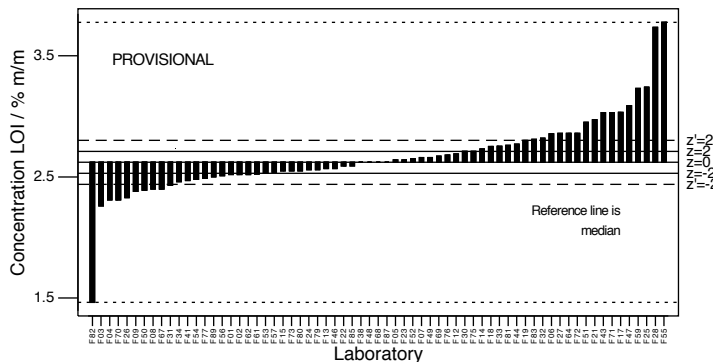
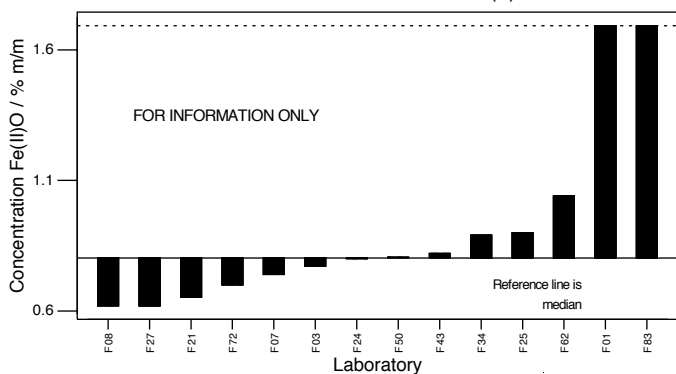
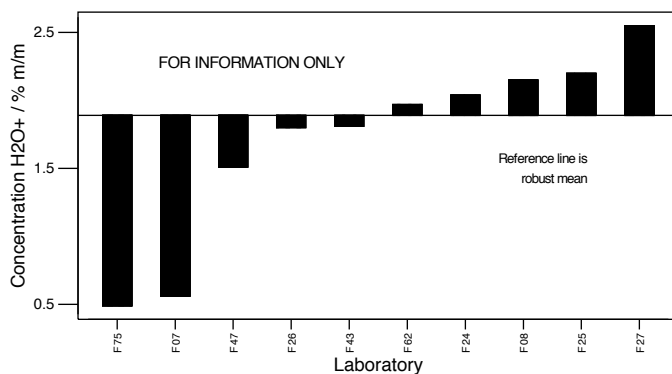


Figure 5.1 (cont'd): GeoPT31 – SdAR-1, modified river sediment. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z < 2$ for applied geochemistry labs (pecked lines).

GeoPT31 - Barchart for Fe(II)O



GeoPT31 - Barchart for H2O+



GeoPT31 - Barchart for CO2

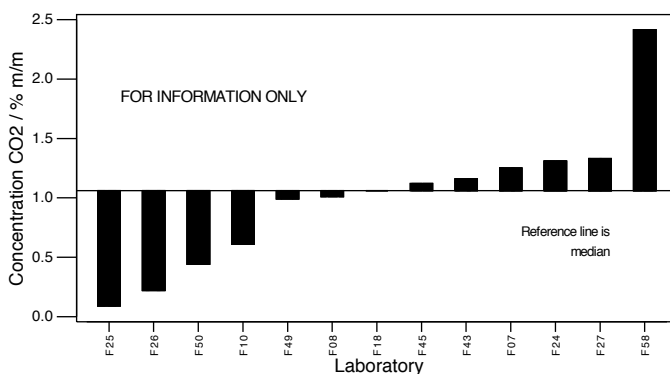
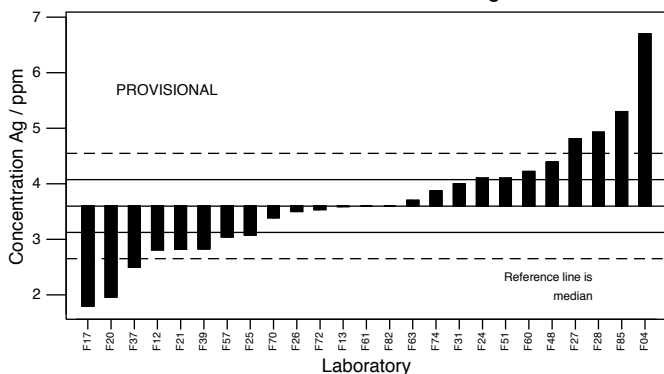


Figure 6.1: GeoPT31 – SdAR-1, modified river sediment. Data distribution charts for information only for elements for which values could not be assigned.

GeoPT31 - Barchart for Ag



GeoPT31 - Barchart for As

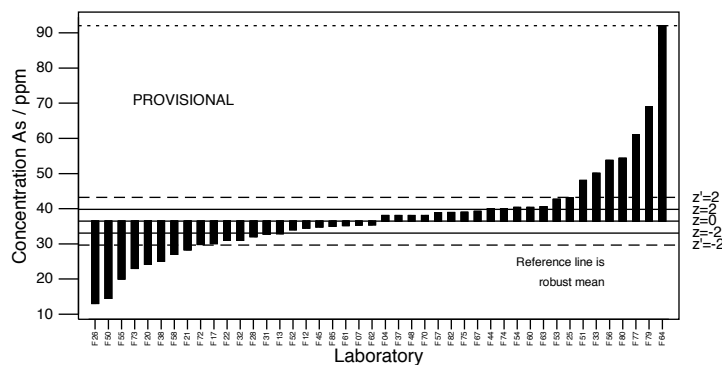


Figure 5.2: GeoPT31 – SdAR-1, modified river sediment. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z < 2$ for applied geochemistry labs (pecked lines).

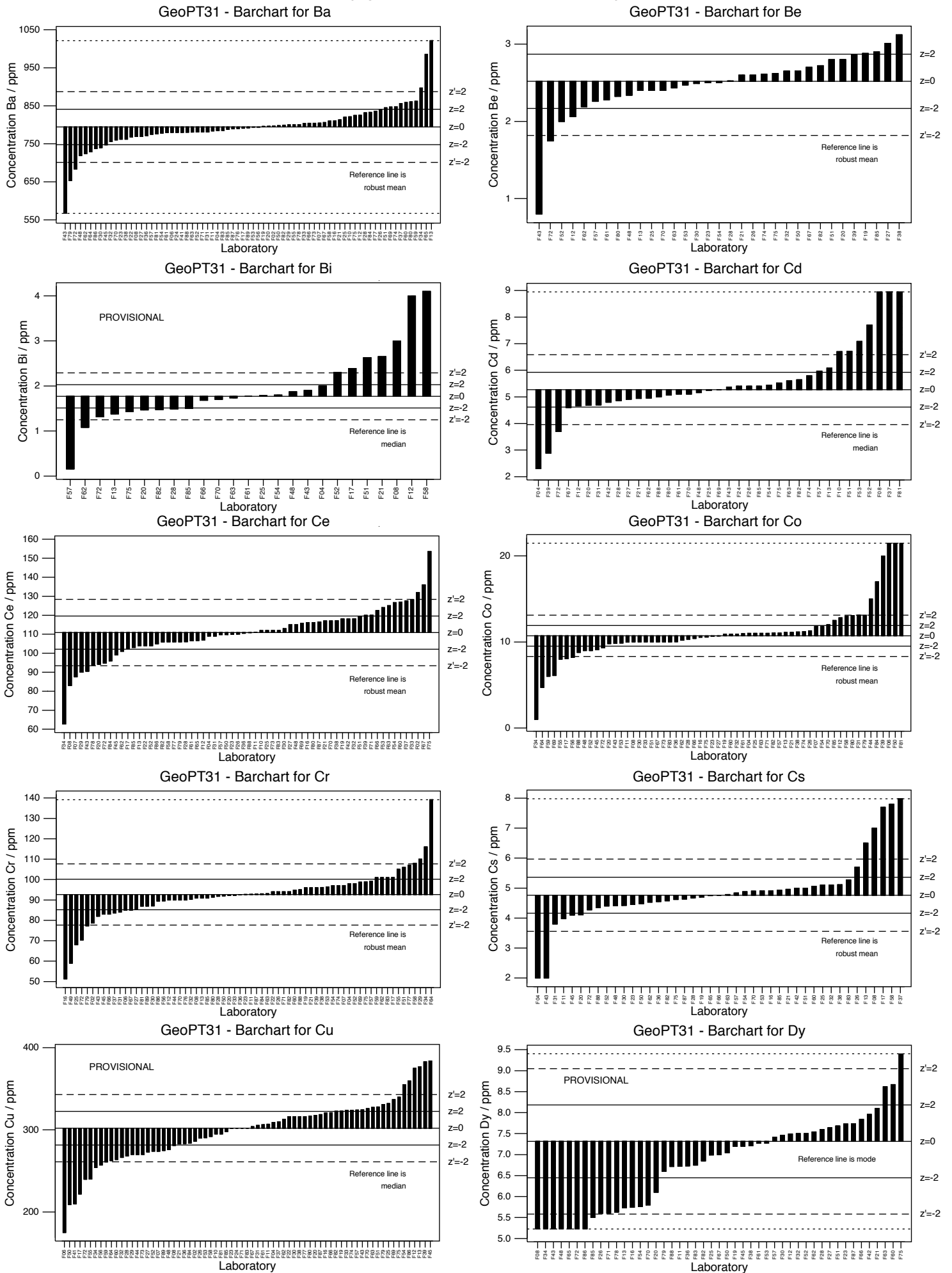


Figure 5.2 (cont'd): GeoPT31, SdAR-1, modified river sediment. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z < 2$ for applied geochemistry labs (pecked lines).

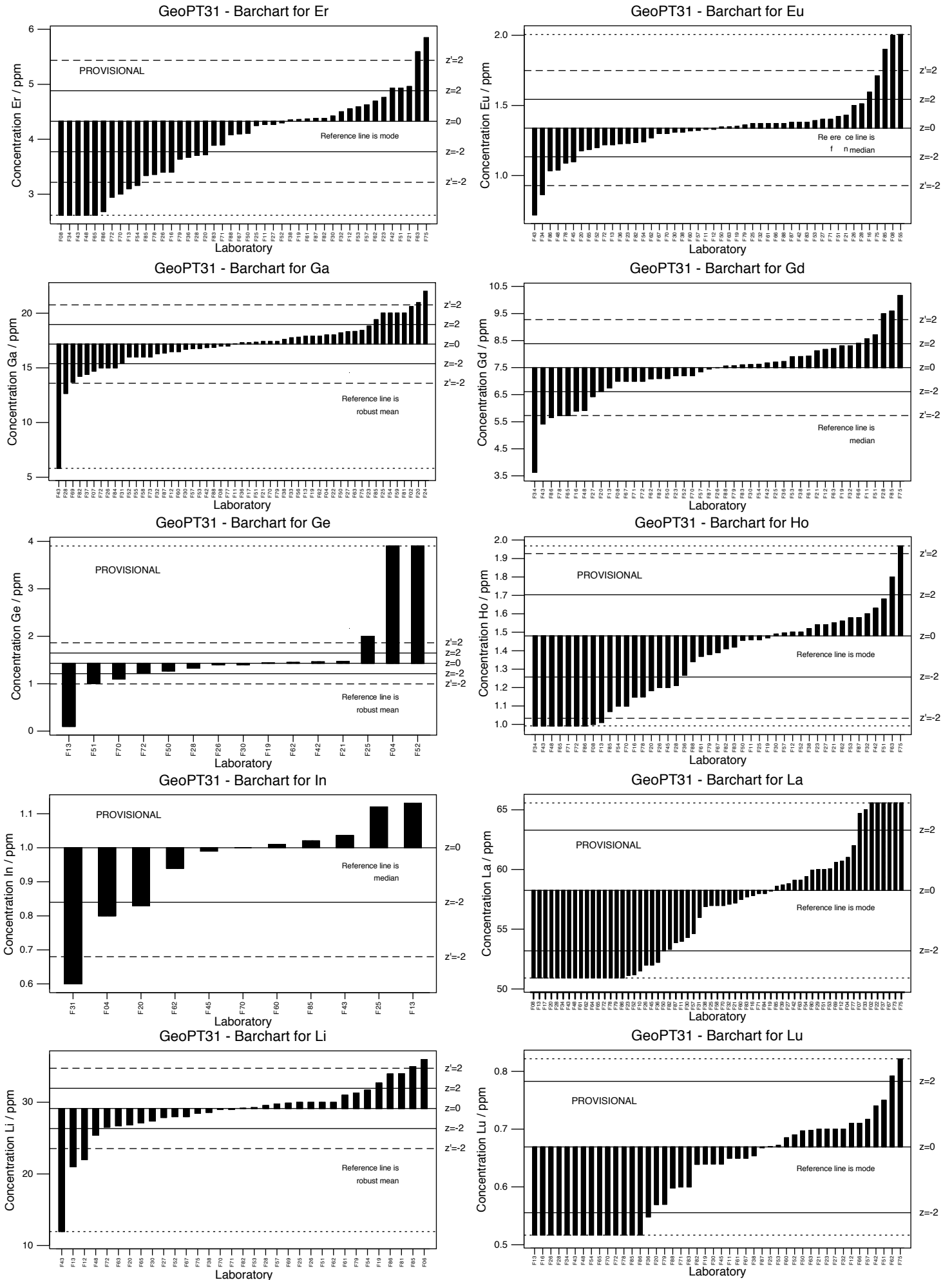


Figure 5.2 (cont'd): GeoPT31, SdAR-1, modified river sediment. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

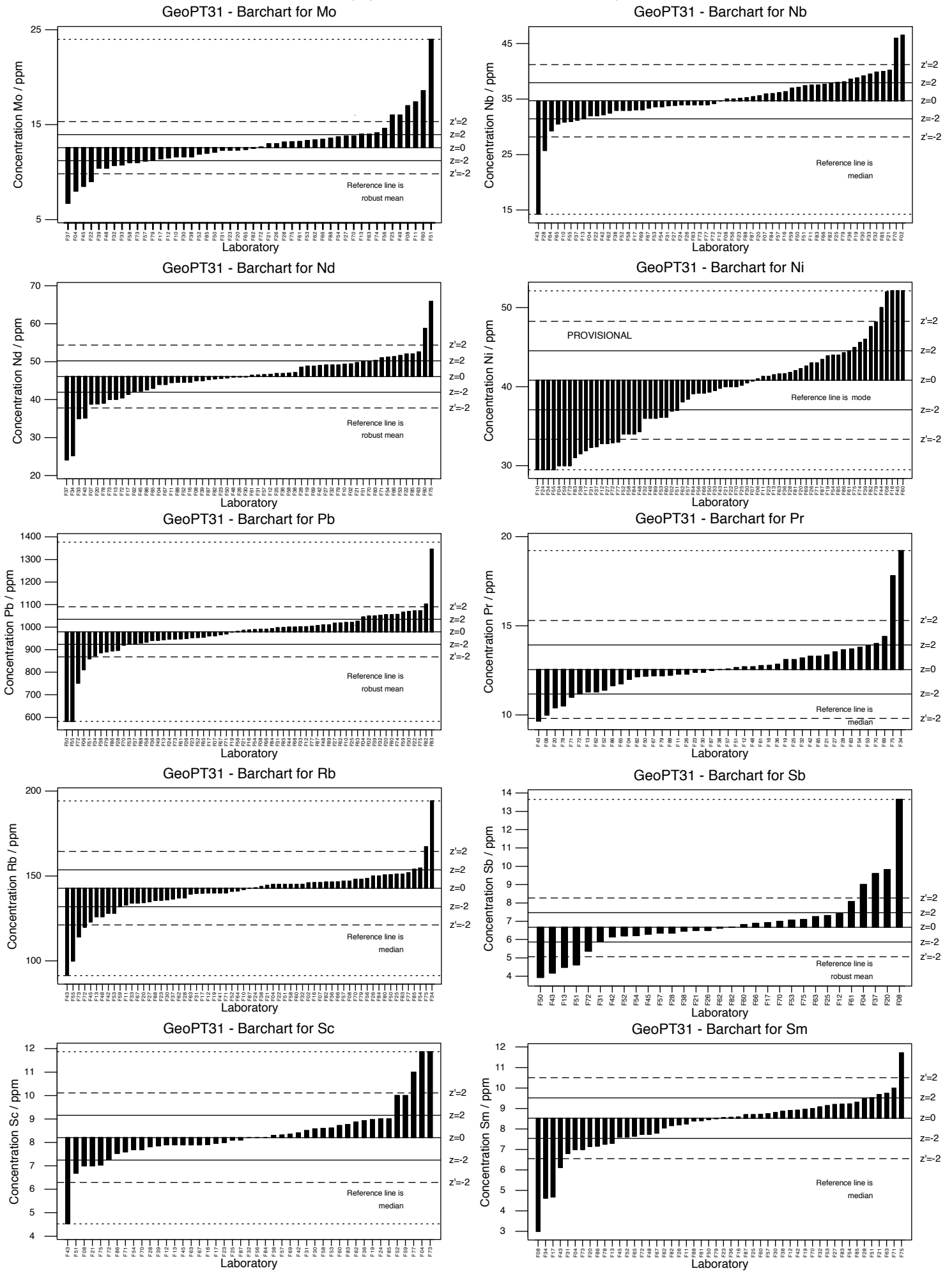


Figure 5.2 (cont'd): GeoPT31, SdAR-1, modified river sediment. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z < 2$ for applied geochemistry labs (pecked lines).

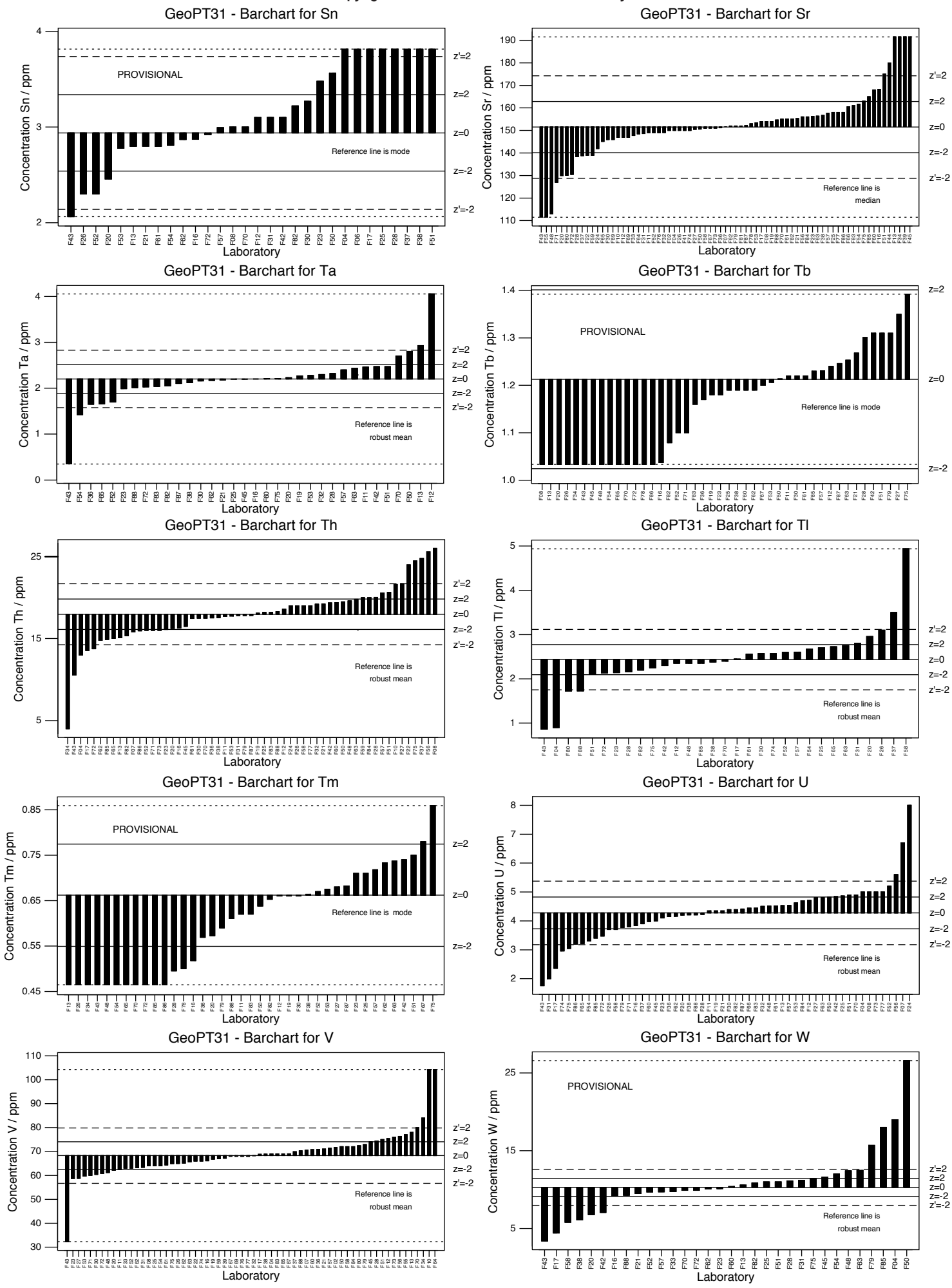


Figure 5.2 (cont'd): GeoPT31, SdAR-1, modified river sediment. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

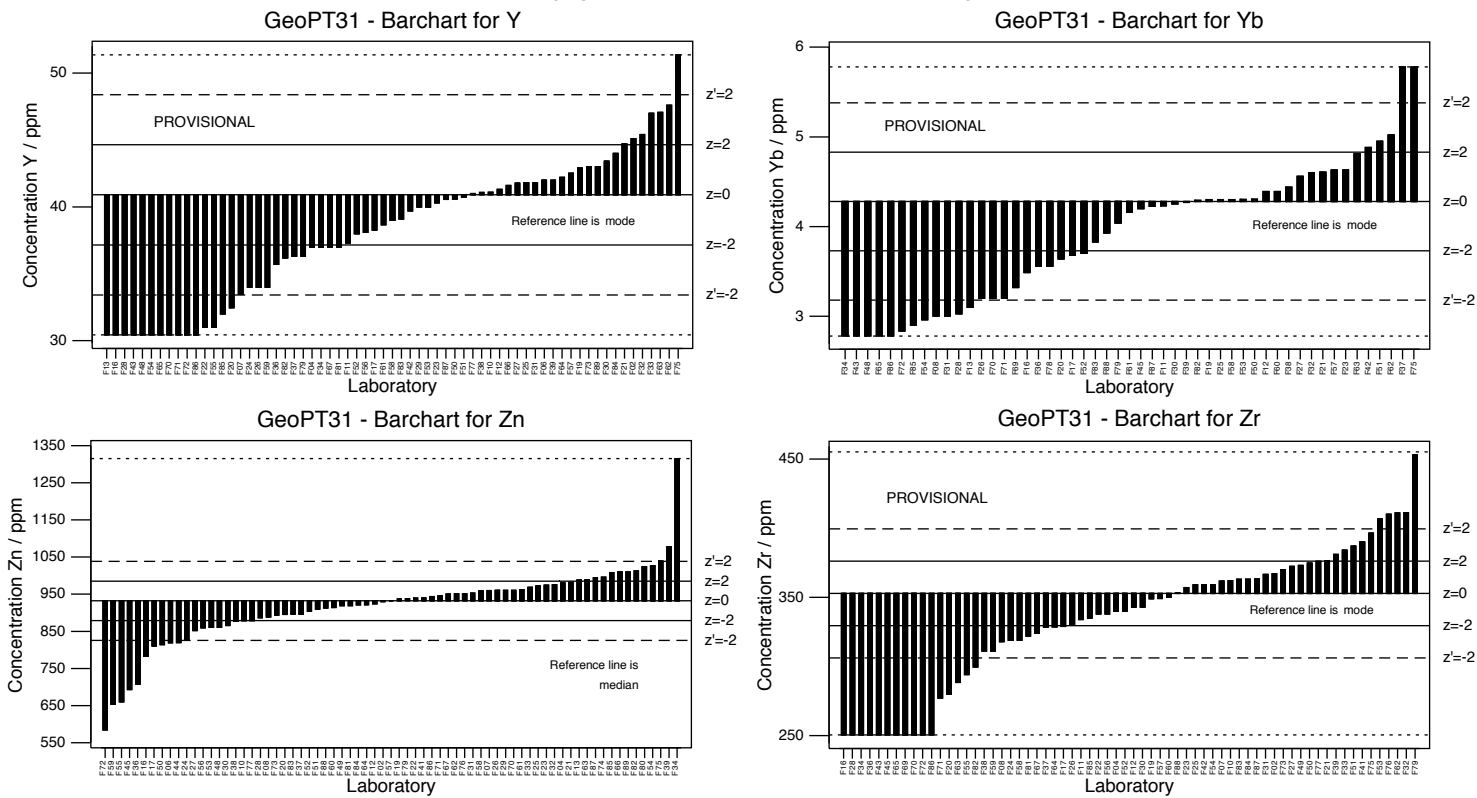


Figure 5.2 (cont'd): GeoPT31, SdAR-1, modified river sediment. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

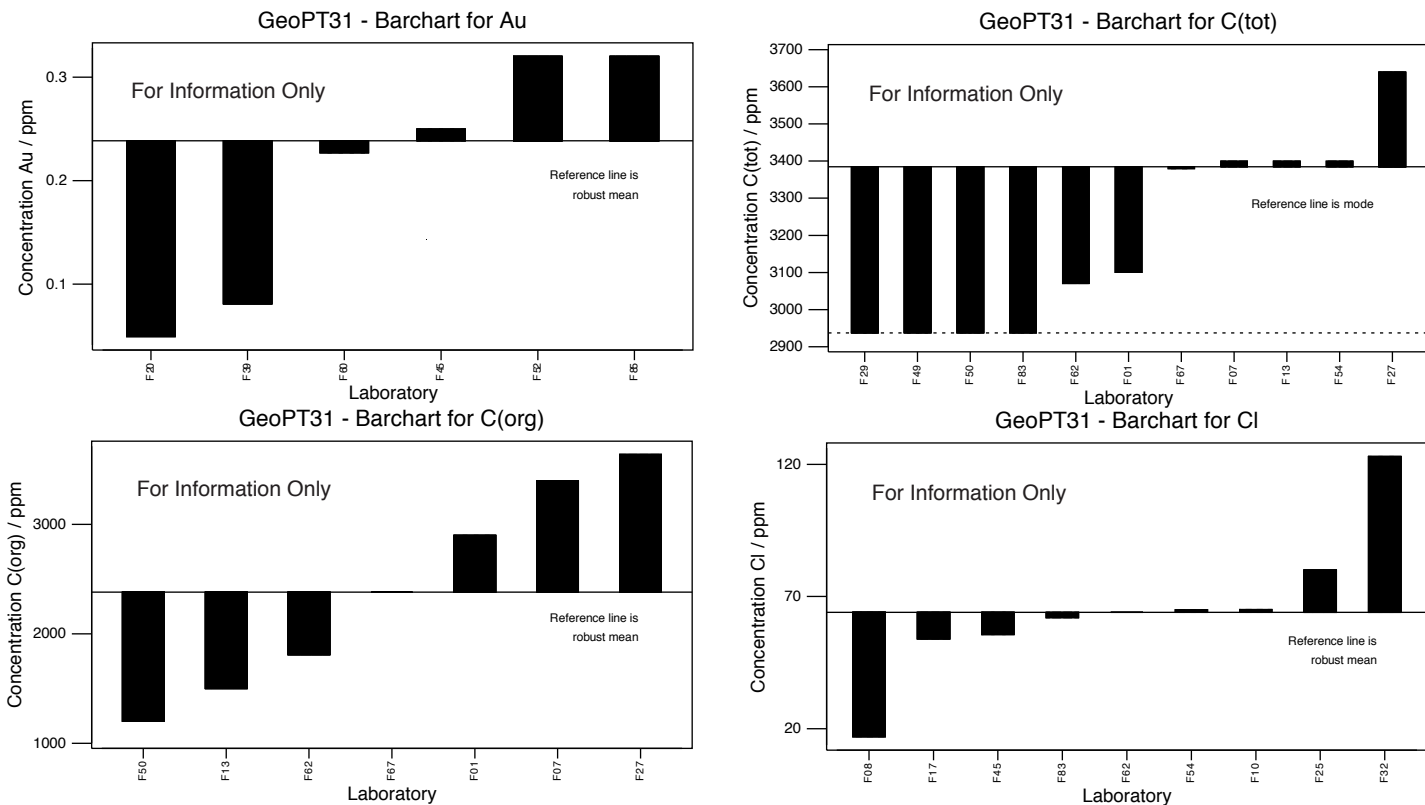


Figure 6.2: GeoPT31 – SdAR-1, modified river sediment. Data distribution charts for information only for elements for which values could not be assigned.

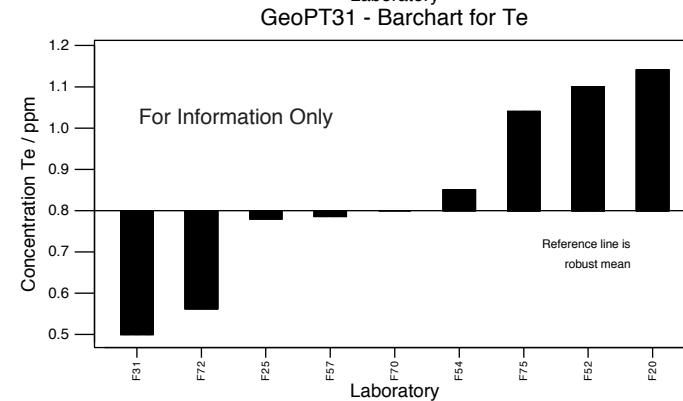
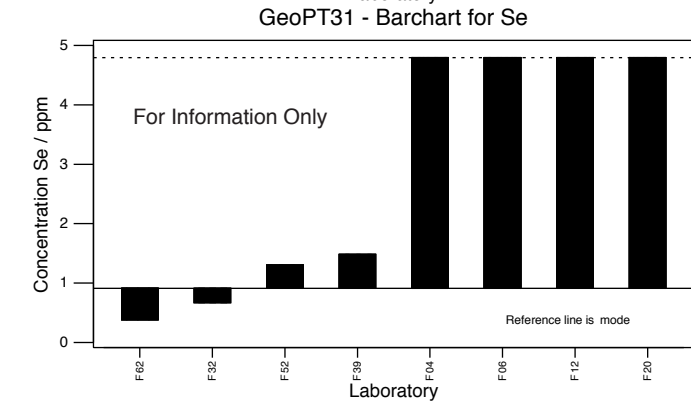
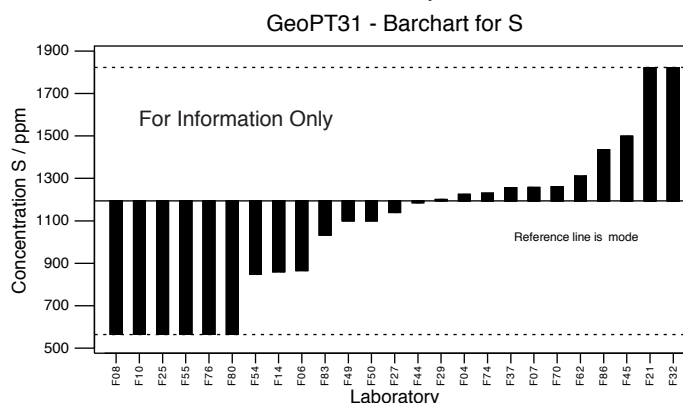
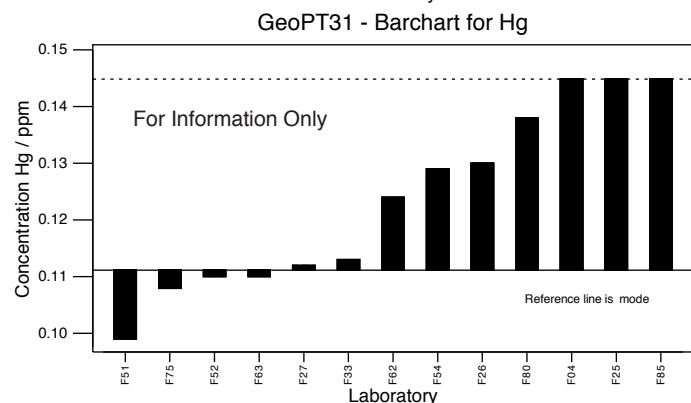
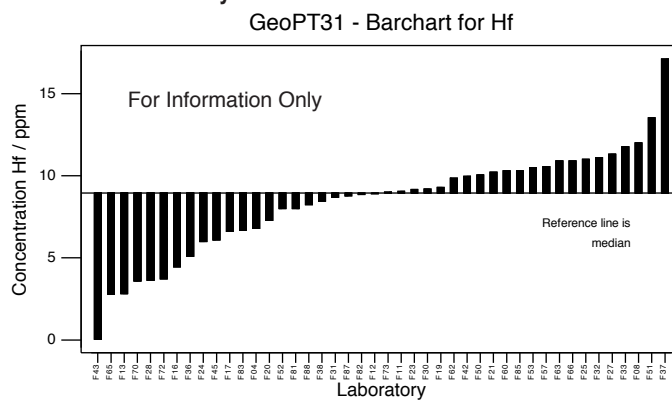
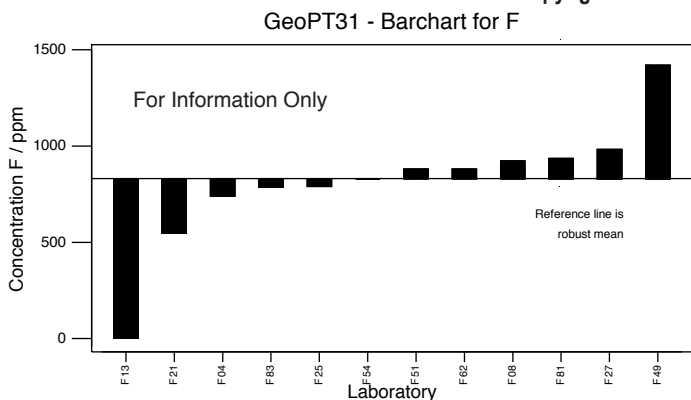


Figure 6.2 (cont'd): GeoPT31, SdAR-1, modified river sediment. Data distribution charts for information only for elements for which values could not be assigned.

Multiple z-score chart for GeoPT31

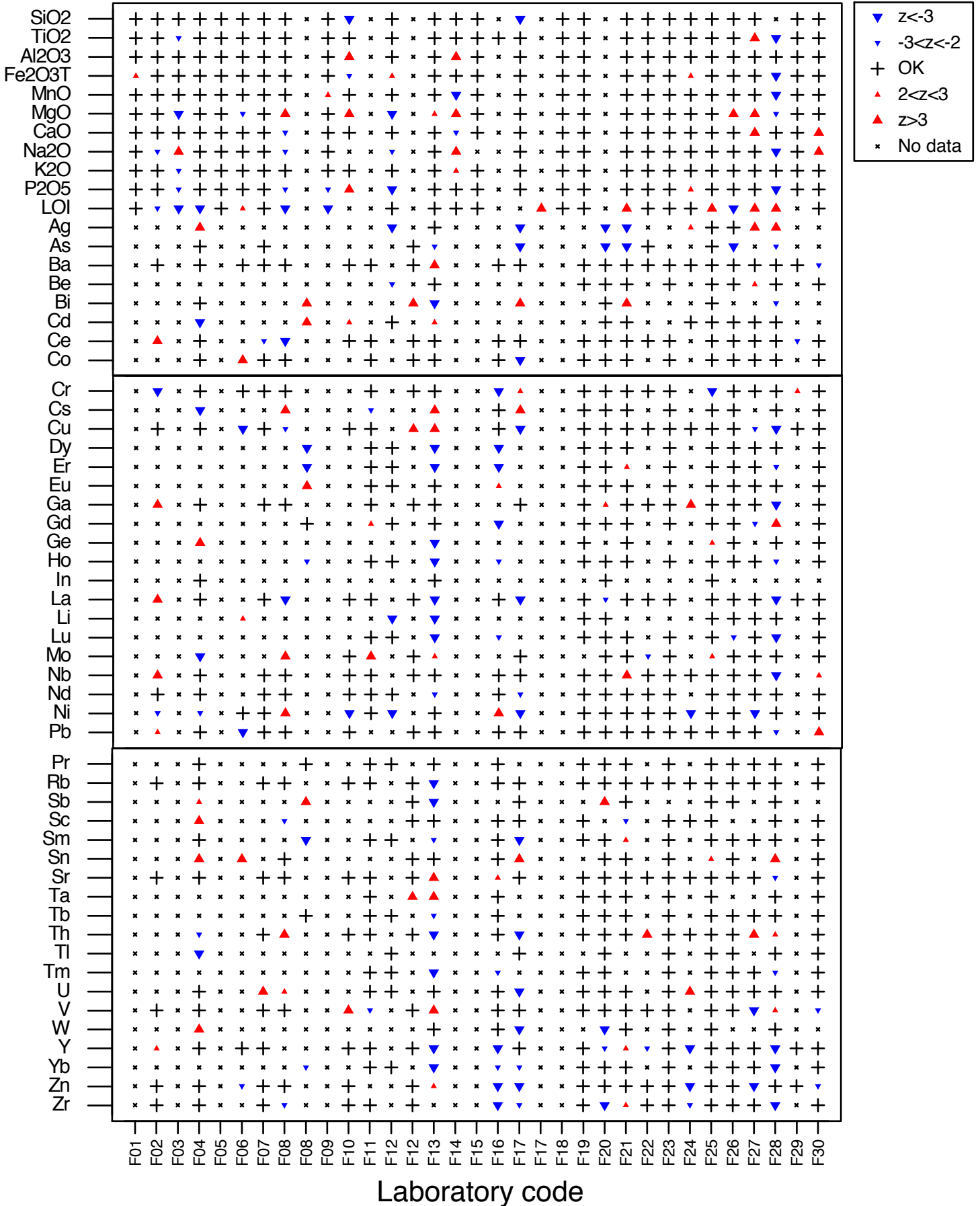


Figure 7.1: GeoPT31 – Modified river sediment, SdAR-1. Multiple z-score charts for laboratories participating in the GeoPT31 round. Symbols indicate whether or not an elemental result complies with the $-2 < z < +2$ criteria. Satisfactory data are plotted as '+'. Data for other categories are plotted as follows: $z < -3$ (▼), $-3 < z < -2$ (▽), $+2 < z < +3$ (▲), $Z > +3$ (▲).

Multiple z-score chart for GeoPT31

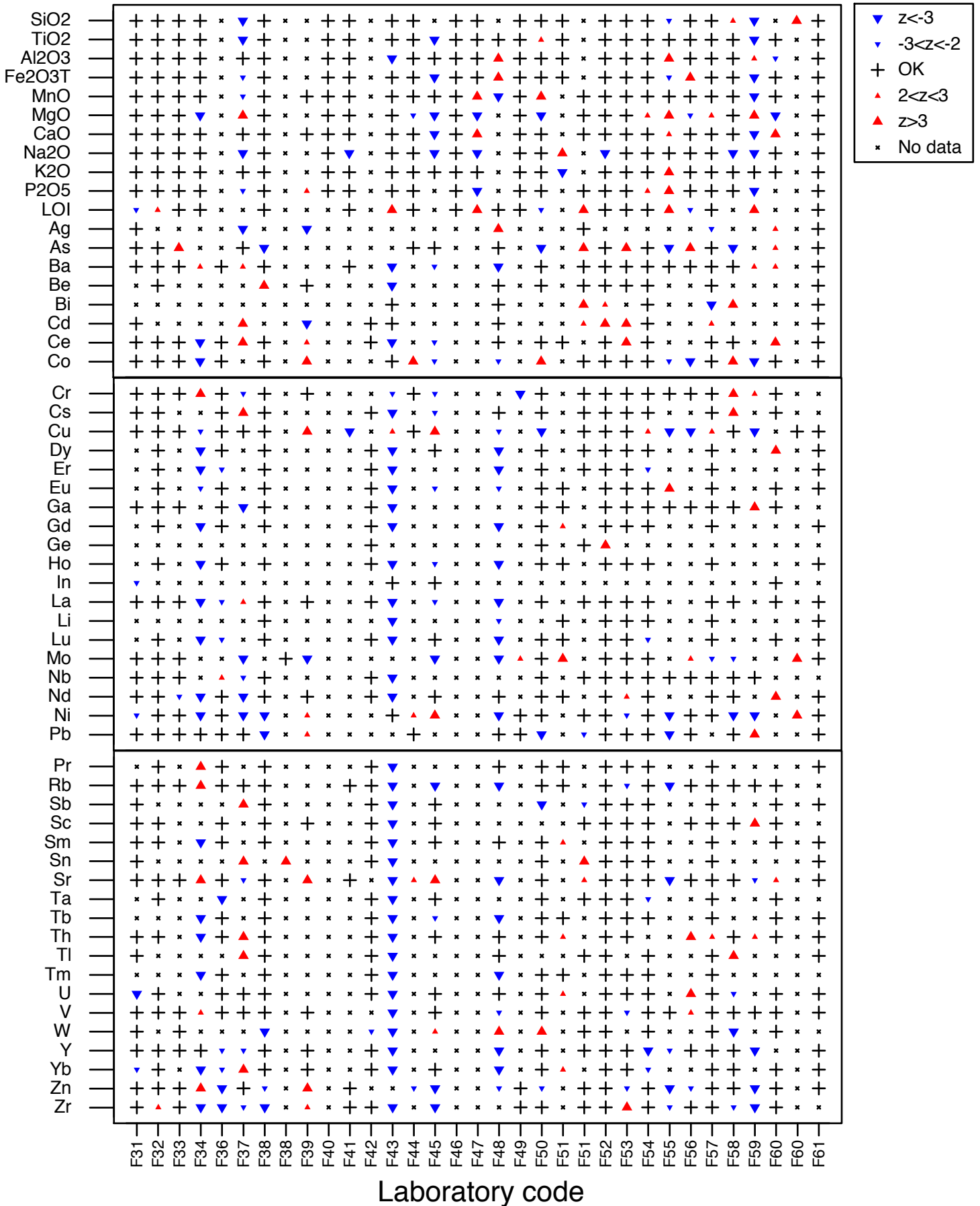


Figure 7.2: GeoPT31 – Modified river sediment, SdAR-1. Multiple z-score charts for laboratories participating in the GeoPT31 round. Symbols indicate whether or not an elemental result complies with the $-2 < z < +2$ criteria. Satisfactory data are plotted as '+'. Data for other categories are plotted as follows: $z < -3$ (▼), $-3 < z < -2$ (▽), $+2 < z < +3$ (▲), $Z > +3$ (▲).

