

GeoPT29 – AN INTERNATIONAL PROFICIENCY TEST FOR ANALYTICAL GEOCHEMISTRY LABORATORIES – REPORT ON ROUND 29 (Nephelinite, NKT-1) / June 2011

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Abstract

Results are presented for GeoPT29, round twenty-nine of the International Association of Geoanalysts' Proficiency Testing programme for analytical geochemistry laboratories. The sample distributed for this round was nephelinite, NKT-1, 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, *z*-scores and charts showing both the distribution of contributed results and the overall performance of participating laboratories.

Introduction

This twenty-ninth round of GeoPT, the international proficiency testing programme for geoanalytical laboratories, 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 (<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 the laboratories can decide whether the quality of their data is satisfactory in relation to both their chosen fitness-for-purpose criterion and results submitted by all the other laboratories contributing to the round and, therefore, choose to take appropriate corrective action if this appears justified.

Steering Committee for Round 29: M. Thompson, P.C. Webb, P.J. Potts and S Wilson.

Sample GeoPT29: The nephelinite, NKT-1, was produced by the U.S. Geological Survey, under direction of Dr S.Wilson. The test material was tested for grain size distribution and compositional homogeneity by the originating laboratory and was considered suitable for use in the GeoPT proficiency testing programme.

Timetable for Round 29:

Distribution of sample: March 2011.

Deadline for submission of analytical results:
10th June 2011.

Distribution of draft report: July 2011

Submission of results

The analytical results submitted by 88 laboratories are listed in Table 1.

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. Table 2 lists assigned and provisional values for 10 major components and 44 trace elements. 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 showed a central portion approximating to a normal distribution. Part of this assessment involved examining bar charts for each element to judge the distribution of results and the most favourable basis for defining the assigned values. In 21 cases the robust mean was used as the preferred value. In 25 cases the median value was preferred. In 4 cases a mode produced a baseline that had improved symmetry with the normally distributed portion of the graph. The procedure used to determine the mode was based on the analysis of mixed populations detailed in Thompson (2006) and first used in GeoPT to analyse round 23 data. Confidence in one such value (for Cs) was sufficient for it to be designated as assigned (although only marginally different from the median): the other values (for Mo, Pb and Sb) obtained in this way were designated as provisional values.

Bar charts for 50 elements/components that were judged to have satisfactory distributions for assigned or provisional values to be given, as listed in Table 2, are shown in Figure 1, namely: SiO₂, TiO₂, Al₂O₃, Fe₂O₃T, MnO, MgO, CaO, Na₂O, K₂O, P₂O₅, Ba, Be, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Ga, Gd, Hf, Ho, In, La, Li, Lu, Mo, Nb, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Sm, Sn, Sr, Ta, Tb, Th, Tm, U, V, Y, Yb, Zn, and Zr. Of these, only provisional values could be given to the 5 elements/components: In, Mo, Pb, Sb and Sn.

Bar charts for the 17 elements/components, Fe(II)O, CO₂, H₂O⁺, LOI, Ag, As, Bi, Cd, Cl, F, Ge, Hg, S, Se, Te, Tl and W, are plotted in Figure 2 for information only, where the data were not amenable to the reliable determination of a consensus.

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. 1579 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. 1740 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:

$$H_a = k \cdot X_a^{0.8495}$$

Where X_a is the concentration of the element expressed as a *fraction*, and the factor $k = 0.01$ for pure geochemistry labs and $k = 0.02$ for applied geochemistry labs.

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 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, to take action to ensure that determinations are not subject to unsuspected analytical bias. In this round, there were 20 laboratories with more than 20% of their z -scores outside the range $-3 < z < 3$.

Overall performance

A summary of the overall performance of individual laboratories in this round is plotted in Figure 3 as a multiple z -score chart. In this chart, 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.

Participation in future rounds

The benefit from proficiency testing arises from regular participation and laboratories are invited to contribute to the GeoPT30 round, the sample for which will be distributed during September 2011.

Acknowledgements

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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: Nanhon 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 Serpentinite). 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 (Andesite, MGL-AND). International Association of Geoanalysts: Unpublished report.

Table 1		GeoPT29 Contributed data for Nephelinite, NKT-1 (June 2011)										
	Lab	D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11
	Quality	2	1	2	1	1	2	1	1	2	2	2
SiO ₂	% m/m	37.69	37.86	37.48	35.27	40.03	38.1	37.89	38.38	37.459	37.74	37.95
TiO ₂	% m/m	3.88	3.85	3.81	3.58	3.52	3.76	3.82	3.79	3.838	3.91	3.832
Al ₂ O ₃	% m/m	10.09	10.00	10.34	9.15	10.09	10.09	10	10.02	9.903	10.22	10.07
Fe ₂ O ₃ T	% m/m	13.38	13.44	13.17	13.01	13	13.24	13.26	13.18	13.248	13.28	13.32
Fe(II)O	% m/m				7.01	5.43		7.58	6.55			
MnO	% m/m	0.208	0.20	0.2	0.17	0.173	0.196	0.203	0.211	0.210	0.202	0.200
MgO	% m/m	14.2	14.25	14.04	12.57	11.46	14.21	14.06	13.80	14.407	14.1	14.31
CaO	% m/m	12.99	12.91	13.07	12.29	13.46	13.03	12.98	12.99	12.856	12.67	12.84
Na ₂ O	% m/m	3.38	3.43	3.43	3.26	3.1	3.35	3.48	3.296	3.360	3.29	3.38
K ₂ O	% m/m	1.24	1.26	1.29	1.19	1.38	1.27	1.25	1.23	1.249	1.23	1.25
P ₂ O ₅	% m/m	0.906	0.87	0.95	0.81	3.58	0.9	0.92	0.916	0.909	0.945	0.885
H ₂ O+	% m/m							1.95				
CO ₂	% m/m	0.26		0.26				0.25				
LOI	% m/m	1.78	1.45	1.57	1.55	2.3	1.85	1.65	1.6	1.463	1.81	1.66
Ag	mg kg ⁻¹	0.5				1.086						
As	mg kg ⁻¹	5			0			1.8				
B	mg kg ⁻¹							9				
Ba	mg kg ⁻¹	804	729		1022	660.275		723	679	836.1	744	793
Be	mg kg ⁻¹					1.866		2.32	2.26			
Bi	mg kg ⁻¹					0.012						
Br	mg kg ⁻¹		7									
Cd	mg kg ⁻¹	0.6				0.052		0.2	0.09			
Ce	mg kg ⁻¹	124				105.280		123	120.95	145.2	118	104
Cl	mg kg ⁻¹	100						50				
Co	mg kg ⁻¹	63	66		86	58.014		63.9	65	62.4	59	64.7
Cr	mg kg ⁻¹	451	459		403	393.333		474	458.05	431.1	447	448
Cs	mg kg ⁻¹					0.803		0.55	0.71	1.2		
Cu	mg kg ⁻¹	44	59		46	58.550		57.8	60.28	55.9	46	48.6
Dy	mg kg ⁻¹					6.021		6.66	6.87			
Er	mg kg ⁻¹					2.410		2.44	2.61			
Eu	mg kg ⁻¹					3.372		3.8	4.12			
F	mg kg ⁻¹	850			0			970				
Ga	mg kg ⁻¹	21	18			19.176		22		20.8	19	18.7
Gd	mg kg ⁻¹					8.590		9.91	10.11			
Ge	mg kg ⁻¹					0.976		1.46		1.9		
Hf	mg kg ⁻¹	5.5				6.154		6.35	6.71	7.8		7.3
Hg	mg kg ⁻¹	0.3						0.0008				
Ho	mg kg ⁻¹					1.009		1.06	1.16			
I	mg kg ⁻¹											
In	mg kg ⁻¹							0.1				
La	mg kg ⁻¹	68				52.944		62.1	62.09	75.8	67	53.2
Li	mg kg ⁻¹					13.096		15.2	16.3			
Lu	mg kg ⁻¹					0.198		0.23	0.23			
Mo	mg kg ⁻¹	2.3				0.567		0.71	0.74	1.5		1.0
N	mg kg ⁻¹											
Nb	mg kg ⁻¹	83	91		79	75.941		80.9	82	82.6	81	84.2
Nd	mg kg ⁻¹	49				52.218		59.5	60.28	58.0	51	46.6
Ni	mg kg ⁻¹	316	338		271	267.644		310	323	315.4	306	310
Pb	mg kg ⁻¹	8	3		26	2.555		3.01	3.46	1.9		
Pr	mg kg ⁻¹	15				12.920		15.2	14.68			
Rb	mg kg ⁻¹	21	31			29.058		30.7	33	30.6	28	35.1
S	mg kg ⁻¹	230			0							
Sb	mg kg ⁻¹							0.11	0.1			
Sc	mg kg ⁻¹	17	28			18.084		23.1	24.73	21.9	20	24.7
Se	mg kg ⁻¹											
Sm	mg kg ⁻¹	8				10.654		12.1	12.27	7.0		
Sn	mg kg ⁻¹	5			0	2.145		2.96	2.59	1.9		
Sr	mg kg ⁻¹	1174	1183		812	1067.427		1221	1192	1181.9	1104	1150
Ta	mg kg ⁻¹					6.065		5.58	5.15	4.0		
Tb	mg kg ⁻¹					1.110		1.32	1.47			
Te	mg kg ⁻¹					0.007						
Th	mg kg ⁻¹	1.3				6.056		7.09	6.79	6.0	10	12.3
Tl	mg kg ⁻¹					0.008						
Tm	mg kg ⁻¹					0.289		0.3	0.28			
U	mg kg ⁻¹	2.1				2.004		2.12	1.86	2.4		7.2
V	mg kg ⁻¹	300	295			257.280		290	288	282.2	278	301
W	mg kg ⁻¹	25				0.317		0.32				
Y	mg kg ⁻¹	26	28			23.027		29.7	34	30.5	28	33.2
Yb	mg kg ⁻¹					1.549		1.72	1.75	1.4		
Zn	mg kg ⁻²	111	120		115	99.043		143	128	114.8	123	112
Zr	mg kg ⁻¹	365	273			233.359		292	273.9	295.7	267	293

Table 1		GeoPT29 Contributed data for Nephelinite, NKT-1 (June 2011)										
	Lab	D12	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21
	Quality	1	2	1	2	2	2	1	1	1	1	2
SiO ₂	% m/m	37.18			38.05	37.21	37.63	37.19	37.99	38.762	38.9	38.27
TiO ₂	% m/m	3.76			3.74	4.06	3.87	3.83	3.755	3.8224	3.9	3.906
Al ₂ O ₃	% m/m	9.91			10.17	9.88	10.09	9.96	10.01	10.343	10.5	9.923
Fe ₂ O ₃ T	% m/m	13.35			3.92	13.48	13.30	13.26	13.3	14.019	13.5	13.471
Fe(II)O	% m/m	9.4			8.09			6.76				7.628
MnO	% m/m	0.21			0.19	0.21	0.21	0.21	0.205	0.21810	0.21	0.19
MgO	% m/m	14.27			14.51	14.62	14.25	14.18	14.58	14.5544	13.38	14.175
CaO	% m/m	12.95			12.99	13.1	12.86	13.05	12.92	13.1603	13.05	13.067
Na ₂ O	% m/m	3.43			3.44	3.25	3.24	3.37	3.372	3.5302	3.03	3.226
K ₂ O	% m/m	1.3			1.24	1.24	1.20	1.24	1.23	1.2317	1.26	1.247
P ₂ O ₅	% m/m	0.9			0.86	0.89	0.93	0.91	0.917	0.9290	0.85	0.902
H ₂ O+	% m/m	2.24			2.04			2.49				
CO ₂	% m/m	0.25				0.29		0.31				0.322
LOI	% m/m				1.92	1.69	1.83	1.42	1.46	1.89	1.31	1.745
Ag	mg kg ⁻¹						0.044				0.16	
As	mg kg ⁻¹		12				3.6			1.020	65.5	
B	mg kg ⁻¹											
Ba	mg kg ⁻¹	687			746	760	739	743		694.0	430	691.5
Be	mg kg ⁻¹				2.31		1.79			3.360	1.17	0.88
Bi	mg kg ⁻¹		0				0.005					
Br	mg kg ⁻¹											
Cd	mg kg ⁻¹		10	0.1			0.052			0.064	0.037	
Ce	mg kg ⁻¹	395		118	129	130	126			90.9	63.2	139
Cl	mg kg ⁻¹		21									30
Co	mg kg ⁻¹	68			65.4		62.50	60		59.1	45.7	59
Cr	mg kg ⁻¹	428			455	460	464	437.5		402.2	192	349.5
Cs	mg kg ⁻¹	0		0.5	0.56		0.52					0.35
Cu	mg kg ⁻¹	68			68.7	60	55.8	68		57.7	29.1	36.8
Dy	mg kg ⁻¹		4	6.9	7.00		7.08				3.89	6.52
Er	mg kg ⁻¹		2	2.7	2.77		2.74				0.74	2.64
Eu	mg kg ⁻¹		2	3.7	3.80		3.84				1.56	3.53
F	mg kg ⁻¹		839									
Ga	mg kg ⁻¹	23		19.6	20.8		18.5	17.5				22
Gd	mg kg ⁻¹		20	9.8	10.5		10.6				4.3	10.37
Ge	mg kg ⁻¹			1.1								1.26
Hf	mg kg ⁻¹	15			7.09		6.93	8				6.52
Hg	mg kg ⁻¹									0.014		
Ho	mg kg ⁻¹		5	1.1	1.19		1.17				0.43	1.13
I	mg kg ⁻¹						0.079					
In	mg kg ⁻¹											
La	mg kg ⁻¹	25		61	65.1	60	62.0			45.1	31.3	59
Li	mg kg ⁻¹				17.0		14.9					
Lu	mg kg ⁻¹			0.2	0.24		0.243				0.14	0.25
Mo	mg kg ⁻¹	1			0.58		0.680				1.08	0.65
N	mg kg ⁻¹											
Nb	mg kg ⁻¹	104		82	93.7		87.3	84				45
Nd	mg kg ⁻¹	46		58.1	62.9		61.9				29.5	45.5
Ni	mg kg ⁻¹	310			317	340	319	333		302.6	141	281.5
Pb	mg kg ⁻¹	6			2.80		2.800	4		3.4	1.37	1.36
Pr	mg kg ⁻¹		11	14.3	15.8		15.4				7.98	15.04
Rb	mg kg ⁻¹	32		30	31.4		34.5	31		32.1		32.46
S	mg kg ⁻¹		61			100				142.4		30.5
Sb	mg kg ⁻¹		30				0.123					
Sc	mg kg ⁻¹	28		21	22.6		23	24			11.2	19.85
Se	mg kg ⁻¹						0.093			0.0	0.17	
Sm	mg kg ⁻¹	14		11.5	12.6		12.4				5.56	11.62
Sn	mg kg ⁻¹	2		2.3			2.33					
Sr	mg kg ⁻¹	1211			1200		1165	1167		1096.7	603	1322
Ta	mg kg ⁻¹	0		5.2	4.85		4.88					1.73
Tb	mg kg ⁻¹	2		1.3	1.41		1.40				0.69	1.36
Te	mg kg ⁻¹						0.020					
Th	mg kg ⁻¹	9		6.3	7.19		7.368	6				4.59
Tl	mg kg ⁻¹						0.008			0.024		
Tm	mg kg ⁻¹			0.3	0.32		0.33					0.34
U	mg kg ⁻¹	1		2	2.18		2.19			0.0		2.4
V	mg kg ⁻¹	169			297	300	275	273		293.5	142	290
W	mg kg ⁻¹	12			0.53		0.508	31				0.11
Y	mg kg ⁻¹	22		28	30.9	30	29.425				28.4	27.55
Yb	mg kg ⁻¹	3		1.8	1.82		1.81				0.76	1.83
Zn	mg kg ⁻²	76			132	140	121	116		114.2	95	92
Zr	mg kg ⁻¹	319			300	120	289	285			157	295.9

Table 1		GeoPT29 Contributed data for Nephelinite, NKT-1 (June 2011)										
	Lab	D22	D22	D23	D24	D25	D26	D27	D28	D29	D30	D31
	Quality	1	2	1	2	1	2	1	1	1	1	2
SiO ₂	% m/m	37.422			38.02	38.12	37.66	36.6			38.45	38.17
TiO ₂	% m/m	3.921		3.75	3.91	3.56	3.834	3.74			3.76	3.82
Al ₂ O ₃	% m/m	10.026			9.93	10.64	10.13	9.87			10.13	9.95
Fe ₂ O ₃ T	% m/m	13.370			13.57	12.98	13.57	13.1			12.48	13.47
Fe(II)O	% m/m										7.59	7.5
MnO	% m/m		0.198	0.2	0.2	0.17	0.195	0.23			0.19	0.21
MgO	% m/m	14.211			14.42	12.34	13.83	13.9			13.20	14.13
CaO	% m/m	13.031			12.57	13.39	12.93	12.7			13.33	12.83
Na ₂ O	% m/m	3.35			3.39	3.69	3.459	3.31			4.26	3.21
K ₂ O	% m/m	1.21			1.28	1.48	1.274	1.27			1.38	1.27
P ₂ O ₅	% m/m		0.862	0.86	0.82	0.94	0.913	0.95			0.97	0.93
H ₂ O+	% m/m											
CO ₂	% m/m						0.270					
LOI	% m/m		2.25		1.76	2.33	1.871				2.15	1.82
Ag	mg kg ⁻¹		0.05									
As	mg kg ⁻¹		2.3									1.5
B	mg kg ⁻¹		8.5									
Ba	mg kg ⁻¹		880	800	733		1219.7		461.953	735	688	787
Be	mg kg ⁻¹		2.9	2.07	2.56					2.26		2.2
Bi	mg kg ⁻¹											
Br	mg kg ⁻¹											
Cd	mg kg ⁻¹		0.063	0.26								
Ce	mg kg ⁻¹		210.0	130	125				131.850	128	120	130
Cl	mg kg ⁻¹						133.3					
Co	mg kg ⁻¹		£51.0	61.4	66		103.0	64.3	51.969	66.4	61	61
Cr	mg kg ⁻¹		£436.0	434	451		418.5	443	437.754	459	408	427
Cs	mg kg ⁻¹			0.58	0.53				3.676	0.52		
Cu	mg kg ⁻¹		62.3	53.8	59.9		96.0	64.4		55.6	58	56
Dy	mg kg ⁻¹			7.09	7.14					7.03	7	7
Er	mg kg ⁻¹			2.72	2.74					2.68	3	2.71
Eu	mg kg ⁻¹			3.97	3.83					3.85	3.6	3.74
F	mg kg ⁻¹		920.0				1445					
Ga	mg kg ⁻¹			20.5	21.3				18.543	21.0		18
Gd	mg kg ⁻¹			11.7	10.2					10.8	10	10.4
Ge	mg kg ⁻¹		4.60		1.36				13.048	1.23		
Hf	mg kg ⁻¹			7.06	6.54					6.80		6.2
Hg	mg kg ⁻¹											
Ho	mg kg ⁻¹			1.17	1.22					1.14	1	1.17
I	mg kg ⁻¹											
In	mg kg ⁻¹											
La	mg kg ⁻¹		97.0	63.1	63.1			64.7	67.343	66.4	62	64.2
Li	mg kg ⁻¹	15.0		14.89	18.3					15.9	16	18
Lu	mg kg ⁻¹			0.26	0.24					0.24		0.24
Mo	mg kg ⁻¹		0.70	0.7						0.73		
N	mg kg ⁻¹											
Nb	mg kg ⁻¹		79.0	88.5	91.2			86.8	78.262	94.2		82
Nd	mg kg ⁻¹		95.0	68.5	60.4				68.218	63.6	57	61.5
Ni	mg kg ⁻¹		330.0	291	317		514.7	334		334	296	318
Pb	mg kg ⁻¹		4.60	3.53	2.81		14.0			2.77		
Pr	mg kg ⁻¹			16.6	15				33.538	15.3	13	15.3
Rb	mg kg ⁻¹	26		31.6	31.6			36.3	31.284	29.9	27	32
S	mg kg ⁻¹						56.0					
Sb	mg kg ⁻¹											
Sc	mg kg ⁻¹		27.0	23.6	20.1			18.2	17.690	22.1	19	26
Se	mg kg ⁻¹											
Sm	mg kg ⁻¹			12.6	12.5				13.747	12.6	13	12.3
Sn	mg kg ⁻¹		3.60	2.45						2.67		
Sr	mg kg ⁻¹		1066.5	1179	1191			1231	###	1191	1058	1149
Ta	mg kg ⁻¹			6.31	5.26					5.31		5.1
Tb	mg kg ⁻¹			1.49	1.39					1.44	1.2	1.39
Te	mg kg ⁻¹											
Th	mg kg ⁻¹		4.70	7.46	7.52			10.0		7.22		7.9
Tl	mg kg ⁻¹		0.28	0.0082								
Tm	mg kg ⁻¹			0.36	0.33					0.33		0.33
U	mg kg ⁻¹		1.30	2.21	2.21			6.42		2.20	2.5	2.4
V	mg kg ⁻¹		316.0	286	295		513.0	310	228.450	294	277	278
W	mg kg ⁻¹		3.8									
Y	mg kg ⁻¹		32.0	28.9	30.8			31.7	29.499	31.5	29	29
Yb	mg kg ⁻¹		2.5	2.16	1.8					1.78	1.8	1.8
Zn	mg kg ⁻²		125.0		122		196.0	119	132.767	120	121	112
Zr	mg kg ⁻¹		273.5	292	295		691.3	312	322.437	289	319	286

Table 1		GeoPT29 Contributed data for Nephelinite, NKT-1 (June 2011)										
	Lab	D32	D33	D34	D34	D35	D37	D38	D38	D39	D40	D41
	Quality	1	2	1	2	1	2	1	2	2	1	1
SiO ₂	% m/m	38.40		37.71			39.60	37.45		37.486	37.15	
TiO ₂	% m/m	4.56		3.92			3.64	3.854		3.872	3.84	3.92
Al ₂ O ₃	% m/m	10.16		10.04			10.62	9.82		10.222	9.95	9.367
Fe ₂ O ₃ T	% m/m	13.10		13.1			12.53	13.32		13.412	13.12	
Fe(II)O	% m/m			7.34				7.57				
MnO	% m/m	0.206		0.202			0.195	0.202		0.217	0.20	0.176
MgO	% m/m	13.75		13.84			12.52	14.07		14.219	14.02	14.92
CaO	% m/m	12.97		13.26			12.04	12.98		13.087	12.82	12.34
Na ₂ O	% m/m	3.02		3.36			4.35	3.35		3.426	3.47	3.329
K ₂ O	% m/m	1.24		1.18			1.25	1.25		1.258	1.23	1.256
P ₂ O ₅	% m/m	0.976		0.876			1.15	0.901		0.901	0.88	
H ₂ O+	% m/m			2.47				2.35				
CO ₂	% m/m			0.27				0.25				
LOI	% m/m	1.42		1.86			1.58	1.76		1.548	1.66	
Ag	mg kg ⁻¹											
As	mg kg ⁻¹										2	
B	mg kg ⁻¹											
Ba	mg kg ⁻¹		721	704.4		703	742	745			835	799.2
Be	mg kg ⁻¹				2.25		2.46					
Bi	mg kg ⁻¹											
Br	mg kg ⁻¹											
Cd	mg kg ⁻¹			0.52			0.052					
Ce	mg kg ⁻¹		127	123		117	130	150			108	130.98
Cl	mg kg ⁻¹											
Co	mg kg ⁻¹		67.5	53.38		61.9	65.2	57			62	65.95
Cr	mg kg ⁻¹		388		392	448	369	446			401	467.4
Cs	mg kg ⁻¹		0.52			0.28	0.539					0.568
Cu	mg kg ⁻¹		59.1	61.60		55.0	40	59			54	51.52
Dy	mg kg ⁻¹		7.17	6.32		6.42	7.13					6.59
Er	mg kg ⁻¹		2.79	2.47		2.56	2.81					2.55
Eu	mg kg ⁻¹		3.86	3.76		3.49	3.88					4.04
F	mg kg ⁻¹			920			770		626			
Ga	mg kg ⁻¹			20.94			21	20			20	20.55
Gd	mg kg ⁻¹		10.6	9.25		10.6	11.0					12.65
Ge	mg kg ⁻¹											
Hf	mg kg ⁻¹			8.22		2.49	6.8				6	7.23
Hg	mg kg ⁻¹											
Ho	mg kg ⁻¹		1.18	1.05		1.08	1.18					0.979
I	mg kg ⁻¹											
In	mg kg ⁻¹											
La	mg kg ⁻¹		63.4	63.4		59.4	64.3	60			192	66.02
Li	mg kg ⁻¹		16.3		14		15.6					16.5
Lu	mg kg ⁻¹		0.23	0.220		0.18	0.25					0.25
Mo	mg kg ⁻¹			3.01			0.79				1	
N	mg kg ⁻¹											
Nb	mg kg ⁻¹			87.50		57.0	81	81			81	92.67
Nd	mg kg ⁻¹		63.8	63.0		57.7	63.3	63			53	64.16
Ni	mg kg ⁻¹		323	276.6		308	320	316			288	329.05
Pb	mg kg ⁻¹		2.8	2.99			3.1	17			14	2.616
Pr	mg kg ⁻¹		15.5	13.88		14.2	15.5					15.45
Rb	mg kg ⁻¹			27.91		27.1	30.2	29			36	29.98
S	mg kg ⁻¹											
Sb	mg kg ⁻¹						0.10					
Sc	mg kg ⁻¹		19.8	33.10			21.5	31			19	21.97
Se	mg kg ⁻¹											
Sm	mg kg ⁻¹		12.6	11.34		10.9	12.53				9	12.26
Sn	mg kg ⁻¹						2.22					
Sr	mg kg ⁻¹		1258	1132		1147	1140	1145			1166	1211.14
Ta	mg kg ⁻¹				26.1	4.00						4.66
Tb	mg kg ⁻¹		1.41	1.33		1.40	1.37					1.44
Te	mg kg ⁻¹						0.19					
Th	mg kg ⁻¹		8.75	8.74		6.42	8.1	15			11	7.396
Tl	mg kg ⁻¹						0.015					
Tm	mg kg ⁻¹		0.31	0.296		0.29	0.336					
U	mg kg ⁻¹		2.55	3.02		2.16	2.32	4			6.7	2.24
V	mg kg ⁻¹		276	265.6		281	307	273			310	312.35
W	mg kg ⁻¹						0.44					
Y	mg kg ⁻¹		30.8	26.10		26.9	29	30			30	29.95
Yb	mg kg ⁻¹		1.79	1.66		1.63	1.98					1.896
Zn	mg kg ⁻²		105	104.5			108	116			111	110.05
Zr	mg kg ⁻¹			285.0		119	282	274			291	304.17

Table 1		GeoPT29 Contributed data for Nephelinite, NKT-1 (June 2011)										
	Lab	D42	D43	D44	D45	D46	D47	D47	D48	D49	D50	D51
	Quality	1	2	2	2	2	1	2	2	2	2	2
SiO ₂	% m/m	34.7	37.99	35.09	37.8	35.5	37.52		37.6	38.9	37.5	38.79
TiO ₂	% m/m	3.58	4.28	3.81	3.96	3.84	3.61		3.96	3.89	3.96	3.81
Al ₂ O ₃	% m/m	7.69	10.18	12.23	10.1	9.56	9.73		10.12	9.94		10.32
Fe ₂ O ₃ T	% m/m	12.63	13.43	13.48	13.2	13.3	12.32		13.01	13	13.8	13.13
Fe(II)O	% m/m											
MnO	% m/m	0.188	0.2	0.18	0.2	0.206	0.11			0.213	0.21	0.205
MgO	% m/m	10.10	14.02	12.09	14.2	14.2	14.25		14.19	11.98		13.73
CaO	% m/m	12.38	12.64	13.56	13.2	12.6	13.26		12.91	12.9	13.2	12.91
Na ₂ O	% m/m	2.26	3.46	4.54	3.32	3.37	3.57		3.3	3.54		2.96
K ₂ O	% m/m	1.31	1.3	1.33	1.32	1.17	1.27		1.25	1.3		1.26
P ₂ O ₅	% m/m	0.919		1.16	0.918	0.98	0.86		0.93	0.877	0.88	0.855
H ₂ O+	% m/m			0.28								
CO ₂	% m/m									0.33		
LOI	% m/m		1.93	1.73	2.1	4.67	2.12		2.1	1.84	1.62	1.64
Ag	mg kg ⁻¹								0.34			
As	mg kg ⁻¹					5.7		6		0.9		
B	mg kg ⁻¹		60									
Ba	mg kg ⁻¹	789.9	731	696	661	739		1004		753	830	773
Be	mg kg ⁻¹									2.37		2.51
Bi	mg kg ⁻¹							5				0.05
Br	mg kg ⁻¹											
Cd	mg kg ⁻¹	2.4				0.33	7.6					0.09
Ce	mg kg ⁻¹	121.1		83		116			128.5	138		128
Cl	mg kg ⁻¹											
Co	mg kg ⁻¹		106	72	82.0	66.7		163	55.5	59.7		65.6
Cr	mg kg ⁻¹	348	448	464	394	462		674	410	462		457
Cs	mg kg ⁻¹	4.3				0.66			0.55	0.55		1.10
Cu	mg kg ⁻¹	53.7	48	58	49.0	94		66	56	50		89.4
Dy	mg kg ⁻¹					6.29			6.84	7.19		7.49
Er	mg kg ⁻¹					2.68			2.65	2.84		3.68
Eu	mg kg ⁻¹					3.49			3.68	4.1		5.16
F	mg kg ⁻¹		820									
Ga	mg kg ⁻¹	18.4		20				23	20.8	19.7		21
Gd	mg kg ⁻¹					10.7			9.8	11.3		13.4
Ge	mg kg ⁻¹							2	0.23			
Hf	mg kg ⁻¹		2			6.39		11		7.1		7.9
Hg	mg kg ⁻¹						0.043					0.030
Ho	mg kg ⁻¹					1.04			1.14	1.33		1.21
I	mg kg ⁻¹											
In	mg kg ⁻¹								0.088	0.094		0.09
La	mg kg ⁻¹	56.6		42		56.9		74	66.7	66.4		63.7
Li	mg kg ⁻¹		16							17.9		17.0
Lu	mg kg ⁻¹					0.21			0.25	0.25		0.30
Mo	mg kg ⁻¹					1.4		10	0.82	0.89		1.5
N	mg kg ⁻¹											
Nb	mg kg ⁻¹	78.6		83		75.9		102	90.2	96.7		77.6
Nd	mg kg ⁻¹	20.1		39		57.1		73	61.1	61.5		62.9
Ni	mg kg ⁻¹	302.1	308	315	269	356		396	278	272		318
Pb	mg kg ⁻¹	4.7				7.9				5		5.6
Pr	mg kg ⁻¹					13.6			15.25	16.3		15.7
Rb	mg kg ⁻¹	29.2		30		26.9		41	35	31.3	40	32.5
S	mg kg ⁻¹	30.2		127						150		
Sb	mg kg ⁻¹					0.3	58					
Sc	mg kg ⁻¹			28		29		42	18.3	28.9		22.1
Se	mg kg ⁻¹									3.4		0.44
Sm	mg kg ⁻¹	15.8				11.2		13	12.55	12.3		13.1
Sn	mg kg ⁻¹	4.2				3.6			2.3			
Sr	mg kg ⁻¹	1067	1214	1174	1087	1220		1438	1225	1210	1190	1121
Ta	mg kg ⁻¹					552		11	5.55	6		2.3
Tb	mg kg ⁻¹					1.36			1.35	1.54		2.01
Te	mg kg ⁻¹						34.11					
Th	mg kg ⁻¹	9.1				6.5		11	7.28	8.16		8.62
Tl	mg kg ⁻¹											
Tm	mg kg ⁻¹					0.29			0.32	0.36		0.34
U	mg kg ⁻¹					1.99		9	2.3	2.46		2.49
V	mg kg ⁻¹	344.2		316	261	285		413	272	298		339
W	mg kg ⁻¹					1.3		5				
Y	mg kg ⁻¹	27.9	40	32		28		39	30.6	30.7		28.3
Yb	mg kg ⁻¹					1.67			1.73	1.81		2.18
Zn	mg kg ⁻²	99.4	131	116	107	136		161	123	107		167
Zr	mg kg ⁻¹	279.7	220	297		266		392	295	294	280	278

Table 1		GeoPT29 Contributed data for Nephelinite, NKT-1 (June 2011)										
	Lab	D52	D53	D54	D54	D55	D55	D56	D57	D58	D60	D61
	Quality	2	1	1	2	1	2	1	1	2	2	2
SiO ₂	% m/m		37.754	38.15		37.999		37.343	38.1	38.3	37.82	37.82
TiO ₂	% m/m	4.058	3.8183	3.69		3.729		3.928	3.86	3.93	3.88	3.84
Al ₂ O ₃	% m/m	10.53	10.054	9.57		10.291		10.080	10.2	10.2	9.99	9.84
Fe ₂ O ₃ T	% m/m	13.74	13.549	12.57		13.409		13.179	13.5		13.42	13.47
Fe(II)O	% m/m									11.88		7.37
MnO	% m/m	0.213	0.2052	0.150		0.205		0.2034	0.22	0.193	0.21	0.21
MgO	% m/m	15.52	14.149	11.87		14.423		14.882	13.8	14.6	14.26	14.1
CaO	% m/m	13.42	12.876	13.64		12.88		13.259	13.3	13.01	12.96	13.32
Na ₂ O	% m/m	3.488	3.406	4.05		3.461		2.955	3.28	3.7	3.5	3.15
K ₂ O	% m/m	1.34	1.245	1.64		1.275		1.269	1.31	1.2	1.26	1.27
P ₂ O ₅	% m/m	1.058	0.9117	0.81		0.909		0.7612	0.84	0.97	0.926	0.97
H ₂ O+	% m/m									0.46		2.87
CO ₂	% m/m									0.273		0.28
LOI	% m/m		1.670		2.84	1.61		1.691	2.07	1.77	1.55	2.08
Ag	mg kg ⁻¹	0.06		6.06					10.7			0.04
As	mg kg ⁻¹	0.176		0.42				0.464	23		1.5	1.3
B	mg kg ⁻¹	6.209										
Ba	mg kg ⁻¹	819.2	731.7	753.13		769.3		810.5	538	784	789	780.1
Be	mg kg ⁻¹	2.518							2.5		2.3	2.5
Bi	mg kg ⁻¹			0				0.827		33	0.04	
Br	mg kg ⁻¹			0								
Cd	mg kg ⁻¹	0.119		2.23					0.07		0.19	0.104
Ce	mg kg ⁻¹	139.7	120.1	87.05				103.1	134	113	119	135.15
Cl	mg kg ⁻¹			53.62						96		115
Co	mg kg ⁻¹	63.99		59.53		55.6		65.25	63.7	64.6	63	73.14
Cr	mg kg ⁻¹	424.8	435.3	433.72		453.4		464.9	310	447	700	499
Cs	mg kg ⁻¹	0.657	0.537	0					0.53		0.5	0.573
Cu	mg kg ⁻¹	56.44	55.9	62.34		62.9		63.16	64.1	58	56	56.4
Dy	mg kg ⁻¹	7.551	7.606						8.37	7.26	6.7	7.527
Er	mg kg ⁻¹	3.013	2.763						3.59	2.75	2.5	2.874
Eu	mg kg ⁻¹	4.233	4.117						4.98	3.56	3.6	4.171
F	mg kg ⁻¹									1030		571
Ga	mg kg ⁻¹	16.96	19.9	19.88		20		22.80	19.4	21	20.5	19.99
Gd	mg kg ⁻¹	11.2	10.866						11.6	10.7	10	10.981
Ge	mg kg ⁻¹			0					0.3		0.73	
Hf	mg kg ⁻¹	6.935	6.707	6.72				5.54	6.18	7.89	6.9	7.14
Hg	mg kg ⁻¹											
Ho	mg kg ⁻¹	1.264	1.256						1.58	1.13	1.1	1.235
I	mg kg ⁻¹			0								
In	mg kg ⁻¹								0.04		0.08	0.089
La	mg kg ⁻¹	69.73	63.8	62.56				62.15	75.3	54.8	65	66.54
Li	mg kg ⁻¹	17.66							19		16.2	17.6
Lu	mg kg ⁻¹	0.25	0.235						0.41	0.23	0.24	0.249
Mo	mg kg ⁻¹	0.653		1.04				1.42	1.15		0.9	0.74
N	mg kg ⁻¹											
Nb	mg kg ⁻¹	88.1	85.3	86.88		84.6		95.66	52.2	92.7	81	92.162
Nd	mg kg ⁻¹	65.34	62.1	48.22				50.10	71.1	57.1	59.5	67.44
Ni	mg kg ⁻¹	345.7	304.3	315.77		315		327.7	268	344	293	345.1
Pb	mg kg ⁻¹	2.873	2.8	0.8		5.4		3.09	14.5		3.2	2.8
Pr	mg kg ⁻¹	16.73	15.504						17.6	13.9	13.8	16.494
Rb	mg kg ⁻¹	32.9	30.5	32.01		31.8		35.36	34.5	30.3	30	32.1
S	mg kg ⁻¹									90	96	
Sb	mg kg ⁻¹	0.135		0							0.16	0.15
Sc	mg kg ⁻¹		23.2	21.79		26.5		23.36	24.9	18.6	22	26.5
Se	mg kg ⁻¹			0.230				1.14				
Sm	mg kg ⁻¹	13.27	12.853	10.240				10.73	14.0	11.1	11.8	13.551
Sn	mg kg ⁻¹	2.251		1.53					2.8		2.7	0.83
Sr	mg kg ⁻¹	1407	1205.4	1125.88		1205.3		1176.1	1000	1168	1098	1206.6
Ta	mg kg ⁻¹	4.743	4.3	5.95				9.14	2.36	5.9	5	5.439
Tb	mg kg ⁻¹	1.478	1.489						1.83	1.44	1.29	1.463
Te	mg kg ⁻¹			0								
Th	mg kg ⁻¹	7.544	7.5	12.46		8		10.41	8.2	6.54	6.96	7.655
Tl	mg kg ⁻¹			0					0.04		0.06	0.008
Tm	mg kg ⁻¹	0.351	0.333						0.44	0.33	0.31	0.347
U	mg kg ⁻¹	2.293	2.2	4.85		2			2.28	2.17	2.1	2.357
V	mg kg ⁻¹	307.2	286.0	290.49			299.9	325.4	240	260	299	307.7
W	mg kg ⁻¹	0.618		3.74				1.59	0.6		0.4	0.33
Y	mg kg ⁻¹	31.43	30.8	29.04		33.3		31.65	36.3	25.2	26	32.57
Yb	mg kg ⁻¹	2.055	1.761	0.43				0.585	2.9	1.83	1.7	1.876
Zn	mg kg ⁻²	128.7	119.0	112.53		109		113.2	109	125	103	121
Zr	mg kg ⁻¹	315	291.2	279.74		294.6		300.2	217	305	274	308

Table 1		GeoPT29 Contributed data for Nephelinite, NKT-1 (June 2011)										
	Lab	D62	D63	D64	D65	D66	D67	D68	D69	D70	D71	D72
	Quality	2	2	1	1	2	1	2	1	2	2	2
SiO ₂	% m/m	37.61	37.7			37.51	38.11	38.14	38.135	33.225	38.02	37.52
TiO ₂	% m/m	3.85	3.85	3.8		3.822	3.88	3.92	3.84	4.242	3.94	3.76
Al ₂ O ₃	% m/m	10.01	9.83	9.8		9.93	10.2	10.19	10.158	10.761	10.15	10.1
Fe ₂ O ₃ T	% m/m	13.2	13.29	13		13.35	13.36	13.13	13.159	12.809	13.29	13.18
Fe(II)O	% m/m					7.33						
MnO	% m/m	0.2	0.208	0.2		0.2	0.21	0.2	0.2017	0.258	0.2	0.21
MgO	% m/m	14.1	14.53	14		14.34	14.27	14.27	14.333	15.791	14.19	14.55
CaO	% m/m	12.77	12.9	12.66		13.33	13.04	12.96	12.972	13.29	13.02	12.24
Na ₂ O	% m/m	3.48	3.44	3.48		3.35	3.36	3.46	3.431	3.632	3.43	3.41
K ₂ O	% m/m	1.26	1.28	1.24		1.32	1.25	1.26	1.243	1.225	1.27	1.15
P ₂ O ₅	% m/m	0.95	0.92			0.9	0.92	0.93	0.9098	0.968	0.92	0.95
H ₂ O+	% m/m											1.64
CO ₂	% m/m					0.33				0.41		0.36
LOI	% m/m	2.05				1.61	1.94	1.8	1.603		1.37	2.06
Ag	mg kg ⁻¹									1.97		
As	mg kg ⁻¹	6		1.4			2.28			8.04		
B	mg kg ⁻¹											
Ba	mg kg ⁻¹			655	771.1	725	748.58	689	738.5	951.3	806	850
Be	mg kg ⁻¹					2.5		2.59	2.354	2.66		2.06
Bi	mg kg ⁻¹									0.02		
Br	mg kg ⁻¹											
Cd	mg kg ⁻¹								0.039	0.05		
Ce	mg kg ⁻¹			136	124.57	121	122.09	126.3	126	110.37		130
Cl	mg kg ⁻¹			134						0		
Co	mg kg ⁻¹	50		60	61.33	62	63.6	68.2	66.12	68.05		61
Cr	mg kg ⁻¹	270		434	448.61		431.16	455.6	431.3	419.1	465	410
Cs	mg kg ⁻¹			0.56	0.521		0.57	0.63	0.553	0.52		0.51
Cu	mg kg ⁻¹	50			66.55	56	46.49	48.5	51.43	77.37	31	54
Dy	mg kg ⁻¹			6.15	7.158	5.62	6.45	6.85	7.142	7.09		7.1
Er	mg kg ⁻¹				2.862	2.47	2.49	2.71	2.751	2.72		2.2
Eu	mg kg ⁻¹			4	3.835	3.44	3.92	3.92	4.067	3.84		4.03
F	mg kg ⁻¹											
Ga	mg kg ⁻¹				21.47	21	18	20.3	19.69	24.18		20
Gd	mg kg ⁻¹				10.95		10.18	10.8	10.63	12.01		11.5
Ge	mg kg ⁻¹											1.3
Hf	mg kg ⁻¹			6.6	6.71		3.31	6.8	6.799			6.1
Hg	mg kg ⁻¹									0.00064		
Ho	mg kg ⁻¹			1.3	1.161	1	1.1	1.2	1.224	1.04		1.1
I	mg kg ⁻¹											
In	mg kg ⁻¹											
La	mg kg ⁻¹			62.4	62.66	59	62.98	63.7	62.67	54.14		66
Li	mg kg ⁻¹					18			17.6	17.22		15.8
Lu	mg kg ⁻¹			0.2	0.249	0.19	0.22	0.24	0.241	0.22		0.23
Mo	mg kg ⁻¹							1.65	0.743	0.66		
N	mg kg ⁻¹											
Nb	mg kg ⁻¹				92.21	87	82.39	87.98	79.42			86
Nd	mg kg ⁻¹			54.74	61.8	54.5	59.76	62.7	63.01	63.91		62
Ni	mg kg ⁻¹	260		286	320.76	303	305.42	322.5	311.6	243.88	238	320
Pb	mg kg ⁻¹	6			3.064		2.19		2.866	2.86	18	
Pr	mg kg ⁻¹				15.36	13.7	14.57	15.4	15.57	13.51		15.2
Rb	mg kg ⁻¹			31.3	31.47	32	32.8	31.8	29.22	35.63		29
S	mg kg ⁻¹											
Sb	mg kg ⁻¹			0.12					0.122	0.25		
Sc	mg kg ⁻¹			21.8	22.03	20.7	23.79	20.6	23.34	21.59		20.5
Se	mg kg ⁻¹											
Sm	mg kg ⁻¹			12.1	12.19	10.2	11.97	12.46	12.58	12.38		12.4
Sn	mg kg ⁻¹								2.448			2.1
Sr	mg kg ⁻¹			1168	1283.2	1175	1150.58	1174	1133.8	1477.03	1100	1250
Ta	mg kg ⁻¹			4.8	4.511		4.9	5.6	4.851	5.64		4.4
Tb	mg kg ⁻¹			1.07	1.475	1.2	1.33		1.409	1.4		1.25
Te	mg kg ⁻¹									0.03		
Th	mg kg ⁻¹	5		6.7	7.052		6.24	7.3	7.564	6.43		7.4
Tl	mg kg ⁻¹									0.02		
Tm	mg kg ⁻¹				0.334	0.105	0.298		0.337	0.29		0.34
U	mg kg ⁻¹			1.96	2.075		2.15	2.1	2.315	1.92		2.2
V	mg kg ⁻¹			313	282.44		304.93	297.6	294	311.62	242	300
W	mg kg ⁻¹								0.295			0.31
Y	mg kg ⁻¹				31.43	30	28.95	32.1	30.1	24.63		28
Yb	mg kg ⁻¹			1.6	1.802	1.68	1.69	1.84	1.793	1.92		1.63
Zn	mg kg ⁻²	95		135	134.88	115	117.26	117.5	117.5	154.07	161	105
Zr	mg kg ⁻¹			319	294.77	294	289.34	283.6	281.6	248.39	281	290

Table 1												
	Lab	D73	D74	D75	D76	D77	D78	D79	D80	D81	D82	D83
	Quality	1	2	2	1	1	2	2	2	1	1	1
SiO ₂	% m/m		36.788	38.4		38.15	37.2534	36.64	38.04			37.56
TiO ₂	% m/m	3.703	4.043	3.84		3.84	3.89648	3.55	3.999		4.25976	3.83
Al ₂ O ₃	% m/m	9.92	10.126	10.3		9.95	9.84017	13.26	9.805		10.936	10.08
Fe ₂ O ₃ T	% m/m	13.31	13.338	13		13	13.8419	12.71	12.77		13.5344	13.38
Fe(II)O	% m/m			7.2					6.84			
MnO	% m/m	0.195	0.203	0.21		0.2	0.2112	0.212	1.1984		0.19121	0.208
MgO	% m/m	12.766	15.219	14.7		14.05	14.0711	9.87	14.45		13.1729	14.51
CaO	% m/m	12.873	12.811	13.2		13	13.0022	12.25	13.49		13.3007	12.96
Na ₂ O	% m/m	3.397		3.4		3.45	3.32953		3.063		3.26241	3.35
K ₂ O	% m/m	1.397	1.281	1.29		1.27	1.25255	1.11	1.401		1.20896	1.25
P ₂ O ₅	% m/m		0.927	0.93		0.93	0.91476		0.9134		1.1001	0.92
H ₂ O+	% m/m			2.3								
CO ₂	% m/m			0.25				9.63				
LOI	% m/m		1.6	1.82		1.73	1.658		1.55			1.53
Ag	mg kg ⁻¹			0.04					0.07			0.038
As	mg kg ⁻¹	2.2									1.55805	2.65
B	mg kg ⁻¹											
Ba	mg kg ⁻¹	670	711.4	730	718.85			781	725		716.434	789
Be	mg kg ⁻¹		2.3	2.6					3.159	2.645	2.30296	2.57
Bi	mg kg ⁻¹								0.023		0.02188	0.0047
Br	mg kg ⁻¹											
Cd	mg kg ⁻¹			0.07				2	0.169			0.075
Ce	mg kg ⁻¹	122	116.75	123	122.423			117	127.01	129.4	123.33	122.8
Cl	mg kg ⁻¹			80								
Co	mg kg ⁻¹	64	62.58	64.7					69.7	66.94	67.3798	66.3
Cr	mg kg ⁻¹	459	421.1	450				411	355	318	503.331	464
Cs	mg kg ⁻¹		0.53	0.5	0.539				0.516	0.6015	0.51805	0.519
Cu	mg kg ⁻¹		55.1	52.3				103	54.5	64.36	56.1326	57.7
Dy	mg kg ⁻¹	7.7	6.48	6.58	6.973				6.979	7.195	9.06872	7.107
Er	mg kg ⁻¹		2.54	2.63	2.607				2.733	2.787	3.2303	2.743
Eu	mg kg ⁻¹	3.88	3.62	3.94	3.769				3.804	3.913	4.14189	3.903
F	mg kg ⁻¹			780								1290
Ga	mg kg ⁻¹		20.5	21				19.9	14.5	22.21	20.1572	20.6
Gd	mg kg ⁻¹		9.59	9.78	10.144				10.86	10.69	13.3273	10.47
Ge	mg kg ⁻¹								1.559		1.89586	
Hf	mg kg ⁻¹	7.1	5.45	7	7.36				6.556	5.919	6.8485	6.615
Hg	mg kg ⁻¹											
Ho	mg kg ⁻¹		1.08	1.2	1.143				1.197	1.199	1.11858	1.146
I	mg kg ⁻¹											
In	mg kg ⁻¹			0.1								
La	mg kg ⁻¹	63.4	58.01	61.1	61.272			54.5	64.82	66.4	61.6746	61.3
Li	mg kg ⁻¹			20	15.854				15.4	17.85	14.6874	16.4
Lu	mg kg ⁻¹	0.2	0.21	0.2	0.212				0.231	0.2486	0.27581	0.233
Mo	mg kg ⁻¹			0.83	0.716				0.921	0.7536	0.82333	0.725
N	mg kg ⁻¹											
Nb	mg kg ⁻¹		74.74	86	88.626			83.5	81.34	92.16	96.2173	86
Nd	mg kg ⁻¹	58	58.47	60.4	60.469			62.6	63.67	63.62	59.9973	62.2
Ni	mg kg ⁻¹	270	340.9	304				295	214	340.7	288.795	323
Pb	mg kg ⁻¹			2.9	2.838				6.341	3.055	2.25034	2.847
Pr	mg kg ⁻¹		14.08	15.7	14.814			10.5	15.26	16.03	14.4954	15.21
Rb	mg kg ⁻¹	35	29.6	31				33.3	30.42	33.71	32.2464	31.2
S	mg kg ⁻¹								71.3			
Sb	mg kg ⁻¹	0.28							0.208	0.0972	0.1085	0.092
Sc	mg kg ⁻¹	22.5	20.9	20					23.7	21.59	23.6438	23
Se	mg kg ⁻¹										0.06578	
Sm	mg kg ⁻¹	12.1	11.54	12.4	11.801				12.82	12.69	12.37	12.77
Sn	mg kg ⁻¹		2.67	2					2.797		3.48773	2.622
Sr	mg kg ⁻¹	1170	1140	1260	1146.92			1250	1180.4		1248.97	1194
Ta	mg kg ⁻¹	5	4.24	4.9	3.817				5.073	5.257	5.80634	6.946
Tb	mg kg ⁻¹	1.23	1.29	1.44	1.343				1.513	1.423	1.79093	1.458
Te	mg kg ⁻¹											
Th	mg kg ⁻¹	7.1	6.59	7.2	7.707			5.3	7.002	7.612	6.31548	7.141
Tl	mg kg ⁻¹				0.056					0.0097	0.00697	0.008
Tm	mg kg ⁻¹		0.3	0.29	0.337				0.344	0.3365	0.35109	0.329
U	mg kg ⁻¹		1.95	2.16	2.162				2.173	2.358	2.16373	2.122
V	mg kg ⁻¹	304	284.7	285				704	241	317.5	429.295	309
W	mg kg ⁻¹								0.502	0.2955	0.33412	0.385
Y	mg kg ⁻¹		26.54	29.2	27.064			27.5	30.14	28.21	29.5997	28.4
Yb	mg kg ⁻¹	1.45	1.64	1.9	1.774				1.869	1.9	1.97203	1.788
Zn	mg kg ⁻²		122.3	115				116	120	151.2	111.641	118.8
Zr	mg kg ⁻¹	340	247.85	300	295.139			326	276.8	258.5	308.358	294

Table 1		GeoPT29 Contributed data for Nephelinite, NKT-1 (June 2011)								
	Lab	D84	D85	D86	D86	D87	D89	D90	D91	D92
	Quality	1	2	1	2	2	1	2	2	2
SiO ₂	% m/m	37.73	37.75	37.89		38.23	35.9	37.41	37.68	38.55
TiO ₂	% m/m	3.727	3.868	3.82		3.84	3.7	3.836	3.93	
Al ₂ O ₃	% m/m	9.823	10.05	9.61		9.68	9.5	10.19	10.11	10.39
Fe ₂ O ₃ T	% m/m	12.48	13.3	13.77		12.77	12.6	13.22	13.37	12.1
Fe(II)O	% m/m						7.3		7.36	
MnO	% m/m	0.2	0.209	0.196		0.1997	0.2	0.197	0.206	
MgO	% m/m	13.78	14.56	14.02		2.45	13.6	14.48	14.28	13.74
CaO	% m/m	12.809	13.03	13.32		13.53	12.4	12.51	13.02	13.17
Na ₂ O	% m/m	3.307	3.482	3.26		12.71	3.3	3.53	3.35	
K ₂ O	% m/m	1.279	1.242	1.266		1.24	1.2	1.23	1.26	
P ₂ O ₅	% m/m	0.933	0.907	0.916		0.92	0.9	0.919	0.91	
H ₂ O+	% m/m								0.33	
CO ₂	% m/m	0.525								
LOI	% m/m		1.258	1.93		2.04			1.76	1.5
Ag	mg kg ⁻¹		0.62	0.14						
As	mg kg ⁻¹	1.78		3.13			2.1	8		
B	mg kg ⁻¹					709				
Ba	mg kg ⁻¹	760.3	692	759			721.4	721	523.1	
Be	mg kg ⁻¹	2.433	1.43	2.55			2.5			
Bi	mg kg ⁻¹									
Br	mg kg ⁻¹							3		
Cd	mg kg ⁻¹	0.053		0.42			0.18			
Ce	mg kg ⁻¹	127	128	126		89	128	122.15	157.9	
Cl	mg kg ⁻¹									
Co	mg kg ⁻¹	64.87	65.7		69	63		44	60.2	
Cr	mg kg ⁻¹	445			440	391	454.5	351	435.1	
Cs	mg kg ⁻¹	0.554					0.5			
Cu	mg kg ⁻¹		56.8		58	13	57.5	43	53.2	
Dy	mg kg ⁻¹	6.767	6.98	7.18			7	6.629		
Er	mg kg ⁻¹	3.103	2.66	2.91			2.8	2.562		
Eu	mg kg ⁻¹	3.827	4.01	3.95			4	3.6		
F	mg kg ⁻¹						635			
Ga	mg kg ⁻¹	21.5			22.9	19	19.7	18	21.2	
Gd	mg kg ⁻¹	10.243	11.1	11.03			10.6	9.867		
Ge	mg kg ⁻¹						1.5			
Hf	mg kg ⁻¹	6.673					6.5	7		
Hg	mg kg ⁻¹									
Ho	mg kg ⁻¹	1.323	1.13	1.18			1.2	1.088		
I	mg kg ⁻¹									
In	mg kg ⁻¹									
La	mg kg ⁻¹	60.8	66.3	62.6		55	62.7	61.33	54.5	
Li	mg kg ⁻¹	17.77	18	11						
Lu	mg kg ⁻¹	0.244		0.24			0.2	0.218		
Mo	mg kg ⁻¹	0.817	0.81	0.98			0.8			
N	mg kg ⁻¹						0.8			
Nb	mg kg ⁻¹	85.17			92		95	83	77.3	
Nd	mg kg ⁻¹	60.4	63.8	60.5		53	62.4	58.91	67.1	
Ni	mg kg ⁻¹	302.33	320		324	297	366	331	321.2	
Pb	mg kg ⁻¹	2.84	2.56	2.74		5	2.5			
Pr	mg kg ⁻¹	15.27	15.5	15.1			14.7	14.65		
Rb	mg kg ⁻¹	32.2			34	29	30.9	29	31.2	
S	mg kg ⁻¹						106			
Sb	mg kg ⁻¹	0.143		0.15						
Sc	mg kg ⁻¹	22			17		25.5	20.15		
Se	mg kg ⁻¹	0.053		6.19						
Sm	mg kg ⁻¹	11.867	12.4	12.2			12.2	11.559		
Sn	mg kg ⁻¹		2.4				0.1			
Sr	mg kg ⁻¹	1213.3	1060		1191	1079	1170.3	1202	1203.9	
Ta	mg kg ⁻¹	5.59					5			
Tb	mg kg ⁻¹	1.42	1.45	1.43			1.4	1.269		
Te	mg kg ⁻¹									
Th	mg kg ⁻¹	7.313	8.03	8.25		9	7	7.615	8.1	
Tl	mg kg ⁻¹	0.23								
Tm	mg kg ⁻¹	0.28		0.32				0.307		
U	mg kg ⁻¹	2.17	2.32	2.09		18	2.2			
V	mg kg ⁻¹	281	274		329	293	310.5	247	286.7	
W	mg kg ⁻¹									
Y	mg kg ⁻¹	29.8	28.8		29	25	31.2	28.65	30	
Yb	mg kg ⁻¹	1.83	1.84	1.81			1.8	1.636		
Zn	mg kg ⁻²	120	130		116	98	121.5	107	125.1	
Zr	mg kg ⁻¹	297			298	265	292.3	318	287.5	

Table 2 GeoPT29 Assigned values and statistical summary of contributed data for Nephelinite, NKT-1

	Assigned value	Uncertainty of assigned value	Horwitz Target value	Uncertainty /Target	Number of reported results	Robust mean of results	Median of results	Status	Type of assigned value
	X_a % m/m	s_{dm} % m/m	H_a % m/m	s_{dm}/H_a	n	% m/m	% m/m		
SiO ₂	37.78	0.065	0.437	0.149	75	37.78	37.75	Assigned	Robust mean
TiO ₂	3.84	0.011	0.063	0.179	81	3.84	3.84	Assigned	Robust mean
Al ₂ O ₃	10.05	0.027	0.142	0.190	79	10.05	10.07	Assigned	Robust mean
Fe ₂ O ₃ T	13.29	0.031	0.180	0.173	78	13.24	13.29	Assigned	Median
MnO	0.203	0.001	0.005	0.204	80	0.203	0.202	Assigned	Robust mean
MgO	14.19	0.048	0.190	0.254	79	14.10	14.19	Assigned	Median
CaO	12.99	0.032	0.177	0.180	80	12.99	12.99	Assigned	Robust mean
Na ₂ O	3.39	0.016	0.056	0.282	77	3.39	3.38	Assigned	Robust mean
K ₂ O	1.258	0.003	0.024	0.124	79	1.259	1.258	Assigned	Median
P ₂ O ₅	0.917	0.003	0.019	0.151	76	0.915	0.917	Assigned	Median
	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹			mg kg ⁻¹	mg kg ⁻¹		
Ba	741	7.583	21.911	0.346	74	746	741	Assigned	Median
Be	2.43	0.038	0.170	0.225	37	2.39	2.43	Assigned	Median
Ce	124.3	1.027	4.811	0.214	68	123.8	124.3	Assigned	Median
Co	63.7	0.590	2.730	0.220	71	63.7	64.0	Assigned	Robust mean
Cr	438	3.640	14.020	0.260	75	433	438	Assigned	Median
Cs	0.532	0.007	0.047	0.159	44	0.553	0.539	Assigned	Mode
Cu	56.5	0.925	2.464	0.375	73	56.5	56.4	Assigned	Robust mean
Dy	7.00	0.045	0.418	0.107	50	6.9198	7	Assigned	Median
Er	2.72	0.023	0.187	0.122	48	2.70	2.72	Assigned	Median
Eu	3.84	0.036	0.251	0.141	50	3.84	3.85	Assigned	Robust mean
Ga	20.2	0.197	1.028	0.192	58	20.2	20.2	Assigned	Robust mean
Gd	10.6	0.114	0.596	0.191	47	10.6	10.6	Assigned	Robust mean
Hf	6.74	0.104	0.405	0.258	50	6.74	6.76	Assigned	Robust mean
Ho	1.15	0.014	0.090	0.149	49	1.15	1.16	Assigned	Robust mean
In	0.090	0.004	0.010	0.356	8	0.090	0.090	Provisional	Robust mean
La	62.6	0.519	2.688	0.193	70	62.1	62.6	Assigned	Median
Li	16.3	0.326	0.857	0.380	35	16.5	16.3	Assigned	Median
Lu	0.235	0.003	0.023	0.139	47	0.231	0.235	Assigned	Median
Mo	0.747	0.027	0.062	0.428	41	0.911	0.82	Provisional	Mode
Nb	85.2	0.886	3.491	0.254	63	85.2	84.6	Assigned	Robust mean
Nd	60.5	0.541	2.609	0.207	66	59.8	60.5	Assigned	Median
Ni	315	2.470	10.600	0.233	76	310	315	Assigned	Median
Pb	2.88	0.055	0.196	0.279	55	3.72	3.01	Provisional	Mode
Pr	15.2	0.108	0.807	0.134	51	15.0	15.2	Assigned	Median
Rb	31.4	0.296	1.496	0.198	69	31.4	31.3	Assigned	Robust mean
Sb	0.120	0.010	0.010	0.660	21	0.16	0.14	Provisional	Mode
Sc	22.5	0.446	1.128	0.395	62	22.5	22.1	Assigned	Robust mean
Sm	12.3	0.094	0.674	0.140	58	12.2	12.3	Assigned	Median
Sn	2.47	0.135	0.172	0.786	30	2.47	2.42	Provisional	Robust mean
Sr	1175	6.160	32.430	0.190	75	1172	1175	Assigned	Median
Ta	5.14	0.141	0.321	0.440	46	5.14	5.09	Assigned	Robust mean
Tb	1.40	0.015	0.106	0.139	49	1.39	1.40	Assigned	Median
Th	7.40	0.141	0.438	0.321	65	7.50	7.40	Assigned	Median
Tm	0.330	0.005	0.031	0.149	41	0.321	0.33	Assigned	Median
U	2.2	0.024	0.156	0.154	59	2.23	2.20	Assigned	Median
V	292	2.812	9.950	0.283	73	292	294	Assigned	Robust mean
Y	29.5	0.281	1.416	0.198	69	29.5	29.5	Assigned	Robust mean
Yb	1.80	0.020	0.132	0.150	54	1.78	1.80	Assigned	Median
Zn	117.4	1.288	4.583	0.281	74	118.2	117.4	Assigned	Median
Zr	292	2.076	9.927	0.209	72	290	292	Assigned	Median

Table 3	GeoPT29 Z-scores for contributed data for nephelinite, NKT-1 (June 2011)																			
Lab. Code	D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D12	D13	D14	D15	D16	D17	D18	D19
Quality	2	1	2	1	1	2	1	1	2	2	2	1	2	1	2	2	2	1	1	1
SiO ₂	-0.10	0.19	-0.34	-5.74	5.15	0.37	0.25	1.37	-0.37	-0.04	0.20	-1.37	*	*	0.31	-0.65	-0.17	-1.35	0.48	2.25
TiO ₂	0.30	0.12	-0.26	-4.18	-5.14	-0.66	-0.35	-0.83	-0.03	0.54	-0.08	-1.31	*	*	-0.81	1.74	0.22	-0.19	-1.39	-0.32
Al ₂ O ₃	0.13	-0.37	1.01	-6.35	0.27	0.13	-0.37	-0.23	-0.53	0.59	0.06	-1.00	*	*	0.41	-0.61	0.13	-0.65	-0.30	2.05
Fe ₂ O ₃ T	0.26	0.86	-0.32	-1.53	-1.58	-0.13	-0.14	-0.58	-0.10	0.10	0.36	*	*	*	-26.01	0.54	0.04	-0.14	0.08	4.08
MnO	0.49	-0.57	-0.28	-6.38	-5.80	-0.67	0.01	1.56	0.69	-0.09	-0.28	1.37	*	*	-1.25	0.69	0.69	1.37	0.40	2.94
MgO	0.03	0.32	-0.39	-8.51	-14.34	0.05	-0.68	-2.05	0.57	-0.24	0.32	0.42	*	*	0.84	1.13	0.16	-0.05	2.05	1.91
CaO	0.01	-0.44	0.23	-3.95	2.68	0.12	-0.04	0.01	-0.37	-0.90	-0.42	-0.21	*	*	0.01	0.32	-0.36	0.35	-0.38	0.98
Na ₂ O	-0.07	0.75	0.37	-2.27	-5.10	-0.33	1.64	-1.63	-0.25	-0.87	-0.07	0.75	*	*	0.46	-1.22	-1.31	-0.31	-0.28	2.53
K ₂ O	-0.37	0.08	0.66	-2.80	5.02	0.25	-0.33	-1.15	-0.19	-0.58	-0.16	1.73	*	*	-0.37	-0.37	-1.19	-0.74	-1.15	-1.08
P ₂ O ₅	-0.28	-2.50	0.90	-5.74	143.42	-0.44	0.19	-0.03	-0.20	0.77	-0.85	-0.89	*	*	-1.52	-0.71	0.36	-0.35	0.03	0.67
Ba	1.45	-0.53	*	12.85	-3.66	*	-0.80	-2.81	2.18	0.08	1.20	-2.44	*	*	0.13	0.45	-0.03	0.11	*	-2.12
Be	*	*	*	*	-3.33	*	-0.66	-1.02	*	*	*	*	*	*	-0.36	*	-1.89	*	*	5.45
Ce	-0.03	*	*	*	-3.95	*	-0.27	-0.69	2.17	-0.65	-2.11	56.27	*	-1.31	0.49	0.59	0.18	*	*	-6.94
Co	-0.13	0.83	*	8.16	-2.10	*	0.06	0.47	-0.24	-0.87	0.18	1.56	*	*	0.31	*	-0.23	-1.37	*	-1.70
Cr	0.47	1.52	*	-2.48	-3.17	*	2.59	1.45	-0.24	0.33	0.37	-0.70	*	*	0.62	0.79	0.94	-0.02	*	-2.54
Cs	*	*	*	*	5.79	*	0.38	3.80	7.14	*	*	-11.37	*	-0.69	0.30	*	-0.13	*	*	*
Cu	-2.54	1.00	*	-4.28	0.82	*	0.51	1.52	-0.13	-2.14	-1.61	4.65	*	*	2.47	0.70	-0.15	4.65	*	0.47
Dy	*	*	*	*	-2.34	*	-0.81	-0.31	*	*	*	*	-3.59	-0.24	0.00	*	0.10	*	*	*
Er	*	*	*	*	-1.63	*	-1.47	-0.56	*	*	*	*	-1.91	-0.08	0.15	*	0.07	*	*	*
Eu	*	*	*	*	-1.87	*	-0.16	1.12	*	*	*	*	-3.67	-0.56	-0.08	*	0.00	*	*	*
Ga	0.38	-2.15	*	*	-1.01	*	1.74	*	0.28	-0.59	-0.74	2.71	*	-0.60	0.28	*	-0.83	-2.64	*	*
Gd	*	*	*	*	-3.42	*	-1.21	-0.87	*	*	*	*	7.87	-1.39	-0.11	*	-0.02	*	*	*
Hf	-1.53	*	*	*	-1.45	*	-0.97	-0.08	1.31	*	0.69	20.42	*	*	0.43	*	0.23	3.11	*	*
Ho	*	*	*	*	-1.57	*	-1.01	0.10	*	*	*	*	21.36	-0.56	0.22	*	0.11	*	*	*
In	*	*	*	*	*	*	1.02	*	*	*	*	*	*	*	*	*	*	*	*	*
La	1.00	*	*	*	-3.60	*	-0.20	-0.20	2.45	0.81	-1.75	-14.00	*	-0.61	0.46	-0.49	-0.12	*	*	-6.52
Li	*	*	*	*	-3.74	*	-1.28	0.00	*	*	*	*	*	*	0.41	*	-0.82	*	*	*
Lu	*	*	*	*	-1.58	*	-0.21	-0.21	*	*	*	*	*	-1.50	0.11	*	0.17	*	*	*
Mo	12.45	*	*	*	-2.88	*	-0.59	-0.11	6.04	*	2.03	4.06	*	*	-1.34	*	-0.53	*	*	*
Nb	-0.32	1.66	*	-1.78	-2.66	*	-1.24	-0.92	-0.37	-0.60	-0.14	5.38	*	-0.92	1.22	*	0.30	-0.35	*	*
Nd	-2.20	*	*	*	-3.17	*	-0.38	-0.08	-0.48	-1.82	-2.66	-5.55	*	-0.91	0.46	*	0.27	*	*	*
Ni	0.05	2.17	*	-4.15	-4.47	*	-0.47	0.76	0.02	-0.43	-0.24	-0.47	*	*	0.09	1.18	0.19	1.70	*	-1.17
Pb	13.05	0.63	*	117.82	-1.64	*	0.68	2.97	-2.49	*	*	15.91	*	*	-0.20	*	-0.20	5.72	*	2.67
Pr	-0.12	*	*	*	-2.82	*	0.00	-0.64	*	*	*	*	-2.60	-1.12	0.37	*	0.12	*	*	*
Rb	-3.48	-0.28	*	*	-1.58	*	-0.48	1.05	-0.28	-1.14	1.23	0.38	*	-0.95	-0.01	*	1.03	-0.28	*	0.45
Sb	*	*	*	*	*	*	-0.85	-1.60	*	*	*	*	1120.4	*	*	*	0.06	*	*	*
Sc	-2.46	4.83	*	*	-3.95	*	0.49	1.94	-0.29	-1.13	0.95	4.83	*	-1.37	0.02	*	0.20	1.29	*	*
Sm	-3.19	*	*	*	-2.44	*	-0.30	-0.04	-3.93	*	*	2.52	*	-1.19	0.22	*	0.07	*	*	*
Sn	7.34	*	*	-14.32	-1.88	*	2.85	0.70	-1.65	*	*	-2.72	*	-0.98	*	*	-0.40	*	*	*
Sr	-0.02	0.25	*	-11.19	-3.32	*	1.42	0.52	0.11	-1.09	-0.39	1.11	*	*	0.39	*	-0.15	-0.25	*	-2.41
Ta	*	*	*	*	2.89	*	1.38	0.04	-1.77	*	*	-15.99	*	0.20	-0.45	*	-0.40	*	*	*
Tb	*	*	*	*	-2.72	*	-0.75	0.66	*	*	*	5.64	*	-0.94	0.05	*	0.00	*	*	*
Th	-6.96	*	*	*	-3.06	*	-0.70	-1.38	-1.59	2.97	5.60	3.66	*	-2.50	-0.24	*	-0.03	-3.19	*	*
Tm	*	*	*	*	-1.31	*	-0.96	-1.60	*	*	*	*	*	-0.96	-0.16	*	0.00	*	*	*
U	-0.32	*	*	*	-1.25	*	-0.51	-2.18	0.64	*	16.00	-7.68	*	-1.28	-0.06	*	-0.03	*	*	-14.08
V	0.38	0.26	*	*	-3.53	*	-0.24	-0.44	-0.51	-0.72	0.43	-12.40	*	*	0.23	0.38	-0.87	-1.95	*	0.11
Y	-1.22	-1.03	*	*	-4.54	*	0.17	3.20	0.37	-0.52	1.32	-5.27	*	-1.03	0.51	0.19	-0.01	*	*	*
Yb	*	*	*	*	-1.90	*	-0.61	-0.38	-1.52	*	*	9.11	*	0.00	0.08	*	0.04	*	*	*
Zn	-0.70	0.57	*	-0.52	-4.00	*	5.59	2.32	-0.28	0.61	-0.59	-9.03	*	*	1.60	2.47	0.40	-0.30	*	-0.69
Zr	3.70	-1.87	*	*	-5.87	*	0.04	-1.78	0.21	-1.24	0.07	2.76	*	*	0.42	-8.64	-0.13	-0.67	*	*

Table 3	GeoPT29 Z-scores for contributed data for nephelinite, NKT-1 (June 2011)																			
Lab. Code	D20	D21	D22	D22	D23	D24	D25	D26	D27	D28	D29	D30	D31	D32	D33	D34	D34	D35	D37	D38
Quality	1	2	1	2	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1
SiO ₂	2.56	0.56	-0.82	*	*	0.28	0.78	-0.14	-2.70	*	*	1.53	0.45	1.42	*	-0.16	*	*	2.08	-0.75
TiO ₂	0.92	0.51	1.26	*	-1.47	0.54	-4.50	-0.07	-1.63	*	*	-1.31	-0.18	11.44	*	1.24	*	*	-1.61	0.19
Al ₂ O ₃	3.15	-0.45	-0.18	*	*	-0.43	4.14	0.27	-1.28	*	*	0.55	-0.36	0.76	*	-0.09	*	*	2.00	-1.63
Fe ₂ O ₃ T	1.19	0.52	0.47	*	*	0.79	-1.69	0.79	-1.03	*	*	-4.47	0.51	-1.03	*	-1.03	*	*	-2.10	0.19
MnO	1.37	-1.25	*	-0.48	-0.57	-0.28	-6.38	-0.77	5.25	*	*	-2.51	0.69	0.60	*	-0.18	*	*	-0.77	-0.18
MgO	-4.25	-0.04	0.11	*	*	0.60	-9.72	-0.95	-1.52	*	*	-5.20	-0.16	-2.31	*	-1.84	*	*	-4.39	-0.63
CaO	0.35	0.22	0.25	*	*	-1.18	2.28	-0.16	-1.63	*	*	1.94	-0.45	-0.10	*	1.54	*	*	-2.68	-0.04
Na ₂ O	-6.34	-1.43	-0.67	*	*	0.02	5.36	0.63	-1.38	*	*	15.47	-1.58	-6.52	*	-0.49	*	*	8.53	-0.67
K ₂ O	0.08	-0.23	-1.98	*	*	0.45	9.13	0.33	0.49	*	*	5.02	0.25	-0.74	*	-3.21	*	*	-0.16	-0.33
P ₂ O ₅	-3.58	-0.39	*	-1.47	-3.04	-2.60	1.27	-0.09	1.80	*	*	2.88	0.36	3.20	*	-2.18	*	*	6.29	-0.84
Ba	-14.17	-1.12	*	3.18	2.72	-0.17	*	10.94	*	-12.71	-0.25	-2.40	1.06	*	-0.45	-1.65	*	-1.71	0.03	0.21
Be	-7.42	-4.56	*	1.37	-2.13	0.37	*	*	*	*	-1.02	*	-0.68	*	*	*	-0.54	*	0.08	*
Ce	-12.70	1.53	*	8.91	1.19	0.07	*	*	*	1.57	0.77	-0.89	0.59	*	0.28	-0.27	*	-1.51	0.59	5.35
Co	-6.61	-0.87	*	2105.7	-0.85	0.42	*	7.20	0.21	-4.31	0.98	-1.00	-0.50	*	0.69	-3.79	*	-0.67	0.27	-2.47
Cr	-17.53	-3.15	*	4101.4	-0.27	0.47	*	-0.69	0.37	0.00	1.52	-2.12	-0.38	*	-1.77	*	-1.63	0.73	-2.45	0.59
Cs	*	-1.95	*	*	1.02	-0.02	*	*	*	67.18	-0.26	*	*	*	-0.13	*	*	-5.39	0.07	*
Cu	-11.14	-4.01	*	1.17	-1.11	0.68	*	8.01	3.19	*	-0.38	0.59	-0.11	*	0.52	2.06	*	-0.62	-3.36	1.00
Dy	-7.44	-0.57	*	*	0.22	0.17	*	*	*	*	0.07	0.00	0.00	*	0.20	-1.63	*	-1.39	0.16	*
Er	-10.57	-0.20	*	*	0.03	0.07	*	*	*	*	-0.19	1.53	-0.01	*	0.20	-1.31	*	-0.83	0.25	*
Eu	-9.09	-0.62	*	*	0.52	-0.02	*	*	*	*	0.04	-0.96	-0.20	*	0.04	-0.32	*	-1.40	0.08	*
Ga	*	0.87	*	*	0.28	0.53	*	*	*	-1.63	0.76	*	-1.08	*	*	0.71	*	*	0.38	-0.21
Gd	-10.62	-0.22	*	*	1.80	-0.36	*	*	*	*	0.29	-1.06	-0.19	*	-0.02	-2.31	*	-0.05	0.31	*
Hf	*	-0.27	*	*	0.79	-0.25	*	*	*	*	0.15	*	-0.67	*	*	3.66	*	-10.51	0.07	*
Ho	-8.00	-0.12	*	*	0.21	0.38	*	*	*	*	-0.12	-1.67	0.11	*	0.16	-1.12	*	-0.79	0.16	*
In	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
La	-11.66	-0.68	*	6.39	0.17	0.09	*	*	0.77	1.75	1.40	-0.23	0.29	*	0.14	0.29	*	-1.20	0.31	-0.98
Li	*	*	-1.52	*	-1.65	1.17	*	*	*	*	-0.47	-0.35	0.99	*	0.00	*	-1.34	*	-0.41	*
Lu	-4.06	0.32	*	*	1.07	0.11	*	*	*	*	0.21	*	0.11	*	-0.11	-0.64	*	-2.35	0.32	*
Mo	5.34	-0.77	*	-0.37	-0.75	*	*	*	*	*	-0.27	*	*	*	*	36.27	*	*	0.35	*
Nb	*	-5.76	*	-0.89	0.94	0.86	*	*	0.45	-1.99	2.57	*	-0.46	*	*	0.66	*	-8.08	-0.60	-1.21
Nd	-11.88	-2.87	*	6.61	3.07	-0.02	*	*	*	2.96	1.19	-1.34	0.19	*	0.64	0.96	*	-1.07	0.54	0.96
Ni	-16.42	-1.58	*	0.71	-2.26	0.09	*	9.42	1.79	*	1.79	-1.79	0.14	*	0.38	-3.62	*	-0.66	0.24	0.09
Pb	-7.68	-3.86	*	4.39	3.33	-0.17	*	28.34	*	*	-0.54	*	*	*	-0.20	0.58	*	*	0.57	71.96
Pr	-8.94	-0.10	*	*	1.73	-0.12	*	*	*	22.72	0.12	-2.73	0.06	*	0.19	-1.64	*	-1.24	0.19	*
Rb	*	0.35	-3.63	*	0.12	0.06	*	*	3.26	-0.09	-1.02	-2.96	0.19	*	*	-2.35	*	-2.89	-0.41	-1.62
Sb	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-0.80	*
Sc	-10.06	-1.19	*	1.97	0.93	-1.08	*	*	-3.85	-4.30	-0.39	-3.14	1.53	*	-1.22	9.35	*	*	-0.46	7.49
Sm	-10.00	-0.50	*	*	0.44	0.15	*	*	*	2.15	0.44	1.04	0.00	*	0.22	-1.42	*	-2.08	0.17	*
Sn	*	*	*	3.28	-0.11	*	*	*	*	*	1.17	*	*	*	*	*	*	*	-0.72	*
Sr	-17.64	2.27	*	-1.67	0.12	0.25	*	*	1.73	26.53	0.49	-3.61	-0.40	*	1.28	-1.33	*	-0.86	-0.54	-0.92
Ta	*	-5.30	*	*	3.65	0.19	*	*	*	*	0.54	*	-0.06	*	*	*	32.63	-3.54	*	*
Tb	-6.67	-0.19	*	*	0.85	-0.05	*	*	*	*	0.38	-1.88	-0.05	*	0.05	-0.66	*	0.00	-0.14	*
Th	*	-3.21	*	-3.08	0.15	0.14	*	*	5.95	*	-0.40	*	0.58	*	1.55	3.07	*	-2.23	0.80	17.37
Tm	*	0.16	*	*	0.96	0.00	*	*	*	*	0.00	*	0.00	*	-0.32	-1.09	*	-1.28	0.10	*
U	*	0.64	*	-2.88	0.06	0.03	*	*	27.00	*	0.00	1.92	0.64	*	1.12	5.25	*	-0.26	0.38	11.52
V	-15.11	-0.12	*	1.19	-0.64	0.13	*	11.09	1.77	-6.43	0.16	-1.55	-0.72	*	-0.82	-2.69	*	-1.15	0.73	-1.95
Y	-0.75	-0.68	*	0.90	-0.40	0.47	*	*	1.58	0.03	1.44	-0.33	-0.16	*	0.47	-2.37	*	-1.81	-0.16	0.38
Yb	-7.89	0.11	*	2.66	2.73	0.00	*	*	*	*	-0.15	0.00	0.00	*	-0.04	-1.06	*	-1.29	0.68	*
Zn	-4.88	-2.77	*	0.83	*	0.50	*	8.58	0.35	3.36	0.57	0.79	-0.59	*	-1.35	-2.81	*	*	-1.02	-0.30
Zr	-13.56	0.22	*	-0.91	0.04	0.17	*	20.13	2.06	3.11	-0.26	2.76	-0.28	*	*	-0.67	*	-17.39	-0.48	-1.77

Table 3	GeoPT29 Z-scores for contributed data for nephelinite, NKT-1 (June 2011)																			
Lab. Code	D39	D40	D41	D42	D43	D44	D45	D46	D47	D47	D48	D49	D50	D51	D52	D53	D54	D55	D55	D56
Quality	2	1	1	1	2	2	2	2	1	2	2	2	2	2	2	1	1	1	2	1
SiO ₂	-0.33	-1.44	*	-7.04	0.24	-3.07	0.02	-2.60	-0.59	*	-0.20	1.28	-0.32	1.16	*	-0.06	0.85	0.50	*	-1.00
TiO ₂	0.24	-0.04	1.24	-4.18	3.49	-0.26	0.94	-0.02	-3.70	*	0.94	0.38	0.94	-0.26	1.72	-0.38	-2.43	-1.80	*	1.37
Al ₂ O ₃	0.60	-0.72	-4.82	-16.63	0.45	7.67	0.17	-1.73	-2.27	*	0.24	-0.39	*	0.94	1.68	0.01	-3.39	1.68	*	0.20
Fe ₂ O ₃ T	0.35	-0.92	*	-3.64	0.40	0.54	-0.24	0.04	-5.36	*	-0.76	-0.79	1.43	-0.43	1.26	1.47	-3.97	0.69	*	-0.59
MnO	1.36	-0.57	-5.22	-2.89	-0.28	-2.22	-0.28	0.30	-18.01	*	*	0.98	0.69	0.20	0.98	0.44	-10.26	0.40	*	0.09
MgO	0.08	-0.89	3.83	-21.48	-0.45	-5.52	0.03	0.03	0.32	*	0.00	-5.80	*	-1.21	3.49	-0.22	-12.19	1.22	*	3.63
CaO	0.28	-0.95	-3.67	-3.44	-0.98	1.62	0.60	-1.10	1.54	*	-0.22	-0.25	0.60	-0.22	1.22	-0.63	3.69	-0.61	*	1.54
Na ₂ O	0.34	1.46	-1.04	-20.00	0.64	10.22	-0.60	-0.16	3.23	*	-0.78	1.35	*	-3.79	0.89	0.32	11.75	1.30	*	-7.67
K ₂ O	0.00	-1.15	-0.08	2.14	0.86	1.48	1.28	-1.81	0.49	*	-0.16	0.86	*	0.04	1.69	-0.53	15.72	0.70	*	0.45
P ₂ O ₅	-0.42	-1.97	*	0.14	*	6.56	0.04	1.71	-3.04	*	0.36	-1.06	-0.98	-1.66	3.81	-0.26	-5.74	-0.40	*	-8.36
Ba	*	4.31	2.68	2.26	-0.22	-1.02	-1.81	-0.03	*	6.01	*	0.29	2.04	0.74	1.80	-0.40	0.58	1.31	*	3.20
Be	*	*	*	*	*	*	*	*	*	*	*	-0.19	*	0.23	0.25	*	*	*	*	*
Ce	*	-3.39	1.39	-0.66	*	-4.29	*	-0.86	*	*	0.44	1.43	*	0.39	1.60	-0.87	-7.74	*	*	-4.40
Co	*	-0.63	0.81	*	7.75	1.52	3.35	0.54	*	18.20	-1.51	-0.74	*	0.34	0.05	*	-1.54	-2.98	*	0.56
Cr	*	-2.62	2.11	-6.40	0.37	0.94	-1.56	0.86	*	8.43	-0.99	0.86	*	0.69	-0.46	-0.18	-0.29	1.12	*	1.94
Cs	*	*	0.77	80.51	*	*	*	1.37	*	*	0.19	0.19	*	6.07	1.33	0.10	-11.37	*	*	*
Cu	*	-1.03	-2.04	-1.15	-1.73	0.30	-1.53	7.60	*	1.92	-0.11	-1.33	*	6.67	-0.02	-0.26	2.36	2.58	*	2.69
Dy	*	*	-0.98	*	*	*	*	-0.85	*	*	-0.19	0.23	*	0.59	0.66	1.45	*	*	*	*
Er	*	*	-0.88	*	*	*	*	-0.09	*	*	-0.17	0.33	*	2.58	0.80	0.26	*	*	*	*
Eu	*	*	0.80	*	*	*	*	-0.70	*	*	-0.32	0.52	*	2.63	0.78	1.10	*	*	*	*
Ga	*	-0.21	0.33	-1.76	*	-0.10	*	*	*	1.35	0.28	-0.25	*	0.38	-1.58	-0.31	-0.33	-0.21	*	2.51
Gd	*	*	3.39	*	*	*	*	0.06	*	*	-0.70	0.56	*	2.33	0.48	0.40	*	*	*	*
Hf	*	-1.83	1.21	*	-5.86	*	*	-0.43	*	5.26	*	0.44	*	1.43	0.24	-0.08	-0.05	*	*	-2.97
Ho	*	*	-1.91	*	*	*	*	-0.61	*	*	-0.06	0.99	*	0.33	0.63	1.17	*	*	*	*
In	*	*	*	*	*	*	*	*	*	*	-0.07	0.22	*	0.02	*	*	*	*	*	*
La	*	48.14	1.26	-2.24	*	-3.84	*	-1.07	*	2.12	0.76	0.70	*	0.20	1.32	0.44	-0.03	*	*	-0.18
Li	*	*	0.23	*	-0.18	*	*	*	*	*	*	0.93	*	0.41	0.79	*	*	*	*	*
Lu	*	*	0.64	*	*	*	*	-0.53	*	*	0.32	0.32	*	1.39	0.32	0.00	*	*	*	*
Mo	*	4.06	*	*	*	*	*	5.23	*	74.14	0.59	1.15	*	6.04	-0.75	*	4.70	*	*	10.79
Nb	*	-1.21	2.14	-1.89	*	-0.32	*	-1.33	*	2.40	0.71	1.65	*	-1.09	0.41	0.03	0.48	-0.18	*	2.99
Nd	*	-2.87	1.41	-15.48	*	-4.12	*	-0.65	*	2.40	0.12	0.19	*	0.46	0.93	0.62	-4.70	*	*	-3.98
Ni	*	-2.55	1.33	-1.22	-0.33	0.00	-2.17	1.93	*	3.82	-1.75	-2.03	*	0.14	1.45	-1.01	0.07	0.00	*	1.20
Pb	*	56.68	-1.33	9.29	*	*	*	12.80	*	*	*	5.41	*	6.94	-0.01	-0.39	-10.58	12.86	*	1.09
Pr	*	*	0.31	*	*	*	*	-0.99	*	*	0.03	0.68	*	0.31	0.95	0.38	*	*	*	*
Rb	*	3.06	-0.97	-1.49	*	-0.48	*	-1.51	*	3.20	1.19	-0.04	2.87	0.36	0.49	-0.62	0.39	0.25	*	2.63
Sb	*	*	*	*	*	*	*	6.70	4340.82	*	*	*	*	*	0.51	*	-9.10	*	*	*
Sc	*	-3.14	-0.51	*	*	2.42	*	2.86	*	8.62	-1.88	2.82	*	-0.20	*	0.58	-0.67	3.50	*	0.72
Sm	*	-4.89	-0.06	5.19	*	*	*	-0.82	*	0.52	0.19	0.00	*	0.59	0.72	0.82	-3.05	*	*	-2.33
Sn	*	*	*	10.04	*	*	*	3.28	*	*	-0.49	*	*	*	-0.63	*	-5.45	*	*	*
Sr	*	-0.28	1.11	-3.33	0.60	-0.02	-1.36	0.69	*	4.05	0.77	0.54	0.23	-0.83	3.58	0.94	-1.51	0.93	*	0.03
Ta	*	*	-1.49	*	*	*	*	851.34	*	9.13	0.64	1.34	*	-4.42	-0.61	-2.61	2.53	*	*	12.46
Tb	*	*	0.38	*	*	*	*	-0.19	*	*	-0.23	0.66	*	2.87	0.37	0.84	*	*	*	*
Th	*	8.23	0.00	3.89	*	*	*	-1.02	*	4.12	-0.13	0.87	*	1.40	0.17	0.24	11.57	1.38	*	6.89
Tm	*	*	*	*	*	*	*	-0.64	*	*	-0.16	0.48	*	0.16	0.34	0.10	*	*	*	*
U	*	28.80	0.26	*	*	*	*	-0.67	*	21.76	0.32	0.83	*	0.93	0.30	0.00	16.96	-1.28	*	*
V	*	1.77	2.01	5.21	*	1.19	-1.58	-0.37	*	6.06	-1.03	0.28	*	2.34	0.74	-0.64	-0.19	*	0.38	3.32
Y	*	0.38	0.34	-1.10	3.72	0.90	*	-0.52	*	3.37	0.40	0.44	*	-0.41	0.69	0.94	-0.30	2.71	*	1.55
Yb	*	*	0.73	*	*	*	*	-0.49	*	*	-0.27	0.04	*	1.44	0.97	-0.30	-10.40	*	*	-9.22
Zn	*	-1.39	-1.60	-3.92	1.49	-0.15	-1.13	2.03	*	4.76	0.61	-1.13	*	5.41	1.24	0.35	-1.06	-1.83	*	-0.91
Zr	*	-0.06	1.27	-1.20	-3.61	0.27	*	-1.29	*	5.06	0.17	0.12	-0.58	-0.69	1.18	-0.04	-1.20	0.30	*	0.87

Table 3	GeoPT29 Z-scores for contributed data for nephelinite, NKT-1 (June 2011)																			
Lab. Code	D57	D58	D60	D61	D62	D63	D64	D65	D66	D67	D68	D69	D70	D71	D72	D73	D74	D75	D76	D77
Quality	1	2	2	2	2	2	1	1	2	1	2	1	2	2	2	1	2	2	1	1
SiO ₂	0.73	0.60	0.05	0.05	-0.19	-0.09	*	*	-0.31	0.76	0.41	0.81	-5.21	0.28	-0.30	*	-1.13	0.71	*	0.85
TiO ₂	0.28	0.70	0.30	-0.02	0.06	0.06	-0.67	*	-0.16	0.60	0.62	-0.04	3.19	0.78	-0.66	-2.22	1.60	-0.02	*	-0.04
Al ₂ O ₃	1.04	0.52	-0.22	-0.75	-0.15	-0.78	-1.78	*	-0.43	1.04	0.49	0.75	2.50	0.34	0.17	-0.93	0.26	0.87	*	-0.72
Fe ₂ O ₃ T	1.19	*	0.38	0.51	-0.24	0.01	-1.58	*	0.18	0.42	-0.43	-0.70	-1.32	0.01	-0.29	0.14	0.15	-0.79	*	-1.58
MnO	3.31	-0.96	0.69	0.69	-0.28	0.49	-0.57	*	-0.28	1.37	-0.28	-0.24	5.34	-0.28	0.69	-1.54	0.01	0.69	*	-0.57
MgO	-2.05	1.08	0.18	-0.24	-0.24	0.89	-1.00	*	0.39	0.42	0.21	0.75	4.20	0.00	0.95	-7.48	2.70	1.34	*	-0.74
CaO	1.77	0.06	-0.08	0.94	-0.62	-0.25	-1.86	*	0.97	0.30	-0.08	-0.09	0.86	0.09	-2.12	-0.65	-0.50	0.60	*	0.07
Na ₂ O	-1.91	2.77	1.00	-2.11	0.82	0.46	1.64	*	-0.33	-0.49	0.64	0.77	2.17	0.37	0.20	0.16	*	0.11	*	1.10
K ₂ O	2.14	-1.19	0.04	0.25	0.04	0.45	-0.74	*	1.28	-0.33	0.04	-0.62	-0.68	0.25	-2.22	5.72	0.47	0.66	*	0.49
P ₂ O ₅	-4.12	1.44	0.26	1.44	0.90	0.09	*	*	-0.44	0.19	0.36	-0.36	1.39	0.09	0.90	*	0.28	0.36	*	0.73
Ba	-9.24	0.99	1.11	0.90	*	*	-3.90	1.40	-0.35	0.37	-1.18	-0.09	4.81	1.50	2.50	-3.22	-0.66	-0.24	-0.99	*
Be	0.39	*	-0.39	0.20	*	*	*	*	0.20	*	0.46	-0.46	0.67	*	-1.10	*	-0.39	0.49	*	*
Ce	2.02	-1.17	-0.55	1.13	*	*	2.44	0.06	-0.34	-0.46	0.21	0.36	-1.45	*	0.59	-0.48	-0.78	-0.13	-0.39	*
Co	-0.01	0.16	-0.13	1.72	-2.52	*	-1.37	-0.88	-0.32	-0.05	0.82	0.88	0.79	*	-0.50	0.10	-0.21	0.18	*	*
Cr	-9.11	0.33	9.35	2.18	-5.98	*	-0.27	0.77	*	-0.47	0.64	-0.46	-0.67	0.97	-0.99	1.52	-0.59	0.44	*	*
Cs	-0.05	*	-0.34	0.44	*	*	0.60	-0.24	*	0.81	1.05	0.45	-0.13	*	-0.24	*	-0.02	-0.34	0.15	*
Cu	3.07	0.30	-0.11	-0.03	-1.33	*	*	4.06	-0.11	-4.08	-1.63	-2.07	4.23	-5.18	-0.51	*	-0.29	-0.86	*	*
Dy	3.28	0.31	-0.36	0.63	*	*	-2.03	0.38	-1.65	-1.32	-0.18	0.34	0.11	*	0.12	1.68	-0.62	-0.50	-0.06	*
Er	4.68	0.09	-0.58	0.43	*	*	*	0.79	-0.66	-1.20	-0.01	0.19	0.01	*	-1.38	*	-0.47	-0.23	-0.58	*
Eu	4.54	-0.56	-0.48	0.66	*	*	0.64	-0.02	-0.80	0.32	0.16	0.90	0.00	*	0.38	0.16	-0.44	0.20	-0.28	*
Ga	-0.79	0.38	0.14	-0.11	*	*	*	1.22	0.38	-2.15	0.04	-0.51	1.93	*	-0.10	*	0.14	0.38	*	*
Gd	1.63	0.06	-0.53	0.30	*	*	*	0.54	*	-0.75	0.14	0.00	1.16	*	0.73	*	-0.87	-0.71	-0.81	*
Hf	-1.39	1.42	0.20	0.49	*	*	-0.35	-0.08	*	-8.48	0.07	0.14	*	*	-0.79	0.89	-1.59	0.32	1.53	*
Ho	4.76	-0.12	-0.28	0.47	*	*	1.66	0.11	-0.84	-0.56	0.27	0.81	-0.61	*	-0.28	*	-0.39	0.27	-0.09	*
In	-4.81	*	-0.46	-0.02	*	*	*	*	*	*	*	*	*	*	*	*	*	0.51	*	*
La	4.71	-1.46	0.44	0.73	*	*	-0.09	0.01	-0.68	0.13	0.20	0.01	-1.58	*	0.63	0.29	-0.86	-0.28	-0.51	*
Li	3.15	*	-0.06	0.76	*	*	*	*	0.99	*	*	1.52	0.54	*	-0.29	*	*	2.16	-0.52	*
Lu	7.49	-0.11	0.11	0.30	*	*	-1.50	0.60	-0.96	-0.64	0.11	0.26	-0.32	*	-0.11	-1.50	-0.53	-0.75	-0.98	*
Mo	6.46	*	1.23	-0.05	*	*	*	*	*	*	7.24	-0.06	-0.69	*	*	*	*	0.67	-0.49	*
Nb	-9.46	1.07	-0.60	1.00	*	*	*	2.00	0.26	-0.81	0.40	-1.66	*	*	0.11	*	-1.50	0.11	0.98	*
Nd	4.07	-0.65	-0.19	1.33	*	*	-2.20	0.50	-1.15	-0.28	0.42	0.97	0.66	*	0.29	-0.95	-0.39	-0.02	-0.01	*
Ni	-4.43	1.37	-1.04	1.42	-2.59	*	-2.74	0.54	-0.57	-0.90	0.35	-0.32	-3.36	-3.63	0.24	-4.25	1.22	-0.52	*	*
Pb	59.22	*	0.82	-0.20	7.96	*	*	0.95	*	-3.50	*	-0.06	-0.04	38.53	*	*	*	0.06	-0.20	*
Pr	2.97	-0.81	-0.87	0.80	*	*	*	0.20	-0.93	-0.78	0.12	0.46	-1.05	*	0.00	*	-0.69	0.31	-0.48	*
Rb	2.06	-0.38	-0.48	0.23	*	*	-0.08	0.03	0.19	0.92	0.13	-1.47	1.41	*	-0.81	2.39	-0.61	-0.14	*	*
Sb	*	*	1.45	1.07	*	*	-0.10	*	*	*	*	0.05	4.82	*	*	11.90	*	*	*	*
Sc	2.09	-1.75	-0.24	1.75	*	*	-0.66	-0.46	-0.82	1.10	-0.86	0.70	-0.42	*	-0.91	-0.04	-0.73	-1.13	*	*
Sm	2.52	-0.89	-0.37	0.93	*	*	-0.30	-0.16	-1.56	-0.49	0.12	0.42	0.06	*	0.07	-0.30	-0.56	0.07	-0.74	*
Sn	1.92	*	0.67	-4.75	*	*	*	*	*	*	*	-0.12	*	*	-1.07	*	0.58	-1.36	*	*
Sr	-5.40	-0.11	-1.19	0.49	*	*	-0.22	3.34	0.00	-0.75	-0.02	-1.27	4.66	-1.16	1.16	-0.15	-0.54	1.31	-0.87	*
Ta	-8.65	1.19	-0.21	0.47	*	*	-1.05	-1.95	*	-0.74	0.72	-0.89	0.78	*	-1.15	-0.43	-1.40	-0.37	-4.11	*
Tb	4.04	0.19	-0.52	0.30	*	*	-3.10	0.70	-0.94	-0.66	*	0.08	0.00	*	-0.70	-1.60	-0.52	0.19	-0.54	*
Th	1.84	-0.98	-0.50	0.30	-2.74	*	-1.59	-0.79	*	-2.64	-0.11	0.38	-1.10	*	0.00	-0.68	-0.92	-0.22	0.71	*
Tm	3.53	0.00	-0.32	0.27	*	*	*	0.13	-3.61	-1.03	*	0.22	-0.64	*	0.16	*	-0.48	-0.64	0.22	*
U	0.51	-0.10	-0.32	0.50	*	*	-1.54	-0.80	*	-0.32	-0.32	0.74	-0.90	*	0.00	*	-0.80	-0.13	-0.24	*
V	-5.27	-1.63	0.33	0.77	*	*	2.07	-1.00	*	1.26	0.26	0.16	0.97	-2.53	0.38	1.17	-0.39	-0.37	*	*
Y	4.83	-1.50	-1.22	1.10	*	*	*	1.39	0.19	-0.36	0.93	0.45	-1.71	*	-0.52	*	-1.03	-0.09	-1.69	*
Yb	8.35	0.11	-0.38	0.29	*	*	-1.52	0.02	-0.46	-0.83	0.15	-0.05	0.46	*	-0.65	-2.66	-0.61	0.38	-0.20	*
Zn	-1.83	0.83	-1.57	0.40	-2.44	*	3.85	3.82	-0.26	-0.03	0.01	0.03	4.00	4.76	-1.35	*	0.54	-0.26	*	*
Zr	-7.52	0.68	-0.89	0.83	*	*	2.76	0.32	0.12	-0.23	-0.40	-1.01	-2.18	-0.53	-0.08	4.88	-2.20	0.42	0.36	*

Table 3 GeoPT29 Z-scores for contributed data for nephelinite, NKT-1 (June 2011)															
Lab. Code	D78	D79	D80	D81	D82	D83	D84	D85	D86	D86	D87	D89	D90	D91	D92
Quality	2	2	2	1	1	1	1	2	1	2	2	1	2	2	2
SiO ₂	-0.60	-1.30	0.30	*	*	-0.50	-0.11	-0.03	0.25	*	0.52	-4.30	-0.42	-0.11	0.88
TiO ₂	0.43	-2.33	1.25	*	6.65	-0.19	-1.84	0.21	-0.35	*	-0.02	-2.27	-0.05	0.70	*
Al ₂ O ₃	-0.75	11.29	-0.87	*	6.22	0.20	-1.61	-0.01	-3.11	*	-1.31	-3.89	0.49	0.20	1.19
Fe ₂ O ₃ T	1.55	-1.60	-1.43	*	1.39	0.53	-4.47	0.04	2.69	*	-1.43	-3.81	-0.18	0.24	-3.29
MnO	0.80	0.88	96.48	*	-2.27	0.98	-0.57	0.59	-1.34	*	-0.31	-0.57	-0.57	0.30	*
MgO	-0.31	-11.35	0.68	*	-5.34	1.68	-2.15	0.97	-0.89	*	-30.83	-3.10	0.76	0.24	-1.18
CaO	0.04	-2.09	1.42	*	1.77	-0.16	-1.01	0.12	1.88	*	1.54	-3.33	-1.35	0.09	0.52
Na ₂ O	-0.52	*	-2.88	*	-2.22	-0.67	-1.43	0.84	-2.27	*	82.67	-1.56	1.26	-0.33	*
K ₂ O	-0.11	-3.04	2.94	*	-2.02	-0.33	0.86	-0.33	0.33	*	-0.37	-2.39	-0.58	0.04	*
P ₂ O ₅	-0.05	*	-0.08	*	9.89	0.19	0.89	-0.26	-0.03	*	0.09	-0.89	0.07	-0.18	*
Ba	*	0.92	-0.35	*	-1.10	2.21	0.90	-1.11	0.84	*	*	-0.87	-0.45	-4.96	*
Be	*	*	2.13	1.25	-0.76	0.80	0.00	-2.95	0.69	*	*	0.39	*	*	*
Ce	*	-0.76	0.28	1.06	-0.20	-0.31	0.56	0.39	0.36	*	-3.67	0.77	-0.22	3.49	*
Co	*	*	1.09	1.18	1.34	0.94	0.42	0.36	*	0.97	-0.13	*	-3.62	-0.65	*
Cr	*	-0.95	-2.95	-8.54	4.68	1.87	0.52	*	*	0.08	-1.67	1.19	-3.09	-0.09	*
Cs	*	*	-0.17	1.48	-0.30	-0.28	0.47	*	*	*	*	-0.69	*	*	*
Cu	*	9.43	-0.41	3.18	-0.16	0.47	*	0.05	*	0.30	-8.84	0.39	-2.75	-0.68	*
Dy	*	*	-0.03	0.47	4.95	0.26	-0.56	-0.02	0.43	*	*	0.00	-0.44	*	*
Er	*	*	0.05	0.39	2.76	0.15	2.08	-0.15	1.04	*	*	0.45	-0.41	*	*
Eu	*	*	-0.07	0.29	1.20	0.25	-0.05	0.34	0.44	*	*	0.64	-0.48	*	*
Ga	*	-0.15	-2.78	1.94	-0.06	0.38	1.25	*	*	1.31	-0.59	-0.50	-1.08	0.48	*
Gd	*	*	0.19	0.10	4.53	-0.27	-0.65	0.40	0.67	*	*	-0.05	-0.64	*	*
Hf	*	*	-0.23	-2.03	0.27	-0.31	-0.17	*	*	*	*	-0.59	0.32	*	*
Ho	*	*	0.26	0.53	-0.36	-0.05	1.91	-0.12	0.32	*	*	0.55	-0.35	*	*
In	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
La	*	-1.51	0.41	1.40	-0.36	-0.49	-0.68	0.68	-0.01	*	-1.42	0.03	-0.24	-1.51	*
Li	*	*	-0.53	1.81	-1.88	0.12	1.72	0.99	-6.19	*	*	*	*	*	*
Lu	*	*	-0.09	0.58	1.75	-0.09	0.39	*	0.21	*	*	-1.50	-0.36	*	*
Mo	*	*	1.40	0.11	1.23	-0.35	1.13	0.51	3.74	*	*	*	0.85	*	*
Nb	*	-0.25	-0.55	1.99	3.15	0.23	-0.01	*	*	0.97	*	2.80	-0.32	-1.13	*
Nd	*	0.41	0.61	1.20	-0.19	0.66	-0.03	0.64	0.01	*	-1.43	0.73	-0.30	1.27	*
Ni	*	-0.94	-4.76	2.42	-2.47	0.76	-1.20	0.24	*	0.43	-0.85	4.81	0.76	0.29	*
Pb	*	*	8.83	0.91	-3.19	-0.15	-0.19	-0.81	-0.70	*	5.41	-1.92	*	*	*
Pr	*	-2.91	0.04	1.03	-0.87	0.01	0.09	0.19	-0.12	*	*	-0.62	-0.34	*	*
Rb	*	0.63	-0.34	1.53	0.55	-0.15	0.52	*	*	0.86	-0.81	-0.35	-0.81	-0.08	*
Sb	*	*	3.25	-1.81	-0.96	-2.20	1.62	*	2.15	*	*	*	*	*	*
Sc	*	*	0.51	-0.85	0.97	0.40	-0.48	*	*	-2.46	*	2.62	-1.06	*	*
Sm	*	*	0.39	0.58	0.10	0.70	-0.64	0.07	-0.15	*	*	-0.15	-0.55	*	*
Sn	*	*	0.95	*	5.91	0.89	*	-0.20	*	*	*	-13.74	*	*	*
Sr	*	1.16	0.08	*	2.28	0.59	1.18	-1.77	*	0.25	-1.48	-0.14	0.42	0.45	*
Ta	*	*	-0.10	0.37	2.08	5.63	1.41	*	*	*	*	-0.43	*	*	*
Tb	*	*	0.53	0.22	3.67	0.54	0.19	0.23	0.28	*	*	0.00	-0.62	*	*
Th	*	-2.39	-0.45	0.49	-2.47	-0.58	-0.19	0.72	1.95	*	1.83	-0.90	0.25	0.80	*
Tm	*	*	0.22	0.21	0.68	-0.03	-1.60	*	-0.32	*	*	*	-0.37	*	*
U	*	*	-0.09	1.01	-0.23	-0.50	-0.19	0.38	-0.70	*	50.55	0.00	*	*	*
V	*	20.68	-2.58	2.52	13.76	1.67	-1.15	-0.92	*	1.84	0.03	1.82	-2.28	-0.29	*
Y	*	-0.69	0.24	-0.88	0.10	-0.75	0.24	-0.23	*	-0.16	-1.58	1.23	-0.29	0.19	*
Yb	*	*	0.26	0.76	1.31	-0.09	0.23	0.15	0.08	*	*	0.00	-0.62	*	*
Zn	*	-0.15	0.29	7.38	-1.25	0.31	0.57	1.38	*	-0.15	-2.11	0.90	-1.13	0.84	*
Zr	*	1.73	-0.75	-3.33	1.69	0.24	0.54	*	*	0.32	-1.34	0.07	1.33	-0.21	*

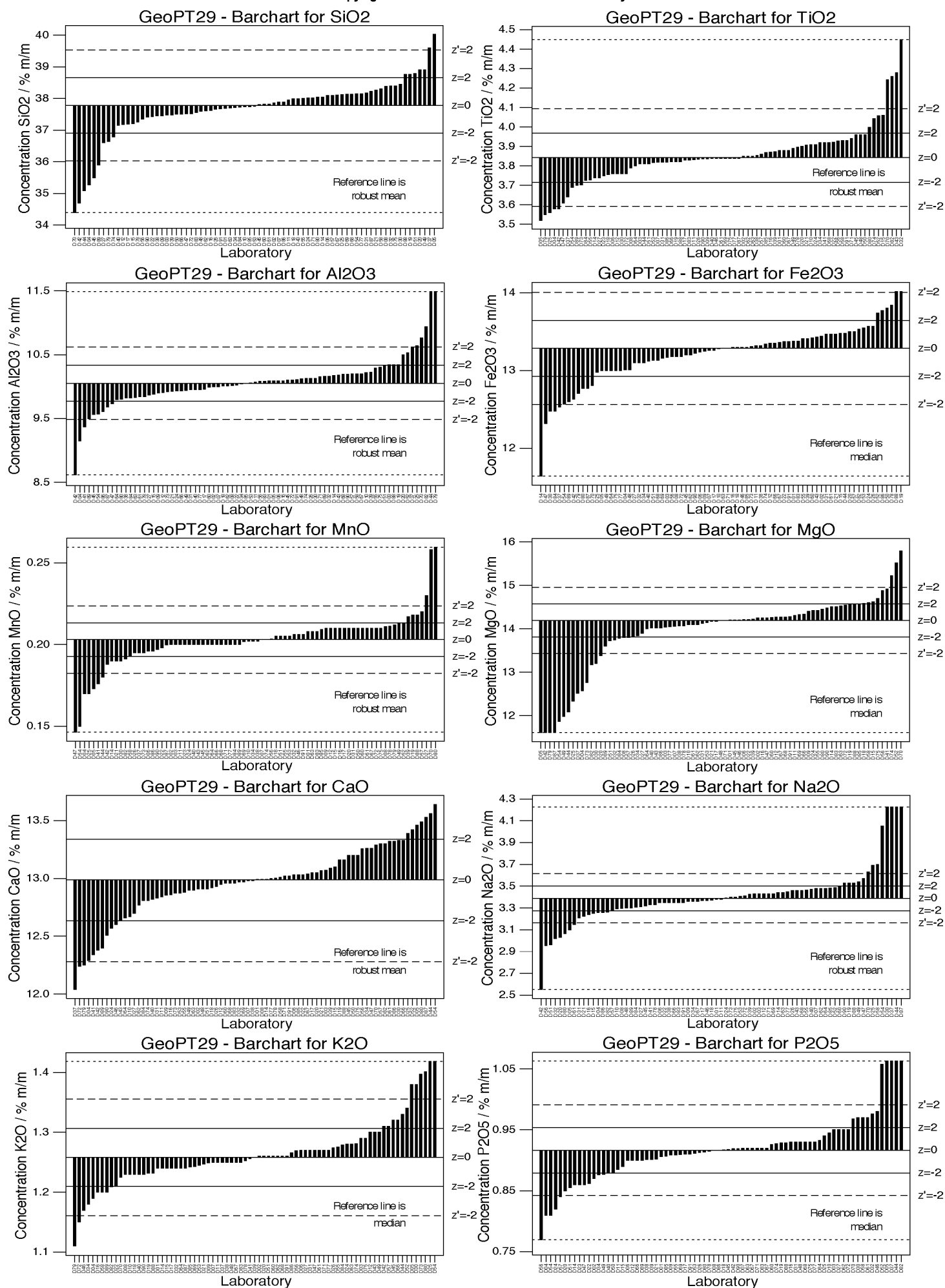


Figure 1.1: GeoPT29 – Nephelinite, NKT-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

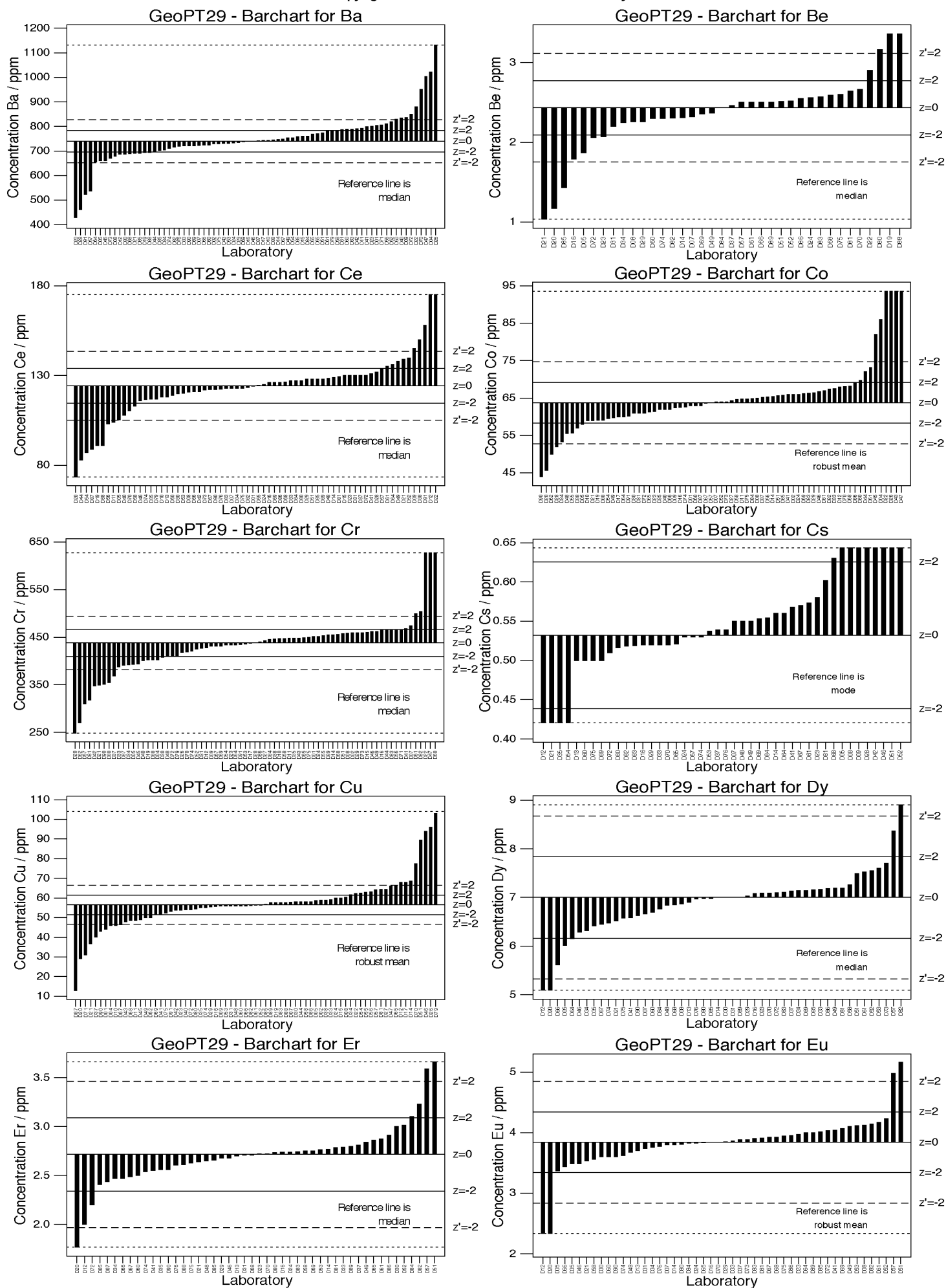


Figure 1.2: GeoPT29 – Nephelinite, NKT-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

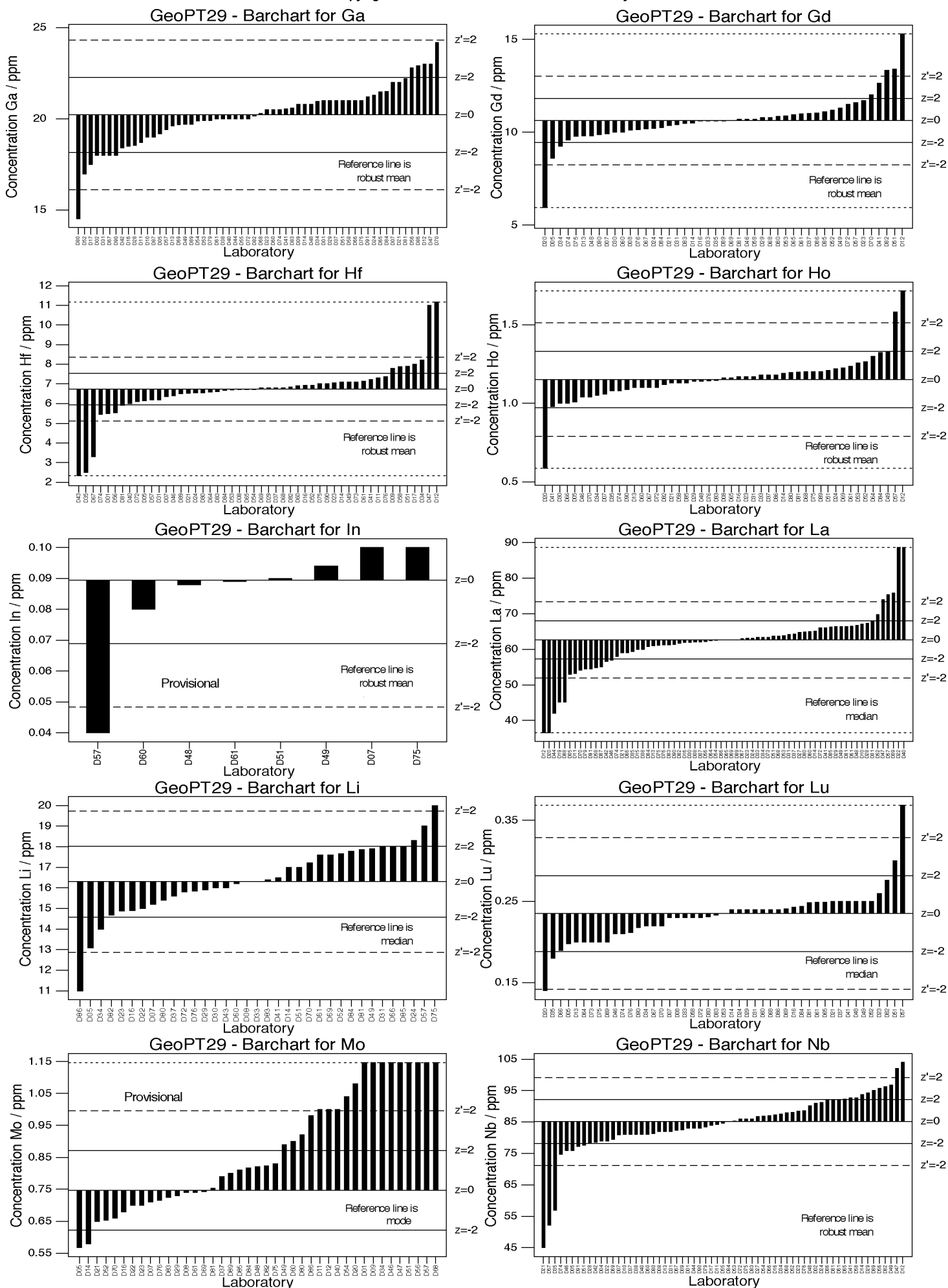


Figure 1.3: GeoPT29 – Nephelinite, NKT-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

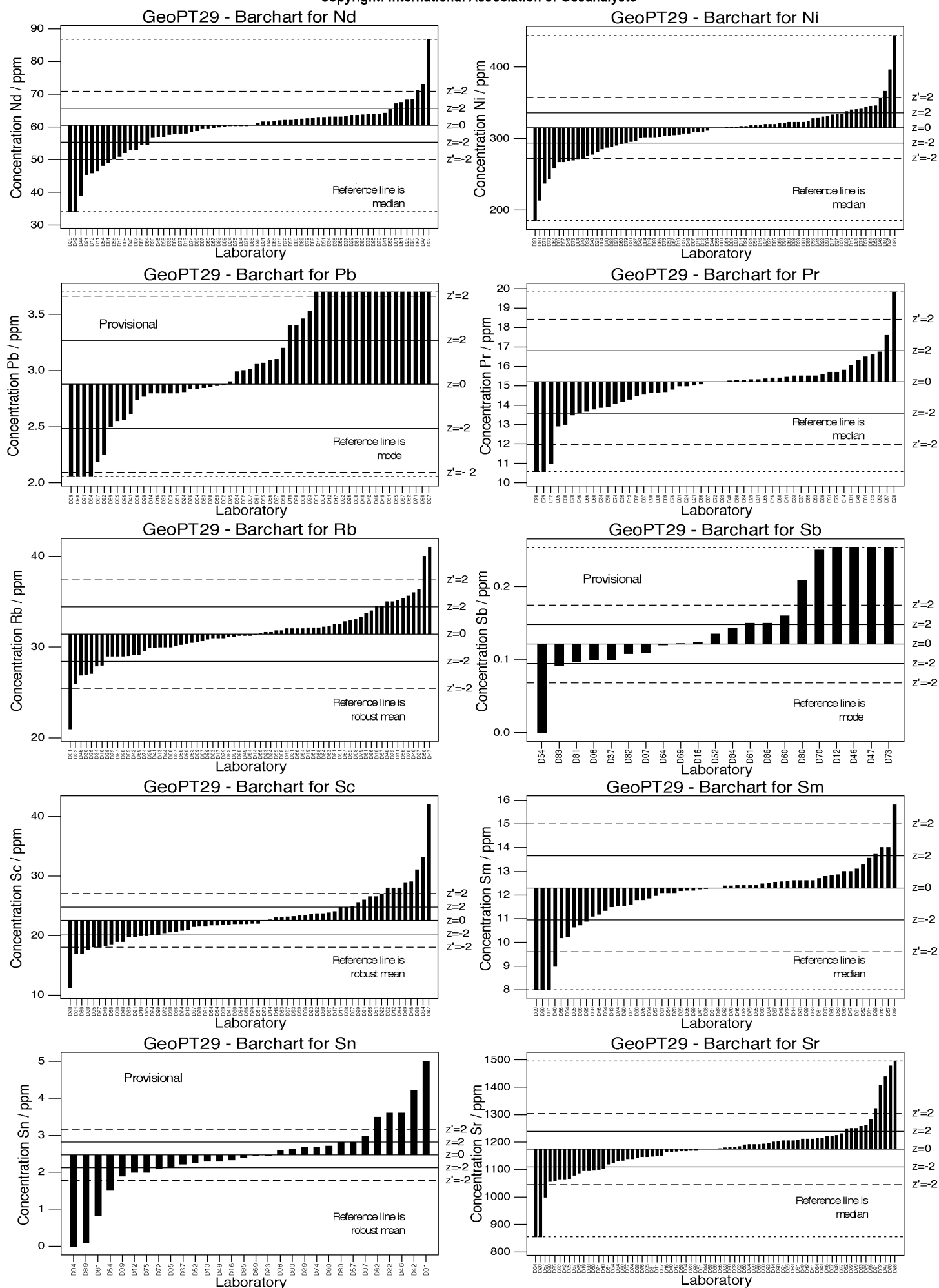


Figure 1.4: GeoPT29 – Nephelinite, NKT-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

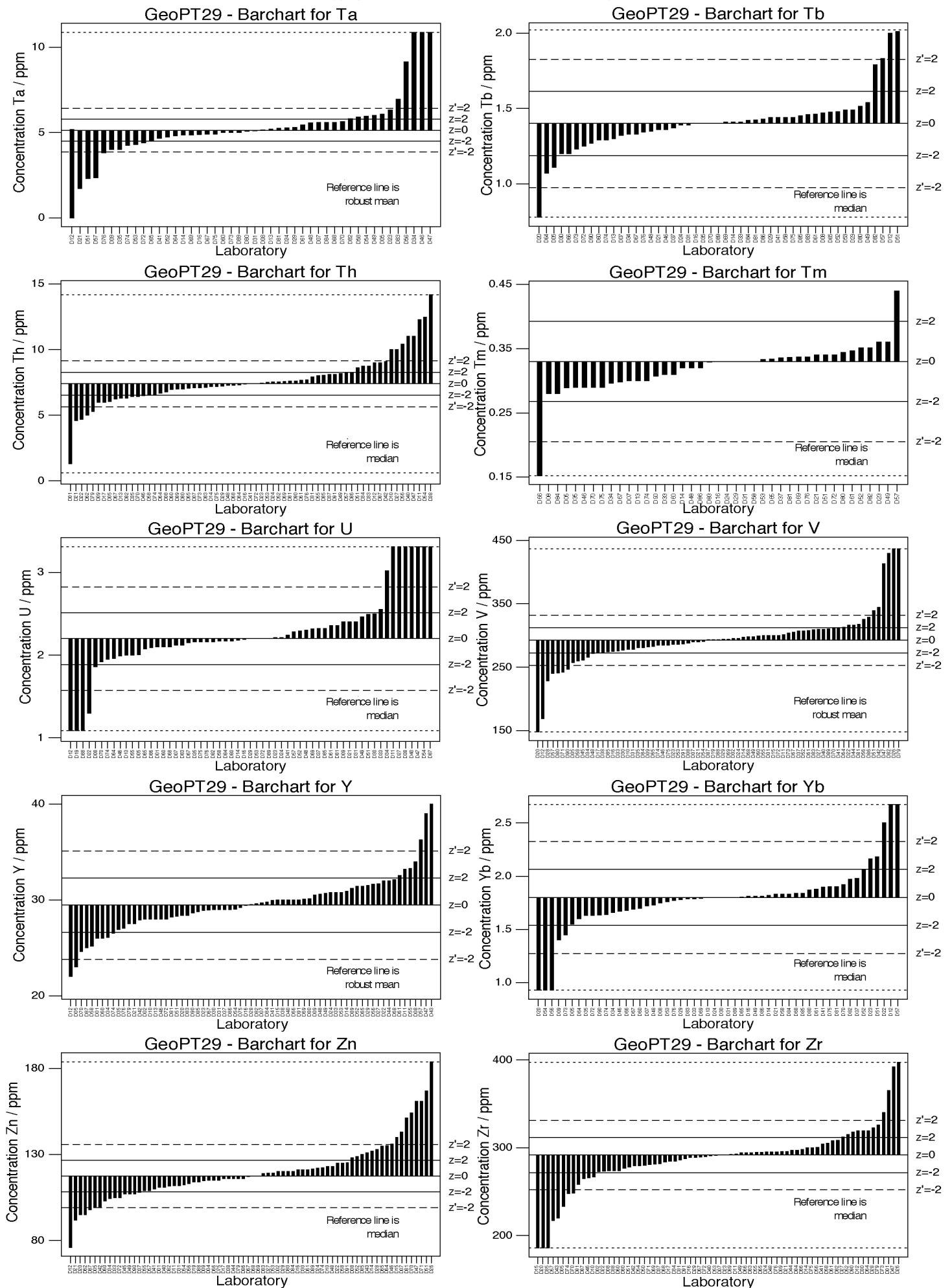


Figure 1.5: GeoPT29 – Nephelinite, NKT-1. Data distribution charts for elements for which values were assigned or provisional values given for guidance. Horizontal lines show the limits for $-2 < z < 2$ for pure geochemistry labs (solid lines) and $-2 < z' < 2$ for applied geochemistry labs (pecked lines).

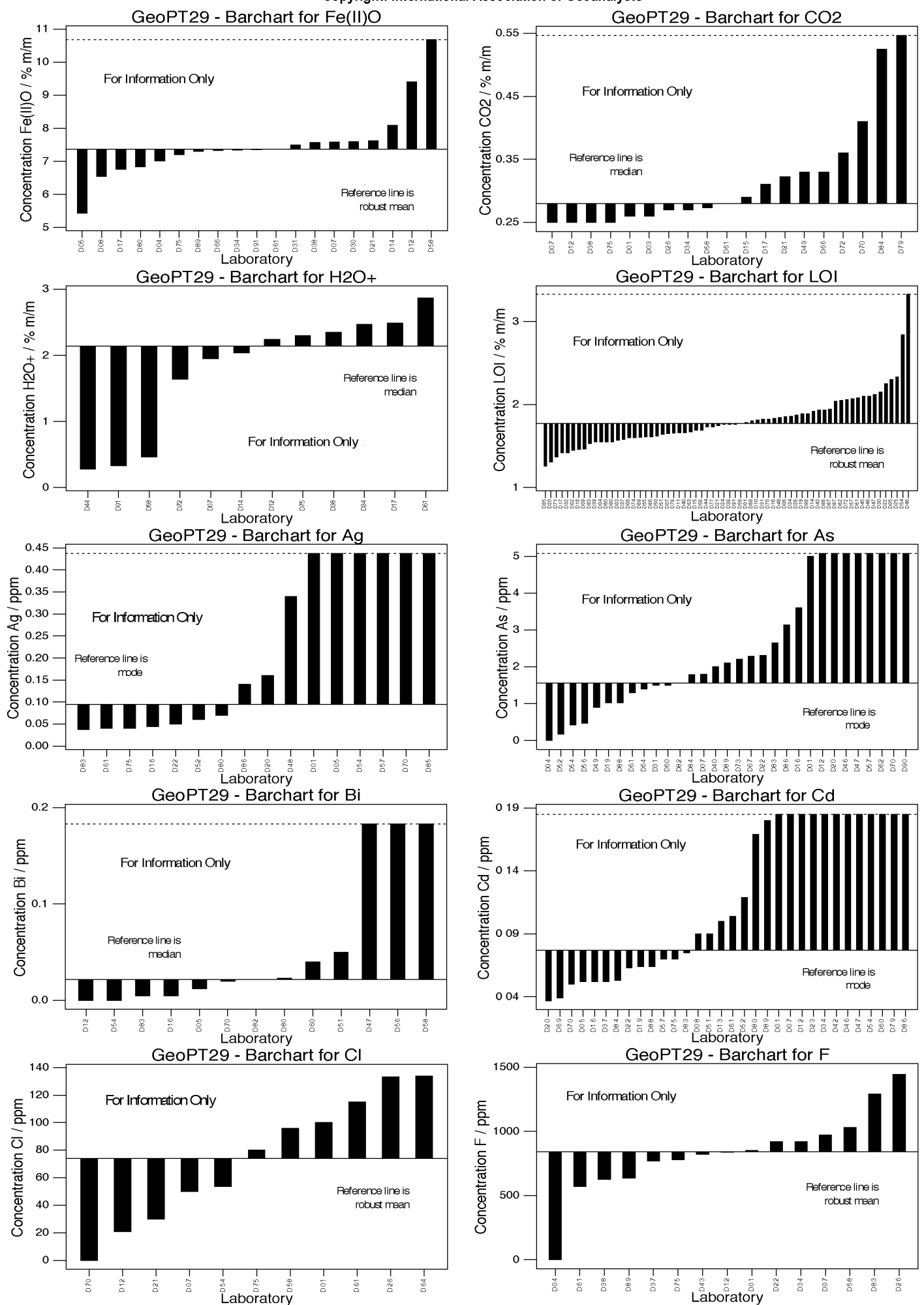


Figure 2.1: GeoPT29 – Nephelinite, NKT-1. Data distribution charts for information only for elements for which values could not be assigned.

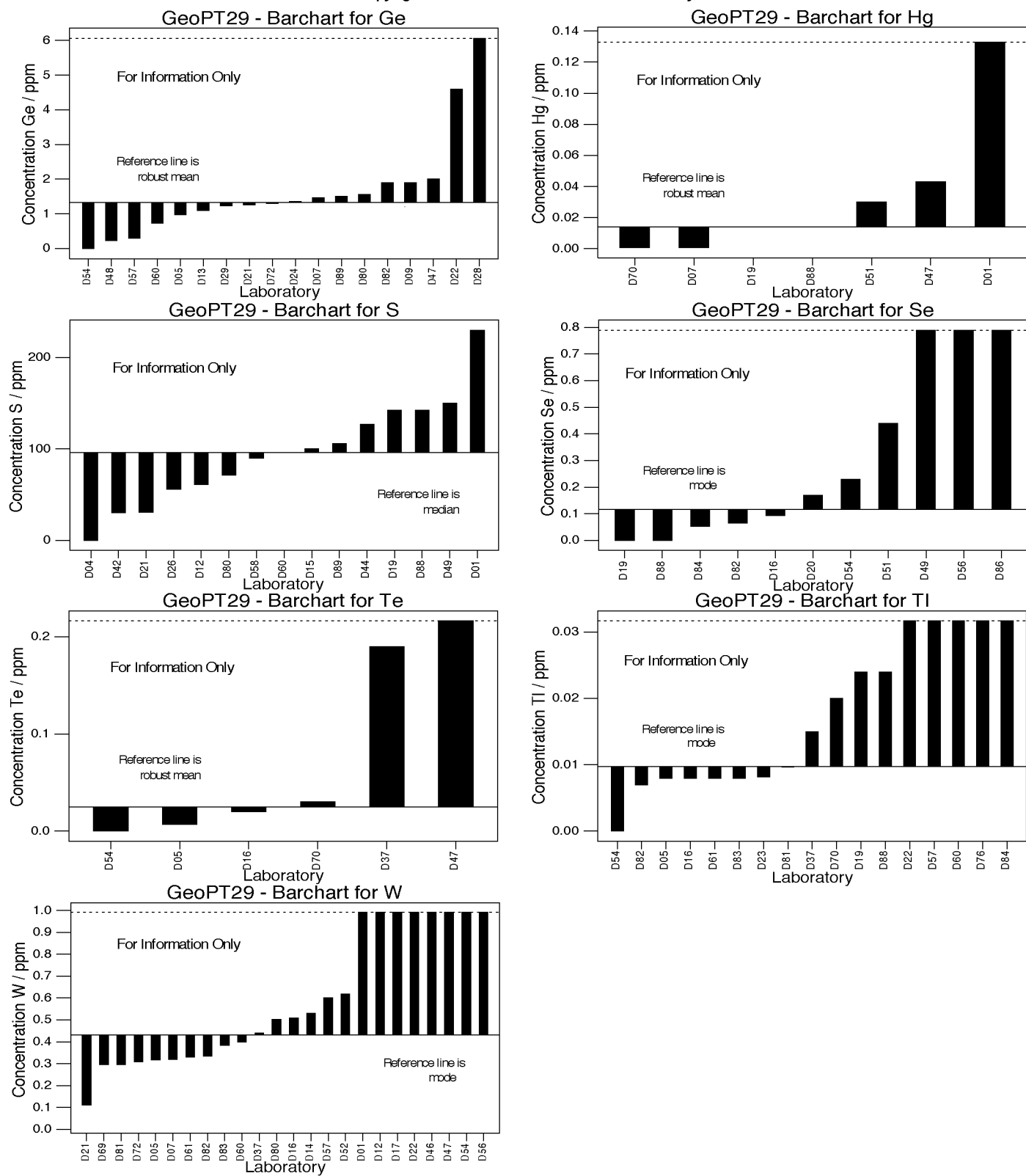


Figure 2.2: GeoPT29 – Nephelinite, NKT-1. Data distribution charts for information only for elements for which values could not be assigned.

Multiple z-score chart for GeoPT29

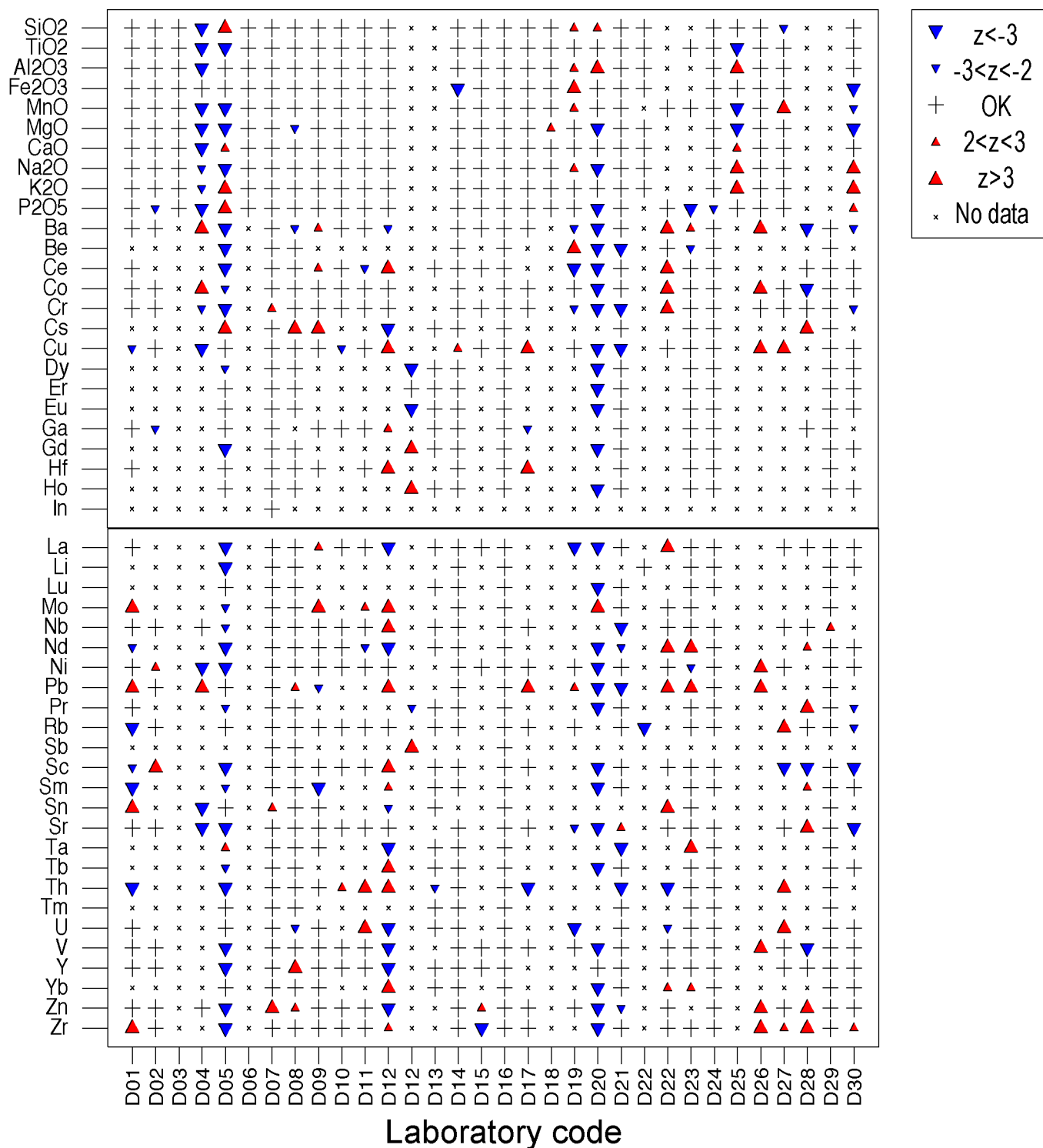


Figure 3.1: GeoPT29 – Nephelinite, NKT-1. Multiple z-score charts for laboratories participating in the GeoPT29 round. Symbols indicate whether or not an elemental result complies with the $-2 < z < +2$ criteria. Satisfactory data are plotted as '+'. Data for other categories are plotted as follows: $z < -3$ (∇), $-3 < z < -2$ ($\blacktriangledup$), $+2 < z < +3$ ($\blacktriangle$), $z > +3$ ($\blacktriangledown$).

Multiple z-score chart for GeoPT29

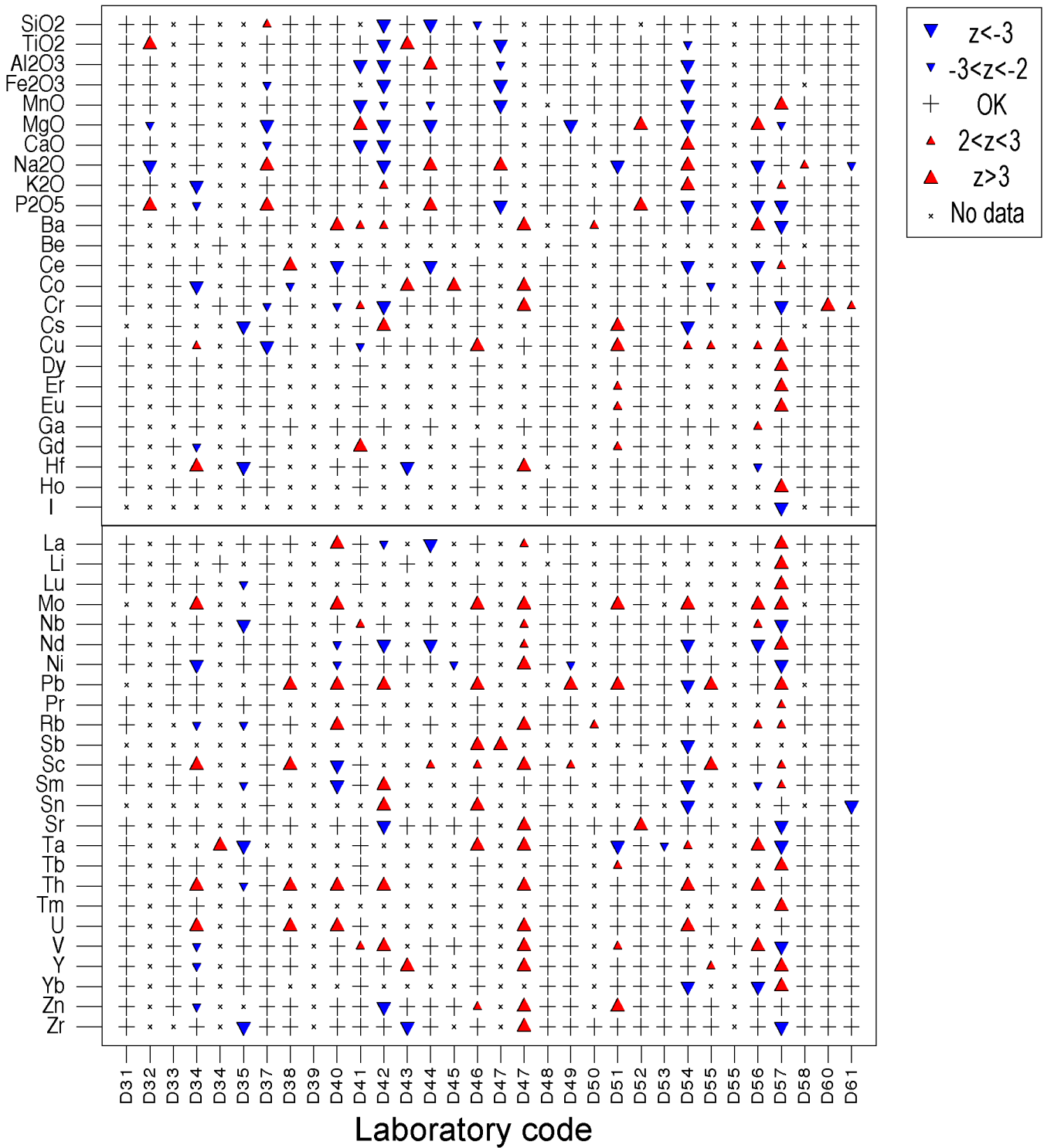


Figure 3.2: GeoPT29 – Nephelinite, NKT-1. Multiple z-score charts for laboratories participating in the GeoPT29 round. Symbols indicate whether or not an elemental result complies with the $-2 < z < +2$ criteria. Satisfactory data are plotted as '+'. Data for other categories are plotted as follows: $z < -3$ (▼), $-3 < z < -2$ (▼), $+2 < z < +3$ (▲), $Z > +3$ (▲).

Multiple z-score chart for GeoPT29

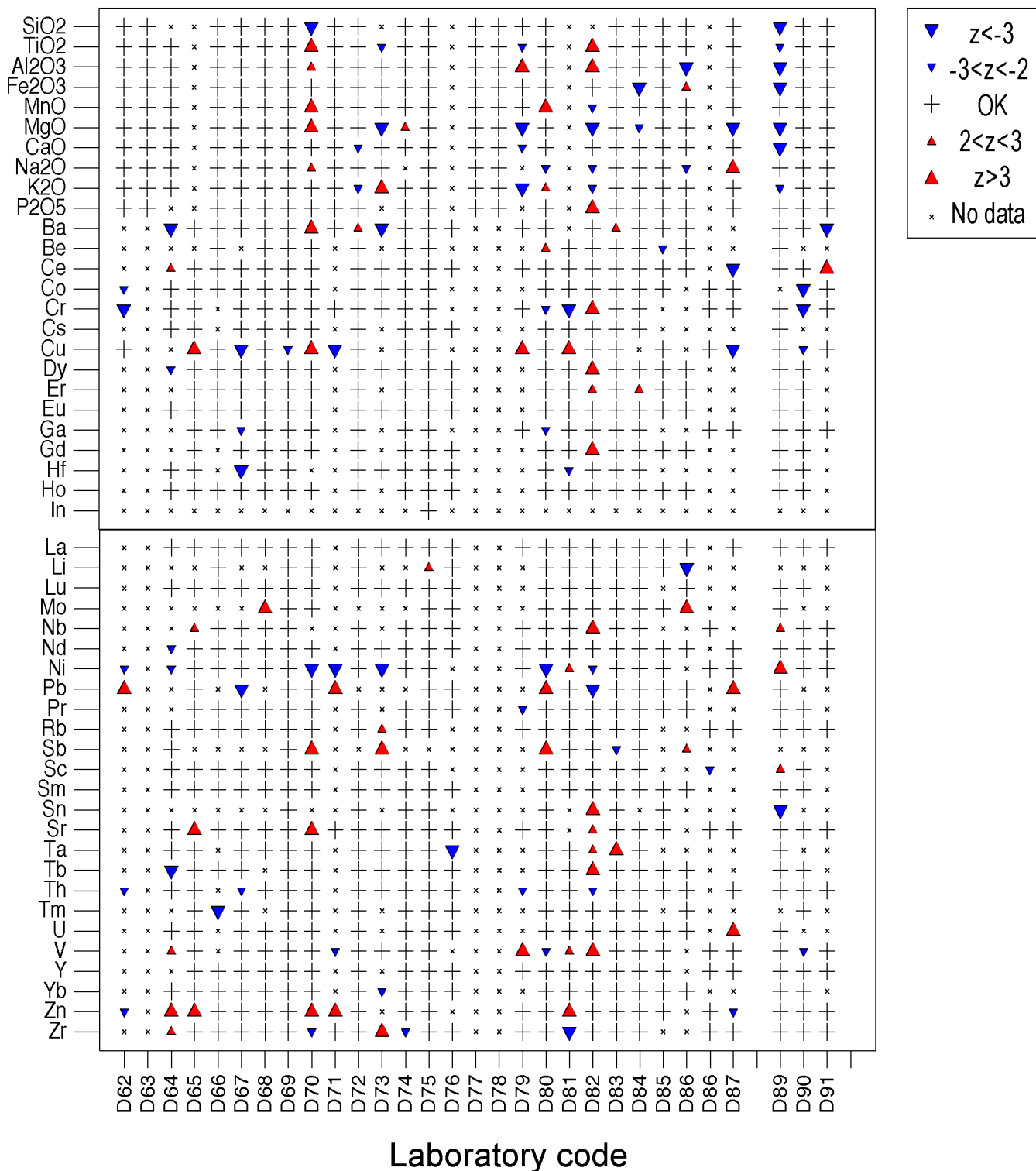


Figure 3.3: GeoPT29 – Nephelinite, NKT-1. Multiple z-score charts for laboratories participating in the GeoPT29 round. Symbols indicate whether or not an elemental result complies with the $-2 < z < +2$ criteria. Satisfactory data are plotted as '+'. Data for other categories are plotted as follows: $z < -3$ (▼), $-3 < z < -2$ (◄), $+2 < z < +3$ (▲), $Z > +3$ (▲).