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CERTIFICATE OF ANALYSIS FOR

REE ORE REFERENCE MATERIAL

OREAS 146

SUMMARY STATISTICS

Constituent (ppm)	Certified Value	1SD	95% Confidence Interval	
			Low	High
Cerium, Ce	4691	360	4491	4891
Dysprosium, Dy	224	16	215	233
Erbium, Er	87	7	83	91
Europium, Eu	127	9	122	132
Gadolinium, Gd	359	23	346	373
Holmium, Ho	36.8	2.7	35.3	38.3
Lanthanum, La	2513	185	2413	2614
Lutetium, Lu	6.3	0.3	6.1	6.5
Neodymium, Nd	2182	192	2077	2287
Praseodymium, Pr	548	36	527	568
Samarium, Sm	441	36	421	461
Terbium, Tb	47.2	3.4	45.3	49.2
Thulium, Tm	9.9	0.8	9.5	10.4
Ytterbium, Yb	53.5	3.9	51.3	55.7
Yttrium, Y	905	53	875	934
Uranium, U	2.69	0.24	2.56	2.83
Thorium, Th	903	72	863	942

Note - intervals may appear asymmetric due to rounding

Prepared by:
ORE Research & Exploration Pty Ltd
November 2010

REPORT 10-862-146

INTRODUCTION

OREAS reference materials (RM) are intended to provide a low cost method of evaluating and improving the quality of elemental analysis of geological samples. To the explorationist, they provide an important control in analytical data sets related to exploration from the grass roots level through to resource definition. To the mine geologist, they provide a tool for grade control in routine mining operations. To the analyst, they provide an effective means of calibrating analytical equipment, assessing new techniques and routinely monitoring in-house procedures.

SOURCE MATERIALS

OREAS 146 is a rare earth element (REE) certified reference material. The mineralization is a lithologically distinct horizon of banded carbonates that is hosted within, and has gradational contacts with, an amphibolite unit (hornblende-biotite schist). The approximate major and trace element composition of OREAS 146 is given in Table 1. The constituents SiO_2 to LOI are the means of duplicate XRF analyses determined using a borate fusion method, S and C are means of duplicate IR combustion furnace analyses, while the remaining constituents, Ag to Zr, are means of duplicate analyses determined by 4-acid digestion with ICP-MS finish.

HAZARDOUS MATERIAL WARNING

Due to elevated levels of thorium (~900 ppm) appropriate personal protective equipment (PPE) should be worn when handling this CRM. Dangers include inhalation, skin and eye contact (see 'Proper Handling guidelines' below).

COMMINUTION AND HOMOGENISATION PROCEDURES

OREAS 146 was prepared in the following manner:

a) jaw crushing to minus 3mm;
b) drying to constant mass at 105°C;
c) multi-stage milling to 100% minus 30 microns;
d) homogenisation;
e) blending and bagging into 25kg sublots;
f) packaging into 5g laminated foil pouches and 500g/1kg plastic jars.

ANALYSIS OF OREAS 146

Fifteen laboratories participated in the analytical program to characterise Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Tm, Yb, Y, U and Th. They are listed in the section headed 'Participating Laboratories'. To maintain anonymity these laboratories have been randomly designated the letter codes A through O. Each laboratory received six samples collected by taking duplicate 10 gram samples from three of five 300 gram test units. The 300g test units were taken at regular intervals during the bagging stage and are considered representative of the entire batch. For each sample laboratories were requested to determine the specified elements by lithium borate (6 labs) or sodium peroxide (9 labs) fusion with ICP-MS finish. The exception was Lab K who used ICP-OES to determine Ce and La. The nested design of the interlaboratory programme is amenable to analysis of variance (ANOVA) and enables a comparative assessment of within- and between-unit homogeneity (see 'ANOVA study' section).

Results for Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Tm, Yb, Y, U and Th are presented in an Appendix (Tables A2 to A18). These results are shown together with the mean, median, standard deviations (absolute and relative) and percent deviation of the lab mean from the corrected mean of means for each data set (PDM[3]). The analytical methods employed by each laboratory are explained, together with other abbreviations used, in Table A1 (Appendix). Summary statistics including Certified Values, 95% Confidence Intervals, Tolerance Intervals and Performance Gates are shown in Tables 2 to 4.

Table 1. Approximate major and trace element composition of REE reference material OREAS 146; wt.% - weight percent; ppm - parts per million.

Constituent	wt.%	Constituent	ppm	Constituent	ppm	Constituent	ppm
SiO_2	20.1	Ag	<0.5	Hf	1.6	Sc	21
TiO_2	1.44	As	4	Ho	35.9	Sm	447
Al_2O_3	2.97	Ba	12700	In	0.34	Sn	29
Fe_2O_3	28.31	Be	12.1	La	2510	Sr	3290
MgO	6.87	Bi	3.3	Li	26.5	Ta	3.9
MnO	2.47	Cd	1.5	Lu	5.84	Tb	44.3
CaO	17.3	Ce	4870	Mo	60	Te	-0.2
Na_2O	0.4	Co	33	Nb	341	Th	941
K_2O	1.28	Cs	0.6	Nd	2140	U	2.6
P_2O_5	0.539	Cu	39	Ni	82	W	26
LOI	10.2	Dy	221	Pb	751	Y	877
		Er	83	Pr	560	Yb	49.4
C	2.68	Eu	130	Rb	29.6	Zn	1470
S	0.1	Ga	35	Re	<0.1	Zr	86
		Gd	338	Sb	0.8		

STATISTICAL EVALUATION OF ANALYTICAL DATA FOR OREAS 146

Certified Value and Confidence Limits

The certified value was determined from the mean of means of accepted replicate values of accepted laboratory data sets A to U according to the formulae

$$\overline{x}_i = \frac{1}{n_i} \sum_{j=1}^{n_i} x_{ij}$$

$$\dot{x} = \frac{1}{p} \sum_{i=1}^{p} \overline{x}_i$$

where

x_{ij} *is the jth result reported by laboratory i;*

p *is the number of participating laboratories;*

n_i *is the number of results reported by laboratory i;*

$\overline{x}_i$ *is the mean for laboratory i;*

$\dot{x}$ *is the mean of means.*

The confidence limits were obtained by calculation of the variance of the consensus value (mean of means) and reference to Student's-*t* distribution with degrees of freedom (*p*-1):

$$\hat{V}(\ddot{x}) = \frac{1}{p(p-1)} \sum_{i=1}^{p} (\bar{x}_i - \ddot{x})^2$$

$$\textit{Confidence limits} = \ddot{x} \pm t_{1-x/2}(p-1) \left(\hat{V}(\ddot{x})\right)^{1/2}$$

where $t_{1-x/2}(p-1)$ is the 1-x/2 fractile of the t-distribution with (p-1) degrees of freedom.

The distribution of the values is assumed to be symmetrical about the mean in the calculation of the confidence limits.

Table 2. Certified Values and 95% Confidence Intervals for OREAS 146.

Constituent (ppm)	Certified Value	95% Confidence Interval	
		Low	High
Cerium, Ce	4691	4491	4891
Dysprosium, Dy	224	215	233
Erbium, Er	87	83	91
Europium, Eu	127	122	132
Gadolinium, Gd	359	346	373
Holmium, Ho	36.8	35.3	38.3
Lanthanum, La	2513	2413	2614
Lutetium, Lu	6.3	6.1	6.5
Neodymium, Nd	2182	2077	2287
Praseodymium, Pr	548	527	568
Samarium, Sm	441	421	461
Terbium, Tb	47.2	45.3	49.2
Thulium, Tm	9.9	9.5	10.4
Ytterbium, Yb	53.5	51.3	55.7
Yttrium, Y	905	875	934
Uranium, U	2.69	2.56	2.83
Thorium, Th	903	863	942

Note: intervals may appear asymmetric due to rounding

The test for rejection of individual outliers from each laboratory data set was based on *z* scores (rejected if $|z_i| > 2.5$) computed from the robust estimators of location and scale, *T* and *S*, respectively, according to the formulae

$$S = 1.483 \underset{j=1.....n}{\textit{median}} / x_j - \underset{i=1.....n}{\textit{median}} (x_i) /$$

$$z_i = \frac{x_i - T}{S}$$

where

T is the median value in a data set;
S is the median of all absolute deviations from the sample median multiplied by 1.483, a correction factor to make the estimator consistent with the usual parameter of a normal distribution.

The z-score test is used in combination with a second method of individual outlier detection that determines the percent deviation of the individual value from the median. Outliers in general are selected on the basis of z-scores > 2.5 and with percent deviations > 3%. In certain instances statistician's prerogative has been employed in discriminating outliers.
Each laboratory data set is tested for outlying status based on z-score discrimination and rejected if $|z_i| > 2.5$. After individual and entire lab data set outliers have been eliminated a non-iterative 3 standard deviation filter is applied, with those values lying outside this window also relegated to outlying status.
Individual outliers and, more rarely, laboratory means deemed to be outlying are shown left justified and in bold in the tabulated results (Tables A2 to A18) and have been omitted in the determination of certified values.
The magnitude of the confidence interval is inversely proportional to the number of participating laboratories and interlaboratory agreement. It is a measure of the reliability of the certified value, i.e. the narrower the confidence interval the greater the certainty in the certified value.

Statement of Homogeneity
The standard deviation of each laboratory data set includes error due to both the imprecision of the analytical method employed and to possible inhomogeneity of the material analysed. The standard deviation of the pooled individual analyses of all participating laboratories includes error due to the imprecision of each analytical method, to possible inhomogeneity of the material analysed and, in particular, to deficiencies in accuracy of each analytical method.
In determining tolerance intervals that component of error attributable to measurement inaccuracy was eliminated by transformation of the individual results of each data set to a common mean (the uncorrected grand mean) according to the formula

$$x'_{ij} = x_{ij} - \bar{x}_i + \frac{\sum_{i=1}^{p}\sum_{j=1}^{n_i} x_{ij}}{\sum_{i=1}^{p} n_i}$$

where

x_{ij} *is the jth raw result reported by laboratory i*;
x'_{ij} *is the jth transformed result reported by laboratory i*;
n_i *is the number of results reported by laboratory i*;
p *is the number of participating laboratories*;
$\bar{x}_i$ *is the raw mean for laboratory i.*

The homogeneity of each constituent was determined from tables of factors for two-sided tolerance limits for normal distributions (ISO 3207) in which

$$\text{Lower limit is } \ddot{x} - k'_2(n,p,1-\alpha)s''_g$$
$$\text{Upper limit is } \ddot{x} + k'_2(n,p,1-\alpha)s''_g$$

where

n the number of results

1-α is the confidence level;

p is the proportion of results expected within tolerance limits;

k'_2 is the factor for two-sided tolerance limits (m, α unknown);

s''_g is the corrected grand standard deviation.

The meaning of these tolerance limits may be illustrated for cerium, where 99% of the time at least 95% of subsamples will have concentrations lying between 4577 and 4804 ppm. Put more precisely, this means that if the same number of subsamples were taken and analysed in the same manner repeatedly, 99% of the tolerance intervals so constructed would cover at least 95% of the total population, and 1% of the tolerance intervals would cover less than 95% of the total population (IS0 Guide 35).
The corrected grand standard deviation, s_g'', used to compute the tolerance intervals is the weighted means of standard deviations of all data sets for a particular constituent according to the formula

$$s''_g = \frac{\sum_{i=1}^{p}(s_i(1 - \frac{s_i}{s'_g}))}{\sum_{i=1}^{p}(1 - \frac{s_i}{s'_g})}$$

where

$$1 - (\frac{s_i}{2s'_g}) \text{ is the weighting factor for laboratory } i ;$$

$$s'_g \text{ is the grand standard deviation computed from the transformed (i.e. means - adjusted) results}$$

according to the formula

$$s'_g = \left[\frac{\sum_{i=j}^{p} \sum_{j=i}^{n_i} (x'_{ij} - \bar{x}'_i)^2}{\sum_{i=1}^{p} n_i - 1} \right]^{1/2}$$

$$\text{where } \bar{x}'_i \text{ is the transformed mean for laboratorty } i$$

The weighting factors were applied to compensate for the considerable variation in analytical precision amongst participating laboratories. Hence, weighting factors for each data set have been constructed so as to be inversely proportional to the standard deviation of that data set. It should be noted that estimates of tolerance by this method are considered conservative as a significant proportion of the observed variance, even in those laboratories exhibiting the best analytical precision, can presumably be attributed to measurement error.

Table 3. Certified Values and Tolerance Intervals for OREAS 146.

Constituent (ppm)	Certified Value	Tolerance Interval 1-α=0.99, ρ=0.95	
		Low	High
Cerium, Ce	4691	4577	4804
Dysprosium, Dy	224	218	229
Erbium, Er	87	85	89
Europium, Eu	127	124	129
Gadolinium, Gd	359	352	367
Holmium, Ho	36.8	35.8	37.8
Lanthanum, La	2513	2450	2577
Lutetium, Lu	6.3	6.1	6.5
Neodymium, Nd	2182	2136	2229
Praseodymium, Pr	548	533	563
Samarium, Sm	441	432	451
Terbium, Tb	47.2	46.1	48.4
Thulium, Tm	9.9	9.7	10.2
Ytterbium, Yb	53.5	52.4	54.7
Yttrium, Y	905	881	928
Uranium, U	2.69	2.56	2.83
Thorium, Th	903	882	923

Note - intervals may appear asymmetric due to rounding

ANOVA Study

The sampling format for OREAS 146 was structured to enable nested ANOVA treatment of the round robin results. All laboratories were included in this treatment for Ce, La, Yb and Th. During the bagging stage, immediately following homogenization, five 300g samples were taken at regular intervals representative of the entire batch of OREAS 146. Each laboratory received paired samples from three different, non-adjacent 300g samples. For example, the six samples that any one of the twenty-one participating labs could have received are:

- Sample 1 (from sampling interval 1)
- Sample 2 (from sampling interval 3)
- Sample 3 (from sampling interval 5)
- Sample 4 (from sampling interval 1)
- Sample 5 (from sampling interval 3)
- Sample 6 (from sampling interval 5)

The purpose of the ANOVA investigation was to compare the within-unit variance with that of the between-unit variance. This approach permitted an assessment of homogeneity across the entire batch of OREAS 146. The test was performed using the following parameters:

- Significance Level α = P (type I error) = 0.05
- Null Hypothesis, H_0: Between-unit variance is no greater than within-unit variance (reject H_0 if p-value < 0.05)
- Alternative Hypothesis, H_1: Between-unit variance is greater than within-unit variance

P-values are a measure of probability whereby values less than 0.05 indicate a greater than 95% probability that the observed differences in within-unit and between-unit variances are real. The dataset was filtered for both individual and laboratory outliers prior to the calculation of the p-value. This process derived p-values of 0.9995 for Ce, 0.913 for La, 0.9990 for Yb and 0.970 for Th and indicates no evidence that between-unit variance is greater than within-unit variance. Conclusion: do not reject H_o.
Note that ANOVA is not an absolute measure of homogeneity. Rather, it establishes that the analytes are distributed in a uniform manner throughout OREAS 146 and that the variance between two subsamples from the same unit is statistically indistinguishable to the variance from two subsamples taken from any two separate units.

Performance Gates
Performance gates provide an indication of a level of performance that might reasonably be expected from a laboratory being monitored by this CRM in a QA/QC program. They take into account errors attributable to measurement and CRM variability. For an effective CRM the contribution of the latter should be negligible in comparison to measurement errors. Sources of measurement error include inter-lab bias and analytical precision (repeatability). Two methods have been employed to calculate performance gates. The first method uses the same filtered data set used to determine the certified value, i.e. after removal of all individual, lab dataset (batch) and 3SD outliers. These outliers can only be removed after the absolute homogeneity of the CRM has been independently established, i.e. the outliers must be confidently deemed to be analytical rather than arising from inhomogeneity of the CRM. The standard deviation is then calculated for each analyte from the pooled individual analyses generated from the certification program. Table 4 shows performance gates calculated for two and three standard deviations. As a guide these intervals may be regarded as warning or rejection for multiple 2SD outliers, or rejection for individual 3SD outliers in QC monitoring, although their precise application should be at the discretion of the QC manager concerned.

Table 4. Performance Gates for OREAS 146.

Constituent (ppm)	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window	
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High
Ce	4691	360	3970	5411	3610	5771	7.68%	15.36%	23.03%	4456	4925
Dy	224	16	192	256	176	271	7.08%	14.16%	21.24%	213	235
Er	87	7	72	102	65	109	8.44%	16.89%	25.33%	83	91
Eu	127	9	109	144	101	153	6.90%	13.80%	20.70%	120	133
Gd	359	23	313	406	289	429	6.49%	12.99%	19.48%	341	377
Ho	36.8	2.7	31.4	42.2	28.7	44.9	7.36%	14.72%	22.08%	35.0	38.7
La	2513	185	2143	2883	1958	3069	7.37%	14.73%	22.10%	2388	2639
Lu	6.3	0.3	5.6	7.0	5.3	7.3	5.25%	10.50%	15.75%	6.0	6.6
Nd	2182	192	1799	2565	1608	2757	8.78%	17.56%	26.33%	2073	2291
Pr	548	36	476	619	440	655	6.53%	13.07%	19.60%	520	575
Sm	441	36	370	512	334	548	8.07%	16.13%	24.20%	419	463
Tb	47.2	3.4	40.4	54.0	37.0	57.4	7.20%	14.41%	21.61%	44.9	49.6
Tm	9.9	0.8	8.4	11.5	7.6	12.2	7.73%	15.45%	23.18%	9.4	10.4
Yb	53.5	3.9	45.7	61.3	41.8	65.2	7.28%	14.56%	21.84%	50.9	56.2
Y	905	53	799	1010	746	1063	5.85%	11.69%	17.54%	859	950
U	2.69	0.24	2.20	3.18	1.96	3.42	9.06%	18.12%	27.19%	2.56	2.83
Th	903	72	758	1047	686	1119	7.99%	15.99%	23.98%	857	948

Note: intervals may appear asymmetric due to rounding

A second method utilises a 5% window calculated directly from the certified value. Standard deviation is also shown in relative percent for one, two and three relative standard deviations (1RSD, 2RSD and 3RSD) to facilitate an appreciation of the magnitude of these numbers and a comparison with the 5% window. Caution should be exercised when concentration levels approach lower limits of detection of the analytical methods employed as performance gates calculated from standard deviations tend to be excessively wide whereas those determined by the 5% method are too narrow.

PARTICIPATING LABORATORIES

Acme Analytical Laboratories, Vancouver, BC, Canada
Activation Laboratories, Ancaster, ON, Canada
ALS Chemex, Brisbane, QLD, Australia
ALS Chemex, Lima, Callao, Peru
ALS Chemex, Perth, WA, Australia
ALS Chemex, Vancouver, BC, Canada
Bureau Veritas Amdel, Adelaide, SA, Australia
Bureau Veritas Ultra Trace, Perth, WA, Australia
Genalysis Laboratory Services, Perth, WA, Australia
Inspectorate Kalassay, Perth, WA, Australia
Intertek Testing Services, Beijing, PR, China
OMAC Laboratories, Loughrea, County Galway, Ireland
SGS Australia, Perth, WA, Australia
SGS Lakefield Research, Lakefield, ON, Canada
SGS Mineral Services, Toronto, ON, Canada

PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

OREAS 146 has been prepared and certified, and is supplied by:

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It is available in 5g units in laminated foil packets and in 500g/1kg units in plastic jars.

PROPER HANDLING GUIDELINES

OREAS 146 contains elevated levels (900 ppm) of thorium, a slightly radioactive metal. Taken internally it is a potential carcinogen due to radioactive emission of alpha particles. Health risks include inhalation, ingestion and possible skin/eye irritation. Personal protective equipment (airborne particulate mask, disposable gloves, eye protection and coveralls) should be worn when handling this CRM.

INTENDED USE

OREAS 146 is a reference material intended for the following:

i) for the monitoring of laboratory performance in the analysis of Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Tm, Yb, Y, U and Th in geological samples;

ii) for the calibration of instruments used in the determination of the concentration of Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Tm, Yb, Y, U and Th;

iii) for the verification of analytical methods for Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Tm, Yb, Y, U and Th;

STABILITY AND STORAGE INSTRUCTIONS

OREAS 146 has been prepared from a REE-bearing mafic amphibolite (hornblende-biotite shist) with Fe-Ti oxides. The robust foil laminate packaging film is an effective barrier to oxygen and moisture and the sealed CRM is considered to have long-term stability (>5 years) under normal storage conditions.

INSTRUCTIONS FOR THE CORRECT USE OF THE REFERENCE MATERIAL

The certified values for OREAS 146 refer to the concentration level of Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Tm, Yb, Y, U and Th in their packaged state. Therefore it should not be dried prior to weighing and analysis.

LEGAL NOTICE

Ore Research & Exploration Pty Ltd has prepared and statistically evaluated the property values of this reference material to the best of its ability. The Purchaser by receipt hereof releases and indemnifies Ore Research & Exploration Pty Ltd from and against all liability and costs arising from the use of this material and information.

CERTIFYING OFFICER

Craig Hamlyn (B.Sc. Hons.), Geology

REFERENCES

ISO Guide 35 (2006), Certification of reference materials - General and statistical principals.

ISO Guide 3207 (1975), Statistical interpretation of data - Determination of a statistical tolerance interval.

APPENDIX

Analytical Data for OREAS 146

Table A1. Explanation of abbreviations used in Tables A2 – A18.

Abbreviation	Explanation
Std.Dev.	one standard deviation
Rel.Std.Dev.	one relative standard deviation (%)
PDM[3]	percent deviation of lab mean from corrected mean of means
NR	not reported
PF	sodium peroxide fusion
BF	lithium metaborate fusion
OES	inductively coupled plasma optical emission spectrometry
MS	inductively coupled plasma mass spectrometry

Table A2. Results for Ce in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*OES	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	4628	5020	4206	4960	4460	4586	4480	4858	4471	4901	5120	4450	4890	4010	4740
2	4567	5140	4199	4930	**4310**	4717	4310	4833	4455	4938	5270	4410	4900	4040	4955
3	4483	5000	4223	5030	4450	**4866**	4350	4934	4601	4985	5117	4530	4990	4090	5276
4	4598	5100	4144	5030	4450	4669	4440	4761	4609	4870	5279	4440	4950	**4170**	5323
5	4527	5030	4156	5080	4390	4664	4310	4802	4502	4837	5114	4450	4920	4050	5532
6	4631	5090	4129	5000	4430	4666	4350	4760	4458	4941	5196	4410	4880	4050	5486
Mean	4572	5063	4176	5005	4415	4695	4373	4825	4516	4912	5183	4448	4922	4068	5218
Median	4582	5060	4178	5015	4440	4668	4350	4818	4486	4920	5158	4445	4910	4050	5299
Std.Dev.	59	55	38	54	57	94	71	66	71	54	78	44	42	56	311
Rel.Std.Dev.	1.28%	1.08%	0.91%	1.08%	1.30%	2.00%	1.61%	1.37%	1.57%	1.09%	1.50%	0.99%	0.85%	1.38%	5.96%
PDM[3]	-2.52%	7.95%	-10.97%	6.70%	-5.87%	0.09%	-6.76%	2.86%	-3.72%	4.72%	10.49%	-5.16%	4.93%	-13.27%	11.25%

Table A3. Results for Dy in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	210	232	209	245	211	201	218	234	203	238	251	224	239	197	**213**
2	212	236	206	241	205	210	220	233	210	232	249	223	239	197	228
3	**199**	233	207	247	214	220	216	235	211	232	250	230	241	201	246
4	212	236	202	244	210	208	224	230	208	226	241	231	238	**205**	239
5	210	233	205	251	213	214	222	231	205	224	241	230	237	196	244
6	205	233	204	247	214	209	224	228	204	229	248	232	238	199	249
Mean	208	234	206	246	211	210	221	232	207	230	247	228	239	199	237
Median	210	233	206	246	212	210	221	232	206	231	249	230	239	198	242
Std.Dev.	5	2	2	3	3	6	3	3	3	5	5	4	1	3	14
Rel.Std.Dev.	2.52%	0.74%	1.21%	1.37%	1.62%	2.86%	1.48%	1.23%	1.53%	2.21%	1.83%	1.68%	0.57%	1.73%	5.89%
PDM[3]	-7.10%	4.42%	-8.20%	9.78%	-5.70%	-6.07%	-1.46%	3.58%	-7.72%	2.80%	10.16%	1.97%	6.58%	-11.13%	5.64%

Table A4. Results for Er in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	77	92	81	91	85	**78**	90	89	75	88	102	84	93	80	85
2	76	92	80	90	82	81	91	88	78	91	103	84	94	81	90
3	76	91	81	92	85	**84**	90	88	76	93	101	85	**97**	80	96
4	79	93	78	93	83	80	92	86	76	92	101	85	94	**85**	94
5	78	90	79	95	86	80	93	87	73	91	**98**	86	95	80	97
6	78	91	79	95	84	81	94	86	74	89	102	86	94	80	99
Mean	77	91	80	92	84	81	92	87	75	91	101	85	94	81	94
Median	77	91	80	92	85	80	91	88	75	91	102	85	94	80	95
Std.Dev.	1	1	1	2	1	2	2	1	2	2	2	1	1	2	5
Rel.Std.Dev.	1.76%	1.19%	1.81%	2.07%	1.42%	2.54%	1.64%	1.39%	2.15%	1.91%	1.63%	1.05%	1.32%	2.29%	5.59%
PDM[3]	-11.22%	5.16%	-8.45%	6.16%	-3.10%	-7.34%	5.24%	0.41%	-13.52%	4.24%	16.35%	-2.27%	8.48%	-6.82%	7.59%

Table A5. Results for Eu in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	130	137	129	139	120	**120**	116	131	111	134	152	122	131	114	119
2	127	138	129	140	**118**	124	115	132	113	136	154	122	134	113	125
3	125	136	129	143	124	**130**	116	131	114	135	153	125	133	114	133
4	129	138	126	140	122	124	120	130	112	136	151	123	131	**118**	130
5	129	136	127	146	122	125	120	130	112	135	**147**	122	134	**110**	136
6	130	139	126	145	121	125	121	128	111	137	153	122	134	113	135
Mean	128	137	128	142	121	125	118	130	112	135	**152**	123	133	114	130
Median	129	138	128	142	122	124	118	130	112	135	153	122	133	113	131
Std.Dev.	2	1	1	3	2	3	3	1	1	1	3	1	1	3	7
Rel.Std.Dev.	1.63%	0.88%	1.07%	2.06%	1.82%	2.49%	2.19%	1.11%	1.23%	0.56%	1.65%	0.99%	0.94%	2.30%	5.19%
PDM[3]	1.21%	8.29%	0.71%	12.10%	-4.52%	-1.67%	-7.22%	2.65%	-11.42%	6.79%	19.59%	-3.28%	4.54%	-10.50%	2.17%

Table A6. Results for Gd in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	329	339	343	366	349	**316**	365	394	326	**360**	442	370	402	352	334
2	323	347	338	362	345	332	362	390	337	377	441	368	405	356	351
3	**319**	347	**348**	386	360	342	363	390	329	372	438	379	404	355	375
4	329	345	336	370	355	329	375	385	329	370	433	383	405	368	364
5	325	344	340	378	359	333	374	390	330	376	428	382	404	341	378
6	330	345	337	370	357	335	373	389	325	378	447	385	401	347	382
Mean	326	345	340	372	354	331	369	390	330	372	**438**	378	404	353	364
Median	327	345	339	370	356	332	369	390	329	374	440	381	404	354	370
Std.Dev.	4	3	5	9	6	9	6	3	4	7	7	7	2	9	19
Rel.Std.Dev.	1.31%	0.86%	1.33%	2.33%	1.68%	2.65%	1.62%	0.74%	1.27%	1.79%	1.55%	1.89%	0.41%	2.59%	5.16%
PDM[3]	-9.31%	-4.14%	-5.39%	3.51%	-1.45%	-7.86%	2.58%	8.42%	-8.29%	3.52%	21.92%	5.13%	12.27%	-1.73%	1.28%

Table A7. Results for Ho in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	34.2	37.9	35.6	40.4	34.8	35.4	37.5	36.9	32.0	40.2	40.6	36.0	38.9	32.2	35.3
2	34.0	37.9	35.8	39.4	**33.4**	36.4	38.0	36.9	33.0	38.1	40.3	37.0	39.4	32.8	38.3
3	**33.0**	37.5	35.7	41.0	35.0	**37.2**	38.0	36.8	32.4	40.2	40.2	37.0	40.1	32.6	41.2
4	34.2	37.9	35.2	40.4	34.2	36.4	38.6	36.1	31.9	37.8	39.8	37.0	38.6	**33.9**	38.9
5	33.8	37.0	35.4	41.6	34.7	36.1	38.3	36.2	31.5	37.8	39.6	38.0	39.6	31.8	40.1
6	34.9	37.4	35.0	40.6	34.7	36.2	39.2	35.9	31.3	39.3	40.2	38.0	39.0	32.1	41.6
Mean	34.0	37.6	35.4	40.6	34.5	36.3	38.3	36.5	32.0	38.9	40.1	37.2	39.3	32.6	39.2
Median	34.1	37.7	35.5	40.5	34.7	36.3	38.2	36.5	32.0	38.7	40.2	37.0	39.2	32.4	39.5
Std.Dev.	0.6	0.4	0.3	0.7	0.6	0.6	0.6	0.5	0.6	1.1	0.4	0.8	0.5	0.7	2.3
Rel.Std.Dev.	1.83%	0.98%	0.85%	1.80%	1.70%	1.66%	1.53%	1.23%	1.94%	2.95%	0.90%	2.03%	1.38%	2.29%	5.89%
PDM[3]	-7.61%	2.12%	-3.77%	10.18%	-6.39%	-1.50%	3.93%	-0.96%	-13.08%	5.65%	8.96%	0.94%	6.65%	-11.55%	6.56%

Table A8. Results for La in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*OES	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	2515	2690	2504	2680	2370	**2394**	2460	2630	2282	2703	2581	2330	2700	2150	2423
2	2532	2740	2490	2660	2270	2460	2360	2603	2265	2727	2499	2310	2710	2180	2537
3	2454	2680	2517	2700	2360	**2562**	2390	2633	2320	2824	**2765**	2370	2750	2210	2691
4	2544	2740	2467	2710	2350	2486	2440	2541	2296	2826	2521	2320	2730	2220	2672
5	2471	2680	2468	2720	2320	2471	2380	2567	2222	2763	2520	2320	2770	2180	2816
6	2542	2700	2468	2700	2330	2452	2400	2551	2270	2858	2628	2350	2710	2170	2788
Mean	2510	2705	2486	2695	2333	2471	2405	2588	2276	2784	2586	2333	2728	2185	2654
Median	2523	2695	2479	2700	2340	2466	2395	2585	2276	2794	2551	2325	2720	2180	2682
Std.Dev.	38	28	22	22	36	55	38	40	33	62	100	23	27	26	151
Rel.Std.Dev.	1.52%	1.04%	0.87%	0.80%	1.55%	2.21%	1.57%	1.55%	1.45%	2.22%	3.87%	0.96%	0.99%	1.18%	5.67%
PDM[3]	-0.15%	7.63%	-1.10%	7.23%	-7.16%	-1.69%	-4.31%	2.96%	-9.44%	10.75%	2.88%	-7.16%	8.56%	-13.06%	5.62%

Table A9. Results for Lu in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	6.52	6.20	6.57	6.20	6.10	6.07	7.00	6.50	6.41	6.10	5.70	<8	7.20	5.83	6.60
2	6.05	6.28	6.55	6.60	5.99	6.39	6.80	6.50	6.48	6.20	5.90	<8	7.20	5.87	7.10
3	6.12	6.38	6.59	6.60	6.07	6.36	6.90	6.40	6.53	6.50	5.80	<8	7.30	6.03	7.20
4	6.30	6.28	6.50	6.20	6.25	6.26	7.10	6.30	6.48	6.00	5.70	<8	7.20	**6.09**	7.50
5	6.61	6.22	6.36	6.80	6.21	6.27	7.00	6.30	6.34	5.90	6.10	<8	7.10	5.77	7.60
6	6.67	6.18	6.49	6.60	6.23	6.12	7.00	6.40	6.39	5.90	5.60	<8	7.20	5.82	7.60
Mean	6.38	6.26	6.51	6.50	6.14	6.24	6.97	6.40	6.44	6.10	5.80		**7.20**	5.90	**7.27**
Median	6.41	6.25	6.52	6.60	6.16	6.26	7.00	6.40	6.45	6.05	5.75		7.20	5.85	7.35
Std.Dev.	0.26	0.07	0.09	0.24	0.10	0.13	0.10	0.09	0.07	0.23	0.18		0.06	0.13	0.39
Rel.Std.Dev.	4.09%	1.17%	1.31%	3.77%	1.69%	2.04%	1.48%	1.40%	1.09%	3.74%	3.08%		0.88%	2.17%	5.34%
PDM[3]	1.25%	-0.68%	3.30%	3.18%	-2.51%	-0.88%	10.59%	1.59%	2.20%	-3.17%	-7.93%		14.29%	-6.32%	15.35%

Table A10. Results for Nd in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	2181	2350	2014	2410	2060	**2036**	1870	2193	2126	2206	2569	2060	**2230**	**1815**	2169
2	2147	2380	2024	2360	2020	2154	1865	2201	2203	2262	2545	2020	2290	1870	2225
3	2110	2310	2031	2420	**2120**	**2243**	1865	2204	2180	2190	2565	2070	2300	1895	2405
4	2172	2330	1986	2390	2050	2126	1950	2152	2213	2199	2520	2050	2290	1925	2428
5	2119	2340	2005	2490	2050	2133	1940	2174	2141	2195	2539	2050	2300	1870	2561
6	2164	2360	1988	2460	2060	2122	1955	2150	2091	2255	2570	2050	2300	1880	2494
Mean	2149	2345	2008	2422	2060	2136	1908	2179	2159	2218	2551	2050	2285	1876	2380
Median	2156	2345	2010	2415	2055	2129	1905	2184	2161	2203	2555	2050	2295	1875	2416
Std.Dev.	29	24	18	47	33	66	45	24	48	32	20	17	27	36	153
Rel.Std.Dev.	1.35%	1.04%	0.91%	1.94%	1.60%	3.11%	2.36%	1.11%	2.20%	1.44%	0.79%	0.82%	1.20%	1.93%	6.44%
PDM[3]	-1.53%	7.46%	-7.99%	10.97%	-5.60%	-2.14%	-12.59%	-0.15%	-1.06%	1.63%	16.91%	-6.06%	4.71%	-14.04%	9.07%

Table A11. Results for Pr in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	539	589	570	579	533	517	501	568	511	581	689	515	570	472	542
2	531	596	568	577	518	526	498	565	519	570	683	512	577	485	559
3	521	585	570	590	539	**551**	498	570	524	564	686	527	**593**	489	591
4	540	596	562	594	529	525	521	558	522	578	674	522	577	493	605
5	530	583	560	604	523	537	519	559	510	574	674	521	577	479	627
6	540	586	561	589	524	526	525	561	509	579	693	516	588	483	625
Mean	534	589	565	589	528	531	510	564	516	574	**683**	519	580	484	591
Median	535	588	565	590	527	526	510	563	515	576	685	519	577	484	598
Std.Dev.	7	6	5	10	8	12	13	5	7	6	8	5	8	7	35
Rel.Std.Dev.	1.36%	0.96%	0.82%	1.69%	1.44%	2.26%	2.47%	0.87%	1.29%	1.12%	1.15%	1.06%	1.46%	1.54%	5.89%
PDM[3]	-2.57%	7.59%	3.20%	7.53%	-3.64%	-3.11%	-6.81%	2.90%	-5.80%	4.90%	24.75%	-5.25%	5.98%	-11.71%	8.01%

Table A12. Results for Sm in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	439	475	414	478	423	415	397	443	390	476	482	419	465	**369**	443
2	430	476	415	481	412	443	400	441	400	481	502	416	472	382	444
3	423	470	416	488	424	451	398	443	405	463	500	419	471	386	482
4	446	475	407	489	424	423	411	437	393	471	489	418	472	389	476
5	426	472	405	501	421	433	415	437	394	479	490	413	477	380	513
6	442	474	407	502	418	436	413	436	389	473	495	419	471	384	496
Mean	434	474	411	490	420	434	406	439	395	474	493	417	471	382	475
Median	435	475	410	489	422	435	406	439	393	474	493	419	472	383	479
Std.Dev.	9	2	5	10	5	13	8	3	6	7	7	2	4	7	28
Rel.Std.Dev.	2.09%	0.48%	1.20%	2.03%	1.11%	2.99%	2.02%	0.70%	1.58%	1.38%	1.52%	0.58%	0.81%	1.82%	5.87%
PDM[3]	-1.55%	7.37%	-6.93%	11.03%	-4.72%	-1.70%	-8.05%	-0.40%	-10.46%	7.38%	11.75%	-5.40%	6.84%	-13.49%	7.76%

Table A13. Results for Tb in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	45.1	46.5	43.7	49.0	46.2	42.8	49.6	48.2	41.7	48.5	58.1	49.0	50.7	44.5	**48.4**
2	43.9	47.5	43.7	48.0	**44.4**	43.6	49.5	47.3	42.4	51.0	59.8	48.0	51.1	44.5	50.9
3	43.0	46.5	43.9	49.8	46.2	45.5	49.4	47.7	42.2	50.5	57.8	50.0	51.2	44.3	54.3
4	45.0	46.6	43.1	49.0	46.8	44.0	51.1	46.5	41.6	48.1	57.6	50.0	51.7	**46.1**	53.3
5	44.0	46.5	43.0	**50.6**	46.0	45.2	50.5	47.0	41.0	49.0	57.1	51.0	50.8	43.6	55.1
6	44.9	46.7	43.2	49.2	46.6	44.3	50.5	45.7	40.7	50.2	59.1	51.0	50.3	44.7	55.3
Mean	44.3	46.7	43.4	49.3	46.0	44.3	50.1	47.1	41.6	49.6	**58.3**	49.8	51.0	44.6	52.9
Median	44.5	46.6	43.5	49.1	46.2	44.2	50.1	47.2	41.6	49.6	58.0	50.0	51.0	44.5	53.8
Std.Dev.	0.8	0.4	0.4	0.9	0.9	1.0	0.7	0.9	0.7	1.2	1.0	1.2	0.5	0.8	2.7
Rel.Std.Dev.	1.88%	0.84%	0.91%	1.77%	1.85%	2.28%	1.39%	1.88%	1.60%	2.38%	1.73%	2.35%	0.94%	1.84%	5.14%
PDM[3]	-6.21%	-1.10%	-8.04%	4.30%	-2.54%	-6.30%	6.07%	-0.36%	-11.94%	4.90%	23.32%	5.50%	7.90%	-5.54%	11.96%

Table A14. Results for Tm in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	9.2	10.2	9.3	11.0	9.2	10.0	10.4	10.0	8.7	9.9	10.7	<10	10.4	8.8	10.2
2	9.0	10.0	9.4	10.6	9.2	9.9	10.5	10.0	9.0	10.2	10.6	<10	10.4	8.8	10.8
3	**8.6**	10.1	9.4	11.0	9.3	**10.3**	10.3	10.0	8.9	10.4	10.4	10.0	**10.7**	8.7	11.7
4	**9.6**	10.1	9.2	10.8	9.3	10.0	10.6	10.0	8.9	9.7	**10.0**	10.0	10.3	**9.2**	11.6
5	9.1	10.1	9.3	11.0	9.3	10.0	10.7	10.0	8.7	10.2	10.8	10.0	10.4	8.9	11.7
6	9.2	10.0	9.2	10.8	9.4	9.8	10.8	10.0	8.7	10.1	10.6	10.0	10.3	8.7	12.0
Mean	9.1	10.1	9.3	10.9	9.3	10.0	10.6	10.0	8.8	10.1	10.5	10.0	10.4	8.8	11.3
Median	9.2	10.1	9.3	10.9	9.3	10.0	10.6	10.0	8.8	10.2	10.6	10.0	10.4	8.8	11.7
Std.Dev.	0.3	0.1	0.1	0.2	0.1	0.2	0.2	0.0	0.1	0.2	0.3	0.0	0.1	0.2	0.7
Rel.Std.Dev.	3.57%	0.75%	0.96%	1.50%	1.04%	1.76%	1.77%	0.00%	1.62%	2.46%	2.72%	0.00%	1.41%	2.09%	6.05%
PDM[3]	-8.30%	1.42%	-6.35%	9.30%	-6.69%	0.49%	6.12%	0.59%	-11.18%	1.42%	5.78%	0.59%	4.78%	-11.13%	14.00%

Table A15. Results for Yb in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	45.9	57.2	52.1	56.5	49.9	49.6	54.0	55.0	52.8	54.6	**53.7**	53.0	55.9	46.0	54.0
2	**47.4**	57.4	51.3	56.0	**48.4**	51.1	53.8	55.0	54.1	54.2	60.7	53.0	57.3	46.5	56.9
3	**44.1**	58.1	51.6	57.5	50.7	**53.1**	53.9	55.0	54.0	54.5	57.5	54.0	58.1	47.1	59.7
4	46.4	57.3	51.0	54.5	50.2	50.7	54.3	53.0	53.8	54.7	58.5	54.0	56.1	48.3	59.8
5	46.2	57.1	51.3	57.5	49.6	50.7	55.0	53.0	52.3	**56.6**	57.2	55.0	56.7	45.4	62.3
6	46.0	57.0	51.0	57.0	50.1	50.6	55.3	53.0	51.9	55.1	59.2	54.0	56.7	46.3	61.9
Mean	46.0	57.4	51.4	56.5	49.8	51.0	54.4	54.0	53.2	55.0	57.8	53.8	56.8	46.6	59.1
Median	46.1	57.3	51.3	56.8	50.0	50.7	54.2	54.0	53.3	54.7	58.0	54.0	56.7	46.4	59.8
Std.Dev.	1.1	0.4	0.4	1.1	0.8	1.2	0.6	1.1	0.9	0.9	2.4	0.8	0.8	1.0	3.2
Rel.Std.Dev.	2.34%	0.69%	0.83%	2.02%	1.57%	2.27%	1.15%	2.03%	1.79%	1.56%	4.10%	1.40%	1.42%	2.15%	5.34%
PDM[3]	-14.09%	7.11%	-4.05%	5.53%	-6.96%	-4.78%	1.57%	0.86%	-0.70%	2.63%	7.95%	0.54%	6.09%	-12.97%	10.38%

Table A16. Results for Y in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	856	944	927	1010	861	895	866	931	830	812	1305	932	953	856	833
2	859	946	934	1010	**829**	919	859	930	852	877	1380	933	948	862	855
3	**834**	905	930	1020	878	947	861	946	852	857	1341	957	968	880	926
4	870	925	915	1020	860	920	868	908	863	832	1335	953	949	**892**	911
5	885	931	926	1030	858	939	859	909	838	838	1318	947	958	860	939
6	871	905	923	1040	856	919	879	911	814	814	1355	956	946	868	955
Mean	863	926	926	1022	857	923	865	923	841	838	**1339**	946	954	870	903
Median	865	928	926	1020	859	920	864	921	845	835	1338	950	951	865	918
Std.Dev.	17	18	7	12	16	18	8	16	18	25	27	11	8	14	49
Rel.Std.Dev.	2.01%	1.95%	0.71%	1.14%	1.85%	1.96%	0.89%	1.68%	2.11%	3.02%	1.99%	1.19%	0.86%	1.58%	5.39%
PDM[3]	-4.63%	2.37%	2.35%	12.95%	-5.25%	2.07%	-4.33%	1.99%	-6.99%	-7.32%	48.03%	4.62%	5.43%	-3.85%	-0.16%

Table A17. Results for U in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	2.60	2.70	**2.96**	2.50	2.46	2.71	3.10	2.90	3.00	3.05	2.20	<5	2.70	2.33	**2.50**
2	2.40	2.80	2.69	2.50	2.42	2.73	3.10	3.00	3.30	2.88	2.40	<5	2.60	2.44	2.70
3	2.50	2.70	2.72	2.50	2.55	**2.92**	3.00	2.90	2.90	2.85	2.40	<5	2.70	2.44	2.80
4	2.50	2.70	2.68	2.50	2.39	2.86	3.20	2.80	3.00	3.04	2.60	<5	2.70	2.51	2.70
5	2.40	2.60	2.69	2.50	2.38	2.71	3.10	2.90	2.80	2.88	2.20	<5	2.70	2.31	2.80
6	2.40	2.70	2.62	2.50	2.43	2.75	3.10	3.10	2.70	2.94	2.40	<5	2.70	2.44	2.80
Mean	2.47	2.70	2.73	2.50	2.44	2.78	3.10	2.93	2.95	2.94	2.37		2.68	2.41	2.72
Median	2.45	2.70	2.69	2.50	2.43	2.74	3.10	2.90	2.95	2.91	2.40		2.70	2.44	2.75
Std.Dev.	0.08	0.06	0.12	0.00	0.06	0.09	0.06	0.10	0.21	0.09	0.15		0.04	0.08	0.12
Rel.Std.Dev.	3.31%	2.34%	4.36%	0.00%	2.53%	3.21%	2.04%	3.52%	7.03%	2.94%	6.36%		1.52%	3.16%	4.30%
PDM[3]	-8.35%	0.31%	1.29%	-7.12%	-9.41%	3.31%	15.18%	8.98%	9.60%	9.23%	-12.07%		-0.30%	-10.40%	0.93%

Table A18. Results for Th in OREAS 146 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*MS	Lab B PF*MS	Lab C BF*MS	Lab D PF*MS	Lab E BF*MS	Lab F PF*MS	Lab G BF*MS	Lab H PF*MS	Lab I BF*MS	Lab J PF*MS	Lab K PF*MS	Lab L PF*ICP	Lab M BF*MS	Lab N BF*MS	Lab O PF*MS
1	944	865	1020	898	860	**857**	809	912	922	808	794	879	922	859	**897**
2	941	878	1040	974	835	893	798	911	930	799	799	864	938	886	965
3	**907**	866	1055	1030	880	**920**	790	906	959	815	804	874	964	908	1011
4	948	876	1034	984	850	889	818	894	939	806	784	880	928	927	980
5	927	864	1034	1030	863	894	800	897	944	818	776	878	949	877	1036
6	943	865	1030	965	856	896	815	894	930	829	802	871	943	917	1018
Mean	935	869	1036	980	857	892	805	902	937	812	793	874	941	896	984
Median	942	866	1034	979	858	894	805	902	934	811	797	876	941	897	995
Std.Dev.	15	6	12	49	15	20	11	8	13	11	11	6	15	26	50
Rel.Std.Dev.	1.64%	0.72%	1.11%	5.00%	1.74%	2.26%	1.34%	0.93%	1.39%	1.29%	1.39%	0.70%	1.60%	2.90%	5.09%
PDM[3]	3.59%	-3.71%	14.75%	8.60%	-5.01%	-1.22%	-10.81%	-0.02%	3.83%	-10.02%	-12.12%	-3.12%	4.23%	-0.76%	9.08%