ORE RESEARCH & EXPLORATION PTY LTD

6 - 8 Gatwick Road, Bayswater North, Vic 3153 AUSTRALIA
Telephone: 61-3-9729 0333 Facsimile: 61-3-9729 4777

CERTIFICATE OF ANALYSIS FOR

QUARTZ GOLD & BASE METAL BLANK
OREAS 22b

SUMMARY STATISTICS OREAS 22b

Constituent	Recommended value	95% Confidence Interval		Tolerance limits 1-α=0.99, ρ=0.95	
		Low	High	Low	High
Gold, Au (ppb)	<2	IND	IND	IND	IND
Silver, Ag (ppm)	<0.1	IND	IND	IND	IND
Arsenic, As (ppm)	<1	IND	IND	IND	IND
Barium, Ba (ppm)	6.9	6.3	7.4	6.5	7.3
Bismuth, Bi (ppm)	~0.02	IND	IND	IND	IND
Cadmium, Cd (ppm)	<0.1	IND	IND	IND	IND
Cobalt, Co (ppm)	0.61	0.59	0.63	0.59	0.62
Copper, Cu (ppm)	8.9	7.8	9.9	7.8	9.9
Molybdenum, Mo (ppm)	4.9	4.7	5.2	4.6	5.3
Nickel, Ni (ppm)	~5	IND	IND	IND	IND
Lead, Pb (ppm)	<2	IND	IND	IND	IND
Antimony, Sb (ppm)	<0.2	IND	IND	IND	IND
Tin, Sn (ppm)	0.6	0.4	0.8	0.5	0.6
Thorium, Th (ppm)	0.6	0.5	0.7	0.5	0.7
Uranium, U (ppm)	~0.1	IND	IND	IND	IND
Tungsten, W (ppm)	<0.2	IND	IND	IND	IND
Zinc, Zn (ppm)	10	8	12	8	12

Prepared by:
Ore Research & Exploration Pty Ltd
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REPORT 22b

INTRODUCTION

OREAS geochemical reference materials are intended to provide a low cost method of evaluating and improving the quality of analysis of geological samples. To the analyst they provide an effective means of calibrating analytical equipment, assessing new techniques and routinely monitoring in-house procedures. To the geologist they provide a means of implementing quality control in analytical data sets generated in exploration, from the grass roots level through to prospect evaluation, and in grade control at mining operations.

SOURCE MATERIALS

OREAS 22b has been prepared from quartz sand to which 0.5% iron oxide has been added to produce a pale grey pulp. It is characterised by extremely low background gold of less than 2 parts per billion and very low base metal values, typically less than 10 parts per million.

COMMINUTION AND HOMOGENISATION PROCEDURES

The material was prepared in the following manner:

a) milling of the quartz sand to approximately 95% less than 75 microns;

b) blending with 0.5% iron oxide pulp;

c) collection into 25kg multiwall bags;

d) packaging into 10 and 60 gram units.

The presence of a small oversize fraction is intentional in that it more closely resembles a typical sample pulp prepared in a laboratory ring mill.

ANALYTICAL PROGRAM FOR OREAS 22b

Six laboratories participated in the analytical program to characterise Au, Ag, As, Ba, Bi, Cd, Co, Cu, Mo, Ni, Pb, Sb, Sn, Th, U, W and Zn. Their results together with uncorrected means, medians, one sigma standard deviations, relative standard deviations and percent deviation of lab means from the corrected mean of means (PDM^3) are presented in an appendix (Tables A2 – A18). For those analytes where concentrations are below detection limits summary statistics could not be determined. The analytical methods employed by each laboratory are indicated as codes at the head of each laboratory data set and explained in Table A1 of the appendix.

Each laboratory has been randomly designated with letter codes A through F in all tables. For gold, all the laboratories used a lead fire assay collection on 30-50g charges with an ICP OES or MS finish with one lab employing solvent extraction AAS. The results indicate uniform impoverishment in gold making it an ideal natural blank for monitoring contamination levels in routine assay work. For the other elements, a four acid digest was employed with an ICP OES or MS finish.

STATISTICAL EVALUATION OF OREAS 22b

Recommended Value and Confidence Limits

The certified value is the mean of means of accepted replicate values of accepted participating laboratories computed according to the formulae:

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

$$\ddot{x} = \frac{1}{p} \sum_{i=1}^{p} \bar{x}_i$$

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;*

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

$\ddot{x}$ *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).

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

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

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

The distributions of the values are assumed to be symmetrical about the mean in the calculation of the confidence limits.

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

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

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

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.

Individual outliers and, more rarely, laboratory means deemed to be outlying are shown in bold in the tabulated results (Appendix) and have been omitted in the determination of recommended 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 recommended value, i.e. the narrower the confidence interval the greater the certainty in the recommended value. Because the abundance levels of many of the elements are at or below detection levels the confidence intervals could not be determined.

Table 1. Recommended values and 95% confidence intervals for OREAS 22b

Constituent	Recommended value	95% Confidence Interval	
		Low	High
Gold, Au (ppb)	<2	IND	IND
Silver, Ag (ppm)	<0.1	IND	IND
Arsenic, As (ppm)	<1	IND	IND
Barium, Ba (ppm)	6.9	6.3	7.4
Bismuth, Bi (ppm)	~0.02	IND	IND
Cadmium, Cd (ppm)	<0.1	IND	IND
Cobalt, Co (ppm)	0.61	0.59	0.63
Copper, Cu (ppm)	8.9	7.8	9.9
Molybdenum, Mo (ppm)	4.9	4.7	5.2
Nickel, Ni (ppm)	~5	IND	IND
Lead, Pb (ppm)	<2	IND	IND
Antimony, Sb (ppm)	<0.2	IND	IND
Tin, Sn (ppm)	0.6	0.4	0.8
Thorium, Th (ppm)	0.6	0.5	0.7
Uranium, U (ppm)	~0.1	IND	IND
Tungsten, W (ppm)	<0.2	IND	IND
Zinc, Zn (ppm)	10	8	12

*IND - indeterminate; values may appear asymmetric due to rounding

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 the 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 *is the number of results*;

$1-\alpha$ *is the confidence level*;

p *is the proportion of results expected within the 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 zinc, where 99% of the time at least 95% of subsamples will have concentrations lying between 8 and 12 ppm (see Table 2). 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

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

s'_g *is the grand standard deviation computed from the transformed (i.e. means - adjusted) results*

according to the formula:

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

where $\bar{x}'_i$ *is the transformed mean for laboratory i*

Table 2. Recommended values and tolerance limits for OREAS 22b

Constituent	Recommended value	Tolerance limits 1-α=0.99, ρ=0.95	
		Low	High
Gold, Au (ppb)	<2	IND	IND
Silver, Ag (ppm)	<0.1	IND	IND
Arsenic, As (ppm)	<1	IND	IND
Barium, Ba (ppm)	6.9	6.5	7.3
Bismuth, Bi (ppm)	~0.02	IND	IND
Cadmium, Cd (ppm)	<0.1	IND	IND
Cobalt, Co (ppm)	0.61	0.59	0.62
Copper, Cu (ppm)	8.9	7.8	9.9
Molybdenum, Mo (ppm)	4.9	4.6	5.3
Nickel, Ni (ppm)	~5	IND	IND
Lead, Pb (ppm)	<2	IND	IND
Antimony, Sb (ppm)	<0.2	IND	IND
Tin, Sn (ppm)	0.6	0.5	0.6
Thorium, Th (ppm)	0.6	0.5	0.7
Uranium, U (ppm)	~0.1	IND	IND
Tungsten, W (ppm)	<0.2	IND	IND
Zinc, Zn (ppm)	10	8	12

*IND - indeterminate; values may appear asymmetric due to rounding

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. A weighting factor of zero was applied to those data sets where $s_l / 2s_g' > 1$ (i.e. where the weighting factor $1- s_l / 2s_g' < 0$). 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. Outliers were removed prior to the calculation of tolerance intervals and a weighting factor of zero was applied to those data sets where $s_l / 2s_g' > 1$ (i.e. where the weighting factor $1- s_l / 2s_g' < 0$).

Performance Gates

Performance gates provide an indication of a level of performance that might reasonably be expected for a particular analyte from a laboratory being monitored by this standard in a QA/QC program. They incorporate errors attributable to measurement (analytical bias and precision) and standard variability. For an effective standard the contribution of the latter should be negligible in comparison to measurement errors. Two methods have been employed to calculate performance gates.

Table 3. Performance gates for OREAS 22b

Constituent	Recommended Value	1 σ	2 σ		3 σ		5%	
			Low	High	Low	High	Low	High
Gold, Au (ppb)	<2	IND	IND	IND	IND	IND	IND	IND
Silver, Ag (ppm)	<0.1	IND	IND	IND	IND	IND	IND	IND
Arsenic, As (ppm)	<1	IND	IND	IND	IND	IND	IND	IND
Barium, Ba (ppm)	6.9	0.4	6.1	7.6	5.8	8.0	6.5	7.2
Bismuth, Bi (ppm)	~0.02	IND	IND	IND	IND	IND	IND	IND
Cadmium, Cd (ppm)	<0.1	IND	IND	IND	IND	IND	IND	IND
Cobalt, Co (ppm)	0.6	0.0	0.5	0.7	0.5	0.7	0.6	0.6
Copper, Cu (ppm)	8.9	0.7	7.5	10.3	6.8	10.9	8.4	9.3
Molybdenum, Mo (ppm)	4.9	0.2	4.5	5.3	4.3	5.6	4.7	5.2
Nickel, Ni (ppm)	~5	IND	IND	IND	IND	IND	IND	IND
Lead, Pb (ppm)	<2	IND	IND	IND	IND	IND	IND	IND
Antimony, Sb (ppm)	<0.2	IND	IND	IND	IND	IND	IND	IND
Tin, Sn (ppm)	0.6	0.1	0.4	0.7	0.3	0.8	0.5	0.6
Thorium, Th (ppm)	0.6	0.0	0.5	0.7	0.4	0.7	0.6	0.6
Uranium, U (ppm)	~0.1	IND	IND	IND	IND	IND	IND	IND
Tungsten, W (ppm)	<0.2	IND	IND	IND	IND	IND	IND	IND
Zinc, Zn (ppm)	10.2	0.7	8.7	11.6	8.0	12.3	9.7	10.7

*IND - indeterminate; values may appear asymmetric due to rounding

The first method uses the standard deviation of the pooled individual analyses generated from the certification program. All individual and lab dataset (batch) outliers are removed prior to determination of the standard deviation. These outliers can only be removed if they can be confidently deemed to be analytical rather than arising from inhomogeneity of the CRM. Performance gates have been calculated for one, two and three standard deviations

of the accepted pool of certification data and are presented in Table 3. As a guide these intervals may be regarded as informational (1σ), warning or rejection for multiple outliers (2σ), or rejection for individual outliers (3σ) in QC monitoring although their precise application should be at the discretion of the QC manager concerned. For the second method a ±5% error bar on the recommended value is used as the window of acceptability (refer Table 3).
Both methods should be used with caution 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

ALS Chemex, Stafford, QLD, Australia
ALS Chemex, North Vancouver, BC, Canada
Amdel Laboratories, Thebarton, SA, Australia
Genalysis Laboratory Services, Maddington, WA, Australia
SGS, Welshpool, WA, Australia
Ultra Trace Laboratories, Canning Vale, WA, Australia

PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

The quartz blank reference material OREAS 22b has been prepared and certified and is supplied by:

Ore Research & Exploration Pty Ltd
6-8 Gatwick Road
Bayswater North, VIC 3153
AUSTRALIA

Telephone	(03) 9729 0333	International	+613-9729 0333
Facsimile	(03) 9729 4777	International	+613-9729 4777
Email	info @ore.com.au	Web	www.ore.com.au

It is available in unit sizes of 10 and 60 grams.

INTENDED USE

OREAS 22b is a reference material intended for the following:

i) for the calibration of instruments used in the determination of the concentration of Au, Ag, As, Ba, Bi, Cd, Co, Cu, Mo, Ni, Pb, Sb, Sn, Th, U, W and Zn;
ii) for the verification of analytical methods and in particular the monitoring of contamination levels for Au, Ag, As, Ba, Bi, Cd, Co, Cu, Mo, Ni, Pb, Sb, Sn, Th, U, W and Zn ;

STABILITY AND STORAGE INSTRUCTIONS

OREAS 22b has been prepared from a barren quartz sample. It is considered to have long-term stability under normal storage conditions.

INSTRUCTIONS FOR THE CORRECT USE OF THE REFERENCE MATERIAL

The recommended values for OREAS 22b refer to the concentration levels of Au, Ag, As, Ba, Bi, Cd, Co, Cu, Mo, Ni, Pb, Sb, Sn, Th, U, W and Zn in its packaged state.

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

Dr Paul Hamlyn

REFERENCES

ISO Guide 35 (1985), Certification of reference materials - General and statistical principals. ISO Guide 3207 (1975), Statistical interpretation of data - Determination of a statistical tolerance interval.

APPENDIX

Analytical Results for OREAS 22b

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

Abbreviation	Explanation
Std.Dev.	one sigma standard deviation
Rel.Std.Dev.	one sigma relative standard deviation
PDM[3]	percent deviation of lab mean from corrected mean of means
FA	fire assay
4A	four acid (HF-HNO3 -HClO4 -HCl) digestion
OES	inductively coupled plasma optical emission spectrometry
MS	inductively coupled plasma mass spectrometry
AAS	atomic absorption spectrometry
SXAAS	solvent extraction atomic absorption spectrometry
Mean	this refers to the tabulated RAW (uncorrected) data only

Table A2. Results for Au in OREAS 22b (abbreviations as in Table A1; values in ppb).

Replicate No.	LAB A FA*MS 50g	LAB B FA*MS 50g	LAB C FA*SXAAS 50g	LAB D FA*MS 40g	LAB E FA*OES 40g	LAB F FA*MS 30g
1	<0.1	1	<1	<1	<1	**6**
2	<0.1	1	<1	2	<1	1
3	<0.1	1	<1	<1	<1	1
4	<0.1	2	4.0	<1	<1	1
5	<0.1	1	<1	<1	<1	1
6	<0.1	1	<1	<1	<1	<1
Mean	<0.1	1.2	<1	2.0	<1	1.0
Median	<0.1	1.0	<1	2.0	<1	1.0

Table A3. Results for Ag in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	0.03	<0.01	<0.2	<0.5	<0.1	<0.1
2	0.03	<0.01	<0.2	<0.5	<0.1	<0.1
3	**0.07**	<0.01	<0.2	0.500	<0.1	<0.1
4	0.04	<0.01	<0.2	<0.5	<0.1	<0.1
5	0.03	<0.01	<0.2	<0.5	<0.1	<0.1
6	0.03	<0.01	<0.2	<0.5	<0.1	<0.1
Mean	0.04	<0.01	<0.2	<0.5	<0.1	<0.1
Median	0.03	<0.01	<0.2	<0.5	<0.1	<0.1

Table A4. Results for As in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	0.2	1.0	<2	<1	0.8	1.0
2	0.7	0.5	<2	<1	<0.5	<1
3	0.8	0.4	<2	<1	<0.5	1.0
4	0.5	0.3	<2	<1	<0.5	1.0
5	0.3	1.6	<2	<1	0.6	1.0
6	0.3	1.2	<2	<1	<0.5	1.0
Mean	0.5	0.8	<2	<1	<0.5	1.0
Median	0.4	0.8	<2	<1	<0.5	1.0

Table A5. Results for Ba in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	10	10	**8.4**	8.0	6.8	7.0
2	10	10	6.9	8.0	6.8	6.0
3	10	10	7.0	7.0	6.7	7.0
4	10	10	7.0	7.0	6.6	6.0
5	10	10	6.8	7.0	6.8	7.0
6	10	10	**7.6**	7.0	6.7	6.0
Mean	**10.0**	**10.0**	7.3	7.3	6.7	6.5
Median	10.0	10.0	7.0	7.0	6.8	6.5
Std.Dev.	0.0	0.0	0.6	0.5	0.1	0.5
Rel.Std.Dev.	0.00%	0.00%	8.44%	7.04%	1.30%	8.43%
PDM[3]	45.5%	45.5%	5.97%	6.70%	-2.03%	-5.43%

Table A6. Results for Bi in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	0.03	0.03	0.03	<0.1	<0.1	<0.1
2	**0.07**	0.02	0.04	<0.1	<0.1	<0.1
3	0.03	0.02	0.03	<0.1	<0.1	<0.1
4	0.02	0.02	<0.01	<0.1	<0.1	<0.1
5	0.02	0.02	<0.01	<0.1	<0.1	<0.1
6	0.02	0.02	<0.01	<0.1	<0.1	<0.1
Mean	0.03	0.02	**0.03**	<0.1	<0.1	<0.1
Median	0.03	0.02	0.03	<0.1	<0.1	<0.1
Std.Dev.	0.02	0.00	0.01	-	-	-
Rel.Std.Dev.	61.3%	18.8%	17.3%	-	-	-
PDM[3]	38.7%	-5.11%	46.0%	-	-	-

Table A7. Results for Cd in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	<0.02	<0.02	<0.1	<0.5	<0.1	<0.1
2	<0.02	<0.02	<0.1	<0.5	<0.1	<0.1
3	<0.02	<0.02	<0.1	<0.5	<0.1	<0.1
4	<0.02	<0.02	<0.1	<0.5	<0.1	<0.1
5	<0.02	<0.02	<0.1	<0.5	<0.1	<0.1
6	<0.02	<0.02	<0.1	<0.5	<0.1	<0.1
Mean	<0.02	<0.02	<0.1	<0.5	<0.1	<0.1
Median	<0.02	<0.02	<0.1	<0.5	<0.1	<0.1

Table A8. Results for Co in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*OES	LAB E 4A*MS	LAB F 4A*OES
1	0.6	0.6	0.6	<5	0.6	0.7
2	0.6	0.7	0.6	<5	0.6	0.6
3	0.6	0.6	0.6	<5	0.6	0.6
4	0.6	0.6	0.6	<5	0.6	0.6
5	0.7	0.6	0.6	<5	0.6	0.6
6	0.6	0.6	0.6	<5	**0.6**	0.6
Mean	0.6	0.6	**0.6**	<5	**0.6**	0.6
Median	0.6	0.6	0.6	<5	0.6	0.6
Std.Dev.	0.0	0.0	0.0	-	0.0	0.0
Rel.Std.Dev.	6.62%	6.62%	0.00%	-	3.56%	6.62%
PDM[3]	1.69%	1.69%	-1.06%	-	-2.70%	1.69%

Table A9. Results for Cu in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*OES	LAB D 4A*OES	LAB E 4A*MS	LAB F 4A*OES
1	8.9	8.9	7.0	10.0	8.2	9.0
2	9.1	9.3	8.0	12.0	8.1	8.0
3	10.3	8.8	8.0	12.0	8.4	9.0
4	10.1	8.6	8.0	8.0	8.2	9.0
5	9.7	9.0	7.0	10.0	8.7	9.0
6	9.9	8.3	7.0	10.0	8.2	8.0
Mean	9.7	8.8	7.5	10.3	8.3	8.7
Median	9.8	8.9	7.5	10.0	8.2	9.0
Std.Dev.	0.6	0.3	0.5	1.5	0.2	0.5
Rel.Std.Dev.	5.77%	3.89%	7.30%	14.6%	2.68%	5.96%
PDM[3]	8.89%	-0.68%	-15.5%	16.4%	-6.73%	-2.37%

Table A10. Results for Mo in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	5.0	4.8	4.7	4.5	5.2	5.4
2	5.2	5.1	4.6	4.5	5.2	4.8
3	4.8	5.0	4.8	5.0	5.3	5.7
4	4.7	5.2	4.9	5.0	5.2	5.3
5	4.8	5.2	4.6	4.5	5.2	5.0
6	4.5	4.6	4.7	4.5	5.1	4.9
Mean	4.8	5.0	4.7	4.7	5.2	5.2
Median	4.8	5.0	4.7	4.5	5.2	5.2
Std.Dev.	0.2	0.2	0.1	0.3	0.1	0.3
Rel.Std.Dev.	4.91%	4.58%	2.48%	5.53%	1.30%	6.62%
PDM[3]	-2.29%	0.92%	-4.28%	-5.30%	5.76%	5.19%

Table A11. Results for Ni in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*OES	LAB D 4A*OES	LAB E 4A*MS	LAB F 4A*MS
1	4.2	4.0	8.0	6.0	3.8	6.0
2	6.3	4.2	6.0	6.0	3.8	5.0
3	5.8	4.3	8.0	8.0	3.9	7.0
4	3.6	3.7	5.0	6.0	3.6	8.0
5	3.6	3.7	8.0	8.0	4.1	6.0
6	5.5	4.1	8.0	6.0	3.7	5.0
Mean	4.8	4.0	7.2	6.7	3.8	6.2
Median	4.9	4.1	8.0	6.0	3.8	6.0
Std.Dev.	1.2	0.3	1.3	1.0	0.2	1.2
Rel.Std.Dev.	24.4%	6.32%	18.5%	15.5%	4.74%	19.0%
PDM[3]	-11.2%	-26.5%	31.7%	22.5%	-29.8%	13.3%

Table A12. Results for Pb in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	0.8	1.2	2.0	<1	**<0.5**	**7.0**
2	0.8	1.8	<2	<1	0.8	**5.0**
3	1.3	1.3	<2	<1	0.9	3.0
4	0.9	1.4	<2	<1	0.8	4.0
5	1.4	1.8	<2	<1	1.0	3.0
6	0.8	1.5	<2	<1	0.8	3.0
Mean	1.0	1.5	<2	<1	0.9	4.2
Median	0.9	1.5	<2	<1	0.8	3.5
Std.Dev.	0.3	0.3	-	-	0.1	1.6
Rel.Std.Dev.	27.6%	16.9%	-	-	11.6%	38.4%
PDM[3]	-41.9%	-12.8%	-	-	-50.6%	142%

Table A13. Results for Sb in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	0.17	0.18	**0.21**	<0.2	<0.5	0.20
2	0.19	0.19	0.14	<0.2	<0.5	0.20
3	0.18	0.17	0.13	<0.2	<0.5	0.20
4	0.17	0.17	0.12	<0.2	<0.5	0.20
5	**0.36**	0.17	0.12	<0.2	<0.5	0.20
6	0.17	0.18	0.13	<0.2	<0.5	0.20
Mean	0.21	0.18	**0.14**	<0.2	<0.5	0.20
Median	0.18	0.18	0.13	<0.2	<0.5	0.20
Std.Dev.	0.08	0.01	0.03	-	-	0.00
Rel.Std.Dev.	36.6%	4.62%	24.2%	-	-	0.00%
PDM[3]	12.2%	-4.10%	-23.1%	-	-	8.56%

Table A14. Results for Sn in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	0.7	0.7	0.7	<1	0.3	0.6
2	0.7	0.7	0.7	<1	**0.8**	<0.5
3	0.7	0.7	0.5	<1	0.2	0.6
4	0.7	0.7	0.5	<1	0.3	<0.5
5	0.7	0.7	0.5	<1	0.5	<0.5
6	0.7	0.6	0.4	<1	0.3	0.6
Mean	0.7	0.7	0.6	<1	0.4	0.6
Median	0.7	0.7	0.5	<1	0.3	0.6
Std.Dev.	0.0	0.0	0.1	-	0.2	0.0
Rel.Std.Dev.	0.00%	5.97%	22.3%	-	54.9%	0.00%
PDM[3]	22.7%	19.8%	-3.55%	-	-31.3%	5.21%

Table A15. Results for Th in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	0.70	0.60	0.55	0.40	0.32	0.56
2	0.60	0.70	0.55	0.40	0.29	0.59
3	0.60	0.60	0.60	0.50	0.27	0.62
4	0.60	0.70	0.57	0.50	0.23	0.55
5	0.70	0.80	0.56	0.50	0.23	**0.78**
6	0.60	0.70	0.57	0.50	0.19	0.57
Mean	0.63	0.68	0.57	0.47	**0.26**	0.61
Median	0.60	0.70	0.57	0.50	0.25	0.58
Std.Dev.	0.05	0.08	0.02	0.05	0.05	0.09
Rel.Std.Dev.	8.15%	11.0%	3.29%	11.1%	18.5%	14.1%
PDM[3]	8.15%	16.7%	-3.23%	-20.3%	-56.5%	4.45%

Table A16. Results for U in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	0.10	0.50	0.14	0.10	<0.2	0.18
2	0.10	**0.80**	0.14	0.10	<0.2	0.13
3	0.10	0.40	0.13	0.10	<0.2	0.16
4	0.20	**0.80**	0.13	0.10	<0.2	0.14
5	0.10	**1.90**	0.13	0.10	<0.2	0.16
6	0.10	0.60	0.14	0.10	<0.2	0.16
Mean	0.12	**0.83**	0.14	0.10	<0.2	0.16
Median	0.10	0.70	0.14	0.10	<0.2	0.16
Std.Dev.	0.04	0.55	0.01	0.00	-	0.02
Rel.Std.Dev.	35.0%	65.6%	4.06%	0.00%	-	11.4%
PDM[3]	-7.89%	558%	6.58%	-21.1%	-	22.4%

Table A17. Results for W in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*MS	LAB D 4A*MS	LAB E 4A*MS	LAB F 4A*MS
1	0.2	0.1	0.2	<0.5	0.3	0.2
2	0.2	0.2	0.2	<0.5	0.2	0.1
3	0.2	0.1	0.2	<0.5	<0.1	0.1
4	0.1	0.2	0.2	<0.5	<0.1	0.1
5	0.1	0.1	0.2	<0.5	<0.1	0.1
6	0.1	0.1	0.2	<0.5	<0.1	0.2
Mean	0.15	0.13	0.20	<0.5	<0.1	0.13
Median	0.15	0.10	0.20	<0.5	<0.1	0.10
Std.Dev.	0.05	0.05	0.00	-	-	0.05
Rel.Std.Dev.	36.5%	38.7%	0.00%	-	-	38.7%
PDM[3]	-2.70%	-13.5%	29.7%	-	-	-13.5%

Table A18. Results for Zn in OREAS 22b (abbreviations as in Table A1; values in ppm).

Replicate No.	LAB A 4A*MS	LAB B 4A*MS	LAB C 4A*OES	LAB D 4A*OES	LAB E 4A*MS	LAB F 4A*MS
1	8	9	10	12	10	13
2	8	9	10	10	11	12
3	9	9	10	12	9	13
4	8	9	11	12	11	12
5	8	9	10	10	11	13
6	7	8	12	10	9	12
Mean	8	9	11	11	10	13
Median	8	9	10	11	11	13
Std.Dev.	1	0	1	1	1	1
Rel.Std.Dev.	7.91%	4.62%	7.97%	9.96%	9.27%	4.38%
PDM[3]	-21.4%	-13.2%	3.21%	8.12%	0.34%	22.9%