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CERTIFICATE OF ANALYSIS FOR

HIGH GRADE COPPER ORE
REFERENCE MATERIAL
OREAS 166

Summary Statistics for OREAS 166

Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window	
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High
SP Fusion ICP											
Cu (wt.%)	8.75	0.35	8.05	9.46	7.69	9.82	4.04%	8.09%	12.1%	8.32	9.19
Fe (wt.%)	11.45	0.43	10.58	12.32	10.15	12.75	3.78%	7.57%	11.3%	10.88	12.02
S (wt.%)	11.29	0.33	10.63	11.95	10.29	12.28	2.93%	5.86%	8.79%	10.72	11.85
CaO (wt.%)	0.98	0.05	0.87	1.08	0.82	1.13	5.26%	10.5%	15.8%	0.93	1.02
MgO (wt.%)	1.67	0.04	1.60	1.74	1.56	1.78	2.16%	4.32%	6.48%	1.58	1.75
Al_2O_3 (wt.%)	1.34	0.05	1.25	1.43	1.20	1.47	3.37%	6.74%	10.1%	1.27	1.40
SiO_2 (wt.%)	61.4	2.0	57.4	65.5	55.4	67.5	3.28%	6.56%	9.83%	58.4	64.5
Ag (ppm)	12	1	9	14	7	16	11.6%	23.3%	34.9%	11	12
Pb (ppm)	128	27	75	181	48	208	20.8%	41.6%	62.3%	122	135
Zn (ppm)	37	10	17	58	7	68	27.2%	54.3%	81.5%	36	39
Co (ppm)	2077	142	1793	2362	1651	2504	6.85%	13.7%	20.5%	1973	2181
4-Acid ICP											
Cu (wt.%)	8.82	0.27	8.28	9.36	8.01	9.63	3.08%	6.15%	9.23%	8.38	9.26
Fe (wt.%)	11.38	0.19	11.00	11.76	10.81	11.95	1.66%	3.32%	4.98%	10.81	11.95
S (wt.%)	11.6	0.6	10.3	12.9	9.7	13.6	5.57%	11.1%	16.7%	11.0	12.2
CaO (wt.%)	0.98	0.03	0.92	1.04	0.89	1.07	2.99%	5.99%	8.98%	0.93	1.03
MgO (wt.%)	1.67	0.05	1.56	1.77	1.51	1.82	3.12%	6.23%	9.35%	1.59	1.75
Al_2O_3 (wt.%)	1.38	0.05	1.27	1.48	1.22	1.54	3.84%	7.67%	11.5%	1.31	1.45
Ag (ppm)	10.8	0.7	9.4	12.3	8.7	13.0	6.70%	13.4%	20.1%	10.3	11.4
Pb (ppm)	140	9	123	157	114	165	6.12%	12.2%	18.4%	133	147
Zn (ppm)	37	2	33	41	31	43	5.63%	11.3%	16.9%	35	39
Co (ppm)	1970	108	1753	2186	1645	2295	5.50%	11.0%	16.5%	1871	2068

Note - intervals may appear asymmetric due to rounding; IND – indeterminate

Prepared by:
Ore Research & Exploration Pty Ltd
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INTRODUCTION

OREAS reference materials (RM) are intended to provide a low cost method of evaluating and improving the quality of precious and base metal 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 analyst, they provide an effective means of calibrating analytical equipment, assessing new techniques and routinely monitoring in-house procedures.

OREAS 166 is a high grade copper ore certified reference material (CRM) prepared and certified by Ore Research & Exploration Pth Ltd. The material was sourced from Xstrata's Mt Isa copper ore deposits located near the township of Mt Isa in north-west Queensland. The ore deposits are hosted by brecciated siliceous and dolomitic rock masses within the Urquhart Shale comprising complex and dissociated veins with chalcopyrite, pyrite and pyrrhotite with grades of 3-4% copper. OREAS 166 is one of a suite of seven CRMs characterised for Cu, Fe, S, CaO, MgO, Al_2O_3, SiO_2, Ag, Pb, Zn and Co by both sodium peroxide fusion ICP and 4-acid ICP methods.

COMMINUTION AND HOMOGENISATION PROCEDURES

The material was prepared in the following manner:

a) drying at 65^0 C to constant mass;
b) crushing and screening;
c) multi-stage milling to 100% minus 50 microns;
d) preliminary blending;
e) check assaying;
f) adjustment of grades as necessary;
g) final homogenisation;
h) packaging into 10g units sealed under nitrogen in laminated foil pouches.

ANALYSIS OF OREAS 166

Ten commercial laboratories participated in the analytical program to characterise Cu, Fe, S, CaO, MgO, Al_2O_3, SiO_2, Ag, Pb, Zn and Co by both sodium peroxide fusion ICP and 4-acid ICP methods. To maintain anonymity laboratories were randomly designated the letter codes A through J. In some instances laboratories determined one or more analytes using an alternative method to sodium peroxide fusion. These instances include: Lab J where a pyrosulfate fusion for Fe was used, Lab D and Lab H used infra red combustion furnace to determine sulphur and Lab H used lithium borate fusion to determine all analytes except Cu and Zn. Other exceptions include instances where laboratories used an alternative method to 4-acid digest. These include Lab G where a modified aqua regia digest was used to determine all analytes and Lab J where an acid digest (non specified) with AAS finish was used for Ag only. All 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 Tables A2 and A22 (Appendix). The parameter PDM^3 is a measure of laboratory accuracy while the relative standard deviation is an effective measure of analytical precision where homogeneity of the test material has been confirmed. The analytical methods employed by each laboratory are explained, together with other abbreviations used, in Table A1 (Appendix). Each participating laboratory received 5 samples of 50g each. Each set of subsamples submitted to each laboratory was taken at regular intervals during packaging of the standard in order to maximise their representation. Laboratories were instructed to assay samples as received.

STATISTICAL EVALUATION OF ANALYTICAL DATA FOR OREAS 166

Certified Value and Confidence Intervals

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 intervals 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).

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

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

where

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

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

The test for rejection of individual outliers from each laboratory data set was primarily 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.

Table 1. Certified values and 95% confidence intervals for OREAS 166

Constituent	Certified Value	95% Confidence Interval	
		Low	High
Sodium Peroxide Fusion ICP			
Copper, Cu (wt.%)	8.75	8.54	8.97
Iron, Fe (wt.%)	11.45	11.15	11.75
Sulphur, S (wt.%)	11.29	11.04	11.54
Calcium oxide, CaO (wt.%)	0.98	0.94	1.01
Magnesium oxide, MgO (wt.%)	1.67	1.65	1.69
Aluminium oxide, Al_2O_3 (wt.%)	1.34	1.30	1.37
Silicon dioxide, SiO_2 (wt.%)	61.4	60.0	62.9
Silver, Ag (ppm)	12	8	15
Lead, Pb (ppm)	128	108	148
Zinc, Zn (ppm)	37	23	51
Cobalt, Co (ppm)	2077	1989	2165
4-Acid* ICP			
Copper, Cu (wt.%)	8.82	8.62	9.01
Iron, Fe (wt.%)	11.38	11.33	11.43
Sulphur, S (wt.%)	11.6	10.9	12.3
Calcium oxide, CaO (wt.%)	0.98	0.96	1.00
Magnesium oxide, MgO (wt.%)	1.67	1.63	1.71
Aluminium oxide, Al_2O_3 (wt.%)	1.38	1.34	1.42
Silver, Ag (ppm)	10.8	10.3	11.4
Lead, Pb (ppm)	140	133	146
Zinc, Zn (ppm)	37	35	39
Cobalt, Co (ppm)	1970	1894	2046

*Lab G used a modified aqua regia digest. Note - intervals may appear asymmetric due to rounding; IND – indeterminate

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 > 1.5%. 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 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 (see Appendix) 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. A 95% confidence interval indicates a 95% probability that the interval includes the true value of the analyte under consideration.

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 *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* $(m, \alpha$ *unknown*);

s''_g *is the corrected grand standard deviation.*

The meaning of these tolerance limits may be illustrated for Cu by 4-acid digest, where 99% of the time at least 95% of subsamples will have concentrations lying between 8.69 and 8.95 wt.%. 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).

Table 2. Certified values and tolerance intervals for OREAS 166.

Constituent	Certified Value	Tolerance Interval 1-α=0.99, ρ=0.95	
		Low	High
Sodium Peroxide Fusion ICP			
Copper, Cu (wt.%)	8.75	8.53	8.98
Iron, Fe (wt.%)	11.45	11.20	11.70
Sulphur, S (wt.%)	11.29	11.06	11.51
Calcium oxide, CaO (wt.%)	0.98	0.94	1.01
Magnesium oxide, MgO (wt.%)	1.67	1.64	1.70
Aluminium oxide, Al_2O_3 (wt.%)	1.34	1.29	1.39
Silicon dioxide, SiO_2 (wt.%)	61.4	60.0	62.8
Silver, Ag (ppm)	12	IND	IND
Lead, Pb (ppm)	128	114	142
Zinc, Zn (ppm)	37	26	49
Cobalt, Co (ppm)	2077	2023	2131
4-Acid* ICP			
Copper, Cu (wt.%)	8.82	8.69	8.95
Iron, Fe (wt.%)	11.38	11.19	11.57
Sulphur, S (wt.%)	11.6	11.3	11.9
Calcium oxide, CaO (wt.%)	0.98	0.96	1.00
Magnesium oxide, MgO (wt.%)	1.67	1.63	1.71
Aluminium oxide, Al_2O_3 (wt.%)	1.38	1.34	1.42
Silver, Ag (ppm)	10.8	10.2	11.4
Lead, Pb (ppm)	140	134	146
Zinc, Zn (ppm)	37	34	40
Cobalt, Co (ppm)	1970	1940	2000

*Lab G used a modified aqua regia digest. Note - intervals may appear asymmetric due to rounding; IND – indeterminate

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:

$$s_g'' = \frac{\sum_{i=1}^{p}\left(s_i\left(1-\frac{s_i}{s_g'}\right)\right)}{\sum_{i=1}^{p}\left(1-\frac{s_i}{s_g'}\right)}$$

where

$1-\left(\frac{s_i}{2s_g'}\right)$ *is the weighting factor for laboratory* i ;

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 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.

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, analytical precision (repeatability) and inter-batch bias (reproducibility).

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 3 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. 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.

Table 3. Performance Gates for OREAS 166

Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window	
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High
SP Fusion ICP											
Cu (wt.%)	8.75	0.35	8.05	9.46	7.69	9.82	4.04%	8.09%	12.1%	8.32	9.19
Fe (wt.%)	11.45	0.43	10.58	12.32	10.15	12.75	3.78%	7.57%	11.3%	10.88	12.02
S (wt.%)	11.29	0.33	10.63	11.95	10.29	12.28	2.93%	5.86%	8.79%	10.72	11.85
CaO (wt.%)	0.98	0.05	0.87	1.08	0.82	1.13	5.26%	10.5%	15.8%	0.93	1.02
MgO (wt.%)	1.67	0.04	1.60	1.74	1.56	1.78	2.16%	4.32%	6.48%	1.58	1.75
Al_2O_3 (wt.%)	1.34	0.05	1.25	1.43	1.20	1.47	3.37%	6.74%	10.1%	1.27	1.40
SiO_2 (wt.%)	61.4	2.0	57.4	65.5	55.4	67.5	3.28%	6.56%	9.83%	58.4	64.5
Ag (ppm)	12	1	9	14	7	16	11.6%	23.3%	34.9%	11	12
Pb (ppm)	128	27	75	181	48	208	20.8%	41.6%	62.3%	122	135
Zn (ppm)	37	10	17	58	7	68	27.2%	54.3%	81.5%	36	39
Co (ppm)	2077	142	1793	2362	1651	2504	6.85%	13.7%	20.5%	1973	2181
4-Acid* ICP											
Cu (wt.%)	8.82	0.27	8.28	9.36	8.01	9.63	3.08%	6.15%	9.23%	8.38	9.26
Fe (wt.%)	11.38	0.19	11.00	11.76	10.81	11.95	1.66%	3.32%	4.98%	10.81	11.95
S (wt.%)	11.6	0.6	10.3	12.9	9.7	13.6	5.57%	11.1%	16.7%	11.0	12.2
CaO (wt.%)	0.98	0.03	0.92	1.04	0.89	1.07	2.99%	5.99%	8.98%	0.93	1.03
MgO (wt.%)	1.67	0.05	1.56	1.77	1.51	1.82	3.12%	6.23%	9.35%	1.59	1.75
Al_2O_3 (wt.%)	1.38	0.05	1.27	1.48	1.22	1.54	3.84%	7.67%	11.5%	1.31	1.45
Ag (ppm)	10.8	0.7	9.4	12.3	8.7	13.0	6.70%	13.4%	20.1%	10.3	11.4
Pb (ppm)	140	9	123	157	114	165	6.12%	12.2%	18.4%	133	147
Zn (ppm)	37	2	33	41	31	43	5.63%	11.3%	16.9%	35	39
Co (ppm)	1970	108	1753	2186	1645	2295	5.50%	11.0%	16.5%	1871	2068

*Lab G used a modified aqua regia digest. Note - intervals may appear asymmetric due to rounding; IND – indeterminate

PARTICIPATING LABORATORIES

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Activation Laboratories, Perth, WA, Australia
ALS Chemex, Brisbane, QLD, Australia
ALS Chemex, Vancouver, BC, Canada
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SGS Mineral Services, Lakefield, ON, Canada
Ultra Trace Pty Ltd, Perth, WA, Australia

PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

Reference material OREAS 166 has been prepared and certified and is supplied by:

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OREAS 166 is available in 10g units sealed in nitrogen-purged laminated foil pouches.

INTENDED USE

OREAS 166 is a reference material intended for the following:

i) for the monitoring of laboratory performance in the analysis of Cu, Fe, S, CaO, MgO, Al_2O_3, SiO_2, Ag, Pb, Zn and Co in geological samples;
ii) for the calibration of instruments used in the determination of the concentration of Cu, Fe, S, CaO, MgO, Al_2O_3, SiO_2, Ag, Pb, Zn and Co;
iii) for the verification of analytical methods for Cu, Fe, S, CaO, MgO, Al_2O_3, SiO_2, Ag, Pb, Zn and Co.

STABILITY AND STORAGE INSTRUCTIONS

OREAS 166 is a reference material made from high grade copper ore material from the Mt Isa Copper Operations. In its unopened state in the nitrogen-purged laminated foil pouches and under normal conditions of storage it has a shelf life beyond five years.

INSTRUCTIONS FOR THE CORRECT USE OF THE REFERENCE MATERIAL

The certified values for OREAS 166 refer to the concentration level of Cu, Fe, S, CaO, MgO, Al_2O_3, SiO_2, Ag, Pb, Zn and Co in its packaged state. The CRM 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 166

Table A1. Explanation of abbreviations used in Tables A2 – A11.

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
AD	acid digest (unspecified)
4A	four acid digest (HF-HNO_3-$HClO_4$-HCl)
MAR	modified aqua regia digest
PF	sodium peroxide fusion
PSF	pyrosulfate fusion
XRF	x-ray fluorescence
AAS	atomic absorption spectrometry
OES	inductively coupled plasma optical emission spectrometry
MS	inductively coupled plasma mass spectrometry
ICP	unspecified/combination of ICP-OES and ICP-MS

Table A2. Fusion results for Cu in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*ICP	Lab B PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*MS	Lab F PF*OES	Lab G PF*OES	Lab H PF*OES	Lab I PF*ICP	Lab J PF*OES
1	9.27	9.10	8.72	7.75	8.27	8.56	8.82	8.48	9.29	8.90
2	9.31	9.29	8.76	8.83	8.41	8.68	8.70	8.58	9.24	9.20
3	9.18	9.27	8.59	8.62	8.46	**8.36**	8.99	**8.86**	9.25	8.70
4	8.66	9.11	8.62	8.20	8.32	8.55	8.66	8.53	9.15	8.60
5	8.48	8.96	8.54	8.25	8.51	8.57	8.92	8.56	9.13	9.10
Mean	8.98	9.14	8.65	8.33	8.39	8.54	8.82	8.60	9.21	8.90
Median	9.18	9.11	8.62	8.25	8.41	8.56	8.82	8.56	9.24	8.90
Std.Dev.	0.383	0.137	0.092	0.416	0.099	0.115	0.140	0.149	0.071	0.255
Rel.Std.Dev.	4.26%	1.50%	1.06%	5.0%	1.18%	1.35%	1.59%	1.73%	0.77%	2.86%
PDM[3]	2.57%	4.45%	-1.24%	-4.85%	-4.12%	-2.41%	0.70%	-1.75%	5.21%	1.66%

Table A3. Fusion results for Fe in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*ICP	Lab B PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab F PF*OES	Lab G PF*OES	Lab H BF*OES	Lab I PF*ICP	Lab J PSF*XRF
1	11.0	12.2	12.0	11.7	**10.6**	11.3	11.6	11.5	11.8	11.1
2	11.0	12.5	11.9	11.3	11.0	11.2	11.2	11.4	11.6	11.0
3	11.0	12.4	11.4	11.7	11.3	10.8	11.8	11.3	11.9	11.2
4	11.0	12.3	11.4	11.2	11.0	10.9	11.8	11.6	11.8	11.2
5	11.1	12.3	11.7	11.1	11.0	11.0	11.6	11.6	11.8	11.2
Mean	11.0	12.3	11.7	11.4	11.0	11.0	11.6	11.5	11.8	11.1
Median	11.0	12.3	11.7	11.3	11.0	11.0	11.6	11.5	11.8	11.2
Std.Dev.	0.045	0.092	0.277	0.283	0.249	0.202	0.240	0.122	0.116	0.09
Rel.Std.Dev.	0.41%	0.75%	2.38%	2.48%	2.3%	1.83%	2.07%	1.06%	0.99%	0.80%
PDM[3]	-3.76%	7.72%	2.01%	-0.44%	-4.19%	-3.76%	1.41%	0.22%	2.69%	-2.71%

Table A4. Fusion results for S in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*ICP	Lab B PF*OES	Lab C PF*OES	Lab D IRC	Lab E PF*OES	Lab F PF*OES	Lab G PF*OES	Lab H IRC	Lab I PF*ICP	Lab J PF*OES
1	11.4	12.4	**12.0**	11.0	11.6	11.1	10.8	11.2	11.1	11.8
2	11.4	12.8	**11.2**	11.0	12.2	11.5	10.8	11.3	11.0	11.2
3	11.4	12.4	11.6	11.0	**12.6**	11.2	10.8	11.3	11.0	11.1
4	11.4	12.1	11.7	11.2	12.0	11.1	11.0	11.3	11.2	11.5
5	11.2	12.3	11.6	11.1	12.0	11.2	10.9	11.2	11.0	10.9
Mean	11.4	**12.4**	11.6	11.1	12.1	11.2	10.9	11.2	11.0	11.3
Median	11.4	12.4	11.6	11.0	12.0	11.2	10.8	11.3	11.0	11.2
Std.Dev.	0.089	0.24	0.29	0.089	0.36	0.16	0.09	0.067	0.08	0.35
Rel.Std.Dev.	0.79%	1.90%	2.46%	0.81%	3.01%	1.47%	0.82%	0.59%	0.73%	3.13%
PDM[3]	0.65%	9.94%	2.96%	-2.00%	6.86%	-1.03%	-3.85%	-0.43%	-2.20%	0.12%

Table A5. Fusion results for CaO in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*ICP	Lab B PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab F PF*OES	Lab G PF*OES	Lab H BF*OES	Lab I PF*ICP	Lab J PF*OES
1	0.92	0.90	1.10	1.00	0.97	0.88	0.80	0.98	0.98	NR
2	0.93	1.00	1.10	1.10	0.98	0.92	0.76	0.97	0.98	NR
3	0.95	1.00	1.00	1.00	**1.03**	0.89	**0.71**	0.98	0.96	NR
4	0.94	0.90	1.00	1.00	0.99	0.96	0.79	0.99	0.99	NR
5	0.94	1.00	1.00	1.00	0.97	0.91	0.81	0.99	**1.05**	NR
Mean	0.94	0.96	1.04	1.02	0.99	0.91	**0.77**	0.98	0.99	
Median	0.94	1.00	1.00	1.00	0.98	0.91	0.79	0.98	0.98	
Std.Dev.	0.011	0.055	0.055	0.045	0.025	0.031	0.043	0.008	0.034	
Rel.Std.Dev.	1.22%	5.71%	5.27%	4.38%	2.52%	3.42%	5.54%	0.85%	3.45%	
PDM[3]	-4.06%	-1.60%	6.60%	4.55%	1.27%	-6.52%	-20.7%	0.65%	1.68%	

Table A6. Fusion results for MgO in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*ICP	Lab B PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab F PF*OES	Lab G PF*OES	Lab H BF*OES	Lab I PF*ICP	Lab J PF*OES
1	1.67	1.67	1.76	**1.75**	1.51	1.55	1.63	1.64	**1.56**	1.60
2	1.69	1.69	1.64	1.69	1.57	1.58	1.65	1.64	1.63	1.60
3	1.67	1.71	1.71	1.68	1.61	1.55	1.67	1.67	1.61	1.70
4	1.67	1.67	1.74	1.68	1.56	1.57	1.65	1.66	**1.69**	1.70
5	1.69	1.67	1.64	**1.61**	1.54	1.55	1.66	1.71	1.62	1.70
Mean	1.68	1.68	1.70	1.68	**1.56**	**1.56**	1.65	1.66	1.62	1.66
Median	1.67	1.67	1.71	1.68	1.56	1.55	1.65	1.66	1.62	1.70
Std.Dev.	0.011	0.015	0.056	0.050	0.037	0.014	0.013	0.029	0.047	0.055
Rel.Std.Dev.	0.65%	0.88%	3.29%	2.95%	2.38%	0.91%	0.81%	1.73%	2.87%	3.30%
PDM[3]	0.62%	1.02%	1.82%	0.86%	-6.58%	-6.46%	-0.84%	-0.22%	-2.74%	-0.46%

Table A7. Fusion results for Al_2O_3 in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*ICP	Lab B PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab F PF*OES	Lab G PF*OES	Lab H BF*OES	Lab I PF*ICP	Lab J PF*OES
1	1.40	1.30	1.40	1.60	1.23	1.31	**1.09**	1.39	1.37	1.30
2	1.41	1.32	1.32	1.50	1.27	1.31	1.19	1.38	1.33	1.30
3	1.39	1.34	1.32	1.50	1.31	1.33	1.18	1.38	1.35	1.30
4	1.39	1.30	1.36	1.50	1.27	1.35	1.16	1.38	**1.42**	1.30
5	1.36	1.30	1.38	1.50	1.27	1.33	1.19	1.42	1.36	1.30
Mean	1.39	1.32	1.36	**1.52**	1.27	1.33	**1.16**	1.39	1.37	1.30
Median	1.39	1.30	1.36	1.50	1.27	1.33	1.18	1.38	1.36	1.30
Std.Dev.	0.019	0.017	0.036	0.045	0.028	0.017	0.042	0.017	0.034	0.000
Rel.Std.Dev.	1.35%	1.29%	2.64%	2.94%	2.23%	1.26%	3.60%	1.25%	2.46%	0.00%
PDM[3]	3.93%	-1.67%	1.39%	13.6%	-5.04%	-0.86%	-13.3%	3.93%	2.13%	-2.80%

Table A8. Fusion results for SiO_2 in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*ICP	Lab B PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab F PF*OES	Lab G PF*OES	Lab H BF*OES	Lab I PF*ICP	Lab J PF*OES
1	64.7	62.0	61.2	69.0	57.8	62.0	58.0	60.1	61.2	64.0
2	64.9	62.9	61.0	72.9	59.7	61.8	56.8	60.5	61.9	66.0
3	**57.0**	62.8	62.7	72.5	61.5	59.3	58.9	60.6	62.0	63.0
4	61.6	62.2	61.8	74.6	60.0	61.2	58.3	60.1	62.6	62.0
5	64.1	61.7	62.0	71.1	59.1	60.1	58.9	60.7	61.8	65.0
Mean	62.4	62.3	61.7	**72.0**	59.6	60.9	58.2	60.4	61.9	64.0
Median	64.1	62.2	61.8	72.5	59.7	61.2	58.3	60.5	61.9	64.0
Std.Dev.	3.35	0.52	0.68	2.10	1.35	1.15	0.86	0.27	0.49	1.58
Rel.Std.Dev.	5.37%	0.83%	1.10%	2.91%	2.26%	1.89%	1.48%	0.45%	0.79%	2.47%
PDM[3]	1.65%	1.45%	0.50%	17.2%	-2.95%	-0.90%	-5.31%	-1.66%	0.78%	4.18%

Table A9. Fusion results for Ag in OREAS 166 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*ICP	Lab B -	Lab C PF*MS	Lab D PF*MS	Lab E -	Lab F -	Lab G PF*OES	Lab H -	Lab I -	Lab J -
1	<10	NR	10.0	12.0	NR	NR	12.1	NR	NR	NR
2	<10	NR	10.0	11.0	NR	NR	13.6	NR	NR	NR
3	<10	NR	10.0	12.0	NR	NR	13.5	NR	NR	NR
4	<10	NR	10.0	11.0	NR	NR	11.9	NR	NR	NR
5	<10	NR	10.0	12.0	NR	NR	13.4	NR	NR	NR
Mean			10.0	11.6			12.9			
Median			10.0	12.0			13.4			
Std.Dev.			0.000	0.548			0.828			
Rel.Std.Dev.			0.00%	4.72%			6.42%			
PDM[3]			-13.0%	0.87%			12.2%			

Table A10. Fusion results for Pb in OREAS 166 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*ICP	Lab B PF*OES	Lab C PF*MS	Lab D PF*OES	Lab E PF*MS	Lab F PF*OES	Lab G PF*OES	Lab H -	Lab I PF*ICP	Lab J PF*OES
1	200	128	160	220	127	100	<50	NR	200	110
2	100	129	150	210	129	<100	<50	NR	200	120
3	100	129	150	210	130	<100	<50	NR	200	110
4	200	135	160	210	132	<100	<50	NR	**100**	110
5	100	135	150	210	129	<100	<50	NR	200	120
Mean	140	131	154	**212**	129	100			**180**	114
Median	100	129	150	210	129	100			200	110
Std.Dev.	54.8	3.49	5.48	4.47	1.82				44.7	5.48
Rel.Std.Dev.	39.1%	2.66%	3.56%	2.11%	1.40%				24.8%	4.80%
PDM[3]	9.29%	2.42%	20.2%	65.5%	1.01%	-21.9%			40.5%	-11.0%

Table A11. Fusion results for Zn in OREAS 166 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*ICP	Lab B PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*MS	Lab F PF*OES	Lab G PF*OES	Lab H PF*OES	Lab I PF*ICP	Lab J PF*OES
1	<100	24	50	100	32	<100	71	<100	<100	34
2	<100	32	50	110	51	<100	88	<100	<100	<30
3	<100	28	50	110	23	<100	114	<100	<100	36
4	<100	34	<50	100	45	<100	86	<100	<100	36
5	<100	**46**	<50	100	24	<100	112	<100	<100	**50**
Mean		33	50	**104**	35		**94**			39
Median		32	50	100	32		88			36
Std.Dev.		8.32	0.00	5.48	12.5		18.4			7.39
Rel.Std.Dev.		25.4%	0.00%	5.27%	35.9%		19.5%			19.0%
PDM[3]		-12.4%	33.5%	178%	-6.56%		151%			4.12%

Table A12. Fusion results for Co in OREAS 166 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*ICP	Lab B PF*MS	Lab C PF*OES	Lab D PF*OES	Lab E PF*MS	Lab F PF*OES	Lab G PF*OES	Lab H PF*OES	Lab I PF*ICP	Lab J PF*OES
1	2180	1940	2140	2230	2050	2010	1890	2391	2030	1900
2	2170	1918	2000	2090	2070	2000	2027	2313	2020	1900
3	2180	1913	2060	2030	2020	1970	2392	**1995**	2050	1900
4	2170	1929	2120	2280	2050	1990	2395	2397	2060	1900
5	2190	1924	2080	2210	2010	2000	2103	2069	2010	1900
Mean	2178	1925	2080	2168	2040	1994	2161	2233	2034	1900
Median	2180	1924	2080	2210	2050	2000	2103	2313	2030	1900
Std.Dev.	8	10	55	104	24	15	225	188	21	0
Rel.Std.Dev.	0.38%	0.54%	2.63%	4.80%	1.20%	0.76%	10.4%	8.44%	1.02%	0.00%
PDM[3]	4.85%	-7.34%	0.13%	4.37%	-1.79%	-4.01%	4.05%	7.49%	-2.08%	-8.53%

Table A13. 4-acid results for Cu in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*OES	Lab E 4A*OES	Lab F 4A*OES	Lab G MAR*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES
1	8.81	**10.19**	8.59	NR	8.80	8.75	8.64	8.40	9.16	8.70
2	8.85	9.40	8.72	8.82	8.73	8.59	8.63	8.48	9.24	8.90
3	8.81	9.34	8.59	NR	8.70	8.61	8.56	**8.73**	9.25	9.10
4	8.95	9.00	8.70	9.10	8.58	8.54	8.63	8.32	9.23	9.00
5	9.02	9.24	8.71	8.89	8.64	8.67	8.65	8.33	9.20	8.90
Mean	8.89	9.43	8.66	8.94	8.69	8.63	8.62	8.45	9.22	8.92
Median	8.85	9.34	8.70	8.89	8.70	8.61	8.63	8.40	9.23	8.90
Std.Dev.	0.09	0.45	0.07	0.15	0.08	0.08	0.03	0.17	0.04	0.15
Rel.Std.Dev.	1.05%	4.78%	0.76%	1.63%	0.97%	0.94%	0.40%	1.96%	0.40%	1.66%
PDM[3]	0.78%	6.95%	-1.79%	1.33%	-1.47%	-2.13%	-2.22%	-4.17%	4.50%	1.14%

Table A14. 4-acid results for Fe in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*OES	Lab E 4A*MS	Lab F 4A*OES	Lab G MAR*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES
1	11.40	**13.33**	11.60	11.90	10.90	11.50	11.01	11.29	11.40	12.00
2	11.40	12.25	12.00	11.20	11.40	11.30	**10.85**	11.51	11.30	12.00
3	11.40	12.01	11.50	11.60	**12.05**	11.40	11.10	11.38	11.30	12.00
4	11.50	11.76	11.90	11.10	11.60	11.15	11.03	11.58	11.40	11.00
5	11.50	11.92	11.70	11.40	11.45	11.40	11.01	11.07	11.30	12.00
Mean	11.44	**12.25**	**11.74**	11.44	11.48	11.35	**11.00**	11.37	11.34	**11.80**
Median	11.40	12.01	11.70	11.40	11.45	11.40	11.01	11.38	11.30	12.00
Std.Dev.	0.05	0.63	0.21	0.32	0.41	0.13	0.09	0.20	0.05	0.45
Rel.Std.Dev.	0.48%	5.12%	1.77%	2.81%	3.60%	1.17%	0.83%	1.76%	0.48%	3.79%
PDM[3]	0.54%	7.69%	3.17%	0.54%	0.89%	-0.25%	-3.33%	-0.11%	-0.34%	3.70%

Table A15. 4-acid results for S in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*OES	Lab E 4A*MS	Lab F 4A*OES	Lab G MAR*OES	Lab H -	Lab I 4A*OES	Lab J -
1	12.50	11.39	11.30	>5	>10.0	11.00	12.05	NR	11.90	NR
2	12.70	11.59	11.50	>5	>10.0	10.70	11.91	NR	12.00	NR
3	12.60	11.03	11.30	>5	>10.0	10.60	11.81	NR	11.80	NR
4	12.70	11.17	11.70	>5	>10.0	10.40	11.97	NR	11.70	NR
5	12.60	11.24	11.40	>5	>10.0	10.40	12.00	NR	11.80	NR
Mean	12.62	11.28	11.44			10.62	11.95		11.84	
Median	12.60	11.24	11.40			10.60	11.97		11.80	
Std.Dev.	0.08	0.21	0.17			0.25	0.09		0.11	
Rel.Std.Dev.	0.66%	1.90%	1.46%			2.34%	0.76%		0.96%	
PDM[3]	8.56%	-2.94%	-1.59%			-8.65%	2.77%		1.85%	

Table A16. 4-acid results for CaO in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*OES	Lab E 4A*MS	Lab F 4A*OES	Lab G MAR*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES
1	0.96	0.97	0.99	0.98	0.97	0.96	0.96	0.97	1.01	1.20
2	0.95	1.01	1.02	0.94	0.99	0.94	0.95	0.99	1.01	1.10
3	0.95	1.04	0.99	0.95	1.05	0.95	0.95	0.99	1.01	1.10
4	0.96	1.02	1.02	1.00	1.02	0.93	0.96	0.98	1.02	1.20
5	0.96	1.01	1.01	0.98	1.01	0.95	0.96	0.97	1.01	1.10
Mean	0.96	1.01	1.01	0.97	1.01	0.95	0.96	0.98	1.01	**1.14**
Median	0.96	1.01	1.01	0.98	1.01	0.95	0.96	0.98	1.01	1.10
Std.Dev.	0.01	0.03	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.05
Rel.Std.Dev.	0.57%	2.60%	1.51%	2.24%	3.01%	1.21%	0.57%	1.43%	0.62%	4.80%
PDM[3]	-2.67%	2.56%	2.42%	-1.29%	2.62%	-3.69%	-2.51%	-0.29%	2.85%	16.1%

Table A17. 4-acid results for MgO in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*OES	Lab E 4A*MS	Lab F 4A*OES	Lab G MAR*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES
1	1.71	1.71	1.69	1.70	1.53	1.52	1.44	1.64	1.69	1.70
2	1.70	1.76	1.71	1.58	1.58	1.49	1.44	1.69	1.67	1.60
3	1.70	1.76	1.64	1.68	1.67	1.51	1.42	1.67	1.69	1.60
4	1.71	1.72	1.71	1.67	1.63	1.48	1.44	1.67	1.71	1.60
5	1.72	1.72	1.66	1.64	1.59	1.51	1.44	1.64	1.67	1.60
Mean	1.71	1.73	1.68	1.65	1.60	**1.50**	**1.43**	1.66	1.69	1.62
Median	1.71	1.72	1.69	1.67	1.59	1.51	1.44	1.67	1.69	1.60
Std.Dev.	0.01	0.02	0.03	0.05	0.05	0.02	0.01	0.02	0.01	0.04
Rel.Std.Dev.	0.49%	1.28%	1.85%	2.82%	3.31%	1.09%	0.76%	1.34%	0.82%	2.76%
PDM[3]	2.34%	3.92%	0.79%	-0.89%	-4.13%	-10.0%	-14.0%	-0.25%	1.14%	-2.93%

Table A18. 4-acid results for Al_2O_3 in OREAS 166 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*OES	Lab E 4A*MS	Lab F 4A*OES	Lab G MAR*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES
1	0.69	1.36	1.36	1.46	1.30	1.30	0.78	1.40	1.36	1.40
2	0.71	1.42	1.36	**1.35**	1.36	1.27	0.77	1.44	1.38	1.40
3	0.72	1.40	1.34	1.45	1.42	1.29	0.77	1.42	1.40	1.40
4	0.69	1.36	1.38	1.44	1.38	1.26	0.78	1.45	1.40	1.30
5	0.71	1.36	1.36	1.47	1.36	1.29	0.77	1.40	1.40	1.40
Mean	**0.70**	1.38	1.36	1.43	1.36	1.28	**0.77**	1.42	1.39	1.38
Median	0.71	1.36	1.36	1.45	1.36	1.29	0.77	1.42	1.40	1.40
Std.Dev.	0.01	0.03	0.01	0.05	0.04	0.02	0.01	0.02	0.02	0.04
Rel.Std.Dev.	1.91%	1.94%	1.04%	3.37%	3.18%	1.28%	0.88%	1.73%	1.22%	3.24%
PDM[3]	-48.9%	0.06%	-1.34%	4.02%	-1.05%	-7.00%	-43.9%	3.07%	0.61%	0.11%

Table A19. 4-acid results for Ag in OREAS 166 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*MS	Lab C 4A*MS	Lab D 4A*OES	Lab E 4A*MS	Lab F 4A*OES	Lab G MAR*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 3A*AAS
1	10.2	10.0	10.5	11.1	11.8	12.0	10.8	12.0	16.3	10.0
2	10.3	11.0	11.0	10.7	12.2	12.0	10.9	15.0	16.3	9.9
3	10.6	11.0	11.0	11.0	11.8	12.0	10.2	13.0	16.1	10.1
4	10.4	10.0	11.0	11.2	12.4	11.0	10.0	12.0	15.7	10.4
5	10.6	10.0	11.0	10.8	12.4	10.0	10.3	13.0	15.9	10.2
Mean	10.4	10.4	10.9	11.0	12.1	11.4	10.4	**13.0**	**16.1**	10.1
Median	10.4	10.0	11.0	11.0	12.2	12.0	10.3	13.0	16.1	10.1
Std.Dev.	0.2	0.5	0.2	0.2	0.3	0.9	0.4	1.2	0.3	0.2
Rel.Std.Dev.	1.72%	5.27%	2.05%	1.89%	2.41%	7.85%	3.75%	9.42%	1.62%	1.90%
PDM[3]	-3.87%	-4.06%	0.55%	1.11%	11.4%	5.17%	-3.69%	19.9%	48.2%	-6.64%

Table A20. 4-acid results for Pb in OREAS 166 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*MS	Lab C 4A*MS	Lab D 4A*OES	Lab E 4A*MS	Lab F 4A*OES	Lab G MAR*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES
1	130	140	148	191	133	110	200	<200	**222**	130
2	160	148	140	190	136	110	200	<200	204	140
3	130	144	137	**203**	**141**	110	190	<200	207	130
4	160	144	140	193	137	110	200	<200	211	140
5	**190**	145	137	194	135	100	200	<200	208	130
Mean	154	144	140	**194**	136	**108**	**198**		**210**	134
Median	160	144	140	193	136	110	200		208	130
Std.Dev.	25	3	5	5	3	4	4		7	5
Rel.Std.Dev.	16.3%	1.99%	3.21%	2.66%	2.27%	4.14%	2.26%		3.30%	4.09%
PDM[3]	10.2%	3.21%	0.49%	39.0%	-2.52%	-22.7%	41.7%		50.6%	-4.09%

Table A21. 4-acid results for Zn in OREAS 166 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*OES	Lab C 4A*OES	Lab D 4A*OES	Lab E 4A*MS	Lab F 4A*OES	Lab G MAR*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES
1	37	66	40	39	34	30	<50	<100	37	34
2	37	55	40	34	35	30	<50	<100	39	37
3	38	60	38	37	38	30	<50	<100	38	33
4	37	54	38	35	36	20	<50	<100	39	35
5	38	60	38	39	35	20	<50	<100	41	34
Mean	37	**59**	39	37	36	**26**			39	35
Median	37	60	38	37	35	30			39	34
Std.Dev.	1	5	1	2	2	5			1	2
Rel.Std.Dev.	1.46%	8.13%	2.82%	6.20%	4.26%	21.1%			3.82%	4.38%
PDM[3]	1.08%	59.5%	4.86%	-0.54%	-3.78%	-29.7%			4.86%	-6.49%

Table A22. 4-acid results for Co in OREAS 166 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A 4A*OES	Lab B 4A*MS	Lab C 4A*OES	Lab D 4A*OES	Lab E 4A*MS	Lab F 4A*OES	Lab G MAR*OES	Lab H 4A*OES	Lab I 4A*OES	Lab J 4A*OES
1	2090	1967	2050	2100	**1880**	1890	1886	1970	1770	2000
2	2070	2016	2080	2080	1950	1860	1857	1950	1760	2100
3	2080	2028	2060	2070	**2100**	1870	**1815**	**2010**	1780	2100
4	2100	1965	2110	1970	1950	1850	1861	1960	1780	2000
5	2100	2000	2080	**1900**	1960	1870	1865	1970	1780	2100
Mean	2088	1995	2076	2024	1968	1868	1857	1972	1774	2060
Median	2090	2000	2080	2070	1950	1870	1861	1970	1780	2100
Std.Dev.	13	28	23	86	80	15	26	23	9	55
Rel.Std.Dev.	0.62%	1.43%	1.11%	4.23%	4.09%	0.79%	1.40%	1.16%	0.50%	2.66%
PDM[3]	5.99%	1.28%	5.38%	2.74%	-0.10%	-5.17%	-5.74%	0.11%	-9.95%	4.57%