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**LA-8265-MS**

Informal Report

#240  
4/28/80

**MASTER**

**Compilation of Elemental Concentration Data  
for United States Geological Survey's  
Eight New Rock Standards**

University of California



**LOS ALAMOS SCIENTIFIC LABORATORY**

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LA-8265-MS  
Informal Report  
UC-11  
Issued: March 1980

# **Compilation of Elemental Concentration Data for United States Geological Survey's Eight New Rock Standards**

Ernest S. Gladney

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## CONTENTS

LIST OF TABLES	v
ABSTRACT	1
INTRODUCTION	1
DATA COMPILATION	2
ACKNOWLEDGEMENTS	6
APPENDIX TABLE NOTE	6
REFERENCES	9
APPENDIX A: Elemental Concentrations in BHVO-1 Reported by Individual Investigators	15
APPENDIX B: Elemental Concentrations in MAG-1 Reported by Individual Investigators	21
APPENDIX C: Elemental Concentrations in QLO-1 Reported by Individual Investigators	26
APPENDIX D: Elemental Concentrations in RGM-1 Reported by Individual Investigators	31
APPENDIX E: Elemental Concentrations in SCo-1 Reported by Individual Investigators	36
APPENDIX F: Elemental Concentrations in SDC-1 Reported by Individual Investigators	41
APPENDIX G: Elemental Concentrations in SGR-1 Reported by Individual Investigators	46
APPENDIX H: Elemental Concentrations in STM-1 Reported by Individual Investigators	51

## LIST OF TABLES

### Table No.

I.	Eight New USGS Rock Standards	3
II.	Archival Journals Surveyed	3
III.	Elemental Concentrations in Eight New USGS Standard Rocks	4
IV.	Whole Rock Summations as Oxides	7
V.	Usable Values by Abbey	8

COMPILATION OF ELEMENTAL CONCENTRATION DATA  
FOR UNITED STATES GEOLOGICAL SURVEY'S EIGHT NEW ROCK STANDARDS

by

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ABSTRACT

Elemental composition data on BHVO-1, MAG-1, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, and STM-1, have been collected from 62 journal papers and reports. All individual data, their uncertainties, and analytical technique used are reported for 68 elements. These data are summarized into mean values with standard deviation.

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INTRODUCTION

Since the inception of the natural silicate rock standards program at the USGS in the early 1950's, these materials have provided an invaluable mechanism for quality assurance, analytical methods development, and interlaboratory comparison. Most of the earlier materials are either completely depleted or in such short supply as to compromise their value for widespread intercomparisons.

Two new sets of natural silicate standards have been prepared by the USGS. Six "Geochemical Exploration Reference Samples" (GXR) are being distributed through the Denver, CO, office, while eight "Rock Standards" are being made available through the Reston, VA, office. The detailed characterization of the GXR materials (1) and a review of their elemental composition (2) have been published. An excellent description of the latter "Rock Standards" is available (3); however, no complete summary of available analytical data on these materials has been developed.

The Environmental Surveillance Group uses standard reference materials from the National Bureau of Standards, the Environmental Protection Agency, and the Canadian Centre for Mineral and Energy Technology (CANMET), in

addition to those from the USGS as an integral part of our quality assurance program for elemental measurements. High quality "certified" and "recommended" values are available for a number of constituents in these matrices. However, many elements are not reported by the issuing agencies. If enough reliable data from other investigators can be accumulated and summarized, we can use these mean values to extend the range of our quality assurance program within the standard materials already available. Since no compiled data are available on the eight new USGS rock standards, this effort was undertaken in order that they may become part of our analytical quality assurance program.

#### DATA COMPILATION

The standard rock designations, names, descriptions, and sources are shown in Table I. The seventeen major journals in analytical chemistry and geochemistry shown in Table II have been exhaustively surveyed in an effort to find original analytical data on these eight new USGS rock standards. Sixty-two independent articles containing original data were located. Since the available data are not nearly so extensive as those for the older USGS standard rocks, only limited statistical techniques can be employed to evaluate the newer data. Some subjective judgemental criteria, as discussed by Abbey (4), were used to eliminate some data that were outside the limits of acceptability. In a limited data set such as this, these points cannot normally be eliminated by purely statistical criteria such as lying outside two or three standard deviations from the mean. Using these judgmental eliminations (less than 0.5% of the total data), a mean and standard deviation was computed among all the remaining data for a given element in each rock standard. All data points now outside two standard deviations from the mean were dropped and the mean and standard deviation were recomputed. In no case could any additional data point be eliminated using the  $2\sigma$  criterion. These final means  $\pm$  one standard deviation are reported in Table III. The numbers in parentheses following each entry indicate the number of values reported in the literature. The individual data, their uncertainties (where provided), and the exact reference are given in Appendices A-H (4-66). The data points eliminated as described above are also indicated by asterisks.



TABLE I: EIGHT NEW USGS ROCK STANDARDS

<u>Standard Rock Designation</u>	<u>Description: Source</u>
BHVO-1	Basalt: Kilauea Crater
MAG-1	Marine Mud: Gulf of Maine
QLO-1	Quartz Latite: Southeastern, OR
RGM-1	Rhyolite: Glass Mountain, CA
SCo-1	Cody Shale, Natrona County, WY
SDC-1	Mica Schist: Rock Creek Park, Washington, D.C.
SGR-1	Green River Shale: WY
STM-1	Nepheline Syenite: Table Mountain, OR

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TABLE II: ARCHIVAL JOURNALS SURVEYED

<u>Journal</u>	<u>Volume Numbers Examined</u>
Analyst	97-104
Analytical Chemistry	43-51
Analytical Chimica Acta	53-106
Analytical Letters	5-12
Atomic Absorption Newsletter	11-18
Chemical Geology	13-25
Environmental Science & Technology	6-13
Geochimica et Cosmochimica Acta	31-43
Geostandards Newsletter	1-3
International Journal of Applied Radiation and Isotopes	23-30
Journal of the Association of Official Analytical Chemists	55-62
Journal of Radioanalytical Chemistry	11-49
Microchemical Journal	17-24
Nuclear Instruments and Methods	114-155
Radiochemical and Radioanalytical Letters	9-39
Talanta	19-26
X-Ray Spectrometry	7

TABLE III : ELEMENTAL CONCENTRATIONS IN EIGHT NEW USGS STANDARD ROCKS  
(ppm unless otherwise indicated)

Ele	BHVO-1	MAG-1	QLO-1	RGM-1	SCO-1	SDC-1	SGR-1	STM-1
Ag (ppb)	5.7-332 (3)	6.4-112 (2)	4.5-170 (2)	10.3-99 (3)	19,<100 (2)	9.0-300 (4)	19.2,<100 (2)	8.0-395 (3)
Al (%)	7.35±0.18 (8)	8.65±0.15 (6)	8.60±0.08 (7)	7.24±0.16 (7)	7.21±0.20 (7)	8.51±0.20 (7)	3.53±0.23 (5)	9.79±0.12 (5)
As	1.5,<5 (2)	<5-9 (2)	<5 (1)	2.9,<5 (2)	11-54 (2)	<5 (1)	70±6 (2)	<5 (1)
Au (ppb)	1.53±0.31 (3)	2.51 (2)	1.3 (2)	0.33 (2)	2.4 (2)	1.5 (2)	9.8 (2)	0.40 (2)
B	2.3, <10(2)	138±15 (3)	38±4 (3)	29±2 (3)	69±4 (4)	10-30 (3)	30-59 (3)	<10 (2)
Ba	143±20 (8)	500±60 (8)	1380±40 (7)	800±60 (7)	530±130 (9)	620±70 (7)	320±25 (7)	600±90 (70)
Be	0.95 (2)	3.03±0.38 (4)	1.9±0.2 (4)	2.5±0.4 (4)	1.6±0.4 (4)	3.0±0.6 (4)	0.89±0.04 (3)	9.7±1.5 (4)
Bi (ppb)	15±4 (4)	360±40 (3)	64±2 (3)	260±40 (4)	389 (2)	277±1 (3)	1030 (2)	110-250 (3)
C	120±60 (5)	1000-24,600 (4)	29±2 (4)	39±10 (5)	8500±1500 (4)	270±120 (3)	30,200-270,000(2)	64±35 (3)
Ca(%)	8.18±0.13 (7)	1.04±0.03 (5)	2.27±0.06 (6)	0.81±0.07 (8)	1.87±0.14 (6)	1.02±0.03 (6)	6.12±0.23 (4)	0.79±0.06 (6)
Cd (ppb)	120 (1)	-	-	60 (1)	150 (1)	110 (1)	1030 (1)	-
Ce	40±4 (5)	93±8 (4)	61±10 (4)	53±7 (4)	62±7 (6)	104±14 (5)	42±12 (4)	290±50 (6)
Cl	92±4 (3)	31500±200 (4)	210±16 (4)	480±40 (4)	47±17 (4)	26±11 (3)	21-44 (3)	450±35(4)
Co	45±2 (6)	20±2 (6)	7.1±0.4 (5)	2.0±0.2 (6)	10±1 (7)	18±2 (5)	12±2 (5)	0.3-7.5 (5)
Cr	290±30 (6)	104±13 (5)	2-10 (3)	2.6±0.4 (5)	67±6 (5)	69±7 (4)	29±6 (4)	2.3±0.8 (6)
Cs	0.08-1.7 (3)	8.2±0.6 (3)	1.8±0.2 (3)	10.0±0.4 (3)	7.5±0.6 (3)	3.84±0.02 (3)	5.1±0.4 (3)	1.53±0.10 (3)
Cu	130±13 (6)	30±3 (8)	29±3 (7)	12±2 (9)	30±2 (8)	30±2 (7)	66±4 (7)	3.7±1.9 (9)
Dy	4.8 (2)	<3.2 (1)	<3.2 (1)	4.3 (1)	3.8 (2)	<3.2 (1)	<3.2 (1)	7.8 (1)
Er	2.1 (2)	<2.2 (1)	<2.2 (1)	<2.2 (1)	2.5 (1)	<2.2 (1)	<2.2 (1)	4.4 (1)
Eu	2.1±0.4 (6)	1.5±0.2 (4)	1.4±0.2 (4)	0.75±0.14 (4)	1.2±0.2 (6)	1.8±0.2 (4)	0.59±0.11 (4)	3.6±0.4 (5)
F	-	1200 (1)	280 (2)	370 (2)	780-1500 (2)	620 (1)	-	950 (2)
Fe (%)	8.51±0.19 (11)	4.81±0.29 (8)	3.04±0.07 (9)	1.32±0.05 (11)	3.54±0.12 (8)	4.91±0.13 (9)	2.07±0.14 (7)	3.64±0.14 (9)
Ga	22±3 (3)	21.4±0.4 (3)	18±1 (3)	14±2 (3)	13±3 (4)	25±5 (3)	8.8±3.4 (3)	37±1 (4)
Gd	5.35±0.46 (5)	4.8-9.0 (3)	3.6-6.0 (3)	3.1 (1)	4.0±0.2 (4)	5.4-9.8 (2)	1.7 (1)	11 (2)
Ge	1.6 (2)	-	1.4 (2)	1.2 (2)	-	1.6 (2)	-	1.4 (2)
H	190 (1)	7820 (1)	540 (1)	840 (1)	4460 (1)	2060 (1)	30100 (1)	-
Hf	4.1±0.3 (6)	3.5±0.6 (4)	4.4±0.2 (3)	6.0±0.5 (4)	4.4±0.2 (4)	7.9±0.5 (4)	1.36±0.04 (4)	26.8±1.7 (4)
Ho	0.93 (2)	<1.0 (1)	<1.0 (1)	<1.0 (1)	0.93 (1)	<1.0 (1)	<1.0 (1)	1.7 (1)
In	-	-	-	-	-	-	-	0.087 (1)
Ir(ppb)	0.44 (1)	-	-	-	-	-	-	-
K (%)	0.46±0.07 (11)	3.02±0.19 (7)	3.03±0.16 (9)	3.64±0.18 (11)	2.28±0.08 (8)	2.72±0.08 (9)	1.43±0.13 (6)	3.57±0.06 (8)
La	16.7±0.8 (4)	46 (2)	31 (2)	25 (2)	31±3 (4)	48±9 (3)	18.8-31.7 (2)	170±30 (4)
Li	4 (2)	76±4 (3)	24 (2)	51±9 (4)	42 (2)	34 (2)	130 (2)	29±7 (4)
Lu	0.32 (2)	0.40 (1)	0.42 (1)	0.42 (1)	0.37 (2)	0.49 (1)	0.20 (1)	0.66 (2)
Mg (%)	4.28±0.12 (8)	1.81±0.09 (6)	0.61±0.04 (7)	0.168±0.012 (9)	1.61±0.14 (7)	1.00±0.04 (7)	2.69±0.08 (5)	0.055±0.010 (7)

TABLE III : ELEMENTAL CONCENTRATIONS IN EIGHT NEW USGS STANDARD ROCKS (contd)

Ele	BHQ-1	MAG-1	QLO-1	RGM-1	SCo-1	SDC-1	SGR-1	STM-1
Mn	1280±30 (8)	760±120 (5)	720±70 (7)	280±20 (9)	420±50 (7)	890±70 (6)	280±40 (6)	1720±140 (7)
Mo	0.96±0.04 (4)	2.8 (1)	2.9±0.7 (5)	2.4±0.7 (4)	1.4-2.8 (2)	1.9 (1)	36 (2)	5.7±1.4 (5)
Na (%)	1.64±0.06 (9)	2.77±0.19 (6)	3.09±0.10 (8)	3.00±0.10 (10)	0.67±0.09 (7)	1.52±0.09 (8)	2.18±0.24 (5)	6.61±0.14 (7)
Nb	19±2 (8)	9.4±1.7 (3)	11±4 (5)	10±4 (5)	10±3 (4)	18±3 (5)	4.5±1.3 (3)	250±50 (4)
Nd	25±3 (6)	43±3 (4)	31±5 (4)	17±2 (4)	26±2 (5)	39±6 (5)	20±12 (4)	74±13 (4)
Ni	120±16 (8)	55±9 (7)	1.0-9.2 (6)	1.9-14 (6)	28±4 (8)	42±11 (7)	32±6 (7)	0.5-8 (7)
O (%)	-	46.5 (1)	48.0 (1)	49.4 (1)	50.8 (1)	-	-	-
P (%)	0.12±0.01 (5)	0.076±0.007 (4)	0.12±0.02 (5)	0.020±0.001 (4)	0.10±0.02 (5)	0.077±0.018 (5)	0.14±0.02 (4)	0.071±0.002 (6)
Pb	3.3-6.2 (2)	24 (2)	21 (2)	21 (2)	15-30 (3)	24 (1)	37 (2)	17 (2)
Pd (ppb)	3.5 (1)	-	-	-	-	30 (1)	-	-
Pr	5.6 (2)	7.7 (1)	6.1 (1)	4.1 (1)	5.4 (1)	8.7 (1)	6.9 (1)	19.4 (1)
Pt	<0.01 (1)	-	-	-	-	-	-	-
Rb	0.1-11 (5)	158±16 (6)	78±10 (5)	157±4 (5)	120±10 (5)	129±8 (5)	86±7 (5)	123±8 (5)
S (%)	0.010 (2)	0.46±0.06 (3)	0.0013 (2)	0.001 (2)	0.06 (2)	0.058 (2)	1.75 (2)	0.0022 (1)
Sb	0.17±0.01 (4)	0.88±0.08 (4)	2.2±0.4 (5)	1.3±0.2 (5)	2.50±0.07 (5)	0.49±0.09 (4)	3.4±0.4 (5)	1.69±0.11 (5)
Sc	30±2 (7)	17±2 (6)	9.7±1.4 (6)	5.0±0.9 (6)	10±1 (6)	17±2 (6)	4.2±0.8 (5)	0.68±0.01 (4)
Se	-	-	-	-	-	-	3.0 (1)	0.010 (1)
Si (%)	23.2±0.5 (7)	23.4±0.5 (5)	30.5±0.5 (5)	34.0±0.6 (6)	29.2±0.4 (4)	30.5±0.6 (5)	13.4±0.6 (4)	27.8±0.4 (4)
Sm	6.2±0.7 (6)	7.7±1.1 (3)	4.8±0.6 (4)	4.3±0.5 (4)	5.2±0.4 (4)	8.5±1.0 (4)	2.7±0.3 (4)	15±3 (4)
Sn	2.2 (1)	3.5-6.4 (2)	2.4 (1)	3.9 (2)	4.1 (2)	3 (2)	1.6 (1)	10±3 (3)
Sr	440±70 (8)	160±20 (9)	360±40 (8)	110±10 (8)	180±20 (10)	200±20 (8)	420±70 (8)	730±70 (8)
Ta	1.08±0.18 (5)	1.0±0.2 (5)	0.76±0.12 (4)	0.95±0.10 (5)	0.89±0.08 (4)	1.1±0.2 (4)	0.54 (2)	18±2 (5)
Tb	1.0±0.3 (5)	1.01±0.06 (3)	0.84±0.09 (3)	0.74 (1)	0.75±0.04 (3)	1.3 (2)	0.37±0.05 (3)	1.7±0.4 (3)
Te (ppb)	6.3 (1)	-	<5 (1)	<5 (1)	-	5.5 (1)	-	<5 (1)
Th	1.0±0.2 (8)	12.8±0.6 (5)	4.1±0.9 (6)	16±2 (5)	10.2±0.8 (5)	12±1 (5)	4.89±0.03 (5)	33±5
Ti	16300±1000 (6)	4300±300 (4)	3700±200 (6)	1600±200 (6)	3700±500 (6)	6000±300 (5)	1700±300 (5)	910±50 (4)
Tm	0.30±0.04 (3)	0.44 (1)	0.39 (1)	0.37 (1)	0.35 (1)	0.72 (1)	0.18 (1)	-
U	0.40±0.06 (5)	2.82 (2)	1.9±0.2 (3)	5.84 (2)	3.0 (2)	3.0 (2)	5.68 (2)	9.12 (2)
V	310±10 (7)	140±5 (6)	60±5 (5)	13±2 (5)	118±13 (7)	110±30 (5)	128±9 (5)	2.0 (1)
Y	28±2 (4)	25-57 (2)	28 (2)	27 (2)	26 (2)	44-70 (2)	13 (1)	52 (2)
Yb	2.1±0.5 (6)	3.0±0.3 (4)	2.8±0.8 (4)	2.6±0.4 (4)	2.5±0.4 (5)	5.2±1.6 (4)	0.8-2.4 (3)	4.3±0.3 (4)
Zn	102±8 (9)	130±15 (10)	59±7 (9)	32±7 (11)	106±9 (9)	102±8 (9)	80±9 (9)	241±20 (12)
Zr	177±26 (5)	130±9 (4)	175±15 (4)	214±14 (4)	165±23 (5)	270±30 (4)	58±6 (4)	1260±80 (4)

Mean values in Table III that are based upon less than three reports do not include standard deviations. In a few cases, the data reported spanned too wide a range to make the mean value significant, and have been reported as ranges only (e.g., Ag in BHVO-1). There are also some instances where only upper limit data are available and these are given as limit values in Table III (e.g., As in SDC-1).

The major element data have been converted to oxide form for summation of the major constituents and are shown in Table IV. All Fe has been converted to  $\text{Fe}_2\text{O}_3$ , which will introduce small errors into the comparison against 100%. The oxide of carbon used will also influence the results, especially for MAG-1, SCo-1, and SGR-1. Within these limitations, the mean values for the major elements from Table III provide reasonably good summation percentages for three of the standards. Some small improvements are needed in the data for STM-1, while significant improvements are needed for RGM-1, and SCo-1. The spread in C data for MAG-1 and SGR-1 is so wide that no conclusions can be drawn from the summation.

Abbey (4) has proposed a set of "usable values" for several CANMET standards as well as for a number of elements in these eight new USGS rock standards. His criteria for usable values are carefully defined and his data are collected in Table V for comparison to our mean values in Tables III and IV. Abbey has provided nearly complete coverage for 15 elements and incomplete data for 20 more. There are no significant differences between the mean values of this compilation and Abbey's usable values.

#### ACKNOWLEDGEMENT

I thank Mary Lou Keigher and Verna V. Halloran for their assistance in the production of this document.

#### APPENDIX TABLE NOTE

These tables are designed to be read from left to right. Under each element the mean value appears as the top entry with its associated 1 $\sigma$  standard deviation immediately underneath and with the reference number(s) immediately below the standard deviation. An asterisk(\*) following a mean value indicates that this data point was dropped using criteria discussed in the text. A dash (-) for a standard deviation means either that no value was provided by the investigator or that none could be calculated from the original raw data.

TABLE IV: WHOLE ROCK SUMMATIONS AS OXIDES (%)

<u>Oxide or Element</u>	<u>BHV0-1</u>	<u>MAG-1</u>	<u>QLO-1</u>	<u>RGM-1</u>	<u>SCo-1</u>	<u>SNC-1</u>	<u>SGR-1</u>	<u>STM-1</u>
Al <sub>2</sub> O <sub>3</sub>	13.89	16.35	16.26	13.69	13.63	16.09	6.67	18.51
SiO <sub>2</sub>	49.68	50.11	65.31	72.81	62.53	65.31	28.69	59.53
Fe <sub>2</sub> O <sub>3</sub> (T)	2.17	6.88	4.35	1.89	5.06	7.02	2.96	5.21
MgO	7.10	3.00	1.01	0.28	2.67	1.66	4.46	0.09
CaO	11.44	1.45	3.17	1.13	2.62	1.43	8.56	1.10
Na <sub>2</sub> O	2.21	3.73	4.16	4.04	0.90	2.05	2.94	8.91
K <sub>2</sub> O	0.55	3.64	3.65	4.39	2.75	3.28	1.72	4.30
CO <sub>2</sub>	0.04	0.4→9.0	0.01	0.01	3.11	0.10	11.1→98.9	0.02
TiO <sub>2</sub>	2.72	0.72	0.62	0.27	0.62	1.00	0.28	0.15
P <sub>2</sub> O <sub>5</sub>	0.28	0.17	0.28	0.05	0.23	0.18	0.32	0.16
F	-	0.12	0.03	0.04	0.11	0.06	-	0.10
S	0.01	0.46	<0.01	<0.01	0.06	0.06	1.75	<0.01
MnO	0.17	0.10	0.09	0.04	0.05	0.11	0.04	0.22
Cl	<0.01	3.15	0.02	0.05	<0.01	<0.01	<0.01	0.04
Summation	100.26	90.3→98.9	98.96	98.69	94.34	98.35	69.5→157	98.34

TABLE V: USABLE VALUES BY ABBEY (4)

Oxide/Element	USGS ROCK DESIGNATION							
	BHVO-1	MAG-1	QL0-1	RGM-1	SCo-1	SDC-1	SGR-1	STM-1
SiO <sub>2</sub> (%)	50.2	50.9	65.6	73.4	62.9	66.1	28.3	59.5
Al <sub>2</sub> O <sub>3</sub> (%)	13.8	16.5	16.3	13.8	13.6	16.0	-	18.6
Fe <sub>2</sub> O <sub>3</sub> (%)	12.0	6.8	4.3	1.87	5.06	6.9	3.2	5.19
MgO(%)	7.1	2.99	1.00	0.28	2.67	1.70	4.42	0.10
CaO(%)	11.4	1.36	3.19	1.12	2.61	1.4	-	1.09
Na <sub>2</sub> O(%)	2.21	3.8	4.20	4.08	0.91	2.07	2.9	8.94
K <sub>2</sub> O(%)	0.52	3.6	3.63	4.36	2.8	3.27	1.65	4.30
TiO <sub>2</sub> (%)	2.69	0.75	0.62	0.27	0.64	1.02	0.29	0.13
P <sub>2</sub> O <sub>5</sub> (%)	0.28	-	0.26	0.05	-	0.17	-	0.16
F(%)	-	-	0.03	0.04	0.08	-	-	0.10
S(%)	-	-	-	-	0.08	-	-	-
MnO(%)	0.17	0.10	0.09	0.04	0.05	0.12	0.04	0.22
Ba(ppm)	130	480	1350	750	550	590	320	550
Be(ppm)	-	-	-	-	-	-	-	10
Cl(ppm)	-	31000	-	-	-	-	-	500
Co(ppm)	45	18	7	-	10	20	10	-
Cr(ppm)	320	105	-	-	65	68	32	-
Cu(ppm)	-	33	29	11	30	30	68	3
Eu(ppm)	1.7	-	-	-	-	-	-	4
Hf(ppm)	4	-	-	-	-	-	-	-
La(ppm)	-	-	-	-	-	-	-	155
Li(ppm)	4	-	-	46	44	32	-	27
Mo(ppm)	-	-	-	-	-	-	-	6
Nb(ppm)	19	-	-	-	-	-	-	-
Ni(ppm)	140	54	7	-	29	50	29	3
Pb(ppm)	-	-	21	20	-	-	-	-
Rb(ppm)	10	-	-	170	-	-	-	-
Sc(ppm)	30	18	10	5	-	19	-	-
Sr(ppm)	400	159	350	110	180	190	420	720
U(ppm)	0.4	-	-	-	-	-	-	-
V(ppm)	-	-	55	15	110	-	-	-
Y(ppm)	27	-	-	-	-	-	-	50
Yb(ppm)	-	-	-	-	-	-	-	5
Zn(ppm)	100	140	60	32	110	105	80	240
Zr(ppm)	160	130	170	210	160	300	-	1200

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APPENDIX A

ELEMENTAL CONCENTRATIONS IN BHVO-1  
REPORTED BY INDIVIDUAL INVESTIGATORS

ELEMENTAL CONCENTRATIONS IN BHVO-1  
REPORTED BY INDIVIDUAL INVESTIGATORS

Ag (ppb)	$\bar{x}$ $\sigma$ Ref	322 58 22	5.7 0.17 25	56 3 33		
Al (%)	$\bar{x}$ $\sigma$ Ref	7.4 - 12	7.25 0.03 17	7.38 0.21 20	7.68 0.16 22	7.47 0.23 30
	$\bar{x}$ $\sigma$ Ref	7.24 - 47	7.24 0.03 54	7.10 0.06 62		
As (ppm)	$\bar{x}$ $\sigma$ Ref	<5 - 20	1.5 - 47			
Au (ppb)	$\bar{x}$ $\sigma$ Ref	1.58 0.11 15	1.82 0.04 25	1.2 0.4 28		
B (ppm)	$\bar{x}$ $\sigma$ Ref	<10 - 22	2.3 0.2 62			
Ba (ppm)	$\bar{x}$ $\sigma$ Ref	131 10 12	170 20 12	132.5 0.9 56, 63	122 3 20	117 10 22
	$\bar{x}$ $\sigma$ Ref	163 16 29	151 5 30	158 - 43		
Be (ppm)	$\bar{x}$ $\sigma$ Ref	1.0 - 22	0.90 0.05 41			
Bi (ppb)	$\bar{x}$ $\sigma$ Ref	<1000 - 22	13.9 6 39	18.8 2.7 64	11.2 1.4 66	

C (ppm)	$\bar{x}$ $\sigma$ Ref	<140 - 12	104.0 4.4 24	74.7 6.2 24	85 - 48	200 30 54
Ca (%)	$\bar{x}$ $\sigma$ Ref	8.1 - 12	8.34 0.08 17	8.20 0.04 20	7.45* 0.66 22	8.15 0.08 30
	$\bar{x}$ $\sigma$ Ref	8.30 0.02 54	7.98 0.15 62			
Cd (ppb)	$\bar{x}$ $\sigma$ Ref	120 20 62				
Ce (ppm)	$\bar{x}$ $\sigma$ Ref	33.3 2.8 12	39.0 3.9 11	43.2 3.9 29	41.8 - 43	43 - 47
Cl (ppm)	$\bar{x}$ $\sigma$ Ref	92 10 20	96 - 50	87 9 62		
Co (ppm)	$\bar{x}$ $\sigma$ Ref	42.1 0.6 11	45 4 12	47.4 4.5 22	45.1 2.0 29	44.9 - 47
	$\bar{x}$ $\sigma$ Ref	50* 20 62				
Cr (ppm)	$\bar{x}$ $\sigma$ Ref	264 7 11	320 50 12	315 15 12	322 29 22	285 9 30
	$\bar{x}$ $\sigma$ Ref	256 - 47				
Cs (ppm)	$\bar{x}$ $\sigma$ Ref	1.7 0.9 12	0.083 0.028 12	<0.2 - 29		

Cu (ppm)	$\bar{x}$ $\sigma$ Ref	130 30 12	<46 - 22	143 1 23	111 2 30	144.0 - 55
	$\bar{x}$ $\sigma$ Ref	133.0 - 55				
Dy (ppm)	$\bar{x}$ $\sigma$ Ref	4.62 0.55 12	<3.16 - 22	5.02 - 43		
Er (ppm)	$\bar{x}$ $\sigma$ Ref	1.78 0.28 12	<2.15 - 22	2.40 - 43		
Eu (ppm)	$\bar{x}$ $\sigma$ Ref	2.36 0.08 11	1.65 0.17 12	1.59 0.18 22	2.74 0.60 29	2.00 - 43
	$\bar{x}$ $\sigma$ Ref	2.06 - 47				
Fe (%)	$\bar{x}$ $\sigma$ Ref	8.48 0.09 11	8.4 - 12	8.68 0.05 17	8.33 0.3 20	9.56 <sup>*</sup> 0.30 22
	$\bar{x}$ $\sigma$ Ref	8.83 0.11 29	8.28 0.13 30	8.63 - 36	8.35 - 47	8.59 0.02 54
	$\bar{x}$ $\sigma$ Ref	7.88 <sup>*</sup> 0.16 62				
Ga (ppm)	$\bar{x}$ $\sigma$ Ref	19 2 12	25.9 2.0 22	22.4 - 55		
Gd (ppm)	$\bar{x}$ $\sigma$ Ref	5.48 0.88 12	7.1 <sup>*</sup> 2.5 22	9.2 <sup>*</sup> 0.7 29	5.74 - 43	4.84 0.04 62

Ge (ppm)	$\bar{x}$ $\sigma$ Ref	1.67 0.11 52	1.6 - 52			
H (ppm)	$\bar{x}$ $\sigma$ Ref	190 60 62				
Hf (ppm)	$\bar{x}$ $\sigma$ Ref	3.77 0.66 11	3.72 0.52 12	4.43 0.21 14	4.38 0.21 29	4.28 - 43
	$\bar{x}$ $\sigma$ Ref	4.21 - 47				
Ho (ppm)	$\bar{x}$ $\sigma$ Ref	0.891 0.139 12	<1.0 - 22	0.97 - 43		
Ir (ppb)	$\bar{x}$ $\sigma$ Ref	0.44 0.10 28				
K (%)	$\bar{x}$ $\sigma$ Ref	0.52 - 12	0.437 0.003 12	0.394 0.015 17	0.378 0.034 17	0.43 0.02 20
	$\bar{x}$ $\sigma$ Ref	0.553 0.120 22	0.429 0.004 23	0.38 0.07 30	0.55 - 47	0.56 0.14 54
	$\bar{x}$ $\sigma$ Ref	0.41 0.05 62				
La (ppm)	$\bar{x}$ $\sigma$ Ref	17.5 1.4 12	30.1 <sup>*</sup> 5.6 22	16.7 - 43	16.0 - 47	
Li (ppm)	$\bar{x}$ $\sigma$ Ref	4.1 0.3 12	5 - 23			

Lu (ppb)	$\bar{x}$ $\sigma$ Ref	290 - 43	360 - 47			
Mg (%)	$\bar{x}$ $\sigma$ Ref	4.3 - 12	4.22 0.07 17	4.18 0.04 20	7.25* 0.40 22	4.21 0.02 23
	$\bar{x}$ $\sigma$ Ref	4.44 0.09 30	4.45 0.01 54	4.16 0.14 62		
Mn (ppm)	$\bar{x}$ $\sigma$ Ref	1250 110 12	1300 100 17	1250 10 20	1810* 100 22	1290 6 23
	$\bar{x}$ $\sigma$ Ref	1330 30 30	1300 - 54	1270 30 62		
Mo (ppm)	$\bar{x}$ $\sigma$ Ref	5.58* 1.05 22	1.0 - 29	0.95 0.02 32	0.92 0.13 65	
Na (%)	$\bar{x}$ $\sigma$ Ref	1.6 - 12	1.64 0.07 17	1.57 0.05 17	1.74 0.08 20	1.70 0.01 23
	$\bar{x}$ $\sigma$ Ref	1.68 0.03 30	1.62 - 47	1.98* 0.22 54	1.56 0.11 62	
Nb (ppm)	$\bar{x}$ $\sigma$ Ref	21.7 1.8 12	16 2 12	18.9 2.0 12	21.0 1.1 19	15.2 2.9 22
	$\bar{x}$ $\sigma$ Ref	16.3 0.9 26, 51	21.1 - 43	20 - 46		
Nd (ppm)	$\bar{x}$ $\sigma$ Ref	22.6 2.9 12	<14.7 - 22	25.9 6.6 29	27.8 - 43	44* - 47
	$\bar{x}$ $\sigma$ Ref	15* 3 62				

Ni (ppm)	$\bar{x}$ $\sigma$ Ref	114 15 12	122 3 20	140 15 22	92 11 29	138 22 30
	$\bar{x}$ $\sigma$ Ref	106 - 46	117.5 - 55	130.0 - 55		
P (ppm)	$\bar{x}$ $\sigma$ Ref	1400 - 12	1020 170 20	1200 300 30	1330 20 50	1200 100 54
Pb (ppm)	$\bar{x}$ $\sigma$ Ref	6.2 2.1 12	3.38 0.16 22			
Pd (ppb)	$\bar{x}$ $\sigma$ Ref	3.5 0.5 28				
Pr (ppm)	$\bar{x}$ $\sigma$ Ref	5.67 0.51 12	<14.7 - 22	5.57 - 43		
Pt (ppb)	$\bar{x}$ $\sigma$ Ref	<10 - 28				
Rb (ppm)	$\bar{x}$ $\sigma$ Ref	0.147 0.008 11	8.0 0.7 12	8.7 1.9 20	10.9 0.3 29	2 - 46
S (ppm)	$\bar{x}$ $\sigma$ Ref	<50 - 20	101 - 48			
Sb (ppb)	$\bar{x}$ $\sigma$ Ref	430* 90 11	160 50 14	170 18 29	170 20 38	
Sc (ppm)	$\bar{x}$ $\sigma$ Ref	32.0 0.4 11	31 1 12	28.0 0.6 20	> 68* - 22	31.3 1.1 29



	$\bar{x}$ $\sigma$ Ref	32.3 - 47				
Si (%)	$\bar{x}$ $\sigma$ Ref	23.2 - 12	23.8 0.2 17	23.7 0.3 20	23.2 2.4 22	22.6 1.1 30
	$\bar{x}$ $\sigma$ Ref	23.3 0.1 54	22.3 0.8 62			
Sm (ppm)	$\bar{x}$ $\sigma$ Ref	5.26 0.66 12	<4.6 - 22	6.84 0.29 29	6.34 - 43	6.78 - 47
	$\bar{x}$ $\sigma$ Ref	5.51 0.10 62				
Sn (ppm)	$\bar{x}$ $\sigma$ Ref	<3.2 - 22	2.15 0.04 40			
Sr (ppm)	$\bar{x}$ $\sigma$ Ref	330 60 12	374 7 20	473 38 22	438 4 23	486 38 29
	$\bar{x}$ $\sigma$ Ref	492 19 30	381 - 46	540 80 62		
Ta (ppm)	$\bar{x}$ $\sigma$ Ref	0.86 0.17 11	1.10 0.05 14	0.96 0.03 25	1.34 0.05 29	1.12 - 47
Tb (ppm)	$\bar{x}$ $\sigma$ Ref	1.41 0.22 11	0.729 0.115 12	1.02 0.07 29	0.80 - 43	1.08 - 47
Te (ppb)	$\bar{x}$ $\sigma$ Ref	6.3 0.7 35				

Th (ppm)	$\bar{x}$ $\sigma$ Ref	3.19* 0.25 11	0.78 0.12 12	0.816 0.162 12	0.91 0.66 13	<22 - 22
	$\bar{x}$ $\sigma$ Ref	1.29 0.04 29	1.12 - 43	1.36 - 47		
Ti (%)	$\bar{x}$ $\sigma$ Ref	1.67 0.03 17	1.63 0.01 20	1.80 0.33 22	1.50 0.03 30	1.62 0.01 54
	$\bar{x}$ $\sigma$ Ref	1.56 0.03 62				
Tm (ppb)	$\bar{x}$ $\sigma$ Ref	282 44 12	340 50 29	270 - 43		
U (ppb)	$\bar{x}$ $\sigma$ Ref	400 100 12	333 82 12	480 80 13	429 59 29	380 - 43
V (ppm)	$\bar{x}$ $\sigma$ Ref	300 30 12	316 9 20	27.2* 3.3 22	328 18 30	320 - 34
	$\bar{x}$ $\sigma$ Ref	308 2 37	390* 16 62			
Y (ppm)	$\bar{x}$ $\sigma$ Ref	30 1 12	25.8 3.5 12	27.2 3.3 22	30.0 - 43	
Yb (ppm)	$\bar{x}$ $\sigma$ Ref	2.8 0.4 12	1.52 0.27 12	4.24* 0.64 22	2.46 0.23 29	1.90 - 43
	$\bar{x}$ $\sigma$ Ref	1.96 - 47				

Zn (ppm)	$\bar{x}$	102	87	178 <sup>*</sup>	100	111
	$\sigma$	5	1	19	-	16
	Ref	12	20	22	23	29
	$\bar{x}$	106	79 <sup>*</sup>	100.4	107	
	$\sigma$	20	-	-	-	
	Ref	30	46	55	55	
Zr (ppm)	$\bar{x}$	145	156	203	199	180
	$\sigma$	11	4	22	-	-
	Ref	12	20	22	43	46

APPENDIX B

ELEMENTAL CONCENTRATIONS IN MAG-1

REPORTED BY INDIVIDUAL INVESTIGATORS

## ELEMENTAL CONCENTRATIONS IN MAG-1

Reported by Individual Investigators

Ag (ppb)	$\bar{x}$ $\sigma$ Ref	112 21 22	6.4 0.4 25			
Al (%)	$\bar{x}$ $\sigma$ Ref	8.70 - 9	8.87 0.13 20	8.47 0.67 22	8.57 - 47	8.76 0.05 54
	$\bar{x}$ $\sigma$ Ref	8.54 0.09 62				
As (ppm)	$\bar{x}$ $\sigma$ Ref	<5-9 - 20	6.0 - 47			
Au (ppb)	$\bar{x}$ $\sigma$ Ref	2.58 0.54 15	2.43 0.11 25			
B (ppm)	$\bar{x}$ $\sigma$ Ref	130 10 9	155 11 22	128 2 62		
Ba (ppm)	$\bar{x}$ $\sigma$ Ref	490 60 9	311* 78 11	513 8 20	426 49 22	527 50 29
	$\bar{x}$ $\sigma$ Ref	605 - 47	480 27 52	476 2 56,63		
Be (ppm)	$\bar{x}$ $\sigma$ Ref	2.72 0.09 16	2.97 0.32 22	2.84 0.18 41	3.57 0.09 52	
Bi (ppb)	$\bar{x}$ $\sigma$ Ref	<1000 - 22	331 35 39	384 16 64		
C (%)	$\bar{x}$ $\sigma$ Ref	0.14 - 9	2.31 - 48	2.46 - 49	0.100 0.008 54	

Ca (%)	$\bar{x}$ $\sigma$ Ref	1.07 - 9	1.01 0.02 20	1.32* 0.22 22	1.04 0.02 54	0.75* 0.08 62
Ce (ppm)	$\bar{x}$ $\sigma$ Ref	95.3 4.7 11	104 10 22	89.6 8.1 29	84 - 47	
Cl (%)	$\bar{x}$ $\sigma$ Ref	2.86 - 9	3.12 0.05 20	3.15 - 50	3.17 0.03 62	
Co (ppm)	$\bar{x}$ $\sigma$ Ref	18 2 9	18.8 0.1 11	21.6 3.8 22	22.9 1.6 29	18.3 - 47
	$\bar{x}$ $\sigma$ Ref	19.3 1.9 52				
Cr (ppm)	$\bar{x}$ $\sigma$ Ref	120 10 9	103 2 11	104 16 22	84 - 47	111.8 2.6 52
Cs (ppm)	$\bar{x}$ $\sigma$ Ref	7.53 0.18 11	8.60 0.38 29	8.36 - 47		
Cu (ppm)	$\bar{x}$ $\sigma$ Ref	49* 2 9	27.9 0.8 16	32.0 1.0 16	46 - 22	34.4 0.4 23
	$\bar{x}$ $\sigma$ Ref	30.9 4.2 52	25.6 - 55	27.5 - 55		
Dy (ppm)	$\bar{x}$ $\sigma$ Ref	<3.16 - 22				
Er (ppm)	$\bar{x}$ $\sigma$ Ref	<2.15 - 22				

Eu (ppm)	$\bar{x}$ $\sigma$ Ref	1.64 0.05 11	1.30 0.17 22	1.73 0.37 29	1.35 - 47	
F (ppm)	$\bar{x}$ $\sigma$ Ref	1200 - 9				
Fe (%)	$\bar{x}$ $\sigma$ Ref	4.68 - 9	4.52 0.04 11	4.96 0.02 20	5.24 0.30 22	5.09 0.25 29
	$\bar{x}$ $\sigma$ Ref	4.65 - 47	4.90 0.06 54	4.41 0.05 62		
Ga (ppm)	$\bar{x}$ $\sigma$ Ref	21 2 9	21.8 1.5 22	21.3 - 55		
Gd (ppm)	$\bar{x}$ $\sigma$ Ref	<3.2 - 22	9.0 0.7 29	4.75 0.16 62		
H (ppm)	$\bar{x}$ $\sigma$ Ref	7820 40 62				
Hf (ppm)	$\bar{x}$ $\sigma$ Ref	3.15 0.13 11	3.52 0.05 14	4.36 0.20 29	2.86 - 47	
Ho (ppm)	$\bar{x}$ $\sigma$ Ref	<1.0 - 22				
K (%)	$\bar{x}$ $\sigma$ Ref	3.0 - 9	2.96 0.02 20	>1.0* - 22	2.93 0.01 23	3.35 - 47
	$\bar{x}$ $\sigma$ Ref	3.09 0.05 54	2.78 0.09 62			

La (ppm)	$\bar{x}$ $\sigma$ Ref	49.7 7.6 22	42.9 - 47			
Li (ppm)	$\bar{x}$ $\sigma$ Ref	72.0 3.5 16	77.6 0.4 23	78.6 0.5 52		
Lu (ppb)	$\bar{x}$ $\sigma$ Ref	400 - 47				
Mg (%)	$\bar{x}$ $\sigma$ Ref	1.80 - 9	1.71 0.01 20	2.66* 0.19 22	1.81 0.01 23	1.93 0.01 54
	$\bar{x}$ $\sigma$ Ref	2.03* 0.17 62				
Mn (ppm)	$\bar{x}$ $\sigma$ Ref	880 3 20	1020* 40 22	713 7 23	850 - 54	610 20 62
Mo (ppm)	$\bar{x}$ $\sigma$ Ref	2.80 0.40 22				
Na (%)	$\bar{x}$ $\sigma$ Ref	2.9 - 9	2.55 0.03 20	2.81 0.02 23	2.84 - 47	2.99 0.06 54
	$\bar{x}$ $\sigma$ Ref	2.54 0.12 62				
Nb (ppm)	$\bar{x}$ $\sigma$ Ref	7.60 1.34 22	9.6 - 26,51	11 - 46		
Nd (ppm)	$\bar{x}$ $\sigma$ Ref	26.8* 3.2 22	40.7 6.9 29	46 - 47	43 5 62	

Ni (ppm)	$\bar{x}$ $\sigma$ Ref	51 4 9	53.8 0.71 20	70.2 6.6 22	50 - 29	45 - 46
	$\bar{x}$ $\sigma$ Ref	48.3 - 55	60 - 55			
O (%)	$\bar{x}$ $\sigma$ Ref	46.54 - 45				
P (ppm)	$\bar{x}$ $\sigma$ Ref	1400* - 9	750 110 20	830 10 50	700 - 54	
Pb (ppm)	$\bar{x}$ $\sigma$ Ref	20.4 1.3 22	27.7 5.3 52			
Pr (ppm)	$\bar{x}$ $\sigma$ Ref	7.72 0.70 22				
Rb (ppm)	$\bar{x}$ $\sigma$ Ref	84.3* 4.7 11	186 4 20	155 4 29	147 - 46	151 - 47
	$\bar{x}$ $\sigma$ Ref	151.8 1.6 52				
S (ppm)	$\bar{x}$ $\sigma$ Ref	5200 - 9	4600 100 20	3943 - 48		
Sb (ppm)	$\bar{x}$ $\sigma$ Ref	0.83 0.29 11	0.88 0.05 14	1.00 0.11 29	0.82 0.07 38	
Sc (ppm)	$\bar{x}$ $\sigma$ Ref	18 1 9	16.3 0.2 11	20.2 1.5 20	17.0 5.3 22	17.2 0.6 29

Sc(Cont.) (ppm)	$\bar{x}$ $\sigma$ Ref	14.7 - 47				
Si (%)	$\bar{x}$ $\sigma$ Ref	23.2 - 9	23.8 0.3 20	23.0 1.4 22	24.0 0.1 54	22.8 0.5 62
Sm (ppm)	$\bar{x}$ $\sigma$ Ref	8.21 0.17 29	8.45 - 47	6.49 0.09 62		
Sn (ppm)	$\bar{x}$ $\sigma$ Ref	6.43 0.51 22	3.54 0.33 40			
Sr (ppm)	$\bar{x}$ $\sigma$ Ref	160 20 9	150 4 16	128 2 16	168 3 20	185 4 22
	$\bar{x}$ $\sigma$ Ref	173 1 23	166 13 29	136 - 46	133 3 52	
Ta (ppm)	$\bar{x}$ $\sigma$ Ref	0.74 0.07 11	1.00 0.08 14	0.88 0.19 25	1.30 0.07 29	1.10 - 47
Tb (ppm)	$\bar{x}$ $\sigma$ Ref	0.95 0.09 11	1.06 0.04 29	1.02 - 47		
Th (ppm)	$\bar{x}$ $\sigma$ Ref	13.0 0.2 11	12.2 0.8 13	<22 - 22	12.6 0.4 29	13.6 - 47
Ti (ppm)	$\bar{x}$ $\sigma$ Ref	4500 - 20	2480* 640 22	4500 - 54	4000 80 62	
Tm (ppb)	$\bar{x}$ $\sigma$ Ref	440 60 29				

U (ppm)	$\bar{x}$ $\sigma$ Ref	2.82 0.10 13	2.83 0.08 29			
V (ppm)	$\bar{x}$ $\sigma$ Ref	130 10 9	142 2 20	143 7 22	138 1 37	145.0 4.3 52
	$\bar{x}$ $\sigma$ Ref	140 15 62				
Y (ppm)	$\bar{x}$ $\sigma$ Ref	57 3 9	25.0 4.1 22			
Yb (ppm)	$\bar{x}$ $\sigma$ Ref	3.2 0.4 9	2.68 0.30 22	2.78 0.26 29	3.34 - 47	
Zn (ppm)	$\bar{x}$ $\sigma$ Ref	122 4 16	153 1 16	148 3 20	102 6 22	124 1 23
	$\bar{x}$ $\sigma$ Ref	123 18 29	95 <sup>*</sup> - 46	138.8 2.9 52	130.4 - 55	134 - 55
Zr (ppm)	$\bar{x}$ $\sigma$ Ref	130 10 9	130 3 20	142 14 22	119 - 46	

APPENDIX C  
ELEMENTAL CONCENTRATIONS IN QLO-1  
REPORTED BY INDIVIDUAL INVESTIGATORS



ELEMENTAL CONCENTRATIONS IN QLO-1 Reported by Individual Investigators						
Ag (ppb)	$\bar{x}$ $\sigma$ Ref	<100-170 - 22	4.5 0.2 25			
Al (%)	$\bar{x}$ $\sigma$ Ref	8.64 - 7	8.70 0.10 17	8.53 0.15 20	10.2* 1.2 22	8.54 - 47
	$\bar{x}$ $\sigma$ Ref	8.67 0.04 54	8.52 0.13 62			
As (ppm)	$\bar{x}$ $\sigma$ Ref	<5 - 20				
Au (ppb)	$\bar{x}$ $\sigma$ Ref	0.96 0.20 15	1.66 0.32 25			
B (ppm)	$\bar{x}$ $\sigma$ Ref	40 10 7	41.0 4.1 22	33.3 0.5 62		
Ba (ppm)	$\bar{x}$ $\sigma$ Ref	1300 200 7	1360 131 11	1390 20 20	1170* 40 22	1427 50 29
	$\bar{x}$ $\sigma$ Ref	1390 - 47	1401 3 56,63			
Be (ppm)	$\bar{x}$ $\sigma$ Ref	2 - 7	1.65 0.07 16	2.14 0.12 22	1.83 0.26 41	
Bi (ppb)	$\bar{x}$ $\sigma$ Ref	<1000 - 22	63.3 1.4 39	66.3 3.0 64		

C (ppm)	$\bar{x}$ $\sigma$ Ref	30 - 7	68.5* 5.0 24	26 - 48	30 - 54	
Ca (%)	$\bar{x}$ $\sigma$ Ref	2.28 - 7	2.32 0.02 17	2.27 0.01 20	3.00* 0.40 22	2.32 0.02 54
	$\bar{x}$ $\sigma$ Ref	2.17 0.07 62				
Ce (ppm)	$\bar{x}$ $\sigma$ Ref	59.8 3.8 11	75.5 8.7 22	56.0 5.0 29	53 - 47	
Cl (ppm)	$\bar{x}$ $\sigma$ Ref	200 - 7	192 4 20	225 - 50	220 20 62	
Co (ppm)	$\bar{x}$ $\sigma$ Ref	7 1 7	6.9 0.1 11	7.31 0.37 22	7.75 0.26 29	6.76 - 47
Cr (ppm)	$\bar{x}$ $\sigma$ Ref	2 1 7	9.98 1.38 11	4.4 - 47		
Cs (ppm)	$\bar{x}$ $\sigma$ Ref	1.76 0.22 11	1.61 0.07 29	2.08 - 47		
Cu (ppm)	$\bar{x}$ $\sigma$ Ref	31 2 7	26.6 0.8 16	29.0 0.6 16	<46 - 22	33.5 0.9 23
	$\bar{x}$ $\sigma$ Ref	27.3 - 55	26.6 - 55			
Dy (ppm)	$\bar{x}$ $\sigma$ Ref	<3.16 - 22				

Er (ppm)	$\bar{x}$ $\sigma$ Ref	<2.15 - 22				
Eu (ppm)	$\bar{x}$ $\sigma$ Ref	1.53 0.05 11	1.15 0.18 22	1.63 0.07 29	1.39 - 47	
F (ppm)	$\bar{x}$ $\sigma$ Ref	300 - 7	256 22 16			
Fe (%)	$\bar{x}$ $\sigma$ Ref	3.0 - 7	3.04 0.04 11	3.13 0.10 17	3.09 0.08 20	4.08* 0.50 22
	$\bar{x}$ $\sigma$ Ref	3.10 0.08 29	2.95 - 47	2.98 0.01 54	2.86* 0.07 62	
Ga (ppm)	$\bar{x}$ $\sigma$ Ref	16 4 7	18.8 1.7 22	18.0 - 55		
Gd (ppm)	$\bar{x}$ $\sigma$ Ref	<3.2 - 22	6.0 0.5 29	3.57 0.05 62		
Ge (ppm)	$\bar{x}$ $\sigma$ Ref	1.40 0.10 52	1.3 - 52			
H (ppm)	$\bar{x}$ $\sigma$ Ref	540 50 62				
Hf (ppm)	$\bar{x}$ $\sigma$ Ref	4.47 0.30 11	4.68 0.10 14	4.20 0.20 29		
Ho (ppm)	$\bar{x}$ $\sigma$ Ref	<1.0 - 22				

K (%)	$\bar{x}$ $\sigma$ Ref	2.99 - 7	3.00 0.04 17	3.02 0.10 17	2.90 0.06 20	3.80* 0.05 22
	$\bar{x}$ $\sigma$ Ref	2.96 0.01 23	3.35 - 47	3.15 0.02 54	2.84 0.13 62	
La (ppm)	$\bar{x}$ $\sigma$ Ref	35.9 2.1 22	26.1 - 47			
Li (ppm)	$\bar{x}$ $\sigma$ Ref	23.0 0.6 16	24.6 0.6 23			
Lu (ppb)	$\bar{x}$ $\sigma$ Ref	420 - 47				
Mg (ppm)	$\bar{x}$ $\sigma$ Ref	6000 - 7	6500 100 17	5700 300 20	9570* 940 22	5810 70 23
	$\bar{x}$ $\sigma$ Ref	6390 60 54	9700* 1200 62			
Mn (ppm)	$\bar{x}$ $\sigma$ Ref	640 80 7	800 - 17	760 10 20	1080* 60 22	672 4 23
	$\bar{x}$ $\sigma$ Ref	800 80 54	650 20 62			
Mo (ppm)	$\bar{x}$ $\sigma$ Ref	4 1 7	3.40 0.59 22	2.6 - 29	2.41 0.08 32	2.3 0.2 65
Na (%)	$\bar{x}$ $\sigma$ Ref	3.13 - 7	3.06 0.04 17	3.15 0.10 17	3.02 0.07 20	3.11 0.01 23
	$\bar{x}$ $\sigma$ Ref	2.93 - 47	3.24 0.05 54	2.73* 0.12 62		

Nb (ppm)	$\bar{x}$ $\sigma$ Ref	16 6 7	11.7 0.5 19	6.10 1.12 22	9.3 0.5 26, 51	13 - 46
Nd (ppm)	$\bar{x}$ $\sigma$ Ref	35.3 3.8 22	25.4 2.8 29	33 - 47	17 <sup>*</sup> 2 62	
Ni (ppm)	$\bar{x}$ $\sigma$ Ref	2 1 7	9.2 4.2 20	1.99 0.22 22	<50 - 29	1.0 - 55
	$\bar{x}$ $\sigma$ Ref	3.5 - 55				
O (%)	$\bar{x}$ $\sigma$ Ref	47.97 - 45				
P (ppm)	$\bar{x}$ $\sigma$ Ref	1100 - 7	1000 100 20	1440 140 22	1190 20 50	1100 100 54
Pb (ppm)	$\bar{x}$ $\sigma$ Ref	20 7 7	21.6 4.0 22			
Pr (ppm)	$\bar{x}$ $\sigma$ Ref	6.06 0.76 22				
Rb (ppm)	$\bar{x}$ $\sigma$ Ref	34.7 <sup>*</sup> 5.7 11	68 2 20	74.3 2.2 29	77 - 46	92 - 47
S (ppm)	$\bar{x}$ $\sigma$ Ref	<50 - 20	13 - 48			
Sb (ppm)	$\bar{x}$ $\sigma$ Ref	2.84 1.20 11	2.03 0.52 14	1.76 0.19 29	1.99 0.05 38	2.5 - 47

Sc (ppm)	$\bar{x}$ $\sigma$ Ref	10 1 7	8.96 0.08 11	11.3 1.5 20	11.4 0.7 22	8.79 0.30 29
	$\bar{x}$ $\sigma$ Ref	7.98 - 47				
Si (%)	$\bar{x}$ $\sigma$ Ref	30.8 - 7	30.5 0.2 17	30.4 0.2 20	30.9 0.1 54	29.7 0.5 62
Sm (ppm)	$\bar{x}$ $\sigma$ Ref	<4.6 - 22	5.24 0.12 29	5.11 - 47	4.19 0.08 62	
Sn (ppm)	$\bar{x}$ $\sigma$ Ref	2.35 0.12 40				
Sr (ppm)	$\bar{x}$ $\sigma$ Ref	360 40 7	354 24 16	326 2 16	329 18 20	436 52 22
	$\bar{x}$ $\sigma$ Ref	382 1 23	352 28 29	332 - 46		
Ta (ppm)	$\bar{x}$ $\sigma$ Ref	0.70 0.04 11	0.81 0.06 14	0.63 0.08 25	0.91 0.06 29	
Tb (ppb)	$\bar{x}$ $\sigma$ Ref	920 100 11	750 50 29	860 - 47		
Te (ppb)	$\bar{x}$ $\sigma$ Ref	<5 - 35				
Th (ppm)	$\bar{x}$ $\sigma$ Ref	3.4 0.7 7	620 <sup>*</sup> 0.07 11	3.24 0.78 13	<22 - 22	4.86 0.15 29
	$\bar{x}$ $\sigma$ Ref	4.8 - 47				

Ti (ppm)	$\bar{x}$	3600	3910	3800	3780	3700
	$\sigma$	600	170	100	390	60
	Ref	7	17	20	22	54
	$\bar{x}$	3430				
	$\sigma$	15				
	Ref	62				
Tm (ppb)	$\bar{x}$	390				
	$\sigma$	50				
	Ref	29				
U (ppm)	$\bar{x}$	1.6	2.01	1.97		
	$\sigma$	0.1	0.10	0.11		
	Ref	7	13	29		
V (ppm)	$\bar{x}$	61	52.5	61.9	63	30 <sup>*</sup>
	$\sigma$	16	4.6	7.5	3	15
	Ref	7	20	22	37	62
Y (ppm)	$\bar{x}$	30	25.4			
	$\sigma$	10	2.9			
	Ref	7	22			
Yb (ppm)	$\bar{x}$	2	3.29	3.62	2.22	
	$\sigma$	1	0.40	0.33	-	
	Ref	7	22	29	47	
Zn (ppm)	$\bar{x}$	64.6	67.5	44.5	61.2	57
	$\sigma$	1.3	1.2	1.0	4.7	-
	Ref	16	16	20	22	23
	$\bar{x}$	57	32 <sup>*</sup>	57.5	65.5	
	$\sigma$	8	-	-	-	
	Ref	29	46	55	55	
Zr (ppm)	$\bar{x}$	160	175	219 <sup>*</sup>	190	
	$\sigma$	30	9	19	-	
	Ref	7	20	22	46	

APPENDIX D  
ELEMENTAL CONCENTRATIONS IN RGM-1  
REPORTED BY INDIVIDUAL INVESTIGATORS

## ELEMENTAL CONCENTRATIONS IN RGM-1

Reported by Individual Investigators

Ag (ppb)	$\bar{x}$ $\sigma$ Ref	<100 - 22	10.3 1.7 25	99 10 33		
Al (%)	$\bar{x}$ $\sigma$ Ref	7.28 - 6	7.36 0.17 17	7.34 0.05 20	6.94 0.40 22	7.12 - 47
	$\bar{x}$ $\sigma$ Ref	7.33 0.01 54	7.33 0.05 62			
As (ppm)	$\bar{x}$ $\sigma$ Ref	<5 - 20	2.9 - 47			
Au (ppb)	$\bar{x}$ $\sigma$ Ref	0.386 0.083 15	0.28 0.08 25			
B (ppm)	$\bar{x}$ $\sigma$ Ref	30 4 6	30.0 2.7 22	26.5 0.4 62		
Ba (ppm)	$\bar{x}$ $\sigma$ Ref	700 50 6	807 50 11	827 12 20	752 118 22	879 82 29
	$\bar{x}$ $\sigma$ Ref	809 - 47	822 2 56,63			
Be (ppm)	$\bar{x}$ $\sigma$ Ref	3 1 6	2.16 0.06 16	2.56 0.27 22	2.21 0.14 41	
Bi (ppb)	$\bar{x}$ $\sigma$ Ref	<1000 - 22	279 31 39	283 20 64	217 26 66	

C (ppm)	$\bar{x}$ $\sigma$ Ref	30 - 6	54 11 24	43.0 7.9 24	37 - 48	30 6 54
Ca (ppm)	$\bar{x}$ $\sigma$ Ref	8300 - 6	8600 200 17	7400 200 18	7400 600 18	8900 200 20
	$\bar{x}$ $\sigma$ Ref	12800* 2400 22	8650 70 54	7500 600 62		
Cd (ppb)	$\bar{x}$ $\sigma$ Ref	60 20 62				
Ce (ppm)	$\bar{x}$ $\sigma$ Ref	46.3 1.9 11	60.4 7.8 22	56.0 5.0 29	48 - 47	
Cl (ppm)	$\bar{x}$ $\sigma$ Ref	500 - 6	440 30 20	440 - 50	525 30 62	
Co (ppm)	$\bar{x}$ $\sigma$ Ref	2 1 6	1.88 0.18 11	7.2* 1.4 18	1.76 0.15 22	2.36 0.21 29
	$\bar{x}$ $\sigma$ Ref	1.91 - 47				
Cr (ppm)	$\bar{x}$ $\sigma$ Ref	3 1 6	39.5* 3.0 11	2.55 0.96 22	2.2 0.5 44	5.1* - 47
Cs (ppm)	$\bar{x}$ $\sigma$ Ref	10.3 0.1 11	9.56 0.42 29	10.1 - 47		
Cu (ppm)	$\bar{x}$ $\sigma$ Ref	10 2 6	11.6 0.8 16	11.0 0.6 16	10.8 1.2 18	16.5 0.9 18

	$\bar{x}$ $\sigma$ Ref	<46 - 22	13.4 0.6 23	10.3 - 55	10.5 - 55	
Dy (ppm)	$\bar{x}$ $\sigma$ Ref	4.34 0.61 22				
Er (ppm)	$\bar{x}$ $\sigma$ Ref	<2.15 - 22				
Eu (ppb)	$\bar{x}$ $\sigma$ Ref	725 38 11	<1000 - 22	890 130 29	620 - 47	
F (ppm)	$\bar{x}$ $\sigma$ Ref	400 - 6	342 15 16			
Fe (%)	$\bar{x}$ $\sigma$ Ref	1.31 - 6	1.32 0.03 11	1.31 0.05 17	1.29 0.01 18	1.24 0.03 18
	$\bar{x}$ $\sigma$ Ref	1.36 0.01 20	1.44 0.14 22	1.34 0.05 29	1.27 - 47	1.29 0.02 54
	$\bar{x}$ $\sigma$ Ref	1.32 0.07 62				
Ga (ppm)	$\bar{x}$ $\sigma$ Ref	13 3 6	13.5 2.4 22	16.5 - 55		
Gd (ppm)	$\bar{x}$ $\sigma$ Ref	<3.2 - 22	3.06 0.06 62			
Ge (ppm)	$\bar{x}$ $\sigma$ Ref	1.28 0.08 52	1.2 - 52			

H (ppm)	$\bar{x}$ $\sigma$ Ref	840 40 62				
Hf (ppm)	$\bar{x}$ $\sigma$ Ref	5.97 0.28 11	5.93 0.13 14	6.58 0.31 29	5.30 - 47	
Ho (ppm)	$\bar{x}$ $\sigma$ Ref	<1.0 - 22				
K (%)	$\bar{x}$ $\sigma$ Ref	3.60 - 6	3.61 0.05 17	3.65 0.09 17	3.62 0.02 18	3.63 0.02 18
	$\bar{x}$ $\sigma$ Ref	3.49 0.11 20	4.82* 0.29 22	3.54 0.02 23	4.10 - 47	3.71 0.05 54
	$\bar{x}$ $\sigma$ Ref	3.45 0.11 62				
La (ppm)	$\bar{x}$ $\sigma$ Ref	27.0 3.3 22	23.1 - 47			
Li (ppm)	$\bar{x}$ $\sigma$ Ref	56.3 2.9 16	45.8 1.4 18	41.0 - 18	61 - 23	
Lu (ppb)	$\bar{x}$ $\sigma$ Ref	420 - 47				
Mg (ppm)	$\bar{x}$ $\sigma$ Ref	1800 - 6	1660 80 17	1600 100 18	1600 100 18	2400* 400 20
	$\bar{x}$ $\sigma$ Ref	1900 170 22	1600 10 23	1600 100 54	7900* 1100 62	

Mn (ppm)	$\bar{x}$	290	300	285	256	290
	$\sigma$	40	-	17	8	10
	Ref	6	17	18	18	20
	$\bar{x}$	400*	264	300	270	
	$\sigma$	30	12	80	15	
	Ref	22	23	54	62	
Mo (ppm)	$\bar{x}$	3	2.87	1.5	2.44	
	$\sigma$	1	0.40	-	0.08	
	Ref	6	22	29	32	
Na (%)	$\bar{x}$	3.11	3.00	2.97	3.03	3.03
	$\sigma$	-	0.06	0.04	0.01	0.02
	Ref	6	17	17	18	18
	$\bar{x}$	2.91	2.97	2.92	3.19	2.82
	$\sigma$	0.06	0.02	-	0.13	0.11
	Ref	20	23	47	54	62
Nb (ppm)	$\bar{x}$	17	9.4	5.44	8.0	12
	$\sigma$	1	0.3	0.13	-	-
	Ref	6	19	22	26,51	46
Nd (ppm)	$\bar{x}$	18.8	17.3	14	18	
	$\sigma$	4.3	2.0	-	2	
	Ref	22	29	47	62	
Ni (ppm)	$\bar{x}$	6.0	14.0	1.99	<50	1.9
	$\sigma$	3.9	7.5	0.20	-	-
	Ref	18	20	22	29	55
	$\bar{x}$	3				
	$\sigma$	-				
	Ref	55				
O (%)	$\bar{x}$	49.44				
	$\sigma$	-				
	Ref	45				
P (ppm)	$\bar{x}$	200	210	210	200	
	$\sigma$	-	40	10	100	
	Ref	6	20	50	54	

Pb (ppm)	$\bar{x}$	21	20.9			
	$\sigma$	7	2.1			
	Ref	6	22			
Pr (ppm)	$\bar{x}$	4.06				
	$\sigma$	0.41				
	Ref	22				
Rb (ppm)	$\bar{x}$	193*	154	154	158	162
	$\sigma$	13	8	4	-	-
	Ref	11	20	29	46	47
S (ppm)	$\bar{x}$	<100	50	100		
	$\sigma$	-	-	-		
	Ref	6	20	48		
Sb (ppm)	$\bar{x}$	1.52	1.30	1.18	1.26	2.2*
	$\sigma$	0.16	0.09	0.13	0.05	-
	Ref	11	14	29	38	47
Sc (ppm)	$\bar{x}$	6	4.75	6.3	4.60	4.42
	$\sigma$	1	0.11	1.2	0.89	0.15
	Ref	6	11	20	22	29
	$\bar{x}$	4.14				
	$\sigma$	-				
	Ref	47				
Si (%)	$\bar{x}$	34.6	33.6	34.2	>34	34.7
	$\sigma$	-	0.3	0.1	-	0.3
	Ref	6	17	20	22	54
	$\bar{x}$	33.1				
	$\sigma$	0.7				
	Ref	62				
Sm (ppm)	$\bar{x}$	<4.6	4.34	4.77	3.72	
	$\sigma$	-	0.12	-	0.05	
	Ref	22	29	47	62	
Sn (ppm)	$\bar{x}$	3.73	4.11			
	$\sigma$	0.40	0.23			
	Ref	22	40			



Sr (ppm)	$\bar{x}$	110	112	96.3	116	132
	$\sigma$	20	5	2.5	5	7
	Ref	6	16	16	20	22
	$\bar{x}$	100	128	107		
	$\sigma$	1	10	-		
	Ref	23	29	46		
Ta (ppb)	$\bar{x}$	870	900	540 <sup>*</sup>	1090	920
	$\sigma$	50	40	30	90	-
	Ref	11	14	25	29	47
Tb (ppb)	$\bar{x}$	740				
	$\sigma$	60				
	Ref	29				
Te (ppb)	$\bar{x}$	<5				
	$\sigma$	-				
	Ref	35				
Th (ppm)	$\bar{x}$	18.6	13.1	<22	15.2	16.6
	$\sigma$	0.5	1.5	-	0.5	-
	Ref	11	13	22	29	47
Ti (ppm)	$\bar{x}$	1600	1810	1700	1340	1600
	$\sigma$	200	170	100	250	-
	Ref	6	17	20	22	54
	$\bar{x}$	1460				
	$\sigma$	20				
	Ref	62				
Tm (ppb)	$\bar{x}$	370				
	$\sigma$	50				
	Ref	29				
U (ppm)	$\bar{x}$	5.85	5.82			
	$\sigma$	0.10	0.30			
	Ref	13	29			
Y (ppm)	$\bar{x}$	13	14.7	14.9	10.4	13
	$\sigma$	5	4.6	1.0	0.7	6
	Ref	6	20	22	37	62

Y (ppm)	$\bar{x}$	30	23.8			
	$\sigma$	10	2.4			
	Ref	6	22			
Yb (ppm)	$\bar{x}$	2	2.83	3.04	2.66	
	$\sigma$	1	0.60	0.28	-	
	Ref	6	22	29	47	
Zn (ppm)	$\bar{x}$	38.9	38.8	31.8	37.8	21.8
	$\sigma$	1.0	1.2	0.7	0.4	6.2
	Ref	16	16	18	18	20
	$\bar{x}$	21.5	33	28	15 <sup>*</sup>	29.2
	$\sigma$	1.5	-	4	-	-
	Ref	22	23	29	46	55
	$\bar{x}$	38				
	$\sigma$	-				
	Ref	55				
Zr (ppm)	$\bar{x}$	200	212	304 <sup>*</sup>	229	
	$\sigma$	20	11	38	-	
	Ref	6	20	22	46	

APPENDIX E  
ELEMENTAL CONCENTRATIONS IN SCo-1  
REPORTED BY INDIVIDUAL INVESTIGATORS

ELEMENTAL CONCENTRATIONS IN SCo-1						
Reported by Individual Investigators						
Ag (ppb)	$\bar{x}$ $\sigma$ Ref	<100 - 22	19 1.3 25			
Al (%)	$\bar{x}$ $\sigma$ Ref	7.09 - 8	7.30 0.07 20	7.30 0.60 22	6.91 - 31	7.06 - 47
	$\bar{x}$ $\sigma$ Ref	7.29 0.04 54	7.51 0.06 62			
As (ppm)	$\bar{x}$ $\sigma$ Ref	11 3 20	54.3 - 47			
Au (ppb)	$\bar{x}$ $\sigma$ Ref	2.11 0.22 15	2.72 0.34 25			
B (ppm)	$\bar{x}$ $\sigma$ Ref	70 - 8	64.4 8.8 21	93.2* 3.2 22	72.1 0.5 62	
Ba (ppm)	$\bar{x}$ $\sigma$ Ref	300 - 8	474 82 11	622 19 20	744 55 21	416 45 22
	$\bar{x}$ $\sigma$ Ref	594 18 29	544 - 31	500 - 47	570 1 56,63	
Be (ppm)	$\bar{x}$ $\sigma$ Ref	1 - 8	1.58 0.04 16	1.90 0.13 22	1.74 0.06 41	
Bi (ppb)	$\bar{x}$ $\sigma$ Ref	<1000 - 22	389 49 39			
C (ppm)	$\bar{x}$ $\sigma$ Ref	6960 - 8	9727 - 48	9900 - 49	7510 80 54	

Ca (%)	$\bar{x}$ $\sigma$ Ref	1.92 - 8	1.83 0.01 20	2.02 0.15 22	1.88 - 31	1.93 - 54
	$\bar{x}$ $\sigma$ Ref	1.62 0.08 62				
Cd (ppb)	$\bar{x}$ $\sigma$ Ref	150 30 62				
Ce (ppm)	$\bar{x}$ $\sigma$ Ref	100* - 8	62.1 4.7 11	71.0 6.4 22	54.4 4.1 27	64.8 5.8 29
	$\bar{x}$ $\sigma$ Ref	56 - 47				
Cl (ppm)	$\bar{x}$ $\sigma$ Ref	1600* - 8	67 8 20	41.3 - 50	34 8 62	
Co (ppm)	$\bar{x}$ $\sigma$ Ref	10 - 8	9.66 0.20 11	11.3 3.2 21	9.30 0.86 22	11.7 0.4 29
	$\bar{x}$ $\sigma$ Ref	10.6 - 47	9 3 62			
Cr (ppm)	$\bar{x}$ $\sigma$ Ref	70 - 8	75.3 4.4 11	65.2 8.1 21	59.0 4.5 22	67 - 47
Cs (ppm)	$\bar{x}$ $\sigma$ Ref	6.82 0.68 11	7.57 0.33 29	8.10 - 47		
Cu (ppm)	$\bar{x}$ $\sigma$ Ref	30 - 8	28.0 0.5 16	33.7 1.0 16	30.6 4.1 21	<46 - 22
	$\bar{x}$ $\sigma$ Ref	30.1 0.4 23	26.7 - 55	29.0 - 55		

Dy (ppm)	$\bar{x}$ $\sigma$ Ref	<3.16 - 22	4.21 0.20 27	3.5 - 31		
Er (ppm)	$\bar{x}$ $\sigma$ Ref	<2.15 - 22	2.5 0.2 27			
Eu (ppm)	$\bar{x}$ $\sigma$ Ref	1.24 0.06 11	<1.0 - 22	1.02 0.04 27	1.42 0.26 29	<1 - 31
	$\bar{x}$ $\sigma$ Ref	1.10 - 47				
F (ppm)	$\bar{x}$ $\sigma$ Ref	1500 - 8	779 16 16			
Fe (%)	$\bar{x}$ $\sigma$ Ref	3.57 - 8	3.36 0.11 11	1.62 <sup>*</sup> 0.04 20	4.46 <sup>*</sup> 0.73 22	3.73 0.08 29
	$\bar{x}$ $\sigma$ Ref	3.53 - 47	3.59 0.03 54	3.48 0.10 62		
Ga (ppm)	$\bar{x}$ $\sigma$ Ref	10 - 8	13.9 2.5 21	10.9 1.4 22	17.3 - 55	
Gd (ppm)	$\bar{x}$ $\sigma$ Ref	<3.2 - 22	4.2 0.4 27	6.2 <sup>*</sup> 0.5 29	3.92 0.05 62	
H (ppm)	$\bar{x}$ $\sigma$ Ref	4460 50 62				
Hf (ppm)	$\bar{x}$ $\sigma$ Ref	4.38 0.30 11	4.73 0.17 14	4.27 0.20 29	4.15 - 47	

Ho (ppm)	$\bar{x}$ $\sigma$ Ref	<1.0 - 22	0.93 0.09 27			
K (%)	$\bar{x}$ $\sigma$ Ref	2.3 - 8	2.20 0.03 20	>1.0 - 22	2.22 0.01 23	1.49 <sup>*</sup> - 31
	$\bar{x}$ $\sigma$ Ref	2.40 - 47	2.34 0.04 54	2.20 0.14 62		
La (ppm)	$\bar{x}$ $\sigma$ Ref	50 <sup>*</sup> - 8	34.2 4.4 22	29.2 1.0 27	28.4 - 47	
Li (ppm)	$\bar{x}$ $\sigma$ Ref	41.6 1.7 16	44.2 0.5 23			
Lu (ppb)	$\bar{x}$ $\sigma$ Ref	370 10 27	370 - 47			
Mg (%)	$\bar{x}$ $\sigma$ Ref	1.62 - 8	1.40 0.03 20	2.23 <sup>*</sup> 0.04 22	1.57 0.02 23	0.868 <sup>*</sup> - 31
	$\bar{x}$ $\sigma$ Ref	1.72 0.02 54	1.75 0.15 62			
Mn (ppm)	$\bar{x}$ $\sigma$ Ref	460 10 20	411 40 21	554 <sup>*</sup> 45 22	398 5 23	381 1 31
	$\bar{x}$ $\sigma$ Ref	500 - 54	390 10 62			
Mo (ppm)	$\bar{x}$ $\sigma$ Ref	2.79 0.24 22	1.4 - 29			
Na (ppm)	$\bar{x}$ $\sigma$ Ref	7200 - 8	5800 300 20	6810 60 23	6360 - 31	6200 - 47

	$\bar{x}$ $\sigma$ Ref	8380 1110 54	6200 1600 62			
Nb (ppm)	$\bar{x}$ $\sigma$ Ref	15 - 8	7.3 1.8 22	8.6 - 26,51	10 - 46	
Nd (ppm)	$\bar{x}$ $\sigma$ Ref	23.8 2.2 22	27.3 0.7 27	27.4 1.4 29	24 - 47	29 3 62
Ni (ppm)	$\bar{x}$ $\sigma$ Ref	30 - 8	28 1 20	29.8 2.7 21	28.1 3.2 22	<50 - 29
	$\bar{x}$ $\sigma$ Ref	21 - 46	26.7 - 55	32 - 55		
O (%)	$\bar{x}$ $\sigma$ Ref	50.79 - 45				
P (ppm)	$\bar{x}$ $\sigma$ Ref	1900* - 8	860 100 20	1280 220 22	1010 20 50	900 - 54
Pb (ppm)	$\bar{x}$ $\sigma$ Ref	15 - 8	27.6 2.1 21	29.6 2.6 22		
Pr (ppm)	$\bar{x}$ $\sigma$ Ref	5.43 0.35 22				
Rb (ppm)	$\bar{x}$ $\sigma$ Ref	68.9* 15.9 11	122 1 20	114 3 29	109 - 46	133 - 47
S (ppm)	$\bar{x}$ $\sigma$ Ref	1200 - 8	600 - 20	608 - 48		

Sb (ppm)	$\bar{x}$ $\sigma$ Ref	2.40 0.22 11	2.51 0.13 14	2.52 0.27 29	2.49 0.09 38	2.6 - 47
Sc (ppm)	$\bar{x}$ $\sigma$ Ref	10 - 8	11.4 0.4 11	19.3* 2.1 20	9.00 1.8 22	11.1 0.4 29
	$\bar{x}$ $\sigma$ Ref	10.9 - 47				
Si (%)	$\bar{x}$ $\sigma$ Ref	28.8 - 8	29.3 0.4 20	29.8 0.1 54	29.0 0.4 62	
Sm (ppm)	$\bar{x}$ $\sigma$ Ref	<4.6 - 22	5.13 0.24 27	5.59 0.19 29	4.78 0.04 62	
Sn (ppm)	$\bar{x}$ $\sigma$ Ref	4.93 0.33 22	3.28 0.19 40			
Sr (ppm)	$\bar{x}$ $\sigma$ Ref	200 - 8	179 6 16	156 2 16	193 2 20	224 20 21
	$\bar{x}$ $\sigma$ Ref	215 8 22	153 5 23	179 14 29	<200 - 31	162 - 46
Ta (ppb)	$\bar{x}$ $\sigma$ Ref	560* 30 11	820 110 14	980 70 29	860 - 47	
Tb (ppb)	$\bar{x}$ $\sigma$ Ref	780 20 11	700 20 27	760 80 29		
Th (ppm)	$\bar{x}$ $\sigma$ Ref	10.5 0.4 11	9.52 0.59 13	<22 - 22	9.64 0.30 29	11.1 - 47

Ti (ppm)	$\bar{x}$	3600	4500	1680*	3260	3600
	$\sigma$	100	240	210	-	60
	Ref	20	21	22	31	54
	$\bar{x}$	3540				
	$\sigma$	30				
	Ref	62				
Tm (ppb)	$\bar{x}$	350				
	$\sigma$	50				
	Ref	29				
U (ppm)	$\bar{x}$	3.15	2.89			
	$\sigma$	0.09	0.20			
	Ref	13	29			
V (ppm)	$\bar{x}$	100	138	109	117	128
	$\sigma$	-	2	8	4	-
	Ref	8	20	21	22	31
	$\bar{x}$	118	150*			
	$\sigma$	2	15			
	Ref	37	62			
Y (ppm)	$\bar{x}$	30	21.1			
	$\sigma$	-	1.9			
	Ref	8	22			
Yb (ppm)	$\bar{x}$	3	2.21	2.33	2.86	2.31
	$\sigma$	-	0.30	0.10	0.26	-
	Ref	8	22	27	29	47
Zn (ppm)	$\bar{x}$	107	122	116	98.8	95.4
	$\sigma$	4	2	2	5.1	0.8
	Ref	16	16	20	22	23
	$\bar{x}$	101	112	102.3	105.0	
	$\sigma$	14	-	-	-	
	Ref	29	46	55	55	
Zr (ppm)	$\bar{x}$	150	178	132	187	178
	$\sigma$	-	5	15	34	-
	Ref	8	20	21	22	46

APPENDIX F  
ELEMENTAL CONCENTRATIONS IN SDC-1  
REPORTED BY INDIVIDUAL INVESTIGATORS

ELEMENTAL CONCENTRATIONS IN SDC-1 Reported by Individual Investigators						
Ag (ppb)	$\bar{x}$ $\sigma$ Ref	300 - 10	155 7 22	9.0 1.9 25	47 1 33	
Al (%)	$\bar{x}$ $\sigma$ Ref	8.6 - 10	8.47 0.06 17	8.82 0.13 20	9.88* 0.84 22	8.56 - 47
	$\bar{x}$ $\sigma$ Ref	8.28 0.01 54	8.30 0.03 62			
As (ppm)	$\bar{x}$ $\sigma$ Ref	<5 - 20				
Au (ppb)	$\bar{x}$ $\sigma$ Ref	1.89 0.96 15	1.1 0.2 25			
B (ppm)	$\bar{x}$ $\sigma$ Ref	30 - 10	10 - 22	11.2 0.2 62		
Ba (ppm)	$\bar{x}$ $\sigma$ Ref	1000* - 10	530 86 11	675 18 20	526 35 22	649 33 29
	$\bar{x}$ $\sigma$ Ref	690 - 47	641 2 56, 63			
Be (ppm)	$\bar{x}$ $\sigma$ Ref	3 - 10	2.57 0.06 16	3.78 0.14 22	2.52 0.15 41	
Bi (ppb)	$\bar{x}$ $\sigma$ Ref	<1000 - 22	278 52 39	276 12 64		
C (ppm)	$\bar{x}$ $\sigma$ Ref	140 - 10	297 - 48	380 40 54		

Ca (%)	$\bar{x}$ $\sigma$ Ref	1.0 - 6	1.04 0.01 17	1.05 0.02 20	1.34* 0.06 22	1.04 0.02 54
	$\bar{x}$ $\sigma$ Ref	0.99 0.08 62				
Cd (ppb)	$\bar{x}$ $\sigma$ Ref	110 20 62				
Ce (ppm)	$\bar{x}$ $\sigma$ Ref	200 - 10	106 4 11	124 6 22	95 8 29	92 - 47
Cl (ppm)	$\bar{x}$ $\sigma$ Ref	38 5 20	23.4 - 50	17 8 62		
Co (ppm)	$\bar{x}$ $\sigma$ Ref	20 - 10	16.6 0.8 11	20.3 1.7 22	17.5 0.8 29	17.5 - 47
Cr (ppm)	$\bar{x}$ $\sigma$ Ref	70 - 10	77.4 2.7 11	67.4 2.9 22	61 - 47	
Cs (ppm)	$\bar{x}$ $\sigma$ Ref	3.85 0.24 11	3.82 0.17 29	3.84 - 47		
Cu (ppm)	$\bar{x}$ $\sigma$ Ref	30 - 10	29.0 1.1 16	28.0 1.0 16	<46 - 22	32.6 0.8 23
	$\bar{x}$ $\sigma$ Ref	27.5 - 55	30.0 - 55			
Dy (ppm)	$\bar{x}$ $\sigma$ Ref	<3.16 - 22				
Er (ppm)	$\bar{x}$ $\sigma$ Ref	<2.15 - 22				



Eu (ppm)	$\bar{x}$ $\sigma$ Ref	1.86 0.04 11	1.68 0.10 22	2.10 0.28 29	1.66 - 47	
F (ppm)	$\bar{x}$ $\sigma$ Ref	621 2 16				
Fe (%)	$\bar{x}$ $\sigma$ Ref	4.9 - 10	4.80 0.12 11	5.14 0.08 17	5.03 0.07 20	5.97* 0.22 22
	$\bar{x}$ $\sigma$ Ref	4.87 0.20 29	4.88 - 47	4.78 0.04 54	4.49* 0.14 62	
Ga (ppm)	$\bar{x}$ $\sigma$ Ref	30 - 10	20.3 1.9 22	23.6 - 55		
Gd (ppm)	$\bar{x}$ $\sigma$ Ref	<3.2 - 22	1.69 0.04 62			
Ge (ppm)	$\bar{x}$ $\sigma$ Ref	1.57 0.20 52	1.5 - 52			
H (ppm)	$\bar{x}$ $\sigma$ Ref	2060 50 62				
Hf (ppm)	$\bar{x}$ $\sigma$ Ref	8.14 0.50 11	8.30 0.04 14	8.03 0.38 29	7.21 - 47	
Ho (ppm)	$\bar{x}$ $\sigma$ Ref	<1.0 - 22				
K (%)	$\bar{x}$ $\sigma$ Ref	2.6 - 10	2.72 0.03 17	2.72 0.04 17	2.71 0.10 20	> 1.0 - 22

	$\bar{x}$ $\sigma$ Ref	2.66 0.01 23	3.10* - 47	2.85 0.02 54	2.76 0.14 62	
La (ppm)	$\bar{x}$ $\sigma$ Ref	150* - 10	54.7 5.4 22	42.2 - 47		
Li (ppm)	$\bar{x}$ $\sigma$ Ref	32.3 1.3 16	36 - 23			
Lu (ppb)	$\bar{x}$ $\sigma$ Ref	490 - 47				
Mg (%)	$\bar{x}$ $\sigma$ Ref	0.96 - 10	1.02 0.02 17	0.95 0.03 20	1.74* 0.09 22	0.994 0.007 23
	$\bar{x}$ $\sigma$ Ref	1.06 0.02 54	1.33* 0.15 62			
Mn (ppm)	$\bar{x}$ $\sigma$ Ref	940 30 17	930 10 20	1280* 70 22	826 2 23	930 - 54
	$\bar{x}$ $\sigma$ Ref	800 10 62				
Mo (ppm)	$\bar{x}$ $\sigma$ Ref	1.90 0.56 22				
Na (%)	$\bar{x}$ $\sigma$ Ref	1.6 - 10	1.44 0.02 17	1.54 0.03 17	1.47 0.02 20	1.54 0.01 23
	$\bar{x}$ $\sigma$ Ref	1.46 - 47	1.66 0.07 54	1.41 0.07 62		
Nb (ppm)	$\bar{x}$ $\sigma$ Ref	15 - 10	21.1 1.3 19	14.4 2.6 22	16.0 0.1 26,51	21 - 46

Nd (ppm)	$\bar{x}$ $\sigma$ Ref	100* - 10	33.8 4.4 22	46.9 2.7 29	35 - 47	42 5 62
Ni (ppm)	$\bar{x}$ $\sigma$ Ref	50 - 10	40.7 0.6 20	56.3 4.7 22	<50 - 29	28 - 46
	$\bar{x}$ $\sigma$ Ref	32.5 - 55	47.0 - 55			
P (ppm)	$\bar{x}$ $\sigma$ Ref	800 - 10	650 60 20	1060 160 22	720 20 50	610 40 54
Pb (ppm)	$\bar{x}$ $\sigma$ Ref	24.5 1.5 22				
Pd (ppb)	$\bar{x}$ $\sigma$ Ref	30 (?) - 10				
Pr (ppm)	$\bar{x}$ $\sigma$ Ref	8.73 1.18 22				
Rb (ppm)	$\bar{x}$ $\sigma$ Ref	67.9* 5.2 11	129 4 20	125 4 29	122 - 46	140 - 47
S (ppm)	$\bar{x}$ $\sigma$ Ref	480 40 20	671 - 48			
Sb (ppb)	$\bar{x}$ $\sigma$ Ref	360 160 11	530 100 14	540 60 29	540 20 38	
Sc (ppm)	$\bar{x}$ $\sigma$ Ref	20 - 10	15.8 0.5 11	19.0 1.6 20	19.7 3.6 22	15.0 0.5 29

	$\bar{x}$ $\sigma$ Ref	14.4 - 47				
Si (%)	$\bar{x}$ $\sigma$ Ref	30.7 - 10	30.9 0.1 17	30.5 0.2 20	31.0 0.2 54	29.4 0.8 62
Sm (ppm)	$\bar{x}$ $\sigma$ Ref	5.18* 0.34 22	9.00 0.24 29	9.03 - 47	7.37 0.14 62	
Sn (ppm)	$\bar{x}$ $\sigma$ Ref	3 - 10	<3.2 - 22	3.02 0.10 40		
Sr (ppm)	$\bar{x}$ $\sigma$ Ref	200 - 10	183 9 16	171 2 16	200 5 20	239 6 22
	$\bar{x}$ $\sigma$ Ref	188 6 23	224 18 29	186 - 46		
Ta (ppm)	$\bar{x}$ $\sigma$ Ref	0.90 0.13 11	1.15 0.06 14	1.41 0.10 29	0.94 - 47	
Tb (ppm)	$\bar{x}$ $\sigma$ Ref	1.35 0.12 11	1.21 0.06 29			
Te (ppb)	$\bar{x}$ $\sigma$ Ref	5.5 2.7 35				
Th (ppm)	$\bar{x}$ $\sigma$ Ref	14.2 0.3 11	11.4 0.8 13	<22 - 22	12.0 0.4 29	12.4 - 47
Ti (ppm)	$\bar{x}$ $\sigma$ Ref	6290 210 17	6200 100 20	4840* 200 22	6000 60 54	5590 40 62

Tm (ppb)	$\bar{x}$ $\sigma$ Ref	720 100 29				
U (ppm)	$\bar{x}$ $\sigma$ Ref	3.13 0.08 13	2.89 0.15 29			
V (ppm)	$\bar{x}$ $\sigma$ Ref	70 - 10	106 4 20	128 4 22	94 2 37	155 15 62
Y (ppm)	$\bar{x}$ $\sigma$ Ref	70 - 10	44.0 6.7 22			
Yb (ppm)	$\bar{x}$ $\sigma$ Ref	7 - 10	5.13 0.57 22	5.59 0.51 29	3.20 - 47	
Zn (ppm)	$\bar{x}$ $\sigma$ Ref	105 3 16	107 2 16	104 5 20	108 8 22	100 1 23
	$\bar{x}$ $\sigma$ Ref	83 12 29	73* - 46	103.4 - 55	106 - 55	
Zr (ppm)	$\bar{x}$ $\sigma$ Ref	500* - 10	299 8 20	245 28 22	264 - 46	

APPENDIX G  
ELEMENTAL CONCENTRATIONS IN SGR-1  
REPORTED BY INDIVIDUAL INVESTIGATORS

ELEMENTAL CONCENTRATIONS IN SGR-1 Reported by Individual Investigators						
Ag (ppb)	$\bar{x}$ $\sigma$ Ref	<100 - 22	19.2 1.2 25			
Al (%)	$\bar{x}$ $\sigma$ Ref	3.83 0.14 20	3.57 0.20 22	3.30 - 47	3.32 0.02 54	3.65 0.10 62
As (ppm)	$\bar{x}$ $\sigma$ Ref	74 1 20	66.2 - 47			
Au (ppb)	$\bar{x}$ $\sigma$ Ref	8.9 0.3 15	10.8 1.8 25			
B (ppm)	$\bar{x}$ $\sigma$ Ref	29.8 1.7 21	58.8 6.4 22	50.4 0.4 62		
Ba (ppm)	$\bar{x}$ $\sigma$ Ref	225* 120 11	328 8 20	322 12 21	361 46 22	333 29 29
	$\bar{x}$ $\sigma$ Ref	310 - 47	286 3 56, 63			
Be (ppm)	$\bar{x}$ $\sigma$ Ref	0.91 0.01 16	<1.0 - 22	0.86 0.08 41		
Bi (ppm)	$\bar{x}$ $\sigma$ Ref	< 1 - 22	1.03 0.10 39			
C (%)	$\bar{x}$ $\sigma$ Ref	27.03 - 48	3.020 $\pm 0.036$ 54			

Ca (%)	$\bar{x}$ $\sigma$ Ref	6.34 0.07 20	5.15* 0.24 22	6.14 0.03 54	5.89 0.05 62	
Cd (ppm)	$\bar{x}$ $\sigma$ Ref	1.03 0.04 62				
Ce (ppm)	$\bar{x}$ $\sigma$ Ref	31.2 2.1 11	58.9 5.3 22	41.6 3.7 29	38 - 47	
Cl (ppm)	$\bar{x}$ $\sigma$ Ref	44 3 20	22.1 - 50	21 4 62		
Co (ppm)	$\bar{x}$ $\sigma$ Ref	10.3 0.5 11	13.2 0.8 21	9.96 0.43 22	12.8 0.1 29	7.73* - 47
Cr (ppm)	$\bar{x}$ $\sigma$ Ref	32.5 3.2 11	33.5 4.7 21	20.9 3.2 22	30 - 47	
Cs (ppm)	$\bar{x}$ $\sigma$ Ref	4.61 0.36 11	5.33 0.23 29	5.32 - 47		
Cu (ppm)	$\bar{x}$ $\sigma$ Ref	64.2 0.7 16	59.2 0.7 16	69.4 5.1 21	<46 - 22	68.4 1.5 23
	$\bar{x}$ $\sigma$ Ref	65.8 - 55	66.5 - 55			
Dy (ppm)	$\bar{x}$ $\sigma$ Ref	<3.16 - 22				
Er (ppm)	$\bar{x}$ $\sigma$ Ref	< 2.15 - 22				

Eu (ppb)	$\bar{x}$ $\sigma$ Ref	520 74 11	<1000 - 22	720 160 29	530 - 47	
Fe (%)	$\bar{x}$ $\sigma$ Ref	1.88 0.09 11	2.24 0.04 20	2.25 0.36 22	2.12 0.08 29	1.99 - 47
	$\bar{x}$ $\sigma$ Ref	2.04 0.02 54	2.00 0.12 62			
Ga (ppm)	$\bar{x}$ $\sigma$ Ref	12.2 2.7 21	5.52 0.33 22	8.6 - 55		
Gd (ppm)	$\bar{x}$ $\sigma$ Ref	<3.2 - 22	1.69 0.04 62			
H (%)	$\bar{x}$ $\sigma$ Ref	3.01 0.02 62				
Hf (ppm)	$\bar{x}$ $\sigma$ Ref	1.31 0.26 11	1.41 0.05 14	1.34 0.06 29	1.37 - 47	
Ho (ppm)	$\bar{x}$ $\sigma$ Ref	<1.0 - 22				
K (%)	$\bar{x}$ $\sigma$ Ref	1.42 0.04 20	> 1.0 - 22	1.33 0.01 23	1.61 - 47	1.50 0.03 54
	$\bar{x}$ $\sigma$ Ref	1.29 0.08 62				
La (ppm)	$\bar{x}$ $\sigma$ Ref	31.7 4.8 22	18.8 - 47			

Li (ppm)	$\bar{x}$ $\sigma$ Ref	123 2 16	131 1 23			
Lu (ppb)	$\bar{x}$ $\sigma$ Ref	200 - 47				
Mg (%)	$\bar{x}$ $\sigma$ Ref	2.71 0.21 20	3.77* 0.19 22	2.60 0.02 23	2.76 0.02 54	3.11* 0.20 62
Mn (ppm)	$\bar{x}$ $\sigma$ Ref	330 10 20	297 7 21	302 31 22	250 1 23	300 - 54
	$\bar{x}$ $\sigma$ Ref	230 10 62				
Mo (ppm)	$\bar{x}$ $\sigma$ Ref	36.1 3.3 22	35.7 - 29			
Na (%)	$\bar{x}$ $\sigma$ Ref	1.97 0.04 20	2.24 0.01 23	2.17 - 47	2.55 0.08 54	1.96 0.11 62
Nb (ppm)	$\bar{x}$ $\sigma$ Ref	5.31 0.91 22	5.3 - 26, 51	3 - 46		
Nd (ppm)	$\bar{x}$ $\sigma$ Ref	37.0 1.9 22	15.8 0.8 29	16 - 47	10 3 62	
Ni (ppm)	$\bar{x}$ $\sigma$ Ref	39 2 20	31.4 1.8 21	32.3 1.2 22	34 4 29	21 - 46
	$\bar{x}$ $\sigma$ Ref	27.9 - 55	35 - 55			

P (ppm)	$\bar{x}$ $\sigma$ Ref	1300 100 20	1780 150 22	1480 10 50	1200 - 54	
Pb (ppm)	$\bar{x}$ $\sigma$ Ref	41.2 3.9 21	32.0 1.9 22			
Pr (ppm)	$\bar{x}$ $\sigma$ Ref	6.86 0.55 22				
Rb (ppm)	$\bar{x}$ $\sigma$ Ref	66.5* 9.1 11	92 1 20	81.8 2.4 29	93 - 46	78 - 47
S (%)	$\bar{x}$ $\sigma$ Ref	1.89 0.02 20	1.61 - 48			
Sb (ppm)	$\bar{x}$ $\sigma$ Ref	3.05 0.36 11	3.70 0.11 14	3.00 0.32 29	3.74 0.20 38	3.4 - 47
Sc (ppm)	$\bar{x}$ $\sigma$ Ref	4.78 0.19 11	<5-11* - 20	3.86 0.36 20	5.03 0.17 29	3.34 - 47
Se (ppm)	$\bar{x}$ $\sigma$ Ref	3.0 0.3 29				
Si (%)	$\bar{x}$ $\sigma$ Ref	13.2 0.3 20	14.4 0.7 22	13.0 0.1 54	13.2 0.9 62	
Sm (ppm)	$\bar{x}$ $\sigma$ Ref	<4.6 - 22	2.81 0.07 29	2.87 - 47	2.31 0.03 62	
Sn (ppm)	$\bar{x}$ $\sigma$ Ref	<3.2 - 22	1.58 0.05 40			

Sr (ppm)	$\bar{x}$ $\sigma$ Ref	433 16 16	417 2 16	445 6 20	316 23 21	558 38 22
	$\bar{x}$ $\sigma$ Ref	332 10 23	436 34 29	406 - 46		
Ta (ppb)	$\bar{x}$ $\sigma$ Ref	220* 50 11	570 240 14	510 70 29		
Tb (ppb)	$\bar{x}$ $\sigma$ Ref	340 140 11	350 50 29	430 - 47		
Th (ppm)	$\bar{x}$ $\sigma$ Ref	4.86 0.23 11	7.66* 1.90 13	<22 - 22	4.91 0.15 29	4.9 - 47
Ti (ppm)	$\bar{x}$ $\sigma$ Ref	2100 100 20	1700 200 21	690* 60 22	1600 - 54	1380 20 62
Tm (ppb)	$\bar{x}$ $\sigma$ Ref	180 30 29				
U (ppm)	$\bar{x}$ $\sigma$ Ref	5.60 0.23 13	5.76 0.54 29			
V (ppm)	$\bar{x}$ $\sigma$ Ref	134 3 20	117 8 21	122 15 22	128 10 37	140 15 62
Y (ppm)	$\bar{x}$ $\sigma$ Ref	12.7 0.7 22				
Yb (ppm)	$\bar{x}$ $\sigma$ Ref	1.17 0.20 22	2.45 0.23 29	0.82 - 47		

Zn (ppm)	$\bar{x}$	81.6	85.3	96	66.4	72.1
	$\sigma$	1.5	1.0	10	4.0	0.4
	Ref	16	16	20	22	23
	$\bar{x}$	78	37 <sup>*</sup>	82.2	81.0	
	$\sigma$	11	-	-	-	
	Ref	29	46	55	55	
Zr (ppm)	$\bar{x}$	59	52.3	105 <sup>*</sup>	63	
	$\sigma$	5	8.4	13	-	
	Ref	20	21	22	46	



APPENDIX H  
ELEMENTAL CONCENTRATIONS IN STM-1  
REPORTED BY INDIVIDUAL INVESTIGATORS

## ELEMENTAL CONCENTRATIONS IN STM-1

Reported by Individual Investigators

Ag (ppb)	$\bar{x}$ $\sigma$ Ref	395 26 22	8.0 1.8 25	78 5 33		
Al (%)	$\bar{x}$ $\sigma$ Ref	9.84 - 5	9.91 0.08 20	9.67 0.64 22	9.65 - 47	9.87 0.03 54
As (ppm)	$\bar{x}$ $\sigma$ Ref	<5 - 20				
Au (ppb)	$\bar{x}$ $\sigma$ Ref	0.43 0.12 15	0.36 0.07 25			
B (ppm)	$\bar{x}$ $\sigma$ Ref	<10 - 22				
Ba (ppm)	$\bar{x}$ $\sigma$ Ref	484 94 5	551 59 11	612 7 20	771 109 22	614 45 29
	$\bar{x}$ $\sigma$ Ref	620 - 47	584 1 56, 63			
Be (ppm)	$\bar{x}$ $\sigma$ Ref	9.0 3.6 5	9.02 0.12 16	11.85 0.50 22	8.75 0.34 41	
Bi (ppb)	$\bar{x}$ $\sigma$ Ref	<1000 - 22	110 29 39	250 62 64		
C (ppm)	$\bar{x}$ $\sigma$ Ref	30 - 5	61 - 48	100 10 54		

Ca (%)	$\bar{x}$ $\sigma$ Ref	0.83 - 5	0.71 0.01 18	0.74 0.01 18	0.82 0.09 20	1.78* 0.18 22
	$\bar{x}$ $\sigma$ Ref	0.829 0.007 54				
Ce (ppm)	$\bar{x}$ $\sigma$ Ref	530* 180 5	73.1* 10.2 11	354 14 22	226 19 27	291 26 29
	$\bar{x}$ $\sigma$ Ref	273 - 47				
Cl (ppm)	$\bar{x}$ $\sigma$ Ref	500 - 5	420 40 20	452 - 50	431 - 61	
Co (ppm)	$\bar{x}$ $\sigma$ Ref	0.325 0.056 11	7.5 1.7 18	11.2 2.4 18	<1.0 - 22	1.10 0.05 29
	$\bar{x}$ $\sigma$ Ref	0.99 - 47				
Cr (ppm)	$\bar{x}$ $\sigma$ Ref	2 1 5	74.1* 3.6 11	2.54 0.34 22	3.4 1.1 44	8.8* - 47
	$\bar{x}$ $\sigma$ Ref	1.4 0.1 57				
Cs (ppm)	$\bar{x}$ $\sigma$ Ref	1.47 0.11 11	1.48 0.07 29	1.64 - 47		
Cu (ppm)	$\bar{x}$ $\sigma$ Ref	3 1 5	4.78 0.91 16	3.3 0.6 18	5.8 0.4 18	<1+2.2 - 22
	$\bar{x}$ $\sigma$ Ref	6 1 23	1.0 - 55	7* - 55	2.0 0.1 59	

Dy (ppm)	$\bar{x}$ $\sigma$ Ref	<3.1 - 22	7.8 0.4 27			
Er (ppm)	$\bar{x}$ $\sigma$ Ref	<2.15 - 22	4.4 0.2 27			
Eu (ppm)	$\bar{x}$ $\sigma$ Ref	4.03 0.05 11	3.86 0.12 22	3.00 0.13 27	3.70 0.20 29	3.52 - 47
F (ppm)	$\bar{x}$ $\sigma$ Ref	1000 - 5	900 14 16			
Fe (%)	$\bar{x}$ $\sigma$ Ref	3.63 - 5	3.38 0.07 11	3.59 0.07 18	3.59 0.02 18	3.75 0.01 20
	$\bar{x}$ $\sigma$ Ref	3.88 0.38 22	3.75 0.09 29	3.57 - 47	3.61 0.02 54	
Ga (ppm)	$\bar{x}$ $\sigma$ Ref	36 7 5	64.3* 4.3 22	37.0 - 55	38 - 59	
Gd (ppm)	$\bar{x}$ $\sigma$ Ref	<3.2 - 22	8.4 1.6 27	13.8 1.1 29		
Ge (ppm)	$\bar{x}$ $\sigma$ Ref	1.43 0.02 52	1.3 - 52			
Hf (ppm)	$\bar{x}$ $\sigma$ Ref	26.4 0.5 11	28.9 1.6 14	27.2 1.3 29	24.8 - 47	
Ho (ppm)	$\bar{x}$ $\sigma$ Ref	1.7 0.2 27				

In (ppb)	$\bar{x}$ $\sigma$ Ref	87 - 42				
K (%)	$\bar{x}$ $\sigma$ Ref	3.54 - 5	3.57 0.01 18	3.60 0.03 18	3.54 0.01 20	5.19* 0.30 22
	$\bar{x}$ $\sigma$ Ref	3.51 0.01 23	4.40* - 47	3.68 0.08 54		
La (ppm)	$\bar{x}$ $\sigma$ Ref	190 60 5	197 5 22	140 6 27	162 - 47	
Li (ppm)	$\bar{x}$ $\sigma$ Ref	32.3 1.7 16	27.2 0.9 18	20.0 0.6 18	36.1 0.4 23	
Lu (ppb)	$\bar{x}$ $\sigma$ Ref	650 30 27	660 - 47			
Mg (ppm)	$\bar{x}$ $\sigma$ Ref	600 - 5	400 100 18	500 100 18	2100* 500 20	1030* 50 22
	$\bar{x}$ $\sigma$ Ref	595 11 23	660 60 54			
Mn (ppm)	$\bar{x}$ $\sigma$ Ref	1600 200 5	1700 100 18	1700 100 18	1960 10 20	2460* 40 22
	$\bar{x}$ $\sigma$ Ref	1570 5 23	1800 - 54			
Mo (ppm)	$\bar{x}$ $\sigma$ Ref	6 3 5	7.9 2.2 22	5.2 - 29	4.98 0.18 32	4.4 0.3 65

Na (%)	$\bar{x}$	6.68	6.64	6.39	6.62	6.48
	$\sigma$	-	0.03	0.06	0.10	0.01
	Ref	5	18	18	20	23
	$\bar{x}$	6.81	6.68			
	$\sigma$	-	0.19			
	Ref	47	54			
Nb (ppm)	$\bar{x}$	300	189	262	255	
	$\sigma$	30	22	10	-	
	Ref	5	22	26, 51	46	
Nd (ppm)	$\bar{x}$	55.7	75.5	79.0	85	
	$\sigma$	7.3	3.6	9.0	--	
	Ref	22	27	29	47	
Ni (ppm)	$\bar{x}$	2	<4-8	1.65	<50	0.5
	$\sigma$	1	-	0.21	-	-
	Ref	5	20	22	29	46
	$\bar{x}$	1.7	3			
	$\sigma$	-	-			
	Ref	55	55			
P (ppm)	$\bar{x}$	700	700	730	740	700
	$\sigma$	-	40	110	10	70
	Ref	5	20	22	50	54
	$\bar{x}$	1820*				
	$\sigma$	-				
	Ref	58				
Pb (ppm)	$\bar{x}$	16	17.7			
	$\sigma$	7	0.93			
	Ref	5	22			
Pr (ppm)	$\bar{x}$	19.4				
	$\sigma$	0.3				
	Ref	22				
Rb (ppm)	$\bar{x}$	56.0*	113	120	129	130
	$\sigma$	3.4	1	3	-	-
	Ref	11	20	29	46	52
S (ppm)	$\bar{x}$	<100	<50	22		
	$\sigma$	-	-	-		
	Ref	5	20	48		

Sb (ppm)	$\bar{x}$	1.88	1.67	1.66	1.65	1.6
	$\sigma$	0.05	0.06	0.18	0.08	-
	Ref	11	14	29	38	47
Sc (ppb)	$\bar{x}$	675	<5000	680	680	
	$\sigma$	21	-	20	-	
	Ref	11	20	29	47	
Se (ppb)	$\bar{x}$	10				
	$\sigma$	-				
	Ref	60				
Si (%)	$\bar{x}$	27.8	28.1	27.3	28.0	
	$\sigma$	-	0.1	2.4	0.1	
	Ref	5	20	22	54	
Sm (ppm)	$\bar{x}$	15.8	11.6	14.2	19.3	
	$\sigma$	0.7	0.3	0.5	-	
	Ref	22	27	29	47	
Sn (ppm)	$\bar{x}$	12	11.2	6.9		
	$\sigma$	1	0.7	1.0		
	Ref	5	22	40		
Sr (ppm)	$\bar{x}$	770	717	673	711	843
	$\sigma$	260	11	2	7	41
	Ref	5	16	16	20	22
	$\bar{x}$	609	735	765		
	$\sigma$	16	58	-		
	Ref	23	29	46		
Ta (ppm)	$\bar{x}$	18.0	17.3	7.9*	20.5	17.3
	$\sigma$	0.5	0.5	0.6	0.4	-
	Ref	11	14	25	29	47
Tb (ppm)	$\bar{x}$	2.10	1.38	1.57		
	$\sigma$	0.03	0.09	0.15		
	Ref	11	27	29		
Te (ppb)	$\bar{x}$	< 5				
	$\sigma$	-				
	Ref	35				

Th (ppm)	$\bar{x}$ $\sigma$ Ref	38.8 0.6 11	26.6 1.2 13	<22 - 22	31.0 1.0 29	35.5 - 47
Ti (ppm)	$\bar{x}$ $\sigma$ Ref	950 180 5	960 60 20	900 50 22	840 60 54	
U (ppm)	$\bar{x}$ $\sigma$ Ref	9.10 0.14 13	9.15 0.59 29			
V (ppm)	$\bar{x}$ $\sigma$ Ref	<10 - 20	2.0 0.2 37			
Y (ppm)	$\bar{x}$ $\sigma$ Ref	57 11 5	48.4 4.2 22			
Yb (ppm)	$\bar{x}$ $\sigma$ Ref	4 1 5	6.67* 0.35 22	4.26 0.23 27	4.59 0.42 29	
Zn (ppm)	$\bar{x}$ $\sigma$ Ref	245 2 16	242 1 16	212 2 18	277 13 18	260 8 20
	$\bar{x}$ $\sigma$ Ref	177* 5 22	244 2 23	236 34 29	186* - 46	238.9 - 55
	$\bar{x}$ $\sigma$ Ref	243.5 - 55	209 - 59			
Zr (ppm)	$\bar{x}$ $\sigma$ Ref	1200 200 5	1230 10 20	> 680 - 22	1350 - 46	