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1992 compilation of analytical data for rare-earth elements, scandium, yttrium, zirconium and hafnium in twenty-six GSJ reference samples

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Abstract: Analytical data for fourteen rare-earth elements, scandium, yttrium, zirconium and hafnium, received by May 1992, have been compiled on twenty-six GSJ (Geological Survey of Japan) reference samples. Seventeen of them are "Igneous rock series" and nine are "Sedimentary rock series". The reported data including personal communication were evaluated under the consideration on analytical methods and geochemical evidences. No significant difference has been observed between the values obtained by the different analytical methods. Based on the selected available data, 1992 compilation values were tabulated.

1. Introduction

The Geological Survey of Japan (GSJ) has issued 26 geochemical reference samples which have been analyzed for major and minor elements, isotopic compositions and radiometric ages by many research laboratories worldwide. Recent compilations of the analytical data for the 17 samples of the "Igneous rock series" have been published by Ando *et al.* (1989) and Govindaraju (1989). However, the recommended or consensus values of 14 rare-earth elements (REE ; Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Tm and Yb), scandium (Sc), yttrium (Y), zirconium (Zr) and hafnium (Hf) have been given only for about a half of the samples, and the individual data reported were not shown. As for the 9 samples of the "Sedimentary rock series", no recommended or consensus values for the elements have yet been published.

Since the REE geochemistry of silicate rocks and minerals has become important for petrogenetic studies, the elements have been analyzed frequently by several methods including ICP, ICP-MS and INAA. In these analyses, the reliability of the analytical data were often confirmed by the simultaneous analysis of the standard materials having the known concentrations of neccessary elements.

In this paper, all analytical data received by May 1992 for 14 REE, Sc, Y, Zr and Hf were evaluated, and a set of the 1992 compilation values of the elements is presented for the 26 GSJ reference samples.

2. Note on the samples

Brief description including sampling location

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Keywords: rock reference sample, compilation value, rare-earth element, scandium, yttrium, zirconium, hafnium

Table 1 List of 26 GSJ reference samples.

Sample name (year of issue)		Locality
'Igneous rock series'		
JA-1	Andesite(1982)	Hakone volcano, Quaternary, Manazuru-machi, Kanagawa Prefecture.
JA-2	Andesite(1985)	Goshikidai sanukitoid, 13Ma, Sakaide, Kagawa prefecture.
JA-3	Andesite(1986)	Asama volcano erupted in 1783, Tsumagoi-mura, Gunma Prefecture.
JB-1	Basalt(1968)	Kitamatsuura basalt, 7.6Ma, Sasebo, Nagasaki Prefecture.
JB-1a	Basalt(1984)	Replacement sample of JB-1.
JB-2	Basalt(1982)	Oshima volcano erupted in 1950-1951, Oshima, Tokyo.
JB-3	Basalt(1983)	Fuji volcano erupted in 864, Narusawa-mura, Yamanashi Prefecture.
JF-1	Feldspar(1985)	Ohira feldspar, Nagiso-machi, Nagano Prefecture.
JF-2	Feldspar(1986)	Kurosaka feldspar, Kurosaka, Ibaraki prefecture.
JG-1	Granodiorite(1967)	Sori granodiorite, 85Ma, Azuma-mura, Gunma Prefecture.
JG-1a	Granodiorite(1984)	Replacement sample of JG-1.
JG-2	Granite(1985)	Naegi granite, Cretaceous, Hirukawa-mura, Gifu Prefecture.
JG-3	Granite(1986)	Mitoya granodiorite, Cretaceous-Paleogene, Mitoya-cho, Simane Prefecture.
JGb-1	Gabbro(1983)	Utsushigatake, 86Ma, Funehiki-machi, Fukushima Prefecture.
JP-1	Peridotite(1984)	Horoman peridotite, Horoman, Hokkaido.
JR-1	Rhyolite(1982)	Wada Toge obsidian, 0.8Ma, Wada-mura, Nagano Prefecture.
JR-2	Rhyolite(1983)	Wada Toge obsidian, Shimosuwa-machi, Nagano Prefecture.
'Sedimentary rock series'		
JCh-1	Chert(1989)	Ashio chert, Triassic ?, Ashikaga-shi, Tochigi Prefecture.
JDo-1	Dolomite(1987)	Kuzuu dolomite, Permian, Kuzuu-machi, Tochigi Prefecture.
JLk-1	Lake sediment(1987)	Lake Biwa, fresh water lake sediment, Shiga Prefecture.
JLs-1	Limestone(1987)	Garo limestone, Triassic, Kamiiso-cho Hokkaido.
JSd-1	Stream sediment(1988)	Composite sample of northern Ibaraki Prefecture.
JSd-2	Stream sediment(1989)	Composite sample of eastern Ibaraki Prefecture.
JSd-3	Stream sediment(1989)	Composite sample of central Ibaraki Prefecture.
JSl-1	Slate(1988)	Toyama clay slate, permian, Toyama-cho, Miyagi Prefecture.
JSl-2	Slate(1989)	Toyama clay slate, permian, Okatsu-cho, Miyagi Prefecture.

of 26 GSJ reference samples are shown in Table 1. Recent compilation values of major and minor elements for the 17 samples of "Igneous rock series" have been reported (Ando *et al.*, 1989 ; Govindaraju, 1989). For the 9 reference samples of "Sedimentary rock series", analytical results of major and some minor elements are shown in the report of Terashima *et al.* (1990). In addition, the detailed description and the preliminary compilation on the three samples JDo-1, JLk-1 and JLs-1 have been reported (Ando *et al.*, 1990).

The older four reference samples, JG-1, JB-1, JB-1a and JA-1, have already been exhausted. JG-1a and JB-1a are replacement samples for JG-1 and JB-1, respectively. In order to replace JB-1 again, JB-1b is under consideration to be prepared from the same rock chip from which JB-1 and JB-1a were made.

3. Evaluation of the reported data

We have collected the analytical data from 235 laboratories worldwide (126 publications and 109 personal communications) on 14 REE, Sc, Y, Zr and Hf of 26 GSJ reference samples. All reported data are tabulated in an appendix (Table A-1 to 26) together with references. Analytical method codes using in the appendix are given in Table 2.

Recommended values for all elements were generally proposed by calculating the mean, after eliminating data lying out of the range two times greater than the standard deviation (Ando *et al.*, 1989 ; Gladney and Roelandts, 1990). However, this method gives faulty values for several elements in such cases where significant errors are due to incomplete decomposition, interferences from various elements and so on (Terashima *et al.*, 1992). For example, the analysis of Zr in JG-1 by the ICP method with acids digestion gave clearly lower values, compared to the results by the same method with alkali fusion or most other methods (Fig. 1). For this reason, the analyses for Zr in JG-1 carried out by the ICP with acids digestion are excluded from statistical calculation.

Table 2 Code for analytical methods.

Code	Method
Chrom.	Chromatography
EX-XRF	Energy dispersive X-ray fluorescence
GFAAS	Graphite furnace atomic absorption spectrometry
ICP	Inductively coupled plasma atomic emission spectrometry
ICP-MS	Inductively coupled plasma mass spectrometry
IDMS	Isotope dilution mass spectrometry
INAA	Instrumental neutron activation analysis
L-Chrom.	Liquid chromatography
MS	Mass spectrometry
NAA	Neutron activation analysis
OES	Optical emission spectrometry
PAA	Photon activation analysis
Photom.	Absorption spectrophotometry
RNAA	Radiochemical neutron activation analysis
SSMS	Spark-source mass spectrometry
XRF	X-ray fluorescence

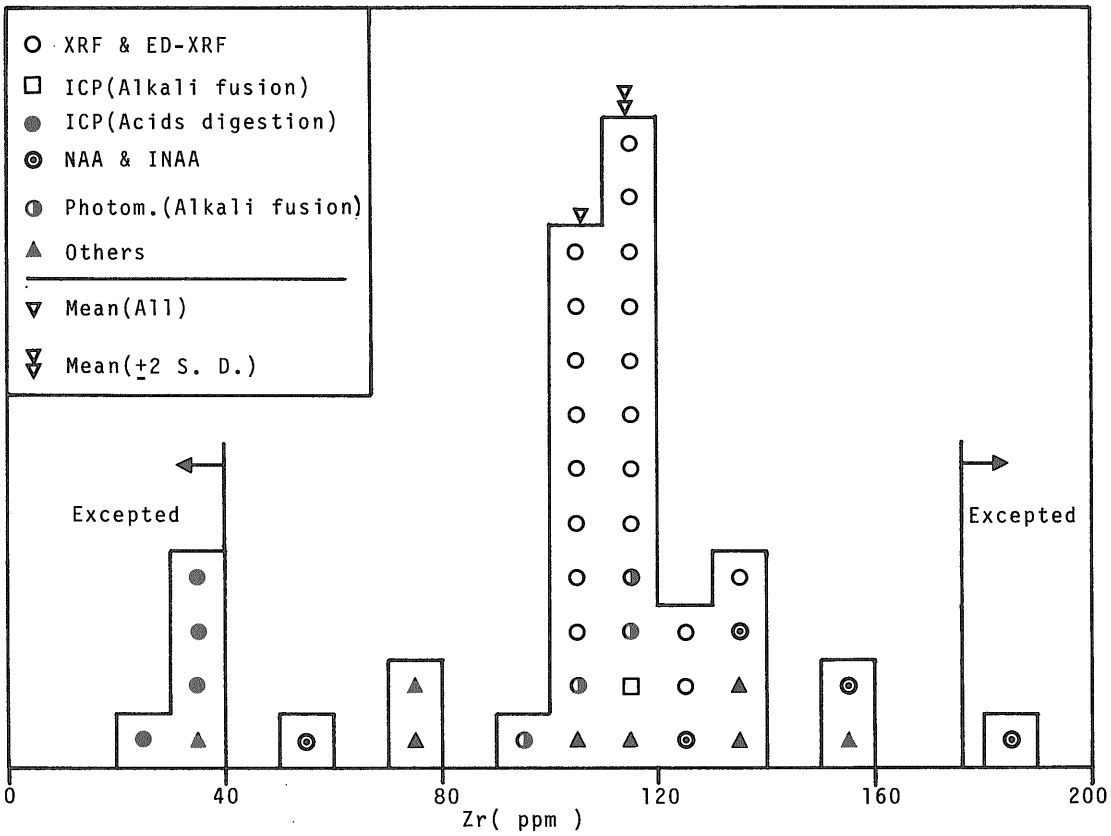

Figure 1 Frequency diagram of zirconium in JG-1 analyzed by different methods, indicating a difference between mean values for all samples and for the samples within two standard deviation.

The 1992 compilation values listed in Table 3 are the mean and standard deviation which are calculated when the number of available data is more than four after the elimination described above. When the number is less than three, only the range or individual datum is presented. In the special cases such as Ce and Y in JP-1, only the range of data is presented, even though the number of available data is more than four, because the data were considered to be derived from the group of unreasonably high values.

In order to examine the variation among analytical methods, analytical results for six selected elements in the five reference samples are listed in Table 4. Very small deviation among the mean values of the methods suggests that the data are highly accurate.

4. Presentation of the recommended values of the reference samples

In the 1992 compilation values, the mean values calculated from the available data of more than five are considered to be the recommended values. The mean value calculated from less than four data is proposed as the preferable value.

On the other hand, there have been no precise data for rare earth elements in JP-1, because of the difficulties of analysis for the extremely small concentrations present. However, very recently Watkins and le Roex (1992) analyzed the elements for various GSJ reference rocks including JP-1 by high performance ion chromatography (HPIC), in which the data for

Table 3 1992 compilation values for REE, Sc, Y, Zr and Hf in 26 GSJ geochemical reference samples (in ppm). Mean values are given with standard deviation. Number of data available is indicated in parentheses. "n.g." meas "not given".

	JA-1 Andesite	JA-2 Andesite	JA-3 Andesite	JB-1 Basalt	JB-1a Basalt	JB-2 Basalt	JB-3 Basalt	JF-1 Feldspar	JF-2 Feldspar	JG-1 Granodiorite
Sc	28.4±2.6(25)	19.6±1.6(16)	21.8±3.3(11)	27.5±2.0(31)	27.9±1.4(14)	54.4±4.6(30)	33.3±2.0(19)	0.22±0.03(10)	0.09±0.02(7)	6.5±0.8(25)
Y	30.6±3.0(35)	18.1±2.8(20)	21.3±3.2(15)	24.4±3.7(33)	24.0±2.7(25)	24.9±3.2(31)	27.0±2.8(29)	3.0±0.7(8)	(0.2)~12(11)	28.5±5.1(25)
Zr	88.3±6.6(31)	119±12(22)	119±5(16)	143±14(44)	146±8(26)	51.4±5.2(31)	98.3±7.7(28)	39.1±4.8(16)	6.6±2.3(8)	114±20(35)
La	5.1±0.7(33)	16.3±0.9(20)	9.0±1.0(13)	37.9±2.4(47)	38.1±1.9(22)	2.4±0.2(36)	8.9±0.8(27)	2.9±0.4(13)	0.62±0.07(4)	22.4±2.7(34)
Ce	13.5±1.2(34)	32.7±2.9(21)	23.3±2.2(13)	66.7±3.1(55)	66.1±5.3(21)	6.8±1.0(36)	21.5±1.6(28)	4.1±0.5(15)	1.2±0.6(5)	45.9±4.7(40)
Pr	2.0±0.3(12)	4.4±0.9(6)	2.3±0.3(6)	7.0±0.8(15)	7.3±0.8(5)	0.96±0.28(10)	3.4±0.3(10)	0.37~0.7(3)	n.g.	5.2±0.5(10)
Nd	11.0±1.9(27)	13.8±1.3(15)	12.3±1.0(9)	26.7±1.8(38)	25.5±2.1(15)	6.7±0.7(25)	15.4±2.0(22)	1.4±0.1(7)	(0.2), <10(2)	19.5±2.1(26)
Sm	3.5±0.3(36)	3.1±0.4(20)	3.1±0.2(12)	5.1±0.4(46)	5.1±0.4(18)	2.3±0.2(36)	4.3±0.2(25)	0.45±0.13(13)	0.08±0.03(6)	4.7±0.5(36)
Eu	1.2±0.1(34)	0.94±0.11(17)	0.85±0.08(9)	1.5±0.1(51)	1.5±0.1(16)	0.86±0.06(33)	1.3±0.1(22)	0.87±0.09(11)	0.62±0.04(8)	0.74±0.11(34)
Gd	4.4±0.4(22)	3.1±0.5(8)	2.9±0.7(5)	4.9±0.5(26)	4.5±0.4(7)	3.3±0.3(14)	4.5±0.3(11)	0.73~1.85(3)	(0.7)	4.2±0.5(17)
Tb	0.77±0.13(17)	0.42±0.10(7)	0.52±0.14(6)	0.84±0.19(29)	0.69±0.08(10)	0.62±0.09(17)	0.75±0.08(17)	0.08±0.01(8)	0.014(1)	0.83±0.27(18)
Dy	4.5±0.7(25)	3.0±0.6(9)	3.0±0.5(7)	4.1±0.2(22)	4.2±0.4(10)	3.7±0.6(17)	4.6±0.4(12)	0.37±0.10(5)	0.017, 0.035(2)	3.9±0.9(16)
Ho	0.9±0.1(16)	0.46±0.16(6)	0.48±0.15(5)	0.80±0.09(16)	0.64±0.09(6)	0.81±0.11(10)	0.79±0.15(11)	0.05~0.107(3)	0.021, 0.021(2)	0.83±0.23(12)
Er	3.0±0.3(21)	1.4±0.5(8)	1.5±0.5(6)	2.3±0.2(24)	2.2±0.6(8)	2.6±0.3(16)	2.6±0.2(11)	0.09~0.37(3)	n.g.	1.8±0.4(11)
Tm	0.48±0.06(12)	0.27±0.06(4)	0.09~0.53(3)	0.35±0.06(15)	0.31±0.06(5)	0.45±0.07(6)	0.41±0.04(9)	0.04(1)	n.g.	0.44±0.13(11)
Yb	2.9±0.3(31)	1.7±0.2(16)	2.2±0.3(12)	2.2±0.2(45)	2.1±0.2(18)	2.5±0.2(29)	2.6±0.4(24)	0.34±0.07(10)	0.039~0.2(3)	2.5±0.7(30)
Lu	0.47±0.06(31)	0.27±0.03(14)	0.32±0.07(10)	0.31±0.03(43)	0.32±0.05(15)	0.39±0.03(28)	0.39±0.05(21)	0.05±0.01(10)	0.006~0.025(4)	0.39±0.11(27)
Hf	2.4±0.2(17)	2.9±0.2(12)	3.4±0.3(9)	3.4±0.3(22)	3.5±0.2(13)	1.4±0.2(19)	2.7±0.1(15)	1.2±0.1(11)	0.19±0.08(6)	3.8±0.6(16)

Table 3 Continued

	JG-1a Granodiorite	JG-2 Granite	JG-3 Granodiorite	JGb-1 Gabbro	JP-1 Peridotite	JR-1 Rhyolite	JR-2 Rhyolite	JCh-1 Chert	JDo-1 Dolomite	JLk-1 Lake sediment
Sc	6.3±0.5(13)	2.5±0.3(13)	8.9±0.9(8)	36.6±3.7(18)	7.1±0.7(12)	5.2±0.5(20)	5.6±1.0(16)	0.85±0.23(6)	0.14±0.03(8)	16.0±1.2(14)
Y	31.6±3.1(22)	88.2±8.1(17)	17.2±1.7(14)	10.8±2.4(26)	0.4～4(7)	45.4±5.4(31)	51.3±6.1(27)	1.8±0.3(8)	11.2±1.4(8)	40.8±5.1(10)
Zr	121±15(22)	101±11(18)	143±8(15)	33.5±7.4(27)	6.3±2.1(13)	101±6(29)	97.2±5.9(24)	11.7±3.9(7)	5.3±2.5(4)	146±15(9)
La	21.8±2.0(20)	20.1±2.8(19)	20.7±2.3(14)	3.7±0.4(23)	0.08±0.05(4)	19.7±1.8(32)	16.9±1.4(22)	1.5±0.5(4)	7.9±0.5(10)	41.3±2.1(12)
Ce	45.2±5.4(22)	49.5±4.1(18)	40.1±2.9(14)	7.9±1.7(24)	0.57～13(7)	47.1±4.4(32)	38.8±3.9(27)	4.7±1.8(8)	2.5±0.5(10)	89.1±8.1(14)
Pr	6.1±0.7(5)	6.0±1.1(6)	4.7±1.4(6)	1.1±0.1(9)	0.1, <0.34(2)	5.6±0.4(10)	4.9±0.7(9)	0.53(1)	0.2～1.22(3)	8.4±1.8(6)
Nd	21.0±3.0(17)	25.8±2.7(9)	16.8±0.88(11)	5.7±0.7(15)	0.3～<10(3)	23.5±3.1(24)	21.1±2.7(17)	1.7±0.2(4)	5.3±0.6(7)	35.4±3.0(6)
Sm	4.8±1.4(18)	7.7±1.2(15)	3.4±0.5(14)	1.5±0.2(20)	0.02±0.01(4)	6.1±0.8(28)	5.7±0.6(21)	0.37±0.08(4)	0.84±0.05(7)	8.0±0.6(11)
Eu	0.72±0.05(16)	0.09±0.04(12)	0.91±0.08(12)	0.63±0.05(20)	0.032±0.008(4)	0.30±0.04(23)	0.15±0.06(20)	0.063～0.1(3)	0.19±0.04(8)	1.4±0.1(9)
Gd	3.8±0.4(6)	7.1±1.9(4)	2.9±0.3(5)	1.6±0.2(10)	2.4, <6.8(2)	5.2±0.8(13)	6.3±0.7(9)	0.8(1)	<0.98, 1.8(2)	4.9～6.6(3)
Tb	0.79±0.12(10)	1.5±0.3(6)	0.46±0.05(8)	0.31±0.07(13)	0.012, 0.019(2)	1.0±0.2(13)	1.2±0.1(12)	0.033～0.19(3)	0.12±0.03(7)	1.3±0.1(7)
Dy	4.2±0.4(9)	11.5±1.0(6)	2.6±0.6(8)	1.5±0.4(14)	0.021, 0.027(2)	5.8±1.0(17)	6.9±1.0(12)	0.37～0.4(3)	0.96±0.08(4)	6.5±0.6(6)
Ho	0.76±0.13(7)	1.4±0.4(4)	0.36±0.15(5)	0.32±0.05(10)	0.018, 0.018(2)	1.1±0.1(10)	1.3±0.3(9)	0.095, 0.16(2)	0.164(1)	1.20, 1.52(2)
Er	2.4±0.6(7)	5.0±1.4(5)	1.4±0.4(6)	1.1±0.2(11)	n.g.	3.8±0.4(11)	4.5±0.6(9)	0.184, 0.33(2)	n.g.	3.5±0.4(5)
Tm	0.39±0.09(5)	0.3, 0.99(2)	0.2～0.27(3)	0.15±0.03(8)	<0.041(1)	0.67±0.07(7)	0.74±0.11(7)	<0.04(1)	0.058(1)	0.53, 0.66(2)
Yb	2.7±0.4(16)	7.3±1.2(9)	1.9±0.3(11)	0.97±0.12(18)	0.017～0.02(3)	4.5±0.5(23)	5.5±0.5(18)	0.14±0.07(4)	0.36±0.11(7)	4.1±0.3(8)
Lu	0.44±0.09(15)	1.2±0.1(9)	0.27±0.05(11)	0.15±0.02(19)	0.031～0.051(3)	0.71±0.08(22)	0.90±0.08(17)	0.035, 0.039(2)	0.05±0.01(6)	0.60±0.07(8)
Hf	3.8±0.2(12)	5.4±0.5(9)	4.3±0.4(10)	0.9±0.2(12)	0.21±0.07(7)	4.7±0.3(14)	5.2±0.2(11)	0.16, 0.221(2)	0.0169～0.604(3)	3.9±0.4(9)

Table 3 Continued

	JLs-1 Limestone	JSd-1 Stream sediment	JSd-2 Stream sediment	JSd-3 Stream sediment	JSl-1 Slate	JSl-2 Slate				
Sc	0.03±0.001(7)	11.4±2.1(10)	16.8±2.7(8)	10.8±1.0(10)	16.6±1.1(9)	17.2±1.2(9)				
Y	<0.2～2.4(5)	15.7±2.1(11)	17.0±2.7(11)	12.9±2.3(10)	30.3±2.1(10)	31.1±3.2(12)				
Zr	<1～14.5(8)	134±19(9)	108±15(9)	129±15(9)	167±18(8)	194±8(8)				
La	0.15±0.02(5)	18.6±1.3(8)	12.3±1.6(7)	20.1±1.8(7)	29.9±1.5(9)	33.1±2.1(9)				
Ce	0.93±0.57(8)	35.4±3.8(10)	20.7±8.4(9)	41.4±3.7(9)	60.5±3.0(10)	71.1±5.4(9)				
Pr	<0.063(1)	2～5.6(3)	1～3.8(3)	2～6.6(3)	4～8.4(3)	5.97～7.8(3)				
Nd	0.133(1)	17.8±0.6(7)	13.2±2.7(6)	16.5±1.3(5)	29.7±1.5(7)	32.4±2.1(6)				
Sm	0.16±0.06(6)	3.9±0.7(6)	3.0±0.4(4)	3.7±0.5(5)	6.1±0.6(6)	5.7±0.3(5)				
Eu	0.007±0.002(6)	0.92±0.08(5)	0.80±0.05(4)	0.69±0.01(4)	1.2±0.1(5)	1.1±0.1(4)				
Gd	<0.14, (0.8)(2)	2～3.6(3)	2.2, 3.4(2)	2.2, 3.3(2)	3.7～5.7(3)	3.7～6.0(3)				
Tb	0.0038～0.0045(3)	0.43±0.08(4)	0.38～0.46(3)	0.33～0.36(3)	0.71±0.13(4)	0.56～0.761(3)				
Dy	0.03(3)	2.1±0.4(4)	0.594～5(4)	2～2.6(3)	5.0～8.66(3)	4.5±0.9(4)				
Ho	<0.009(1)	0.23, 0.280(2)	0.40, 0.50(2)	0.39, 0.50(2)	0.48～0.96(3)	0.532～1.00(3)				
Er	n.g.	0.60, 0.648(2)	1.26, 1.35(2)	0.86, 0.90(2)	1.13, 1.2(2)	1.6, 2.56(2)				
Tm	<0.0066(1)	0.07(1)	0.21(1)	0.12(1)	0.12(1)	0.20(1)				
Yb	0.016～0.021(3)	1.4±0.4(6)	1.6±0.3(5)	1.2±0.3(5)	2.8±0.2(5)	3.2±0.5(5)				
Lu	0.03±0.003(4)	0.15±0.07(4)	0.16～0.329(3)	0.09～0.269(3)	0.451～0.472(3)	0.14～0.498(3)				
Hf	0.0074～0.282(4)	3.30±3.55(3)	<1～2.8(3)	3～3.33(3)	5.0±0.6(4)	5.12～7(3)				

The number of data available is indicated in parentheses.

Table 4 Comparison of average values of different analytical methods and recommended values from this study (in ppm).

Element	Method	JG-1	JG-1a	JA-1	JB-1	JB-2
Ce	ICP	45.2 ± 2.8(5)	47.9 ± 1.4(3)	13.5 ± 1.0(7)	65.9 ± 2.2(6)	7.55 ± 1.21(3)
	ICP-MS	48.8 ± 2.4(4)	48.1(1)	13.1 ± 0.3(4)	63.2 ± 5.0(3)	6.55 ± 0.29(4)
	IDMS	42.6 ± 4.2(5)	n.g.	13.4 ± 0.2(2)	66.8 ± 0.6(8)	6.64 ± 0.02(3)
	INAA	46.5 ± 5.0(10)	46.2 ± 2.9(7)	13.5 ± 1.1(8)	66.7 ± 2.8(15)	6.60 ± 1.03(11)
	NAA	49.5 ± 4.7(7)	42.5 ± 5.5(2)	13.8 ± 1.6(5)	67.8 ± 2.3(8)	7.26 ± 0.92(5)
	Recom.	45.9	45.2	13.5	66.7	6.77
Dy	ICP	4.00 ± 0.58(5)	4.33 ± 0.53(3)	4.56 ± 0.48(7)	4.07 ± 0.34(6)	4.03 ± 0.23(3)
	ICP-MS	3.09 ± 0.09(3)	3.49(1)	4.60 ± 0.13(4)	4.04 ± 0.18(3)	3.81 ± 0.14(4)
	IDMS	3.53 ± 0.36(4)	n.g.	5.07 ± 0.30(3)	4.12 ± 0.08(6)	3.95 ± 0.04(2)
	INAA	5.20(1)	n.g.	4.75 ± 0.11(3)	4.20 ± 0.30(2)	3.23 ± 0.63(2)
	NAA	4.66(1)	4.33(1)	3.47 ± 0.48(2)	4(1)	3.22 ± 0.55(2)
	Recom.	3.93	4.20	4.53	4.07	3.66
La	ICP	21.0 ± 1.1(5)	22.4 ± 1.2(3)	4.99 ± 0.70(7)	37.4 ± 1.4(8)	2.25 ± 0.35(3)
	ICP-MS	22.2 ± 0.5(4)	23.1(1)	5.08 ± 0.32(4)	36.1 ± 0.8(3)	2.46 ± 0.27(4)
	IDMS	18.9 ± 2.0(3)	n.g.	4.98 ± 0.02(2)	37.0 ± 0.2(4)	2.26 ± 0.01(3)
	INAA	23.0 ± 2.0(8)	22.7 ± 1.8(6)	5.49 ± 0.48(6)	38.1 ± 1.6(13)	2.44 ± 0.16(11)
	NAA	24.6 ± 2.8(8)	19.4 ± 1.0(3)	5.24 ± 0.52(6)	37.6 ± 3.2(10)	2.27 ± 0.20(6)
	Recom.	22.4	21.8	5.11	37.9	2.37
Sm	ICP	4.57 ± 0.38(5)	4.20 ± 0.10(2)	3.62 ± 0.25(7)	5.20 ± 0.31(6)	2.14 ± 0.44(3)
	ICP-MS	4.40 ± 0.16(4)	4.15(1)	3.45 ± 0.13(4)	4.94 ± 0.25(3)	2.30 ± 0.07(4)
	IDMS	4.12 ± 0.34(5)	n.g.	3.90 ± 0.65(3)	5.04 ± 0.08(8)	2.25 ± 0.01(3)
	INAA	5.03 ± 0.33(8)	4.70 ± 0.36(7)	3.48 ± 0.15(8)	5.22 ± 0.21(14)	2.24 ± 0.14(13)
	NAA	4.84 ± 0.42(8)	4.40 ± 0.20(2)	3.49 ± 0.32(5)	4.98 ± 0.50(9)	2.21 ± 0.19(5)
	Recom.	4.67	4.85	3.52	5.07	2.25
Yb	ICP	2.60 ± 0.54(4)	2.43 ± 0.47(3)	2.85 ± 0.17(7)	2.08 ± 0.05(6)	2.42 ± 0.21(3)
	ICP-MS	1.51 ± 0.05(3)	2.45(1)	2.91 ± 0.09(4)	2.13 ± 0.03(3)	2.65 ± 0.14(4)
	IDMS	1.80 ± 0.48(4)	n.g.	3.07 ± 0.15(3)	2.09 ± 0.09(7)	2.56 ± 0.02(2)
	INAA	2.91 ± 0.43(7)	2.97 ± 0.21(6)	2.86 ± 0.19(7)	2.21 ± 0.26(17)	2.52 ± 0.28(10)
	NAA	2.51 ± 0.38(7)	2.77(1)	2.75 ± 0.04(3)	2.00 ± 0.29(4)	2.37 ± 0.09(4)
	Recom.	2.49	2.74	2.92	2.16	2.51
Zr	ICP	118(1)	145 ± 4(2)	83.8(1)	148 ± 4(3)	48.9 ± 3.9(2)
	ICP-MS	n.g.	105(1)	87.4 ± 0.7(2)	n.g.	52.2 ± 5.9(2)
	PAA	125 ± 19(3)	n.g.	85.6 ± 5.6(2)	134 ± 6(5)	48.3 ± 2.7(2)
	Photom	109 ± 7(4)	115(1)	91.0 ± 1.0(2)	150 ± 4(4)	58.0 ± 3.0(2)
	XRF	115 ± 8(17)	116 ± 10(12)	86.6 ± 6.2(19)	140 ± 11(22)	50.4 ± 5.2(18)
	Recom.	114	121	88.3	143	51.4

n.g.; not given Recom.; Recommended value
number of report for each method is given in parentheses

Table 5 Comparison of recommended values for REE in USGS DTS-1 and PCC-1 to the analytical data of GSJ JP-1.

	USGS DTS-1	USGS PCC-1	GSJ JP-1		
	Recom. V.	Recom. V.	Individual value	Mean value	Watkins et al. (1992)
La	0.029	0.052	0.026, 0.042, 0.130, 0.131	0.082	0.11
Ce	0.072	0.10	0.57, 0.938, 5, 11.6, 12.0, 13	7.18	0.19
Pr	0.0063	0.013	0.1	0.1	0.019
Nd	0.029	0.042	0.3	0.3	0.072
Sm	0.0046	0.0066	0.0095, 0.020, 0.020, 0.035	0.021	0.026
Eu	0.0012	0.0018	0.018, 0.036, 0.0368, 0.0368	0.032	0.003
Gd	0.0038	0.014	2.4	2.4	0.015
Tb	0.0008	0.0015	0.012, 0.019	0.016	0.003
Dy	0.0034	0.010	0.021, 0.027	0.024	0.019
Ho	0.0013	0.0025	0.018, 0.018	0.018	
Er	0.0039	0.012	n.g.	n.g.	0.015
Tm	0.0014	0.0027	n.g.	n.g.	
Yb	0.010	0.024	0.017, 0.018, 0.020	0.018	0.022
Lu	0.0024	0.0057	0.031, 0.038, 0.051	0.040	

Recom. V., Recommended value from Gladney *et al.* (1991).
n.g., not given.

JP-1 were definitely lower than the data reported previously. DTS-1 and PCC-1 of USGS, both of which are likely to have similar amounts of the elements to JP-1 have been analyzed precisely (Gladney *et al.*, 1991). In Table 5, the data reported for JP-1 are compared to the recommended values of DTS-1 and PCC-1. It is obvious that the previously reported data for JP-1 are 2 or 3 orders of magnitude higher than those expected from the

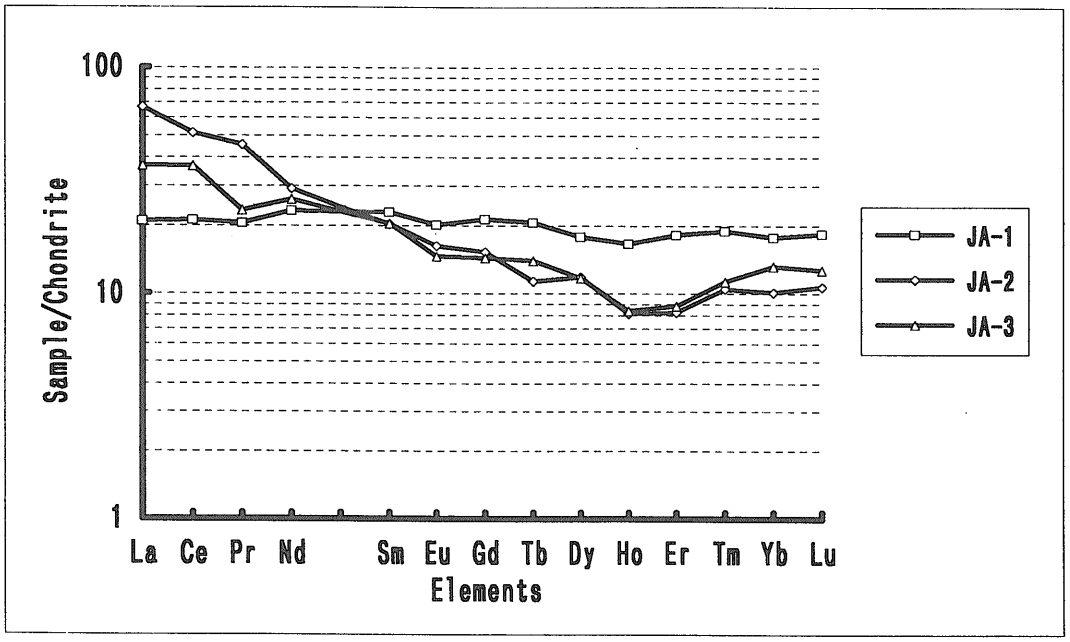

Figure 2 REE abundances normalized by chondritic values for JA-1, JA-2 and JA-3.

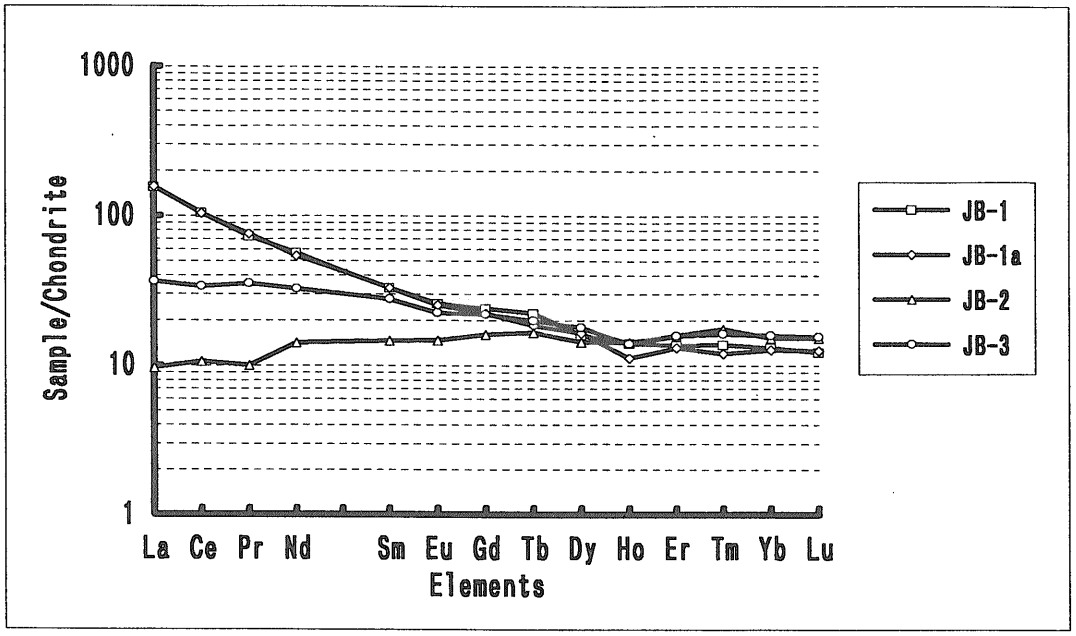

Figure 3 REE abundances normalized by chondritic values for JB-1, JB-1a, JB-2 and JB-3.

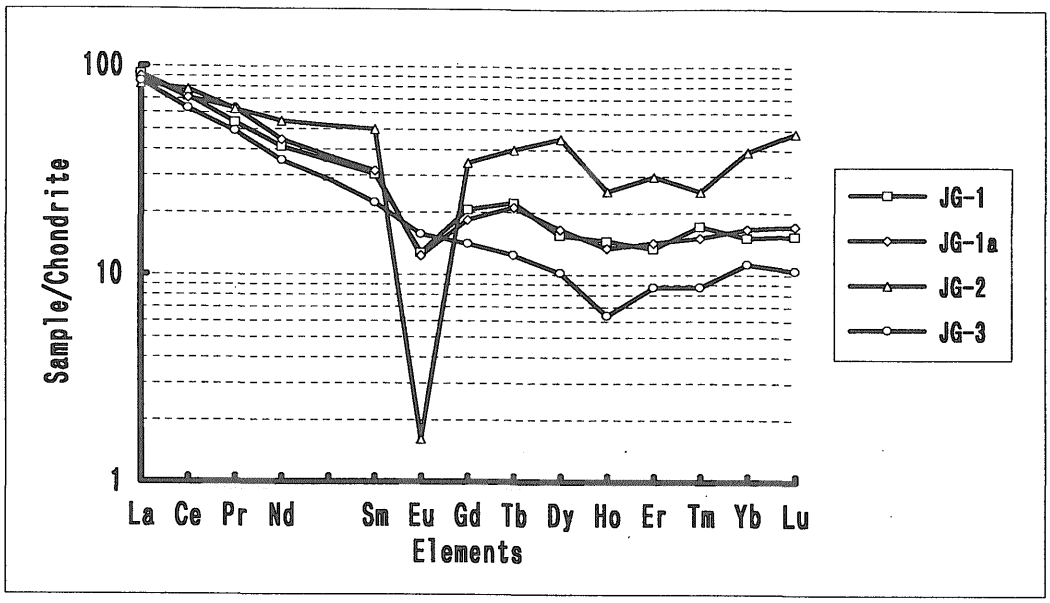

Figure 4 REE abundances normalized by chondritic values for JG-1, JG-1a, JG-2 and JG-3.

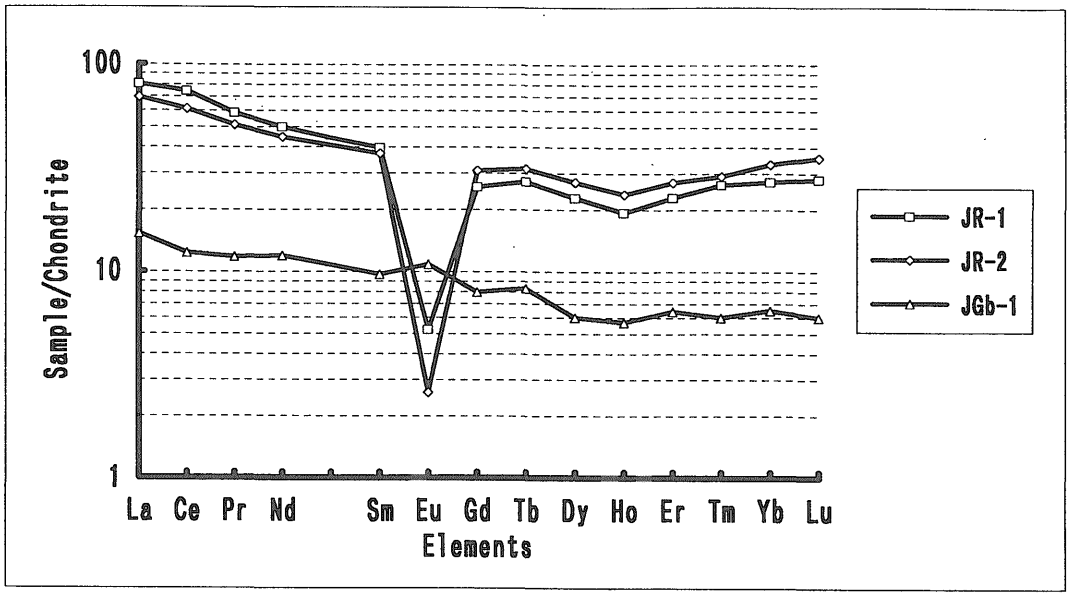

Figure 5 REE abundances normalized by chondritic values for JR-1, JR-2 and JGb-1.

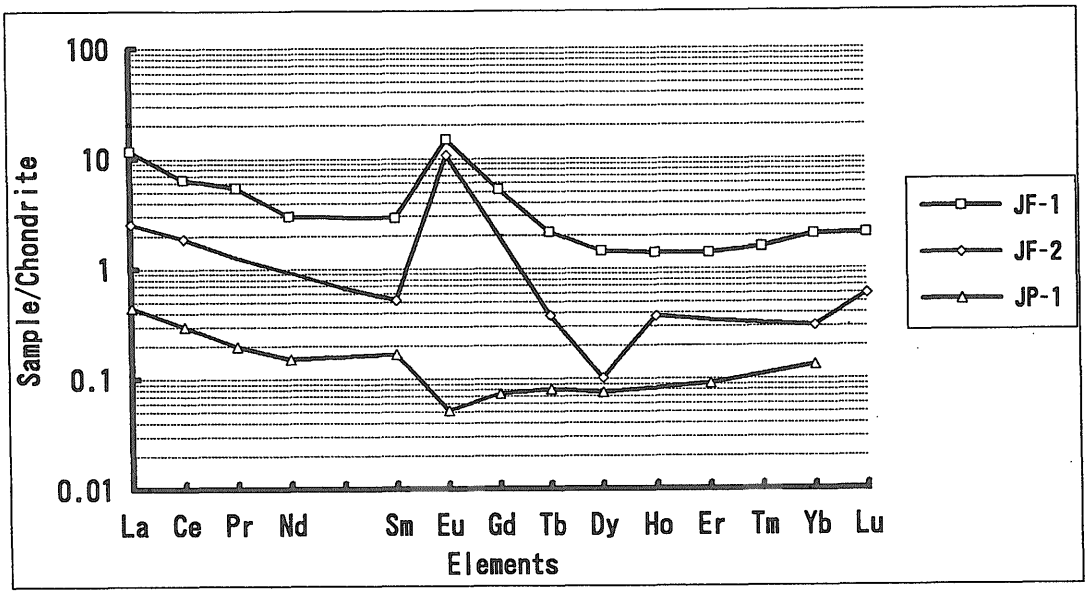

Figure 6 REE abundances normalized by chondritic values for JF-1, JF-2 and JP-1.

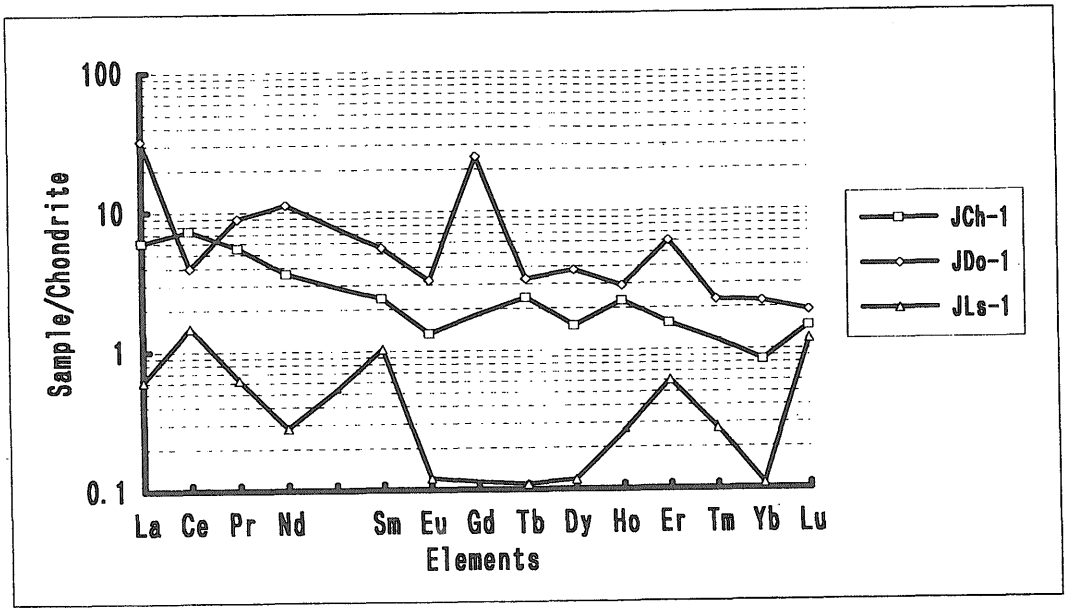

Figure 7 REE abundances normalized by chondritic values for JCh-1, JDo-1 and JLs-1.

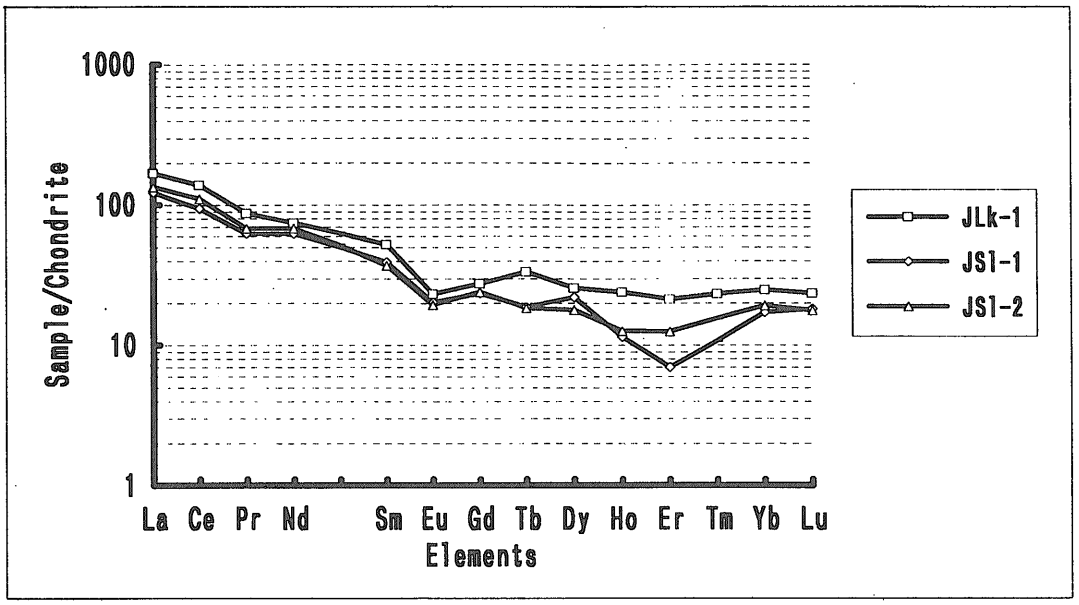

Figure 8 REE abundances normalized by chondritic values for JLk-1, JSl-1 and JSl-2.

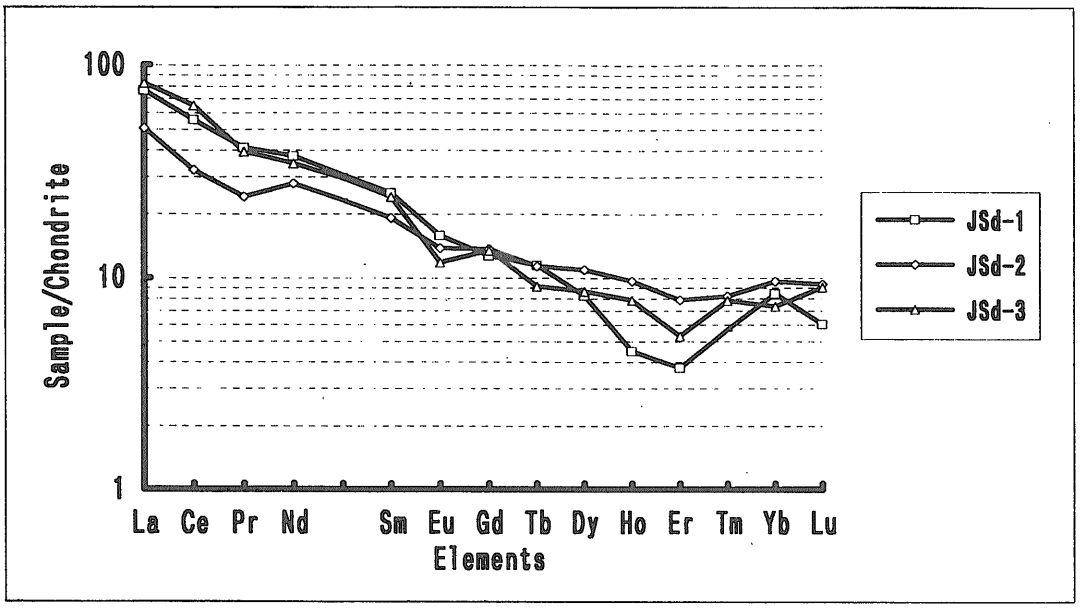

Figure 9 REE abundances normalized by chondritic values for JSd-1, JSd-2 and JSd-3.

Table 6 Recommended values and preferable data (asterisked) for rare earth and some other elements of 26 GSJ reference samples (in ppm).

	JA-1	JA-2	JA-3	JB-1	JB-1a	JB-2	JB-3	JF-1	JF-2	JG-1	JG-1a	JG-2	JG-3
Sc	28.4	19.6	21.8	27.5	27.9	54.4	33.3	0.22	0.09	6.54	6.31	2.47	8.93
Y	30.6	18.1	21.3	24.4	24.0	24.9	27.0	2.99	<1*	28.5	31.6	88.2	17.2
Zr	88.3	119	119	143	146	51.4	98.3	39.1	6.6*	114	121	101	143
La	5.1	16.3	9.00	37.9	38.1	2.37	8.89	2.86	0.6*	22.4	21.8	20.1	20.7
Ce	13.5	32.7	23.3	66.7	66.1	6.77	21.5	4.11	1.20	45.9	45.2	49.5	40.1
Pr	1.98	4.38	2.25	7.02	7.30	0.96	3.39	0.5*	-	5.21	6.08	6.01	4.72
Nd	11.0	13.8	12.3	26.7	25.5	6.70	15.4	1.44	-	19.5	21.0	25.8	16.8
Sm	3.52	3.12	3.14	5.07	5.07	2.25	4.27	0.45	0.08	4.67	4.85	7.72	3.41
Eu	1.17	0.94	0.85	1.50	1.47	0.86	1.31	0.87	0.62	0.74	0.72	0.09	0.91
Gd	4.36	3.11	2.94	4.91	4.54	3.28	4.47	1.1*	-	4.20	3.75	7.1*	2.86
Tb	0.77	0.42	0.52	0.84	0.69	0.62	0.75	0.08	0.01*	0.83	0.79	1.50	0.46
Dy	4.53	3.01	2.97	4.07	4.19	3.66	4.55	0.37	0.03*	3.93	4.20	11.5	2.58
Ho	0.94	0.46	0.48	0.80	0.64	0.81	0.79	0.08*	0.02*	0.83	0.76	1.4*	0.36
Er	3.01	1.37	1.46	2.27	2.18	2.63	2.61	0.2*	-	1.83	2.36	4.95	1.45
Tm	0.48	0.3*	0.3*	0.35	0.31	0.45	0.41	0.04*	-	0.44	0.39	0.7*	0.2*
Yb	2.92	1.67	2.18	2.16	2.10	2.51	2.62	0.34	0.05*	2.49	2.74	7.34	1.86
Lu	0.47	0.27	0.32	0.31	0.32	0.39	0.39	0.05	0.01*	0.39	0.44	1.22	0.27
Hf	2.41	2.89	3.43	3.40	3.48	1.42	2.68	1.22	0.19	3.79	3.84	5.36	4.29

	JGb-1	JR-1	JR-2	JP-1	JCh-1	JDo-1	JLk-1	JLs-1	JSd-1	JSd-2	JSd-3	JSl-1	JSl-2
Sc	36.6	5.16	5.57	7.07	0.85	0.14	16.0	0.03	11.4	16.8	10.8	16.6	17.2
Y	10.75	45.4	51.3	<1*	1.84	11.2	40.8	<0.5*	15.7	17.0	12.9	30.3	31.1
Zr	33.5	101	97.2	6.3	11.7	<10*	146	<5*	134	108	129	167	194
La	3.74	19.7	16.9	0.1*	1.5*	7.87	41.3	0.15	18.6	12.3	20.1	29.9	33.1
Ce	7.86	47.1	38.8	0.2*	4.72	2.54	89.1	0.93	35.4	20.7	41.4	60.5	71.1
Pr	1.14	5.62	4.93	0.02*	0.5*	0.9*	8.42	<0.06*	4.0*	2.3*	3.8*	6.0*	6.6*
Nd	5.65	23.5	21.1	0.07*	1.7*	5.33	35.4	0.1*	17.8	13.2	16.5	29.7	32.4
Sm	1.49	6.07	5.71	0.02*	0.4*	0.84	8.04	0.16	3.87	3.0*	3.71	6.06	5.72
Eu	0.63	0.30	0.15	0.003*	0.08*	0.19	1.35	0.007	0.92	0.8*	0.7*	1.18	1.1*
Gd	1.63	5.24	6.30	0.02*	-	<5*	5.6*	-	2.6*	2.8*	2.8*	4.8*	4.9*
Tb	0.31	1.02	1.18	0.003*	0.09*	0.12	1.25	0.004*	0.4*	0.4*	0.3*	0.7*	0.7*
Dy	1.53	5.78	6.88	0.02*	0.4*	1.0*	6.54	0.03*	2.1*	2.8*	2.2*	5.6*	4.5*
Ho	0.32	1.10	1.35	-	0.1*	0.2*	1.4*	-	0.3*	0.6*	0.5*	0.7*	0.7*
Er	1.07	3.78	4.50	0.02*	0.3*	<1*	3.53	<0.1*	0.6*	1.3*	0.9*	1.2*	2.1*
Tm	0.15	0.67	0.74	-	-	0.06*	0.6*	<0.007*	-	0.2*	0.2*	-	-
Yb	0.97	4.49	5.46	0.02*	0.1*	0.36	4.09	0.02*	1.39	1.59	1.21	2.85	3.17
Lu	0.15	0.71	0.90	-	0.04*	0.05	0.60	0.03*	0.2*	0.2*	0.2*	0.5*	0.5*
Hf	0.88	4.67	5.23	0.21	0.2*	0.1*	3.93	0.1*	3.4*	2.8*	3.2*	5.0*	5.8*

data of ordinary ultrabasic rocks. Therefore, it would be reasonable that the preferable values of the elements for JP-1 are to be taken from the data of Watkins and le Roex (1992), even though we have several analytical data of quite different values for the elements.

An additional assessment of the 1992 compilation values may be made by normalizing the REE abundances to chondritic values (Evensen *et al.*, 1978), and plotting the results against atomic number. Due to the coherent geochemical behaviour of the group, the plotted curve should be smooth for all elements except Ce and Eu, which may display anomalous behaviour because of their different oxidation states. The compiled data show mostly smooth chondrite-normalized curves (Fig. 2-9) with some exception. For the exceptional cases, further analytical data and geochemical studies will be required for considering the anomalous curves.

Table 6, which includes both the recommended and preferable values, is presented for the convenience of the users of the reference samples.

All the GSJ reference samples are still available except for JG-1, JB-1 JB-1a and JA-1. All laboratories having interest in participating in a collaborative programme on the establishment of a complete data set of the samples are invited to write to Geochemistry Department, Geological Survey of Japan, 1-1-3 Higashi, Tsukuba, 305 Japan.

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Table A-1 Individual data for JA-1

ppm	Method	Code No.
Ce		
9.6	Chrom.	B-209
12.0	ICP	B-417
13.3	ICP	B-419
13.3	ICP	B-117
13.4	ICP	B-378
13.5	ICP	B-34
13.5	ICP	B-471
15.8	ICP	G-6'
12.7	ICP-MS	B-292
13.12	ICP-MS	B-442
13.2	ICP-MS	B-320
13.48	ICP-MS	B-313
15.4	ICP-MS(Laser)	B-411
13.2	IDMS	B-324
13.6	IDMS	B-9
11	INAA	B-24
13	INAA	B-18
13.2	INAA	B-289, B-300
13.7	INAA	B-154, B-193
13.8	INAA	B-118
14	INAA	B-58
14.2	INAA	B-324
14.3	INAA	B-146
14.7	INAA	B-270
14.4	L-Chromato.	B-438
11	NAA	B-3
13.5	NAA	B-11
14	NAA	B-126
14.71	NAA	B-234, B-277
15.6	NAA	B-287
<30	OES	B-279
10.6	PAA	B-56, B-221
12.3	PAA	B-55
14.8	RNAA	B-447
12.6	SIMS	B-337
13.8	SIMS	B-376
23	XRF	B-25
24	XRF(powder)	B-70
Dy		
3.4	Chrom.	B-209
4.0	ICP	B-117
4.2	ICP	B-417
4.52	ICP	B-419
4.8	ICP	B-471
5.28	ICP	G-6'
4.0	ICP	B-34
5.1	ICP	B-378
4.5	ICP-MS	B-320
4.82	ICP-MS	B-292
4.52	ICP-MS	B-442
4.57	ICP-MS	B-313
6.1	ICP-MS(Laser)	B-411
5.06	IDMS	B-9
4.71	IDMS	B-324
4.85	INAA	B-154, B-193
4.8	INAA	B-18
4.6	INAA	B-270
2.99	NAA	B-11
3.95	NAA	B-234, B-277
4.4	RNAA	B-447
4.5	SIMS	B-337
4.57	SIMS	B-376
3.5	XRF	B-136
Er		
2.8	Chrom.	B-209
2.7	ICP	B-417
2.7	ICP	B-34
3.05	ICP	G-6'
3.23	ICP	B-471
2.7	ICP	B-117
2.70	ICP	B-419
3.14	ICP-MS	B-292
2.74	ICP-MS	B-442
2.8	ICP-MS	B-320
2.94	ICP-MS	B-313
3.9	ICP-MS(Laser)	B-411
3.03	IDMS	B-324
3.12	IDMS	B-9
3.35	INAA	B-154, B-193
3.07	L-Chromato.	B-438
2.89	NAA	B-234, B-277
2.9	RNAA	B-447
3.2	SIMS	B-337
2.80	SIMS	B-376
Eu		
1.36	AAS	B-260
1.07	ICP	B-419
1.1	ICP	B-417
1.15	ICP	B-117
1.18	ICP	B-471
1.2	ICP	B-34
1.27	ICP	B-378
1.28	ICP	G-6'
1.17	ICP-MS	B-292
1.17	ICP-MS	B-313
1.2	ICP-MS	B-320
1.28	ICP-MS	B-442
0.50	ICP-MS(Laser)	B-411
1.12	IDMS	B-324
1.15	IDMS	B-9
1.12	INAA	B-18
1.14	INAA	B-289, B-300
1.15	INAA	B-146
1.17	INAA	B-324
1.18	INAA	B-118
1.19	INAA	B-58
1.2	INAA	B-270
1.2	INAA	B-24
1.25	INAA	B-154, B-193
1.17	L-Chromato.	B-438
1.1	NAA	B-3
1.12	NAA	B-234, B-277
1.13	NAA	B-287
1.15	NAA	B-11
1.2	NAA	B-126
1.12	RNAA	B-447
1.2	SIMS	B-337
1.30	SIMS	B-376
Gd		
4.44	ICP	B-471
4.6	ICP	B-34
4.6	ICP	B-117
4.45	ICP	G-6'
4.8	ICP	B-378
3.90	ICP	B-419
4.2	ICP	B-417
3.6	ICP-MS	B-320
3.98	ICP-MS	B-313
4.35	ICP-MS	B-292
4.20	ICP-MS	B-442
4.4	ICP-MS(Laser)	B-411
4.27	IDMS	B-324
4.44	IDMS	B-9
4.44	INAA	B-154, B-193
4.9	INAA	B-132
3.78	INAA(PG)	B-436
4.59	L-Chromato.	B-438
3.8	SIMS	B-337
4.37	SIMS	B-376
4.9	XRF	B-136
Hf		
2.2	ICP-MS	B-320
2.58	ICP-MS	B-379
2.25	INAA	B-146
2.32	INAA	B-18
2.37	INAA	B-447
2.44	INAA	B-118
2.49	INAA	B-289, B-300
2.5	INAA	B-270
2.5	INAA	B-24
2.53	INAA	B-324
2.1	NAA	B-3
2.3	NAA	B-26
2.35	NAA	B-234, B-277
2.5	NAA	B-11
2.6	NAA	B-287
3.0	SIMS	B-337
2.0	XRF	B-25
Ho		
0.8	Chrom.	B-209
0.88	ICP	B-34
0.88	ICP	B-117
0.93	ICP	B-417
1.02	ICP	B-419
0.80	ICP-MS	B-320
0.87	ICP-MS	B-442
1.01	ICP-MS	B-313
1.1	ICP-MS(Laser)	B-411
0.79	INAA	B-146
0.89	INAA	B-154, B-193
1.04	L-Chromato.	B-438
0.923	NAA	B-234, B-277
1.12	NAA	B-292
0.92	RNAA	B-447
1.08	SIMS	B-337
La		
4.6	Chrom.	B-209
4	ICP	B-196
4.1	ICP	B-471
4.57	ICP	B-419
5.3	ICP	B-117
5.4	ICP	B-34

Table A-1 Individual data for JA-1

ppm	Method	Code No.
5.7	ICP	B-378
5.85	ICP	G-6'
7.1	ICP	B-417
4.69	ICP-MS	B-292
5.0	ICP-MS	B-320
5.06	ICP-MS	B-313
5.58	ICP-MS	B-442
5.5	ICP-MS(Laser)	B-411
4.96	IDMS	B-9
5.00	IDMS	B-324
4.91	INAA	B-289, B-300
5.1	INAA	B-146
5.10	INAA	B-324
5.19	INAA	B-18
5.52	INAA	B-154, B-193
5.9	INAA	B-24
6.3	INAA	B-270
5.85	L-Chromato.	B-438
4.5	NAA	B-126
4.6	NAA	B-3
5.31	NAA	B-234, B-277
5.4	NAA	B-11
5.7	NAA	B-118
5.9	NAA	B-287
<10	OES	B-279
<20	OES	B-209
5.01	RNAA	B-447
5.20	SIMS	B-376
5.3	SIMS	B-337
2.6	XRF	B-25
11	XRF	B-18
8	XRF(powder)	B-70

Lu

ppm	Method	Code No.
1.2	Chrom.	B-209
0.40	ICP	B-34
0.40	ICP	B-117
0.44	ICP	B-419
0.46	ICP	B-378
0.46	ICP	G-6'
0.46	ICP	B-471
0.47	ICP	B-417
0.42	ICP-MS	B-320
0.428	ICP-MS	B-292
0.45	ICP-MS	B-442
0.46	ICP-MS	B-313
0.67	ICP-MS(Laser)	B-411
0.446	IDMS	B-324
0.462	IDMS	B-9
0.38	INAA	B-146
0.43	INAA	B-18
0.44	INAA	B-24
0.45	INAA	B-289, B-300
0.48	INAA	B-324
0.51	INAA	B-154, B-193
0.52	INAA	B-118
0.63	INAA	B-270
0.47	L-Chromato.	B-438
0.41	NAA	B-287
0.44	NAA	B-11
0.47	NAA	B-3
0.48	NAA	B-234
0.483	NAA	B-277
0.48	RNAA	B-447
0.40	SIMS	B-337

Nd

ppm	Method	Code No.
10.6	Chrom.	B-209
10.1	ICP	B-419
10.6	ICP	B-471
11.0	ICP	B-117
11.0	ICP	B-34
11.67	ICP	G-6'
11.8	ICP	B-378
12.2	ICP	B-417
10.5	ICP-MS	B-442
10.75	ICP-MS	B-313
11.0	ICP-MS	B-320
11.0	ICP-MS	B-292
12.8	ICP-MS(Laser)	B-411
10.7	IDMS	B-324
8.26	INAA	B-154, B-193
8.7	INAA	B-146
10	INAA	B-324
10.5	INAA	B-289, B-300
11.8	INAA	B-118
<76	INAA	B-18
11.5	L-Chromato.	B-438
11.1	MS	B-100, B-296,
6.8	NAA	B-11
11.3	NAA	B-9
3.46	RNAA	B-447
10.4	SIMS	B-337
10.7	SIMS	B-376
12.6	XRF	B-25

Pr

ppm	Method	Code No.
0.7	Chrom.	B-209
1.8	ICP	B-419
2.1	ICP	B-117
1.5	ICP	B-417
2.1	ICP	B-34
2.2	ICP-MS	B-320
1.89	ICP-MS	B-292
2.17	ICP-MS	B-313
1.66	ICP-MS	B-442
2.7	ICP-MS(Laser)	B-411
1.50	INAA	B-154, B-193
2.12	L-Chromato.	B-438
0.4	RNAA	B-447
2.0	SIMS	B-337
3.8	XRF	B-25

Sc

ppm	Method	Code No.
24.5	ICP	B-471
28.4	ICP	K-18'
29.1	ICP	B-196
28.0	ICP-MS	B-320
23.8	INAA	B-154, B-193
27.6	INAA	B-289, B-300
28.5	INAA	B-270
28.5	INAA	B-18
28.7	INAA	B-447
29.0	INAA	B-146
29.3	INAA	B-58
29.8	INAA	B-324
29.9	INAA	B-118
32	INAA	B-24
27	NAA	B-3
28.4	NAA	B-11
28.6	NAA	B-287
29.2	NAA	B-234, B-277
31.6	NAA	B-126
43	OES	B-279
45	OES	B-209
23.8	PAA	B-56, B-143-7
21.9	SIMS	B-337
27.1	XRF	B-25
30	XRF	B-129
31.1	XRF	B-87
33	XRF	B-130

Sm

ppm	Method	Code No.
3.6	Chrom.	B-209
3.4	ICP	B-34
3.4	ICP	B-117
3.46	ICP	B-419
3.5	ICP	B-378
3.6	ICP	B-471
3.99	ICP	G-6'
4.0	ICP	B-417
3.3	ICP-MS	B-320
3.35	ICP-MS	B-313
3.52	ICP-MS	B-292
3.61	ICP-MS	B-442
3.7	ICP-MS(Laser)	B-411
3.35	IDMS	B-324
3.54	IDMS	B-9
3.2	INAA	B-146
3.2	INAA	B-132
3.31	INAA	B-289, B-300
3.4	INAA	B-24
3.50	INAA	B-324
3.55	INAA	B-118
3.58	INAA	B-270
3.6	INAA	B-18
3.69	INAA	B-154, B-193
2.78	INAA(PG)	B-436
3.54	L-Chromato.	B-438
3.46	MS	B-100, B-296,
3.0	NAA	B-3
3.36	NAA	B-234, B-277
3.5	NAA	B-11
3.6	NAA	B-287
3.98	NAA	B-126
3.75	RNAA	B-447
3.1	SIMS	B-337
3.37	SIMS	B-376
7.8	XRF	B-23

Tb

ppm	Method	Code No.
0.60	ICP	B-419
0.79	ICP	B-417
0.73	ICP-MS	B-313
0.75	ICP-MS	B-320
0.75	ICP-MS	B-442
0.808	ICP-MS	B-292
0.98	ICP-MS(Laser)	B-411
0.47	INAA	B-146
0.68	INAA	B-18
0.75	INAA	B-324
0.77	INAA	B-154, B-193

Table A-1 Individual data for JA-1

ppm	Method	Code No.
0.78	INAA	B-289, B-300
0.79	INAA	B-118
0.74	L-Chromato.	B-438
0.60	NAA	B-3
1.07	NAA	B-234, B-277
0.93	RNAA	B-447
0.57	SIMS	B-337
Tm		
0.5	Chrom.	B-209
0.50	ICP	B-417
0.38	ICP	B-419
0.45	ICP-MS	B-313
0.44	ICP-MS	B-442
0.47	ICP-MS	B-320
0.471	ICP-MS	B-292
0.62	ICP-MS(Laser)	B-411
0.53	INAA	B-118
0.49	INAA	B-154, B-193
0.41	L-Chromato.	B-438
0.55	SIMS	B-337
Y		
27	ICP	B-196
26.0	ICP	B-419
26.5	ICP	B-471
33.2	ICP	B-417
35	ICP	K-18'
29.1	ICP-MS	B-320
34.6	ICP-MS	B-292
27	OES	B-279
51	OES	B-209
29.9	PAA	B-56, B-221
26.7	PAA	B-55
27.6	SIMS	B-337
28	XRF	B-134
33	XRF	B-43
33	XRF	B-18
31	XRF	B-6
32.0	XRF	B-87
24	XRF	B-270
36	XRF	B-130
34	XRF	B-35
31.4	XRF	B-135
29	XRF	B-31
34	XRF	B-40
35	XRF	B-312
31.3	XRF	B-428
26.9	XRF	B-19
31.4	XRF	B-29, B-73
33	XRF	B-15
31.4	XRF	B-321
31.0	XRF	B-200
31.0	XRF	B-145
32	XRF	B-129
31	XRF	B-25
28	XRF(fusion)	B-36
28	XRF(powder)	B-36
32	XRF(powder)	B-70
Yb		
1.41	Chrom.	B-209
2.66	ICP	B-419
2.7	ICP	B-117
2.7	ICP	B-34
2.8	ICP	B-417
2.98	ICP	G-6'
2.99	ICP	B-471
3.14	ICP	B-378
2.8	ICP-MS	B-320
2.89	ICP-MS	B-292
2.91	ICP-MS	B-313
3.05	ICP-MS	B-442
5.5	ICP-MS(Laser)	B-411
2.90	IDMS	B-324
3.04	IDMS	B-9
2.5	INAA	B-24
2.7	INAA	B-146
2.78	INAA	B-154, B-193
2.80	INAA	B-289, B-300
2.81	INAA	B-270
2.98	INAA	B-118
3.08	INAA	B-324
3.1	INAA	B-18
2.99	L-Chromato.	B-438
2.7	NAA	B-3
2.76	NAA	B-234, B-277
2.8	NAA	B-11
4.0	OES	B-279
5.7	OES	B-209
2.62	RNAA	B-447
2.8	SIMS	B-337
3.31	SIMS	B-376
3.0	XRF	B-136
Zr		
83.8	ICP	B-471
139	ICP	K-18'
86.7	ICP-MS	B-320
88	ICP-MS	B-379
105	INAA	B-146
<367	INAA	B-18
91	OES	B-279
117	OES	B-209
80.0	PAA	B-56, B-221
91.1	PAA	B-55
90	Photom.	B-290
92	Photom.	B-173
97	SIMS	B-337
78	XRF	B-18
80	XRF	B-15
81	XRF	B-6
81	XRF	B-129
81	XRF	B-130
82.0	XRF	B-87
82.1	XRF	B-145
82.1	XRF	B-200
84	XRF	B-40
84.6	XRF	B-321
86	XRF	B-135
88	XRF	B-428
90	XRF	B-31
90	XRF	B-270
90.0	XRF	B-29, B-73
91	XRF	B-19
97	XRF	B-43
97	XRF	B-25
100	XRF	S-23'
92	XRF(powder)	B-70
95	XRF(powder)	B-36

Table A-2 Individual data for JA-2

ppm	Method	Code No.
Ce		
27.0	Chrom.	B-209
35	ED-XRF	B-444
32.6	ICP	B-471
34	ICP	B-434
34.0	ICP	B-378
35.1	ICP	B-349
29.1	INAA	B-310
29.1	INAA	B-163
31.5	INAA	B-437
33	INAA	B-24
34	INAA	B-244
34.3	INAA	B-324
36	INAA	B-270
39	INAA	B-230
31.6	L-Chromato.	B-438
32	NAA	B-287
34.9	NAA	B-234, B-277
<30	OES	B-279
35.2	RNAA	B-447
29.6	SIMS	B-376
30.8	SIMS	B-337
28	XRF	B-136
Dy		
3.8	Chrom.	B-209
3	ICP	B-434
3.01	ICP	B-471
3.4	ICP	B-378
3.64	ICP	B-349
3.1	INAA	B-270
1.90	NAA	B-234, B-277
1.4	RNAA	B-447
2.33	SIMS	B-376
2.9	SIMS	B-337
<1	XRF	B-136
Er		
1.0	Chrom.	B-209
0.584	NAA	B-234, B-277
1.6	SIMS	B-337
1.87	ICP	B-471
1.88	ICP	B-349
1.55	SIMS	B-376
1.78	L-Chromato.	B-438
0.7	RNAA	B-447
Eu		
0.94	INAA	B-24
0.91	INAA	B-163
0.99	INAA	B-230
1.05	NAA	B-234, B-277
0.95	INAA	B-244
0.97	INAA	B-270
0.97	NAA	B-287
0.91	INAA	B-310
0.90	INAA	B-324
1.16	SIMS	B-337
0.91	ICP	B-471
0.93	ICP	B-349
0.72	SIMS	B-376
0.97	ICP	B-378
0.92	INAA	B-437
0.70	L-Chromato.	B-438
1.04	RNA	B-447
Gd		
3.0	ICP	B-378
3.06	ICP	B-471
3.81	ICP	B-349
2.82	INAA(PG)	B-436
2.50	L-Chromato.	B-438
2.70	SIMS	B-376
3.1	SIMS	B-337
3.9	XRF	B-136
Hf		
3.01	ICP-MS	B-379
2.72	INAA	B-437
2.8	INAA	B-310
2.8	INAA	B-163
2.91	INAA	B-324
2.93	INAA	B-270
3.0	INAA	B-24
3.19	INAA	B-447
2.6	NAA	B-287
3.13	NAA	B-234, B-277
2.6	SIMS	B-337
3.0	XRF	B-136
Ho		
0.4	Chrom.	B-209
0.69	ICP	B-349
0.49	L-Chromato.	B-438
0.272	NAA	B-234, B-277
0.27	RNAA	B-447
0.64	SIMS	B-337
La		
11.0	Chrom.	B-209
24	ED-XRF	B-444
14.9	ICP	B-471
16.0	ICP	B-349
17	ICP	B-434
17.0	ICP	B-378
15.8	INAA	B-437
16.1	INAA	B-270
16.1	INAA	B-324
16.3	INAA	B-310
16.3	INAA	B-163
16.6	INAA	B-244
17	INAA	B-230
18	INAA	B-24
15.0	L-Chromato.	B-438
16.5	NAA	B-287
17.73	NAA	B-234, B-277
17	OES	B-279
<20	OES	B-209
17.4	RNAA	B-447
14.1	SIMS	B-376
15.5	SIMS	B-337
16.0	XRF	B-136
Lu		
0.7	Chrom.	B-209
0.25	ICP	B-471
0.27	ICP	B-378
0.32	ICP	B-349
0.25	INAA	B-24
0.26	INAA	B-270
0.27	INAA	B-324
0.27	INAA	B-163
0.27	INAA	B-310
0.28	INAA	B-437
0.26	L-Chromato.	B-438
0.21	NAA	B-287
0.293	NAA	B-234, B-277
0.29	RNAA	B-447
0.31	SIMS	B-337
Nd		
14.7	Chrom.	B-209
14.0	ICP	B-471
14.3	ICP	B-378
15.1	ICP	B-349
16	ICP	B-434
14	INAA	B-163
14	INAA	B-310
14.3	INAA	B-437
15	INAA	B-324
12.7	L-Chromato.	B-438
12.6	NAA	B-234, B-277
13.0	RNAA	B-447
12.8	SIMS	B-376
13.8	SIMS	B-337
10.6	XRF	B-136
Pr		
2.0	Chrom.	B-209
5.09	ICP	B-349
3.25	L-Chromato.	B-438
4.33	NAA	B-234, B-277
4.3	RNAA	B-447
3.4	SIMS	B-337
5.9	XRF	B-136
Sc		
18.1	ICP	B-471
17.7	INAA	B-230
17.8	INAA	B-244
18.6	INAA	B-270
19.1	INAA	B-310
19.1	INAA	B-163
19.5	INAA	B-324
20.1	INAA	B-437
20.1	INAA	B-447
22	INAA	B-24
18.2	NAA	B-287
20.5	NAA	B-234, B-277
20	OES	B-209
24	OES	B-279
19.1	SIMS	B-337
19.1	XRF	B-136
Sm		
3.7	Chrom.	B-209

Table A-2 Individual data for JA-2

ppm	Method	Code No.
2.2	ICP	B-378
3.55	ICP	B-349
3.6	ICP	B-471
3.0	INAA	B-270
3.05	INAA	B-310
3.05	INAA	B-163
3.08	INAA	B-437
3.1	INAA	B-24
3.16	INAA	B-324
3.2	INAA	B-230
3.25	INAA	B-244
2.73	INAA(PG)	B-436
2.50	L-Chromato.	B-438
3.27	NAA	B-287
3.31	NAA	B-234, B-277
3.43	RNAA	B-447
2.76	SIMS	B-376
2.8	SIMS	B-337
3.6	XRF	B-136
Tb		
0.97	ICP	B-349
0.48	INAA	B-163
0.48	INAA	B-310
0.53	INAA	B-437
0.40	L-Chromato.	B-438
0.339	NAA	B-234, B-277
0.24	RNAA	B-447
0.49	SIMS	B-337
Tm		
0.2	Chrom.	B-209
0.33	ICP	B-349
0.22	L-Chromato.	B-438
0.32	SIMS	B-337
Y		
20	ED-XRF	B-444
15.3	ICP	B-471
19	ICP	B-434
14	OES	B-279
24	OES	B-209
18	SIMS	B-337
12	XRF	B-270
17	XRF	B-113
17	XRF	B-62
17.6	XRF	B-145
17.6	XRF	B-200
18	XRF	B-61
18	XRF	B-142
19	XRF	B-135
19	XRF	B-434
19	XRF	B-428
21.4	XRF	B-136
24	XRF	B-63
17	XRF(fusion)	B-59
16	XRF(powder)	B-59
Yb		
0.6	Chrom.	B-209
1.6	ICP	B-434
1.62	ICP	B-471
1.67	ICP	B-349
1.71	ICP	B-378
1.53	INAA	B-437
1.6	INAA	B-270
1.64	INAA	B-310
1.64	INAA	B-163
1.73	INAA	B-324
1.9	INAA	B-24
1.35	L-Chromato.	B-438
1.76	NAA	B-234, B-277
2.2	OES	B-279
2.6	OES	B-209
1.66	RNAA	B-447
1.43	SIMS	B-376
1.7	SIMS	B-337
5.8	XRF	B-136
Zr		
74	Chem.	B-258-7
119	ED-XRF	B-444
120	ICP	B-471
108	ICP	B-434
120	ICP-MS	B-379
110	INAA	B-324
147	OES	B-209
157	OES	B-279
114	Photom.	B-290
105	SIMS	B-337
102	XRF	B-62
114	XRF	B-200
114	XRF	B-145
114	XRF	B-434
116	XRF	B-142
117	XRF	B-270
117	XRF	B-135
120	XRF	B-61
121	XRF	B-428
128	XRF	B-63
131	XRF	B-136
112	XRF(fusion)	B-59
120	XRF(powder)	B-59

ppm	Method	Code No.

Table A-3 Individual data for JA-3

ppm	Method	Code No.
Ce		
19.1	Chrom.	B-209
36	ED-XRF	B-444
27.8	ICP	B-378
22.3	INAA	B-437
23	INAA	B-230, B-244
23.3	INAA	B-324
24.1	INAA	B-270
15.8	L-Chromato.	B-438
23.76	NAA	B-234
23.77	NAA	B-277
<30	OES	B-279
22.6	RNAA	B-447
19.8	SIMS	B-337
24.9	SIMS	B-376
23	XRF	B-168
26	XRF	B-198
Dy		
2.5	Chrom.	B-209
3.8	ICP	B-378
3.2	INAA	B-270
2.32	NAA	B-234, B-277
2.4	RNAA	B-447
3.1	SIMS	B-337
3.46	SIMS	B-376
7.9	XRF	B-168
Er		
0.9	Chrom.	B-209
1.95	L-Chromato.	B-438
1.01	NAA	B-234, B-277
1.01	RNAA	B-447
1.7	SIMS	B-337
2.18	SIMS	B-376
Eu		
0.92	ICP	B-378
0.81	INAA	B-437
0.84	INAA	B-324
0.88	INAA	B-230, B-244
0.96	INAA	B-270
0.52	L-Chromato.	B-438
0.78	NAA	B-234, B-277
0.777	RNAA	B-447
0.72	SIMS	B-337
0.93	SIMS	B-376
Gd		
3.7	ICP	B-378
2.46	L-Chromato.	B-438
2.9	SIMS	B-337
3.64	SIMS	B-376
2.0	XRF	B-168
Hf		
3.64	ICP-MS	B-379
3.20	INAA	B-437
3.36	INAA	B-447
3.53	INAA	B-324
3.7	INAA	B-270
3.36	NAA	B-277
3.37	NAA	B-234
2.9	SIMS	B-337
3.8	XRF	B-168
Ho		
0.5	Chrom.	B-209
0.60	L-Chromato.	B-438
0.294	NAA	B-234, B-277
0.32	RNAA	B-447
0.66	SIMS	B-337
La		
6.7	Chrom.	B-209
27	ED-XRF	B-444
10.0	ICP	B-378
9.2	INAA	B-230, B-244
9.3	INAA	B-437
9.77	INAA	B-324
10.1	INAA	B-270
8.3	L-Chromato.	B-438
8.24	NAA	B-234
9.02	NAA	B-277
8.2	OES	B-279
<20	OES	B-209
9.02	RNAA	B-447
8.7	SIMS	B-337
10.5	SIMS	B-376
14	XRF	B-168
Lu		
0.09	Chrom.	B-209
0.33	ICP	B-378
0.22	INAA	B-230, B-244
0.32	INAA	B-324
0.33	INAA	B-437
0.48	INAA	B-270
0.38	L-Chromato.	B-438
0.286	NAA	B-277
0.288	NAA	B-234
0.29	RNAA	B-447
0.30	SIMS	B-337
Nd		
12.0	Chrom.	B-209
13.1	ICP	B-378
12.5	INAA	B-437
14	INAA	B-324
7.4	L-Chromato.	B-438
11.6	NAA	B-234, B-277
11.6	RNAA	B-447
10.7	SIMS	B-337
13.4	SIMS	B-376
12	XRF	B-168
Pr		
2.2	Chrom.	B-209
1.82	L-Chromato.	B-438
2.08	NAA	B-234, B-277
2.1	RNAA	B-447
2.4	SIMS	B-337
2.9	XRF	B-168
Sc		
20.3	INAA	B-447
20.5	INAA	B-270
20.9	INAA	B-230, B-244
21.3	INAA	B-437
21.7	INAA	B-324
20.27	NAA	B-234
20.33	NAA	B-277
26	OES	B-209
27	OES	B-279
26	SIMS	B-337
15	XRF	B-168
Sm		
3.2	Chrom.	B-209
2.5	ICP	B-378
3.1	INAA	B-270
3.13	INAA	B-437
3.27	INAA	B-324
3.4	INAA	B-230, B-244
1.75	L-Chromato	B-438
3.08	NAA	B-277
3.25	NAA	B-234
3.07	RNAA	B-447
3.1	SIMS	B-337
3.41	SIMS	B-376
3.2	XRF	B-168
Tb		
0.42	INAA	B-230, B-244
0.56	INAA	B-437
0.54	L-Chromato.	B-438
0.403	NAA	B-234, B-277
0.40	RNAA	B-447
0.80	SIMS	B-337
Tm		
0.09	Chrom.	B-209
0.25	L-Chromato.	B-438
0.53	SIMS	B-337
Y		
20	ED-XRF	B-444
18	OES	B-279
28	OES	B-209
20	SIMS	B-337
16	XRF	B-270
19	XRF	B-170
20	XRF	B-164
20	XRF	B-219
20	XRF	B-169
20.7	XRF	B-171
21	XRF	B-189
22	XRF	B-428
22	XRF	B-198
26	XRF	B-207
27	XRF	B-168

Table A-3 Individual data for JA-3

ppm	Method	Code No.	ppm	Method	Code No.	ppm	Method	Code No.
Yb								
0.4	Chrom.	B-209						
2.10	ICP	B-378						
1.90	INAA	B-437						
2.09	INAA	B-324						
2.3	INAA	B-270						
2.09	L-Chromato.	B-438						
2.05	NAA	B-234, B-277						
2.4	OES	B-279						
2.9	OES	B-209						
1.63	RNAA	B-447						
1.98	SIMS	B-376						
2.1	SIMS	B-337						
2.6	XRF	B-168						
Zr								
117	ED-XRF	B-444						
117	ICP-MS	B-379						
110	INAA	B-324						
128	OES	B-279						
149	OES	B-209						
123	Photom.	B-290						
110	SIMS	B-337						
114	XRF	B-171						
117	XRF	B-189						
118	XRF	B-219						
118	XRF	B-198						
119	XRF	B-428						
120	XRF	B-170						
121	XRF	B-169						
123	XRF	B-207						
127	XRF	B-270						
127	XRF	B-168						

Table A-4 Individual data for JB-1

ppm	Method	Code No.
Ce		
65	ED-XRF	B-400
63.7	ICP	B-116, B-117
63.7	ICP	B-34
63.8	ICP	B-362
67.0	ICP	B-471
68.1	ICP	B-349
68.8	ICP	B-419
56.2	ICP-MS	B-269
66.7	ICP-MS	B-292
66.81	ICP-MS	B-313
65.9	IDMS	B-66
66.3	IDMS	B-258-6
66.4	IDMS	N-1
66.5	IDMS	B-416
67.0	IDMS	B-354
67.1	IDMS	T-5
67.5	IDMS	B-57
67.9	IDMS	T-4
63	INAA	P-6
63.9	INAA	B-383
64.3	INAA	B-393
64.7	INAA	B-252, B-283
65	INAA	B-154, B-193
65	INAA	B-24
65.8	INAA	B-341-2
66	INAA	B-8
66.9	INAA	B-344, B-389
67	INAA	P-1
68	INAA	B-449
68	INAA	B-146
68	INAA	B-360
68.1	INAA	B-386
71.1	INAA	B-358
74	INAA	B-58
64	INAA(epi)	B-114
65	NAA	R-2
65.4	NAA	C-2
67	NAA	B-4
67.1	NAA	M-3
67.3	NAA	B-10
68.3	NAA	B-174
69	NAA	B-126
73	NAA	H-5'
100	NAA	B-1
60.5	PAA	B-56, B-221
61.0	PAA	B-143-2, 3, 4
64	PAA	B-6-1, B-6-2
64	PAA	B-143-1
70	PAA	S-2'
67.5	RNAA	B-301
70	SIMS	B-345
70.0	SIMS	B-337
100	SSMS	R-1'
67.0	SSMS(Elect)	B-394
69.6	SSMS(Photo)	B-394
70	XRF	B-248
73	XRF	B-28
73.1	XRF	B-384
Dy		
3.75	ICP	B-116, B-117
3.8	ICP	B-34
3.82	ICP	B-362
4.06	ICP	B-419
4.29	ICP	B-471
4.72	ICP	B-349
3.8	ICP-MS	B-269
4.06	ICP-MS	B-313
4.25	ICP-MS	B-292
4.03	IDMS	B-258-6
4.05	IDMS	B-416
4.06	IDMS	N-1
4.13	IDMS	T-5
4.19	IDMS	B-57
4.25	IDMS	T-4
3.9	INAA	B-154, B-193
4.5	INAA	B-344, B-389
4.0	NAA	C-2'
4.0	SIMS	B-337
5.6	SIMS	B-345
3.9	SSMS	R-1'
3.90	SSMS(Photo)	B-394
4.13	XRF	B-384
Er		
1.99	ICP	B-419
2.15	ICP	B-362
2.15	ICP	B-116, B-117
2.2	ICP	B-34
2.39	ICP	B-349
2.53	ICP	B-471
2.24	ICP-MS	B-313
2.25	ICP-MS	B-269
2.39	ICP-MS	B-292
2.13	IDMS	B-416
2.19	IDMS	N-1
2.23	IDMS	B-258-6
2.28	IDMS	B-57
2.30	IDMS	B-354
2.31	IDMS	T-5
2.35	IDMS	T-4
2.2	INAA	B-154, B-193
2.4	INAA	B-344, B-389
2.1	SIMS	B-337
2.9	SIMS	B-345
1.9	SSMS	R-1'
2.30	SSMS(Elect)	B-394
2.15	SSMS(Photo)	B-394
2.34	XRF	B-384
Eu		
1.6	GFAAS	B-391
1.47	ICP	B-349
1.47	ICP	B-362
1.48	ICP	B-419
1.5	ICP	B-34
1.51	ICP	B-116, B-117
1.53	ICP	B-471
1.4	ICP-MS	B-269
1.49	ICP-MS	B-292
1.56	ICP-MS	B-313
1.41	IDMS	B-66
1.44	IDMS	B-258-6
1.44	IDMS	B-416
1.45	IDMS	B-354
1.48	IDMS	N-1
1.54	IDMS	T-4
1.55	IDMS	B-57
1.55	IDMS	T-5
1.4	INAA	B-341-2
1.45	INAA	B-393
1.46	INAA	B-252, B-283
1.49	INAA	B-343
1.49	INAA	B-54
1.5	INAA	P-1'
1.5	INAA	B-154, B-193
1.5	INAA	B-8
1.51	INAA	B-383
1.51	INAA	P-6'
1.51	INAA	B-344, B-389
1.6	INAA	B-24
1.6	INAA	B-449
1.6	INAA	B-146
1.6	INAA	B-360
1.60	INAA	B-386
1.61	INAA	B-358
1.3	NAA	B-98
1.42	NAA	B-1
1.5	NAA	H-5'
1.50	NAA	R-2
1.50	NAA	C-2'
1.53	NAA	B-10
1.53	NAA	B-4
1.54	NAA	M-3
1.54	NAA	B-174
1.7	NAA	B-126
1.50	RNAA	B-301
1.6	SIMS	B-345
1.79	SIMS	B-337
0.91	SSMS	B-404
1.7	SSMS	R-1'
1.45	SSMS(Elect)	B-394
1.40	SSMS(Photo)	B-394
0.83	XRF	B-384
Gd		
4.31	ICP	B-362
4.7	ICP	B-34
4.73	ICP	B-116, B-117
4.81	ICP	B-419
4.84	ICP	B-471
5.28	ICP	B-349
5.16	ICP-MS	B-292
5.67	ICP-MS	B-313
4.65	IDMS	B-258-6
4.80	IDMS	T-4
4.82	IDMS	B-57
4.84	IDMS	T-5
4.93	IDMS	B-416
3.8	INAA	P-1'
4.5	INAA	B-344, B-389
4.73	INAA	B-343
4.73	INAA	B-54
4.9	INAA	B-386
5.2	INAA	P-6'
5.8	INAA	B-358
4.79	NAA	B-174
4.7	SIMS	B-337
5.7	SIMS	B-345
5.9	SSMS	R-1'
4.17	SSMS(Photom)	B-394
5.22	XRF	B-384

Table A-4 Individual data for JB-1

ppm	Method	Code No.
Hf		
3.612	IDMS	B-387
1.15	INAA	P-1'
2.4	INAA	B-8
3.3	INAA	C-2'
3.37	INAA	P-6'
3.4	INAA	B-383
3.4	INAA	B-341-2
3.4	INAA	B-344, B-389
3.43	INAA	B-252, B-283
3.5	INAA	B-146
3.5	INAA	B-360
3.50	INAA	B-386
3.6	INAA	B-24
3.92	INAA	B-465
3.559	MS	B-371
3.1	NAA	B-26
3.2	NAA	R-2
3.4	NAA	B-286
3.5	NAA	M-3
3.57	NAA	B-10
3.8	NAA	B-4
4.0	NAA	B-7
2.9	SIMS	B-337
2.9	SSMS	R-1'
Ho		
0.70	ICP	B-116, B-117
0.70	ICP	B-34
0.78	ICP	B-362
0.84	ICP	B-419
0.93	ICP	B-349
0.63	ICP-MS	B-269
0.81	ICP-MS	B-313
0.853	ICP-MS	B-292
0.814	IDMS	B-258-6
0.6	INAA	B-146
0.91	INAA	B-344, B-389
0.92	INAA	B-154, B-193
0.69	RNAA	B-301
0.77	SIMS	B-337
0.70	SSMS	R-1'
0.87	SSMS(Elect)	B-394
0.80	SSMS(Photo)	B-394
La		
35.1	ICP	B-362
36.1	ICP	B-116, B-117
36.1	ICP	B-34
36.8	ICP	B-471
38.2	ICP	B-415, B-441
38.6	ICP	B-349
39	ICP	B-196
39.1	ICP	B-419
35.4	ICP-MS	B-269
35.7	ICP-MS	B-292
37.2	ICP-MS	B-313
36.7	IDMS	T-5
36.8	IDMS	B-258-6
37.0	IDMS	B-57
37.3	IDMS	T-4
36	INAA	B-146
36.1	INAA	B-383
36.6	INAA	B-344, B-389
36.7	INAA	B-341-2
37	INAA	B-449
37.1	INAA	B-386
37.7	INAA	B-358
37.7	INAA	B-360
38.2	INAA	B-252, B-283
38.4	INAA	B-393
39	INAA	B-58
39	INAA	B-154, B-193
40	INAA	B-8
42	INAA	B-24
56	INAA(epi)	B-114
34	NAA	B-4
34.9	NAA	M-3
35	NAA	B-98
35.9	NAA	R-2
36.07	NAA	B-10
37.8	NAA	C-2'
38.0	NAA	B-126
38.4	NAA	B-174
40	NAA	H-5'
45.6	NAA	B-1
37.6	RNAA	B-301
40.4	SIMS	B-337
46	SIMS	B-345
57	SSMS	R-1'
37.4	SSMS(Elect)	B-394
36.2	SSMS(Photo)	B-394
36	XRF	G-1
39.9	XRF	B-384
40	XRF	B-28
40	XRF	B-248
Lu		
0.27	ICP	B-362
0.29	ICP	B-471
0.31	ICP	B-34
0.31	ICP	B-117
0.35	ICP	B-349
0.38	ICP	B-419
0.3	ICP-MS	B-269
0.317	ICP-MS	B-292
0.33	ICP-MS	B-313
0.29	IDMS	B-416
0.302	IDMS	N-1
0.305	IDMS	B-258-6
0.308	IDMS	B-57
0.31	IDMS	T-4
0.313	IDMS	B-387
0.23	INAA	B-386
0.25	INAA	B-146
0.27	INAA	B-54
0.27	INAA	B-343
0.28	INAA	P-6'
0.30	INAA	B-154, B-193
0.31	INAA	B-449
0.31	INAA	B-383
0.31	INAA	H-5'
0.31	INAA	B-360
0.31	INAA	B-8
0.31	INAA	B-252, B-283
0.312	INAA	B-358
0.32	INAA	B-341-2
0.32	INAA	C-2'
0.32	INAA	B-24
0.33	INAA	B-344, B-389
0.349	INAA	B-393
0.303	MS	B-371
0.29	NAA	M-3
0.307	NAA	T-5
0.31	NAA	B-10
0.320	NAA	B-174
0.33	NAA	R-2
0.34	NAA	B-4
0.40	NAA	B-1
0.31	RNAA	B-301
0.31	SIMS	B-337
0.32	SSMS(Photo)	B-394
Nd		
24.6	ICP	B-116, B-117
24.6	ICP	B-34
25.0	ICP	B-362
26.5	ICP	B-471
26.7	ICP	B-349
27.2	ICP	B-419
26.0	ICP-MS	B-292
26.16	ICP-MS	B-313
27.6	ICP-MS	B-269
20.8	IDMS	N-1
24.6	IDMS	B-416
26.0	IDMS	B-258-6
26.6	IDMS	T-5
26.8	IDMS	B-57
27.0	IDMS	T-4
27.2	IDMS	B-66
27.8	IDMS	B-354
21	INAA	B-146
23.8	INAA	P-6'
26	INAA	B-360
26.8	INAA	B-383
27	INAA	B-154, B-193
27.1	INAA	B-344, B-389
27.3	INAA	B-358
27.7	INAA	B-386
29	INAA	B-449
29	INAA	B-252, B-283
29.6	INAA	B-54
29.6	INAA	B-343
26.6	NAA	B-174
28.5	NAA	H-5'
<30	NAA	R-2
26.5	RNAA	B-301
24	SIMS	B-345
27.7	SIMS	B-337
41	SSMS	R-1'
27.8	SSMS(Elect)	B-394
24.0	SSMS(Photo)	B-394
28.2	XRF	B-384
29	XRF	B-28
29	XRF	B-248
34.5	XRF	B-385
Pr		
6.26	ICP	B-116, B-117
6.3	ICP	B-34
6.54	ICP	B-362

Table A-4 Individual data for JB-1

ppm	Method	Code No.
6.74	ICP	B-419
7.91	ICP	B-349
5.6	ICP-MS	B-269
6.04	ICP-MS	B-292
7.12	ICP-MS	B-313
7.1	INAA	B-344, B-389
7.5	INAA	B-154, B-193
7.9	SIMS	B-337
8.7	SSMS	R-1'
7.59	SSMS(Elect)	B-394
7.23	SSMS(Photo)	B-394
6.74	XRF	B-384
Sc		
25.1	ICP	B-471
26.3	ICP	B-121
27.2	ICP	B-415, B-441
27.5	ICP	B-196
27.6	ICP-MS	B-269
25	INAA	B-8
26.0	INAA	C-1'
26.0	INAA	B-383
27	INAA	B-146
27.0	INAA	B-341-2
27.3	INAA	B-393
27.3	INAA	B-154, B-193
27.7	INAA	B-252, B-283
27.8	INAA	P-1'
28	INAA	H-5'
28.9	INAA	B-360
32	INAA	B-24
24.9	NAA	B-4
25.6	NAA	M-3
26.0	NAA	B-1
26.20	NAA	B-10
27	NAA	B-7
27	NAA	B-98
27.5	NAA	R-2
30.6	NAA	B-126
32	OS	C-2
25.7	PAA	B-56, B-221
27.2	PAA	B-143-2, 3, 4
31	PAA	B-143-1
31	PAA	B-6-1, B-6-2
28.9	SIMS	B-337
25	XRF	B-370
Sm		
4.0	GFAAS	B-391
4.70	ICP	B-362
5.0	ICP	B-34
5.04	ICP	B-116, B-117
5.32	ICP	B-471
5.49	ICP	B-419
5.62	ICP	B-349
4.6	ICP-MS	B-269
5.06	ICP-MS	B-313
5.17	ICP-MS	B-292
4.93	IDMS	N-1
4.94	IDMS	B-416
4.99	IDMS	B-258-6
5.02	IDMS	B-66
5.06	IDMS	B-354
5.1	IDMS	T-4
5.13	IDMS	B-57
5.16	IDMS	T-5
4.30	INAA	B-146
4.76	INAA	P-6'
5.0	INAA	B-344, B-389
5.06	INAA	B-360
5.1	INAA	B-8
5.1	INAA	B-154, B-193
5.13	INAA	B-252, B-283
5.2	INAA	B-449
5.2	INAA	B-383
5.20	INAA	B-358
5.31	INAA	B-393
5.43	INAA	B-54
5.43	INAA	B-343
5.5	INAA	B-24
5.6	INAA	B-386
51.0	INAA	B-341-2
4.31	NAA	M-3
4.6	NAA	B-98
4.7	NAA	B-4
4.7	NAA	R-2
4.81	NAA	B-10
5.0	NAA	C-2'
5.10	NAA	B-174
5.6	NAA	H-5'
6.0	NAA	B-126
6.7	NAA	B-1
5.12	RNAA	B-301
4.5	SIMS	B-345
5.1	SIMS	B-337
7.0	SSMS	R-1'
5.06	SSMS(Elect)	B-394
5.02	SSMS(Photo)	B-394
1.78	XRF	B-384
Tb		
0.74	ICP	B-419
0.91	ICP	B-349
0.63	ICP-MS	B-269
0.76	ICP-MS	B-313
0.761	ICP-MS	B-292
0.55	INAA	B-146
0.65	INAA	B-360
0.72	INAA	B-252, B-283
0.73	INAA	B-386
0.74	INAA	B-341-2
0.75	INAA	P-6'
0.75	INAA	B-383
0.76	INAA	B-344, B-389
0.8	INAA	B-449
0.84	INAA	B-8
0.86	INAA	B-393
1.05	INAA	B-154, B-193
1.12	INAA	B-358
1.18	INAA	B-54
1.18	INAA	B-343
0.47	NAA	M-3
0.70	NAA	C-2'
0.81	NAA	B-4
0.85	NAA	B-174
1.2	NAA	H-5'
1.3	NAA	B-11
0.69	RNAA	B-301
0.79	SIMS	B-337
0.80	SSMS	R-1'
0.69	SSMS(Photo)	B-394
Tm		
0.38	ICP	B-349
0.38	ICP	B-419
0.31	ICP-MS	B-313
0.318	ICP-MS	B-292
0.4	ICP-MS	B-269
0.31	INAA	B-344, B-389
0.31	INAA	B-386
0.35	INAA	P-6'
0.388	INAA	B-358
(0.30)	INAA	B-383
0.344	NAA	B-174
0.5	NAA	O-10
0.39	RNAA	B-301
0.26	SIMS	B-337
0.35	SSMS(Elect)	B-394
0.30	SSMS(Photo)	B-394
Y		
20	ED-XRF	B-400
24	ED-XRF	B-413
20.4	ICP	B-362
21.5	ICP	B-471
21.7	ICP	B-415, B-441
21.7	ICP	B-419
27	ICP	B-196
24.0	ICP-MS	B-269
26.7	ICP-MS	B-292
<30	OS	C-2
24	OS(DR)	T-19
21.9	PAA	K-9'
23.1	PAA	B-143-2, 3, 4
24	PAA	B-143-1
24	PAA	B-6-1, B-6-2
26.5	PAA	S-2'
44	PIXE	B-452
23.6	PPA	B-56, B-221
28	SIMS	B-337
37	SSMS	R-1'
5	XRF	B-388
17	XRF	B-270
20	XRF	B-346
21	XRF	B-85
22	XRF	B-12
22.4	XRF	B-29, B-73
24	XRF	T-22'
24	XRF	O-1'
24.5	XRF	B-28
25	XRF	B-341-2
25	XRF	B-428
26	XRF	B'-1
27	XRF	B-352
28	XRF	B-15
28	XRF	C-3'
33	XRF	B-370
Yb		
2.1	GFAAS	B-391
1.96	ICP	B-362
2.08	ICP	B-419

Table A-4 Individual data for JB-1

ppm	Method	Code No.
2.1	ICP	B-34
2.10	ICP	B-116, B-117
2.11	ICP	B-471
2.12	ICP	B-349
2.1	ICP-MS	B-269
2.11	ICP-MS	B-313
2.17	ICP-MS	B-292
1.94	IDMS	B-416
2.01	IDMS	N-1
2.04	IDMS	B-258-6
2.13	IDMS	T-5
2.14	IDMS	B-57
2.15	IDMS	T-4
2.24	IDMS	B-354
1.8	INAA	B-154, B-193
1.95	INAA	H-5'
2.0	INAA	B-146
2.04	INAA	B-252, B-283
2.07	INAA	P-6'
2.09	INAA	B-54
2.1	INAA	B-449
2.1	INAA	C-2'
2.10	INAA	B-344, B-389
2.11	INAA	B-358
2.2	INAA	B-360
2.20	INAA	B-341-2
2.21	INAA	B-386
2.24	INAA	B-393
2.3	INAA	B-24
2.49	INAA	B-383
2.8	INAA	P-1'
2.8	INAA	B-8
1.2	NAA	R-2
1.5	NAA	B-4
2.13	NAA	B-10
2.18	NAA	M-3
2.19	NAA	B-174
<4	OS	C-2
2.09	RNAA	B-343
2.16	RNAA	B-301
2.4	SIMS	B-337
2.9	SIMS	B-345
2.1	SSMS	R-1'
2.24	SSMS(Elect)	B-394
2.15	SSMS(Photo)	B-394

Zr

ppm	Method	Code No.
143	ED-XRF	B-377
147	ED-XRF	B-413
142	ICP	B-121
150	ICP	U-10'
151	ICP	B-471
167	INAA	B-465
168	INAA	B-146
63	NAA	P-1'
110	NAA	B-7
360	NAA	R-2
140	OS	C-2
135	OS(DR)	T-19
126	PAA	B-143-2, 3, 4
132	PAA	B-56, B-221
133	PAA	B-6-1, B-6-2
133	PAA	B-143-1
143.5	PAA	S-2'
144.5	Photom.	K-15'
149	Photom.	B-290
151	Photom.	K-7
157	Photom.	B-173
175	PIXE	B-452
154	SIMS	B-337
170	SSMS	R-1'
104	XRF	B-352
131	XRF	O-1'
134	XRF	S-1'
134	XRF	B-385
134	XRF	B-367
135	XRF	B-85
135	XRF	B-12
136	XRF	C-3'
139	XRF	B-15
139	XRF	B'-1
140	XRF	B-346
140	XRF	M-9
141	XRF	T-22'
142	XRF	B-28
142	XRF	B-248
143	XRF	B-428
148	XRF	W-1
148	XRF	B-29, B-73
149	XRF	B-270
150	XRF	B-341-2
153	XRF	B-370
163	XRF	S-15
215	XRF	G-1
335	XRF	B-388

Table A-5 Individual data for JB-1a

ppm	Method	Code No.
Ce		
52.3	Chrom.	B-209
66.4	ICP	B-471
67	ED-XRF	B-444
69	ICP	B-434
70.9	ICP	B-378
65.33	ICP-MS	B-442
58	INAA	B-24
65	INAA	B-142
67.0	INAA	B-118
67.4	INAA	B-310
67.4	INAA	B-37-2
67.7	INAA	B-324
71	INAA	B-270
60.1	L-Chromato.	B-438
59	NAA	B-287
70.0	NAA	B-277
64.5	RNAA	B-447
63.9	SIMS	B-376
67.1	SIMS	B-337
72	XRF	B-25
77	XRF(powder)	B-70
Dy		
4.0	Chrom.	B-209
4.1	ICP	B-378
4.2	ICP	B-471
4.5	ICP	B-434
4.07	ICP-MS	B-442
4.4	INAA	B-270
4.55	NAA	B-277
4.8	RNAA	B-447
3.6	SIMS	B-337
3.70	SIMS	B-376
1.8	XRF	B-136
Er		
3.1	Chrom.	B-209
2.71	ICP	B-471
2.18	ICP-MS	B-442
1.94	L-Chromato.	B-438
1.97	NAA	B-277
1.1	RNAA	B-447
2.10	SIMS	B-376
2.3	SIMS	B-337
Hf		
1.54	ICP	B-471
1.59	ICP	B-378
1.54	ICP-MS	B-442
1.4	INAA	B-142
1.40	INAA	B-310
1.40	INAA	B-37-2
1.44	INAA	B-270
1.5	INAA	B-24
1.50	INAA	B-324
1.57	INAA	B-118
1.28	L-Chromato.	B-438
1.48	NAA	B-277
1.60	NAA	B-287
1.40	RNAA	B-447
1.43	SIMS	B-376
1.45	SIMS	B-337
Gd		
4.4	ICP	B-378
4.73	ICP	B-471
5.42	ICP-MS	B-442
4.12	INAA(PG)	B-436
4.04	L-Chromato.	B-438
4.48	SIMS	B-376
4.6	SIMS	B-337
5.8	XRF	B-136
Hf		
3.73	ICP-MS	B-379
3.26	INAA	B-310
3.26	INAA	B-37-2
3.4	INAA	B-24
3.41	INAA	B-447
3.53	INAA	B-324
3.58	INAA	B-118
3.6	INAA	B-142
3.7	INAA	B-270
3.79	INAA	B-465
3.0	NAA	B-287
3.41	NAA	B-277
3.5	SIMS	B-337
2.6	XRF	B-25
Ho		
0.7	Chrom.	B-209
0.70	ICP-MS	B-442
0.69	L-Chromato.	B-438
0.613	NAA	B-277
0.46	RNAA	B-447
0.66	SIMS	B-337
La		
28.8	Chrom.	B-209
41	ED-XRF	B-444
37.6	ICP	B-378
37.8	ICP	B-471
40	ICP	B-434
37.80	ICP-MS	B-442
36.9	INAA	B-324
38	INAA	B-142
38.1	INAA	B-37-2
38.1	INAA	B-310
39.4	INAA	B-118
41	INAA	B-270
41	INAA	B-24
33.3	L-Chromato.	B-438
35.92	NAA	B-277
39	NAA	B-287
37	OES	B-209
41	OES	B-279
36.5	RNAA	B-447
37.0	SIMS	B-376
38.7	SIMS	B-337
35.5	XRF	B-25
38	XRF	B-70
Lu		
0.21	ICP	B-471
0.31	ICP	B-378
0.31	ICP-MS	B-442
0.31	INAA	B-24
0.32	INAA	B-310
0.32	INAA	B-324
0.32	INAA	B-37-2
0.34	INAA	B-142
0.35	INAA	B-118
0.41	INAA	B-270
0.37	L-Chromato.	B-438
0.24	NAA	B-287
0.314	NAA	B-277
0.31	RNAA	B-447
0.35	SIMS	B-337
Nd		
22.2	Chrom.	B-209
26.5	ICP	B-434
26.9	ICP	B-378
26.9	ICP	B-471
25.78	ICP-MS	B-442
23.2	INAA	B-37-2
23.2	INAA	B-310
24	INAA	B-142
26	INAA	B-324
27.4	INAA	B-118
22.7	L-Chromato.	B-438
36.6	NAA	B-277
29.0	RNAA	B-447
24.0	SIMS	B-376
27.4	SIMS	B-337
28.0	XRF	B-25
Pr		
3.9	Chrom.	B-209
6.78	ICP-MS	B-442
6.21	L-Chromato.	B-438
8.72	NAA	B-277
7.47	RNAA	B-447
7.3	SIMS	B-337
11.6	XRF	B-25
Sc		
25.2	ICP	B-471
27.0	INAA	B-270
27.2	INAA	B-447
27.6	INAA	B-37-2
27.62	INAA	B-310
28.6	INAA	B-324
29	INAA	B-142
29.4	INAA	B-118
31	INAA	B-24
27.20	NAA	B-277
27.6	NAA	B-287
17	OES	B-209
37	OES	B-279
26.5	SIMS	B-337
28	XRF	B-129
28.7	XRF	B-25
Sm		

Table A-5 Individual data for JB-1a

ppm	Method	Code No.
5.5	Chrom.	B-209
5.0	ICP	B-378
6.2	ICP	B-471
4.80	ICP-MS	B-442
4.8	INAA	B-270
5.04	INAA	B-310
5.04	INAA	B-37-2
5.05	INAA	B-324
5.1	INAA	B-24
5.32	INAA	B-118
5.4	INAA	B-142
4.35	INAA(PG)	B-436
4.35	L-Chromato.	B-438
5.22	NAA	B-277
5.4	NAA	B-287
5.23	RNAA	B-447
4.74	SIMS	B-376
4.8	SIMS	B-337
12.1	XRF	B-23
Tb		
0.65	ICP-MS	B-442
0.61	INAA	B-310
0.61	INAA	B-37-2
0.62	INAA	B-324
0.78	INAA	B-118
0.78	INAA	B-142
0.62	L-Chromato.	B-438
0.782	NAA	B-277
0.82	RNAA	B-447
0.62	SIMS	B-337
Tm		
0.2	Chrom.	B-209
0.33	ICP-MS	B-442
0.34	INAA	B-118
0.28	L-Chromato.	B-438
0.38	SIMS	B-337
Y		
27	ED-XRF	B-444
21.0	ICP	B-471
25.6	ICP	B-434
23	OES	B-279
23	OES	B-209
26	SIMS	B-337
17	XRF	B-31
17	XRF	B-270
21	XRF	B-134
23	XRF	B-434
23.5	XRF	B-145
23.5	XRF	B-200
24	XRF	B-129
24.3	XRF	B-19
25	XRF	B-43
25	XRF	B-428
26	XRF	B-135
26	XRF	B-35
26	XRF	B-25
27	XRF	B-40
27	XRF	B-312
27	XRF	B-15
24	XRF(fusion)	B-36
22	XRF(powder)	B-36
25	XRF(powder)	B-70
Yb		
1.99	ICP	B-378
2	ICP	B-434
2.10	ICP	B-471
1.88	ICP-MS	B-442
1.9	INAA	B-24
1.99	INAA	B-324
2.03	INAA	B-310
2.03	INAA	B-37-2
2.15	INAA	B-118
2.3	INAA	B-142
2.4	INAA	B-270
1.81	L-Chromato.	B-438
2.03	NAA	B-277
2.4	OES	B-209
2.8	OES	B-279
2.05	RNAA	B-447
2.0	SIMS	B-337
2.02	SIMS	B-376
5.3	XRF	B-136
Zr		
147	ED-XRF	B-444
137	ICP	B-434
148	ICP	B-148
153	ICP	B-471
140	ICP-MS	B-379
140	INAA	B-324
154	INAA	B-465
158	INAA	B-310
158	INAA	B-37-2
115	OES	B-209
155	OES	B-279
151	Photom.	B-290
152	SIMS	B-337
136	XRF	B-200
136	XRF	B-145
137	XRF	B-40
139	XRF	B-135
140	XRF	B-428
140	XRF	B-25
140	XRF	B-31
141	XRF	B-19
143	XRF	B-15
144	XRF	B-270
144	XRF	B-43
168	XRF	B-434
144	XRF(powder)	B-36
150	XRF(powder)	B-70

Table A-6 Individual data for JB-2

ppm	Method	Code No.
Ce		
7.3	Chrom.	B-209
7	ED-XRF	B-444
6.6	ICP	B-34, B-117
6.8	ICP	B-471
9.26	ICP	G-6'
6.1	ICP-MS	B-455
6.52	ICP-MS	B-442
6.7	ICP-MS	B-426
6.88	ICP-MS	B-292
6.61	IDMS	B-109
6.65	IDMS	B-165, B-231
6.65	IDMS	B-324
4.72	INAA	B-310
5.5	INAA	B-24
5.6	INAA	B-18
6.2	INAA	B-37-2
6.6	INAA	B-324
6.9	INAA	B-142
7.0	INAA	B-118
7.08	INAA	B-289, B-300
7.1	INAA	B-270
7.1	INAA	B-154, B-193
8.1	INAA	B-146
8.8	INAA	B-58
6.53	L-Chromato.	B-438
6.4460	MS	B-302
6.5	NAA	M-1'
6.52	NAA	B-277
7.0	NAA	B-126
7.3	NAA	B-11
9	NAA	B-287
<30	OES	B-279
4.7	PAA	B-56, B-221
6.3	PAA	B-55
6.53	RNAA	B-447
6.8	SIMS	B-337
8.40	SIMS	B-376
19	XRF	B-18
25	XRF	B-25
6	XRF(powder)	B-70
Dy		
4.22	ICP	G-6'
2.67	NAA	B-11
2.6	INAA	B-18
3.7	ICP	B-34, B-117
4.16	ICP	B-471
3.98	IDMS	B-109
<1	XRF	B-136
3.86	INAA	B-154, B-193
1.9	Chrom.	B-209
<8	INAA	B-270
3.76	NAA	B-277
3.79	ICP-MS	B-292
3.9880	MS	B-302
3.91	IDMS	B-324
4.0	SIMS	B-337
4.23	SIMS	B-376
4.0	ICP-MS	B-426
3.83	ICP-MS	B-442
9.3	RNAA	B-447
3.6	ICP-MS	B-455

ppm	Method	Code No.
Er		
1.0	Chrom.	B-209
2.31	ICP	G-6'
2.5	ICP	B-34, B-117
3.58	ICP	B-471
2.36	ICP-MS	B-442
2.4	ICP-MS	B-455
2.60	ICP-MS	B-292
2.75	ICP-MS	B-426
2.55	IDMS	B-109
2.57	IDMS	B-324
2.19	INAA	B-154, B-193
2.61	L-Chromato.	B-438
2.6050	MS	B-302
2.51	NAA	B-277
2.5	RNAA	B-447
2.9	SIMS	B-337
3.08	SIMS	B-376
Eu		
0.88	AAS	B-260
0.82	ICP	B-34, B-117
0.91	ICP	B-471
0.92	ICP	G-6'
0.820	ICP-MS	B-292
0.85	ICP-MS	B-426
0.86	ICP-MS	B-442
1.0	ICP-MS	B-455
0.826	IDMS	B-324
0.827	IDMS	B-109
0.07	INAA	B-58
0.75	INAA	B-310
0.78	INAA	B-37-2
0.78	INAA	B-154, B-193
0.79	INAA	B-289, B-300
0.82	INAA	B-142
0.83	INAA	B-324
0.86	INAA	B-270
0.87	INAA	B-18
0.88	INAA	B-24
0.893	INAA	B-118
0.90	INAA	B-244
0.91	INAA	B-230
1.0	INAA	B-146
0.82	L-Chromato.	B-438
0.8314	MS	B-302
0.79	NAA	B-3
0.80	NAA	B-11
0.878	NAA	B-277
0.90	NAA	M-1'
0.95	NAA	B-287
0.96	NAA	B-126
0.853	RNAA	B-447
0.74	SIMS	B-337
0.94	SIMS	B-376
Gd		
3.1	ICP	B-34, B-117
3.34	ICP	B-471
3.15	ICP-MS	B-292
3.20	ICP-MS	B-442
3.35	ICP-MS	B-426
3.4	ICP-MS	B-455

ppm	Method	Code No.
3.21	IDMS	B-324
3.27	IDMS	B-109
3.7	INAA	B-132
2.63	INAA(PG)	B-436
3.33	L-Chromato.	B-438
3.1790	MS	B-302
3.01	SIMS	B-376
4.1	SIMS	B-337
5.8	XRF	B-136
Hf		
1.55	ICP-MS	B-426
1.62	ICP-MS	B-379
1.17	INAA	B-324
1.20	INAA	B-447
1.32	INAA	B-289, B-300
1.36	INAA	B-37-2
1.36	INAA	B-310
1.5	INAA	B-142
1.5	INAA	B-270
1.58	INAA	B-118
1.6	INAA	B-18
1.6	INAA	B-24
1.7	INAA	B-146
1.1	NAA	M-1'
1.19	NAA	B-277
1.25	NAA	B-287
1.3	NAA	B-11
1.9	NAA	B-3
1.9	SIMS	B-337
1.0	XRF	B-25
Ho		
0.3	Chrom.	B-209
0.83	ICP	B-34, B-117
0.75	ICP-MS	B-442
0.88	ICP-MS	B-426
0.890	ICP-MS	B-292
0.68	INAA	B-146
0.75	INAA	B-154, B-193
0.83	INAA	B-37-2
0.88	L-Chromato.	B-438
0.642	NAA	B-277
0.64	RNAA	B-447
1.00	SIMS	B-337
La		
1.9	Chrom.	B-209
1.8	ICP	B-471
2.3	ICP	B-34, B-117
2.64	ICP	G-6'
2.2	ICP-MS	B-455
2.32	ICP-MS	B-292
2.4	ICP-MS	B-426
2.91	ICP-MS	B-442
2.25	IDMS	B-324
2.25	IDMS	B-165, B-231
2.28	IDMS	B-109
2.25	INAA	B-310
2.25	INAA	B-37-2
2.26	INAA	B-289, B-300
2.27	INAA	B-324
2.3	INAA	B-146

Table A-6 Individual data for JB-2

ppm	Method	Code No.
2.4	INAA	B-58
2.4	INAA	B-154, B-193
2.5	INAA	B-270
2.6	INAA	B-118
2.6	INAA	B-18
2.6	INAA	B-142
2.7	INAA	B-24
2.49	L-Chromato.	B-438
2.2644	MS	B-302
2.0	NAA	M-1'
2.0	NAA	B-126
2.3	NAA	B-11
2.4	NAA	B-3
2.41	NAA	B-277
2.5	NAA	B-287
<10	OES	B-279
<20	OES	B-209
2.39	RNAA	B-447
2.69	SIMS	B-376
2.7	SIMS	B-337
2.4	XRF	B-25
2.5	XRF	B-18
2	XRF(powder)	B-70
Lu		
0.4	Chrom.	B-209
0.30	ICP	G-6'
0.38	ICP	B-34, B-117
0.40	ICP	B-471
0.35	ICP-MS	B-442
0.386	ICP-MS	B-292
0.4	ICP-MS	B-455
0.41	ICP-MS	B-426
0.389	IDMS	B-109
0.389	IDMS	B-324
0.30	INAA	B-146
0.34	INAA	B-154, B-193
0.37	INAA	B-447
0.38	INAA	B-289, B-300
0.39	INAA	B-324
0.4	INAA	B-142
0.4	INAA	B-37-2
0.40	INAA	B-310
0.41	INAA	B-24
0.45	INAA	B-118
0.45	INAA	B-18
0.66	INAA	B-270
0.40	L-Chromato.	B-438
0.3881	MS	B-302
0.36	NAA	M-1'
0.364	NAA	B-277
0.37	NAA	B-287
0.39	NAA	B-3
0.40	NAA	B-11
0.41	SIMS	B-337
Nd		
5.9	Chrom.	B-209
6.2	ICP	B-34, B-117
6.7	ICP	B-471
6.96	ICP	G-6'
6.37	ICP-MS	B-442
6.5	ICP-MS	B-426
6.53	ICP-MS	B-292
6.6	ICP-MS	B-455
6.22	IDMS	B-324
6.22	IDMS	B-165, B-231
6.37	IDMS	B-109
5.2	INAA	B-154, B-193
5.3	INAA	B-142
5.53	INAA	B-146
6.62	INAA	B-289, B-300
6.8	INAA	B-118
7.0	INAA	B-37-2
7.2	INAA	B-310
<44	INAA	B-18
6.53	L-Chromato.	B-438
6.3120	MS	B-302
7.46	MS	B-296, B-357
7.90	NAA	B-277
<10	OES	B-279
7.9	RNAA	B-447
7.0	SIMS	B-337
7.69	SIMS	B-376
7.9	XRF	B-25
Pr		
0.6	Chrom.	B-209
1.2	ICP	B-34, B-117
0.97	ICP-MS	B-442
1.09	ICP-MS	B-292
1.20	ICP-MS	B-426
1.17	L-Chromato.	B-438
0.679	NAA	B-277
0.7	RNAA	B-447
1.4	SIMS	B-337
0.6	XRF	B-25
Sc		
46.5	ICP	B-471
54.6	ICP	K-18'
66	ICP-MS	B-426
46.8	INAA	B-154, B-193
51.4	INAA	B-58
52.9	INAA	B-289, B-300
53	INAA	B-142
53.3	INAA	B-270
53.4	INAA	B-447
54.4	INAA	B-37-2
54.4	INAA	B-310
54.6	INAA	B-244
54.6	INAA	B-230
56	INAA	B-18
56.0	INAA	B-146
56.6	INAA	B-118
56.8	INAA	B-324
61	INAA	B-24
48.84	NAA	B-277
50.4	NAA	M-1'
52	NAA	B-3
52	NAA	B-11
54.5	NAA	B-287
59.0	NAA	B-126
24	OES	B-209
62	OES	B-279
63	OES	B-130
45.9	PAA	B-56, B-221
52.5	SIMS	B-337
54.3	XRF	B-25
55	XRF	B-129
57	XRF	B-87
Sm		
2.2	Chrom.	B-209
1.57	ICP	B-471
2.2	ICP	B-34, B-117
2.65	ICP	G-6'
2.2	ICP-MS	B-455
2.29	ICP-MS	B-442
2.33	ICP-MS	B-426
2.39	ICP-MS	B-292
2.24	IDMS	B-165, B-231
2.24	IDMS	B-324
2.27	IDMS	B-109
2.0	INAA	B-230
2.0	INAA	B-244
2.13	INAA	B-154, B-193
2.14	INAA	B-289, B-300
2.2	INAA	B-24
2.20	INAA	B-146
2.26	INAA	B-310
2.26	INAA	B-37-2
2.3	INAA	B-270
2.3	INAA	B-132
2.32	INAA	B-324
2.4	INAA	B-142
2.4	INAA	B-18
2.42	INAA	B-118
2.10	INAA(PG)	B-436
2.22	L-Chromato.	B-438
2.2420	MS	B-302
2.29	MS	B-100, B-296,
2.0	NAA	B-3
2.0	NAA	M-1'
2.28	NAA	B-277
2.3	NAA	B-287
2.48	NAA	B-126
2.40	RNAA	B-447
2.40	SIMS	B-376
2.7	SIMS	B-337
3.4	XRF	B-23
Tb		
0.58	ICP	B-34, B-117
0.52	ICP-MS	B-442
0.624	ICP-MS	B-292
0.63	ICP-MS	B-426
0.36	INAA	B-146
0.47	INAA	B-310
0.57	INAA	B-289, B-300
0.58	INAA	B-37-2
0.61	INAA	B-18
0.64	INAA	B-118
0.66	INAA	B-142
0.70	INAA	B-154, B-193
0.57	L-Chromato.	B-438
0.53	NAA	B-3
0.651	NAA	B-277
0.73	NAA	M-1'
0.58	RNAA	B-447
0.90	SIMS	B-337

Table A-6 Individual data for JB-2

ppm	Method	Code No.
Tm		
0.2	Chrom.	B-209
0.399	ICP-MS	B-292
0.41	ICP-MS	B-426
0.48	ICP-MS	B-442
0.50	INAA	B-118
0.35	L-Chromato.	B-438
0.55	SIMS	B-337
Y		
25	ED-XRF	B-444
22	ICP	B-455
31	ICP	K-18'
23.6	ICP-MS	B-426
29.3	ICP-MS	B-292
18	OES	B-209
24	OES	B-279
22.1	PAA	B-55
24.1	PAA	B-56, B-221
27	SIMS	B-337
18	XRF	B-270
21.5	XRF	B-29, B-73
23.3	XRF	B-200
23.3	XRF	B-145
24	XRF	B-130
25	XRF	B-43
25	XRF	B-428
25	XRF	B-25
25	XRF	B-6'
25.1	XRF	B-87
26	XRF	B-129
26	XRF	B-40
26.1	XRF	B-135
27.2	XRF	B-19
28	XRF	B-35
29	XRF	B-15
29	XRF	B-31
32	XRF	B-18
20	XRF(fusion)	B-36
23	XRF(powder)	B-36
24	XRF(powder)	B-70
Yb		
0.6	Chrom.	B-209
2.14	ICP	G-6'
2.5	ICP	B-34, B-117
2.63	ICP	B-471
2.5	ICP-MS	B-455
2.6	ICP-MS	B-426
2.61	ICP-MS	B-292
2.87	ICP-MS	B-442
2.54	IDMS	B-109
2.58	IDMS	B-324
2.0	INAA	B-24
2.07	INAA	B-154, B-193
2.40	INAA	B-146
2.42	INAA	B-289, B-300
2.52	INAA	B-310
2.52	INAA	B-37-2
2.6	INAA	B-142
2.62	INAA	B-118
2.72	INAA	B-324
2.8	INAA	B-18
2.9	INAA	B-270
2.57	L-Chromato.	B-438
2.5210	MS	B-302
2.29	NAA	B-277
2.3	NAA	B-11
2.4	NAA	M-1'
2.5	NAA	B-3
2.6	OES	B-209
4.0	OES	B-279
2.33	RNAA	B-447
2.4	SIMS	B-337
2.83	SIMS	B-376
3.7	XRF	B-136
Zr		
52	ED-XRF	B-444
45	ICP	B-455
52.8	ICP	B-471
111	ICP	K-18'
46.3	ICP-MS	B-426
58	ICP-MS	B-379
10.3	INAA	B-146
<395	INAA	B-18
52	OES	B-209
74	OES	B-279
45.6	PAA	B-56, B-221
51.0	PAA	B-55
55	Photom.	B-290
61	Photom.	B-173
55	SIMS	B-337
44	XRF	B-129
44.9	XRF	B-200
44.9	XRF	B-145
45.6	XRF	B-87
46	XRF	B-6'
47	XRF	B-270
47	XRF	B-31
49	XRF	B-130
49	XRF	B-40
49	XRF	B-15
50	XRF	B-428
51	XRF	B-25
51.2	XRF	B-135
53	XRF	B-18
57	XRF	B-19
57.6	XRF	B-29, B-73
60	XRF	S-23'
61	XRF	B-43
51	XRF(powder)	B-70
60	XRF(powder)	B-36

Table A-7 Individual data for JB-3

ppm	Method	Code No.
Ce		
21.2	Chrom.	B-209
25	ED-XRF	B-444
21.0	ICP	B-34, B-117
23.635	ICP	B-309
20.2	ICP-MS	B-292
21.3	ICP-MS	B-320
22.0	ICP-MS	B-315
22.1	ICP-MS(Laser)	B-411
21.1	IDMS	B-165, B-231
21.2	IDMS	B-324
17	INAA	B-24
20	INAA	B-142
20.0	INAA	B-289, B-300
21.5	INAA	B-324
21.6	INAA	B-270
22	INAA	B-163
22.0	INAA	B-310
22.1	INAA	B-118
23	INAA	B-146
25	INAA	B-230, B-244
22.2	L-Chromato.	B-438
19.1	NAA	B-11
22.55	NAA	B-277
18.8	PAA	B-56, B-221
21.3	PAA	B-55
22.6	RNAA	B-447
20.4	SIMS	B-376
22.4	SIMS	B-337
10	XRF	B-74
22	XRF	B-22
36	XRF	B-25
Dy		
3.8	Chrom.	B-209
4.4	ICP	B-34, B-117
4.915	ICP	B-309
4.3	ICP-MS	B-320
4.3	ICP-MS	B-315
4.40	ICP-MS	B-292
4.7	ICP-MS(Laser)	B-411
4.51	IDMS	B-324
5.3	INAA	B-270
2.30	NAA	B-277
4.33	NAA	B-11
1.6	RNAA	B-447
4.68	SIMS	B-376
5.0	SIMS	B-337
2.2	XRF	B-136
Er		
1.5	Chrom.	B-209
2.5	ICP	B-34, B-117
2.91	ICP	B-309
2.5	ICP-MS	B-320
2.6	ICP-MS	B-315
2.67	ICP-MS	B-292
2.7	ICP-MS(Laser)	B-411
2.67	IDMS	B-324
2.77	L-Chromato.	B-438
2.28	NAA	B-277
1.27	RNAA	B-447
2.4	SIMS	B-337
2.66	SIMS	B-376
Eu		
1.285	ICP	B-309
1.3	ICP	B-34, B-117
1.28	ICP-MS	B-292
1.3	ICP-MS	B-320
1.3	ICP-MS	B-315
1.7	ICP-MS(Laser)	B-411
1.32	IDMS	B-324
1.26	INAA	B-289, B-300
1.27	INAA	B-163
1.27	INAA	B-310
1.27	INAA	B-270
1.3	INAA	B-142
1.35	INAA	B-324
1.35	INAA	B-230, B-244
1.4	INAA	B-146
1.4	INAA	B-24
1.42	INAA	B-118
1.28	L-Chromato.	B-438
1.04	NAA	B-11
1.33	NAA	B-277
1.24	RNAA	B-447
1.17	SIMS	B-337
1.30	SIMS	B-376
Gd		
4.6	ICP	B-34, B-117
4.605	ICP	B-309
3.9	ICP-MS	B-320
4.62	ICP-MS	B-292
4.7	ICP-MS	B-315
4.7	ICP-MS(Laser)	B-411
4.63	IDMS	B-324
4.41	INAA(PG)	B-436
4.72	L-Chromato.	B-438
4.04	SIMS	B-376
4.2	SIMS	B-337
6.1	XRF	B-136
Hf		
2.6	ICP-MS	B-320
2.78	ICP-MS	B-379
2.55	INAA	B-447
2.59	INAA	B-289, B-300
2.64	INAA	B-118
2.7	INAA	B-24
2.7	INAA	B-163
2.7	INAA	B-310
2.7	INAA	B-146
2.73	INAA	B-270
2.75	INAA	B-324
2.8	INAA	B-142
2.51	NAA	B-277
2.7	NAA	B-11
2.9	SIMS	B-337
2.5	XRF	B-25
Ho		
0.5	Chrom.	B-209
0.84	ICP	B-34, B-117
0.78	ICP-MS	B-320
0.90	ICP-MS	B-315
0.970	ICP-MS	B-292
0.84	ICP-MS(Laser)	B-291
0.86	ICP-MS(Laser)	B-411
0.68	INAA	B-146
0.92	L-Chromato.	B-438
0.578	NAA	B-277
0.58	RNAA	B-447
0.91	SIMS	B-337
La		
7.7	Chrom.	B-209
11	ED-XRF	B-444
8.0	ICP	B-34, B-117
8.45	ICP	B-309
7.79	ICP-MS	B-292
8.6	ICP-MS	B-320
9.6	ICP-MS	B-315
9.1	ICP-MS(Laser)	B-411
8.27	IDMS	B-324
8.27	IDMS	B-165, B-231
7.9	INAA	B-230, B-244
8.2	INAA	B-146
8.3	INAA	B-310
8.3	INAA	B-163
8.53	INAA	B-324
9.13	INAA	B-289, B-300
9.2	INAA	B-118
9.2	INAA	B-142
9.6	INAA	B-270
9.7	INAA	B-24
8.52	L-Chromato.	B-438
8.84	NAA	B-277
9.3	NAA	B-11
8.6	OES	B-279
<20	OES	B-209
8.73	RNAA	B-447
8.8	SIMS	B-337
10.5	SIMS	B-376
2.8	XRF	B-25
10	XRF(powder)	B-70
Lu		
0.9	Chrom.	B-209
0.37	ICP	B-34, B-117
0.38	ICP	B-309
0.367	ICP-MS	B-292
0.37	ICP-MS	B-320
0.37	ICP-MS	B-315
0.38	ICP-MS(Laser)	B-411
0.368	IDMS	B-324
0.27	INAA	B-230, B-244
0.28	INAA	B-146
0.36	INAA	B-289, B-300
0.37	INAA	B-24
0.39	INAA	B-324
0.39	INAA	B-163
0.39	INAA	B-310
0.40	INAA	B-142
0.43	INAA	B-118
0.53	INAA	B-270
0.49	L-Chromato.	B-438
0.36	NAA	B-11

Table A-7 Individual data for JB-3

ppm	Method	Code No.
0.46	NAA	B-277
0.42	RNAA	B-447
0.38	SIMS	B-337
Nd		
16.5	Chrom.	B-209
15.4	ICP	B-34, B-117
15.875	ICP	B-309
15.3	ICP-MS	B-292
16.3	ICP-MS	B-320
17.3	ICP-MS	B-315
16.8	ICP-MS(Laser)	B-411
15.5	IDMS	B-324
15.50	IDMS	B-165, B-231
13.2	INAA	B-146
14	INAA	B-142
16.8	INAA	B-118
17	INAA	B-163
17	INAA	B-324
17	INAA	B-310
17.3	INAA	B-289, B-300
15.8	L-Chromato.	B-438
10	NAA	B-11
11.2	NAA	B-277
11.2	RNAA	B-447
14.4	SIMS	B-376
16.4	SIMS	B-337
17.0	XRF	B-25
Pr		
2.3	Chrom.	B-209
3.2	ICP	B-34, B-117
2.80	ICP-MS	B-292
3.4	ICP-MS	B-315
3.5	ICP-MS	B-320
3.2	ICP-MS(Laser)	B-291
3.6	ICP-MS(Laser)	B-411
2.95	L-Chromato.	B-438
3.80	NAA	B-277
3.8	RNAA	B-447
3.7	SIMS	B-337
1.0	XRF	B-25
Sc		
33.7	ICP-MS	B-320
31.2	ICP-MS(Laser)	B-411
32	INAA	B-230, B-244
32.2	INAA	B-447
32.3	INAA	B-310
32.3	INAA	B-270
32.3	INAA	B-163
33.1	INAA	B-289, B-300
34.4	INAA	B-146
34.6	INAA	B-324
35	INAA	B-142
35.0	INAA	B-118
38	INAA	B-24
30.2	NAA	B-277
33.0	NAA	B-11
20	OES	B-209
32	OES	B-130
43	OES	B-279
29.7	PAA	B-56, B-221
35.3	SIMS	B-337
35	XRF	B-129
35.3	XRF	B-25
Sm		
4.8	Chrom.	B-209
4.2	ICP	B-34, B-117
4.42	ICP	B-309
4.1	ICP-MS	B-315
4.18	ICP-MS	B-292
4.2	ICP-MS	B-320
4.5	ICP-MS(Laser)	B-411
4.14	IDMS	B-324
4.14	IDMS	B-165, B-231
3.8	INAA	B-146
4.0	INAA	B-270
4.07	INAA	B-163
4.07	INAA	B-310
4.12	INAA	B-289, B-300
4.2	INAA	B-24
4.3	INAA	B-230, B-244
4.39	INAA	B-324
4.5	INAA	B-142
4.50	INAA	B-118
3.94	INAA(PG)	B-436
4.14	L-Chromato.	B-438
4.10	NAA	B-277
4.4	NAA	B-11
4.24	RNAA	B-447
4.40	SIMS	B-376
4.8	SIMS	B-337
6.3	XRF	B-23
Tb		
0.70	ICP	B-34, B-117
0.74	ICP-MS	B-315
0.75	ICP-MS	B-320
0.766	ICP-MS	B-292
0.82	ICP-MS(Laser)	B-291
0.88	ICP-MS(Laser)	B-411
0.55	INAA	B-146
0.65	INAA	B-310
0.66	INAA	B-230, B-244
0.7	INAA	B-324
0.72	INAA	B-142
0.82	INAA	B-118
0.65	INAA(epi)	B-163
0.70	L-Chromato.	B-438
0.69	NAA	B-289, B-300
0.89	NAA	B-277
0.88	RNAA	B-447
0.69	SIMS	B-337
Tm		
0.4	Chrom.	B-209
0.38	ICP-MS	B-315
0.390	ICP-MS	B-292
0.4	ICP-MS	B-320
0.47	ICP-MS(Laser)	B-411
0.44	ICP-MS(Laser)	B-291
0.50	INAA	B-118
0.36	L-Chromato.	B-438
0.39	SIMS	B-337
Y		
24	ED-XRF	B-444
29.43	ICP	B-309
26.9	ICP-MS	B-320
29.5	ICP-MS	B-292
21	OES	B-209
26	OES	B-279
25.4	PAA	B-55
26.2	PAA	B-56, B-221
29	SIMS	B-337
19	XRF	B-31
24	XRF	B-270
24	XRF	B-22
26	XRF	B-130
26.2	XRF	B-29, B-73
27	XRF	B-134
27.0	XRF	B-200
27.0	XRF	B-145
28.2	XRF	B-19
29	XRF	B-129
29	XRF	B-43
29	XRF	B-428
29.2	XRF	B-135
30	XRF	B-35
30	XRF	B-15
30	XRF	B-25
32	XRF	B-40
24	XRF(fusion)	B-36
26	XRF(powder)	B-36
28	XRF(powder)	B-70
Yb		
1.1	Chrom.	B-209
2.5	ICP	B-309
2.5	ICP	B-34, B-117
2.4	ICP-MS	B-315
2.46	ICP-MS	B-292
2.5	ICP-MS	B-320
3.5	ICP-MS(Laser)	B-411
2.49	IDMS	B-324
2.1	INAA	B-24
2.14	INAA	B-146
2.33	INAA	B-289, B-300
2.5	INAA	B-270
2.56	INAA	B-163
2.56	INAA	B-310
2.62	INAA	B-118
2.63	INAA	B-324
2.8	INAA	B-142
2.73	L-Chromato.	B-438
1.96	NAA	B-277
2.5	NAA	B-11
3.2	OES	B-209
3.7	OES	B-279
2.06	RNAA	B-447
2.3	SIMS	B-337
2.91	SIMS	B-376
3.1	XRF	B-136
Zr		
99	ED-XRF	B-444
97.9	ICP-MS	B-320

Table A-7 Individual data for JB-3

ppm	Method	Code No.	ppm	Method	Code No.	ppm	Method	Code No.
101	ICP-MS	B-379						
90	INAA	B-324						
89	OES	B-209						
120	OES	B-279						
88.8	PAA	B-56, B-221						
103	PAA	B-55						
103	Photom.	B-290						
102	SIMS	B-337						
80	XRF	B-22						
89	XRF	B-129						
90	XRF	B-40						
92.2	XRF	B-200						
92.2	XRF	B-145						
95.1	XRF	B-428						
97	XRF	B-135						
98	XRF	B-130						
98	XRF	B-31						
98	XRF	B-15						
100	XRF	B-74						
100	XRF	B-270						
103	XRF	B-29, B-73						
105	XRF	B-43						
105	XRF	B-25						
105	XRF	B-19						
101	XRF(powder)	B-36						
109	XRF(powder)	B-70						

Table A-8 Individual data for JG-1

ppm	Method	Code No.
Ce		
44	ED-XRF	B-398
42.9	ICP	B-34
42.9	ICP	B-116
44.1	ICP	B-471
45.8	ICP	B-362
50.3	ICP	B-419
46.3	ICP-MS	B-406
46.8	ICP-MS	B-320
50.32	ICP-MS	B-313
51.94	ICP-MS	B-269
42.3	ICP-MS(Laser)	B-411
37.8	IDMS	B-258-6
39.8	IDMS	B-165, B-231
42.4	IDMS	N-1
42.85	IDMS	N-3
50.1	IDMS	B-66
38	INAA	B-24
40	INAA	B-8
45	INAA	B-360
45.2	INAA	B-344, B-389
46.4	INAA	B-252, B-283
46.7	INAA	B-383
47	INAA	P-1'
49.4	INAA	P-6'
50.6	INAA	B-392
57	INAA	B-58
40.7	INAA(epi)	B-184
43	INAA(epi)	B-114
41.9	NAA	M-3
44.4	NAA	B-174
47	NAA	R-2
52	NAA	B-1
52.0	NAA	B-10
53.0	NAA	B-2
56	NAA	B-4
39	PAA	B-6-1, B-6-2
44.5	PAA	S-2'
46.5	PAA	B-56, B-221
48.9	RNAA	B-301
18	SSMS	R-1'
42	XRF	B-28
Dy		
3.28	ICP	B-471
3.31	ICP	B-362
4.45	ICP	B-116
4.46	ICP	B-419
4.5	ICP	B-34
3.0	ICP-MS	B-320
3.06	ICP-MS	B-313
3.22	ICP-MS	B-269
7.50	ICP-MS	B-406
6.5	ICP-MS(Laser)	B-411
3.07	IDMS	N-1
3.41	IDMS	N-3
3.57	IDMS	B-66
4.08	IDMS	B-258-6
5.2	INAA	B-344, B-389
4.66	NAA	T-22
3.1	SSMS	R-1'
Er		
1.78	ICP	B-362
1.96	ICP	B-471
2.54	ICP	B-419
2.96	ICP	B-116
3.0	ICP	B-34
1.5	ICP-MS	B-320
1.5	ICP-MS	B-313
1.63	ICP-MS	B-269
6.47	ICP-MS	B-406
3.8	ICP-MS(Laser)	B-411
1.57	IDMS	N-1
1.63	IDMS	N-3
2.04	IDMS	B-66
2.52	IDMS	B-258-6
3.3	INAA	B-344, B-389
1.5	SSMS	R-1'
Eu		
0.8	GFAAS	B-391
0.65	ICP	B-116
0.65	ICP	B-34
0.71	ICP	B-419
0.71	ICP	B-471
0.74	ICP	B-362
0.75	ICP-MS	B-320
0.78	ICP-MS	B-313
0.95	ICP-MS	B-406
0.98	ICP-MS	B-269
0.45	ICP-MS(Laser)	B-411
0.608	IDMS	B-258-6
0.69	IDMS	N-1
0.69	IDMS	B-66
0.708	IDMS	N-3
0.69	INAA	B-344, B-389
0.7	INAA	B-360
0.70	INAA	B-392
0.72	INAA	B-24
0.74	INAA	B-252, B-283
0.74	INAA	B-146
0.77	INAA	P-6'
0.88	INAA	P-1'
0.90	INAA	B-8
0.97	INAA	B-383
0.62	NAA	M-3
0.69	NAA	B-1
0.72	NAA	B-4
0.74	NAA	B-10
0.745	NAA	B-174
0.75	NAA	R-2
0.81	NAA	B-2
0.70	RNAA	B-301
0.63	SSMS	R-1'
0.78	SSMS	B-404
Gd		
3.65	ICP	B-362
3.82	ICP	B-471
4.19	ICP	B-419
4.4	ICP	B-34
4.42	ICP	B-116
3.6	ICP-MS	B-320
4.09	ICP-MS	B-269
4.59	ICP-MS	B-313
5.65	ICP-MS	B-406
5.2	ICP-MS(Laser)	B-411
3.86	IDMS	N-3
3.89	IDMS	B-258-6
3.5	INAA	P-1'
4.4	INAA	B-344, B-389
6.20	INAA	B-392
4.20	INAA(PG)	B-436
3.73	NAA	B-174
4.2	SSMS	R-1'
Hf		
1.2	ICP-MS	B-320
0.22*	INAA	P-1'
3.4	INAA	B-360
3.6	INAA	B-146
3.6	INAA	B-344, B-389
3.71	INAA	B-252, B-283
3.8	INAA	B-8
3.9	INAA	B-24
3.93	INAA	P-6'
4.8	INAA	B-383
4.96	INAA	B-392
5.21	INAA	B-465
3.4	INAA(epi)	B-184
3.0	NAA	B-185
3.08	NAA	B-10
3.1	NAA	M-3
3.4	NAA	B-26
3.8	NAA	B-4
3.8	NAA	R-2
4.9	NAA	B-7
2.4*	SSMS	R-1'
Ho		
0.64	ICP	B-362
0.95	ICP	B-116
0.95	ICP	B-34
0.96	ICP	B-419
0.48	ICP-MS	B-320
0.56	ICP-MS	B-313
0.67	ICP-MS	B-269
2.18	ICP-MS	B-406
1.2	ICP-MS(Laser)	B-411
0.932	IDMS	B-258-6
0.80	INAA	B-146
1.2	INAA	B-344, B-389
0.79	RNAA	B-301
0.57	SSMS	R-1'
La		
19.9	ICP	B-116
19.9	ICP	B-34
21.0	ICP	B-362
21.4	ICP	B-471
22.8	ICP	B-419
21.7	ICP-MS	B-320
21.8	ICP-MS	B-406
22.65	ICP-MS	B-313
22.74	ICP-MS	B-269
23	ICP-MS(Laser)	B-411
16.6	IDMS	B-258-6
18.54	IDMS	B-165, B-231
21.48	IDMS	N-3

Table A-8 Individual data for JG-1

ppm	Method	Code No.
Lu		
0.19	ICP	B-471
0.25	ICP	B-362
0.40	ICP	B-419
0.22	ICP-MS	B-313
0.22	ICP-MS	B-320
0.35	ICP-MS	B-269
1.68	ICP-MS	B-406
0.62	ICP-MS(Laser)	B-411
0.22	IDMS	N-3
0.238	IDMS	N-1
0.25	IDMS	B-66
0.395	IDMS	B-258-6
0.39	INAA	B-392
0.42	INAA	P-6'
0.42	INAA	B-146
0.44	INAA	B-8
0.46	INAA	B-252, B-283
0.46	INAA	B-360
0.47	INAA	B-344, B-389
0.47	INAA	B-24
0.43	NAA	B-11
0.43	NAA	B-1
0.44	NAA	B-4
0.44	NAA	B-10
0.45	NAA	B-2
0.45	NAA	R-2
0.518	NAA	B-174
0.52	NAA	M-3
0.41	RNAA	B-301
Nd		
<20	ED-XRF	B-398
18.1	ICP	B-34
18.1	ICP	B-116
19.3	ICP	B-362
19.9	ICP	B-471
20.9	ICP	B-419
19.8	ICP-MS	B-320
19.9	ICP-MS	B-406
20.38	ICP-MS	B-269
20.44	ICP-MS	B-313
20.4	ICP-MS(Laser)	B-411
16.4	IDMS	B-258-6
16.6	IDMS	B-165, B-231
18.5	IDMS	N-1
20.58	IDMS	N-3
21.2	IDMS	B-66
19	INAA	B-252, B-283
19.6	INAA	B-383
20	INAA	B-360
20.2	INAA	B-344, B-389
21.2	INAA	B-146
21.8	INAA	P-6'
24.1	INAA	B-392
19.5	MS	B-296, B-357
20.5	NAA	B-174
<30	NAA	R-2
22.8	RNAA	B-301
11	SSMS	R-1'
15	XRF	B-28
15	XRF	B-248
Pr		
4.49	ICP	B-116
4.5	ICP	B-34
4.85	ICP	B-362
5.10	ICP	B-419
5.26	ICP-MS	B-406
5.4	ICP-MS	B-320
5.56	ICP-MS	B-313
5.70	ICP-MS	B-269
6.1	ICP-MS(Laser)	B-411
5.1	INAA	B-344, B-389
2.3	SSMS	R-1'
Sc		
5.3	ICP	B-471
5.4	ICP	B-121
4.7	ICP-MS	B-269
6.5	ICP-MS	B-320
6.4	INAA	B-8
6.5	INAA	B-383
6.5	INAA	B-392
6.6	INAA	B-360
6.65	INAA	B-252, B-283
7.2	INAA	B-24
8.58	INAA	P-1'
6.8	INAA(epi)	B-114
7.15	INAA(epi)	B-184
5.9	NAA	B-4
5.98	NAA	B-10
6	NAA	B-7
6.44	NAA	M-3
6.45	NAA	B-2
6.54	NAA	R-2
6.73	NAA	B-1
7.0	NAA	B-185
8.0	OS	C-2
<20	OS	C-1
6.2	PAA	B-56, B-221
7	PAA	B-6-1, B-6-2
6.9	XRF	B-370
Sm		
4.4	GFAAS	B-391
4.06	ICP	B-362
4.38	ICP	B-116
4.4	ICP	B-34
4.89	ICP	B-419
5.1	ICP	B-471
4.21	ICP-MS	B-406
4.3	ICP-MS	B-320
4.44	ICP-MS	B-313
4.63	ICP-MS	B-269
5.59	ICP-MS(Laser)	B-411
3.61	IDMS	B-165, B-231
3.86	IDMS	B-258-6
4.15	IDMS	N-1
4.48	IDMS	N-3
4.48	IDMS	B-66
4.3	INAA	B-146
4.61	INAA	B-252, B-283
4.7	INAA	B-24
4.73	INAA	B-360
4.9	INAA	B-344, B-389
5.0	INAA	B-392
5.4	INAA	B-8
5.4	INAA	B-383
5.5	INAA	P-6'
4.83	INAA(epi)	B-184
7.4	INAA(epi)	B-114
4.20	INAA(PG)	B-436
4.42	MS	B-296, B-357
4.2	NAA	B-4
4.51	NAA	M-3
4.55	NAA	B-2
4.7	NAA	B-185
4.94	NAA	B-10
4.95	NAA	B-174
5.4	NAA	R-2
5.5	NAA	B-1
4.79	RNAA	B-301
2.8	SSMS	R-1'
Tb		
0.56	ICP	B-419
0.60	ICP-MS	B-320
0.62	ICP-MS	B-313
0.70	ICP-MS	B-269
1.30	ICP-MS	B-406
1.3	ICP-MS(Laser)	B-411
0.10	INAA	B-146
0.78	INAA	B-392
0.79	INAA	B-360
0.79	INAA	B-344, B-389
0.86	INAA	P-6'
0.92	INAA	B-252, B-283
1.04	INAA	B-383
0.43	NAA	M-3
0.68	NAA	B-4
0.823	NAA	B-174
1.44	NAA	B-11
2.5	NAA	B-2
0.73	RNAA	B-301
0.54	SSMS	R-1'
Tm		

Table A-8 Individual data for JG-1

ppm	Method	Code No.
0.34	ICP	B-419
0.23	ICP-MS	B-313
0.25	ICP-MS	B-320
0.35	ICP-MS	B-269
1.35	ICP-MS	B-406
0.67	ICP-MS(Laser)	B-411
0.49	INAA	B-344, B-389
0.51	INAA	P-6'
0.56	INAA	B-392
0.5	NAA	O-10
0.538	NAA	B-174
0.40	RNAA	B-301
Y		
29	ED-XRF	B-413
32	ED-XRF	B-398
15.4	ICP	B-471
17.7	ICP	B-362
26.2	ICP	B-419
18.1	ICP-MS	B-320
19.0	ICP-MS	B-269
51.4	ICP-MS	B-406
30	OS	C-1
<30	OS	C-2
30.5	PAA	S-2'
30.7	PAA	B-56, B-221
33	PAA	B-6-1, B-6-2
25	SSMS	R-1'
18	XRF	B-61
26.2	XRF	B-29, B-73
27	XRF	B-85
28.0	XRF	O-1'
31	XRF	B-346
31	XRF	T-22'
31.5	XRF	B-28
31.5	XRF	B-248
32	XRF	B-370
32	XRF	B-428
32	XRF	B'-1
33	XRF	B-12
33	XRF	B-270
35	XRF	B-15
Yb		
2.9	GFAAS	B-391
1.45	ICP	B-471
1.69	ICP	B-362
2.67	ICP	B-419
3.0	ICP	B-34
3.0	ICP	B-258-4
3.03	ICP	B-116
1.46	ICP-MS	B-313
1.5	ICP-MS	B-320
1.58	ICP-MS	B-269
9.11	ICP-MS	B-406
4.3	ICP-MS(Laser)	B-411
1.48	IDMS	N-3
1.52	IDMS	N-1
1.57	IDMS	B-66
2.62	IDMS	B-258-6
2.0	INAA	B-8
2.6	INAA	B-146
2.6	INAA	B-24
3.05	INAA	B-392
3.08	INAA	B-344, B-389
3.1	INAA	B-360
3.14	INAA	P-6'
3.4	INAA	P-1'
6.6	INAA	B-252, B-283
1.88	NAA	B-2
2.1	NAA	B-4
2.5	NAA	R-2
2.50	NAA	M-3
2.77	NAA	B-10
2.8	NAA	B-11
3.05	NAA	B-174
<10	OS	C-1
<4	OS	C-2
2.71	RNAA	B-301
1.8	SSMS	R-1'
Zr		
104	ED-XRF	B-377
110	ED-XRF	B-413
29	ICP	B-121
30.5	ICP	B-471
38	ICP	B-116
118	ICP	B-258-4
31.4	ICP-MS	B-320
135	INAA	B-146
140	INAA	B-252, B-283
187	INAA	B-465
57	NAA	P-1'
130	NAA	B-7
160	NAA	R-2
74	OS	C-1
140	OS	C-2
75	OS(DR)	T-19
106	PAA	S-2'
118	PAA	B-56, B-221
152	PAA	B-6-1, B-6-2
97.8	Photom.	K-7
108.5	Photom.	K-15'
113	Photom.	B-290
118	Photom.	B-173
39*	SSMS	R-1'
103	XRF	B-12
104	XRF	B-28
106	XRF	B'-1
107	XRF	O-1'
109	XRF	T-22'
109	XRF	B-85
112	XRF	B-346
112	XRF	B-15
115	XRF	G-1
116	XRF	B-370
116	XRF	B-428
117	XRF	B-385
117	XRF	B-367
117	XRF	S-1'
122	XRF	M-9
128	XRF	B-29, B-73
137	XRF	B-270

Table A-9 Individual data for JG-1a

ppm	Method	Code No.
Ce		
32.7	Chrom.	B-209
46	ED-XRF	B-444
46.0	ICP	B-378
48.8	ICP	B-434
49	ICP	B-355
48.14	ICP-MS	B-442
42.4	INAA	B-310
42.4	INAA	B-37-2
45.0	INAA	B-324
46	INAA	B-24
48.9	INAA	B-118
49.1	INAA	B-270
49.65	INAA	B-330
48.5	L-Chromato.	B-438
37	NAA	B-287
48.0	NAA	B-234, B-277
46	OES	B-279
46.6	RNAA	B-447
47.5	RNAA	B-301
46.0	SIMS	B-376
51	XRF	B-25
29	XRF(powder)	B-70
Dy		
4.5	Chrom.	B-209
3.7	ICP	B-378
4.3	ICP	B-355
5	ICP	B-434
3.49	ICP-MS	B-442
6.4	INAA	B-270
4.33	NAA	B-234, B-277
4.3	RNAA	B-447
3.84	SIMS	B-376
4.3	XRF	B-136
Er		
3.35	Chrom.	B-209
2.8	ICP	B-355
1.75	ICP-MS	B-442
1.89	L-Chromato.	B-438
2.00	NAA	B-234, B-277
2.0	RNAA	B-447
2.75	SIMS	B-376
Eu		
0.61	ICP	B-355
0.70	ICP	B-378
0.73	ICP-MS	B-442
0.64	INAA	B-330
0.69	INAA	B-270
0.708	INAA	B-118
0.72	INAA	B-324
0.73	INAA	B-310
0.73	INAA	B-24
0.73	INAA	B-37-2
0.68	L-Chromato.	B-438
0.74	NAA	B-287
0.750	NAA	B-234, B-277
0.69	RNAA	B-301
0.727	RNAA	B-447
0.87	SIMS	B-376
Gd		
3.9	ICP	B-378
3.9	ICP	B-355
4.31	ICP-MS	B-442
3.50	L-Chromato.	B-438
3.80	SIMS	B-376
3.1	XRF	B-136
Hf		
3.99	ICP-MS	B-379
3.6	INAA	B-24
3.65	INAA	B-447
3.68	INAA	B-118
3.69	INAA	B-330
3.74	INAA	B-324
3.83	INAA	B-37-2
3.83	INAA	B-310
4.07	INAA	B-270
4.54	INAA	B-465
3.7	NAA	B-287
3.77	NAA	B-234, B-277
2.3	XRF	B-25
Ho		
0.9	Chrom.	B-209
0.90	ICP	B-355
0.61	ICP-MS	B-442
0.64	L-Chromato.	B-438
0.684	NAA	B-234, B-277
0.68	RNAA	B-447
0.91	RNAA	B-301
La		
13.9	Chrom.	B-209
35	ED-XRF	B-444
21	ICP	B-355
22.3	ICP	B-378
24	ICP	B-434
23.14	ICP-MS	B-442
20.0	INAA	B-310
21.60	INAA	B-330
22.1	INAA	B-324
23.1	INAA	B-270
23.1	INAA	B-118
26	INAA	B-24
22.3	L-Chromato.	B-438
18	NAA	B-287
20.0	NAA	B-34
20.21	NAA	B-234, B-277
22	OES	B-279
20.3	RNAA	B-447
23.1	RNAA	B-301
22.2	SIMS	B-376
24.1	XRF	B-25
18	XRF(powder)	B-70
Lu		
0.09	Chrom.	B-209
0.27	ICP	B-378
0.43	ICP	B-355
0.47	ICP-MS	B-442
0.40	INAA	B-330
0.45	INAA	B-24
0.50	INAA	B-270
0.53	INAA	B-118
0.54	INAA	B-310
0.54	INAA	B-324
0.54	INAA	B-37-2
0.28	L-Chromato.	B-438
0.33	NAA	B-287
0.38	NAA	B-234, B-277
0.43	RNAA	B-447
0.44	RNAA	B-301
Nd		
17.2	Chrom.	B-209
18	ICP	B-355
19.4	ICP	B-378
22	ICP	B-434
19.90	ICP-MS	B-442
19.6	INAA	B-118
19.7	INAA	B-310
19.7	INAA	B-37-2
20.75	INAA	B-330
20.9	INAA	B-324
20.8	L-Chromato.	B-438
29.2	NAA	B-234, B-277
24	OES	B-279
18.8	RNAA	B-447
20.6	RNAA	B-301
19.2	SIMS	B-376
27.0	XRF	B-25
Pr		
3.6	Chrom.	B-209
6	ICP	B-355
5.19	ICP-MS	B-442
5.52	L-Chromato.	B-438
6.70	NAA	B-234, B-277
7	RNAA	B-447
8.7	XRF	B-25
Sc		
5.70	INAA	B-447
5.73	INAA	B-270
5.75	INAA	B-330
6.18	INAA	B-324
6.4	INAA	B-118
6.62	INAA	B-310
6.62	INAA	B-37-2
6.8	INAA	B-24
6.04	NAA	B-287
6.21	NAA	B-234, B-277
6.5	OES	B-279
6.1	XRF	B-25
7.4	XRF	B-129
Sm		
4.5	Chrom.	B-209
4.1	ICP	B-355
4.3	ICP	B-378
4.15	ICP-MS	B-442

Table A-9 Individual data for JG-1a

ppm	Method	Code No.
4.3	INAA	B-270
4.49	INAA	B-310
4.49	INAA	B-37-2
4.52	INAA	B-118
4.60	INAA	B-330
5.1	INAA	B-24
5.37	INAA	B-324
4.53	L-Chromato.	B-438
4.2	NAA	B-287
4.60	NAA	B-234, B-277
4.46	RNAA	B-301
4.60	RNAA	B-447
4.43	SIMS	B-376
10.5	XRF	B-23
Tb		
0.81	ICP-MS	B-442
0.60	INAA	B-330
0.77	INAA	B-324
0.79	INAA	B-118
0.95	INAA	B-37-2
0.95	INAA	B-310
0.59	L-Chromato.	B-438
0.848	NAA	B-234, B-277
0.75	RNAA	B-301
0.85	RNAA	B-447
Tm		
0.3	Chrom.	B-209
0.43	ICP-MS	B-442
0.49	INAA	B-118
0.25	L-Chromato.	B-438
0.46	RNAA	B-301
Y		
32	ED-XRF	B-444
27	ICP	B-355
31.4	ICP	B-434
30	OES	B-279
24	XRF	B-25
27	XRF	B-134
28.1	XRF	B-19
30	XRF	B-312
30	XRF	B-428
31.5	XRF	B-200
31.5	XRF	B-145
32	XRF	B-270
32.0	XRF	B-135
33	XRF	B-129
34	XRF	B-35
34	XRF	B-43
36	XRF	B-15
36	XRF	B-31
37	XRF	B-40
43	XRF	B-434
35	XRF(fusion)	B-36
31	XRF(powder)	B-70
33	XRF(powder)	B-36
Yb		
1.2	Chrom.	B-209
1.78	ICP	B-378
2.6	ICP	B-434
2.9	ICP	B-355
2.45	ICP-MS	B-442
2.58	INAA	B-330
2.8	INAA	B-24
3.05	INAA	B-270
3.06	INAA	B-118
3.17	INAA	B-310
3.17	INAA	B-37-2
1.77	L-Chromato.	B-438
2.77	NAA	B-234, B-277
3.2	OES	B-279
2.93	RNAA	B-301
5.04	RNAA	B-447
3.07	SIMS	B-376
2.5	XRF	B-136
Zr		
111	ED-XRF	B-444
141	ICP	B-148
148	ICP	B-434
105	ICP-MS	B-379
148	INAA	B-324
150	INAA	B-37-2
216	INAA	B-465
112	OES	B-279
115	Photom.	B-290
107	XRF	B-200
107	XRF	B-15
107	XRF	B-145
108	XRF	B-31
110	XRF	B-40
111.1	XRF	B-135
113	XRF	B-25
116	XRF	B-428
119	XRF	B-43
124	XRF	B-19
132	XRF	B-270
138	XRF	B-434
111	XRF(powder)	B-70
121	XRF(powder)	B-36

Table A-10 Individual data for JG-2

ppm	Method	Code No.
Ce		
32.0	Chrom.	B-209
48	ED-XRF	B-444
47.2	ICP	B-378
48	ICP	B-434
41.2	INAA	B-437
47.3	INAA	B-270
51.1	INAA	B-324
52	INAA	B-24
52	INAA	B-244
54.4	INAA	B-330
59	INAA	B-230
49.9	L-Chromato.	B-438
48.0	NAA	B-234
50.6	NAA	B-277
52	NAA	B-287
54	OES	B-279
47.5	RNAA	B-447
42.9	SIMS	B-376
46	XRF	B-136
Dy		
6.9	Chrom.	B-209
11	ICP	B-434
11.6	ICP	B-378
13.4	INAA	B-270
5.87	NAA	B-234, B-277
10.8	RNAA	B-447
10.1	SIMS	B-376
11.9	XRF	B-136
Er		
4.3	Chrom.	B-209
7.1	L-Chromato.	B-438
3.76	NAA	B-234, B-277
3.4	RNAA	B-447
6.20	SIMS	B-376
Eu		
0.06	ICP	B-378
0.060	INAA	B-230
0.08	INAA	B-270
0.093	INAA	B-244
0.10	INAA	B-324
0.10	INAA	B-437
0.10	INAA	B-24
0.13	INAA	B-330
0.20	L-Chromato.	B-438
0.056	NAA	B-234, B-277
0.063	NAA	B-287
0.357	RNAA	B-447
0.09	SIMS	B-376
Gd		
8.6	ICP	B-378
8.86	L-Chromato.	B-438
6.69	SIMS	B-376
4.1	XRF	B-136
Hf		
5.18	ICP-MS	B-379
4.88	INAA	B-330
4.89	INAA	B-324
4.93	INAA	B-437
5.14	INAA	B-270
5.33	INAA	B-447
6.7	INAA	B-24
5.58	NAA	B-277
5.62	NAA	B-234
8.7	NAA	B-287
1.8	XRF	B-136
Ho		
1.1	Chrom.	B-209
2.08	L-Chromato.	B-438
1.31	NAA	B-234, B-277
1.25	RNAA	B-447
La		
12.8	Chrom.	B-209
27	ED-XRF	B-444
17	ICP	B-434
19.7	ICP	B-378
20	INAA	B-270
20.2	INAA	B-330
20.4	INAA	B-437
21	INAA	B-244
21	INAA	B-230
21.1	INAA	B-324
25	INAA	B-24
19.8	L-Chromato.	B-438
19.0	NAA	B-287
19.73	NAA	B-234
20.01	NAA	B-277
22	OES	B-279
20.2	RNAA	B-447
18.1	SIMS	B-376
18.0	XRF	B-136
Lu		
1.05	ICP	B-378
1.17	INAA	B-330
1.19	INAA	B-270
1.28	INAA	B-437
1.3	INAA	B-24
1.44	INAA	B-324
1.12	L-Chromato.	B-438
0.331	NAA	B-234, B-277
1.20	NAA	B-287
1.24	RNAA	B-447
Nd		
16.7	Chrom.	B-209
24.6	ICP	B-378
25	ICP	B-434
22.7	INAA	B-437
28.6	INAA	B-324
29.0	INAA	B-330
26.2	L-Chromato.	B-438
37.6	NAA	B-234, B-277
30	OES	B-279
37.6	RNAA	B-447
22.0	SIMS	B-376
24	XRF	B-136
Pr		
4.1	Chrom.	B-209
6.50	L-Chromato.	B-438
6.66	NAA	B-234
7.00	NAA	B-277
7.0	RNAA	B-447
4.8	XRF	B-136
Sc		
2.12	INAA	B-330
2.19	INAA	B-270
2.32	INAA	B-324
2.37	INAA	B-47
2.5	INAA	B-437
2.64	INAA	B-244
2.70	INAA	B-230
2.8	INAA	B-24
2.36	NAA	B-234
2.37	NAA	B-277
2.62	NAA	B-287
3.1	OES	B-279
2.0	XRF	B-136
Sm		
5.9	Chrom.	B-209
7.4	ICP	B-378
7.12	INAA	B-437
7.2	INAA	B-270
8.4	INAA	B-230
8.4	INAA	B-244
8.8	INAA	B-330
9.62	INAA	B-324
10	INAA	B-24
8.26	L-Chromato.	B-438
5.95	NAA	B-234, B-277
8.6	NAA	B-287
6.55	RNAA	B-447
6.54	SIMS	B-376
7.1	XRF	B-136
Tb		
1.21	INAA	B-330
1.84	INAA	B-437
1.97	INAA	B-324
1.55	L-Chromato.	B-438
1.20	NAA	B-234, B-277
1.20	RNAA	B-447
Tm		
0.3	Chrom.	B-209
0.99	L-Chromato.	B-438
Y		
72	ED-XRF	B-444
79	ICP	B-434
100	OES	B-279
75	XRF	B-61

Table A-10 Individual data for JG-2

ppm	Method	Code No.	ppm	Method	Code No.	ppm	Method	Code No.
83	XRF	B-434						
83	XRF	B-62						
85	XRF	B-113						
87	XRF	B-135						
89	XRF	B-428						
90.6	XRF	B-145						
90.6	XRF	B-200						
95	XRF	B-270						
97	XRF	B-142						
98	XRF	B-63						
100	XRF	B-136						
84	XRF(fusion)	B-59						
91	XRF(powder)	B-59						
Yb								
7.14	ICP	B-378						
7.5	ICP	B-434						
7.56	INAA	B-437						
8.22	INAA	B-330						
8.3	INAA	B-24						
8.5	INAA	B-270						
7.2	L-Chromato.	B-438						
2.79	NAA	B-277						
3.04	NAA	B-234						
9.4	OES	B-279						
2.73	RNAA	B-447						
7.16	SIMS	B-376						
4.5	XRF	B-136						
Zr								
44.4	Photom.	B-258-7						
89	ED-XRF	B-444						
82	ICP	B-434						
107	ICP-MS	B-379						
166	INAA	B-324						
118	OES	B-279						
111	Photom.	B-290						
84	XRF	B-136						
92	XRF	B-428						
94	XRF	B-62						
94	XRF	B-61						
96	XRF	B-135						
98	XRF	B-434						
99.1	XRF	B-145						
99.1	XRF	B-200						
100	XRF	B-142						
103	XRF	B-63						
113	XRF	B-270						
119	XRF(fusion)	B-59						
112	XRF(powder)	B-59						

Table A-11 Individual data for JG-3

ppm	Method	Code No.
Ce		
29.6	Chrom.	B-209
42.1	ICP	B-378
41	ICP-MS	B-426
34	INAA	B-230, B-244
39.8	INAA	B-437
41.6	INAA	B-324
42.15	INAA	B-330
44	INAA	B-270
34.7	L-Chromato.	B-438
38.6	NAA	B-234
39.0	NAA	B-277
53	OES	B-279
39.0	RNAA	B-447
43.7	SIMS	B-376
40	XRF	B-198
42	XRF	B-168
Dy		
2.9	Chrom.	B-209
3.1	ICP	B-378
2.67	ICP-MS	B-426
3.2	INAA	B-270
1.65	NAA	B-234, B-277
1.6	RNAA	B-447
2.55	SIMS	B-376
3.0	XRF	B-168
Er		
1.6	Chrom.	B-209
1.64	ICP-MS	B-426
1.64	L-Chromato.	B-438
0.930	NAA	B-234, B-277
0.93	RNAA	B-447
1.95	SIMS	B-376
Eu		
0.89	ICP	B-378
0.80	ICP-MS	B-426
0.83	INAA	B-330
0.86	INAA	B-437
0.87	INAA	B-230, B-244
0.88	INAA	B-324
0.93	INAA	B-270
0.87	L-Chromato.	B-438
0.948	NAA	B-234
1.01	NAA	B-277
0.882	RNAA	B-447
1.10	SIMS	B-376
Gd		
3.1	ICP	B-378
2.96	ICP-MS	B-426
3.08	L-Chromato.	B-438
2.77	SIMS	B-376
2.4	XRF	B-168
Hf		
4.6	ICP-MS	B-426
4.81	ICP-MS	B-379
3.61	INAA	B-324
3.92	INAA	B-330
4.12	INAA	B-437
4.17	INAA	B-447
4.58	INAA	B-270
4.10	NAA	B-277
4.13	NAA	B-234
4.9	XRF	B-168
Ho		
0.21	Chrom.	B-209
0.53	ICP-MS	B-426
0.56	L-Chromato.	B-438
0.244	NAA	B-234, B-277
0.26	RNAA	B-447
La		
14.9	Chrom.	B-209
21.4	ICP	B-378
21	ICP-MS	B-426
16.7	INAA	B-330
21	INAA	B-230, B-244
21.0	INAA	B-270
21.1	INAA	B-437
21.5	INAA	B-324
18.6	L-Chromato.	B-438
22.72	NAA	B-234, B-277
23	OES	B-279
22.1	RNAA	B-447
22.7	SIMS	B-376
22	XRF	B-168
Lu		
0.9	Chrom.	B-209
0.25	ICP	B-378
0.28	ICP-MS	B-426
0.16	INAA	B-230, B-244
0.27	INAA	B-330
0.30	INAA	B-437
0.32	INAA	B-270
0.35	INAA	B-324
0.26	L-Chromato.	B-438
0.244	NAA	B-277
0.249	NAA	B-234
0.24	RNAA	B-447
Nd		
16.0	Chrom.	B-209
17.0	ICP	B-378
17.6	ICP-MS	B-426
17.00	INAA	B-330
17.2	INAA	B-437
18.6	INAA	B-324
15.9	L-Chromato.	B-438
16.9	NAA	B-234, B-277
23	OES	B-279
16.9	RNAA	B-447
15.3	SIMS	B-376
16	XRF	B-168
Pr		
3.5	Chrom.	B-209
4.5	ICP-MS	B-426
3.97	L-Chromato.	B-438
6.62	NAA	B-234, B-277
6.6	RNAA	B-447
3.1	XRF	B-168
Sc		
30	ICP-MS	B-426
7.86	INAA	B-330
8.12	INAA	B-270
8.66	INAA	B-324
8.9	INAA	B-437
8.93	INAA	B-230, B-244
9.00	INAA	B-447
9.00	NAA	B-234, B-277
11	OES	B-279
2.1	XRF	B-168
Sm		
4.2	Chrom.	B-209
2.3	ICP	B-378
3.2	ICP-MS	B-426
2.85	INAA	B-330
3.1	INAA	B-270
3.47	INAA	B-437
3.6	INAA	B-230, B-244
3.99	INAA	B-324
3.12	L-Chromato.	B-438
3.55	NAA	B-234
3.56	NAA	B-277
3.35	RNAA	B-447
3.70	SIMS	B-376
3.8	XRF	B-168
Tb		
0.41	ICP-MS	B-426
0.39	INAA	B-330
0.44	INAA	B-324
0.5	INAA	B-230, B-244
0.50	INAA	B-437
0.56	L-Chromato.	B-438
0.440	NAA	B-234, B-277
0.46	RNAA	B-447
Tm		
0.2	Chrom.	B-209
0.27	ICP-MS	B-426
0.20	L-Chromato.	B-438
Y		
16	ED-XRF	B-444
16.8	ICP-MS	B-426
16	OES	B-279
15	XRF	B-270
16	XRF	B-164
16	XRF	B-219
16	XRF	B-428
17	XRF	B-198
17	XRF	B-189
17	XRF	B-169

Table A-11 Individual data for JG-3

ppm	Method	Code No.	ppm	Method	Code No.	ppm	Method	Code No.
17.3	XRF	B-171						
20	XRF	B-207						
20	XRF	B-170						
21	XRF	B-168						
Yb								
1.0	Chrom.	B-209						
1.65	ICP	B-378						
1.8	ICP-MS	B-426						
1.63	INAA	B-437						
1.9	INAA	B-270						
2.45	INAA	B-330						
1.66	L-Chromato.	B-438						
1.88	NAA	B-234, B-277						
2.1	OES	B-279						
1.29	RNAA	B-447						
1.99	SIMS	B-376						
2.1	XRF	B-168						
Zr								
135	ED-XRF	B-444						
144	ICP-MS	B-379						
153	ICP-MS	B-426						
135	INAA	B-324						
150	OES	B-279						
138	Photom.	B-290						
130	XRF	B-170						
133	XRF	B-168						
139	XRF	B-219						
140	XRF	B-171						
141	XRF	B-428						
146	XRF	B-198						
148	XRF	B-169						
152	XRF	B-189						
155	XRF	B-207						
183	XRF	B-270						

Table A-12 Individual data for JGb-1

ppm	Method	Code No.
Ce		
9.0	Chrom.	B-209
8.6	ICP	B-34, B-117
8.8	ICP	B-417
8.13	ICP-MS	B-313
8.3	ICP-MS	B-426
9.8	ICP-MS	B-315
1.02	ICP-MS(Laser)	B-411
8.10	IDMS	B-324
6.6	INAA	B-310
6.6	INAA	B-163
6.7	INAA	B-24
7.29	INAA	B-324
8.0	INAA	B-270
8.7	INAA	B-118
8.72	INAA	B-330
9.4	INAA	B-146
7.9	L-Chromato.	B-438
7.6	NAA	B-287
9.11	NAA	B-277
<30	OES	B-279
7.0	PAA	B-56, B-221
8.2	PAA	B-55
7.33	RNAA	B-447
8.8	SIMS	B-337
9.32	SIMS	B-376
15	XRF	B-22
22	XRF	B-25
9	XRF(powder)	B-70
Dy		
0.9	Chrom.	B-209
1.4	ICP	B-417
1.4	ICP	B-34, B-117
1.47	ICP-MS	B-313
1.5	ICP-MS	B-315
1.68	ICP-MS	B-426
2.1	ICP-MS(Laser)	B-411
1.72	IDMS	B-324
2.2	INAA	B-270
0.68	NAA	B-11
1.84	NAA	B-277
1.4	RNAA	B-447
1.48	SIMS	B-376
1.6	SIMS	B-337
<1	XRF	B-136
Er		
0.2	Chrom.	B-209
0.91	ICP	B-34, B-117
1.1	ICP	B-417
0.88	ICP-MS	B-313
0.91	ICP-MS	B-315
0.98	ICP-MS	B-426
1.2	ICP-MS(Laser)	B-411
0.996	IDMS	B-324
0.97	L-Chromato.	B-438
1.44	NAA	B-277
0.43	RNAA	B-447
1.05	SIMS	B-376
1.3	SIMS	B-337
Eu		
0.60	ICP	B-34, B-117
0.65	ICP	B-417
0.58	ICP-MS	B-313
0.59	ICP-MS	B-426
0.72	ICP-MS	B-315
1.1	ICP-MS(Laser)	B-411
0.618	IDMS	B-324
0.59	INAA	B-146
0.61	INAA	B-330
0.62	INAA	B-324
0.65	INAA	B-270
0.66	INAA	B-24
0.689	INAA	B-118
0.7	INAA	B-310
0.7	INAA	B-163
0.57	L-Chromato.	B-438
0.51	NAA	B-11
0.59	NAA	B-277
0.67	NAA	B-287
0.631	RNAA	B-447
0.57	SIMS	B-376
0.63	SIMS	B-337
Gd		
1.50	ICP	B-34, B-117
1.7	ICP	B-417
1.47	ICP-MS	B-313
1.5	ICP-MS	B-315
1.66	ICP-MS	B-426
1.7	ICP-MS(Laser)	B-411
1.61	IDMS	B-324
1.50	L-Chromato.	B-438
1.62	SIMS	B-376
2.0	SIMS	B-337
6.0	XRF	B-136
Hf		
0.86	ICP-MS	B-426
1.01	ICP-MS	B-379
0.65	INAA	B-324
0.68	INAA	B-447
0.77	INAA	B-146
0.81	INAA	B-118
0.86	INAA	B-24
1.05	INAA	B-270
0.677	NAA	B-277
0.85	NAA	B-11
1.4	NAA	B-287
0.77	SIMS	B-337
0.9	XRF	B-25
Ho		
0.32	ICP	B-34, B-117
0.41	ICP	B-417
0.31	ICP-MS	B-313
0.32	ICP-MS	B-315
0.33	ICP-MS	B-426
0.32	ICP-MS(Laser)	B-411
0.26	INAA	B-146
0.35	L-Chromato.	B-438
0.284	NAA	B-277
0.22	RNAA	B-447
0.36	SIMS	B-337
La		
3.4	Chrom.	B-209
3.4	ICP	B-34, B-117
5.1	ICP	B-417
3.4	ICP-MS	B-426
3.45	ICP-MS	B-313
4.0	ICP-MS	B-315
3.95	ICP-MS(Laser)	B-411
3.32	IDMS	B-324
3.4	INAA	B-310
3.4	INAA	B-163
3.42	INAA	B-146
3.57	INAA	B-330
3.63	INAA	B-324
3.9	INAA	B-118
3.9	INAA	B-270
4.4	INAA	B-24
3.6	L-Chromato.	B-438
3.36	NAA	B-277
4.0	NAA	B-287
4.1	NAA	B-11
<10	OES	B-279
<20	OES	B-209
3.88	RNAA	B-447
3.89	SIMS	B-376
4.0	SIMS	B-337
1.6	XRF	B-25
3	XRF(powder)	B-70
Lu		
0.14	ICP	B-34, B-117
0.14	ICP	B-417
0.12	ICP-MS	B-426
0.12	ICP-MS	B-313
0.14	ICP-MS	B-315
0.16	ICP-MS(Laser)	B-411
0.138	IDMS	B-324
0.099	INAA	B-146
0.148	INAA	B-163
0.15	INAA	B-310
0.15	INAA	B-324
0.17	INAA	B-24
0.18	INAA	B-118
0.18	INAA	B-330
0.38	INAA	B-270
0.15	L-Chromato.	B-438
0.132	NAA	B-287
0.15	NAA	B-11
0.159	NAA	B-277
0.16	RNAA	B-447
0.20	SIMS	B-337
Nd		
4.3	Chrom.	B-209
5.5	ICP	B-34, B-117
7.1	ICP	B-417
4.83	ICP-MS	B-313
5.4	ICP-MS	B-426
5.6	ICP-MS	B-315
6.5	ICP-MS(Laser)	B-411
5.16	IDMS	B-324

Table A-12 Individual data for JGb-1

ppm	Method	Code No.
4.0	INAA	B-146
5.6	INAA	B-118
6	INAA	B-163
6	INAA	B-310
4.87	L-Chromato.	B-438
5.74	SIMS	B-376
6.2	SIMS	B-337
6.0	XRF	B-25
Pr		
0.8	Chrom.	B-209
1.1	ICP	B-34, B-117
1.2	ICP	B-417
1.10	ICP-MS	B-426
1.13	ICP-MS	B-313
1.2	ICP-MS	B-315
1.4	ICP-MS(Laser)	B-411
1.09	L-Chromato.	B-438
2.4	RNAA	B-447
1.2	SIMS	B-337
0.1	XRF	B-25
Sc		
48.7	ICP-MS	B-426
33.6	INAA	B-330
33.7	INAA	B-270
35.5	INAA	B-146
35.8	INAA	B-163
35.8	INAA	B-310
36.1	INAA	B-324
36.6	INAA	B-447
36.7	INAA	B-118
39	INAA	B-24
32.7	NAA	B-11
36.1	NAA	B-287
37.5	NAA	B-277
17	OES	B-209
34	OES	B-130
38	OES	B-279
30.7	PAA	B-56, B-221
36.5	SIMS	B-337
36.8	XRF	B-25
40	XRF	B-129
Sm		
0.9	Chrom.	B-209
1.4	ICP	B-34, B-117
1.9	ICP	B-417
1.32	ICP-MS	B-313
1.45	ICP-MS	B-426
1.6	ICP-MS	B-315
1.2	ICP-MS(Laser)	B-411
1.38	IDMS	B-324
1.29	INAA	B-146
1.35	INAA	B-270
1.4	INAA	B-24
1.49	INAA	B-330
1.53	INAA	B-310
1.53	INAA	B-163
1.55	INAA	B-118
1.30	L-Chromato.	B-438
1.42	NAA	B-11
1.55	NAA	B-277
1.7	NAA	B-287
1.52	RNAA	B-447
1.57	SIMS	B-376
1.7	SIMS	B-337
4.6	XRF	B-23
Tb		
0.28	ICP	B-417
0.24	ICP-MS	B-313
0.24	ICP-MS	B-315
0.30	ICP-MS	B-426
0.38	ICP-MS(Laser)	B-411
0.20	INAA	B-330
0.21	INAA	B-146
0.26	INAA	B-310
0.33	INAA	B-118
0.26	INAA(epi)	B-163
0.31	L-Chromato.	B-438
0.417	NAA	B-277
0.42	RNAA	B-447
0.41	SIMS	B-337
Tm		
0.22	ICP	B-417
0.12	ICP-MS	B-313
0.13	ICP-MS	B-315
0.13	ICP-MS	B-426
0.17	ICP-MS(Laser)	B-411
0.17	INAA	B-163
0.12	L-Chromato.	B-438
0.17	SIMS	B-337
Y		
13	ED-XRF	B-444
9.6	ICP	B-417
9.5	ICP-MS	B-426
9.1	OES	B-279
10	OES	B-209
9.0	PAA	B-56, B-221
9.2	PAA	B-55
11	SIMS	B-337
4	XRF	B-31
6.1	XRF	B-29, B-73
8.5	XRF	B-200
8.5	XRF	B-145
9	XRF	B-25
9.9	XRF	B-129
10	XRF	B-134
10	XRF	B-22
11	XRF	B-40
11	XRF	B-135
12	XRF	B-43
12	XRF	B-428
13	XRF	B-35
15	XRF	B-15
15	XRF	B-130
17.0	XRF	B-19
<2	XRF	B-270
<20	XRF	B-312
12	XRF(fusion)	B-36
8	XRF(powder)	B-36
11	XRF(powder)	B-70
Yb		
0.90	ICP	B-34, B-117
0.98	ICP	B-417
0.84	ICP-MS	B-313
0.88	ICP-MS	B-426
0.94	ICP-MS	B-315
1.6	ICP-MS(Laser)	B-411
0.928	IDMS	B-324
0.6	INAA	B-270
0.84	INAA	B-146
0.9	INAA	B-24
0.97	INAA	B-324
1.02	INAA	B-163
1.02	INAA	B-310
1.03	INAA	B-118
1.95	INAA	B-330
0.80	L-Chromato.	B-438
0.97	NAA	B-11
1.32	NAA	B-277
1.8	OES	B-209
2.5	OES	B-279
1.14	RNAA	B-447
0.96	SIMS	B-376
1.0	SIMS	B-337
2.2	XRF	B-136
Zr		
37	ED-XRF	B-444
27.3	ICP-MS	B-426
41	ICP-MS	B-379
26	OES	B-209
45	OES	B-279
26.7	PAA	B-56, B-221
30.6	PAA	B-55
43	Photom.	B-461
39	SIMS	B-337
21	XRF	B-22
24	XRF	B-40
24	XRF	B-129
25.5	XRF	B-200
25.5	XRF	B-145
29	XRF	B-31
30	XRF	B-74
30	XRF	B-15
31	XRF	B-428
31	XRF	B-130
33.4	XRF	B-135
34.5	XRF	B-29, B-73
35	XRF	B-270
41	XRF	B-19
44	XRF	B-70
45	XRF	B-25
46	XRF	B-43
38	XRF(powder)	B-36

Table A-13 Individual data for JR-1

ppm	Method	Code No.
Ce		
32.6	Chrom.	B-209
46	ED-XRF	B-444
46.3	ICP	B-417
46.9	ICP	B-34, B-117
47.6	ICP	B-378
47.8	ICP	B-471
55.29	ICP	G-6'
39.0	ICP-MS	B-320
45.92	ICP-MS	B-313
46.61	ICP-MS	B-442
46.3	IDMS	B-324
46.3	IDMS	B-165, B-231
45	INAA	B-24
49.2	INAA	B-324
50	INAA	B-18
50.1	INAA	B-310
50.1	INAA	B-37-1
50.2	INAA	B-270
50.4	INAA	B-118
52	INAA	B-146
47.9	L-Chromato.	B-438
48.4	NAA	B-277
50.6	NAA	B-11
52	NAA	B-287
43	OES	B-279
45.4	PAA	B-56, B-221
45.7	PAA	B-55
48.4	RNAA	B-447
36.8	SIMS	B-337
51.0	SIMS	B-376
46	XRF	B-25
53	XRF	B-18
48	XRF(powder)	B-70
Dy		
2.8	Chrom.	B-209
5.8	ICP	B-417
5.9	ICP	B-34, B-117
6.38	ICP	B-471
6.97	ICP	G-6'
7.2	ICP	B-378
4.9	ICP-MS	B-320
5.69	ICP-MS	B-313
5.86	ICP-MS	B-442
6.27	IDMS	B-324
6.9	INAA	B-270
7.3	INAA	B-18
3.97	NAA	B-277
4.81	NAA	B-11
4.5	RNAA	B-447
5.5	SIMS	B-337
5.78	SIMS	B-376
4.6	XRF	B-136
Er		
1.5	Chrom.	B-209
3.6	ICP	B-417
3.7	ICP	B-34, B-117
4.08	ICP	G-6'
4.22	ICP	B-471
3.5	ICP-MS	B-320
3.69	ICP-MS	B-313
3.82	ICP-MS	B-442
4.17	IDMS	B-324
4.40	L-Chromato.	B-438
1.70	NAA	B-277
2.3	RNAA	B-447
3.1	SIMS	B-337
3.33	SIMS	B-376
Eu		
0.36	AAS	B-260
0.25	ICP	B-34, B-117
0.26	ICP	B-378
0.31	ICP	B-471
0.34	ICP	B-417
0.4	ICP	G-6'
0.26	ICP-MS	B-320
0.26	ICP-MS	B-313
0.32	ICP-MS	B-442
0.277	IDMS	B-324
0.26	INAA	B-270
0.29	INAA	B-24
0.3	INAA	B-310
0.30	INAA	B-37-1
0.31	INAA	B-324
0.316	INAA	B-118
0.33	INAA	B-18
0.35	INAA	B-146
0.34	L-Chromato.	B-438
0.28	NAA	B-287
0.35	NAA	B-277
0.269	RNAA	B-447
0.29	SIMS	B-337
0.30	SIMS	B-376
Gd		
4.78	ICP	B-471
5.1	ICP	B-417
5.7	ICP	B-378
6.19	ICP	G-6'
6.6	ICP	B-34, B-117
3.4	ICP-MS	B-320
4.30	ICP-MS	B-442
5.22	ICP-MS	B-313
5.72	IDMS	B-324
4.8	INAA	B-132
4.98	INAA(PG)	B-436
5.87	L-Chromato.	B-438
2.6	SIMS	B-337
5.46	SIMS	B-376
2.9	XRF	B-136
Hf		
4.90	ICP-MS	B-379
4.4	INAA	B-270
4.5	INAA	B-24
4.58	INAA	B-324
4.62	INAA	B-37-1
4.62	INAA	B-310
4.75	INAA	B-118
4.8	INAA	B-146
5.01	INAA	B-447
5.1	INAA	B-18
4.5	NAA	B-26
4.7	NAA	B-11
4.9	NAA	B-287
5.01	NAA	B-277
3.8	SIMS	B-337
2.0	XRF	B-25
Ho		
0.4	Chrom.	B-209
1.1	ICP	B-34
1.12	ICP	B-117
1.2	ICP	B-417
0.96	ICP-MS	B-320
1.15	ICP-MS	B-442
1.21	ICP-MS	B-313
1.36	INAA	B-146
1.22	L-Chromato.	B-438
1.23	NAA	B-277
0.76	RNAA	B-447
1.05	SIMS	B-337
La		
15.5	Chrom.	B-209
30	ED-XRF	B-444
18.7	ICP	B-471
19.4	ICP	B-117
19.6	ICP	B-34
20	ICP	B-311
20.2	ICP	B-378
20.82	ICP	G-6'
21.9	ICP	B-417
16.4	ICP-MS	B-320
18.14	ICP-MS	B-313
20.58	ICP-MS	B-442
17.8	IDMS	B-324
17.84	IDMS	B-165, B-231
19.4	INAA	B-146
19.5	INAA	B-37-1
19.5	INAA	B-310
20.3	INAA	B-270
21	INAA	B-18
21	INAA	B-24
21.5	INAA	B-324
21.8	INAA	B-118
19.6	L-Chromato.	B-438
18.21	NAA	B-277
18.5	NAA	B-287
24	NAA	B-11
21	OES	B-279
18.4	RNAA	B-447
17.2	SIMS	B-337
21.6	SIMS	B-376
18	XRF	B-6'
18	XRF	B-18
22.5	XRF	B-25
21	XRF(powder)	B-70
Lu		
0.09	Chrom.	B-209
0.62	ICP	B-34, B-117
0.63	ICP	B-417
0.67	ICP	G-6'
0.69	ICP	B-471
0.73	ICP	B-378

Table A-13 Individual data for JR-1

ppm	Method	Code No.
0.59	ICP-MS	B-320
0.67	ICP-MS	B-313
0.70	ICP-MS	B-442
0.704	IDMS	B-324
0.62	INAA	B-146
0.67	INAA	B-18
0.68	INAA	B-270
0.71	INAA	B-24
0.81	INAA	B-118
0.87	INAA	B-37-1
0.87	INAA	B-310
0.89	INAA	B-324
0.61	L-Chromato.	B-438
0.67	NAA	B-287
0.698	NAA	B-277
0.76	NAA	B-11
0.70	RNAA	B-447
0.67	SIMS	B-337
Nd		
16.2	Chrom.	B-209
23.1	ICP	B-378
23.8	ICP	B-417
24.2	ICP	B-471
24.8	ICP	B-34, B-117
25.93	ICP	G-6'
20.0	ICP-MS	B-320
21.6	ICP-MS	B-313
24.45	ICP-MS	B-442
23.1	IDMS	B-165, B-231
23.1	IDMS	B-324
18	INAA	B-18
22.3	INAA	B-146
25.7	INAA	B-118
28.2	INAA	B-310
28.2	INAA	B-37-1
29	INAA	B-324
25.0	L-Chromato.	B-438
21.8	NAA	B-277
23	NAA	B-11
26	OES	B-279
20.6	RNAA	B-447
19.8	SIMS	B-337
24.0	SIMS	B-376
25.6	XRF	B-25
Pr		
3.5	Chrom.	B-209
5.7	ICP	B-417
5.8	ICP	B-34, B-117
5.3	ICP-MS	B-320
5.53	ICP-MS	B-442
5.62	ICP-MS	B-313
6.19	L-Chromato.	B-438
5.30	NAA	B-277
5.5	RNAA	B-447
5.0	SIMS	B-337
6.3	XRF	B-25
Sc		
3.7	ICP	B-471
5.3	ICP	B-311
4.5	ICP-MS	B-320
4.80	INAA	B-447
5.0	INAA	B-270
5.2	INAA	B-146
5.38	INAA	B-324
5.4	INAA	B-18
5.6	INAA	B-118
5.73	INAA	B-37-1
5.73	INAA	B-310
5.9	INAA	B-24
5.18	NAA	B-277
5.25	NAA	B-11
5.62	NAA	B-287
5	OES	B-130
9.3	OES	B-279
4.6	PAA	B-56, B-221
5.7	SIMS	B-337
4.6	XRF	B-25
4.9	XRF	B-129
5.2	XRF	B-87
Sm		
4.3	Chrom.	B-209
5.5	ICP	B-378
5.7	ICP	B-34, B-117
6.5	ICP	B-417
6.6	ICP	B-471
6.73	ICP	G-6'
4.7	ICP-MS	B-320
5.32	ICP-MS	B-313
6.15	ICP-MS	B-442
5.75	IDMS	B-165, B-231
5.75	IDMS	B-324
5.43	INAA	B-270
5.58	INAA	B-146
5.6	INAA	B-132
6.03	INAA	B-310
6.03	INAA	B-37-1
6.17	INAA	B-118
6.3	INAA	B-18
6.54	INAA	B-324
6.6	INAA	B-24
4.80	INAA(PG)	B-436
6.0	L-Chromato.	B-438
6.5	NAA	B-287
6.7	NAA	B-11
7.34	NAA	B-277
6.73	RNAA	B-447
5.6	SIMS	B-337
5.93	SIMS	B-376
8.7	XRF	B-23
Tb		
1.4	ICP	B-417
0.85	ICP-MS	B-320
0.90	ICP-MS	B-442
0.93	ICP-MS	B-313
0.62	INAA	B-146
0.73	INAA	B-18
1.08	INAA	B-118
1.10	INAA	B-324
1.18	INAA	B-37-1
1.18	INAA	B-310
0.97	L-Chromato.	B-438
1.09	NAA	B-277
1.09	RNAA	B-447
0.74	SIMS	B-337
Tm		
0.2	Chrom.	B-209
0.75	ICP	B-417
0.58	ICP-MS	B-320
0.59	ICP-MS	B-313
0.68	ICP-MS	B-442
0.73	INAA	B-118
0.63	L-Chromato.	B-438
0.76	SIMS	B-337
Y		
14.7	Chrom.	B-209
41	ED-XRF	B-444
39.8	ICP	B-471
42.2	ICP	B-311
43.2	ICP	B-417
37.9	ICP-MS	B-320
57	OES	B-279
39.7	PAA	B-55
44.6	PAA	B-56, B-221
41	SIMS	B-337
31	XRF	B-6'
41	XRF	B-18
41.0	XRF	B-19
41.9	XRF	B-29, B-73
45	XRF	B-134
46	XRF	B-312
46	XRF	B-35
46	XRF	B-270
46	XRF	B-25
47	XRF	B-130
47	XRF	B-428
47.2	XRF	B-135
48	XRF	B-129
48	XRF	B-15
49	XRF	B-43
49.0	XRF	B-200
49.0	XRF	B-87
53	XRF	B-40
59	XRF	B-31
44	XRF(fusion)	B-36
48	XRF(powder)	B-70
48	XRF(powder)	B-36
Yb		
4.2	ICP	B-34, B-117
4.2	ICP	B-417
4.31	ICP	G-6'
4.93	ICP	B-378
4.97	ICP	B-471
4.2	ICP-MS	B-320
4.32	ICP-MS	B-442
4.33	ICP-MS	B-313
4.76	IDMS	B-324
3.8	INAA	B-24
4.3	INAA	B-146
4.55	INAA	B-270
4.75	INAA	B-118
4.89	INAA	B-310
4.89	INAA	B-37-1

Table A-13 Individual data for JR-1

ppm	Method	Code No.	ppm	Method	Code No.	ppm	Method	Code No.
5.0	INAA	B-18						
4.62	L-Chromato.	B-438						
4.03	NAA	B-277						
5.1	NAA	B-11						
5.2	OES	B-279						
4.27	RNAA	B-447						
3.5	SIMS	B-337						
4.95	SIMS	B-376						
3.6	XRF	B-136						
Zr								
98	ED-XRF	B-444						
93.4	ICP	B-471						
92	ICP-MS	B-379						
105	INAA	B-18						
139	INAA	B-146						
143	INAA	B-324						
114	OES	B-279						
96.5	PAA	B-56, B-221						
108	PAA	B-55						
102	Photom.	B-290						
102	Photom.	B-173						
88	SIMS	B-337						
90	XRF	B-31						
95	XRF	B-15						
98	XRF	B-25						
98	XRF	B-129						
98.4	XRF	B-135						
99	XRF	B-40						
99.0	XRF	B-87						
99.0	XRF	B-200						
100	XRF	B-270						
100	XRF	S-23'						
100	XRF	B-19						
103	XRF	B-29, B-73						
103	XRF	B-428						
107	XRF	B-43						
107	XRF	B-6'						
107	XRF	B-130						
107	XRF	B-18						
96	XRF(powder)	B-70						
114	XRF(powder)	B-36						

Table A-14 Individual data for JR-2

ppm	Method	Code No.
Ce		
26.6	Chrom.	B-209
38	ED-XRF	B-444
35.5	ICP	B-417
41.0	ICP	B-34, B-117
43.0	ICP	B-378
39.1	ICP-MS	B-315
39.7	ICP-MS	B-426
37.5	IDMS	B-324
39	INAA	B-244
40	INAA	B-230
40	INAA	B-270
40.1	INAA	B-310
40.1	INAA	B-37-1
40.5	INAA	B-324
41	INAA	B-24
42.6	INAA	B-118
55	INAA	B-146
34.6	L-Chromato.	B-438
42	NAA	B-11
42.8	NAA	B-277
46	OES	B-279
31.7	PAA	B-56, B-221
36.6	PAA	B-55
42.8	RNAA	B-447
29.1	SIMS	B-337
37.2	SIMS	B-376
30	XRF	B-22
40	XRF	B-25
60	XRF	B-74
39	XRF(powder)	B-70
Dy		
4.4	Chrom.	B-209
6.9	ICP	B-417
7.7	ICP	B-34, B-117
8.0	ICP	B-378
7.4	ICP-MS	B-315
7.7	ICP-MS	B-426
6.80	IDMS	B-324
8.7	INAA	B-270
5.59	NAA	B-277
5.6	RNAA	B-447
6.2	SIMS	B-337
6.21	SIMS	B-376
5.8	XRF	B-136
Er		
2.6	Chrom.	B-209
4.7	ICP	B-417
5.2	ICP	B-34, B-117
5.1	ICP-MS	B-315
5.1	ICP-MS	B-426
4.65	IDMS	B-324
4.4	L-Chromato.	B-438
3.2	RNAA	B-447
3.79	SIMS	B-376
4.4	SIMS	B-337
Eu		
0.06	ICP	B-378
0.20	ICP	B-34, B-117
0.23	ICP	B-417
0.11	ICP-MS	B-426
0.14	ICP-MS	B-315
0.102	IDMS	B-324
0.11	INAA	B-270
0.11	INAA	B-324
0.12	INAA	B-230
0.13	INAA	B-310
0.13	INAA	B-37-1
0.132	INAA	B-118
0.14	INAA	B-24
0.18	INAA	B-244
0.32	L-Chromato.	B-438
0.12	NAA	B-277
0.28	NAA	B-11
1.3	NAA	B-146
0.106	RNAA	B-447
0.15	SIMS	B-376
0.15	SIMS	B-337
Gd		
6.3	ICP	B-378
6.8	ICP	B-417
7.8	ICP	B-34, B-117
5.9	ICP-MS	B-315
6.3	ICP-MS	B-426
5.71	IDMS	B-324
6.2	L-Chromato.	B-438
5.38	SIMS	B-376
6.3	SIMS	B-337
3.7	XRF	B-136
Hf		
5.2	ICP-MS	B-426
5.39	ICP-MS	B-379
4.87	INAA	B-324
4.96	INAA	B-447
5.0	INAA	B-146
5.2	INAA	B-24
5.28	INAA	B-118
5.4	INAA	B-270
5.49	INAA	B-310
5.49	INAA	B-37-1
4.96	NAA	B-277
5.3	NAA	B-11
3.4	SIMS	B-337
2.0	XRF	B-25
Ho		
0.9	Chrom.	B-209
1.7	ICP	B-34, B-117
1.9	ICP	B-417
1.5	ICP-MS	B-315
1.64	ICP-MS	B-426
1.67	INAA	B-146
1.4	L-Chromato.	B-438
0.963	NAA	B-277
0.96	RNAA	B-447
1.15	SIMS	B-337
La		
10.5	Chrom.	B-209
23	ED-XRF	B-444
15.5	ICP	B-378
16.5	ICP	B-34, B-117
19.1	ICP	B-417
17.9	ICP-MS	B-315
18.8	ICP-MS	B-426
14.6	IDMS	B-324
15.2	INAA	B-310
15.2	INAA	B-37-1
15.8	INAA	B-146
16.1	INAA	B-270
17	INAA	B-230
17	INAA	B-244
17.0	INAA	B-324
17.8	INAA	B-118
19	INAA	B-24
15.8	L-Chromato.	B-438
17.9	NAA	B-277
20	NAA	B-11
17	OES	B-279
15.5	RNAA	B-447
12.2	SIMS	B-337
15.4	SIMS	B-376
16.9	XRF	B-25
16	XRF(powder)	B-70
Lu		
0.84	ICP	B-378
0.84	ICP	B-34, B-117
0.87	ICP	B-417
0.89	ICP-MS	B-315
0.94	ICP-MS	B-426
0.839	IDMS	B-324
0.76	INAA	B-146
0.88	INAA	B-24
0.88	INAA	B-270
0.97	INAA	B-118
1.01	INAA	B-310
1.01	INAA	B-37-1
1.02	INAA	B-324
0.98	L-Chromato.	B-438
0.83	NAA	B-277
0.89	NAA	B-11
0.93	RNAA	B-447
0.68	SIMS	B-337
Nd		
14.7	Chrom.	B-209
20.5	ICP	B-378
23.7	ICP	B-417
25.0	ICP	B-34, B-117
21.1	ICP-MS	B-315
21.1	ICP-MS	B-426
19.2	IDMS	B-324
18.6	INAA	B-146
22.5	INAA	B-118
23.2	INAA	B-37-1
23.2	INAA	B-310
24	INAA	B-324
17.5	L-Chromato.	B-438
18.19	NAA	B-277
24	NAA	B-11
23	OES	B-279
16.9	RNAA	B-447

Table A-14 Individual data for JR-2

ppm	Method	Code No.
16.1	SIMS	B-337
18.7	SIMS	B-376
29.2	XRF	B-25
Pr		
3.7	Chrom.	B-209
5.5	ICP	B-34, B-117
6.1	ICP	B-417
5.23	ICP-MS	B-426
5.6	ICP-MS	B-315
4.5	L-Chromato.	B-438
4.91	NAA	B-277
4.9	RNAA	B-447
3.9	SIMS	B-337
10.0	XRF	B-25
Sc		
27.4	ICP-MS	B-426
4.17	INAA	B-447
5.3	INAA	B-270
5.50	INAA	B-324
5.54	INAA	B-230
5.9	INAA	B-118
5.91	INAA	B-37-1
5.91	INAA	B-310
6.3	INAA	B-24
8.7	INAA	B-146
5.22	NAA	B-277
5.43	NAA	B-11
5	OES	B-130
8.4	OES	B-279
3.7	PAA	B-56, B-221
6.5	SIMS	B-337
4.6	XRF	B-25
5.7	XRF	B-129
Sm		
4.2	Chrom.	B-209
5.7	ICP	B-378
6.2	ICP	B-417
6.6	ICP	B-34, B-117
5.8	ICP-MS	B-315
5.9	ICP-MS	B-426
5.22	IDMS	B-324
5.46	INAA	B-270
5.5	INAA	B-37-1
5.5	INAA	B-310
5.71	INAA	B-118
5.88	INAA	B-146
5.9	INAA	B-244
5.9	INAA	B-230
6.0	INAA	B-324
6.6	INAA	B-24
4.8	L-Chromato.	B-438
6.31	NAA	B-277
6.6	NAA	B-11
5.99	RNAA	B-447
4.9	SIMS	B-337
5.21	SIMS	B-376
11.6	XRF	B-23
Tb		
1.2	ICP	B-417
1.3	ICP	B-34, B-117
1.0	ICP-MS	B-315
1.15	ICP-MS	B-426
0.47	INAA	B-146
1.14	INAA	B-324
1.19	INAA	B-37-1
1.19	INAA	B-310
1.20	INAA	B-118
1.3	L-Chromato.	B-438
1.14	NAA	B-277
1.14	RNAA	B-447
1.19	SIMS	B-337
Tb		
0.5	Chrom.	B-209
0.80	ICP	B-417
0.76	ICP-MS	B-315
0.83	ICP-MS	B-426
0.86	INAA	B-118
0.76	L-Chromato.	B-438
0.69	SIMS	B-337
Y		
45	ED-XRF	B-444
48.8	ICP	B-417
48.1	ICP-MS	B-426
65	OES	B-279
47.4	PAA	B-55
50.7	PAA	B-56, B-221
48	SIMS	B-337
36	XRF	B-22
38.9	XRF	B-29, B-73
47.1	XRF	B-19
49	XRF	B-134
50	XRF	B-428
50	XRF	B-25
51	XRF	B-15
51	XRF	B-35
52	XRF	B-135
52	XRF	B-130
53	XRF	B-270
54	XRF	B-129
54	XRF	B-43
54.8	XRF	B-200
54.8	XRF	B-145
57	XRF	B-40
66	XRF	B-31
54	XRF(fusion)	B-36
53	XRF(powder)	B-70
54	XRF(powder)	B-36
Yb		
5.2	ICP	B-417
5.3	ICP	B-34, B-117
5.88	ICP	B-378
5.5	ICP-MS	B-426
5.7	ICP-MS	B-315
5.39	IDMS	B-324
4.5	INAA	B-24
4.7	INAA	B-146
5.58	INAA	B-118
5.65	INAA	B-37-1
5.65	INAA	B-310
5.8	INAA	B-270
5.3	L-Chromato.	B-438
4.78	NAA	B-277
6.1	NAA	B-11
6.1	OES	B-279
6.21	RNAA	B-447
4.5	SIMS	B-337
5.21	SIMS	B-376
3.1	XRF	B-136
Zr		
94	ED-XRF	B-444
92	ICP-MS	B-426
93	ICP-MS	B-379
163	INAA	B-324
233	INAA	B-146
94	OES	B-279
91.3	PAA	B-56, B-221
107	PAA	B-55
100	Photom	B-461
75	XRF	B-31
90	XRF	B-15
93	XRF	B-22
95	XRF	B-270
95	XRF	B-129
95	XRF	B-40
95.9	XRF	B-200
95.9	XRF	B-145
96	XRF	B-135
97	XRF	B-19
98	XRF	B-25
98.1	XRF	B-428
98.1	XRF	B-29, B-73
103	XRF	B-130
104	XRF	B-43
110	XRF	B-74
87	XRF(powder)	B-70
111	XRF(powder)	B-36

Table A-15 Individual data for JCH1-1

ppm	Method	Code No.
Ce		
<30	ED-XRF	B-402-5
5.7	ICP	B-334
6.3	ICP	B-338
5.3	INAA	B-423
<5	OES	B-402-1
5	PAA	B-469
5.09	PAA	B-447
5.36	RNAA	B-447
5	XRF	B-339
Dy		
0.37	ICP	B-337
0.4	ICP	B-334
0.96	ICP	B-338
0.371	RNAA	B-447
2	XRF	B-339
Er		
0.33	ICP	B-338
0.184	RNAA	B-447
Eu		
0.1	ICP	B-334
0.19	ICP	B-338
0.067	INAA	B-423
<2	OES	B-402-1
0.063	RNAA	B-447
Gd		
0.8	ICP	B-334
2.2	ICP	B-338
2	XRF	B-339
Hf		
0.16	INAA	B-423
0.221	INAA	B-447
4	XRF	B-339
Ho		
0.16	ICP	B-338
<4	OES	B-402-1
0.095	RNAA	B-447
La		
<30	ED-XRF	B-402-5
2.2	ICP	B-334
8	ICP	B-338
<2	ICP	B-440
<2	ICP	B-311
1.56	INAA	B-423
<2	OES	B-402-1
1.43	RNAA	B-447
0.7	XRF	B-339
Lu		
<0.04	ICP	B-338
0.035	INAA	B-423
0.039	RNAA	B-447
Nd		
1.5	ICP	B-334
1.5	ICP	B-338
1.8	INAA	B-423
<4	OES	B-402-1
3.43	RNAA	B-447
2	XRF	B-339
Pr		
0.53	ICP	B-338
6.12	RNAA	B-447
<1	XRF	B-339
Sc		
1.0	ICP	B-440
1.0	ICP	B-311
0.982	INAA	B-447
1.00	INAA	B-423
<2	OES	B-402-1
<10	OES	B-338
0.4	PAA	B-469
0.7	XRF	B-339
Sm		
0.31	ICP	B-338
0.5	ICP	B-334
0.29	INAA	B-423
0.364	RNAA	B-447
1.9	XRF	B-339
Tb		
0.19	ICP	B-338
0.043	INAA	B-423
0.033	RNAA	B-447
Tm		
<0.04	ICP	B-338
Y		
<10	ED-XRF	B-402-5
0.60	ICP	B-338
1.7	ICP	B-311
1.7	ICP	B-440
2.0	ICP	B-334
2.42	ICP	B-402-8
<2	OES	B-402-1
1.3	PAA	B-469
1.6	XRF	B-340
2	XRF	B-339
5	XRF	B-332
(2.0)	XRF	B-321
Yb		
0.02	ICP	B-338
0.2	ICP	B-334
0.18	INAA	B-423
<1	OES	B-402-1
0.152	RNAA	B-447
1.8	XRF	B-339
Zr		
<10	ED-XRF	B-402-5
50	OES	B-338
8.7	PAA	B-469
14.5	PAA	B-447
6	XRF	B-339
10	XRF	B-340
11.7	XRF	B-321
12	XRF	B-332
19	XRF	B-334

Table A-16 Individual data for JDo-2

ppm	Method	Code No.
Ce		
3.3	Chrom.	B-243
1.9	INAA	B-437
2.2	INAA	B-229
2.3	INAA	B-308
2.47	INAA	B-232
3.03	INAA	B-277
3.31	NAA	B-234
4.98	NAA	B-287
1.99	PAA	B-447
2.1	PAA	B-469
2.76	RNAA	B-447
<1	XRF	B-239
<30	XRF	B-304
Dy		
0.2	Chrom.	B-243
0.83	INAA	B-308
0.97	INAA	B-277
1.05	NAA	B-234
0.970	RNAA	B-447
11	XRF	B-239
Eu		
0.145	INAA	B-229
0.17	INAA	B-437
0.173	INAA	B-308
0.18	INAA	B-232
0.259	INAA	B-277
0.131	NAA	B-287
0.236	NAA	B-234
0.186	RNAA	B-447
Gd		
<0.98	INAA	B-308
1.8	XRF	B-239
Hf		
0.0169	INAA	B-308
0.111	INAA	B-447
0.604	INAA	B-277
1.8	XRF	B-239
Ho		
0.164	INAA	B-308
0.669	RNAA	B-447
La		
2.9	Chrom.	B-243
7	ICP	B-197
7	ICP	B-440
7.7	INAA	B-308
7.8	INAA	B-229
8.1	INAA	B-437
8.20	INAA	B-277
8.52	INAA	B-232
8.24	NAA	B-234
7.81	RNAA	B-447
8.3	XRF	B-239
Lu		
0.044	INAA	B-277
0.045	INAA	B-308
0.05	INAA	B-437
0.06	INAA	B-232
0.042	NAA	B-234
0.047	RNAA	B-447
Nd		
2.3	Chrom.	B-243
4.6	INAA	B-437
4.8	INAA	B-308
5.05	INAA	B-232
5.99	INAA	B-277
5.99	NAA	B-234
5.91	RNAA	B-447
5	XRF	B-239
Pr		
0.2	Chrom.	B-243
1.17	INAA	B-308
1.22	RNAA	B-447
2.8	XRF	B-239
Sc		
<0.05	ICP	B-197
<0.05	ICP	B-440
0.123	INAA	B-229
0.132	INAA	B-447
0.134	INAA	B-277
0.138	INAA	B-308
0.15	INAA	B-232
0.2	INAA	B-437
0.126	NAA	B-234
0.149	NAA	B-287
1.4	PAA	B-469
14	XRF	B-332
21	XRF	B-239
Sm		
0.4	Chrom.	B-243
0.79	INAA	B-437
0.807	INAA	B-277
0.83	INAA	B-308
0.89	INAA	B-229
0.95	INAA	B-232
0.807	NAA	B-234
0.808	RNAA	B-447
2.8	XRF	B-239
Tb		
0.092	INAA	B-277
0.13	INAA	B-437
0.138	INAA	B-308
0.15	INAA	B-232
0.092	NAA	B-234
0.159	NAA	B-287
0.086	RNAA	B-447
Tm		
0.058	INAA	B-308
Y		
10	ICP	B-197
11	ICP	B-440
9.70	PAA	B-447
11.2	PAA	B-469
10	XRF	B-332
11	XRF	B-239
12.7	XRF	B-321
14	XRF	B-304
Yb		
0.31	INAA	B-437
0.34	INAA	B-308
0.432	INAA	B-277
0.58	INAA	B-232
0.185	NAA	B-234
0.326	NAA	B-287
0.373	RNAA	B-447
2.4	XRF	B-239
Zr		
5.5	AAS	B-243
9.33	INAA	B-232
<8.6	INAA	B-308
11.0	NAA	B-287
3.2	PAA	B-469
3.23	PAA	B-447
(8.7)	XRF	B-321
<1	XRF	B-239
<10	XRF	B-332

Table A-17 Individual data for JF-1

ppm	Method	Code No.
Ce		
4.11	AAS	B-324
6.1	Chrom.	B-209
3	ED-XRF	B-444
5	ICP	B-434
4.03	ICP-MS	B-313
4	INAA	B-437
4	INAA	B-24
4.2	INAA	B-270
4.3	INAA	B-163
4.3	INAA	B-310
3.7	NAA	B-287
4.67	NAA	B-277
4.69	NAA	B-234
<30	OES	B-279
4.40	RNAA	B-447
4.01	SIMS	B-376
3.2	XRF	B-136
Dy		
0.5	Chrom.	B-209
0.36	ICP-MS	B-313
<4	INAA	B-270
0.256	NAA	B-234, B-277
0.26	RNAA	B-447
0.45	SIMS	B-376
<1	XRF	B-136
Er		
0.09	Chrom.	B-209
0.23	ICP-MS	B-313
0.37	SIMS	B-376
Eu		
0.98	ICP-MS	B-313
0.79	INAA	B-437
0.825	INAA	B-324
0.85	INAA	B-310
0.85	INAA	B-163
0.93	INAA	B-24
1.37	INAA	B-270
0.71	NAA	B-287
0.843	NAA	B-277
0.850	NAA	B-234
0.831	RNAA	B-447
1.08	SIMS	B-376
Gd		
1.85	ICP-MS	B-313
0.73	SIMS	B-376
1.3	XRF	B-136
Hf		
1.27	ICP-MS	B-379
1.1	INAA	B-437
1.2	INAA	B-24
1.23	INAA	B-447
1.27	INAA	B-310
1.27	INAA	B-163
1.28	INAA	B-270
1.44	INAA	B-324
0.90	NAA	B-287
1.22	NAA	B-234
1.27	NAA	B-277
0.7	XRF	B-136
Ho		
0.08	ICP-MS	B-313
0.107	NAA	B-234, B-277
0.05	RNAA	B-447
La		
2.1	Chrom.	B-209
2.3	ICP-MS	B-313
2.46	INAA	B-324
2.6	INAA	B-163
2.6	INAA	B-310
2.9	INAA	B-437
3.5	INAA	B-24
3.6	INAA	B-270
2.96	NAA	B-277
3.04	NAA	B-234
4.2	NAA	B-287
<10	OES	B-279
2.96	RNAA	B-447
2.75	SIMS	B-376
3.4	XRF	B-136
Lu		
0.04	ICP-MS	B-313
0.049	INAA	B-324
0.05	INAA	B-24
0.05	INAA	B-437
0.06	INAA	B-310
0.06	INAA	B-163
0.08	INAA	B-270
0.040	NAA	B-287
0.051	NAA	B-234, B-277
0.053	RNAA	B-447
Nd		
2.4	Chrom.	B-209
1.31	ICP-MS	B-313
1.5	INAA	B-310
1.5	INAA	B-163
1.6	INAA	B-324
1.45	NAA	B-234, B-277
<10	OES	B-279
1.52	RNAA	B-447
1.17	SIMS	B-376
<1	XRF	B-136
Pr		
0.5	Chrom.	B-209
0.37	ICP-MS	B-313
0.7	XRF	B-136
Sc		
0.2	INAA	B-437
0.207	INAA	B-324
0.213	INAA	B-447
0.22	INAA	B-270
0.22	INAA	B-310
0.22	INAA	B-163
0.3	INAA	B-24
0.211	NAA	B-287
0.221	NAA	B-277
0.224	NAA	B-234
<2	OES	B-279
0.4	XRF	B-136
Sm		
0.6	Chrom.	B-209
0.35	ICP-MS	B-313
0.3	INAA	B-24
0.36	INAA	B-324
0.36	INAA	B-437
0.38	INAA	B-163
0.38	INAA	B-310
0.50	INAA	B-270
0.368	NAA	B-277
0.372	NAA	B-234
0.74	NAA	B-287
0.67	RNAA	B-447
0.42	SIMS	B-376
<1	XRF	B-136
Tb		
0.06	ICP-MS	B-313
0.076	INAA	B-324
0.09	INAA	B-437
0.1	INAA	B-163
0.1	INAA	B-310
0.067	NAA	B-234
0.072	NAA	B-277
0.072	RNAA	B-447
Tm		
0.04	ICP-MS	B-313
Y		
13	ED-XRF	B-444
2.7	OES	B-279
2	XRF	B-113
2.5	XRF	B-145
2.5	XRF	B-200
3	XRF	B-62
3.2	XRF	B-135
4	XRF	B-142
8	XRF	B-61
14.5	XRF	B-136
15	XRF	B-63
<3	XRF	B-270
<5	XRF(fusion)	B-59
4	XRF(powder)	B-59
Yb		
0.28	ICP-MS	B-313
0.3	INAA	B-24
0.31	INAA	B-437
0.35	INAA	B-163

Table A-17 Individual data for JF-1

ppm	Method	Code No.	ppm	Method	Code No.	ppm	Method	Code No.
0.35	INAA	B-310						
0.49	INAA	B-270						
0.348	NAA	B-234						
0.365	NAA	B-277						
<0.8	OES	B-279						
0.35	RNAA	B-447						
0.22	SIMS	B-376						
1.6	XRF	B-136						
Zr								
39	ED-XRF	B-444						
39	ICP-MS	B-379						
34	INAA	B-324						
43	OES	B-279						
31.4	XRF	B-145						
31.4	XRF	B-200						
35	XRF	B-62						
35	XRF	B-63						
37	XRF	B-428						
38	XRF	B-142						
39.2	XRF	B-135						
43	XRF	B-136						
46	XRF	B-270						
46	XRF	B-61						
44	XRF(fusion)	B-59						
45	XRF(powder)	B-59						

Table A-18 Individual data for JF-2

ppm	Method	Code No.
Ce		
0.50	INAA	B-324
1.1	INAA	B-230
2.2	INAA	B-244
<1	INAA	B-270
1.10	NAA	B-234, B-277
<30	OES	B-279
1.09	RNAA	B-447
(0.5)	XRF	B-168
Dy		
<4	INAA	B-270
0.017	NAA	B-234, B-277
0.035	RNAA	B-447
1.0	XRF	B-168
Eu		
0.61	INAA	B-244
0.62	INAA	B-437
0.64	INAA	B-230
0.67	INAA	B-270
0.674	INAA	B-324
0.582	NAA	B-234
0.584	NAA	B-277
0.580	RNAA	B-447
Gd		
(0.7)	XRF	B-168
Hf		
0.17	ICP-MS	B-379
0.12	INAA	B-447
0.14	INAA	B-437
0.17	INAA	B-270
0.203	INAA	B-324
0.360	NAA	B-234, B-277
3.1	XRF	B-168
Ho		
0.021	NAA	B-234, B-277
0.021	RNAA	B-447
La		
0.50	INAA	B-324
0.7	INAA	B-437
<1	INAA	B-270
0.65	NAA	B-234, B-277
<10	OES	B-279
0.616	RNAA	B-447
2.6	XRF	B-168
Lu		
0.006	INAA	B-324
0.01	INAA	B-437
<0.05	INAA	B-270
0.025	NAA	B-234, B-277
0.019	RNAA	B-447

ppm	Method	Code No.
Nd		
<10	OES	B-279
(0.2)	XRF	B-168
Sc		
0.074	INAA	B-447
0.075	INAA	B-270
0.079	INAA	B-324
0.1	INAA	B-437
0.11	INAA	B-230
0.11	INAA	B-244
0.077	NAA	B-234, B-277
<2	OES	B-279
1.0	XRF	B-168
Sm		
0.06	INAA	B-437
0.079	INAA	B-324
0.13	INAA	B-270
0.47	INAA	B-244
0.47	INAA	B-230
0.061	NAA	B-234
0.063	NAA	B-277
0.065	RNAA	B-447
(0.2)	XRF	B-168
Tb		
0.014	RNAA	B-447
Y		
8	ED-XRF	B-444
<1	OES	B-279
1	XRF	B-164
3	XRF	B-169
6	XRF	B-189
(0.2)	XRF	B-168
12	XRF	B-170
<1.7	XRF	B-171
<3	XRF	B-270
<3	XRF	B-207
<5	XRF	B-219
Yb		
0.2	INAA	B-270
0.059	NAA	B-234, B-277
<0.8	OES	B-279
0.039	RNAA	B-447
1.0	XRF	B-168
Zr		
8	ED-XRF	B-444
9	ICP-MS	B-379
6.6	INAA	B-324
<10	OES	B-279
2.0	XRF	B-171
4	XRF	B-207
7	XRF	B-170
7.0	XRF	B-168
9	XRF	B-428
15	XRF	B-270
16	XRF	B-169
22	XRF	B-189
<5	XRF	B-219

Table A-19 Individual data for JLk-1

ppm	Method	Code No.
Ce		
70.8	Chrom.	B-243
84.6	INAA	B-437
92	INAA	B-229
93.8	INAA	B-232
94	INAA	B-308
85.1	ICP-MS	B-466
79	NAA	B-287
95.1	NAA	B-234
95.7	NAA	B-277
85.3	PAA	B-469
102	PAA	B-447
98.5	RNAA	B-447
82	XRF	B-239
89	XRF	B-304
Dy		
7.1	Chrom.	B-243
6.44	ICP-MS	B-466
7.3	INAA	B-308
5.72	NAA	B-277
5.7	RNAA	B-447
7	XRF	B-239
Er		
2.7	Chrom.	B-243
3.55	ICP-MS	B-466
3.81	NAA	B-234
3.81	NAA	B-277
3.8	RNAA	B-447
Eu		
1.23	ICP-MS	B-466
1.26	INAA	B-229
1.28	INAA	B-308
1.32	INAA	B-437
1.32	INAA	B-232
1.28	NAA	B-287
1.55	NAA	B-234
1.62	NAA	B-277
1.33	RNAA	B-447
Gd		
6.6	ICP-MS	B-466
4.9	INAA	B-308
5.4	XRF	B-239
Hf		
3.4	INAA	B-229
3.74	INAA	B-437
3.93	INAA	B-447
4.10	INAA	B-232
4.9	INAA	B-308
3.85	NAA	B-234
3.92	NAA	B-277
4.1	NAA	B-287
3.4	XRF	B-239
Ho		
0.4	Chrom.	B-243
1.20	ICP-MS	B-466
1.52	INAA	B-308
La		
28.3	Chrom.	B-243
42	ICP	B-440
42	ICP	B-197
39.8	ICP-MS	B-466
40	INAA	B-308
40.0	INAA	B-437
42.2	INAA	B-232
47	INAA	B-229
40.62	NAA	B-234
40.69	NAA	B-277
41.7	NAA	B-287
41.5	RNAA	B-447
38	XRF	B-239
Lu		
0.51	ICP-MS	B-466
0.63	INAA	B-437
0.65	INAA	B-308
0.66	INAA	B-232
0.52	NAA	B-287
0.58	NAA	B-277
0.710	NAA	B-234
0.521	RNAA	B-447
Nd		
29.5	Chrom.	B-243
35.5	ICP-MS	B-466
35.6	INAA	B-232
38.0	INAA	B-437
39	INAA	B-308
46.0	NAA	B-234
55.6	RNAA	B-447
35	XRF	B-239
Pr		
7.30	NAA	B-234
9.5	XRF	B-239
6.3	Chrom.	B-243
7.30	NAA	B-277
8.4	INAA	B-308
11.7	RNAA	B-447
Sc		
16	ICP	B-197
16.7	ICP	B-440
15.2	INAA	B-229
15.7	INAA	B-447
15.9	INAA	B-308
16.0	INAA	B-437
16.2	INAA	B-232
15.7	NAA	B-287
15.95	NAA	B-234
16.12	NAA	B-277
17.9	PAA	B-447
18	PAA	B-469
13	XRF	B-239
15	XRF	B-332
Sm		
7.3	Chrom.	B-243
7.64	ICP-MS	B-466
8.19	INAA	B-437
8.3	INAA	B-308
8.35	INAA	B-232
9.5	INAA	B-229
7.5	NAA	B-287
8.09	NAA	B-234
8.14	NAA	B-277
8.22	RNAA	B-447
7.2	XRF	B-239
Tb		
1.06	ICP-MS	B-466
1.31	INAA	B-308
1.38	INAA	B-437
1.39	INAA	B-232
1.20	NAA	B-277
1.20	NAA	B-234
1.23	RNAA	B-447
Tm		
0.53	ICP-MS	B-466
0.66	INAA	B-308
Y		
39	ICP	B-197
39	ICP	B-440
36.4	ICP-MS	B-466
29.1	PAA	B-469
40.9	PAA	B-447
42	XRF	B-332
43	XRF	B-304
44	XRF	B-239
47	XRF	B-340
47.2	XRF	B-321
Yb		
3.52	ICP-MS	B-466
3.95	INAA	B-232
3.96	INAA	B-437
4.4	INAA	B-308
4.08	NAA	B-277
4.19	NAA	B-234
4.02	RNAA	B-447
4.6	XRF	B-239
Zr		
94	AAS	B-243
147	INAA	B-232
178	INAA	B-308
126	PAA	B-469
161	PAA	B-447
131	XRF	B-304
137	XRF	B-332
139	XRF	B-340
140.8	XRF	B-321
153	XRF	B-239

Table A-20 Individual data for JLs-1

ppm	Method	Code No.
Ce		
0.23	INAA	B-308
0.69	INAA	B-232
0.74	INAA	B-229
1.55	NAA	B-287
1.64	NAA	B-277
1.67	NAA	B-234
0.2	PAA	B-469
0.743	RNAA	B-447
4.4	XRF	B-239
48	XRF	B-304
Dy		
<0.156	INAA	B-308
0.030	NAA	B-234
0.030	NAA	B-277
0.030	RNAA	B-447
14	XRF	B-239
Eu		
0.0051	INAA	B-229
0.0058	INAA	B-308
0.01	INAA	B-437
0.01	INAA	B-232
0.0072	NAA	B-287
0.006	RNAA	B-447
Gd		
<0.140	INAA	B-308
(0.8)	XRF	B-239
Hf		
0.0074	INAA	B-308
0.06	INAA	B-232
0.142	INAA	B-447
0.282	NAA	B-234
(0.8)	XRF	B-239
Ho		
<0.0090	INAA	B-308
La		
<0.5	ICP	B-440
<0.5	ICP	B-197
0.119	INAA	B-308
0.154	INAA	B-229
0.5	INAA	B-437
0.145	NAA	B-277
0.172	NAA	B-234
0.157	RNAA	B-447
2.5	XRF	B-239
Lu		
0.03	INAA	B-232
<0.0028	INAA	B-308
0.031	NAA	B-277
0.033	NAA	B-234
0.024	RNAA	B-447

ppm	Method	Code No.
Nd		
0.133	INAA	B-308
1.74	INAA	B-232
<1	XRF	B-239
Pr		
<0.063	INAA	B-308
<1	XRF	B-239
Sc		
37	AAS	B-239
<0.05	ICP	B-440
<0.05	ICP	B-197
0.03	INAA	B-232
0.031	INAA	B-308
0.031	INAA	B-229
0.031	INAA	B-447
0.0292	NAA	B-287
0.032	NAA	B-277
0.032	NAA	B-234
2.2	PAA	B-469
31	XRF	B-332
<65	XRF	B-304
Sm		
0.026	INAA	B-308
0.185	INAA	B-229
0.19	INAA	B-232
0.182	NAA	B-277
0.191	NAA	B-234
0.174	RNAA	B-447
3.4	XRF	B-239
Tb		
0.0038	INAA	B-308
0.0045	NAA	B-287
0.004	RNAA	B-447
Tm		
<0.0066	INAA	B-308
Y		
<0.2	ICP	B-197
<0.2	ICP	B-440
0.3	PAA	B-469
2	XRF	B-332
2.4	XRF	B-321
(0.1)	XRF	B-239
<6	XRF	B-304
Yb		
0.0161	INAA	B-308
0.021	NAA	B-287
0.016	RNAA	B-447
1.8	XRF	B-239
Zr		
7.4	AAS	B-243
14.5	INAA	B-232
<3.4	INAA	B-308
12.0	NAA	B-287
2.8	PAA	B-469
5.8	XRF	B-321
<1	XRF	B-239
<10	XRF	B-332

Table A-21 Individual data for JP-1

ppm	Method	Code No.
Ce		
5	ED-XRF	B-444
12.0	INAA	B-270
<1.40	INAA	B-308
0.938	NAA	B-277
11.6	NAA	B-287
<30	OES	B-279
0.57	RNAA	B-447
13	XRF	B-25
Dy		
<0.31	INAA	B-308
<5	INAA	B-270
0.021	NAA	B-277
0.027	RNAA	B-447
<1	XRF	B-136
Er		
Eu		
0.0368	INAA	B-230
0.0368	INAA	B-244
<0.05	INAA	B-270
<0.143	INAA	B-308
0.036	NAA	B-287
0.018	RNAA	B-447
Gd		
<6.8	INAA	B-308
2.4	XRF	B-136
Hf		
0.28	ICP-MS	B-379
0.12	INAA	B-447
0.14	INAA	B-324
0.149	INAA	B-308
0.3	INAA	B-270
0.26	NAA	B-287
0.603	NAA	B-277
0.2	XRF	B-25
Ho		
<0.020	INAA	B-308
0.018	NAA	B-277
0.018	RNAA	B-447
La		
5	ED-XRF	B-444
0.026	INAA	B-308
0.042	INAA	B-270
6.1	INAA	B-244
6.1	INAA	B-230
0.130	NAA	B-277
6.1	NAA	B-287
<10	OES	B-279
0.131	RNAA	B-447
3.6	XRF	B-25
Lu		
<0.0057	INAA	B-308
<0.04	INAA	B-270
0.031	NAA	B-287
0.051	NAA	B-277
0.038	RNAA	B-447
Nd		
<4.4	INAA	B-308
<10	OES	B-279
0.3	XRF	B-25
Pr		
<0.34	INAA	B-308
0.1	XRF	B-25
Sc		
6.75	INAA	B-447
7.4	INAA	B-230
7.44	INAA	B-244
7.5	INAA	B-270
7.5	INAA	B-308
7.55	INAA	B-324
7.7	INAA	B-118
7.01	NAA	B-287
7.09	NAA	B-277
6.7	OES	B-279
5.1	XRF	B-25
7.1	XRF	B-129
Sm		
0.0095	INAA	B-308
<0.05	INAA	B-270
0.020	NAA	B-277
0.035	NAA	B-287
0.020	RNAA	B-447
4.6	XRF	B-23
Tb		
<0.026	INAA	B-308
0.019	NAA	B-277
0.012	RNAA	B-447
Tm		
<0.041	INAA	B-308
Y		
4	ED-XRF	B-444
<1	OES	B-279
0.4	XRF	B-25
0.6	XRF	B-40
2	XRF	B-135
2	XRF	B-35
3	XRF	B-43
<1.7	XRF	B-200
<3	XRF	B-15
<5	XRF	B-270
<20	XRF	B-312
<5	XRF(fusion)	B-36
1	XRF(powder)	B-70
<1	XRF(powder)	B-36
Yb		
0.020	INAA	B-308
<0.2	INAA	B-270
0.018	NAA	B-277
<0.8	OES	B-279
0.017	RNAA	B-447
59	XRF	B-136
Zr		
7	ED-XRF	B-444
6	ICP-MS	B-379
<16.0	INAA	B-308
12.0	OES	B-279
8.2	PAA	B-143-7
3	XRF	B-31
3.9	XRF	B-200
3.9	XRF	B-145
4	XRF	B-25
6	XRF	B-270
7	XRF	B-15
8	XRF	B-434
9	XRF	B-40
9.9	XRF	B-29, B-73
11	XRF	B-428
12.2	XRF	B-135
25	XRF	B-43
6	XRF(powder)	B-70
21	XRF(powder)	B-36

Table A-22 Individual data for JSd-1

ppm	Method	Code No.
Ce		
36	ED-XRF	B-402-5
32	ICP	B-334
45	ICP	B-338
32.3	INAA	B-437
35.3	INAA	B-423
32	OES	B-402-1
32.5	PAA	B-469
35.7	PAA	B-447
38.3	RNAA	B-447
35	XRF	B-339
Dy		
1.5	ICP	B-338
2.6	ICP	B-334
2.30	RNAA	B-447
2	XRF	B-339
Er		
0.60	ICP	B-338
0.648	RNAA	B-447
Eu		
0.85	ICP	B-338
0.9	ICP	B-334
0.99	INAA	B-437
1.03	INAA	B-423
<2	OES	B-402-1
0.832	RNAA	B-447
Gd		
2.2	ICP	B-338
3.6	ICP	B-334
2	XRF	B-339
Hf		
3.30	INAA	B-447
3.43	INAA	B-437
3.55	INAA	B-423
7	XRF	B-339
Ho		
0.23	ICP	B-338
<4	OES	B-402-1
0.280	RNAA	B-447
La		
<30	ED-XRF	B-402-5
18	ICP	B-334
18	ICP	B-280, B-440
20	ICP	B-338
16.4	INAA	B-437
17.5	INAA	B-423
20	OES	B-402-1
18.8	RNAA	B-447
20	XRF	B-339
Lu		
0.04	ICP	B-338
0.21	INAA	B-437
0.221	INAA	B-423
0.141	RNAA	B-447
Nd		
17	ICP	B-334
19	ICP	B-338
17.3	INA	B-423
17.2	INAA	B-437
18	OES	B-402-1
17.8	RNAA	B-447
18	XRF	B-339
Pr		
5.6	ICP	B-338
4.28	RNAA	B-447
2	XRF	B-339
Sc		
11.2	ICP	B-280, B-440
10.7	INAA	B-447
11.0	INAA	B-437
11.1	INAA	B-423
10	OES	B-338
11	OES	B-402-1
8.3	PAA	B-469
17.1	PAA	B-447
12	XRF	B-339
12	XRF	B-332
Sm		
3.4	ICP	B-334
3.8	ICP	B-338
3.55	INAA	B-437
3.61	INAA	B-423
3.36	RNAA	B-447
5.5	XRF	B-339
Tb		
0.30	ICP	B-338
0.45	INAA	B-423
0.52	INAA	B-437
0.449	RNAA	B-447
Tm		
0.07	ICP	B-338
Y		
18	ED-XRF	B-402-5
14	ICP	B-334
14.0	ICP	B-280, B-440
14.67	ICP	B-402-8
80	ICP	B-338
13	OES	B-402-1
15.4	PAA	B-469
20.8	PAA	B-447
14	XRF	B-340
16	XRF	B-332
16	XRF	B-332
16.0	XRF	B-321
17	XRF	B-339
Yb		
0.30	ICP	B-338
1.2	ICP	B-334
1.28	INAA	B-423
1.30	INAA	B-437
2	OES	B-402-1
0.874	RNAA	B-447
1.7	XRF	B-339
Zr		
141	ED-XRF	B-402-5
100	OES	B-338
132	PAA	B-469
174	PAA	B-447
119	XRF	B-339
128	XRF	B-340
131	XRF	B-332
135.2	XRF	B-321
142	XRF	B-334

Table A-23 Individual data for JSd-2

ppm	Method	Code No.
Ce		
<30	ED-XRF	B-402-5
22	ICP	B-334
31	ICP	B-338
22.8	INAA	B-423
21	OES	B-402-1
22.7	PAA	B-469
24.7	PAA	B-447
26.8	RNAA	B-447
15	XRF	B-339
Dy		
2.5	ICP	B-338
3.0	ICP	B-334
0.594	RNAA	B-447
5	XRF	B-339
Er		
1.35	ICP	B-338
1.26	RNAA	B-447
Eu		
0.76	ICP	B-338
0.8	ICP	B-334
0.88	INAA	B-423
<2	OES	B-402-1
0.763	RNAA	B-447
Gd		
2.2	ICP	B-338
3.4	ICP	B-334
<1	XRF	B-339
Hf		
2.74	INAA	B-447
2.8	INAA	B-423
<1	XRF	B-339
Ho		
0.50	ICP	B-338
0.60	INAA	B-423
<4	OES	B-402-1
La		
<30	ED-XRF	B-402-5
11	ICP	B-280, B-440
12	ICP	B-334
15	ICP	B-338
11.3	INAA	B-423
13	OES	B-402-1
10.1	RNAA	B-447
14	XRF	B-339
Lu		
0.16	ICP	B-338
0.329	INAA	B-423
0.223	RNAA	B-447

ppm	Method	Code No.
Nd		
13	ICP	B-334
15	ICP	B-338
12.6	INAA	B-423
14	OES	B-402-1
16.7	RNAA	B-447
8	XRF	B-339
Pr		
3.8	ICP	B-338
2.19	RNAA	B-447
1	XRF	B-339
Sc		
17.9	ICP	B-280, B-440
16.1	INAA	B-447
18.2	INAA	B-423
10	OES	B-338
18	OES	B-402-1
19.1	PAA	B-469
27.4	PAA	B-447
17	XRF	B-332
18	XRF	B-339
Sm		
2.9	ICP	B-334
3.5	ICP	B-338
2.95	INAA	B-423
2.47	RNAA	B-447
5.5	XRF	B-339
Tb		
0.38	ICP	B-338
0.46	INAA	B-423
0.431	RNAA	B-447
Tm		
0.21	ICP	B-338
Y		
19	ED-XRF	B-402-5
10	ICP	B-338
16.0	ICP	B-280, B-440
17.91	ICP	B-402-8
18	ICP	B-334
15	OES	B-402-1
19.8	PAA	B-469
25.9	PAA	B-447
15	XRF	B-332
18	XRF	B-339
18.8	XRF	B-321
19	XRF	B-340
Yb		
1.1	ICP	B-338
1.6	ICP	B-334
1.85	INAA	B-423

ppm	Method	Code No.
2	OES	B-402-1
1.39	RNAA	B-447
3	XRF	B-339
Zr		
105	ED-XRF	B-402-5
80	OES	B-338
108	PAA	B-469
143	PAA	B-447
101	XRF	B-339
104.1	XRF	B-321
107	XRF	B-334
108	XRF	B-332
116	XRF	B-340

Table A-24 Individual data for JSd-3

ppm	Method	Code No.
Ce		
37	ED-XRF	B-402-5
35	ICP	B-338
41	ICP	B-334
43.0	INAA	B-423
39	OES	B-402-1
43.2	PAA	B-469
47.3	PAA	B-447
41.7	RNAA	B-447
45	XRF	B-339
Dy		
2.0	ICP	B-338
2.6	ICP	B-334
0.927	RNAA	B-447
2	XRF	B-339
Er		
0.90	ICP	B-338
0.860	RNAA	B-447
Eu		
0.67	ICP	B-338
0.7	ICP	B-334
0.70	INAA	B-423
<2	OES	B-402-1
0.680	RNAA	B-447
Gd		
2.2	ICP	B-338
3.3	ICP	B-334
<1	XRF	B-339
Hf		
3.3	INAA	B-423
3.33	INAA	B-447
3	XRF	B-339
Ho		
0.39	ICP	B-338
0.50	INAA	B-423
<4	OES	B-402-1
La		
<30	ED-XRF	B-402-5
20	ICP	B-334
21	ICP	B-440
21	ICP	B-311
28	ICP	B-338
19.3	INAA	B-423
20	OES	B-402-1
16.7	RNAA	B-447
23	XRF	B-339
Lu		
0.09	ICP	B-338
0.269	INAA	B-423
0.188	RNAA	B-447
Nd		
16	ICP	B-334
24	ICP	B-338
15.2	INAA	B-423
16	OES	B-402-1
16.1	RNAA	B-447
19	XRF	B-339
Pr		
6.6	ICP	B-338
2.94	RNAA	B-447
2	XRF	B-339
Sc		
11.3	ICP	B-440
11.3	ICP	B-311
9.68	INAA	B-447
10.9	INAA	B-423
10	OES	B-338
11	OES	B-402-1
9.2	PAA	B-469
13.0	PAA	B-447
11	XRF	B-339
11	XRF	B-332
Sm		
3.2	ICP	B-334
4.5	ICP	B-338
3.24	INAA	B-423
3.51	RNAA	B-447
4.1	XRF	B-339
Tb		
0.33	ICP	B-338
0.36	INAA	B-423
0.333	RNAA	B-447
Tm		
0.12	ICP	B-338
Y		
22	ED-XRF	B-402-5
8.0	ICP	B-338
13.4	ICP	B-440
13.4	ICP	B-311
13.61	ICP	B-402-8
14	ICP	B-334
10	OES	B-402-1
15.3	PAA	B-469
21.6	PAA	B-447
12	XRF	B-332
13.7	XRF	B-321
16	XRF	B-340
22	XRF	B-339
Yb		
0.71	ICP	B-338
1.5	ICP	B-334
1.54	INAA	B-423
1	OES	B-402-1
1.30	RNAA	B-447
3	XRF	B-339
Zr		
122	ED-XRF	B-402-5
140	OES	B-338
128	PAA	B-469
167	PAA	B-447
114	XRF	B-334
119	XRF	B-340
120	XRF	B-339
124.2	XRF	B-321
126	XRF	B-332

Table A-25 Individual data for JSl-1

ppm	Method	Code No.
Ce		
59	ED-XRF	B-402-5
61	ICP	B-334
65	ICP	B-338
56.6	INAA	B-437
66	INAA	B-423
57	OES	B-402-1
58.9	PAA	B-447
62.9	PAA	B-469
59.3	RNAA	B-447
59	XRF	B-339
Dy		
2.6	ICP	B-338
5.0	ICP	B-334
8.66	RNAA	B-447
6	XRF	B-339
Er		
1.2	ICP	B-338
1.13	RNAA	B-447
Eu		
0.95	ICP	B-338
1.3	ICP	B-334
1.20	INAA	B-423
1.28	INAA	B-437
<2	OES	B-402-1
1.16	RNAA	B-447
Gd		
3.7	ICP	B-338
5.7	ICP	B-334
5	XRF	B-339
Hf		
4.52	INAA	B-437
4.62	INAA	B-423
4.72	INAA	B-447
6	XRF	B-339
Ho		
0.48	ICP	B-338
0.96	INAA	B-423
<4	OES	B-402-1
0.526	RNAA	B-447
La		
32	ED-XRF	B-402-5
30	ICP	B-334
31	ICP	B-338
31	ICP	B-280, B-440
28.4	INAA	B-437
30.2	INAA	B-423
31	OES	B-402-1
27.3	RNAA	B-447
28	XRF	B-339

ppm	Method	Code No.
Lu		
0.08	ICP	B-338
0.46	INAA	B-437
0.472	INAA	B-423
0.451	RNAA	B-447
Nd		
29	ICP	B-338
30	ICP	B-334
28.1	INAA	B-437
32.4	INAA	B-423
28	OES	B-402-1
31.1	RNAA	B-447
29	XRF	B-339
Pr		
8.4	ICP	B-338
4	XRF	B-339
5.64	RNAA	B-447
Sc		
17.2	ICP	B-280, B-440
16.2	INAA	B-423
16.8	INAA	B-447
17.4	INAA	B-437
16	OES	B-402-1
25	OES	B-338
16.9	PAA	B-469
17.2	PAA	B-447
18	XRF	B-339
14	XRF	B-332
Sm		
5.3	ICP	B-334
6.2	ICP	B-338
5.70	INAA	B-423
5.76	INAA	B-437
7.00	RNAA	B-447
6.4	XRF	B-339
Tb		
0.52	ICP	B-338
0.74	INAA	B-423
0.87	INAA	B-437
0.691	RNAA	B-447
Tm		
0.12	ICP	B-338
Y		
33	ED-XRF	B-402-5
15	ICP	B-338
28.7	ICP	B-280, B-440
29	ICP	B-334
29.18	ICP	B-402-8
26	OES	B-402-1
31.5	PAA	B-447
32.6	PAA	B-469

ppm	Method	Code No.
29	XRF	B-332
32	XRF	B-339
32.1	XRF	B-321
Yb		
0.61	ICP	B-338
2.7	ICP	B-334
2.80	INAA	B-437
3.09	INAA	B-423
3	OES	B-402-1
2.64	RNAA	B-447
4	XRF	B-339
Zr		
181	ED-XRF	B-402-5
120	OES	B-338
170	PAA	B-469
182	PAA	B-447
166	XRF	B-334
168	XRF	B-339
171	XRF	B-332
176.0	XRF	B-321

Table A-26 Individual data for JSl-2

ppm	Method	Code No.
Ce		
83	ED-XRF	B-402-5
64	ICP	B-338
70	ICP	B-334
73	INAA	B-423
66	OES	B-402-1
72.1	PAA	B-447
73.1	PAA	B-469
65.4	RNAA	B-447
73	XRF	B-339
Dy		
3.0	ICP	B-338
5.4	ICP	B-334
4.73	RNAA	B-447
5	XRF	B-339
Er		
1.6	ICP	B-338
2.56	RNAA	B-447
Eu		
0.95	ICP	B-338
1.3	ICP	B-334
1.16	INAA	B-423
<2	OES	B-402-1
1.13	RNAA	B-447
Gd		
3.7	ICP	B-338
6.0	ICP	B-334
5	XRF	B-339
Hf		
5.12	INAA	B-447
5.19	INAA	B-423
7	XRF	B-339
Ho		
0.62	ICP	B-338
1.00	INAA	B-423
<4	OES	B-402-1
0.532	RNAA	B-447
La		
38	ED-XRF	B-402-5
31	ICP	B-338
33	ICP	B-440
33	ICP	B-334
33	ICP	B-311
33.0	INAA	B-423
35	OES	B-402-1
31.0	RNAA	B-447
31	XRF	B-339
Lu		
0.14	ICP	B-338
0.498	INAA	B-423
0.394	RNAA	B-447
Nd		
29	ICP	B-338
33	ICP	B-334
34	INAA	B-423
33	OES	B-402-1
30.5	RNAA	B-447
35	XRF	B-339
Pr		
7.8	ICP	B-338
5.97	RNAA	B-447
6	XRF	B-339
Sc		
18.0	ICP	B-440
18.0	ICP	B-311
16.1	INAA	B-423
16.3	INAA	B-447
17	OES	B-402-1
20	OES	B-338
11.6	PAA	B-469
16.8	PAA	B-447
16	XRF	B-332
17	XRF	B-339
Sm		
5.4	ICP	B-338
5.8	ICP	B-334
6.12	INAA	B-423
5.49	RNAA	B-447
5.8	XRF	B-339
Tb		
0.56	ICP	B-338
0.76	INAA	B-423
0.761	RNAA	B-447
Tm		
0.20	ICP	B-338
Y		
32	ED-XRF	B-402-5
13	ICP	B-338
29.4	ICP	B-440
29.4	ICP	B-311
29.6	ICP	B-402-8
30	ICP	B-334
23	OES	B-402-1
31.6	PAA	B-469
36.9	PAA	B-447
32	XRF	B-340
32	XRF	B-332
33.0	XRF	B-321
34	XRF	B-339
Yb		
1.1	ICP	B-338
3.0	ICP	B-334
3.20	INAA	B-423
3	OES	B-402-1
2.64	RNAA	B-447
4	XRF	B-339
Zr		
197	ED-XRF	B-402-5
120	OES	B-338
191	PAA	B-469
213	PAA	B-447
182	XRF	B-334
188	XRF	B-332
191	XRF	B-339
194	XRF	B-340
195.8	XRF	B-321

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B-1	Y. Tanizaki	1976	Personal communication, Tokyo Metoro. Isot. Res. Center			
B-2	S. Gohda and H. Yamazaki	1982	Heavy metal pollution in Osaka bay sediment (in Japanese with English abstract)	Rep. Atom. Ener. Res. Inst., Kinki Univ.	19	29-36
B-3	H. Wakita	1982	Personal communication, Tokyo University			
B-4	T. Kawashima	1981	Personal communication, Coverment Industrial Research Institute Nagoya			
B-6'	G. Bologne	1983	Personal communication, University of Liege, Belgium			
B-6-1	T. Yoshida, H. Fujimaki and K. Aoki	1981	Analysis of igneous rocks by instrumental photon-activation	Sci. Rep. Tohoku Univ. Ser. III	15(1)	101-119
B-6-2	T. Yoshida, H. Fujimaki and K. Aoki	1982	Nondestructive multielement photon-activation analysis of rocks	Res. Rep. Lab. Nuc. Sci. Tohoku Univ.	15(2)	224-238
B-7	Y. Saito	1979	Personal communication, Nihon Inspection Ltd., Tokyo Res. Center			
B-8	H. Hamaguchi, N. Nonaka, H. Fukushima and H. Higuchi	1979	Application of instrumental neutron activation analysis for environmental samples	Rep. Ministry of Educ.	(1)	122-124
B-9	M. Hosoi, H. Shimizu, T. Tanaka and A. Masuda	1984	Personal communication, Tokyo University			
B-10	Y. Sakakibara	1977	Personal communication, Tokyo Gakugei University			
B-11	N. Aota, T. Nikko, K. Okada, K. Sakamoto and H. Nohke	1983	Activation analysis of standard rock samples (Abst., in Japanese)	1983 Annual Meet. Japan Geoch. Soc.		170-171
B-12	R. Sugisaki, T. Kinoshita, T. Shimomura and K. Ando	1981	An automatic X-ray fluorescence method for the trace element analyses in silicate rocks (in Japanese with English abstract)	J. Geol. Soc. Japan	87(10)	675-688
B-15	Z. Solyom	1985	Personal communication, University of Lund, Sweden			
B-18	N. W. Bower, E. S. Gladney, R. C. Hagan, P. E. Trujillo and R. G. Warren	1985	Elemental concentrations in Japanese silicate rock standards JA-1, JR-1 and JB-2	Geost. Newsletter	9(2)	199-203
B-19	J. Etoubleau	1985	Personal communication, IFREMER, Centre de Brest, France			
B-22	I. Roelandts	1983	Personal communication, Universite de Liege, Liege, Belgium			
B-23	H. A. Olszowy	1985	Personal communication, Govern. Chem. Lab., Brisbane, Australia			
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B-26	S. Tamanyu	1985	Personal communication, Japan Chem. Anal. Center			
B-28	J. Gill	1985	Personal communication, Earth Sciences Board, University of California			
B-29	S. Nakada	1985	X-ray fluorescence analysis of trace elements in silicate rocks using fused disk samples (in Japanese with English abstract)	Sci. Repts., Dept. Geol., Kyushu Univ.	14(3)	117-127
B-31	S. A. Mertzman	1985	Personal communication, Franklin & Marshall College, Pennsylvania			
B-34	K. Toyoda	1985	Personal communication, Tokyo University			

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B-35	D. J. Bland	1985	Personal communication, British Geological Survey, England			
B-36	R. Kanaris-Sotiriou	1984	Personal communication, Sheffield Univ., England			
B-37-1	T. Chunhan	1985	Personal communication, Chengdu College of Geology, China			
B-37-2	T. Chunhan	1985	Personal communication, Chengdu College of Geology, China			
B-40	J. C. H. Huang	1985	Personal communication, University of Windsor, Canada			
B-43	G. Thompson	1985	Personal communication, Woods Hole Oceanographic Institution, U. S. A.			
B-47	S. Terashima	1984	Determination of arsenic and antimony in geological materials by automated hydride generation and electrothermal atomic absorption spectrometry (in Japanese with English abstract)	Bunseki Kagaku	33(10)	561-563
B-54	P. Mitropoulos	1982	REE patterns of the metasedimentary rocks of the land's end granite aureole (southwest England)	Chem. Geol.	35	265-280
B-55	T. Kato	1984	Personal communication, Tohoku University			
B-56	T. Yoshida and K. Aoki	1985	Photon-activation analysis of GSJ standard rocks	Res. Rep. Lab. Nuc. Sci. Tohoku Univ.	18(2)	336-350
B-57	T. Tanaka	1975	Geological significance of rare earth elements in Japanese geosynclinal basalts	Contrib. Mineral. Petrol.	52	233-246
B-58	H. Nakahara, K. Masago, Y. Nakamura, K. Horiuchi and Y. Murakami	1980	Neutron activation analysis of Japanese standard rocks	J. Radioanal. Chem.	59(1)	245-248
B-59	R. Kanaris-Sotiriou	1985	Personal communication, Sheffield Univ., England			
B-61	J. Etoubleau	1985	Personal communication, IFREMER, Centre de Brest, France			
B-62	D. Nielsen and C. J. Van Niekerk	1985	Personal communication, Gold Fields Laboratories, Johannesburg, South Africa			
B-63	S. A. Mertzman	1985	Personal communication, Franklin & Marshall College, Pennsylvania			
B-66	Y. Ikeda	1985	Personal communication, Hokkaido University			
B-70	I. W. Croudace	1984	Personal communication, University of Southampton, England			
B-73	S. Nakada	1984	Personal communication, Kyushu University			
B-74	V. Sjoberg	1984	Personal communication, Rautaruukki oy, Research Centre, Raahe, Finlande			
B-85	O. Ujike	1982	Personal communication, Univ. Tronto, Canada			
B-87	M. Ogasawara and J. Stanley	1982	Personal communication, The University of Adelaide, Australia			
B-98	S. Tanaka, S. Shibata, P. Y. Chen, C. H. Ke and S. J. Yeh	1977	Depth profiles of chemical elements in pelagic clay sediments	Geoch. J.	11	171-176
B-100	S. Nohda	1982	Personal communication, Kyoto Sangyo University			
B-109	S. Terashima, H. Gotoh, T. Tanaka and H. Kanaya	1975	Personal communication, Geological Survey of Japan			
B-113	D. J. Bland	1986	Personal communication, British Geological Survey, England			

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B-116	K. Toyoda and H. Haraguchi	1985	Determination of rare earth elements in geological standard rock samples by inductively coupled plasma atomic emission spectrometry	Chemistry Letters		981-984
B-117	K. Toyoda and H. Haraguchi	1986	Rare earth elements in six new GSJ standard rock samples as determined by inductively coupled plasma atomic emission spectrometry	Geost. Newsletter	10(2)	173-175
B-118	P. J. Potts and N. W. Rogers	1986	Instrumental neutron activation analysis of nine new reference materials from the Geological Survey of Japan	Geost. Newsletter	10(2)	121-125
B-121	H. Uchida, T. Uchida and C. Iida	1980	Determination of minor and trace elements in silicate rocks by inductively-coupled plasma emission spectrometry	Anal. Chim. Acta	116	433-437
B-126	H. Takagi	1979	Personal communication, Kanagawa Prefectural Public Health Laboratory			
B-129	J. Stanley	1984	Personal communication, University of Adelaide			
B-130	Gotte	1984	Private communication, DDR Zentrales Geologisches Institut, Berlin			
B-132	E. S. Gladney, D. B. Curtis and D. R. Perrin	1985	Determination of selected rare earth elements in 37 international geochemical reference materials by instrumental thermal neutron capture prompt Gamma-ray spectrometry	Geost. Newsletter	9(1)	25-30
B-134	B. Zanettin	1986	Personal communication, Univ. Padova, Italia			
B-135	P. R. Kyle	1986	Personal communication, New Mexico Institute of Mining and Technology			
B-136	H. A. Olszowy	1986	Personal communication, Govern. Chem. Lab., Brisbane, Australia			
B-142	Z. Solyom	1986	Personal communication, University of Lund, Sweden			
B-143-1	T. Yoshida, K. Aoki, M. W. Lee, K. Ishikawa and N. Kaneko	1982	Elemental abundances in some basaltic rocks from the Japan arc and adjacent area	Res. Rep. Lab. Nuc. Sci. Tohoku Univ.	15(2)	239-248
B-143-2	T. Yoshida and K. Aoki	1983	Elemental abundances in some continental basalts	Res. Rep. Lab. Nuc. Sci. Tohoku Univ.	16(1)	160-176
B-143-3	T. Yoshida and K. Masumoto	1983	Instrumental photon-activation analysis of igneous rock samples(in Japanese)	Chikyu	5(10)	587-592
B-143-4	T. Yoshida and K. Aoki	1984	Geochemistry of major and trace elements in the quaternary volcanic rocks from northeast honshu, Japan	Sci. Rep. Tohoku Univ. Series III	16(1)	1-34
B-143-7	T. Yoshida	1985	Personal communication, Tohoku University			
B-145	M. Ogasawara	1986	Personal communication, Geological Survey of Japan			
B-146	Y. Minai, M. Ebihara, K. Sakamoto, N. Aota, R. Matsumoto, J. Ishibashi, K. Togashi, A. Ando and K. Tominaga	1985	Analysis of standard rock samples by neutron activation, x-ray fluorescence and Mossbauer Methods(Abst., in Japanese)	29 Symp. Radioch.		
B-148	S. Terashima	1984	Personal communication, Geological Survey of Japan			
B-154	M. Honda, H. Nagai, T. Nakasone, M. Kuboki, M. Sudoh, T. Miyake and	1986	Distribution of rare earth elements in basaltic rocks (in Japanese with English abstract)	Proceed. Inst. Natural Sci. Nihon Univ.	21	1-23

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B-168	H. A. Olszowy, R. Sumner, R. Francis, J. Hegarty and S. Mckeown	1986	Personal communication, Govern. Chem. Lab., Brisbane, Australia			
B-169	R. Kanaris-Sotiriou	1986	Personal communication, Sheffield Univ., England			
B-170	S. A. Mertzman	1986	Personal communication, Franklin & Marshall College, Pennsylvania			
B-171	M. Ogasawara	1986	Personal communication, Geological Survey of Japan			
B-173	T. Okai	1986	Determination of zirconium in standard rock samples by Xylenol Orange spectrophotometric method(Abst.)	35th Meeting Japan Soc. Anal. Chem.		661
B-174	M. Ebihara, Y. Minai, M. K. Kubo, T. Tominaga, N. Aota, T. Nikko, K. Sakamoto and A. Ando	1985	Reevaluation of rare earth element abundances in Japanese standard rock samples, JG-1 and JB-1	Analytical Sciences	1	209-213
B-184	A. Alian and B. Sansoni	1980	Comparison of different methods for activation analysis of geological and pedological samples: Reactor and epithermal neutron activation, relative and monostandard method	KFA Julich GmbH	1980	1-46
B-185	A. Alian, R. G. Djingova, B. Kroner and B. Sansoni	1983	The monostandard method in thermal neutron activation analysis	KFA Julich GmbH	1983	1-24
B-189	J. Etoubleau	1987	Personal communication, IFREMER, Centre de Brest, France			
B-193	M. Honda, H. Nagai, T. Nakasone, M. Kuboki, M. Sudoh, T. Miyake and H. Taniguchi	1986	Distribution of rare earth elements in basaltic rocks (in Japanese with English abstract)	Proceed. Inst. Natural Sci. Nihon Univ.	21	1-23
B-196	K. Kikkawa	1986	Personal communication, Geological Survey of Japan			
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B-198	I. Roelandts and G. Bologne	1987	Personal communication, Universite de Liege, Liege, Belgium			
B-200	M. Ogasawara	1987	Trace element analysis of rock samples by x-ray fluorescence spectrometry, using Rh anode tube(in Japanese with English abstract)	Bull. Geol. Surv. Japan	38(2)	57-68
B-207	Z. Solyom	1987	Personal communication, University of Lund, Sweden			
B-209	B. F. Myasoedov	1987	Personal communication, Vernadsky Inst. Geoch. Anal. Chem., USSR			
B-219	D. Nielsen, C. J. Van Niekerk, M. B. Forsyth, P. R. Janisch, A. H. Munro and C. J. Ross	1987	Personal communication, Gold Fields Laboratories, Johannesburg, South Africa			
B-221	T. Yoshida, K. Masumoto	1986	Photon-activation analysis of standard rocks	J. Japan. Assoc.	81(10)	406-422

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	and K. Aoki		using an automatic γ-ray counting system with a micro-robot	Min. Petr. Econ. Geol.		
B-229	S. Suzuki and H. Fukushima	1987	Personal communication, Japan Chem. Anal. Center			
B-230	F. Wakabayashi and M. Shima	1987	Personal communication, National Sci. Museum, Tokyo			
B-231	T. Tanaka, H. Shimizu, Y. Kawata and A. Masuda	1987	Combined La-Ce and Sm-Nd isotope systematics in petrogenic studies	Nature	327 (6118)	113-117
B-232	H. Kamioka and T. Tanaka	1987	Personal communication, Geological Survey of Japan			
B-234	Y. Miyamoto, N. Aota, S. Kosanda, T. Fukasawa Y. Ozaki, A. Kunugise, Y. Hamajima and K. Sakamoto	1987	Neutron activation analysis of geochemical reference rocks(Abst.)	31 Symp. Radioch.		70-71
B-239	H. A. Olszowy, R. Sumner, J. Hegarty, P. Smith and P. Furzeman	1987	Personal communication, Govern. Chem. Lab., Brisbane, Australia			
B-243	B. F. Myasoedov	1987	Personal communication, Vernadsky Inst. Geoch. Anal. Chem., USSR			
B-244	F. Wakabayashi	1987	Determination of major and trace elements in nine Japanese geochemical standard rock samples by instrumental neutron activation analysis	Bull. Natn. Sci. Mus., Tokyo, Ser. E	10	14-19
B-248	A. L. Stork, D. K. Smith and J. B. Gill	1987	Evaluation of geochemical reference standards by X-ray fluorescense analysis	Geost. Newsletter	11(1)	107-113
B-252	T. Tanaka, H. Kamioka and K. Yamanaka	1987	A fully automated γ-ray counting and data data processing system for INAA and analysis of rock reference samples (in Japanese with English abstract)	Bull. Geol. Surv. Japan	39(8)	537-557
B-258-4	K. Toyota, H. Haraguchi and K. Fuwa	1984	Determination of rare earth elements in standard rocks by ICP emission spectrometry (Abst., in Japanese)	1984 Annual Meet. Japan Geoch. Soc.		136
B-258-6	O. Kawakami and A. Masuda	1984	Precise determination of Ho in meteorite and standard rocks by isotope dilution (Abst., in Japanese)	1984 Annual Meet. Japan Geoch. Soc.		138
B-258-7	T. Fujinuki, S. Harayama, O. Ujike, T. Sudo and A. Ando	1985	New standard rock samples, JF-1, JA-2 and JG-2, and their prototype chemical composition(Abst., in Japanese)	1985 Annual Meet. Japan Geoch. Soc.		159
B-260	K. Kato, M. Yamamoto, T. Kumamaru, Y. Yamamoto, M. Habara, T. Aoyama and Y. Yoshizawa	1987	Europium isolation from silicate rock samples exposed to Hiroshima atomic bomb neutrons	Analytical Sciences	3	493-497
B-269	A. Yoshino	1988	Personal communication, National Inst. Agro-Env. Sci.			
B-270	K. W. Sims, E. S. Gladney, C. Lundstrom and N. W. Bower	1988	Elemental concentrations in Japanese silicate rock standards: A comparison with the literature	Geost. Newsletter	12(2)	379-389
B-277	Y. Miyamoto	1988	Personal communication, Kanazawa University			
B-279	V. P. Afonin	1988	Personal communication, USSR Academy of Sciences Siberian Branch			
B-280	K. Kikkawa	1988	Personal communication, Geological Survey of Japan			
B-283	S. Itoh, K. Shibata, T. Tanaka, K. Uto,	1988	Geochemical map project for evaluating the distribution of heavy metals in natural	1987 Annual Rep. on Environ. Res.		1-29

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	S. Tamanyu, H. Kamioka, A. Ando, S. Terashima, N. Imai, Y. Kanai, T. Okai, T. Sakamoto and K. Sato		background level (in Japanese with English abstract)	National Inst. Japan		
B-286	K. Arai, Y. Saito and K. Kimura	1988	The noble metals in GSJ rock reference samples(Abst., in Japanese)	32nd Symp. Radiochem.		174-175
B-287	F. Wakabayashi	1988	Neutron activation analysis of Japanese standard rock samples II	Bull. Natn. Sci. Mus., Tokyo Ser. E	11	9-16
B-289	T. Fujitani	1988	Activation analysis of trace elements in some standard rocks	Rev. Marine Tech. College	(31)	45-58
B-290	T. Okai	1988	Spectrophotometric determination of zirconium in geological materials with Xylenol Orange (in Japanese with English abstract)	Bunseki Kagaku	37(12)	671-674
B-291	T. Mochizuki, A. Sakashita, H. Iwata, T. Kagaya, T. Shimamura and P. Blair	1988	Laser ablation for direct elemental analysis of solid samples by inductively coupled plasma mass spectrometry	Analytical Sciences	4	403-409
B-292	T. Hirata, H. Shimizu, T. Akagi, H. Sawatari and A. Masuda	1988	Precise determination of rare earth elements in geological standard rocks by inductively coupled plasma source mass spectrometry	Analytical Sciences	4	637-643
B-296	S. Nohda and G. J. Wasserburg	1981	Nd and Sr isotopic study of volcanic rocks from Japan	Earth Planet. Sci. Let.	52	264-276
B-300	T. Fujitani	1988	Activation analysis of trace elements in some standard rocks	Rev. Marine Tech. College	31	45-58
B-301	Y. Terakada, T. Fujitani and J. Takada	1989	Precise determination of rare earth elements in rocks by neutron activation analysis	J. Radio. Nuc. Chem., Articles	129(1)	23-31
B-302	N. Nakamura	1989	Personal communication, Kobe University			
B-304	I. Roelandts	1988	Personal communication, Universite de Liege, Liege, Belgium			
B-308	S. Hirai and S. Suzuki	1989	Personal communication, Musashi Institute of Technology			
B-309	K. Govindaraju	1988	Personal communication, Centre Nat. Res. Sci., France			
B-310	T. Chunhan	1988	Personal communication, Chengdu College of Geology, China			
B-311	K. Kikkawa	1989	Personal communication, Geological Survey of Japan			
B-312	H. Takeda	1989	Personal communication, Ministry Ener. Mines., Caracas, Venezuela			
B-313	N. Imai	1989	Personal communication, Geological Survey of Japan			
B-315	T. Mochizuki, A. Sakasita, H. Iwata, Y. Ishibashi and N. Gunji	1989	Slurry nebulization technique for direct determination of rare earth elements in silicate rocks by inductively coupled plasma mass spectrometry	Analytical Sciences	5	311-317
B-320	N. Imai	1990	Multielement analysis of rocks with the use of geological certified reference material by inductively coupled plasma mass spectrometry	Analytical sciences	6	389-395
B-321	H. Yokose	1989	Personal communication, Okayama University			
B-324	H. Kamioka and T. Tanaka	1989	The problems in the analyses of geological materials by INAA -An examination of the analytical results of GSJ rock reference samples-	J. Geol. Soc. Japan	95(11)	835-850
B-330	A. Ishiwatari	1989	Personal communication, Kanazawa University			
B-332	J. Etoubleau	1990	Personal communication, IFREMER,			

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			Centre de Brest, France			
B-334	D. C. Gregoire	1990	Personal communication, Geological Survey of Canada			
B-337	H. Yurimoto, A. Yamashita, N. Nishida and S. Sueno	1989	Quantitative SIMS of rock reference samples	Geoch. J.	23(5)	215-236
B-338	B. G. Rao	1990	Personal communication, Geological Survey of India			
B-339	H. A. Olszowy, J. Hegarty, P. Smith, R. Sumner, S. Mckeown and D. Broe	1990	Personal communication, Govern. Chem. Lab., Brisbane, Australia			
B-340	P. R. Kyle	1990	Personal communication, New Mexico Inst. Mining Tech., U. S. A.			
B-341-2	J. N. Ludden, R. Daigneault, F. Robert and R. P. Taylor	1984	Trace element mobility in alteration zones associated with archean au lode deposits	Econ. Geol.	79	1131-1141
B-343	P. Mitropoulos	1982	REE patterns of the metasedimentary rocks of the land's end granite aureole (Southwest England)	Chem. Geol.	35	265-280
B-344	P. J. Potts, O. W. Thorpe and J. S. Watson	1981	Determination of the rare-earth element abundances in 29 international rock standards by instrumental neutron activation analysis: A critical appraisal of calibration errors	Chem. Geol.	34	331-352
B-345	N. D. Macrae and J. B. Metson	1985	In situ rare-earth element analysis of coexisting pyroxene and plagioclase by secondary ion mass spectrometry	Chem. Geol.	53	325-333
B-346	J. Pascual	1987	Determination of several trace elements in silicate rocks by an XRF method with background and matrix corrections	Talanta	34(12)	1027-1031
B-349	K. Iwasaki and H. Haraguchi	1988	Determination of rare earth elements in geological samples by inductively-coupled plasma atomic emission spectrometry after oxalate coprecipitation and cation-exchange column separation	Anal. Chim. Acta	208	163-172
B-352	R. A. Coish, R. Hickey and F. A. Frey	1982	Rare earth elements geochemistry of the Betts Cove ophiolite, Newfoundland: complexities in ophiolite formation	Geoch. Cosmo. Acta	46	2117-2134
B-354	K. G. Heumann	1986	High accuracy in the element analysis by mass spectrometry	Fresenius Z. Anal. Chem.	324	601-611
B-355	E. Zuleger and J. Erzinger	1988	Determination of the REE and Y in silicate materials with ICP-AES	Fresenius Z. Anal. Chem.	332	140-143
B-357	S. Nohda and G. J. Wasserburg	1981	Nd and Sr isotopic study of volcanic rocks from Japan	Earth Planet. Sci. Let.	52	264-276
B-358	E. R. Neumann and J. G. Schilling	1984	Petrology of basalts from the Mohns-Knipovich ridge; the Norwegian-Greenland sea	Contrib. Mineral. Petrol	85	209-223
B-360	S. J. Barnes and M. P. Gorton	1984	Trace element analysis by neutron activation with a low flux reactor (slowpoke-II): Results for international reference rocks	Geost. Newsletter	8(1)	17-23
B-362	K. E. Jarvis and I. Jarvis	1988	Determination of the rare-earth elements and yttrium in 37 international silicate reference materials by inductively coupled plasma-atomic emission spectrometry	Geost. Newsletter	12(1)	1-12
B-367	J. P. Quisefit, R. Dejean De La Batie, J. Faucherre, G. Malingre and R. Vie Le Sage	1979	Dosage par spectrometrie de fluorescence X du nickel, du zinc, du rubidium, du strontium, du zirconium et du niobium dans trente standards geochimiques	Geost. Newsletter	3(2)	181-184

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B-370	E. Maccarrone, A. Paglionico, G. Piccarreta and A. Rottura	1983	Granulite-amphibolite facies metasediments from the serre (Calabria, Southern Italy): their protoliths and the processes controlling their chemistry	Lithos	16	95-111
B-371	P. J. Patchett	1983	Hafnium isotope results from mid-ocean ridges and Kerguelen	Lithos	16	47-51
B-376	N. D. Macrae and T. W. Wu	1990	Determination of the rare earth elements in thirteen GSJ silicate rock reference samples by secondary ion mass spectrometry	Geost. Newsletter	14(1)	119-125
B-377	P. J. Potts, P. C. Webb and J. S. Watson	1990	Zirconium determination by ED-XRF: a critical evaluation of silicate reference materials as calibration standards	Geost. Newsletter	14(1)	127-136
B-378	I. Roelandts	1990	Inductively coupled plasma determination of nine rare-earth elements in sixty international geochemical reference samples	Geost. Newsletter	14(1)	137-147
B-379	G. E. M. Hall and J. C. Pelchat	1990	Analysis of standard reference materials for Zr, Nb, Hf and Ta by ICP-MS after lithium metaborate fusion and cupferron separation	Geost. Newsletter	14(1)	197-206
B-383	D. H. M. Alderton, J. A. Pearce and P. J. Potts	1980	Rare earth element mobility during granite alteration: evidence from southwest England	Earth Planet. Sci. Let.	49	149-165
B-384	G. A. Jenner and B. J. Fryer	1980	Geochemistry of the upper Snooks Arm Group basalts, burlington peninsula, Newfoundland: evidence against formation in an island arc	Can. J. Earth Sci.	17	888-900
B-385	R. Vie Le Sage, J. P. Quisefit, R. Dejean De La Batie and J. Faucherre	1979	Utilisation du rayonnement primaire diffuse par l'Echantillon pour une determination rapide et precise des elements traces dans les roches	X-ray Spectrometry	8(3)	121-
B-386	B. L. Weaver and J. Tarney	1981	The scourie dyke suite: petrogenesis and geochemical nature of the proterozoic sub-continental mantle	Contrib. Mineral. Petrol	78	175-188
B-387	P. J. Patchett and M. Tatsumoto	1980	A routine high-precision method for Lu-Hf isotope geochemistry and chronology	Contrib. Mineral. Petrol	75	263-267
B-388	M. A. Olade and A. A. Elueze	1979	Petrochemistry of the Ilesha amphibolites and Precambrian crustal evolution in the Pan-African domain of SW Nigeria	Precambrian Research	8	303-318
B-391	S. J. Horsky and W. K. Fletcher	1981	Evaluation of a combined ion exchange-graphite furnace atomic absorption procedure for determination of rare-earth elements in geological samples	Chem. Geol.	32	33-340
B-392	D. K. Paul and P. J. Potts	1981	Rare earth abundances and origin of some Indian lamprophyres	Geol. Mag.	118(4)	393-399
B-393	H. Nagasawa, K. Yamakoshi and T. Shimamura	1979	Trace element concentrations in silicate spherules from oceanic sediments	Geoch. Cosmo. Acta	43	267-272
B-394	J. V. Puymbroeck and R. Gijbels	1981	Determination of rare-earth elements in rocks by spark source mass spectrometry and isotope dilution after ion-exchange separation in mixed solvents	Fresenius Z. Anal. Chem.	309	312-315
B-398	P. V. Espen, L. Van Dack, F. Adams and R. V. Grieken	1979	Effective sample weight from scatter peaks in energy-dispersive X-ray fluorescence	Anal. Chem.	51(7)	961-967
B-400	R. V. Grieken, L. Van Dack, C. C. Dantas and H. Da Silveira Dantas	1979	Soil analysis by thin-film energy-dispersive X-ray fluorescence	Anal. Chim. Acta	108	93-101
B-402-1	J. S. Kane, J. G. Crock, P. H. Briggs and D. L. Fey	1990	Personal Communication, U. S. Geological Survey, Lakewood			

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B-402-5	J. S. Kane, B. W. King, J. Kent and D. Y. Vivit	1990	Personal Communication, U. S. Geological Survey, Menlo Park			
B-402-8	J. S. Kane	1990	Personal Communication, U. S. Geological Survey, Reston			
B-404	J. R. Bacon and A. M. Ure	1979	The correction of interference effects in the determination of the rare earth elements and hafnium by spark-source mass spectrometry	Anal. Chim. Acta	105	163-176
B-406	K. E. Jarvis	1989	Determination of rare earth elements in geological samples by inductively coupled plasma mass spectrometry	J. Anal. Atomic Spectrometry	4	563-
B-411	N. Imai	1990	Quantitative analysis of original and powdered rocks and mineral inclusions by laser ablation inductively coupled plasma mass spectrometry	Anal. Chim. Acta	235	381-391
B-413	P. C. Webb, P. J. Potts and J. S. Watson	1990	Trace element analysis of geochemical reference samples by energy dispersive X-ray fluorescence spectrometry	Geost. Newsletter	14(3)	361-372
B-415	K. Kikkawa, N. Imai, K. Okumura and K. Mizuno	1989	Identification of tephra layers by chemical analyses of volcanic glass using inductively coupled plasma emission spectrometry (ICP) (in Japanese with English abstract)	Bull. Geol. Surv. Japan	40(1)	1-18
B-416	Y. Ikeda and M. Yuasa	1989	Volcanism in nascent back-arc basins behind the shichito ridge and adjacent areas in the Izu-Ogasawara arc, northwest Pacific: evidence for mixing between E-type MORB and island arc magmas at the initiation of back-arc rifting	Contrib. Mineral. Petrol	101	377-393
B-417	P. Roychowdhury, N. K. Roy, D. K. Das and A. K. Das	1989	Determination of rare-earth elements and yttrium in silicate rocks by sequential inductively-coupled plasma emission spectrometry	Talanta	36(12)	1183-1186
B-419	Z. Sulcek, I. Rubeska, V. Sixta and T. Paukert	1989	Determination of rare earth elements and yttrium in rocks using the plasma II ICP emission spectrometer	Atomic Spectroscopy	10(1)	4-
B-423	T. Chunhan and L. Xiaolin	1990	Determination of trace element in new reference samples of sedimentary rock series of GSJ by INAA	J. Chengdu College Geol.	17(4)	113-117
B-426	T. Mochizuki, A. Sakashita, Y. Ishibashi, N. Gunji and H. Iwata	1990	Alkali fusion/ICP-MS for rapid determination of trace elements in silicate rocks (in Japanese with English abstract)	Bunseki Kagaku	39	169-174
B-428	S. Tamura, Y. Kobayashi and K. Shuto	1989	Quantitative analysis of the trace elements in silicate rocks by X-ray fluorescence method(in Japanese with English abstract)	Earth Science	43(3)	180-185
B-434	N. K. Saini	1991	Personal communication, Wadia Institute of Himalayan Geology, Dehra, India			
B-436	D. M. Shaw and P. L. C. Smith	1991	Concentrations of B, Sm, Gd, and H in 24 reference materials	Geost. Newsletter	15(1)	59-66
B-437	P. J. Potts and N. W. Rogers	1991	Determination of trace elements in selected geological reference materials by instrumental neutron activation analysis	Geost. Newsletter	15(1)	111-116
B-438	S. P. Verma	1991	Determination of thirteen rare-earth elements by high-performance liquid chromatography in thirty and of K, Rb, Cs, Sr and Ba by isotope dilution mass spectrometry in eighteen	Geost. Newsletter	15(1)	129-134

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			international geochemical reference samples			
B-440	K. Kikkawa	1990	Identification of tephra layers by inductively coupled plasma(ICP) emission spectrometry, and their applications (in Japanese with English abstract)	J. Geography	99(7)	11-26
B-441	K. Kikkawa	1991	Major and minor elements composition of volcanic glasses -Comparison of tephra using ICP analysis-(in Japanese)	Chikyu	13(3)	161-168
B-442	V. Balaram, C. Manikyamba, S. L. Ramesh and V. K. Saxena	1990	Determination of rare earth elements in Japanese rock standards by inductively coupled plasma-mass spectrometry	Atomic Spectroscopy	11(1)	19-
B-444	K. Uto	1991	Personal communication, U. S. Geological Survey			
B-447	Y. Oura, N. Aota, S. Kosanda, Y. Miyamoto, T. Okui, Y. Kameda and K. Sakamoto	1991	Activation analysis of GSJ rock standard samples -Sedimentary rock series- (Abst., in Japanese)	1991 Annual Meet. Japan Geoch. Soc.		201
B-449	I. W. Croudace	1980	The use of pre-irradiation group separations with neutron activation analysis for the determination of the rare earths in silicate rocks	J. Radioanal. Chem.	59(2)	323-330
B-452	I. Brissaud, A. de Chateau-Thierry, J. P. Frontier and G. Lagarde	1986	Analysis of geological standards with PIXE and PIGE techniques applications to volcanic rocks	J. Radio. Nuc. Chem., Articles	102(1)	131-141
B-455	M. Tanaka	1991	Personal communication, Toray research center			
C-1	W. H. Champ	1968	Personal communication, Geological Survey of Canada.			
C-2	W. H. Champ and G. P. Bender	1973	Personal communication, Geologigal Survey of Canada.			
C-2'	C.-L. Chou and G. W. Pearce	1979	Apoll 15 deep drill core: Trace element and metallic iron abundances in size fractions of sample 15002, 170	Proc. Lunar Planet. Sci. Conf. 10 th.		1321-1332
C-3'	D. H. Cornell	1976	Personal communication, The University of Stellenbosch, South Africa.			
G-1	J. Gagnon	1975	Personal communication, Service Analyse et Contro, Complexe Scientifique, Canada.			
G-6'	K. Govindaraju	1982	Personal communication, Center Recherches Petrographiques et Geochimiques, France.			
H-5'	J. Hickey	1979	Personal communication, University of Rhode Island, U. S. A.			
K-7	T. Kiriyama and R. Kuroda	1974	Ion-exchange separation and spectrophotometric determination of zirconium, thorium and uranium in silicate rocks with Arsenazo III.	Anal. Chim. Acta	71	375-381
K-9'	T. Kato and K. Masumoto	1981	Determination of niobium and Yttrium in GSJ GSJ basalt JB-1 by photon activation analysis	Geost. Newsletter	5	167-170
K-15'	T. Kiriyama	1979	Anion-exchange separation and spectrophotometric determinstion of zirconium and uranium in silicate rocks with Arsenazo III	Nippon Kagaku Kaishi		1609-1611
K-18'	S. Koga	1980	The determination of major and minor elements on the two geochemical standard samples, JA-1 and JB-2, by inductively coupled plasma emission spectroscopy	Jour. Japan Assoc. Min. Pet. Econ. Geol.	75	266-271
M-1'	Y. Masuda	1980	Personal communicaction, University of			

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			Osaka Prefecture			
M-3	Y. Masuda and S. Yagi	1971	Personal communicaction, University of Osaka Prefecture			
M-9	E. Murad	1973	Determination of trace elements in unfused rock and mineral samples by X-ray fluorescence	Anal. Chom. Acta	67	37-53
N-1	H. Nagasawa	1971	Personal communication, NASA, Goddard, Maryland, U. S. A.			
N-3	N. Nakamura and A. Masuda	1971	Personal communication, Science University of Tokyo			
O-1'	M. Ogasawara	1979	Personal communication, university of Adelaide, Australia			
O-10	A. Ohyoshi	1984	Neutron activation analysis of rare earths in standard rock samples	Bunseki	1984-1	97-99
P-1'	S. Pall and D. J. Terrll	1978	Instrumental neutron activation analysis of twenty-nine international geochemical reference samples	Geost. Newsletter	2	187-197
P-6'	P. J. Potts	1976	Personal communication, The Open University, Walton Hall, England.			
R-1'	P. C. Rankin	1976	Analysis of JG-1 and by spark source mass spectrometry	Jour. Geol. Soc. Japan	82	215-217
R-2	K. Randle	1974	Some trace element data and their interpretation for several new reference samples obtained by neutron activation analysis	Chem. Geol.	13	237-256
S-1'	V. le Sage	1978	Personal communication, Responsable du center d'Analyse de Routine Elementaire par Rayons X, France.			
S-2'	N. Sato, T. Kato and N. Suzuki	1974	Multielement photon activation analysis of rock materials with 30 Mev bremsstrahlung	Radiochim. Acta	19	1-6
S-15	K. F. Steele	1971	Personal communication, University of Arkansas, U. S. A.			
S-23'	V. Sjoberg	1983	Personal communication, Research Center, Raahe, Finland.			
T-4	T. Tanaka and A. Masuda	1971	Personal communication, Geological Suevey of Japan.			
T-5	T. Tanaka	1974	Personal communication, Geological Suevey of Japan.			
T-19	G. Thompson	1972	Personal communication, woods Hole Oceanographic Institute, U. S. A.			
T-22	K. Tomura, H. Higuchi, N. Onuma and H. Hamaguchi	1968	Rapid determination of dysprosium in rock samples by neutron activation analysis with a Ge (Li) detector apter chemical separation	Anal. Chim. Acta	42	389-395
T-22'	S. Terashima	1977	X-ray fluorescence determination of Cr, Ga, Nb, Pb, Rb, Sr, Y, Zn and Zr in rocks	Bull. Geol. Surv. Japan	28	393-399
U-10'	H. Uchida, K. Iwasaki, K. Tanaka and C. Iida	1982	Determination of zirconium in silicate rocks by inductively-coupled plasma emission spectrometry	Anal. Chim. Acta	134	375-378
W-1	P. W. Weigand	1970	Major and trace element geochemistry of the Mesozoic dolerite dikes from eastern North America, Ph. D. Thesis, University of Noeth Carolina, U. S. A.			

地質調査所（GSJ）岩石標準試料26試料のREE, Sc, Y, Zr, Hfの1992年分析データ編集

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要　旨

地質調査所がこれまで発行した岩石標準試料26試料についてのデータ編集はAndo *et al.*（1989）の火成岩シリーズおよびAndo *et al.*（1990）の堆積岩シリーズの内3試料について発表されて以来途絶えている．しかも，これらの報告においては表記元素のうちとくに希土類元素についてはデータが不十分で，推奨値が与えられている試料は半数に満たない．一方，近年になってこれらの元素は頻繁に分析されるようになり，分析法もICP, ICP-MS, INAAなど多岐にわたっている．したがって，その分析値の信頼性を高めるためにも標準試料の整備が望まれてきた．

そこで，REEと共に分析されることの多いSc, Y, Zr, Hfを加え，1992年5月までに報告されたデータ235例を元素別，分析法別に整理し，異常に高い値や低い値がある場合は取り除いて，平均値及び標準偏差値を計算した．その結果，これまで推奨値が欠落していた試料についても推奨値（一部参考値）を提示することができた．

（受付：1992年8月19日；受理：1992年10月1日）