Newfoundland Labrador

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Mines

GEOCHEMICAL DATA FROM DRILLCORE SAMPLES IN THE GABBRO LAKE AREA, EASTERN LABRADOR TROUGH (NTS 23H/11)

J. Conliffe

Open File 023H/11/0152

St. John's, Newfoundland
September, 2017

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CONTENTS

FIGURE

TABLE

SUMMARY

This Open File release consists of whole-rock geochemical data from drillcore samples in the Gabbro Lake area of western Labrador (NTS map area 23H/11; Figure 1). These samples were collected as part of a study of the geology and geochemistry of the Sokoman Formation iron formation in the Gabbro Lake area (Conliffe, 2017) and forms part of a multiyear study investigating iron ore deposits in the Labrador Trough, western Labrador. More detailed information on the regional geological setting, geological characteristics of rock units and interpretations of the geochemical data from iron formation and tuff samples are found in Conliffe (2017).

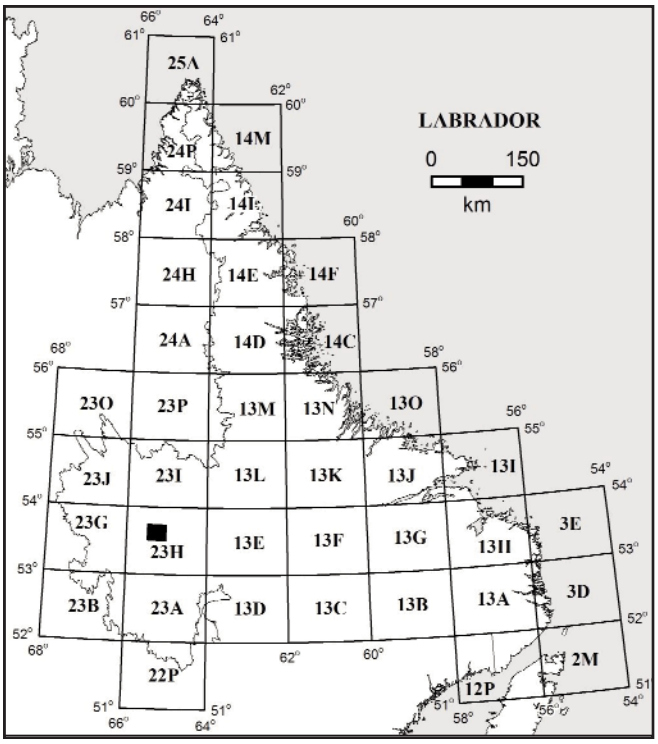

Figure 1. *Location of study area.*

NOTES ON DATABASE

This database includes the results of whole-rock, trace-element and rare-earth-element (REE) analyses of 27 drillcore samples collected in 2014. Also included are the sample location data (drillhole-collar location) and brief sample descriptions. The location data for samples are presented in Appendix A, with locations reported as Universal Transverse Mercator (UTM) eastings and northings (zone 20; NAD27). The data are tabulated below and are also available in digital format (*i.e.*, *.csv comma-separated values files).

All analyses were carried out at the Geological Survey of Newfoundland and Labrador's (GSNL) geochemistry laboratory in St. John's and analytical methods are described in Table 1. Samples were milled using ceramic and tungsten carbide mills, and due to possible contaminations from the tungsten carbide mill, W and Co values are not reported. Major elements are reported in weight percent (wt. %), and trace elements are reported in parts per million (ppm). Major-element compositions (plus Cr, Zr and Ba) were analyzed by ICP-OES methods, following lithium tetraborate and metaborate fusion. REE and selected trace elements were determined by ICP-MS analysis following an identical fusion sample digestion procedure, whereas other trace elements (As, Be, Cu, Li, Mn, Ni, Pb, Rb, Sc, Ti, Zn) were analyzed by ICP-OES after a 4-acid total digestion.

Volatiles are represented as loss-on-ignition (LOI) at 1000°C, which represents the breakdown of all minerals and release of all volatiles. The mass percent of Fe in each sample was calculated from the total Fe_2O_3 values, using the conversion factor of 100 wt. % Fe_2O_3 to 69.95 wt. % Fe.

Analytical duplicates were inserted at a frequency of one in 20, with the duplicate selected at random. In addition, a selection of reference standards was analyzed, also at a frequency of one

Table 1. Analytical methods for geochemical analysis

Analysis	Method	Preparation/Digestion
SiO_2, Al_2O_3, Fe_2O_3, MgO, CaO, Na_2O, K_2O, TiO_2, MnO, P_2O_5, Cr, Zr, Ba	Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES-FUS)	50-50 Lithium Tetraborate Lithium Metaborate Fusion
As, Be, Cu, Li, Mn, Ni, Pb, Rb, Sc, Ti, Zn	Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES)	Hf-HCl-HNO_3-$HClO_4$ (total digestion)
V, Co, Ga, Ge, As, Sr, Y, Nb, Mo, Cd, Sn, Cs, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Ta, W, Tl, Bi, Th, U	Inductively Coupled Plasma Mass Spectrometry (ICP-MS-FUS)	50-50 Lithium Tetraborate Lithium Metaborate Fusion
LOI	Gravimetric (Grav) at 1000°C	None

in 20. Standards were supplied by the Canadian Certified Reference Materials Project (SCH-1) and the United States Geological Survey (RGM-1). The raw, unprocessed data from duplicates and standards is included in the appendices, and can be used by the reader to assess accuracy and precision.

A value of -1 for LOI indicates gain-on-ignition (*i.e.*, a net increase in weight). A value of -99 indicates the sample was not analyzed for that element or the calculation was not completed. All other negative numbers indicate the concentration of the specific element in the sample was below the detection limit (*e.g.*, -0.01 indicates the measured value was below the detection limit of 0.01). Detection limits are listed for each element in Appendices B, C, and D.

ABREVIATIONS USED IN THE DATABASE

Ca-Tuff: Ca-rich Tuffaceous Units
Fe-Tuff: Fe-rich Tuffaceous Units
HGIF: Hematite-rich Granular Iron Formation
LOI: Loss-On-Ignition
MGIF: Magnetite-rich Banded Iron Formation
MM: Magnetite-bearing Mudstone

ACKNOWLEDGMENTS

Sample preparation and analyses were carried out under the supervision of Chris Finch of the GSNL Geochemistry Laboratory. Alex Calon provided able assistance during fieldwork and Wayne Tuttle is thanked for his excellent logistical support in Goose Bay. Sokoman Iron Corp. is

thanked for access to drillcore and exploration properties, and for providing samples. Pauline Honarvar provided a helpful review of an early draft of this file.

REFERENCE

Conliffe, J.

2017: Geology and geochemistry of the Sokoman Formation in the Gabbro Lake area, eastern Labrador Trough. *In* Current Research. Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Report 17-1, pages 147-168.

Open File 023H/11/0152 - Appendix A: Drillhole Locations and Sample Descriptions

Sample_Num	Lab_Num	Lithology	SampleYear	Drillhole	From_m	To_m	UTMEast	UTMNorth	UTMZone	Datum	NTS_Map
14JC-C002	10440984	HGIF	2014	GL-12-01	10.08	10.31	337034	5949158	20	NAD27	23H/11
14JC-C004	10440985	MBIF	2014	GL-12-01	33.65	33.87	337034	5949158	20	NAD27	23H/11
14JC-C005	10440986	Gabbro	2014	GL-12-01	47.89	48.17	337034	5949158	20	NAD27	23H/11
14JC-C006	10440987	MBIF	2014	GL-12-01	55.84	56.15	337034	5949158	20	NAD27	23H/11
14JC-C007	10440988	Shale	2014	GL-12-01	82.35	82.80	337034	5949158	20	NAD27	23H/11
14JC-C020	10440999	MM	2014	GL-12-02	69.45	69.90	338087	5948588	20	NAD27	23H/11
14JC-C023	10441001	Fe-Tuff	2014	GL-12-02	110.55	111.40	338087	5948588	20	NAD27	23H/11
14JC-C025	10441003	MM	2014	GL-12-02	132.87	133.30	338087	5948588	20	NAD27	23H/11
14JC-C027	10441005	Conglomerate	2014	GL-12-02	153.05	153.40	338087	5948588	20	NAD27	23H/11
14JC-C029	10441006	Gabbro	2014	GL-12-02	186.05	186.33	338087	5948588	20	NAD27	23H/11
14JC-C030	10441007	Shale	2014	GL-12-02	218.67	219.00	338087	5948588	20	NAD27	23H/11
14JC-C034	10441008	MBIF	2014	GL-12-03	44.53	45.26	338044	5948450	20	NAD27	23H/11
14JC-C038	10441012	Ca-Tuff	2014	GL-12-03	91.71	92.90	338044	5948450	20	NAD27	23H/11
14JC-C040	10441013	MBIF	2014	GL-12-03	110.21	110.80	338044	5948450	20	NAD27	23H/11
14JC-C041	10441014	MM	2014	GL-12-03	119.02	119.80	338044	5948450	20	NAD27	23H/11
14JC-C008	10440989	MBIF	2014	GL-12-04	11.77	12.20	337636	5948811	20	NAD27	23H/11
14JC-C010	10440991	Ca-Tuff	2014	GL-12-04	14.81	15.25	337636	5948811	20	NAD27	23H/11
14JC-C011	10440992	HGIF	2014	GL-12-04	16.32	16.72	337636	5948811	20	NAD27	23H/11
14JC-C012	10440993	MBIF	2014	GL-12-04	28.40	28.95	337636	5948811	20	NAD27	23H/11
14JC-C013	10440994	MBIF	2014	GL-12-04	33.21	33.55	337636	5948811	20	NAD27	23H/11
14JC-C015	10440995	Ca-Tuff	2014	GL-12-04	41.38	41.82	337636	5948811	20	NAD27	23H/11
14JC-C016	10440996	HGIF	2014	GL-12-04	42.70	43.15	337636	5948811	20	NAD27	23H/11
14JC-C018	10440997	MM	2014	GL-12-04	150.34	150.90	337636	5948811	20	NAD27	23H/11
14JC-C048	10441016	MM	2014	GL-12-05	114.39	114.96	337492	5948662	20	NAD27	23H/11
14JC-C052	10441017	MM	2014	GL-12-05	290.44	290.86	337492	5948662	20	NAD27	23H/11
14JC-C054	10441018	Fe-Tuff	2014	GL-12-05	312.40	312.70	337492	5948662	20	NAD27	23H/11
14JC-C055	10441019	Fe-Tuff	2014	GL-12-05	313.33	314.14	337492	5948662	20	NAD27	23H/11

Open File 023H/11/0152 - Appendix A: Drillhole Locations and Sample Descriptions

Sample_Num	Lab_Num	Notes
14JC-C002	10440984	Granular iron formation, with quartz- and hematite-rich bands and oolitic texture in hematite bands
14JC-C004	10440985	Banded iron formation, with mm-scale bands of magnetite and quartz and syn-sedimentary folding
14JC-C005	10440986	Medium-grained gabbro with pyroxene phenocrysts in matrix of plagioclase and pyroxene
14JC-C006	10440987	Banded iron formation, with mm-scale bands of quartz-Fe-silicates and magnetite
14JC-C007	10440988	Massive, fine-grained black shale, with angular chert fragments and minor pyrite
14JC-C020	10440999	Fine-grained magnetic mudstone with minor silty bands
14JC-C023	10441001	Grey to green tuffaceous sandstone and breccia, with angular to subrounded fragments of chert and rare jasper, abundant secondary chlorite
14JC-C025	10441003	Fine-grained magnetic mudstone with mm-scale magnetite and chert rich laminations
14JC-C027	10441005	Chert breccia with angular to subrounded chert fragments in grey, sandy matrix
14JC-C029	10441006	Medium-grained gabbro with plagioclase and pyroxene phenocrysts and rare interstitial pyrite
14JC-C030	10441007	Massive, fine-grained black shale
14JC-C034	10441008	Banded MBIF, with grey magnetite rich, beige carbonate rich, white quartz rich and green Fe-silicate rich bands
14JC-C038	10441012	Interbedded unit, dominantly tuffaceous sandstone with abundant garnets, with subordinate magnetite and quartz rich bands
14JC-C040	10441013	Banded MBIF with beige carbonate bands (with garnets) and magnetite bands
14JC-C041	10441014	Fine-grained magnetic mudstone with lesser bands of silty, quartz-rich siltstone
14JC-C008	10440989	Banded MBIF with carbonates and iron silicates rich bands
14JC-C010	10440991	Fine- to medium-grained beige tuffaceous sandstone, with carbonate matrix
14JC-C011	10440992	Purple, fine-grained HIF with common ooliths and beige, Mn-carbonate rich layers
14JC-C012	10440993	Interbedded fine-grained magnetite rich bands and medium-grained quartz-carbonate rich bands
14JC-C013	10440994	Banded MBIF with coarse-grained magnetite-quartz bands and fine-grained quartz-Fe-silicate rich layers
14JC-C015	10440995	Medium-grained, grey tuffaceous sandstone
14JC-C016	10440996	Purple, fine-grained HIF with rare ooliths, bands of Mn-carbonates and numerous late-stage calcite veinlets
14JC-C018	10440997	Green to grey magnetic mudstone with lesser Fe-silicate rich bands and rare magnetite bands
14JC-C048	10441016	Finely laminated green magnetic mudstone, with abundant Fe-silicates and rare small (< 1 mm) garnets
14JC-C052	10441017	Fine-grained magnetic mudstone with alternating dark-magnetite rich and beige quartz-carbonate-Fe-silicate rich laminations
14JC-C054	10441018	Green tuffaceous sandstone with abundant secondary chlorite and minor chlorite veinlets
14JC-C055	10441019	Dominantly fine-grained, green tuffaceous sandstone (with abundant < 2 mm garnets) interbedded with minor beige quartz-carbonate-Fe-silicate rich bands

Open File 023H/11/0152 - Appendix B: Major-element ICP-OES-FUS Data for Samples (including Standards and Duplicate Samples)

Sample_Num	Lab_Num	Lithology	SiO2	Al2O3	Fe2O3	Fe	MgO	CaO	Na2O
Unit			%	%	%	%	%	%	%
Method			ICP-OES-FUS	ICP-OES-FUS	ICP-OES-FUS	Calculated	ICP-OES-FUS	ICP-OES-FUS	ICP-OES-FUS
Detection Limit			0.01	0.01	0.01		0.01	0.01	0.01
14JC-C002	10440984	HGIF	39.03	0.27	47.43	33.18	0.26	3.84	0.17
14JC-C004	10440985	MBIF	39.08	0.93	53.64	37.52	3.96	0.79	0.07
14JC-C005	10440986	Gabbro	51.51	11.01	9.50	6.65	12.17	8.35	2.74
14JC-C005_(dup)	10440990	Gabbro	51.60	10.96	9.51	6.65	12.13	8.33	2.73
14JC-C006	10440987	MBIF	43.55	1.21	44.92	31.42	5.09	2.36	0.19
14JC-C007	10440988	Shale	61.80	14.38	3.57	2.49	1.84	0.76	1.76
14JC-C008	10440989	MBIF	52.18	1.74	32.61	22.81	2.29	2.59	0.05
14JC-C010	10440991	Ca-Tuff	27.09	6.43	6.11	4.28	3.19	22.19	0.16
14JC-C011	10440992	HGIF	57.06	0.26	23.85	16.68	0.27	1.73	3.52
14JC-C012	10440993	MBIF	36.80	1.19	34.50	24.13	3.79	1.42	0.48
14JC-C013	10440994	MBIF	28.84	1.78	55.85	39.07	4.89	0.53	0.04
14JC-C015	10440995	Ca-Tuff	30.22	8.14	3.83	2.68	3.81	22.15	3.91
14JC-C016	10440996	HGIF	30.81	0.18	43.22	30.23	1.84	3.04	1.83
14JC-C018	10440997	MM	43.34	3.88	38.56	26.97	3.73	1.80	0.48
14JC-C020	10440999	MM	49.96	3.53	29.82	20.86	2.52	4.65	0.46
14JC-C023	10441001	Fe-Tuff	26.82	15.54	46.25	32.35	1.03	0.45	0.28
14JC-C025	10441003	MM	37.83	1.70	52.04	36.40	4.11	0.69	0.18
14JC-C027	10441005	Conglomerate	94.89	1.20	1.87	1.31	0.26	0.22	0.12
14JC-C027_(dup)	10441010	Conglomerate	94.27	1.20	1.70	1.19	0.25	0.21	0.09
14JC-C029	10441006	Gabbro	45.33	15.24	14.18	9.92	6.42	6.86	3.04
14JC-C030	10441007	Shale	44.29	11.33	18.07	12.64	2.50	1.37	0.09
14JC-C034	10441008	MBIF	47.17	1.58	38.51	26.94	2.68	4.84	0.29
14JC-C038	10441012	Ca-Tuff	31.14	11.78	26.20	18.33	5.08	4.10	0.04
14JC-C040	10441013	MBIF	36.92	0.48	54.04	37.80	3.33	1.37	0.05
14JC-C041	10441014	MM	43.62	1.30	45.99	32.17	5.17	1.53	0.48
14JC-C048	10441016	MM	35.63	4.34	36.83	25.77	9.35	5.47	0.20
14JC-C052	10441017	MM	35.82	4.71	46.51	32.53	3.36	2.16	0.06
14JC-C054	10441018	Fe-Tuff	22.73	16.15	49.18	34.40	1.39	0.80	0.04
14JC-C055	10441019	Fe-Tuff	47.88	10.63	31.42	21.98	1.31	0.44	0.11
RGM-1	10441000	Standard	72.18	13.57	2.04	1.43	0.28	1.19	3.90
SCH-1	10441020	Standard	7.94	0.95	86.46	60.48	0.04	0.05	0.04

Open File 023H/11/0152 - Appendix B: Major-element ICP-OES-FUS Data for Samples (including Standards and Duplicate Samples)

Sample_Num	Lab_Num	K2O	TiO2	MnO	P2O5	Cr	Zr	Ba	LOI	Total
Unit		%	%	%	%	ppm	ppm	ppm	%	%
Method		ICP-OES-FUS	ICP-OES-FUS	ICP-OES-FUS	ICP-OES-FUS	ICP-OES-FUS	ICP-OES-FUS	ICP-OES-FUS	Grav	
Detection Limit		0.01	0.001	0.001	0.001	1	1	1	0.01	
14JC-C002	10440984	0.02	0.055	4.818	0.014	3	33	325	4.50	100.41
14JC-C004	10440985	0.52	0.311	0.174	0.122	35	45	181	-1	99.59
14JC-C005	10440986	0.72	0.387	0.171	0.193	931	60	380	1.95	98.71
14JC-C005_(dup)	10440990	0.69	0.386	0.171	0.195	934	60	377	1.96	98.67
14JC-C006	10440987	0.42	0.473	0.106	0.124	115	57	109	-1	98.43
14JC-C007	10440988	3.59	0.591	0.040	0.144	69	183	489	9.61	98.07
14JC-C008	10440989	1.00	0.595	0.903	0.226	3	92	135	4.26	98.45
14JC-C010	10440991	5.34	2.475	4.246	1.097	86	586	1313	20.03	98.36
14JC-C011	10440992	0.03	0.033	11.696	-0.001	6	19	473	0.48	98.94
14JC-C012	10440993	0.35	0.189	8.517	0.056	36	50	18	10.85	98.15
14JC-C013	10440994	0.14	0.560	2.566	0.198	75	107	19	4.29	99.68
14JC-C015	10440995	1.32	3.472	3.126	1.555	115	820	1388	17.73	99.26
14JC-C016	10440996	0.16	0.043	14.305	0.009	2	25	82	3.80	99.24
14JC-C018	10440997	1.69	0.053	0.753	0.061	3	90	84	4.81	99.16
14JC-C020	10440999	1.57	0.047	0.541	0.052	-1	77	61	5.07	98.21
14JC-C023	10441001	5.80	1.138	0.290	0.324	70	120	478	1.23	99.14
14JC-C025	10441003	0.90	0.553	0.350	0.122	61	84	94	-1	98.48
14JC-C027	10441005	0.40	0.038	0.014	0.012	8	12	39	0.80	99.82
14JC-C027_(dup)	10441010	0.37	0.039	0.016	0.008	8	17	38	0.71	98.85
14JC-C029	10441006	1.67	3.126	0.213	0.804	158	267	883	2.86	99.75
14JC-C030	10441007	5.86	0.422	0.061	0.051	60	94	356	15.01	99.06
14JC-C034	10441008	0.66	0.023	1.118	0.050	-1	48	83	3.20	100.13
14JC-C038	10441012	6.51	5.807	5.454	2.623	210	1007	999	0.36	99.09
14JC-C040	10441013	0.07	0.080	3.362	0.087	16	42	5	-1	99.80
14JC-C041	10441014	0.24	0.428	0.289	0.187	35	59	41	-1	99.23
14JC-C048	10441016	2.51	2.021	0.201	0.275	524	196	303	2.46	99.30
14JC-C052	10441017	2.21	0.069	0.479	0.069	2	118	158	2.56	98.01
14JC-C054	10441018	3.09	0.658	0.485	0.534	72	119	239	3.18	98.23
14JC-C055	10441019	3.88	0.664	1.663	0.111	60	297	257	2.53	100.65
RGM-1	10441000	4.18	0.292	0.041	0.041	5	200	821	-99	-99
SCH-1	10441020	0.05	0.044	1.054	0.121	10	47	105	-99	-99

Open File 023H/11/0152 - Appendix C: Trace-element ICP-OES Data for Samples (including Standards and Duplicate Samples)

Sample_Num	Lab_Num	Lithology	As	Be	Cu	Li	Mn	Ni	Pb	Rb	Sc	Ti	Zn
Unit			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Method			ICP-OES 4-ACID	ICP-OES 4-ACID	ICP-OES 4-ACID	ICP-OES 4-ACID	ICP-OES 4-ACID	ICP-OES 4-ACID	ICP-OES 4-ACID	ICP-OES 4-ACID	ICP-OES 4-ACID	ICP-OES 4-ACID	ICP-OES 4-ACID
Detection Limit			2	0.1	1	0.1	1	1	1	1	0.1	1	1
Upper Det Limit							65000						
14JC-C002	10440984	HGIF	16	1.6	4	4.6	30462	39	8	2	-0.1	270	22
14JC-C004	10440985	MBIF	-2	0.7	7	5.7	1152	61	-1	29	1.4	1879	40
14JC-C005	10440986	Gabbro	35	1.1	8	35.8	1246	149	-1	20	28.3	2472	125
14JC-C005_(dup)	10440990	Gabbro	37	1.1	9	34.1	1204	145	-1	19	26.9	2393	120
14JC-C006	10440987	MBIF	-2	1.2	14	2.2	675	106	-1	24	4.1	3035	76
14JC-C007	10440988	Shale	28	2.5	49	36.0	200	87	166	131	14.7	4166	1440
14JC-C008	10440989	MBIF	-2	1.4	9	6.5	6370	29	-1	44	0.6	3778	35
14JC-C010	10440991	Ca-Tuff	13	5.4	10	86.5	26830	24	22	147	8.8	4335	103
14JC-C011	10440992	HGIF	10	1.6	2	71.3	61545	28	11	-1	-0.1	138	27
14JC-C012	10440993	MBIF	2	0.9	11	11.2	47946	49	5	17	1.1	1150	28
14JC-C013	10440994	MBIF	6	1.0	11	2.8	16058	71	-1	8	3.6	3388	49
14JC-C015	10440995	Ca-Tuff	28	7.2	1	106.7	21355	26	35	79	13.4	5143	125
14JC-C016	10440996	HGIF	28	3.9	4	45.1	65001	42	12	-1	-0.1	210	66
14JC-C018	10440997	MM	-2	2.1	3	20.7	5415	32	-1	109	-0.1	320	40
14JC-C020	10440999	MM	-2	1.8	3	24.5	3883	26	-1	62	-0.1	288	28
14JC-C023	10441001	Fe-Tuff	4	2.9	158	83.6	1839	47	-1	217	62.5	6730	38
14JC-C025	10441003	MM	-2	0.9	18	10.6	2353	72	-1	47	3.0	3439	47
14JC-C027	10441005	Conglomerate	8	0.5	5	4.1	111	15	2	6	0.9	248	11
14JC-C027_(dup)	10441010	Conglomerate	8	0.4	4	3.7	97	15	1	5	0.7	248	5
14JC-C029	10441006	Gabbro	2	1.2	27	34.4	1487	77	37	48	25.6	19321	131
14JC-C030	10441007	Shale	126	1.4	60	33.6	440	131	63	131	12.9	2667	371
14JC-C034	10441008	MBIF	2	1.7	3	9.4	7873	31	-1	34	-0.1	128	35
14JC-C038	10441012	Ca-Tuff	15	7.3	3	124.0	31224	41	-1	304	22.2	32111	133
14JC-C040	10441013	MBIF	30	0.6	5	0.6	20184	44	1	5	-0.1	455	42
14JC-C041	10441014	MM	2	0.9	11	4.4	1916	62	-1	15	2.5	2629	53
14JC-C048	10441016	MM	-2	1.7	120	33.9	1281	339	-1	147	18.6	11587	93
14JC-C052	10441017	MM	-2	1.8	3	14.6	3193	35	3	106	-0.1	396	40
14JC-C054	10441018	Fe-Tuff	-2	1.6	11	149.0	3308	50	-1	159	33.2	4030	96
14JC-C055	10441019	Fe-Tuff	2	1.9	5	49.4	11376	35	-1	212	8.7	4021	63
RGM-1	10441000	Standard	3	0.3	92	44.3	995	61	1	20	44.2	5074	36
SCH-1	10441020	Standard	3	2.5	6	36.1	795	14	3	56	0.9	1698	93

Open File 023H/11/0152 - Appendix D: Trace-element ICP-MS-FUS Data for Samples (including Standards and Duplicate Samples)

Sample_Num	Lab_Num	Lithology	V	Co	Ga	Ge	Sr	Y	Nb	Mo	Cd	Sn	Cs
Unit			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Method			ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS
Detection Limit			5	1	1	1	1	1	1	2	0.2	1	0.5
14JC-C002	10440984	HGIF	11	17	2	17	64	17	5	-2	-0.2	-1	-0.5
14JC-C004	10440985	MBIF	31	7	3	20	28	11	8	-2	-0.2	-1	10.0
14JC-C005	10440986	Gabbro	135	43	12	4	438	8	4	-2	-0.2	-1	2.7
14JC-C005_(dup)	10440990	Gabbro	132	41	12	4	437	8	4	-2	-0.2	-1	2.6
14JC-C006	10440987	MBIF	59	16	4	18	42	12	11	3	-0.2	-1	9.3
14JC-C007	10440988	Shale	437	7	19	4	71	36	12	34	0.3	2	4.4
14JC-C008	10440989	MBIF	91	10	4	14	22	11	27	-2	-0.2	-1	3.3
14JC-C010	10440991	Ca-Tuff	63	38	15	9	727	65	167	-2	0.4	3	2.4
14JC-C011	10440992	HGIF	8	21	3	11	39	14	5	-2	-0.2	-1	-0.5
14JC-C012	10440993	MBIF	24	14	4	13	19	8	11	-2	-0.2	-1	1.5
14JC-C013	10440994	MBIF	71	17	5	22	10	15	21	-2	-0.2	-1	0.9
14JC-C015	10440995	Ca-Tuff	61	28	18	11	1203	91	239	-2	0.4	4	3.3
14JC-C016	10440996	HGIF	14	62	3	24	63	19	6	-2	-0.2	-1	-0.5
14JC-C018	10440997	MM	19	11	7	22	34	6	45	-2	-0.2	-1	10.4
14JC-C020	10440999	MM	12	8	6	17	55	5	40	-2	-0.2	1	2.9
14JC-C023	10441001	Fe-Tuff	295	24	26	22	101	9	11	2	-0.2	-1	2.5
14JC-C025	10441003	MM	57	8	5	22	28	10	15	-2	-0.2	-1	16.7
14JC-C027	10441005	Conglomerate	27	6	2	2	3	4	3	3	-0.2	-1	-0.5
14JC-C027_(dup)	10441010	Conglomerate	22	5	2	2	5	4	6	-2	-0.2	1	-0.5
14JC-C029	10441006	Gabbro	192	47	22	7	426	35	13	4	0.3	2	2.0
14JC-C030	10441007	Shale	224	19	16	8	15	24	10	24	-0.2	3	3.2
14JC-C034	10441008	MBIF	15	15	3	18	35	5	24	3	-0.2	1	14.7
14JC-C038	10441012	Ca-Tuff	250	56	37	24	270	110	394	3	0.6	6	15.9
14JC-C040	10441013	MBIF	21	41	2	19	22	8	7	2	-0.2	3	-0.5
14JC-C041	10441014	MM	41	8	3	20	63	12	12	-2	-0.2	-1	4.0
14JC-C048	10441016	MM	153	52	11	16	79	21	45	3	-0.2	3	19.0
14JC-C052	10441017	MM	16	21	7	22	38	9	53	-2	-0.2	-1	15.8
14JC-C054	10441018	Fe-Tuff	195	36	17	17	41	10	25	-2	-0.2	-1	15.7
14JC-C055	10441019	Fe-Tuff	76	31	17	12	11	10	120	2	0.2	2	26.3
RGM-1	10441000	Standard	16	3	16	2	96	20	11	4	-0.2	4	9.0
SCH-1	10441020	Standard	45	18	3	23	25	12	5	4	-0.2	-1	-0.5

Open File 023H/11/0152 - Appendix D: Trace-element ICP-MS-FUS Data for Samples (including Standards and Duplicate Samples)

Sample_Num	Lab_Num	La	Ce	Pr	Nd	Sm	Eu	Tb	Gd	Dy	Ho	Er	Tm	Yb
Unit		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Method		ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS
Detection Limit		0.5	0.5	0.1	0.2	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.05	0.1
14JC-C002	10440984	12.1	26.5	2.1	8.4	1.7	0.59	0.3	2.1	2.0	0.4	1.4	0.18	1.1
14JC-C004	10440985	12.3	22.7	2.8	11.5	1.9	0.70	0.3	2.0	1.7	0.3	0.9	0.11	0.7
14JC-C005	10440986	19.7	40.6	4.9	19.4	3.3	1.06	0.3	2.4	1.7	0.3	0.9	0.11	0.8
14JC-C005_(dup)	10440990	18.7	39.6	4.7	18.6	3.1	1.01	0.3	2.4	1.6	0.3	0.8	0.13	0.9
14JC-C006	10440987	13.8	27.7	3.6	15.3	2.9	0.92	0.4	2.7	2.1	0.4	1.2	0.16	0.9
14JC-C007	10440988	41.6	75.7	10.0	38.2	7.2	1.33	1.0	6.4	5.5	1.1	3.6	0.50	3.4
14JC-C008	10440989	22.2	35.5	3.7	13.5	2.4	0.84	0.3	2.4	2.0	0.4	1.1	0.12	0.7
14JC-C010	10440991	103.0	191.1	21.6	83.2	15.0	4.95	2.1	14.3	11.4	2.1	5.8	0.70	3.7
14JC-C011	10440992	22.8	18.3	2.4	9.2	1.4	0.53	0.2	1.8	1.6	0.4	1.2	0.17	1.0
14JC-C012	10440993	12.0	21.2	2.5	9.6	1.7	0.44	0.2	1.5	1.2	0.2	0.8	0.10	0.6
14JC-C013	10440994	17.1	34.8	4.2	17.1	3.2	1.04	0.4	3.2	2.5	0.5	1.2	0.15	0.9
14JC-C015	10440995	131.3	246.9	27.5	105.8	20.1	6.43	2.8	18.8	16.1	3.1	8.5	0.98	5.5
14JC-C016	10440996	20.9	24.4	2.9	12.4	2.2	0.76	0.4	2.9	2.3	0.5	1.5	0.20	1.3
14JC-C018	10440997	15.8	35.2	2.8	10.0	1.4	0.28	0.2	1.4	1.0	0.2	0.7	0.09	0.5
14JC-C020	10440999	16.9	41.0	3.0	10.5	1.6	0.20	0.2	1.3	1.0	0.2	0.6	0.09	0.6
14JC-C023	10441001	28.7	94.6	7.2	28.1	5.1	1.28	0.4	3.4	2.6	0.5	1.4	0.20	1.6
14JC-C025	10441003	16.3	32.5	4.2	17.1	3.4	0.93	0.3	2.5	1.9	0.3	1.0	0.11	0.8
14JC-C027	10441005	10.9	7.4	1.7	6.9	1.0	0.31	-0.1	1.1	0.6	0.1	0.3	0.05	0.2
14JC-C027_(dup)	10441010	12.5	9.0	1.9	7.8	1.0	0.27	0.1	1.0	0.6	0.1	0.3	0.06	0.2
14JC-C029	10441006	35.3	77.8	10.0	42.6	8.7	2.47	1.3	8.5	7.1	1.4	4.0	0.56	3.3
14JC-C030	10441007	42.2	71.0	9.2	33.6	6.1	1.33	0.7	5.0	4.2	0.8	2.6	0.38	2.3
14JC-C034	10441008	8.9	26.5	1.7	6.5	1.0	0.22	0.2	1.0	0.9	0.2	0.5	0.09	0.5
14JC-C038	10441012	435.4	757.8	85.2	314.2	53.0	15.03	5.5	40.8	25.2	4.4	11.1	1.32	7.5
14JC-C040	10441013	10.3	22.2	2.2	8.5	1.7	0.55	0.2	1.6	1.2	0.2	0.7	0.09	0.6
14JC-C041	10441014	17.5	32.0	4.0	16.3	2.9	0.92	0.4	2.6	2.0	0.4	1.1	0.12	0.7
14JC-C048	10441016	37.6	82.5	10.7	44.0	7.9	2.35	0.9	7.0	4.3	0.8	2.0	0.25	1.3
14JC-C052	10441017	29.0	60.0	5.3	17.6	2.4	0.35	0.3	2.0	1.7	0.3	0.9	0.13	0.9
14JC-C054	10441018	30.3	117.8	7.0	26.4	5.2	1.49	0.6	4.0	2.9	0.5	1.5	0.24	1.6
14JC-C055	10441019	18.0	53.1	5.0	18.2	3.0	1.15	0.4	2.5	2.3	0.5	1.5	0.25	1.8
RGM-1	10441000	23.9	44.6	5.1	18.4	3.4	0.70	0.6	3.4	3.5	0.7	2.2	0.36	2.3
SCH-1	10441020	13.4	35.6	2.7	10.2	1.9	0.52	0.3	1.8	1.8	0.4	1.2	0.16	1.0

Open File 023H/11/0152 - Appendix D: Trace-element ICP-MS-FUS Data for Samples (including Standards and Duplicate Samples)

Sample_Num	Lab_Num	Lu	Hf	Ta	Tl	Bi	Th	U
Unit		ppm	ppm	ppm	ppm	ppm	ppm	ppm
Method		ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS	ICP-MS-FUS
Detection Limit		0.05	0.2	0.5	0.1	0.5	0.1	0.1
14JC-C002	10440984	0.17	0.2	-0.5	-0.1	-0.5	0.5	-0.1
14JC-C004	10440985	0.10	0.6	0.5	-0.1	-0.5	0.7	0.2
14JC-C005	10440986	0.15	1.5	-0.5	-0.1	-0.5	3.5	0.9
14JC-C005_(dup)	10440990	0.14	1.6	-0.5	-0.1	-0.5	3.4	1.0
14JC-C006	10440987	0.14	1.0	0.7	-0.1	-0.5	1.0	0.2
14JC-C007	10440988	0.58	5.0	0.7	-0.1	-0.5	11.4	19.8
14JC-C008	10440989	0.11	1.8	0.7	-0.1	-0.5	2.1	0.5
14JC-C010	10440991	0.48	10.5	4.7	-0.1	-0.5	7.0	1.6
14JC-C011	10440992	0.15	-0.2	-0.5	-0.1	-0.5	0.2	0.1
14JC-C012	10440993	0.09	1.0	-0.5	-0.1	-0.5	1.4	0.2
14JC-C013	10440994	0.15	1.8	1.1	-0.1	-0.5	1.7	0.6
14JC-C015	10440995	0.71	14.6	6.8	-0.1	-0.5	9.5	3.0
14JC-C016	10440996	0.20	-0.2	-0.5	-0.1	-0.5	0.3	0.3
14JC-C018	10440997	0.08	1.7	2.3	-0.1	-0.5	3.2	0.2
14JC-C020	10440999	0.09	1.7	2.2	-0.1	-0.5	3.5	0.3
14JC-C023	10441001	0.24	2.4	0.6	-0.1	-0.5	1.6	0.8
14JC-C025	10441003	0.11	1.4	0.9	-0.1	-0.5	1.6	0.3
14JC-C027	10441005	-0.05	0.6	0.9	0.1	-0.5	0.9	1.0
14JC-C027_(dup)	10441010	-0.05	0.6	0.6	-0.1	-0.5	1.0	1.0
14JC-C029	10441006	0.54	6.2	1.4	-0.1	-0.5	3.3	0.5
14JC-C030	10441007	0.38	2.7	1.5	-0.1	-0.5	12.0	8.0
14JC-C034	10441008	0.07	1.0	1.7	-0.1	-0.5	1.7	0.1
14JC-C038	10441012	1.08	20.1	11.1	-0.1	-0.5	29.5	4.2
14JC-C040	10441013	0.08	0.5	-0.5	-0.1	-0.5	1.0	0.2
14JC-C041	10441014	0.10	1.0	0.7	-0.1	-0.5	1.4	0.3
14JC-C048	10441016	0.21	4.7	3.4	-0.1	-0.5	4.8	0.6
14JC-C052	10441017	0.14	1.9	3.2	-0.1	-0.5	4.8	0.4
14JC-C054	10441018	0.23	1.8	-0.5	-0.1	-0.5	1.4	0.5
14JC-C055	10441019	0.28	5.6	3.0	-0.1	-0.5	5.0	0.6
RGM-1	10441000	0.41	5.8	1.4	-0.1	-0.5	14.1	5.1
SCH-1	10441020	0.14	0.4	-0.5	-0.1	-0.5	0.6	1.1