IGCP512 – Hoffman & Halverson – Mackenzie Mountains – Data Supplement 2

Upper Sayunei Formation (Rapitan Group) iron formation, Hayhook Lake, NT, Canada

Sample location: 63° 34’ 31” N; 127° 05’ 30” W

Table 1. Iron isotope compositions, mineralogy, and iron concentrations for Rapitan BIF samples. Iron concentrations were measured by ICP-MS and MC-ICPMS. Minerals are abbreviated as follows: hem = hematite, qtz = quartz, chl = chlorite, ill = illite, and cal = calcite. Iron isotope data are reported in per mil (‰) notation relative to the IRMM-14 standard ($\delta_{57}Fe$ = 1000 Å~ [($_{57}Fe/_{54}Fe)_{sample}$/($_{57}Fe/_{54}Fe)_{IRMM-14}$]). These data were acquired variably from a 1M CH2COOH or 6 M HCl leachate (sequential dissolution) of the samples or on a bulk rock dissolution (HCl + HF + HNO_3); since the bulk of iron in these sample occurs as hematite, the latter two methods yielded nearly identical values. Given the large isotopic variations observed between the individual measurements, each sample was analyzed only three times (6 being the normal practice at LMTG where a high level of precision is required). Standard errors (2se) were calculated using the t-correcting factor tabulated in Platzner (1997).
Table 2. Summary of trace element data on Rapitan BIF (bulk rock) samples. The Ce-anomaly is calculated (after Elderfield and Greaves, 1982) as Ce/Ce* = log[$Ce_N/(0.67La_N+0.33Pr_N)$], where the subscript N denotes normalization against mean chondritic values (McLennan, 1989). The Eu-anomaly (after McLennan, 1989) is calculated as $Eu_N/(Sm_N \bullet Gd_N)_{0.5}$, again normalized against chondrite.

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Table 1. (Halverson et al.)

Sample	Strat. Height (m)	Lithology	Mineralogy	Analyzed Fraction	[Fe] ppm	$\delta^{57}Fe$	2se	$\delta^{56}Fe$	2se
G22.5.4	29.5	ferruginous silt	ill+qtz+chl+hem	1N Acetic	1158	-	-	-	-
G22.5.4				HCL	58183	0.128	0.029	0.083	0.010
G22.5.4				Insol. Res.	11529	1.201	0.056	0.816	0.038
G22.13.5	21.4	ferruginous diamictite		bulk rock	54805	0.673	0.138	0.442	0.081
G22.19.8	15.1	hematitic silt		HCL	119951	0.944	0.046	0.635	0.025
				bulk rock	263262	0.967	0.108	0.659	0.078
G22.21.1	13.8	hematitic jaspilite		HCL	123127	0.858	0.021	0.575	0.022
G22.21.3	13.6	hematitic jaspilite	qtz+hem+cal	HCL	121144	1.196	0.089	0.821	0.076
G22.21.3				bulk rock	172368	1.243	0.147	0.833	0.094
G22.22.7	12.2	hematitic mud		HCL	192901	0.591	0.079	0.412	0.036
G22.22.7				bulk rock	240011	0.517	0.162	0.352	0.095
G22.24.8	10.1	hematitic jaspilite	qtz+hem+cal	HCL	123988	0.652	0.011	0.441	0.022
				bulk rock	153488	0.647	0.131	0.443	0.069
G22.26.1	8.8	hematitic mud	hem+chl+qtz+fel	HCL	440934	-0.268	0.049	-0.182	0.021
				bulk rock	543755	-0.445	0.045	-0.303	0.024
G22.28	6.9	hematitic mud		HCL	138342	-0.201	0.058	-0.129	0.048
				bulk rock	178986	-0.194	0.078	-0.123	0.029
G22.29.8	5.1	hematitic mud	qtz+ill+hem+chl	HCL	134868	-0.400	0.073	-	-
G22.32.9	2	hematitic mud	qtz+ill+chl+hem	1N Acetic	1005	-0.942	0.059	-0.657	0.046
				HCL	104757	-0.426	0.026	-0.283	0.019
				Insol. res.	1964	0.148	0.091	0.088	0.038
				bulk rock	112805	-0.418	0.077	-0.276	0.034
G22.34.7	0.2	hematitic silt	qtz+fel+chl+hem +cal	1N Acetic	690	-0.851	0.091	-0.634	0.041
				HCL	126205	-0.650	0.038	-0.431	0.032
				Insol. Res.	2857	-0.370	0.127	-0.543	0.081
				bulk rock	153634	-0.789	0.133	-0.543	0.081

Table 2 (Halverson et al.)

sample	G22.34.7	G22.32.9	G22.29.8	G22.28	G22.26.1	G22.24.8	G22.22.7	G22.21.3	G22.21.1	G22.19.8	G22.13.5	G22.5.4	JA-2	JB-3
height (m)	**0.2**	**2**	**5.1**	**6.9**	**8.8**	**10.1**	**12.2**	**13.6**	**13.8**	**15.1**	**21.4**	**29.5**	**-**	**-**
Sc	10	7.7	18	8.7	9.9	3.7	7.8	1.8	1.9	12	14	20	16	29
Ti	2794	1120	5358	2861	1074	121	1986	136	85	4702	3646	6618	3413	8252
V	105	91	98	87	183	30	75	24	17	145	162	221	123	428
Cr	34	20	39	38	20	3.7	30	3.3	3.5	65	58	95	376	63
Mn	7149	16316	4062	3276	635	369	896	303	178	557	524	329	710	1304
Co	67.6	49.5	21.9	23.2	5.6	1.0	12.4	1.1	0.5	17.5	12.9	23.4	24.4	29.5
Ni	40.8	27.2	24.1	29.8	13.9	3.5	23.1	3.3	2.2	28.0	27.5	50.6	114	31.3
Cu	20.6	33.8	62.4	62.1	24.2	64.6	68.3	49.6	77.0	30.5	112	75.2	26.1	182
Zn	94.7	52.2	50.2	65.9	23.9	5.8	60.3	5.8	4.5	97.5	74.4	113	74.4	110
Ga	38.1	11.6	34.8	18.3	11.5	11.1	23.4	3.0	44.3	20.3	20.7	64.4	62.1	53.6
Ge	1.5	1.0	3.1	1.6	2.5	2.3	2.6	2.5	3.6	4.8	4.3	5.6	1.3	1.6
As	15.3	6.8	9.4	10.2	42.3	8.8	7.4	5.4	6.4	3.8	3.8	3.0	1.1	1.8
Se	0.5	1.3	1.8	1.1	0.7	0.3	1.4	0.4	0.5	3.0	4.8	2.1	0.7	0.8
Rb	16.1	9.5	42.6	10.2	3.9	3.1	23.2	0.7	2.1	19.3	33.5	177	73.2	14.9
Sr	86	236	146	77.4	30.8	21.8	42.8	28.0	36.5	32.0	74.7	29.9	229	402
Y	16.3	13.6	24.9	13.2	23.0	8.0	18.3	4.6	6.6	11.0	14.4	27.0	13.6	20.6
Zr	40.4	11.4	34.9	15.2	28.3	7.9	11.1	5.6	3.4	32.9	21.2	81.1	147	120
Nb	54.8	27.6	103	39.4	34.0	6.6	38.4	5.7	3.8	61.4	70.5	180	64.9	17.1
Mo	2.28	2.11	1.11	1.48	11.7	2.27	1.60	5.60	1.33	0.53	0.30	0.36	1.02	1.32
La	13.5	9.3	12.5	9.92	6.03	1.51	9.52	1.54	1.67	11.2	12.5	42.4	12.0	5.99
Ce	26.5	19.2	28.2	19.86	15.0	4.48	22.2	3.80	4.41	26.2	27.9	87.8	25.0	15.0
Pr	3.27	2.43	3.56	2.46	2.10	0.67	2.78	0.51	0.63	3.30	3.41	10.5	2.87	2.31
Nd	13.0	10.2	14.6	10.1	9.63	3.31	11.8	2.15	3.04	13.7	14.3	41.4	11.1	11.3
Sm	2.68	2.04	3.92	2.08	2.24	0.95	2.56	0.48	0.66	2.92	3.12	8.53	2.34	2.90
Eu	0.65	0.47	0.98	0.56	0.55	0.20	0.61	0.13	0.19	0.72	0.71	1.78	0.68	0.92
Gd	2.96	2.15	4.26	2.25	2.79	1.16	2.86	0.60	0.81	2.98	3.15	7.76	2.31	3.24
Tb	0.43	0.33	0.72	0.36	0.47	0.19	0.45	0.10	0.12	0.44	0.50	1.07	0.36	0.52
Dy	2.67	1.90	4.46	2.10	3.34	1.33	2.93	0.73	0.83	2.41	2.91	5.75	2.27	3.23
Ho	0.50	0.41	0.86	0.42	0.73	0.29	0.63	0.15	0.18	0.43	0.55	1.03	0.44	0.65
Er	1.43	1.18	2.36	1.19	2.08	0.87	1.78	0.50	0.57	1.12	1.49	2.79	1.30	1.89
Tm	0.19	0.16	0.32	0.15	0.30	0.13	0.24	0.08	0.09	0.15	0.19	0.37	0.20	0.27
Yb	1.11	1.05	2.12	0.99	1.90	0.93	1.47	0.52	0.60	0.82	1.15	2.30	1.24	1.74
Lu	0.16	0.16	0.26	0.13	0.27	0.14	0.21	0.08	0.09	0.11	0.15	0.32	0.19	0.26
Ce/Ce*	-0.070	-0.058	-0.027	-0.064	-0.011	0.028	-0.016	-0.008	0.003	-0.016	-0.026	-0.048	-0.041	-0.023
Eu/Eu*	0.353	0.342	0.365	0.397	0.333	0.294	0.343	0.370	0.396	0.372	0.341	0.329	0.445	0.459