Data Repository item 2003036

TABLE DR 2. MAJOR AND TRACE ELEMENT DATA FOR INTRUSIVE AND EXTRUSIVE IGNEOUS ROCKS FROM THE BELINGWE BELT

	Lower Greenstones																
	Hokonui Formation						Brooklands Formation					Bend Formation					
Sample	B-H 1	B-H 2	B-H 3	B-H 4	B-H 5	B-H 6	B-Br 1	B-Br 2	B-Br 3	B-Br 4	B-Br 5	B-B 1	B-B 2	B-B 3	B-B 4	B-B 5	B-B 6
Rock type	int	int	int	ext	ext	int/ext	ext	ext	ext	int	int	ext	int	cum	ext	ext	int
Classification	Fe thol b	kom	kom	Fe thol b	Fe thol b	Fe thol b	kom	Mg thol b	Mg thol b	Fe thol b	Fe thol b	Fe thol b	Fe thol b	kom	Fe thol b	kom.	Mg thol b
(wt%)																	
SiO_2	52.09	53.91	55.24	50.58	50.30	50.52	51.79	56.55	49.07	51.18	53.21	54.55	50.81	43.77	52.45	50.09	51.23
TiO_2	2.24	0.25	0.34	1.19	1.29	2.61	0.41	0.86	1.00	1.67	1.77	1.02	0.67	0.08	0.51	0.15	0.98
Al_2O_3	10.99	5.50	7.30	14.24	14.31	14.21	6.65	12.69	15.22	13.13	13.06	14.27	15.49	2.09	12.52	3.75	13.93
Fe_2O_3	20.46	10.67	10.75	13.39	14.17	15.02	10.19	10.18	14.30	16.08	14.70	12.76	9.89	8.08	11.71	10.02	12.54
MnO	0.23	0.21	0.20	0.19	0.20	0.21	0.20	0.15	0.22	0.22	0.16	0.16	0.16	0.16	0.19	0.19	0.18
MgO	3.64	23.46	19.98	7.17	7.44	4.12	20.79	7.16	7.82	5.75	5.55	5.84	8.23	44.28	10.83	27.48	7.68
CaO	5.39	5.17	4.18	10.07	10.45	7.84	9.21	6.43	8.25	7.53	6.83	9.24	12.55	1.45	9.38	8.21	10.24
Na_2O	4.72	0.70	1.89	1.65	1.64	3.15	0.70	5.84	3.97	4.25	4.53	2.02	1.80	0.09	2.33	0.12	2.95
K_2O	0.05	0.10	0.09	1.01	0.08	1.58	0.04	0.06	0.07	0.06	0.06	0.04	0.15	0.00	0.03	0.00	0.04
P_2O_5	0.18	0.02	0.03	0.11	0.09	0.46	0.02	0.08	0.07	0.12	0.12	0.09	0.04	0.00	0.03	0.00	0.07
Totals without LOI	98.53	94.71	95.80	97.57	96.85	97.91	95.95	98.45	98.08	98.88	97.45	97.91	97.89	88.86	97.50	94.41	96.98
LOI (H_2O+CO_2)	1.67	4.61	4.18	2.10	2.95	1.81	3.78	0.98	1.93	1.48	3.16	2.09	1.93	11.15	4.44	5.04	5.78
Mg#	0.29	0.82	0.81	0.53	0.53	0.37	0.81	0.62	0.54	0.43	0.47	0.51	0.64	0.92	0.68	0.85	0.57
(ppm)																	
Cr (XRF)	22.39	2509.98	2035.05	263.77	438.09	239.67	1568.39	304.46	298.85	77.40	118.91	30.96	681.44	2384.57	1074.95	2724.31	355.85
Ni (XRF)	17.25	645.13	297.49	137.34	791.95	591.36	786.87	79.23	126.43	61.69	62.60	90.90	135.87	2543.33	251.28	487.24	98.99
Sr	86.20	43.95	18.29	261.03	129.90	239.20	13.74	66.51	53.02	62.40	92.45	134.05	86.45	1.26	141.96	17.05	36.81
Sr (XRF)	97.66	58.72	32.53	261.37	144.64	252.82	28.82	79.16	63.59	65.63	100.21	142.25	95.32	17.63	151.18	21.72	50.47
Cs	0.43	2.15	1.53	0.52	0.06	3.46	0.33	0.02	0.09	0.07	0.07	0.03	0.09	0.11	0.05	0.78	0.07
Ba	66.52	46.16	15.82	245.23	43.99	541.53	41.93	70.51	17.45	19.31	38.86	19.11	27.42	0.79	22.84	6.66	15.84
Rb	1.69	5.91	6.24	25.21	1.98	47.97	2.16	0.34	1.33	0.90	1.09	0.64	5.05	0.68	0.36	2.52	0.83
Sc	45.32	28.98	27.68	40.06	39.08	31.74	27.53	27.78	45.30	43.57	36.76	30.11	42.56	9.37	39.40	47.55	39.79
V	471.05	140.69	152.60	325.74	332.99	313.17	171.01	198.62	315.22	406.64	391.95	272.42	242.55	60.67	239.60	227.97	277.15
V (XRF)	439.46	114.03	119.00	308.50	315.95	304.36	152.16	169.63	290.58	398.46	370.45	252.27	220.66	45.01	218.46	92.15	252.63
Ta	0.34	0.06	0.09	0.19	0.17	0.87	0.07	0.29	0.17	0.28	0.40	0.29	0.09	0.01	0.07	0.05	0.16
Ti	12351.70	1578.05	1951.73	6718.17	7105.63	14222.51	2410.86	4836.98	5672.59	9048.26	9545.15	5869.03	3902.75	463.28	2979.32	2366.28	5601.51
Ti (XRF)	13446.62	1519.16	2065.08	7127.40	7737.48	15674.80	2436.74	5175.98	5990.11	10003.79	10581.22	6122.97	4041.99	472.26	3074.36	888.99	5872.60
Nb	5.42	0.81	1.22	2.91	2.67	13.39	1.14	4.38	2.67	4.54	6.18	4.16	1.51	0.11	1.12	0.80	2.50
Zr	128.48	22.80	31.84	72.49	57.81	239.55	30.44	92.19	60.57	100.15	137.20	88.68	36.06	3.94	28.44	20.25	56.85
Zr (XRF)	117.73	26.40	33.40	72.77	55.76	238.99	31.27	89.39	55.06	93.04	125.19	82.73	33.71	11.25	28.72	10.59	53.62
Hf	3.53	0.66	0.85	2.06	1.65	6.06	0.84	2.38	1.72	2.64	3.47	2.39	1.02	0.11	0.83	0.60	1.57
Pb	2.05	2.57	2.41	3.25	2.52	8.16	3.49	7.73	15.17	3.81	2.71	7.91	1.98	1.51	1.75	0.83	1.85
Th	0.61	0.66	0.92	0.35	0.28	5.68	0.21	3.18	0.50	0.60	1.01	2.08	0.16	0.02	0.14	0.10	0.34
U	0.17	0.21	0.22	0.10	0.09	1.44	0.06	0.56	0.11	0.11	0.20	0.61	0.04	0.00	0.03	0.02	0.10
Y	45.57	6.22	7.90	27.12	22.45	47.65	12.81	17.16	23.41	34.38	37.93	23.52	15.40	1.65	12.67	9.23	20.04
P	797.28	92.16	136.67	492.02	405.55	2005.81	90.97	354.63	311.47	529.64	537.41	401.16	178.33	bdl	134.28	bdl	315.01
La	7.00	2.57	3.94	4.02	3.27	27.46	1.15	11.28	2.77	4.20	7.75	7.85	1.84	0.14	1.47	0.96	2.59
Ce	18.30	5.13	7.85	10.44	8.66	60.10	2.89	22.84	6.72	11.03	19.04	17.11	4.88	0.28	3.71	2.42	7.18
Pr	2.91	0.65	0.99	1.69	1.40	7.91	0.48	2.65	1.18	1.96	3.05	2.35	0.79	0.04	0.64	0.45	1.19
Nd	14.92	2.80	4.19	8.61	7.34	34.33	2.68	11.13	6.11	10.25	14.23	10.89	4.27	0.23	3.39	2.47	6.32
Sm	4.96	0.71	1.03	2.87	2.45	8.08	1.09	2.66	2.16	3.48	4.35	3.05	1.52	0.09	1.18	0.90	2.18
Eu	1.57	0.25	0.35	1.00	0.92	2.12	0.40	0.93	0.88	1.17	1.39	0.96	0.62	0.04	0.57	1.02	0.77
Gd	6.45	0.89	1.22	3.93	3.24	8.57	1.56	2.83	3.09	4.71	5.34	3.65	2.10	0.16	1.68	1.21	2.87
Dy	7.54	1.04	1.33	4.54	3.83	8.35	2.06	2.97	3.91	5.44	6.02	4.02	2.52	0.24	2.00	1.50	3.39
Er	4.84	0.66	0.85	2.93	2.46	5.01	1.47	1.83	2.57	3.48	3.77	2.45	1.62	0.17	1.33	0.99	2.17
Yb	4.78	0.67	0.89	2.85	2.38	4.73	1.58	1.72	2.47	3.37	3.70	2.37	1.65	0.20	1.32	1.05	2.16
Lu	0.74	0.11	0.13	0.43	0.36	0.72	0.25	0.26	0.39	0.52	0.56	0.36	0.25	0.03	0.21	0.17	0.32

Note: ext = extrusive, int = intrusive, cum = cumulate, kom = komatiite, kb = komatiitic basalt, Fe thol b = high Fe tholeiitic basalt, Mg thol b = high Mg tholeiitic basalt, thol and = tholeiitic andesite, bdl = below detection limit, LOI = loss on ignition; all elements are recalculated on anhydrous basis; Mg# = (MgO/mol wt)/(MgO/mol wt + FeO/mol wt)

TABLE DR 2. Continued

	Upper Greenstones and dolerites											
	Zeederbergs Formation							Reliance Formation				
Sample	B-B 7	B-Z 1	B-Z 2	B-Z 3	B-Z 4	B-Z 5	B-Z 6	B-R 1	B-R 2	B-R 3	B-R 4	B-R 5
Rock type	int	ext	ext	ext	ext	ext	ext	ext	ext	ext	int	int
Classification	Fe thol b	Mg thol b	Mg thol b	Mg thol b	kom b	kom b	thol and	kom	kom	kom b	Mg thol b	Mg thol b
wt (%)												
SiO_2	53.50	49.72	48.71	50.15	53.07	51.30	60.22	46.66	46.64	54.35	51.42	54.22
TiO_2	1.12	0.70	0.74	0.75	1.21	1.58	0.89	0.29	0.30	0.55	0.51	0.58
Al_2O_3	13.34	15.46	15.90	14.82	8.82	8.24	12.53	6.21	6.30	11.04	14.71	12.76
Fe_2O_3	13.65	11.50	12.28	12.12	15.00	16.99	9.93	11.77	11.81	10.96	11.13	10.67
MnO	0.19	0.19	0.18	0.18	0.20	0.21	0.14	0.18	0.18	0.19	0.15	0.17
MgO	5.65	8.81	8.88	8.51	7.51	8.24	3.19	27.72	27.54	10.18	7.60	8.31
CaO	9.20	12.14	12.08	11.63	10.43	11.27	12.12	6.32	6.33	8.85	12.08	8.90
Na_2O	3.22	1.37	0.96	1.60	3.06	0.89	0.77	0.75	0.80	3.83	2.37	4.21
K_2O	0.05	0.01	0.05	0.00	0.50	0.97	0.10	0.00	0.00	0.00	0.00	0.05
P_2O_5	0.08	0.04	0.05	0.05	0.10	0.23	0.11	0.01	0.01	0.03	0.02	0.06
Totals without LOI	97.55	97.15	96.44	97.57	98.35	98.01	97.61	96.93	97.57	97.53	97.86	97.73
LOI (H_2O+CO_2)	2.88	2.73	3.00	1.96	0.86	1.85	1.86	2.05	2.44	2.12	2.29	1.52
Mg#	0.49	0.61	0.61	0.60	0.54	0.51	0.44	0.83	0.83	0.68	0.59	0.62
(ppm)												
Cr (XRF)	40.76	463.94	471.82	428.92	271.03	525.27	54.09	2586.87	2639.87	917.30	37.46	641.93
Ni (XRF)	55.36	183.22	246.79	174.23	143.37	126.52	36.88	1481.48	1465.61	186.61	87.88	156.55
Sr	46.29	151.12	133.45	103.42	177.98	384.19	593.68	27.18	28.70	110.75	52.55	158.65
Sr (XRF)	58.38	153.62	139.49	113.72	181.74	378.34	583.74	37.84	39.72	118.70	63.16	165.51
Cs	0.04	0.11	0.08	0.15	0.64	0.26	0.05	0.09	0.08	0.02	0.07	0.18
Ba	27.49	10.13	11.53	11.58	67.32	256.16	30.34	4.86	5.78	27.77	12.46	214.61
Rb	1.07	0.99	2.17	0.82	13.88	14.56	2.58	1.08	0.98	0.13	0.25	2.20
Sc	45.12	41.31	37.54	39.86	23.24	27.18	26.27	25.23	25.56	36.82	41.94	31.52
V	360.92	271.06	257.57	268.81	215.76	260.27	226.12	153.36	154.38	223.58	234.53	203.27
V (XRF)	336.24	241.89	235.38	233.68	192.17	252.02	202.85	135.15	136.31	198.91	218.68	174.97
Ta	0.20	0.08	0.09	0.10	0.51	0.80	0.56	0.03	0.04	0.12	0.06	0.28
Ti	6403.37	4008.46	4245.59	4340.82	6858.00	8860.77	5011.01	1690.71	1731.36	3182.54	2936.89	3396.80
Ti (XRF)	6698.67	4196.19	4413.57	4485.34	7253.74	9480.92	5343.36	1731.77	1781.85	3319.29	3063.05	3496.52
Nb	2.73	1.39	1.53	1.58	7.43	11.81	7.18	0.50	0.52	1.60	0.93	3.29
Zr	71.13	34.99	37.76	38.56	105.93	198.80	155.78	13.17	13.80	40.27	23.14	70.75
Zr (XRF)	65.61	36.03	38.37	37.92	98.63	181.61	150.60	13.41	15.37	41.01	24.52	68.56
Hf	2.05	1.07	1.06	1.12	2.71	5.12	4.20	0.39	0.41	1.14	0.69	1.93
Pb	1.80	1.29	1.10	1.14	4.40	3.95	9.84	0.97	1.34	2.31	0.98	6.55
Th	0.65	0.14	0.15	0.17	3.10	4.37	6.24	0.07	0.07	1.15	0.22	3.79
U	0.12	0.05	0.05	0.05	0.80	1.13	1.71	0.02	0.03	0.33	0.06	1.39
Y	27.46	15.36	15.95	16.32	20.35	41.36	37.61	6.39	6.58	12.54	10.59	16.19
P	357.90	179.69	226.27	223.64	443.74	1024.15	491.82	45.02	44.73	134.24	89.19	267.93
La	4.04	1.75	1.90	1.95	13.02	22.29	17.38	0.64	0.69	4.20	1.15	10.05
Ce	10.21	4.70	5.12	5.20	29.71	48.29	34.51	1.66	1.77	8.93	3.10	19.98
Pr	1.65	0.78	0.86	0.87	4.06	6.52	4.31	0.28	0.30	1.17	0.52	2.43
Nd	8.65	4.15	4.49	4.57	17.76	28.83	18.22	1.56	1.60	5.31	2.89	9.79
Sm	2.88	1.48	1.55	1.57	4.25	7.19	4.69	0.59	0.62	1.51	1.04	2.33
Eu	0.94	0.65	0.60	0.58	1.23	2.08	1.67	0.24	0.24	0.53	0.42	0.66
Gd	3.79	2.06	2.16	2.22	4.36	7.80	5.49	0.86	0.91	1.84	1.47	2.58
Dy	4.51	2.52	2.68	2.72	3.86	7.47	6.06	1.09	1.10	2.18	1.80	2.75
Er	2.90	1.65	1.72	1.76	2.10	4.26	3.89	0.70	0.73	1.36	1.14	1.69
Yb	2.83	1.65	1.69	1.78	1.85	3.87	3.78	0.70	0.69	1.29	1.13	1.65
Lu	0.44	0.26	0.26	0.27	0.27	0.59	0.57	0.11	0.11	0.20	0.18	0.25

TABLE DR 3. CONCENTRATIONS AND ISOTOPIC COMPOSITIONS FOR Nd AND Sm IN SAMPLES FROM THE BELINGWE GREENSTONE BELT

Sample	Sm (ppm)	Nd (ppm)	$^{147}Sm/^{144}Nd$	$^{143}Nd/^{144}Nd$	2σ (10^{-6})	ε_{Nd} (t)	ε_{Nd} (2.7 Ga)
B-H 1	4.933	15.527	0.1921	0.512626	±11	+1.49 ± 0.49	+1.37 ± 0.49
B-H 2	0.594	2.254	0.1593	0.511956	±11	+0.59 ± 0.49	-0.41 ± 0.49
B-R 1	0.574	1.568	0.2215	0.513213	±13	+2.72 ± 0.59	+2.69 ± 0.59
B-R 5	2.322	10.017	0.1402	0.511653	±11	+0.20 ± 0.49	+0.26 ± 49
B-Z 1	1.462	4.254	0.2077	0.512938	±11	+2.16 ± 0.5	+2.06 ± 0.5
B-Z 4	4.220	18.163	0.1405	0.511605	±10	-0.85 ± 0.5	-0.79 ± 0.5

Note: emplacement ages (t) are: Hokonui Formation = 2909 ± 9 Ma, Zeederbergs and Reliance Formations = 2692 ± 9 Ma. Calculations are based on present-day parameters of the chondritic uniform reservoir (CHUR) adopted from Jacobsen & Wasserburg (1979): $^{147}Sm/^{144}Nd = 0.1967$, $^{143}Nd/^{144}Nd = 0.512638$. Sm/Nd systematics of the depleted mantle are based on a linear evolution with ε_{Nd} (4.55 Ga) = 0 and (present day) = +10. Sm and Nd were extracted by conventional bomb dissolution/ion exchange procedures (Bolhar, 2001). Sm and Nd isotopic ratios were normalized to $^{152}Sm/^{147}Sm = 1.78307$ and $^{146}Nd/^{144}Nd = 0.7219$, respectively. Total procedural blanks were < 200pg for Sm and Nd. Precision for $^{147}Sm/^{144}Nd$ was < 0.2%. Uncertainties on ε_{Nd} units were calculated using an external reproducibility for $^{143}Nd/^{144}Nd$ of ±25 x 10^{-6}.

TABLE DR 4. Sm-Nd ISOTOPE SYSTEMATICS AND CONCENTRATIONS OF MIXING END-MEMBER COMPOSITIONS

unit	n	Sm (ppm)	Nd (ppm)	$^{147}Sm/^{144}Nd$	$^{143}Nd/^{144}Nd$	2σ	ε_{Nd} (t)	ε_{Nd} (2.7 Ga)	t_{DM}
Chingezi tonalite	3	1.92	9.70	0.1197	0.511203	± 555	+1.49	-1.55	ca. 3.14
Shabani gneiss	3	6.01	33.09	0.1117	0.510795	± 180	+0.59	-6.76	ca. 3.42

Note: emplacement ages are: Chingezi tonalite = 2925±30 Ma and Shabani gneiss = 3088±45 Ma (both ages by Pb/Pb whole rock): Taylor et al. (1991); tonalite and gneiss are basement units underlying the Belingwe greenstone belt. Data sources are Luais and Hawkesworth (1994) and Taylor et al. (1991).

References Cited GSA Data Repository

Jacobsen, S.B., and Wasserburg, G.J., 1979. The mean age of mantle and crustal reservoirs. Journal of Geophysical Research, v. 84, p. 7411-7427.

Taylor, P.N., Kramers, J.D., Moorbath, S., Wilson, J.F., Orpen, J.L. and Martin, A., 1991. Pb/Pb, Sm/Nd and Rb/Sr geochronology in the Archean Craton of Zimbabwe. Chemical Geology, v. 87, p. 175-196.

Luais, B., and Hawkesworth, C.J., The generation of continental crust: An integrated study of crust-forming processes in the Archean of Zimbabwe: Journal of Petrology, v. 35, p. 43-93.