DR2010141

Data Repository Table 1

Whole rock major element oxides (wt. %), selected trace elements, and rare earth elements (in ppm) in anorthosite – leuconorite, FTZR and BZG.

Data Repository Figure 2

Variations of measured and model melt abundances (lines with arrows) of major element oxides (wt %), selected trace elements (ppm) and rare earth elements (chondrite normalized; Byonton, 1984) in anorthosite-leuconorite, FTZR and BZG in the Bolangir pluton for (a) fractionation schemes a-c, (b) fractionation schemes d-f, and (c) fractionation scheme g. In fractionation schemes c, f and g, the horizontal gaps indicate lack of liquidus phase co-existing with melts during isothermal decompression from 12 to 7kbar. Symbols for rocks are keyed to the figure. Compositions of model melts were computed using the Adiabat_1ph software (Smith and Asimow, 2005). See text for discussion on the fractionation schemes, and refer Fig. 8 for details regarding sequence of crystallization, phase compositions and fraction of melt remaining for the fractionation trends. Arrows begin from the average HAG magma (plus sign) for 100% melt remaining, and the tips correspond to fractions of the last residual melts shown in Fig. 8; however, for fractionation schemes d - f, the computed concentrations of K_2O, Ba, Rb, Zr and REEs shown by the arrow tips correspond to 40-50% melt remaining. In other words, the computed concentrations of elements at low melt fractions (e.g. 10-15%) indicated in Fig. 8 for fractionation schemes d – f extends beyond the figures.

Data repository 1: Whole rock major element oxides (wt. %), selected trace and rare earth elements (in ppm) in anorthosite – leuconorite, FTZR and BZG.

	PN-579A	PN-579B	PN-581A	PN-581E	PN590C	PN611	PN612
	FTZR-D	FTZR-D	FTZR-D	FTZR-D	FTZR-D	FTZR-D	FTZR-D
Major oxide (wt %)							
SiO_2	40.82	40.86	41.79	41.99	46.24	40.88	41.95
TiO_2	2.41	2.88	2.02	2.17	1.97	2.64	3.50
Al_2O_3	12.87	12.55	14.46	14.22	13.05	14.88	11.45
FeO^t	24.38	25.01	22.65	21.97	21.48	21.22	26.49
MnO	0.29	0.33	0.24	0.24	0.21	0.21	0.32
MgO	2.52	2.54	1.44	1.59	1.62	2.63	2.98
CaO	7.60	6.99	6.96	7.85	6.14	7.80	4.52
Na_2O	2.09	1.95	1.95	1.56	2.02	2.65	2.11
K_2O	0.86	0.63	1.63	1.94	2.07	0.77	0.59
P_2O_5	1.96	1.77	1.67	1.97	1.40	1.72	0.84
Total	**95.80**	**95.51**	**94.81**	**95.50**	**96.20**	**95.40**	**94.75**
Trace elements (ppm)							
Rb	4.70	4.64	14.41	15.98	57.03	5.08	9.67
Sr	206.83	208.04	322.22	279.56	227.30	382.91	152.60
Y	161.63	148.54	116.53	121.93	140.41	69.67	122.99
Zr	3281	4768	3516	2787	2525	1381	2542
Nb	487.07	298.08	255.50	160.09	201.36	232.53	285.94
Ba	419.14	1099	1518	1351	418.15	484.49	132.38
Hf	3.08	3.14	2.12	1.97	2.21	0.97	5.60
Pb	10.97	8.35	10.81	9.00	17.26	55.15	13.45
Th	3.51	3.61	2.49	2.90	15.07	3.49	62.08
Rare earth elements (ppm)							
La	154.03	131.76	110.64	112.66	159.97	84.27	174.14
Ce	336.81	286.43	235.72	239.51	334.24	174.91	333.76
Pr	40.90	35.11	28.05	28.61	38.81	19.98	35.28
Nd	208.45	179.67	141.96	143.85	188.68	98.05	161.13
Sm	40.98	35.62	28.36	28.61	36.72	18.14	28.02
Eu	4.70	4.67	6.40	5.62	3.85	4.10	2.39
Gd	38.16	33.95	26.09	27.47	34.68	17.85	27.85
Tb	4.67	4.21	3.27	3.44	4.18	2.09	3.19
Dy	27.08	25.23	19.63	20.25	24.24	11.73	18.84
Ho	5.27	4.95	3.81	3.97	4.70	2.24	3.97
Er	14.10	13.36	10.46	10.89	12.41	5.86	11.91
Tm	1.61	1.54	1.20	1.26	1.42	0.67	1.51
Yb	9.71	9.36	7.44	7.50	8.37	3.87	9.57
Lu	2.12	2.05	1.65	1.65	1.80	0.88	2.17

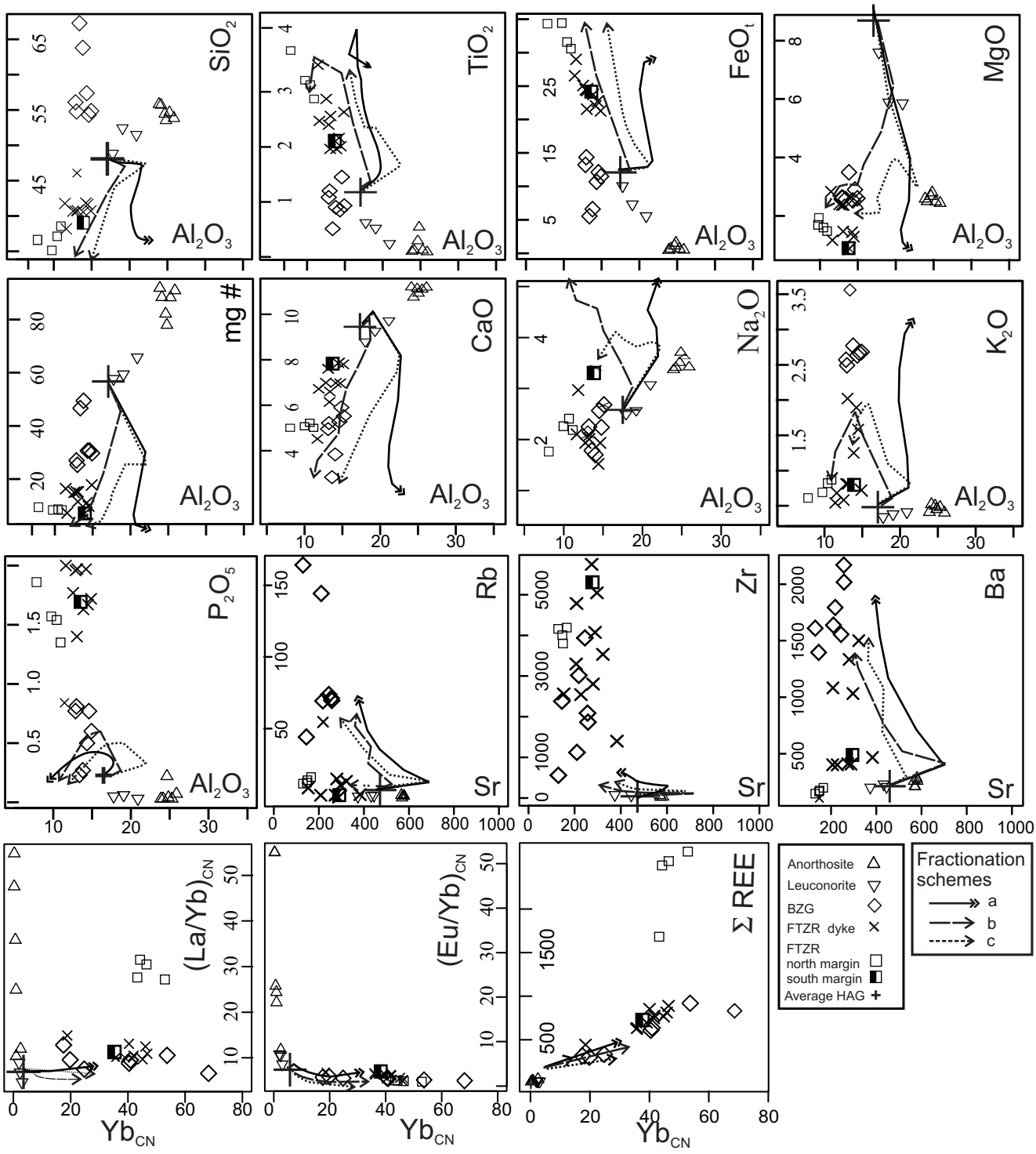
Data repository 1 (contd)

	PN-580	PN 588	PN590B	PN592	PN596	PN597	PN-598	PN-599
	FTZR-D	FTZR-D	FTZR-D	FTZR-C	FTZR-C	FTZR-C	FTZR-C	FTZR-C
Major Oxide (wt %)								
SiO_2	40.92	38.35	40.71	39.24	36.83	35.31	37.29	38.73
TiO_2	2.57	2.48	1.97	2.11	3.76	3.22	3.14	2.88
Al_2O_3	13.11	11.63	13.88	13.88	7.85	9.74	10.44	10.94
FeO^t	24.40	28.92	23.68	24.12	34.26	34.37	31.52	30.54
MnO	0.29	0.34	0.31	0.31	0.41	0.39	0.35	0.34
MgO	2.52	1.32	1.03	0.99	2.08	1.84	1.75	1.63
CaO	6.60	6.72	6.98	7.74	5.01	5.08	5.23	5.01
Na_2O	2.10	2.93	3.34	3.30	1.79	2.26	2.40	2.19
K_2O	0.86	0.73	1.30	0.84	0.66	0.74	0.87	0.92
P_2O_5	1.97	2.00	1.63	1.68	1.86	1.57	1.54	1.35
Total	**95.34**	**95.42**	**94.83**	**94.21**	**94.51**	**94.52**	**94.53**	**94.53**
Trace elements (ppm)								
Rb	3.28	4.75	11.70	4.30	12.72	13.36	15.12	17.34
Sr	288.03	273.60	296.55	300.32	129.32	146.52	149.30	165.52
Y	136.26	139.39	126.96	132.59	193.59	169.90	162.81	160.10
Zr	4056	5730	5029	5236	4142	3988	3783	4175
Nb	391.81	532.57	429.25	527.56	594.03	489.68	476.97	534.83
Ba	424.13	426.69	1049.36	487.27	163.63	182.52	190.34	215.07
Hf	4.63	3.06	2.99	2.19	4.68	4.61	4.90	3.87
Pb	9.29	11.28	17.28	53.77	21.70	26.80	22.58	23.09
Th	3.19	4.04	3.47	3.59	133.85	130.80	130.52	117.21
Rare earth elements (ppm)								
La	126.53	132.37	121.04	129.63	445.73	439.18	432.57	370.91
Ce	279.21	293.09	261.36	283.44	1481.97	1429.78	1403.15	708.00
Pr	34.25	35.84	31.75	33.89	92.43	87.26	85.81	75.78
Nd	176.17	182.28	162.08	172.67	415.74	391.23	381.95	341.84
Sm	34.50	36.18	31.86	34.00	70.58	63.86	62.92	58.27
Eu	6.31	5.93	6.71	6.52	2.96	3.01	3.22	3.42
Gd	32.56	34.32	30.41	32.92	67.73	61.78	60.94	55.43
Tb	3.99	4.10	3.78	3.90	7.07	6.34	6.15	5.78
Dy	23.20	23.67	22.13	22.39	35.23	30.87	29.82	29.15
Ho	4.54	4.57	4.25	4.29	6.41	5.65	5.46	5.35
Er	12.20	12.45	11.54	11.39	17.15	15.32	14.75	14.38
Tm	1.39	1.44	1.29	1.28	1.79	1.59	1.50	1.49
Yb	8.67	8.71	8.17	7.82	11.06	9.72	9.25	9.05
Lu	1.93	1.98	1.81	1.77	2.44	2.13	2.06	2.05

	PN-579C	PN-579D	PN-579G	PN-581B	PN590A	PN606	PN-581C	PN593A	PN593B
	An	An	An	An	An	An	Ln	Ln	Ln
Major Oxide (wt %)									
SiO_2	55.88	54.61	53.73	54.83	56.01	54.01	51.66	52.60	49.01
TiO_2	0.13	0.30	0.55	0.13	0.11	0.10	0.25	0.53	0.63
Al_2O_3	24.15	24.64	24.82	25.29	23.88	25.87	20.90	19.07	17.77
FeO^t	0.60	1.07	1.46	0.60	0.41	0.44	5.48	7.24	9.98
MnO	0.04	0.05	0.05	0.05	0.04	0.05	0.10	0.12	0.15
MgO	2.65	2.83	2.95	2.64	2.74	2.59	6.00	6.03	7.74
CaO	10.74	11.13	10.92	11.09	11.19	11.18	9.72	9.26	8.79
Na_2O	3.36	3.45	3.64	3.54	3.32	3.37	3.02	2.54	2.47
K_2O	0.57	0.55	0.50	0.53	0.46	0.45	0.46	0.43	0.39
P_2O_5	0.03	0.22	0.04	0.03	0.03	0.07	0.03	0.06	0.05
Total	**98.15**	**98.85**	**98.66**	**98.73**	**98.19**	**98.13**	**97.62**	**97.88**	**96.98**
Trace elements (ppm)									
Rb	4.55	5.04	4.14	4.48	3.29	4.42	4.13	3.89	3.42
Sr	582.38	566.21	579.34	578.01	569.48	572.45	445.01	432.29	373.52
Y	1.14	6.89	2.43	2.04	0.93	2.32	3.42	3.93	4.85
Zr	28.58				61.50	21.15	38.55		47.69
Nb	1.28	2.45	2.80	0.88	0.41	0.73	1.60	1.03	1.36
Ba	279.65	279.86	304.03	276.79	232.31	231.03	219.97	242.16	214.19
Hf	0.04	0.14	0.12	0.11	0.06	0.03	0.06	0.18	0.27
Pb	1.77	1.80	3.04	2.05	1.54	2.41	1.54	1.86	1.41
Th	0.09	1.02	0.11	0.15	0.05	0.15	0.05	0.12	0.10
Rare earth elements (ppm)									
La	6.02	9.39	3.21	7.19	4.52	7.67	5.51	4.96	4.38
Ce	10.34	19.45	11.66	12.54	7.78	13.19	10.08	9.07	7.97
Pr	1.12	2.39	1.30	1.38	0.84	1.58	1.11	1.01	0.93
Nd	3.79	9.41	4.56	4.66	2.90	5.80	3.75	3.83	3.37
Sm	0.79	1.96	0.94	0.93	0.62	1.02	0.85	0.88	0.81
Eu	1.36	1.47	1.36	1.43	1.18	1.13	1.02	1.16	1.04
Gd	0.56	1.92	0.75	0.74	0.46	0.90	0.72	0.73	0.77
Tb	0.06	0.30	0.11	0.10	0.05	0.12	0.11	0.12	0.14
Dy	0.24	1.37	0.49	0.44	0.19	0.48	0.54	0.66	0.75
Ho	0.04	0.25	0.09	0.07	0.03	0.08	0.13	0.15	0.17
Er	0.12	0.68	0.27	0.21	0.10	0.23	0.39	0.44	0.55
Tm	0.02	0.09	0.04	0.03	0.02	0.03	0.07	0.08	0.09
Yb	0.07	0.53	0.21	0.19	0.06	0.14	0.42	0.49	0.64
Lu	0.01	0.08	0.04	0.03	0.01	0.03	0.07	0.09	0.11

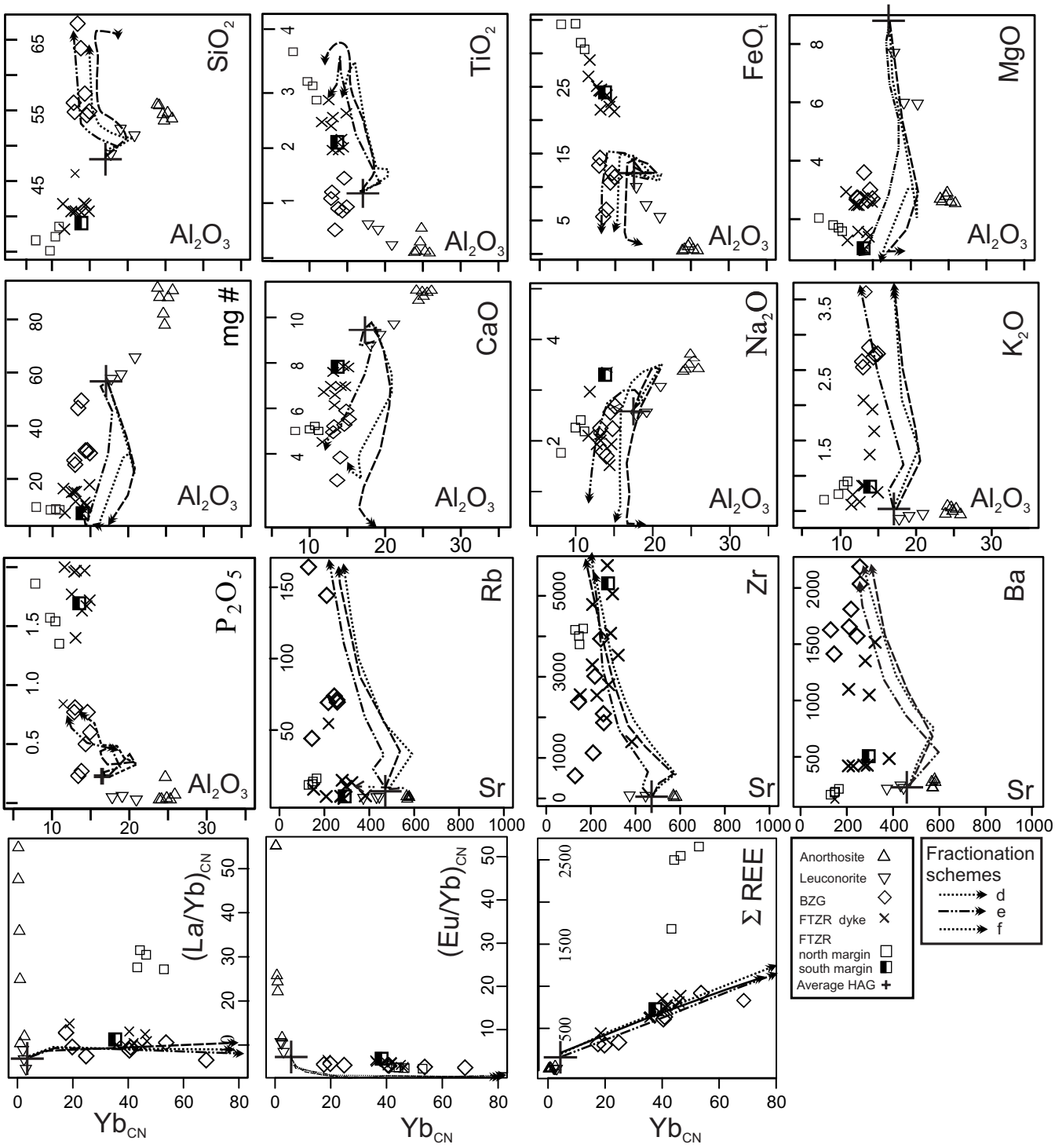
Data repository 1 (contd)

	PN 582	PN 583	PN 585	PN 594	PN 595	PN 600	PN 601
	BZG	BZG	BZG	BZG	BZG	BZG	BZG
Major Oxide (wt %)							
SiO_2	54.49	55.04	57.56	54.96	63.98	56.27	67.46
TiO_2	1.46	0.94	0.86	1.21	0.91	1.09	0.52
Al_2O_3	14.60	14.93	14.34	12.99	13.81	12.86	13.38
FeO^t	12.05	11.43	10.63	14.30	6.54	13.15	5.47
MnO	0.20	0.17	0.16	0.20	0.10	0.18	0.09
MgO	3.05	2.75	2.68	2.77	3.64	2.77	2.72
CaO	5.90	5.52	5.28	5.22	3.84	4.95	2.84
Na_2O	2.24	2.66	2.55	2.25	1.73	2.16	1.81
K_2O	2.72	2.73	2.68	2.54	2.82	2.62	3.61
P_2O_5	0.77	0.60	0.50	0.81	0.27	0.77	0.23
Total	**97.48**	**96.77**	**97.24**	**97.25**	**97.64**	**96.82**	**98.13**
Trace elements (ppm)							
Rb	74.95	72.37	70.80	70.50	145.53	45.32	165.35
Sr	244.17	255.98	257.46	217.64	210.20	144.55	129.44
Y	152.24	96.87	97.80	133.00	49.69	58.40	49.71
Zr	3919.32	2069	1849	2998	1105	2363	542.30
Nb	224.78	141.02	127.43	160.39	17.02	71.44	31.13
Ba	1572.02	2187	2036	1811	1655	1413	1628
Hf	2.25	1.64	1.76	1.66	2.17	0.79	1.57
Pb	8.53	19.20	18.92	45.08	32.44	67.67	31.84
Th	21.99	5.65	7.71	10.62	21.23	2.34	8.01
Rare earth elements (ppm)							
La	139.46	110.66	120.43	175.51	69.53	57.81	58.75
Ce	323.63	246.28	262.66	384.59	136.13	132.92	122.37
Pr	39.89	29.34	30.48	44.35	13.97	15.92	13.95
Nd	176.61	130.15	131.59	189.58	55.02	72.13	60.34
Sm	35.25	23.85	23.70	33.33	9.84	14.02	11.52
Eu	4.89	4.73	4.46	4.55	2.23	2.84	2.78
Gd	30.16	21.62	21.25	30.08	9.41	12.23	10.13
Tb	4.76	3.26	3.22	4.50	1.45	1.88	1.58
Dy	29.75	19.20	19.21	25.92	9.28	11.42	9.36
Ho	3.32	2.09	2.10	2.83	1.01	1.28	1.04
Er	11.24	7.00	7.16	9.76	3.27	4.19	3.52
Tm	1.33	0.82	0.83	1.10	0.38	0.50	0.42
Yb	14.24	8.46	8.55	11.22	3.66	5.18	4.14
Lu	2.43	1.47	1.47	1.93	0.58	0.89	0.71



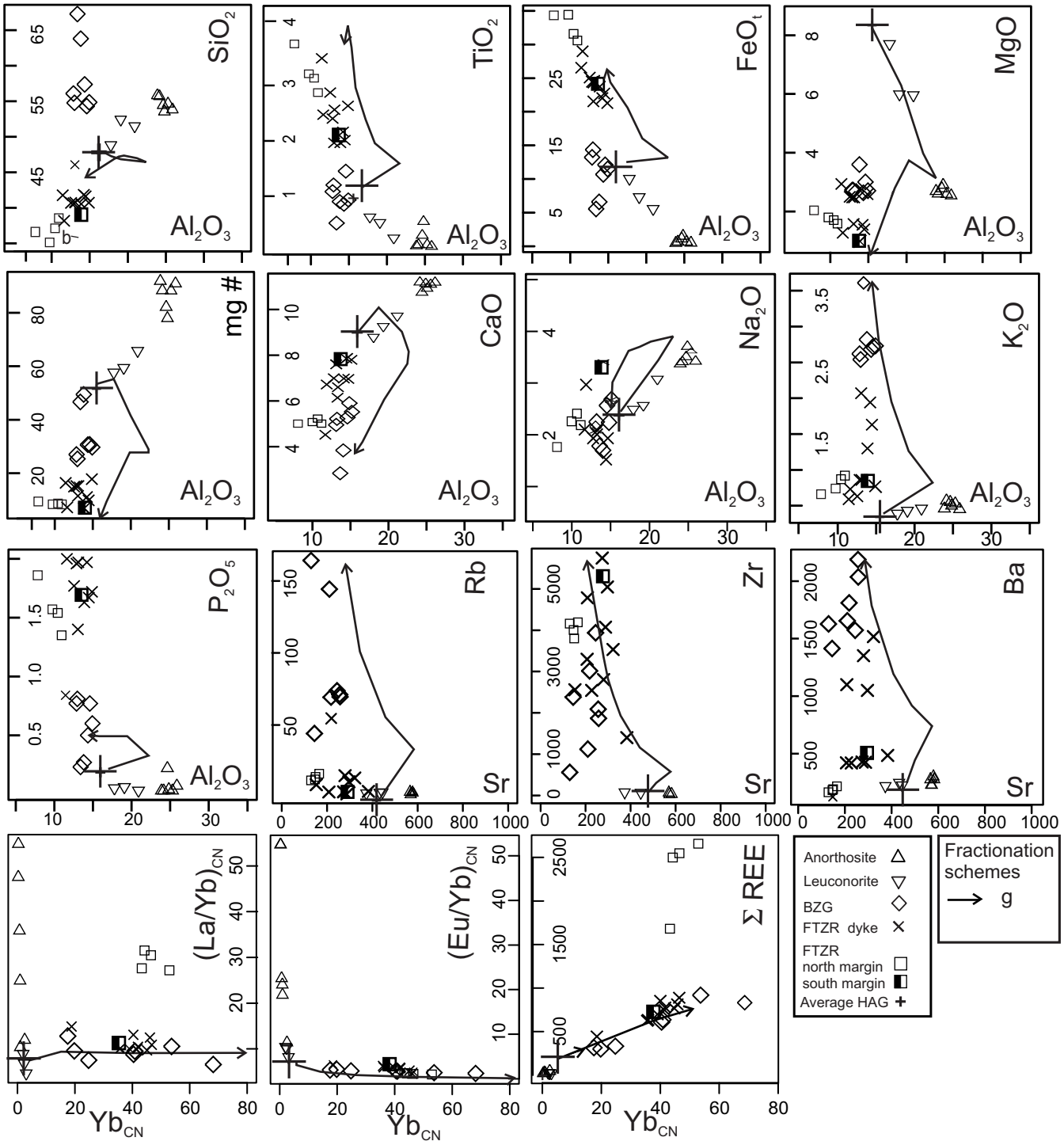
Average HAG (computed from the dataset of Mitchell et al, 1995)																					
Major element oxide (wt %)										Trace element (ppm)				Rare earth element (ppm)							
SiO_2	TiO_2	Al_2O_3	FeO_t	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Rb	Sr	Zr	Ba	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Yb	Lu
48.21	1.15	17.00	12.16	0.15	8.76	9.37	2.55	0.50	0.21	7.96	474.51	42.90	303.28	7.80	16.80	10.03	2.31	1.25	2.23	1.75	0.88	0.82	0.11

Data repository 2a



Average HAG (computed from the dataset of Mitchell et al, 1995)																					
Major element oxide (wt %)										Trace element (ppm)				Rare earth element (ppm)							
SiO_2	TiO_2	Al_2O_3	FeO_t	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Rb	Sr	Zr	Ba	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Yb	Lu
48.21	1.15	17.00	12.16	0.15	8.76	9.37	2.55	0.50	0.21	7.96	474.51	42.90	303.28	7.80	16.80	10.03	2.31	1.25	2.23	1.75	0.88	0.82	0.11

Data repository 2b



d

e

Average HAG (computed from the dataset of Mitchell et al, 1995)																					
Major element oxide (wt %)										Trace element (ppm)				Rare earth element (ppm)							
SiO_2	TiO_2	Al_2O_3	FeO_t	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Rb	Sr	Zr	Ba	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Yb	Lu
48.21	1.15	17.00	12.16	0.15	8.76	9.37	2.55	0.50	0.21	7.96	474.51	42.90	303.28	7.80	16.80	10.03	2.31	1.25	2.23	1.75	0.88	0.82	0.11

Data repository 2c