Appendix E –Examples of NTD calculated fractional crystallization modes.

Parent magma (P)   **G93-2**

Coef	%Solid	Min/Magma
0.07	39.4	OL
0.107	60.6	CPX
0.821		Daughter(D) **10-GEL-20**

	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	NiO	Cr2O3
Daughter	42.17	4	14.28	15.81	0.2	6.45	12.14	3.28	0.97	0.7	0	0
Obs	43.97	3.26	12.4	15.19	0.22	9.21	11.31	2.67	1.06	0.72	0	0
Calc	42.6	3.45	12.04	16.09	0.25	9.12	12.12	2.79	0.8	0.57	0.02	0.02
Diff*Wt	0.55	0.19	0.18	0.9	0.04	0.1	0.81	0.13	0.26	0.14	0.02	0.02

$S^2 = 1.959$

	D	Obs(P)	Calc(P)	Diff	10-GEL-20(D)
RB	0	24.8	8.04	16.8	9.79
SR	0.07	1100	971.9	128	1168
Y	0.26	27.7	28.6	0.86	33.1
ZR	0.08	161.5	126.6	34.9	151.8
NB	0	51.4	49.7	1.64	60.5
BA	0	484	325.7	158.3	396.6
LA	0.03	36.4	38.8	2.47	47
CE	0.05	94	68.4	25.6	82.4
PR	0.09	0	7.86	7.86	9.4
ND	0.12	50.3	35.5	14.8	42.2
SM	0.19	0	7.62	7.62	8.93
EU	0.19	0	2.28	2.28	2.67
GD	0.18	0	6.01	6.01	7.06
TB	0.27	0	0.94	0.94	1.09
DY	0.2	0	4.94	4.94	5.79
HO	0.28	0	0.95	0.95	1.1
ER	0.18	0	2.28	2.28	2.68
YB	0.24	0	1.81	1.81	2.11
LU	0.24	0	0.24	0.24	0.27
HF	0.16	0	3.65	3.65	4.31
TA	0.01	0	2.78	2.78	3.38
PB	0.01	4.41	2	2.41	2.43
TH	0	7.65	4.02	3.62	4.9
U	0	0	0.64	0.64	0.78

Parent magma (P)　　**MD93-7**

Coef	%Solid	Min/Magma
0.069	26.2	OL
0.193	73.8	CPX
0.737		Daughter(D) **MR226**

	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	NiO	Cr2O3
Daughter	47.52	3.43	12.62	14.88	0.17	7.32	9.68	2.82	1.01	0.55	0	0
Obs	47.9	2.33	10.91	13.98	0.22	10.73	10.49	2.29	0.85	0.31	0	0
Calc	47.23	2.83	9.87	14.97	0.25	10.32	10.98	2.26	0.74	0.4	0.02	0.03
Diff*Wt	0.27	0.5	0.52	1	0.03	0.41	0.49	0.03	0.1	0.09	0.02	0.03

$S^2 =$ 2.01

	D	Obs(P)	Calc(P)	Diff	MR226(D)
RB	0	18.7	16.3	2.43	22.1
SR	0.08	436.6	505.4	68.76	669.3
Y	0.31	19.7	28.1	8.41	34.6
ZR	0.1	158.3	163.7	5.39	215.7
NB	0	36.4	30.7	5.73	41.6
BA	0	310.7	273.9	36.9	371.6
LA	0.04	24.6	37.8	13.2	50.7
CE	0.07	65.9	61	4.84	81.2
PR	0.11	0	9.11	9.11	12
ND	0.15	37.4	38.4	1.01	49.8
SM	0.24	0	7.67	7.67	9.68
EU	0.23	0	2.49	2.49	3.15
GD	0.22	0	7.93	7.93	10.1
TB	0.33	0	1.03	1.03	1.26
DY	0.24	0	4.98	4.98	6.28
HO	0.33	0	0.94	0.94	1.15
ER	0.21	0	2.23	2.23	2.83
YB	0.28	0	2	2	2.49
LU	0.28	0	0.27	0.27	0.33
HF	0.2	0	4.16	4.16	5.31
TA	0.01	0	1.98	1.98	2.68
PB	0.01	4.92	2.45	2.47	3.31
TH	0.01	5.9	11.1	5.19	15
U	0	0	0.62	0.62	0.84

Parent magma (P)　　**BD333**

Coef	%Solid	Min/Magma
0.155	42.6	OL
0.208	57.4	CPX
0.635		Daughter(D) **10-KTM-02**

	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	NiO	Cr2O3
Daughter	51.22	3.28	14.33	14.14	0.16	3.39	7.47	3.9	1.52	0.6	0	0
Obs	47.36	2.74	11.36	14.53	0.17	10.75	8.68	2.84	1.02	0.54	0	0
Calc	48.68	2.4	9.72	15.54	0.29	10.21	8.92	2.67	0.97	0.38	0.03	0.03
Diff*Wt	0.52	0.33	0.82	1	0.13	0.55	0.24	0.18	0.05	0.16	0.03	0.03

S^2 = 2.502

	D	Obs(P)	Calc(P)	Diff	10-KTM-02(D)
RB	0	22.6	18.7	3.86	29.4
SR	0.06	638.6	422.7	216	646.8
Y	0.24	24.5	35.4	10.86	49.9
ZR	0.08	194.2	249	54.77	378.9
NB	0	44.1	33.2	11	52.2
BA	0	467.9	327.7	140.3	515.8
LA	0.03	44.1	37	7.18	57.4
CE	0.05	124.6	67.9	56.7	104.4
PR	0.09	0	9.09	9.09	13.8
ND	0.12	47.1	39.1	8.04	58.3
SM	0.18	0	8.8	8.8	12.7
EU	0.18	0	2.49	2.49	3.61
GD	0.17	0	8.4	8.4	12.2
TB	0.26	0	1.22	1.22	1.71
DY	0.19	0	6.29	6.29	9.09
HO	0.26	0	1.25	1.25	1.75
ER	0.17	0	2.96	2.96	4.32
YB	0.23	0	2.39	2.39	3.39
LU	0.23	0	0.32	0.32	0.46
HF	0.16	0	6.55	6.55	9.61
TA	0.01	0	2.27	2.27	3.56
PB	0.01	4.91	2.82	2.08	4.44
TH	0	3.92	4.26	0.34	6.69
U	0	0	0.88	0.88	1.38

Parent magma (P)   **10-BRK-06**

Coef	%Solid	Min/Magma
0.022	5.8	OL
0.328	85.5	CPX
0.033	8.7	MT
0.616		Daughter(D) **10-BRK-16**

	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	NiO	Cr2O3
Daughter	48.89	3.74	14.62	14.57	0.17	4.28	7.74	3.8	1.54	0.65	0	0
Obs	46.38	3.31	11.31	15.43	0.19	8	11.44	2.48	0.93	0.54	0	0
Calc	47.36	3.39	10.09	15.48	0.28	7.88	11.28	2.64	0.95	0.4	0	0
Diff*Wt	0.39	0.08	0.61	0.05	0.09	0.12	0.16	0.17	0.02	0.14	0	0
S^2 =	0.63											

	D	Obs(P)	Calc(P)	Diff	10-BRK-16(D)
RB	0	20.7	17.1	3.64	27.7
SR	0.09	612	554.5	57.4	860.4
Y	0.36	31	25.2	5.82	34.3
ZR	0.2	236.7	214.1	22.6	315.9
NB	0	53.3	35.7	17.5	57.9
CS	0	0.1	0.12	0.02	0.2
BA	0	378.2	658.3	280.2	1068
LA	0.04	45.2	31.7	13.5	50.4
CE	0.08	91	68.7	22.2	107.5
PR	0.13	11.5	9.1	2.4	13.9
ND	0.17	46.4	37	9.34	55.3
SM	0.28	9.33	7.62	1.72	10.8
EU	0.27	2.95	2.48	0.46	3.54
GD	0.26	8.94	7.07	1.87	10.1
TB	0.38	1.28	1.02	0.26	1.38
DY	0.28	6.88	5.21	1.66	7.38
HO	0.39	1.08	0.95	0.13	1.28
ER	0.25	2.85	2.26	0.59	3.25
YB	0.31	2.26	1.9	0.36	2.66
LU	0.32	0.29	0.28	0.01	0.39
HF	0.24	5.9	5.04	0.86	7.28
TA	0.1	3.34	2.16	1.18	3.34
PB	0.02	3.05	3.24	0.19	5.21
TH	0.01	5.21	3.91	1.3	6.3
U	0.01	0.98	0.79	0.19	1.28

Parent magma (P)   **MR226**

Coef   %Solid Min/Magma
0.274   52.2   CPX
0.057   10.9   MT
0.194   36.9   AMPH
0.475   Daughter(D) **-MON-01**

	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	NiO	Cr2O3
Daughter	53.7	2.57	17.21	10.85	0.17	2.12	4.41	4.48	3.98	0.5	0	0
Obs	47.52	3.43	12.62	14.88	0.17	7.32	9.68	2.82	1.01	0.55	0	0
Calc	47.09	3.79	11.46	14.71	0.32	7.22	9.79	2.94	2.11	0.24	0.02	0.36
Diff*Wt	0.17	0.35	0.58	0.16	0.15	0.1	0.11	0.11	1.1	0.31	0.02	0.36

S^2 = 2.014

	D	Obs(P)	Calc(P)	Diff	10-MON-01(D)
RB	0.07	22.1	57.9	35.88	116
SR	0.17	669.3	688.9	19.69	1280
Y	0.23	34.6	16.3	18.4	28.9
ZR	0.26	215.7	247.6	31.83	430.1
NB	0.05	41.6	88.3	46.76	178.7
CS	0.01	0	0.35	0.35	0.73
BA	0.08	371.6	665.9	294.2	1317
LA	0.06	50.7	67.3	16.63	135.1
CE	0.1	81.2	107.3	26.06	209.7
PR	0.15	12	13.7	1.7	25.6
ND	0.21	49.8	48.5	1.32	87.1
SM	0.35	9.68	7.83	1.85	12.7
EU	0.35	3.15	2.26	0.89	3.66
GD	0.34	10.1	6.32	3.74	10.3
TB	0.43	1.26	0.8	0.47	1.22
DY	0.37	6.28	3.93	2.35	6.28
HO	0.44	1.15	0.72	0.43	1.09
ER	0.32	2.83	1.69	1.14	2.8
YB	0.32	2.49	1.4	1.09	2.32
LU	0.34	0.33	0.2	0.13	0.33
HF	0.31	5.31	6.27	0.96	10.5
TA	0.17	2.68	5.37	2.69	9.93
PB	0.04	3.31	8.97	5.66	18.4
TH	0.02	15	14.6	0.39	30.5
U	0.02	0.84	0.38	0.46	0.8

Parent magma (P)   **10-GEL-20**

Coef	%Solidin/Magma	
0.216	24.3	CPX
0.136	15.3	MT
0.271	30.5	PLAG
0.245	27.6	AMPH
0.021	2.3	APAT
0.111	Daughter(D)	**10-GEL-11**

	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	NiO	Cr2O3
Daughter	59.05	0.46	20.32	5.21	0.13	0.42	1.45	7.95	4.96	0.06	0	0
Obs	42.17	4	14.28	15.81	0.2	6.45	12.14	3.28	0.97	0.7	0	0
Calc	42.31	4.25	13.97	15.68	0.34	6.37	12.13	3.21	0.97	0.01	0.01	0.76
Diff*Wt	0.05	0.25	0.16	0.13	0.15	0.08	0.01	0.07	0	0.69	0.01	0.76
S²=	1.184											

	D	Obs(P)	Calc(P)	Diff	10-GEL-11(D)
RB	0.09	9.79	16.9	7.12	124.2
SR	0.64	1168	100.7	1068	222.5
Y	0.14	33.1	6.48	26.6	43
ZR	0.29	151.8	140.6	11.2	664.5
NB	0.07	60.5	28.2	32.3	218.9
BA	0.15	396.6	109.2	287.4	703.3
LA	0.26	47	19	28	95.8
CE	0.34	82.4	35.9	46.6	153.7
PR	0.4	9.4	4.11	5.29	15.3
ND	0.48	42.2	15.5	26.7	48.6
SM	0.57	8.93	3.09	5.84	7.94
EU	0.6	2.67	0.75	1.93	1.82
GD	0.61	7.06	4.4	2.66	10.4
TB	0.63	1.09	1.07	0.01	2.4
DY	0.58	5.79	3.29	2.49	8.33
HO	0.59	1.1	0.59	0.51	1.44
ER	0.46	2.68	1.17	1.51	3.88
YB	0.4	2.11	1.07	1.04	3.97
LU	0.3	0.27	0.12	0.15	0.58
HF	0.23	4.31	2.68	1.63	14.6
TA	0.23	3.38	2.27	1.11	12.2
PB	0.85	2.43	13.4	10.98	18.8
TH	0.14	4.9	3.5	1.4	23.1
U	0.16	0.78	0.25	0.53	1.59