

Appendix 4. Least-Squares mixing models.

A4.1 Introduction.

This appendix contains the results of the application of the least-squares mixing model of Bryan, Finger and Chayes (1968) to the Blanco Trough glass compositions obtained on the microprobe at R.P.I. Three primitive samples (VG-345, VG-348, VG-373) were chosen as possible parental compositions, and two evolved samples (VG-360, VG-384) as possible derivative compositions. Olivine, chromian spinel and plagioclase compositions used are the averages for a given sample, and are listed in Tables VI, IX and XI. The clinopyroxene composition used is an average taken from the compositions reported in Table 3 of Bryan et al. (1981).

The first two models are the best fit achieved exclusive of clinopyroxene. Both of these were found using VG-345 as the parent. Models 3 and 4 are the results of adding clinopyroxene to the first two models. The last two models are the best fits achieved for the other two parental compositions exclusive of clinopyroxene.

A4.2 Results.Model 1:

Parent: VG-345

Estimated weight percent of components:

VG-384	69.88
Ol-360	9.44
Sp-373	-1.69
Pl-373	21.72

	<u>Observed</u>	<u>Calculated</u>	<u>Residual</u>
SiO ₂	49.25	49.42	-0.18
TiO ₂	1.58	1.51	0.07
Al ₂ O ₃	16.13	16.21	-0.08
Fe ₂ O ₃	0.95	0.95	0.00
FeO	8.66	8.47	0.19
MnO	0.19	0.16	0.03
MgO	8.66	8.58	0.08
CaO	11.67	10.94	0.72
Na ₂ O	2.81	2.86	-0.05
K ₂ O	0.12	0.26	-0.14
Total	100.02	99.36	
ΣR^2	0.6287		

Model 2:

Parent: VG-345

Estimated weight percent of components:

VG-360	63.98
Ol-360	11.02
Sp-373	-2.40
Pl-373	26.46

	<u>Observed</u>	<u>Calculated</u>	<u>Residual</u>
SiO ₂	49.25	49.48	-0.24
TiO ₂	1.58	1.67	-0.09
Al ₂ O ₃	16.13	16.24	-0.12
Fe ₂ O ₃	0.95	0.95	0.00
FeO	8.66	8.33	0.33
MnO	0.19	0.17	0.02
MgO	8.66	8.58	0.08
CaO	11.67	10.73	0.94
Na ₂ O	2.81	2.63	0.18
K ₂ O	0.12	0.28	-0.16
Total	100.02	99.06	
ΣR^2	1.1357		

Model 3:

Parent: VG-345

Estimated weight percent of components:

VG-384	70.41
Ol-360	4.98
Sp-373	0.81
Pl-373	15.73
Clinopyroxene	8.20

	<u>Observed</u>	<u>Calculated</u>	<u>Residual</u>
SiO ₂	49.25	49.26	-0.02
TiO ₂	1.58	1.60	-0.02
Al ₂ O ₃	16.13	16.12	0.00
Fe ₂ O ₃	0.95	1.10	-0.15
FeO	8.66	8.60	0.06
MnO	0.19	0.16	0.03
MgO	8.66	8.67	-0.01
CaO	11.67	11.63	0.04
Na ₂ O	2.81	2.73	0.08
K ₂ O	0.12	0.26	-0.14
Total	100.02	100.13	
ΣR^2	0.0556		

Model 4:

Parent: VG-345

Estimated weight percent of components:

VG-360	64.96
Ol-360	5.38
Sp-373	0.73
Pl-373	18.82
Clinopyroxene	10.15

	<u>Observed</u>	<u>Calculated</u>	<u>Residual</u>
SiO ₂	49.25	49.29	-0.05
TiO ₂	1.58	1.79	-0.21
Al ₂ O ₃	16.13	16.14	-0.01
Fe ₂ O ₃	0.95	1.15	-0.20
FeO	8.66	8.51	0.15
MnO	0.19	0.18	0.01
MgO	8.66	8.68	-0.02
CaO	11.67	11.57	0.10
Na ₂ O	2.81	2.47	0.34
K ₂ O	0.12	0.28	-0.16
Total	100.02	100.06	
ΣR^2	0.2607		

Model 5:

Parent: VG-348

Estimated weight percent of components:

VG-384	70.32
Ol-360	8.98
Sp-373	1.90
Pl-373	18.91

	<u>Observed</u>	<u>Calculated</u>	<u>Residual</u>
SiO ₂	47.85	48.07	-0.22
TiO ₂	0.91	1.53	-0.62
Al ₂ O ₃	17.32	17.43	-0.10
Fe ₂ O ₃	0.88	1.16	-0.29
FeO	9.51	8.96	0.56
MnO	0.22	0.16	0.06
MgO	9.17	9.20	-0.03
CaO	11.46	10.55	0.91
Na ₂ O	2.59	2.79	-0.20
K ₂ O	0.09	0.26	-0.17
Total	100.00	100.11	
ΣR^2	1.7520		

Model 6:

Parent: VG-373

Estimated weight percent of components:

VG-384	71.23
Ol-360	8.78
Sp-373	1.78
Pl-373	18.67

	<u>Observed</u>	<u>Calculated</u>	<u>Residual</u>
SiO ₂	48.11	48.33	-0.22
TiO ₂	0.79	1.55	-0.76
Al ₂ O ₃	17.32	17.42	-0.10
Fe ₂ O ₃	0.75	1.17	-0.42
FeO	9.65	8.99	0.66
MnO	0.17	0.16	0.01
MgO	9.09	9.16	-0.07
CaO	11.53	10.61	0.93
Na ₂ O	2.52	2.81	-0.29
K ₂ O	0.07	0.26	-0.19
Total	100.00	100.46	
ΣR^2	2.2284		