

**Appendix 4b - Compositional averages and AX data used for average P-T calculations**

<i>Mineral Compositions (averages from probe data)</i>										<b>CZRL19</b>	
<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>	<i>Activities (AX file for THERMOCALC)</i>	
										<i>Endmember</i>	<i>Activity</i>
bi	CZRL19									phl	0.0142
34.10	18.70	6.61	23.62	0.17	9.24	3.91	0.00	0.04	0.13	ann	0.091
g	CZRL19									east	0.019
36.56	21.38	2.45	37.55	0.00	0.00	0.00	0.64	0.00	1.88	py	0.00133
cd	CZRL19									gr	0.0000089
47.29	33.21	6.77	10.79	0.23	0.00	0.00	0.00	0.00	0.41	alm	0.56
fsp	CZRL19pl									crd	0.29
67.41	20.13	0.00	0.00	11.31	0.12	0.00	0.25	0.00	0.00	fcrd	0.24
fsp	CZRL19ksp									an	0.017
63.62	19.33	0.00	0.00	2.19	13.36	0.00	0.05	0.00	0.00	ab	0.98
										san	0.82
										ab	0.55
										q	
										H2O	0.5
										sill	

<i>Mineral Compositions (averages from probe data)</i>										<b>CZRL20</b>	
<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>	<i>Activities (AX file for THERMOCALC)</i>	
										<i>Endmember</i>	<i>Activity</i>
bi	CZRL20									phl	0.01
34.05	19.10	6.20	23.66	0.18	8.96	3.71	0.01	0.06	0.03	ann	0.09
g	CZRL20									east	0.02
36.48	21.52	2.60	37.28	0.00	0.00	0.00	0.65	0.00	1.79	py	0.00
										gr	0.00
										alm	0.54
										q	
										H2O	0.50
										sill	
										crd	0.29
										fcrd	0.24
										an	0.02
										ab	0.98
										san	0.82
										ab	0.55

Note - these activities are estimates from CZRL19

**LCZ11-1b**

*Mineral Compositions (averages from probe data)*

	<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>
bi	34.52	17.43	8.86	20.96	0.13	9.3	4.81	0.01	0.03	0.13
g	37.05	21.82	4.5	32.12	0	0	0	1.27	0	3.57
cd	47.76	33.53	8.27	8.45	0.09	0	0	0	0	0.29
sp	56.8	0	3.49	35.1	0	0	0	0	0	0.49

*Activities (AX file for THERMOCALC)*

<i>Endmember</i>	<i>Activity</i>
phl	0.027
ann	0.065
east	0.025
py	0.0079
gr	0.000086
alm	0.32
crd	0.41
fcrd	0.15
mt	0.86
q	
H2O	0.5
ilm	
san	0.8
an	0.5
ab	0.5

*Note - these activities are estimates*

**LG003**

*Mineral Compositions (averages from probe data)*

	<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>
bi	34.45	18.27	9.26	20.43	0.18	9.01	3.50	0.04	0.07	0.06
g	36.89	21.84	4.49	34.68	0.00	0.00	0.00	0.70	0.00	1.77
cd	47.62	33.50	8.11	8.95	0.20	0.00	0.00	0.00	0.00	0.15

*Activities (AX file for THERMOCALC)*

<i>Endmember</i>	<i>Activity</i>
phl	0.034
ann	0.059
east	0.034
py	0.0076
gr	0.0000146
alm	0.4
crd	0.4
fcrd	0.16
q	
H2O	0.5
mt	
ilm	
ru	
san	0.8
an	0.5
ab	0.5

*Note - these activities are estimates*

**LID004***Mineral Compositions (averages from probe data)*

<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>
bi	LID004								
36.54	16.18	12.57	17.75	0.18	8.99	3.51	0.01	0.05	0.08
g	LID004								
37.54	22.08	5.30	30.59	0.00	0.00	0.00	2.11	0.00	3.04
fsp	LID004								
55.00	28.76	0.00	0.00	5.73	0.05	0.00	10.14	0.00	0.00
opx	LID004								
49.30	1.30	13.80	25.12	0.14	0.06	0.05	0.27	0.02	0.90
amph	LID004								
36.47	33.04	5.90	8.05	1.55	0.07	0.74	2.02	0.00	0.01

\*

*Activities (AX file for THERMOCALC)*

<i>Endmember</i>	<i>Activity</i>
phl	0.076
ann	0.04
east	0.036
py	0.01
gr	0.00042
alm	0.26
ann	0.66
ab	0.52
san	0.8
en	0.19
fs	0.2
mgts	0.03
q	
H2O	0.50

Note - activity  
for san is an  
estimate

**LID039***Mineral Compositions (averages from probe data)*

<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>
bi	LID039								
37.06	17.10	13.64	15.97	0.18	8.87	3.09	0.04	0.04	0.12
g	LID039								
37.75	22.09	5.58	28.73	0.00	0.00	0.00	2.69	0.00	3.69
fsp	LID039								
57.51	26.68	0.00	0.00	6.90	0.14	0.00	8.49	0.00	0.00
opx	LID039								
50.36	1.45	15.29	29.05	0.03	0.03	0.06	0.32	0.00	1.35

*Activities (AX file for THERMOCALC)*

<i>Endmember</i>	<i>Activity</i>
phl	0.094
ann	0.025
east	0.052
py	0.015
gr	0.00089
alm	0.24
ann	0.54
ab	0.6
san	0.8
en	0.21
fs	0.24
mgts	0.025
q	
H2O	0.5

Note - activity  
for san is an  
estimate

**LID042***Mineral Compositions (averages from probe data)*

<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>
bi	LID042								
35.39	18.51	9.25	20.21	0.19	9.23	3.93	0.01	0.04	0.05
g	LID042								
37.51	21.55	4.21	34.88	0.00	0.00	0.00	0.83	0.00	1.38
cd	LID042								
48.27	33.85	7.87	9.19	0.17	0.00	0.00	0.00	0.00	0.13

*Activities (AX file for THERMOCALC)*

<i>Endmember</i>	<i>Activity</i>
phl	0.03
ann	0.06
east	0.03
py	0.01
gr	0.00
alm	0.46
crd	0.38
fcrd	0.18
q	
H2O	0.50
ilm	
mt	
san	0.80
an	0.50
ab	0.50

Note - these activities are estimates

**LKR012***Mineral Compositions (averages from probe data)*

<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>
bi	LKR012								
36.09	17.82	11.85	17.52	0.11	9.37	3.93	0.01	0.08	0.03
g	LKR012								
37.41	22.20	6.41	32.68	0.00	0.00	0.00	0.79	0.00	0.75
fsp	LKR012ksp								
63.49	19.34	0.00	0.00	1.81	13.83	0.00	0.07	0.00	0.00
fsp	LKR012pl								
61.90	23.96	0.00	0.00	8.84	0.27	0.00	4.41	0.00	0.00

*Activities (AX file for THERMOCALC)*

<i>Endmember</i>	<i>Activity</i>
phl	0.062
ann	0.035
east	0.046
py	0.021
gr	0.000026
alm	0.32
san	0.84
ab	0.47
an	0.3
ab	0.78
q	
H2O	0.5
mt	
ilm	
crd	0.4
fcrd	0.15

Note - these activities are estimates

**LKR013***Mineral Compositions (averages from probe data)*

<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>
bi	LKR013								
35.17	17.85	11.33	18.01	0.21	8.35	5.53	0.04	0.06	0.06
g	LKR013								
37.39	21.97	5.61	32.59	0.00	0.00	0.00	1.01	0.00	1.64

*Activities (AX file for THERMOCALC)*

<i>Endmember</i>	<i>Activity</i>
phl	0.045
ann	0.033
east	0.037
py	0.014
gr	0.00005
alm	0.33
q	
H2O	0.5
an	0.5
ab	0.5
san	0.8
crd	0.4
fcrd	0.2

Note - these activities are estimates

**LHA006***Mineral Compositions (averages from probe data)*

<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>
bi	LHA006								
35.59	17.49	10.72	19.00	0.17	9.33	4.26	0.01	0.04	0.29
g	LHA006								
37.53	21.53	4.17	27.43	0.00	0.00	0.00	0.59	0.00	8.80
cd	LHA006								
48.18	34.41	9.36	6.49	0.18	0.00	0.00	0.00	0.00	0.57
fsp	LHA006								
63.70	23.12	0.00	0.00	9.81	0.25	0.00	3.08	0.00	0.00
sp	LHA006								
58.16	0.00	4.96	34.00	0.00	0.00	0.00	0.00	0.00	1.17

*Activities (AX file for THERMOCALC)*

<i>Endmember</i>	<i>Activity</i>
phl	0.046
ann	0.047
east	0.035
py	0.0057
gr	0.0000086
alm	0.23
crd	0.57
fcrd	0.065
an	0.21
ab	0.84
san	0.8
mt	0.81
q	
H2O	0.5
sill	

Note - activity for san is an estimate

**LHA008**

*Mineral Compositions (averages from probe data)*

	<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>
bi		LHA008								
	37.89	13.61	12.98	17.57	0.09	9.32	4.41	0.01	0.05	0.03
fsp		LHA008								
	50.42	32.26	0.00	0.00	3.56	0.12	0.00	13.79	0.00	0.00
fsp		LHA008								
	58.85	26.40	0.00	0.00	7.11	0.78	0.00	7.07	0.00	0.00
fsp		LHA008								
	63.77	18.87	0.00	0.00	1.05	14.82	0.00	0.15	0.00	0.00
sp		LHA008								
	57.51	0.00	4.35	37.44	0.00	0.00	0.00	0.00	0.00	0.32
cd		LHA006								
	48.18	34.41	9.36	6.49	0.18	0.00	0.00	0.00	0.00	0.57
*										

*Activities (AX file for THERMOCALC)*

<i>Endmember</i>	<i>Activity</i>
phl	0.087
ann	0.042
east	0.011
an	0.6
ab	0.51
san	0.9
mt	0.83
crd	0.57
fcrd	0.065
q	
H2O	
py	0.0057
gr	0.0000086
alm	0.23

Note - these activities are estimates from LHA006

**LHA009**

*Mineral Compositions (averages from probe data)*

	<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>MgO</i>	<i>FeO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>TiO<sub>2</sub></i>	<i>CaO</i>	<i>Cr<sub>2</sub>O<sub>3</sub></i>	<i>MnO</i>
bi		LHA009								
	35.16	18.33	7.80	21.97	0.13	9.20	4.13	0.00	0.08	0.05
cd		LHA009								
	47.43	33.40	7.74	9.45	0.21	0.00	0.00	0.00	0.00	0.13
fsp		LHA009ksp								
	64.71	19.04	0.00	0.00	1.99	13.71	0.00	0.03	0.00	0.00
fsp		LHA009ksp2								
	67.38	20.13	0.00	0.00	9.75	3.11	0.00	0.52	0.00	0.00
fsp		LHA009pl								
	65.81	19.40	0.00	0.00	3.91	11.24	0.00	0.04	0.00	0.00
sp		LHA009								
	55.12	0.00	3.07	35.45	0.00	0.00	0.00	0.00	0.00	0.15

*Activities (AX file for THERMOCALC)*

<i>Endmember</i>	<i>Activity</i>
phl	0.0209
ann	0.072
east	0.023
crd	0.43
fcrd	0.14
san	0.83
ab	0.51
san	0.6
ab	0.89
san	0.73
ab	0.77
mt	0.87
q	
H2O	0.5
sill	
py	0.0057
gr	0.0000086
alm	0.23

Note - these activities are estimates from LHA006