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Title of article Granulites at Winding Stair Gap, North Carolina The thermal axis of Paleozoic metamorphism in the southern Appalachians

Author(s) B. Steven Absher and Harry Y. McSween, Jr.

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TABLE A-1. REPRESENTATIVE MICROPROBE ANALYSES OF GRT

	Bt-Grt granulite FG-2		Bt-Hbl granulite Q-54	
	core[3*]	rim[3]	core[3]	rim[3]
SiO_2	38.37(7)	37.5(2)	35.7(4)	36.5(6)
TiO_2	.05(1)	.05(1)	.7(1)	.6(2)
Al_2O_3	21.89(4)	21.88(5)	21.8(2)	21.8(1)
FeO	25.9(2)	27.0(3)	30.2(4)	31.3(3)
MnO	2.21(5)	1.84(4)	1.93(5)	2.01(8)
MgO	5.89(2)	5.50(6)	7.2(1)	6.7(1)
CaO	6.06(4)	6.13(8)	2.84(4)	2.91(2)
Total	100.37	99.90	99.74	101.28
formula basis (oxygens)	12	12	12	12
Si	2.986	2.936	2.799	2.858
Al^{IV}	.014	.064	.201	.142
Al^{VI}	1.988	1.954	1.811	1.831
Ti	.002	.002	.004	.002
Fe^{3+}	.010	.044	.185	.167
Fe^{2+}	1.673	1.726	1.797	1.844
Mn	.144	.122	.126	.132
Mg	.681	.640	.840	.778
Ca	.503	5.12	.236	.246

*number of replicate analyses
units in ( ) represent one standard deviation of replicate analyses in terms of least units cited
n.d. = not detected; less than 0.03%
Fe^{3+} calculated from charge balance and stoichiometry

TABLE A-1. (continued)

	Sil schist				calc-silicate gneiss	
	P-9		FS-2		FG-1A	
	core[3]	rim[3]	core[2]	rim[4]	core[3]	rim[3]
SiO_2	34.2(1)	34.0(1)	35.4(6)	35.0(1)	39.37(4)	37.2(2)
TiO_2	.04(1)	.05(1)	.05(1)	.04(1)	.09(1)	.08(1)
Al_2O_3	22.1(1)	21.5(6)	21.8(1)	22.0(2)	21.13(6)	21.18(2)
FeO	33.6(6)	34.5(3)	28.9(2)	30.5(7)	21.8(3)	22.4(2)
MnO	2.4(2)	2.7(1)	2.06(1)	2.12(9)	3.55(5)	3.5(2)
MgO	5.1(8)	5.4(1)	8.95(4)	8.73(8)	4.08(5)	3.9(2)
CaO	1.1(2)	1.31(2)	1.67(6)	1.8(1)	10.6(1)	11.1(6)
Total	98.44	99.46	98.83	100.19	100.62	99.36
formula basis (oxygens)	12	12	12	12	12	12
Si	2.659	2.667	2.762	2.724	3.058	2.929
Al^{IV}	.341	.333	.238	.276	-	.071
Al^{VI}	1.673	1.680	1.770	1.736	1.932	1.896
Ti	.002	.002	.002	.002	.004	.004
Fe^{3+}	.325	.318	.232	.262	-	.100
Fe^{2+}	1.990	2.021	1.685	1.707	1.418	1.373
Mn	.188	.180	.134	.138	.232	.234
Mg	.695	.674	1.038	1.004	.471	.460
Ca	.126	1.24	1.37	.152	.883	.934

TABLE A-2. REPRESENTATIVE MICROPROBE ANALYSES OF BT

	Bt-Grt granulite		Bt-Hbl granulite	orthopyroxenite
	FG-2[3*]	Q-18[3]	Q-54[3]	FM-3[3]
SiO_2	35.2(7)	34.7(6)	36.0(4)	37.8(7)
TiO_2	3.75(5)	3.7(1)	2.28(6)	2.79(4)
Al_2O_3	15.9(1)	15.9(2)	18.4(2)	16.20(3)
FeO	17.4(2)	15.8(2)	13.73(7)	9.09(4)
MnO	.08(3)	.11(2)	n.d.	n.d.
MgO	12.1(1)	14.0(3)	14.4(2)	19.5(2)
CaO	.08(1)	n.d.	.07(1)	n.d.
Na_2O	.04(4)	.24(4)	.21(4)	.08(1)
K_2O	9.2(1)	9.3(2)	8.96(3)	8.96(5)
total	93.75	93.75	94.05	95.14
formula basis (oxygens) column	22	22	22	22
Si	5.428	5.325	5.397	5.489
Al^{IV}	2.572	2.675	2.603	2.511
Al^{VI}	.315	.199	.641	.200
Ti	.435	.427	.256	.304
Fe	2.240	2.026	1.718	1.102
Mn	.009	.015	-	-
Mg	2.776	3.199	3.211	4.212
Ca	.013	-	.011	-
Na	.011	.072	.061	.225
K	1.808	1.819	1.711	1.657
total	15.607	15.757	15.609	15.702

*number of replicate analyses
units in ( ) represent one standard deviation of replicate analyses in terms of least units cited
n.d. = not detected; less than 0.03%

TABLE A-2. (continued)

	Sil schist		Q-F gneiss
	P-9[3]	FS-2[4]	Q-3[5]
SiO_2	34.8(7)	35.5(3)	35.6(2)
TiO_2	3.4(2)	3.04(6)	2.98(2)
Al_2O_3	18.2(2)	17.4(1)	17.32(7)
FeO	15.8(1)	12.8(4)	16.8(2)
MnO	n.d.	n.d.	.08(5)
MgO	13.31(7)	16.01(5)	12.4(1)
CaO	.06(2)	n.d.	n.d.
Na_2O	.08(2)	.40(1)	.50(7)
K_2O	9.39(6)	9.8(1)	9.57(5)
total	95.05	94.95	95.25
formula basis (oxygens) column	22	22	22
Si	5.244	5.297	5.386
Al^{IV}	2.756	2.703	2.614
Al^{VI}	.475	.354	.472
Ti	.385	.341	.339
Fe	1.988	1.594	2.123
Mn	-	-	.010
Mg	2.984	3.555	2.793
Ca	.010	-	-
Na	.024	.115	.147
K	1.803	1.863	1.845
total	15.669	15.882	15.729

TABLE A-3. REPRESENTATIVE MICROPROBE ANALYSES OF HBL, CUM, AND OPX

	Hbl				
	Bt-Hbl granulite		Bt-Grt granulite	c-s gneiss	ortho-pyroxenite
	Q-49[4*]	Q-54[4]	Q-18[3]	FG-1A[3]	FM-3[3]
SiO_2	41.0(4)	42.3(3)	40.9(4)	41.41(5)	45.9(2)
TiO_2	1.3(3)	1.43(3)	1.37(4)	.85(4)	.88(3)
Al_2O_3	13.9(5)	13.67(3)	13.6(3)	13.65(3)	12.17(5)
FeO	15.3(2)	11.4(2)	15.9(1)	15.8(3)	9.8(3)
MnO	.24(4)	.14(1)	.26(4)	.38(4)	.18(3)
MgO	11.0(2)	12.7(2)	11.1(2)	10.2(2)	16.75(8)
CaO	10.6(2)	11.12(3)	10.1(1)	11.40(4)	10.37(9)
Na_2O	1.31(1)	1.3(1)	1.2(2)	1.44(7)	2.04(7)
K_2O	.8(1)	1.10(4)	1.3(2)	1.34(2)	.40(1)
total	95.44	95.16	95.73	96.47	98.49
formula basis (oxygens)	23	23	23	23	23
Si	6.205	6.302	6.212	6.217	6.541
Al^{VI}	1.795	1.638	1.788	1.729	1.459
Al^{VI}	.683	.767	.646	.707	.582
Ti	.145	.157	.146	.093	.092
Fe^{3+}	.294	-	.378	.148	.062
Mg	2.482	2.843	2.510	2.302	3.554
Fe^{2+}	1.652	1.437	1.639	1.834	1.109
Mn	.027	.017	.037	.043	.021
Ca	1.718	1.778	1.643	1.873	1.580
$Na(M^4)$	-	-	-	-	-
Na(A)	.381	.368	.347	.427	.560
K	.145	.206	.127	.261	.071
total	15.527	15.573	15.473	15.688	15.631

*number of replicate analyses
units in ( ) represent one standard deviation of replicate analyses in terms of least units cited
n.d. = not detected; less than 0.03%
Fe^3 calculated from charge balance and stoichiometry

TABLE A-3. (continued)

	Cum	Opx		
	ortho-pyroxenite	ortho-pyroxenite	Bt-Hbl granulite	Bt-Grt granulite
	FM-3[3]	FM-1[3]	Q-54[3]	Q-18[3]
SiO_2	53.7(4)	52.1(2)	51.2(6)	49.5(3)
TiO_2	.04(2)	n.d.	n.d.	n.d.
Al_2O_3	1.84(8)	2.12(4)	2.84(1)	1.96(3)
FeO	14.5(2)	15.0(2)	20.6(8)	27.0(1)
MnO	.38(2)	.40(4)	.39(4)	.7(1)
MgO	25.1(3)	29.72(9)	23.8(2)	19.66(5)
CaO	.40(3)	.17(3)	.29(2)	.55(5)
Na_2O	.61(6)	n.d.	n.d.	n.d.
K_2O	n.d.	n.d.	n.d.	n.d.
total	96.57	99.61	99.12	99.60
formula basis (oxygens)	23	6	6	6
Si	7.693	1.890	1.908	1.909
Al^{VI}	.307	.090	.092	.088
Al^{VI}	-	-	.032	-
Ti	.004	-	-	-
Fe^{3+}	-	-	-	-
Mg	5.365	1.605	1.326	1.128
Fe^{2+}	1.835	.454	.643	.871
Mn	.042	.011	.012	.022
Ca	.058	.006	.011	.021
$Na(M^4)$	.168	-	-	.004
Na(A)	-	-	-	-
K	-	-	-	-
total	15.472	4.056	4.024	4.043

TABLE A-4. REPRESENTATIVE MICROPROBE ANALYSIS OF PL, KFS, AND SCP

	Pl				
	Bt-Hbl granulite		Bt-Grt granulite		Sil schist
	Q-49[3*]	Q-54[3]	Q-18[3]	FG-2[5]	FS-2[4]
SiO_2	48.2(2)	48.1(3)	57.3(3)	56.9(5)	58.2(1)
Al_2O_3	33.3(3)	34.2(3)	26.9(1)	27.2(1)	25.7(1)
CaO	15.77(7)	15.9(2)	8.93	8.7(1)	7.4(1)
Na_2O	2.44(8)	2.2(1)	5.7(3)	6.1(1)	7.5(3)
K_2O	n.d.	.06(3)	.10(2)	.19(2)	.19(2)
total	99.76	100.46	99.46	99.09	98.99
formula basis (oxygens)	8	8	8	8	8
Si	2.209	2.187	2.590	2.569	2.629
Al	1.796	1.833	1.424	1.445	1.354
Ca	.772	.773	.429	.421	.365
Na	.216	.196	.499	.530	.671
K	-	.002	.005	.010	.009
total	4.993	4.991	4.947	4.975	5.028
Or	-	0.3	0.5	1.0	0.9
An	29.1	19.8	53.5	55.2	64.2
An	78.1	79.9	46.0	43.8	34.0

*number of replicate analysis
units in ( ) represent one standard deviation of replicate analyses in terms of least units cited
n.d. = not detected; less than 0.3%

TABLE A-4. (Continued)

	Pl			Kfs	Scp
	Q-F gneiss	c-s gneiss	ortho-pyroxenite	Sil schist	c-s gneiss
	Q-3[4]	FG-1A[3]	FM-3[3]	P-9[3]	FG-1[3]
SiO_2	56.4(2)	46.6(2)	57.6(3)	66.1(5)	45.4(2)
Al_2O_3	27.1(1)	34.7(2)	26.82(5)	18.9(1)	27.94(8)
CaO	8.9(2)	17.7(2)	8.50(7)	.08(1)	18.31(1)
Na_2O	6.9(2)	1.50(5)	7.05(8)	1.3(1)	3.1(1)
K_2O	.14(2)	n.d.	.05(1)	13.5(4)	.08(1)
total	99.44	99.50	100.02	99.88	94.83
formula basis (oxygens)	8	8	8	8	24
Si	2.550	2.109	2.580	3.008	6.948
Al	1.441	1.890	1.415	1.017	5.051
Ca	.432	.875	.407	.003	2.998
Na	.602	.133	.611	.112	.942
K	.008	-	.002	.790	.012
total	5.033	5.007	5.015	4.930	15.951
Or	0.8	-	0.2	87.3	
An	57.8	13.2	59.9	12.4	
An	41.4	86.8	39.9	0.3	

TABLE A-5. REPRESENTATIVE MICROPROBE ANALYSES OF Fe-Ti OXIDES

	Bt-Hbl granulite		Sil schist	
	Q-49[3*]	Q-49[3]	P-9[3]	P-9[12]
	Mag	Ilm	Mag	Ilm-Hem
TiO_2	.10(1)	46.4(2)	.05(1)	27.0(1)
Al_2O_3	.45(2)	.17(2)	.32(8)	.22(1)
Cr_2O_3	.04(2)	n.d.	.28(2)	.09(2)
FeO	93.2(8)	50.7(2)	92.6(7)	69.5(9)
MnO	.06(3)	.69(4)	.08(1)	.07(4)
MgO	n.d.	.52(4)	n.d.	.06(5)
total	93.85	98.48	93.33	96.94
FORMULA BASIS (oxygens)	12	12	12	12
Ti	.007	3.677	.003	2.045
Al	.057	.019	.044	.026
Cr	-	-	.023	.005
Fe^{3+}	5.929	.013	5.927	3.873
Fe^{2+}	3.004	4.459	2.996	2.042
Mn	.003	.059	.007	.004
Mg	-	.080	-	.008
total	9.000	8.307	9.000	8.003

*Number of replicate analyses.

units in ( ) represent one standard deviation of replicate analyses in terms of least units cited.

n.d. = not detected; less than 0.03%

Fe^{3+} calculated from charge balance and stoichiometry.