

TABLE DR1. AVERAGE HORNBLLENDE MICROPROBE DATA

Wt. %	McDoogle-central		McDoogle-border		Sawmill Lake gd		Unidentified	
	992C	MD13A	MD15A	MD2C	993A	MD6B	992B	991A
SiO <sub>2</sub>	46.41	45.73	46.22	46.93	45.43	44.60	48.98	46.34
TiO <sub>2</sub>	1.34	1.31	1.27	1.05	0.87	1.20	0.80	1.03
Al <sub>2</sub> O <sub>3</sub>	7.52	8.22	7.89	7.28	7.93	9.13	6.56	7.75
FeO	16.23	17.11	17.57	16.64	19.51	19.28	5.89	18.09
MnO	0.49	0.38	0.54	0.48	1.56	0.73	1.16	1.00
MgO	12.14	11.48	11.46	12.08	9.39	9.66	12.83	10.76
CaO	11.87	11.82	11.73	11.88	11.54	11.66	11.95	11.76
Na <sub>2</sub> O	1.22	1.26	1.35	1.31	1.11	1.29	1.02	1.19
K <sub>2</sub> O	0.92	0.97	0.93	0.83	0.81	1.10	0.57	0.80
Cl	0.15	0.16	0.15	0.12	0.17	0.28	0.09	0.14
F	0.47	0.58	0.71	0.70	0.27	0.66	0.22	0.28
H <sub>2</sub> O <sup>†</sup>	1.69	1.70	2.13	1.10	1.74	2.17	1.59	1.60
Total	100.21	100.44	101.62	100.07	99.87	101.42	101.54	100.59
Formula								
Si	6.83	6.74	6.77	6.88	6.80	6.63	7.02	6.82
Al <sup>IV</sup>	1.17	1.26	1.23	1.12	1.20	1.37	0.98	1.18
Al <sup>VI</sup>	0.13	0.17	0.14	0.14	0.20	0.23	0.13	0.17
Ti	0.15	0.15	0.14	0.12	0.10	0.13	0.09	0.11
Fe <sup>+2*</sup>	1.52	1.59	1.58	1.56	1.80	1.83	1.28	1.66
Fe <sup>+3*</sup>	0.48	0.52	0.57	0.48	0.61	0.57	0.62	0.57
Mn	0.06	0.05	0.07	0.06	0.20	0.09	0.14	0.12
Mg	2.66	2.52	2.50	2.64	2.10	2.14	2.74	2.36
Ca	1.87	1.87	1.84	1.87	1.85	1.86	1.84	1.86
Na	0.35	0.36	0.38	0.37	0.32	0.37	0.28	0.34
K	0.17	0.18	0.17	0.16	0.15	0.21	0.10	0.15
Cl	0.04	0.04	0.04	0.03	0.04	0.07	0.02	0.03
F	0.22	0.27	0.33	0.33	0.13	0.31	0.10	0.13
OH	1.72	1.74	1.94	1.48	1.65	1.99	1.51	1.59
Fe/Mg	0.75	0.84	0.86	0.77	1.15	1.12	0.70	0.94
Al barom <sup>§</sup>	2.1	2.6	2.3	1.9	2.5	3.3	1.2	2.2

NOTES: Standard wavelength dispersive spectrometry methods were used with a Cameca SX-50 at the University of Utah. Operating conditions were 15 kV accelerating voltage, 30 nA sample current, a 10  $\mu$ m beam, and 20 s counting times (except for Na, where counting time was 10 s). Number of individual analyses averaged for each sample: 992C (7), MD13A (9), MD15A (11), MD2C (10), 993A (5), MD6B (12), 992B (4), 991A (3).

\*Fe<sup>3+</sup> calculated by charge balance.

†O was directly analyzed. H<sub>2</sub>O calculated from excess O after oxide calculation.

§Pressure units are kilobars. Johnson and Rutherford (1989) calibration.

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TABLE DR2. U-Pb ISOTOPIC DATA FOR ZIRCON AND TITANITE

Fractions and Properties	Weight (mg)	Concentrations				Atomic Ratios						Ages (Ma)			corr. coef.
		U (ppm)	Pb <sup>†</sup> (ppm)	<sup>206</sup> Pb <sup>†</sup>	<sup>206</sup> Pb <sup>§</sup>	<sup>207</sup> Pb <sup>§</sup>		<sup>207</sup> Pb <sup>§</sup>		<sup>206</sup> Pb	<sup>207</sup> Pb	<sup>207</sup> Pb			
				<sup>204</sup> Pb	<sup>238</sup> U	% err	<sup>235</sup> U	% err	<sup>206</sup> Pb	% err	238U	<sup>235</sup> U	<sup>206</sup> Pb		
McDoogle pluton, border phase (KM-11b). UTM E 380170 N 4082950.															
d+2 z1	0.16	306.9	5.4	456.4	0.0148	(.48)	0.09826	(.80)	0.04815	(.62)	94.7	95.2	107	0.634	
d+3 z1	0.084	361.5	7.0	254.0	0.0149	(.34)	0.09871	(.64)	0.04800	(.52)	95.4	95.6	99.3	0.588	
d+4 z3	0.088	243.9	4.2	486.6	0.0147	(1.6)	0.09653	(2.3)	0.04754	(1.7)	94.2	93.6	76.5	0.702	
d+4 z1	0.040	361.5	5.9	881.6	0.0148	(1.0)	0.09796	(1.4)	0.04794	(.89)	94.8	94.9	96.3	0.772	
McDoogle pluton, central phase (KMR). UTM E 378850 N 4082650.															
nm(+1)A	0.23	267.1	5.14	461.7	0.0158	(1.3)	0.1069	(4.3)	0.04893	(4.1)	101	103	144	0.311	
nm(-3)B	0.089	263.2	5.05	285.2	0.0149	(.18)	0.09968	(.69)	0.04838	(.65)	95.6	96.5	118	0.353	
m(-1)A	0.084	847.2	16	333.6	0.0149	(2.0)	0.09801	(3.6)	0.04774	(3.0)	95.3	94.9	86.4	0.554	
nm(+1)C	0.098	456.7	10	147.5	0.0147	(.96)	0.09799	(2.2)	0.04829	(2.0)	94.2	94.9	113	0.460	
nm(-3)A	0.33	243.8	4.24	612.8	0.0149	(.38)	0.09785	(.64)	0.04771	(.50)	95.2	94.8	85.1	0.623	
m(0)>100	0.61	564.3	8.86	3521	0.0147	(.15)	0.09740	(.24)	0.04816	(.18)	93.9	94.4	107	0.659	
m(-3)	0.18	601.9	10	719.6	0.0147	(1.0)	0.09686	(1.2)	0.04773	(.52)	94.2	93.9	85.8	0.895	
nm(+1)B	0.18	185.5	4.38	136.6	0.0149	(.65)	0.09312	(3.1)	0.04536	(3.0)	95.3	90.4	-36.5	0.239	
nm(0)	0.045	1282	37.95	83.14	0.0145	(.73)	0.09192	(2.7)	0.04591	(2.6)	92.9	89.3	-7.20	0.360	
McDoogle pluton, inclusion (KM-10a). UTM E 379800 N 4082710															
d+1 z2	0.034	529.9	8.7	756.2	0.0153	(.58)	0.1014	(.69)	0.04806	(.36)	97.9	98.1	102	0.854	
d+1 z3	0.035	538.2	10	363.5	0.0152	(.83)	0.1006	(1.5)	0.04791	(1.3)	97.4	97.3	94.7	0.553	
d+2.5-3 z1	0.013	417.8	7.44	344.4	0.0151	(1.8)	0.1002	(2.1)	0.04799	(1.0)	96.9	97.0	98.6	0.878	
d+2 z1	0.022	395.6	7.23	458.3	0.0152	(1.1)	0.1005	(1.5)	0.04796	(.90)	97.3	97.3	97.4	0.793	
alaskite of Twin Lakes (WLT94-9). UTM E 374154 N 4084815.															
nm1 #1 small	0.043	324.9	11	875.3	0.0262	(.42)	0.1791	(.47)	0.04951	(.20)	167	167	172	0.903	
nm1 #2 large	0.034	331.1	10	1168	0.0261	(.51)	0.1774	(.54)	0.04939	(.17)	166	166	166	0.947	
nm1 #1 large	0.044	289.4	9.1	1257	0.0260	(.47)	0.1771	(.50)	0.04944	(.16)	165	166	169	0.945	
granodiorite of Sawmill Lake (KM-1; zircon). UTM E 379150 N 4083110.															
d+1 z2	0.0080	1624	48	98.60	0.0263	(1.3)	0.1814	(1.6)	0.05000	(.91)	167	169	195	0.820	
d+1 z3	0.023	954.5	28	147.8	0.0265	(.81)	0.1834	(1.1)	0.05012	(.67)	169	171	201	0.778	
d+2 z1	0.016	876.0	25	194.6	0.0261	(1.3)	0.1789	(1.5)	0.04963	(.62)	166	167	178	0.906	
m+1 z1	0.014	1206	35	149.7	0.0258	(1.1)	0.1760	(1.3)	0.04939	(.76)	165	165	166	0.822	
m+1 z2	0.025	777.2	23	257.2	0.0266	(.95)	0.1833	(1.0)	0.04998	(.33)	169	171	194	0.945	
granodiorite of Sawmill Lake (KM-1; titanite). UTM E 379150 N 4083110.															
s12	0.0031	346.2	58	24.37	0.0144	(6.2)	0.1057	(80)	0.05334	(75)	92.0	102	343	0.809	

s5	0.0071	501.9	25	43.92	0.0148	(2.6)	0.09928	(4.1)	0.04872	(3.1)	94.6	96.1	134	0.666
s7	0.0045	481.4	29	37.97	0.0148	(3.9)	0.09585	(15)	0.04704	(14)	94.6	92.9	51.3	0.435
s13	0.0050	268.1	9.68	48.82	0.0148	(8.0)	0.09502	(9.0)	0.04669	(3.7)	94.4	92.2	33.6	0.909
s11	0.0032	710.8	19	72.97	0.0149	(5.4)	0.09074	(5.8)	0.04422	(2.0)	95.2	88.2	-98.7	0.940
s8	0.0041	328.3	15	42.62	0.0147	(7.2)	0.08971	(8.5)	0.04413	(4.3)	94.3	87.2	-103	0.864
s4	0.015	497.5	49	29.38	0.0142	(1.2)	0.06912	(22)	0.03526	(21)	91.0	67.9	-688	0.679
s10	0.0059	243.4	29	27.50	0.0151	(4.0)	0.03847	(89)	0.01845	(87)	96.8	38.3	-3010	0.491

<sup>†</sup> Radiogenic Pb.

<sup>‡</sup> Measured ratio corrected for fractionation only. Most Pb isotope ratios were corrected for mass fractionation using 0.1 ‰/amu for data collected with the Faraday detector cups and 0.18 ‰/amu for data collected with the Daly detector. Sample WLT94-9 was analyzed at MIT in 1995 and is corrected 0.12‰/amu for data collected with the Faraday detectors and 0.15 ‰/amu for data collected with the Daly detector.

<sup>§</sup> Corrected for fractionation, spike, blank, and initial common Pb. Common Pb corrections were made for sample KM-1 using K-feldspar initial <sup>206</sup>Pb/<sup>204</sup>Pb, <sup>207</sup>Pb/<sup>204</sup>Pb, <sup>208</sup>Pb/<sup>204</sup>Pb ratios of 18.77, 15.69, and 39.01, respectively [sample 26 of Chen and Tilton (1991) and Chen and Moore (1982)]. They are considered the best estimates of the initial common Pb ratios for sample KM-1 because of similar lithology, age, and proximity to the Sawmill Lake granodiorite (Figure 1). Common Pb corrections for the other samples were made using Stacey and Kramers (1975) initial Pb.

Sample processing and U and Pb separation for most samples was performed at Boston University. Sample WLT94-9 was processed and analyzed at MIT, otherwise, analytical details for this sample are the same as the others. Analysis was accomplished with a VG Sector 54 thermal ionization mass spectrometer at the University of North Carolina - Chapel Hill. Conventional separation techniques (ie., water table, heavy liquids, magnetic) were used. Grains were separated using a Frantz Isodynamic LB-1 magnetic separator, and zircon fractions are designated as magnetic (m), nonmagnetic (nm) and diamagnetic (d) in terms of degrees tilt on a Frantz magnetic separator. All fractions were handpicked by color, size, and morphology. Zircon fractions were air abraded (Krogh, 1982). Dissolution and isolation of U and Pb followed the methods of Krogh (1973) and Parrish (1987). Fractions from sample KM-1 were spiked with a <sup>205</sup>Pb-<sup>233</sup>U-<sup>236</sup>U and fractions from the other samples were spiked at MIT with a <sup>205</sup>Pb-<sup>233</sup>U-<sup>235</sup>U. Purified U and Pb fractions were loaded on single Re filaments with silica gel and graphite, respectively. Decay constants used are <sup>238</sup>U = 0.15513 x 10<sup>-9</sup>yr<sup>-1</sup>, and <sup>235</sup>U = 0.98485 x 10<sup>-9</sup>yr<sup>-1</sup> [Steiger and Jäger, 1977]. Weights are estimated using a video camera and scale, and are known to within 10%. Data reduction and error analysis was accomplished using the PbMacDat-2 by D.S. Coleman, using the algorithms of Ludwig [1989, 1990] and all errors are reported in percent at the 2 $\omega$  confidence interval.

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