Datashare 96

Geochemical, petrographic, and uranium–lead geochronological evidence for multisourced polycyclic provenance of deep-water strata in a hybrid tectonic setting: The upper Miocene upper Mount Messenger Formation, Taranaki Basin, New Zealand

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Appendix 1: Uranium–Lead Geochronologic Analyses for Pukearuhe Sample (MM18)

				Isotope Ratios							Apparent Ages, Ma								
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
PK-1	1791	125,556	13.8	19.2238	0.4	0.3158	1.8	0.0440	1.7	0.97	277.8	4.7	278.7	4.3	286.2	10.2	277.8	4.7	NA
PK-3	59	4,223	2.3	23.5659	24.7	0.2353	25.2	0.0402	5.2	0.20	254.2	12.9	214.6	48.8	−200.7	626.9	254.2	12.9	NA
PK-4	784	10,552	0.4	19.0742	3.5	0.2494	3.8	0.0345	1.6	0.41	218.7	3.4	226.1	7.8	304.1	79.7	218.7	3.4	NA
PK-5	573	21,003	1.8	20.1064	3.9	0.2434	4.0	0.0355	0.9	0.22	224.8	2.0	221.2	8.0	182.6	91.5	224.8	2.0	NA
PK-6	170	15,036	0.8	19.0613	10.3	0.3768	10.5	0.0521	2.4	0.23	327.3	7.8	324.7	29.3	305.6	234.1	327.3	7.8	NA
PK-7	341	52,320	5.7	16.3688	1.4	0.8621	3.8	0.1023	3.5	0.92	628.1	20.9	631.3	17.7	642.5	30.9	628.1	20.9	97.8
PK-8	159	21,217	1.9	18.4437	6.5	0.5627	7.0	0.0753	2.5	0.36	467.8	11.5	453.3	25.7	380.1	147.1	467.8	11.5	NA
PK-9	82	4,424	1.2	22.5349	27.8	0.2410	28.3	0.0394	5.3	0.19	249.0	12.9	219.2	55.9	−89.8	693.9	249.0	12.9	NA
PK-10	210	13,667	2.0	20.0438	9.0	0.2716	9.3	0.0395	2.2	0.24	249.7	5.4	244.0	20.2	189.9	210.5	249.7	5.4	NA
PK-11	81	3,717	0.7	23.5636	18.7	0.2443	18.9	0.0418	3.0	0.16	263.7	7.8	222.0	37.7	−200.4	471.1	263.7	7.8	NA
PK-12	221	79,149	2.8	13.3947	1.9	1.8875	2.9	0.1834	2.2	0.75	1085.4	21.9	1076.7	19.4	1059.3	39.2	1059.3	39.2	102.5
PK-13	161	6,889	1.4	19.2812	13.4	0.2811	13.9	0.0393	3.9	0.28	248.5	9.6	251.5	31.1	279.4	307.2	248.5	9.6	NA
PK-15	298	48,445	1.8	13.1098	0.9	1.8968	1.3	0.1804	0.9	0.73	1068.9	9.1	1080.0	8.4	1102.4	17.1	1102.4	17.1	97.0
PK-16	432	29,744	2.5	16.8985	1.7	0.7361	2.2	0.0902	1.4	0.61	556.8	7.2	560.1	9.5	573.6	37.8	556.8	7.2	97.1
PK-17	290	35,540	2.2	20.1711	4.9	0.2712	5.3	0.0397	2.0	0.38	250.8	4.9	243.7	11.4	175.1	113.7	250.8	4.9	NA
PK-18	71	44,514	1.1	8.7110	1.3	5.1062	1.9	0.3226	1.4	0.73	1802.4	21.3	1837.1	15.8	1876.7	22.9	1876.7	22.9	96.0
PK-19	324	182,490	6.7	8.3100	0.4	5.1733	4.4	0.3118	4.4	1.00	1749.5	67.8	1848.2	37.8	1961.2	6.8	1961.2	6.8	89.2
PK-20	338	18,926	1.2	19.7007	3.9	0.2594	4.0	0.0371	1.1	0.27	234.6	2.5	234.2	8.4	229.9	89.1	234.6	2.5	NA
PK-21	377	42,481	1.3	18.6005	4.9	0.3124	5.2	0.0421	1.6	0.31	266.1	4.2	276.0	12.6	361.1	111.6	266.1	4.2	NA
PK-22	548	23,816	1.1	19.5897	2.6	0.2334	2.7	0.0332	0.9	0.34	210.3	1.9	213.0	5.2	242.9	58.9	210.3	1.9	NA
PK-23	42	2,028	1.4	39.3799	53.7	0.1616	53.9	0.0461	5.4	0.10	290.8	15.5	152.1	76.3	−1704.0	202.0	290.8	15.5	NA
PK-24	656	139,054	9.4	13.7267	0.6	1.5872	2.3	0.1580	2.2	0.96	945.7	19.4	965.2	14.3	1009.8	13.1	1009.8	13.1	93.7
PK-25	176	25,683	2.0	16.5885	3.2	0.8550	4.4	0.1029	3.0	0.68	631.2	18.0	627.4	20.6	613.7	69.9	631.2	18.0	102.8
PK-26	162	9,222	1.7	21.2094	17.2	0.2588	17.4	0.0398	3.2	0.18	251.7	7.8	233.7	36.4	56.8	411.7	251.7	7.8	NA
PK-27	468	26,958	3.1	16.8023	1.9	0.7555	3.1	0.0921	2.5	0.80	567.8	13.5	571.4	13.6	586.0	40.4	567.8	13.5	96.9
PK-28	130	3,658	1.0	20.5775	14.8	0.2009	15.4	0.0300	4.3	0.28	190.5	8.0	185.9	26.2	128.4	350.1	190.5	8.0	NA
PK-29	378	16,881	1.5	19.8929	6.6	0.2629	7.1	0.0379	2.7	0.38	240.0	6.4	237.0	15.0	207.5	152.4	240.0	6.4	NA
PK-30	208	5,205	1.0	22.6845	17.2	0.1015	18.6	0.0167	6.9	0.37	106.8	7.3	98.2	17.4	−106.0	426.7	106.8	7.3	NA
PK-31	120	29,373	4.1	13.4408	2.5	1.6122	3.3	0.1572	2.2	0.66	941.0	19.3	975.0	20.9	1052.4	50.6	1052.4	50.6	89.4
PK-32	220	14,945	2.5	19.5287	7.6	0.1944	8.4	0.0275	3.6	0.42	175.1	6.1	180.4	13.9	250.1	176.2	175.1	6.1	NA
PK-33	205	8,776	0.8	21.7308	9.6	0.2729	9.7	0.0430	1.9	0.19	271.5	5.0	245.0	21.2	−1.4	230.7	271.5	5.0	NA

(*continued*)

Appendix 1: Continued

				Isotope Ratios							Apparent Ages, Ma								
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
PK-34	248	12,947	1.1	20.9086	6.1	0.2245	6.3	0.0340	1.9	0.29	215.8	4.0	205.7	11.8	90.7	143.9	215.8	4.0	NA
PK-35	612	154,296	2.8	16.2831	0.8	0.8870	1.2	0.1047	0.9	0.73	642.2	5.4	644.7	5.8	653.7	17.9	642.2	5.4	98.2
PK-36	401	11,250	2.3	21.4691	16.1	0.1189	16.4	0.0185	3.1	0.19	118.2	3.6	114.0	17.7	27.7	388.3	118.2	3.6	NA
PK-38	79	6,178	2.3	23.9095	19.5	0.2349	21.5	0.0407	9.1	0.42	257.3	22.9	214.2	41.5	−237.1	495.2	257.3	22.9	NA
PK-40	72	13,775	0.9	13.6689	2.9	1.7887	3.6	0.1773	2.2	0.60	1052.3	21.2	1041.4	23.8	1018.3	59.2	1018.3	59.2	103.3
PK-41	512	22,907	1.6	19.8162	4.1	0.2291	4.5	0.0329	1.9	0.42	208.8	3.9	209.5	8.5	216.4	94.5	208.8	3.9	NA
PK-42	144	26,537	3.2	15.9042	3.3	0.9180	3.9	0.1059	2.1	0.54	648.8	13.1	661.3	19.1	704.0	70.7	648.8	13.1	92.2
PK-43	765	97,455	6.9	18.8127	2.1	0.3895	2.7	0.0531	1.8	0.66	333.8	5.8	334.0	7.8	335.4	46.6	333.8	5.8	NA
PK-44	929	63,924	2.4	21.0270	3.8	0.1288	3.8	0.0196	0.7	0.18	125.4	0.8	123.0	4.4	77.3	89.1	125.4	0.8	NA
PK-45	156	7,687	0.8	19.9310	8.5	0.2689	8.9	0.0389	2.4	0.27	245.9	5.8	241.9	19.1	203.0	198.4	245.9	5.8	NA
PK-46	295	72,108	2.5	14.1906	1.0	1.5812	3.7	0.1627	3.5	0.96	972.0	31.8	962.9	22.8	942.1	20.1	942.1	20.1	103.2
PK-47	1450	184,890	1.4	19.3955	1.2	0.3279	2.1	0.0461	1.6	0.80	290.7	4.7	288.0	5.1	265.9	28.0	290.7	4.7	NA
PK-48	952	46,297	1.6	19.4677	3.2	0.2731	4.7	0.0386	3.4	0.72	243.9	8.1	245.1	10.2	257.3	74.0	243.9	8.1	NA
PK-49	161	23,576	1.6	16.9547	5.9	0.3305	6.2	0.0406	2.1	0.33	256.8	5.2	290.0	15.7	566.4	127.6	256.8	5.2	NA
PK-50	76	4,781	1.1	21.5554	33.1	0.2389	33.3	0.0373	3.6	0.11	236.4	8.3	217.5	65.3	18.0	815.4	236.4	8.3	NA
PK-51	523	24,052	2.3	21.1618	7.0	0.1426	8.3	0.0219	4.4	0.53	139.6	6.0	135.4	10.5	62.1	167.0	139.6	6.0	NA
PK-52	359	24,926	1.2	19.3881	5.2	0.3034	5.6	0.0427	1.9	0.34	269.3	5.0	269.1	13.1	266.7	119.7	269.3	5.0	NA
PK-53	269	35,358	5.1	16.5615	4.5	0.7821	6.3	0.0939	4.4	0.70	578.8	24.5	586.7	28.3	617.2	98.2	578.8	24.5	93.8
PK-54	186	2,975	1.2	26.6565	26.9	0.0890	27.1	0.0172	3.2	0.12	110.0	3.5	86.6	22.5	−519.5	729.2	110.0	3.5	NA
PK-55	431	64,948	1.4	18.4431	2.7	0.4423	2.9	0.0592	1.0	0.36	370.6	3.7	371.9	8.9	380.2	60.1	370.6	3.7	NA
PK-56	343	18,412	1.2	19.7708	4.9	0.3516	5.1	0.0504	1.2	0.24	317.1	3.8	305.9	13.4	221.7	113.9	317.1	3.8	NA
PK-58	138	3,964	2.7	21.5171	21.3	0.1105	21.8	0.0172	4.4	0.20	110.2	4.8	106.4	22.0	22.3	517.1	110.2	4.8	NA
PK-59	583	34,101	4.2	18.6968	1.5	0.4199	2.4	0.0569	1.8	0.77	357.0	6.4	356.0	7.2	349.4	34.3	357.0	6.4	NA
PK-60	545	13,563	1.8	19.9885	5.7	0.2501	6.0	0.0363	2.0	0.34	229.6	4.6	226.6	12.2	196.3	131.9	229.6	4.6	NA
PK-61	438	59,215	3.1	17.5041	2.1	0.6516	2.8	0.0827	1.8	0.67	512.4	9.1	509.5	11.1	496.5	45.6	512.4	9.1	103.2
PK-62	120	6,283	1.8	22.5919	6.7	0.2241	7.1	0.0367	2.4	0.33	232.4	5.4	205.3	13.3	−96.0	165.5	232.4	5.4	NA
PK-63	160	5,702	1.2	18.7164	10.6	0.3086	11.8	0.0419	5.2	0.44	264.5	13.5	273.1	28.4	347.1	241.4	264.5	13.5	NA
PK-64	135	6,512	1.3	19.9905	11.7	0.3379	12.2	0.0490	3.5	0.29	308.3	10.5	295.6	31.3	196.1	272.5	308.3	10.5	NA
PK-65	139	2,632	0.9	21.5913	14.3	0.1299	15.8	0.0203	6.7	0.42	129.8	8.6	124.0	18.5	14.0	345.6	129.8	8.6	NA
PK-67	69	2,313	1.0	21.9859	24.1	0.2030	25.4	0.0324	8.2	0.32	205.3	16.6	187.6	43.6	−29.6	590.8	205.3	16.6	NA
PK-68	141	6,653	0.8	24.6894	34.8	0.1629	35.3	0.0292	6.0	0.17	185.4	11.0	153.2	50.3	−318.8	916.0	185.4	11.0	NA

(*continued*)

Appendix 1: Continued

				Isotope Ratios							Apparent Ages, Ma								
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
PK-69	152	9,333	1.1	21.2334	13.4	0.2169	13.8	0.0334	3.3	0.24	211.8	6.8	199.3	24.9	54.1	320.2	211.8	6.8	NA
PK-70	338	12,905	0.9	18.5647	4.1	0.2641	4.9	0.0356	2.7	0.56	225.2	6.1	237.9	10.4	365.4	91.4	225.2	6.1	NA
PK-71	252	6,175	1.0	21.5511	18.4	0.1093	19.2	0.0171	5.4	0.28	109.2	5.9	105.3	19.2	18.5	446.4	109.2	5.9	NA
PK-72	149	14,218	3.8	20.6385	10.7	0.3905	11.0	0.0584	2.4	0.22	366.2	8.4	334.7	31.2	121.4	252.6	366.2	8.4	NA
PK-73	930	76,184	9.3	18.3696	1.3	0.4382	2.4	0.0584	2.0	0.83	365.8	7.0	369.0	7.3	389.2	29.4	365.8	7.0	NA
PK-74	205	12,404	1.2	20.1955	10.0	0.2683	10.2	0.0393	1.8	0.18	248.5	4.4	241.4	21.9	172.3	234.9	248.5	4.4	NA
PK-75	571	4,3031	3.0	18.6060	1.8	0.4289	2.7	0.0579	2.0	0.75	362.7	7.1	362.4	8.1	360.4	39.8	362.7	7.1	NA
PK-76	262	16,119	0.7	19.9579	10.3	0.2539	10.9	0.0368	3.5	0.32	232.7	8.0	229.8	22.4	199.9	240.3	232.7	8.0	NA
PK-77	202	9,054	1.2	20.8827	6.2	0.2768	7.2	0.0419	3.7	0.51	264.7	9.5	248.1	15.8	93.7	145.8	264.7	9.5	NA
PK-78	751	174,603	2.0	13.3607	0.3	1.9201	1.9	0.1861	1.9	0.98	1100.0	19.3	1088.1	12.9	1064.4	7.0	1064.4	7.0	103.3
PK-79	144	6,750	1.1	21.5494	14.1	0.1925	14.5	0.0301	3.4	0.23	191.1	6.4	178.8	23.8	18.7	341.2	191.1	6.4	NA
PK-80	462	14,931	1.2	19.6651	5.5	0.2695	5.9	0.0384	2.2	0.38	243.1	5.3	242.3	12.7	234.1	125.9	243.1	5.3	NA
PK-81	144	7,023	1.2	19.7094	8.3	0.2894	8.7	0.0414	2.6	0.30	261.3	6.8	258.1	19.8	228.9	191.3	261.3	6.8	NA
PK-82	221	2,541	1.1	27.7786	32.6	0.0861	32.8	0.0173	3.8	0.11	110.9	4.1	83.9	26.4	−631.0	912.5	110.9	4.1	NA
PK-83	529	42,358	5.5	17.2999	1.9	0.6279	2.2	0.0788	1.2	0.56	488.9	5.9	494.8	8.7	522.3	40.6	488.9	5.9	93.6
PK-84	506	26,353	1.1	19.2403	2.5	0.2989	4.9	0.0417	4.3	0.86	263.5	11.0	265.6	11.5	284.3	56.6	263.5	11.0	NA
PK-85	457	23,280	1.4	20.4645	6.3	0.1972	6.5	0.0293	1.7	0.27	186.0	3.2	182.8	10.9	141.4	148.1	186.0	3.2	NA
PK-86	137	5,321	0.9	20.1777	15.2	0.2044	15.5	0.0299	2.6	0.17	190.0	4.9	188.9	26.6	174.4	357.2	190.0	4.9	NA
PK-87	299	14,667	2.0	19.5191	4.9	0.3047	5.3	0.0431	2.1	0.40	272.2	5.7	270.0	12.7	251.2	112.7	272.2	5.7	NA
PK-88	205	7,181	0.7	18.2135	12.3	0.2427	12.5	0.0321	2.4	0.19	203.4	4.8	220.6	24.9	408.3	276.3	203.4	4.8	NA
PK-89	313	9,511	2.3	19.5969	8.5	0.3026	9.1	0.0430	3.3	0.37	271.4	8.9	268.4	21.5	242.1	195.4	271.4	8.9	NA
PK-90	83	5,190	0.8	25.5341	31.0	0.1920	31.5	0.0356	5.6	0.18	225.3	12.4	178.4	51.6	−405.8	825.9	225.3	12.4	NA
PK-91	393	18,969	1.4	19.8770	4.2	0.3123	4.3	0.0450	0.9	0.20	283.9	2.4	275.9	10.3	209.3	96.6	283.9	2.4	NA
PK-92	239	7,220	1.0	23.4501	8.1	0.1470	8.8	0.0250	3.5	0.39	159.2	5.4	139.3	11.5	−188.3	203.5	159.2	5.4	NA
PK-93	238	8,273	0.6	21.5013	8.4	0.2189	9.3	0.0341	4.1	0.43	216.4	8.6	201.0	17.0	24.1	201.8	216.4	8.6	NA
PK-94	829	61,093	0.7	19.8689	2.1	0.2734	2.4	0.0394	1.3	0.51	249.1	3.1	245.4	5.3	210.3	48.6	249.1	3.1	NA
PK-95	201	8,013	1.6	20.2081	6.0	0.2725	6.4	0.0399	2.3	0.36	252.4	5.7	244.7	14.0	170.9	140.3	252.4	5.7	NA
PK-96	157	6,643	1.3	19.7758	7.2	0.2826	8.1	0.0405	3.6	0.45	256.1	9.1	252.7	18.0	221.1	166.6	256.1	9.1	NA
PK-98	1018	95,685	4.3	17.8306	1.3	0.5682	2.5	0.0735	2.1	0.85	457.1	9.3	456.9	9.1	455.7	29.5	457.1	9.3	NA
PK-99	300	11,999	0.9	21.4476	10.4	0.2508	10.8	0.0390	2.8	0.26	246.7	6.8	227.2	22.0	30.1	250.5	246.7	6.8	NA
PK-100	325	17,243	1.2	20.3905	4.1	0.2770	4.3	0.0410	1.4	0.32	258.9	3.5	248.3	9.6	149.9	96.6	258.9	3.5	NA

(*continued*)

Appendix 1: Continued

				Isotope Ratios							Apparent Ages, Ma							
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
PK-102	548	13,207	1.1	21.5960	4.8	0.1081	5.2	0.0169	2.0	0.39	108.3	2.2	104.2	5.1	13.5	114.7	108.3	2.2	NA
PK-103	100	2,200	1.2	19.4681	13.7	0.1247	15.7	0.0176	7.6	0.49	112.5	8.5	119.3	17.6	257.3	315.5	112.5	8.5	NA
PK-104	287	43,469	4.5	17.5403	4.0	0.5579	5.1	0.0710	3.2	0.63	442.0	13.6	450.2	18.5	492.0	87.6	442.0	13.6	NA
PK-105	301	16,491	0.7	19.2161	6.3	0.2719	6.7	0.0379	2.2	0.34	239.8	5.3	244.2	14.4	287.1	143.3	239.8	5.3	NA
PK-107	564	115,748	4.3	15.2278	0.8	1.2444	5.4	0.1374	5.3	0.99	830.1	41.2	820.9	30.2	795.8	17.5	830.1	41.2	104.3
PK-108	305	95,375	3.3	14.0677	1.2	1.3612	3.1	0.1389	2.9	0.92	838.4	22.6	872.4	18.3	959.8	24.4	838.4	22.6	87.3
PK-109	458	90,917	2.6	13.1811	0.7	1.9704	2.4	0.1884	2.3	0.96	1112.5	23.8	1105.5	16.3	1091.5	13.6	1091.5	13.6	101.9
PK-110	435	25,397	1.0	19.4764	3.3	0.3091	3.6	0.0437	1.6	0.43	275.5	4.2	273.5	8.7	256.3	75.2	275.5	4.2	NA

Analyzed at the GeoChron Center at the University of Arizona.
Abbreviations: Conc = concentration; Corr. = correction; N/A = not available; U/Th = uranium/thorium.

Appendix 2: Uranium–Lead Geochronologic Analyses for Conglomerate Sample at the Waterfall (MM13)

				Isotope Ratios							Apparent Ages, Ma								
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
CG-1	105.2	7,321.1	0.9	23.2	41.9	0.1	42.6	0.0	7.4	0.2	109.6	8.0	98.6	40.0	−158.6	1084.4	109.6	8.0	NA
CG-2	372.9	123,571.0	2.6	15.4	1.4	1.1	7.2	0.1	7.1	1.0	735.4	49.2	745.6	38.1	776.2	28.6	735.4	49.2	94.7
CG-3	323.3	42,119.9	8.3	17.9	3.8	0.5	4.3	0.1	2.1	0.5	429.3	8.9	432.6	15.3	450.2	83.8	429.3	8.9	95.4
CG-4	491.5	91,454.0	3.5	17.0	1.2	0.7	1.6	0.1	1.1	0.7	522.6	5.4	528.9	6.5	556.3	25.3	522.6	5.4	93.9
CG-5	263.5	19,320.5	0.8	19.8	9.8	0.2	9.9	0.0	1.6	0.2	210.4	3.3	211.5	18.9	223.4	226.4	210.4	3.3	NA
CG-6	202.3	21,151.8	1.5	19.1	6.6	0.3	6.8	0.0	1.8	0.3	248.1	4.5	253.7	15.4	305.3	150.3	248.1	4.5	NA
CG-7	920.8	85,874.2	1.1	19.6	2.2	0.3	3.0	0.0	2.0	0.7	251.4	5.0	251.0	6.6	246.9	49.6	251.4	5.0	NA
CG-8	554.8	23,254.7	1.7	19.1	2.8	0.3	3.1	0.0	1.4	0.5	270.4	3.7	274.1	7.5	306.0	63.4	270.4	3.7	NA
CG-9	302.9	3,800.9	1.0	19.4	11.4	0.1	11.9	0.0	3.4	0.3	124.2	4.2	131.6	14.7	267.0	261.8	124.2	4.2	NA
CG-10	776.9	38,382.0	1.4	20.9	5.8	0.1	6.1	0.0	1.9	0.3	122.0	2.3	120.6	7.0	91.7	138.1	122.0	2.3	NA
CG-11	65.3	5,272.2	0.7	34.0	35.6	0.2	35.9	0.0	4.5	0.1	253.9	11.1	153.3	51.1	NA	NA	253.9	11.1	NA
CG-12	222.3	118,285.5	3.0	10.0	1.2	3.1	3.8	0.2	3.6	0.9	1287.0	42.2	1422.7	29.3	1632.2	23.2	1632.2	23.2	78.8
CG-13	306.7	178,926.5	1.9	8.7	0.8	4.3	7.4	0.3	7.3	1.0	1556.3	101.3	1701.2	60.9	1884.7	14.7	1884.7	14.7	82.6
CG-14	324.1	81,394.1	3.9	16.9	1.8	0.7	2.6	0.1	1.8	0.7	534.4	9.4	542.4	10.8	576.2	39.4	534.4	9.4	92.7
CG-15	997.1	205,414.7	2.9	15.8	0.7	0.8	2.1	0.1	2.0	1.0	592.2	11.3	619.2	9.7	719.2	13.8	592.2	11.3	82.3
CG-16	135.8	7,224.0	0.8	18.2	12.6	0.3	13.2	0.0	3.8	0.3	245.1	9.1	261.0	30.4	406.3	283.7	245.1	9.1	NA
CG-17	205.8	29,711.1	1.4	17.9	3.0	0.6	3.2	0.1	1.1	0.3	461.9	4.9	459.9	11.9	450.2	67.4	461.9	4.9	102.6
CG-18	543.6	219,441.1	1.7	18.8	2.8	0.4	3.1	0.1	1.2	0.4	327.0	3.7	327.9	8.6	334.5	64.4	327.0	3.7	NA
CG-19	261.8	35,077.9	1.4	19.5	8.2	0.3	8.4	0.0	2.0	0.2	240.5	4.7	241.5	18.1	251.1	189.1	240.5	4.7	NA
CG-20	191.5	68,886.8	2.5	16.9	1.7	0.7	2.3	0.1	1.5	0.7	526.1	7.5	534.6	9.4	571.4	36.8	526.1	7.5	92.1
R33	227.8	24,316.5	1.3	17.8	3.6	0.5	3.9	0.1	1.4	0.4	424.9	5.7	429.5	13.6	454.2	80.9	424.9	5.7	93.6
CG-21	420.5	50,840.9	1.2	19.7	3.7	0.3	4.2	0.0	2.0	0.5	238.9	4.7	237.8	8.9	227.1	85.2	238.9	4.7	NA
CG-22	58.9	6,966.7	0.8	21.5	27.9	0.2	28.7	0.0	6.8	0.2	240.7	16.0	222.0	57.3	28.6	679.8	240.7	16.0	NA
CG-23	63.2	3,972.7	1.4	20.2	22.4	0.3	22.7	0.0	4.1	0.2	267.0	10.7	257.1	51.7	167.6	528.5	267.0	10.7	NA
CG-24	481.0	19,435.7	1.6	21.7	5.0	0.1	5.5	0.0	2.2	0.4	119.6	2.6	114.3	5.9	4.5	121.0	119.6	2.6	NA
CG-25	149.3	32,124.2	2.2	17.9	3.2	0.6	3.5	0.1	1.3	0.4	499.7	6.1	490.8	13.4	449.4	71.2	499.7	6.1	111.2
CG-26	1070.4	143,644.2	11.2	13.4	0.3	1.7	1.7	0.2	1.7	1.0	1011.7	16.1	1026.3	11.3	1057.7	6.1	1057.7	6.1	95.6
CG-27	284.0	19,944.1	0.8	19.8	6.1	0.3	6.4	0.0	1.7	0.3	237.1	3.9	234.9	13.4	212.9	142.4	237.1	3.9	NA
CG-28	657.9	195,310.9	4.2	17.1	1.0	0.7	2.7	0.1	2.5	0.9	513.7	12.5	520.4	11.1	549.8	21.1	513.7	12.5	93.4
CG-29	149.0	31,477.0	1.4	14.3	1.8	1.1	5.3	0.1	4.9	0.9	708.8	33.1	761.4	28.2	919.2	37.3	708.8	33.1	77.1
CG-30	147.9	22,240.5	0.6	19.9	12.8	0.3	13.1	0.0	2.4	0.2	249.0	5.9	244.6	28.4	202.2	299.0	249.0	5.9	NA

(*continued*)

Appendix 2: Continued

				Isotope Ratios							Apparent Ages, Ma								
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
CG-31	231.7	74,017.9	2.4	17.1	3.2	0.7	3.4	0.1	1.3	0.4	563.3	7.0	560.1	14.7	547.2	69.1	563.3	7.0	102.9
CG-32	673.8	141,230.9	2.7	16.7	1.0	0.8	1.6	0.1	1.3	0.8	621.8	7.5	617.8	7.4	603.0	21.2	621.8	7.5	103.1
CG-33	445.3	158,844.8	5.6	16.1	0.9	0.9	2.6	0.1	2.4	0.9	640.0	14.6	647.2	12.3	672.1	19.5	640.0	14.6	95.2
CG-34	43.6	2,785.5	1.0	21.1	23.2	0.2	23.4	0.0	3.4	0.1	241.6	8.0	225.9	47.5	65.4	558.3	241.6	8.0	NA
CG-35	139.2	8,028.5	0.6	18.8	9.6	0.3	9.8	0.0	2.0	0.2	254.9	5.0	263.5	22.7	341.0	217.5	254.9	5.0	NA
CG-36	453.1	41,555.4	1.0	19.6	1.6	0.3	2.2	0.0	1.5	0.7	230.0	3.3	230.6	4.5	236.4	37.7	230.0	3.3	NA
CG-37	366.8	35,644.7	1.1	18.1	3.1	0.4	4.0	0.1	2.6	0.6	358.6	9.0	367.1	12.3	421.5	68.3	358.6	9.0	NA
CG-38	77.9	15,241.9	2.4	16.2	8.9	0.8	9.5	0.1	3.3	0.3	573.0	18.2	591.5	42.7	663.2	191.5	573.0	18.2	86.4
CG-39	343.6	45,826.5	0.7	13.3	1.1	1.8	3.1	0.2	2.9	0.9	1018.8	27.4	1034.6	20.2	1068.3	21.8	1068.3	21.8	95.4
CG-40	268.6	16,679.1	1.0	20.5	7.0	0.2	7.2	0.0	1.6	0.2	187.1	3.0	183.3	12.1	134.4	165.3	187.1	3.0	NA
R33	102.1	29,062.1	1.3	18.4	5.9	0.5	7.2	0.1	4.2	0.6	422.1	17.0	415.8	24.5	380.7	132.1	422.1	17.0	110.9
CG-41	269.3	86,535.5	1.8	13.3	0.6	1.8	2.4	0.2	2.3	1.0	1023.1	22.2	1040.1	15.7	1076.1	11.3	1076.1	11.3	95.1
CG-42	174.1	23,948.9	1.8	19.5	2.7	0.3	3.0	0.0	1.4	0.5	278.6	3.7	275.9	7.3	253.0	61.7	278.6	3.7	NA
CG-44	343.0	93,382.6	4.0	12.6	0.6	2.2	1.3	0.2	1.2	0.9	1153.3	12.4	1165.1	9.2	1187.0	11.9	1187.0	11.9	97.2
CG-45	173.9	19,232.5	1.3	21.6	11.2	0.3	11.4	0.0	1.9	0.2	247.9	4.5	227.0	23.2	15.7	270.6	247.9	4.5	NA
CG-46	1578.1	310,099.8	22.2	17.3	0.5	0.7	1.6	0.1	1.6	0.9	549.2	8.2	545.2	6.9	528.5	11.4	549.2	8.2	103.9
CG-47	555.3	95,159.6	1.5	18.2	2.9	0.4	3.4	0.1	1.9	0.5	360.5	6.6	366.4	10.5	404.0	64.1	360.5	6.6	NA
CG-50	167.8	6,899.5	0.9	20.2	16.5	0.1	16.7	0.0	3.0	0.2	123.4	3.7	125.8	19.8	172.8	386.4	123.4	3.7	NA
CG-51	224.1	27,971.3	1.4	17.0	2.3	0.7	2.9	0.1	1.7	0.6	535.7	8.5	540.4	12.0	560.5	50.8	535.7	8.5	95.6
CG-52	248.0	59,536.4	2.8	15.1	1.6	1.1	4.3	0.1	4.0	0.9	723.9	27.4	745.2	22.7	809.5	33.3	723.9	27.4	89.4
CG-53	766.7	421,736.5	79.5	12.6	2.8	2.0	3.3	0.2	1.8	0.5	1081.8	18.0	1114.4	22.4	1178.5	55.0	1178.5	55.0	91.8
CG-54	721.4	73,922.4	1.3	19.5	1.3	0.3	1.9	0.0	1.4	0.7	265.3	3.5	263.7	4.4	249.0	30.1	265.3	3.5	NA
CG-55	163.1	19,969.7	0.7	20.7	8.9	0.3	9.2	0.0	2.3	0.2	245.8	5.4	234.2	19.3	119.5	210.7	245.8	5.4	NA
R33	445.8	148,922.2	4.3	17.0	1.6	0.8	2.1	0.1	1.4	0.7	576.0	7.6	573.9	9.2	565.2	34.1	576.0	7.6	101.9
CG-56	142.4	7,144.0	1.5	22.9	24.7	0.1	24.9	0.0	3.3	0.1	122.2	4.0	110.6	26.1	−133.8	617.6	122.2	4.0	NA
CG-57	170.0	25,601.2	1.8	19.1	6.6	0.4	6.9	0.1	2.0	0.3	337.9	6.4	333.9	19.5	305.9	149.7	337.9	6.4	NA
CG-58	422.5	51,903.7	3.6	19.5	4.0	0.4	4.3	0.1	1.4	0.3	321.4	4.4	313.4	11.5	254.0	92.9	321.4	4.4	NA
CG-59	209.8	81,777.9	1.6	6.2	0.3	10.4	1.4	0.5	1.4	1.0	2482.8	27.8	2473.6	12.8	2466.0	4.5	2466.0	4.5	100.7
CG-60	64.3	8,845.9	1.1	20.0	19.5	0.4	19.8	0.1	3.5	0.2	334.2	11.3	317.8	54.0	199.4	455.5	334.2	11.3	NA
R33	137.1	15,224.9	1.4	18.4	5.4	0.5	5.5	0.1	1.1	0.2	412.8	4.4	409.0	18.6	387.7	121.3	412.8	4.4	106.5
CG-61	217.7	33,042.8	2.5	18.9	5.8	0.4	6.5	0.1	2.9	0.4	342.8	9.5	339.9	18.7	320.4	132.4	342.8	9.5	NA

(*continued*)

Appendix 2: Continued

				Isotope Ratios							Apparent Ages, Ma								
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
CG-62	525.3	65,845.4	0.8	18.7	1.9	0.4	2.2	0.1	1.0	0.5	368.7	3.7	366.0	6.7	348.6	43.3	368.7	3.7	NA
CG-63	180.6	6,173.8	1.2	20.7	6.2	0.3	6.7	0.0	2.5	0.4	245.2	5.9	232.9	13.9	109.9	146.8	245.2	5.9	NA
CG-64	868.8	118,635.4	16.7	16.8	0.6	0.7	3.7	0.1	3.6	1.0	560.4	19.6	565.4	16.0	585.8	13.2	560.4	19.6	95.7
CG-65	261.2	14,693.1	1.4	19.9	12.1	0.2	12.1	0.0	1.4	0.1	217.9	3.0	216.7	23.7	203.8	280.9	217.9	3.0	NA
CG-66	44.0	12,732.6	1.0	12.1	150.1	0.5	150.3	0.0	7.5	0.0	251.6	18.5	379.9	516.9	1261.7	435.3	251.6	18.5	NA
CG-67	550.2	19,504.4	0.8	21.8	5.6	0.1	6.2	0.0	2.6	0.4	112.1	2.9	106.9	6.3	−6.9	136.1	112.1	2.9	NA
CG-68	101.9	6,965.7	1.3	19.9	15.8	0.2	16.2	0.0	3.3	0.2	203.6	6.7	203.9	29.9	208.3	369.5	203.6	6.7	NA
CG-69	174.9	10,875.0	1.3	25.3	29.1	0.1	29.4	0.0	3.8	0.1	134.0	5.1	110.3	30.7	−376.8	769.7	134.0	5.1	NA
CG-70	62.0	4,694.2	1.1	24.0	24.4	0.2	25.0	0.0	5.3	0.2	176.0	9.2	150.1	34.8	−241.4	623.7	176.0	9.2	NA
CG-71	142.9	29,389.6	0.9	20.3	12.2	0.2	13.1	0.0	4.6	0.4	176.2	8.0	175.2	21.0	162.1	287.1	176.2	8.0	NA
CG-72	156.2	12,322.4	1.6	19.7	6.3	0.4	6.5	0.1	1.8	0.3	344.8	6.0	330.9	18.4	233.9	145.0	344.8	6.0	NA
CG-73	637.9	222,952.0	11.6	12.3	1.4	2.1	2.1	0.2	1.6	0.8	1093.6	16.4	1139.0	14.7	1226.5	27.5	1226.5	27.5	89.2
CG-74	278.1	19,543.9	1.3	19.9	7.8	0.2	8.0	0.0	1.9	0.2	188.4	3.5	189.8	13.9	207.1	181.5	188.4	3.5	NA
CG-75	353.0	17,562.5	4.4	20.4	5.5	0.2	5.9	0.0	2.0	0.3	194.1	3.9	190.4	10.2	144.3	129.0	194.1	3.9	NA
CG-76	273.2	19,046.4	1.3	21.2	8.5	0.2	8.5	0.0	1.2	0.1	228.1	2.6	213.4	16.4	55.0	202.0	228.1	2.6	NA
CG-77	351.4	19,772.8	1.0	21.8	8.7	0.1	8.9	0.0	1.9	0.2	134.9	2.5	127.6	10.6	−5.9	209.6	134.9	2.5	NA
CG-79	181.8	16,816.6	1.1	17.2	14.8	0.2	15.4	0.0	4.2	0.3	121.6	5.1	144.2	20.7	534.6	324.9	121.6	5.1	NA
CG-80	193.4	21,098.2	1.8	20.1	11.8	0.3	12.2	0.0	3.2	0.3	276.3	8.8	266.9	28.7	184.7	275.1	276.3	8.8	NA
R33	196.9	36,773.6	1.3	18.1	3.8	0.5	4.0	0.1	1.3	0.3	422.4	5.2	422.0	13.8	419.5	85.0	422.4	5.2	100.7
CG-81	1042.5	104,861.5	2.5	19.7	1.0	0.3	3.4	0.0	3.2	1.0	259.5	8.2	256.2	7.7	225.8	23.4	259.5	8.2	NA
CG-82	893.8	96,388.2	1.2	19.3	1.5	0.3	3.0	0.0	2.6	0.9	261.1	6.6	262.8	6.9	278.0	34.5	261.1	6.6	NA
CG-83	209.9	38,757.9	3.0	18.8	4.2	0.5	5.1	0.1	2.9	0.6	390.6	11.1	383.8	16.3	342.6	94.6	390.6	11.1	NA
CG-84	454.1	43,048.9	1.0	19.6	3.8	0.3	4.1	0.0	1.6	0.4	269.9	4.2	266.5	9.6	236.7	87.3	269.9	4.2	NA
CG-85	221.1	13,825.0	1.7	19.1	3.1	0.3	4.6	0.0	3.4	0.7	262.7	8.7	266.8	10.7	302.9	69.6	262.7	8.7	NA
CG-86	303.9	33,638.5	8.3	18.7	2.2	0.4	3.3	0.1	2.5	0.8	352.1	8.5	352.5	9.8	355.1	48.6	352.1	8.5	NA
CG-87	840.6	97,976.0	5.7	18.4	1.4	0.5	4.5	0.1	4.3	1.0	381.5	15.9	381.6	14.3	382.3	30.5	381.5	15.9	NA
CG-88	427.5	25,934.7	1.4	19.3	3.6	0.3	6.4	0.0	5.3	0.8	272.8	14.2	273.6	15.4	280.4	81.8	272.8	14.2	NA
CG-89	178.5	16,020.2	1.4	20.2	10.0	0.3	10.7	0.0	3.8	0.4	240.5	9.0	233.9	22.3	167.3	233.0	240.5	9.0	NA
CG-90	176.9	22,239.5	1.9	21.9	14.2	0.2	15.0	0.0	5.0	0.3	236.6	11.6	214.4	29.1	−22.0	344.4	236.6	11.6	NA
CG-91	93.7	20,561.2	4.2	15.5	3.9	0.9	5.5	0.1	3.8	0.7	632.1	22.9	660.8	26.5	759.8	82.8	632.1	22.9	83.2
CG-92	90.6	12,112.1	1.5	17.8	6.0	0.7	6.5	0.1	2.7	0.4	522.0	13.6	510.3	26.3	458.2	132.3	522.0	13.6	113.9

(*continued*)

Appendix 2: Continued

				Isotope Ratios							Apparent Ages, Ma								
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
CG-93	382.0	50,304.7	1.0	19.2	2.2	0.3	2.9	0.0	1.8	0.6	257.8	4.5	260.9	6.6	288.8	50.8	257.8	4.5	NA
CG-94	527.6	31,869.4	1.3	19.5	1.4	0.3	2.4	0.0	1.9	0.8	249.0	4.7	249.9	5.3	259.1	32.8	249.0	4.7	NA
CG-95	521.2	6,807.0	2.0	19.7	6.9	0.2	7.7	0.0	3.5	0.4	203.0	6.9	205.1	14.3	229.3	159.7	203.0	6.9	NA
CG-96	264.5	58,316.1	1.0	19.6	3.7	0.3	4.2	0.0	2.0	0.5	269.0	5.2	265.7	9.9	236.7	86.4	269.0	5.2	NA
CG-97	126.1	12,990.0	1.1	21.2	20.4	0.2	20.7	0.0	3.4	0.2	240.4	8.1	224.4	41.6	59.4	490.2	240.4	8.1	NA
CG-98	593.4	83,110.4	1.4	19.7	2.7	0.3	3.1	0.0	1.5	0.5	257.4	3.9	255.0	7.0	233.2	62.4	257.4	3.9	NA
CG-99	182.1	106,267.7	1.2	13.5	0.5	1.8	1.2	0.2	1.1	0.9	1062.0	10.5	1055.9	7.8	1043.3	10.4	1043.3	10.4	101.8
CG-100	428.9	48,711.8	1.3	20.8	5.5	0.2	5.7	0.0	1.2	0.2	213.5	2.6	204.3	10.5	99.0	130.5	213.5	2.6	NA

Analyzed at the GeoChron Center at the University of Arizona.
Abbreviations: Conc = concentration; Corr. = correction; N/A = not available; U/Th = uranium–thorium.

Appendix 3: Uranium–Lead Geochronologic Analyses for Whitecliffs Sample (MM3)

				Isotope Ratios							Apparent Ages, Ma								
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
WC-2	847	160,888	16.5	17.90	0.8	0.617	2.4	0.080	2.2	0.94	497.1	10.7	488.2	9.2	446.7	18.1	497.1	10.7	NA
WC-3	292	6,168	0.8	19.81	6.2	0.242	7.8	0.035	4.8	0.61	220.4	10.3	220.1	15.5	216.7	144.0	220.4	10.3	NA
WC-4	839	40,490	1.2	19.95	2.5	0.269	2.8	0.039	1.3	0.45	246.2	3.1	241.9	6.1	200.7	59.1	246.2	3.1	NA
WC-5	252	58,183	2.4	17.11	3.7	0.666	5.0	0.083	3.4	0.68	512.1	16.7	518.4	20.2	546.4	79.9	512.1	16.7	93.7
WC-6	182	8,913	0.8	18.84	10.2	0.301	10.9	0.041	3.8	0.35	260.0	9.8	267.4	25.6	332.2	231.6	260.0	9.8	NA
WC-7	431	36,561	1.5	18.91	2.5	0.398	3.0	0.055	1.5	0.52	342.3	5.2	339.9	8.6	323.7	57.4	342.3	5.2	NA
WC-8	319	20,867	1.2	19.06	6.2	0.318	6.5	0.044	1.9	0.29	277.2	5.0	280.2	15.9	305.6	141.5	277.2	5.0	NA
WC-9	189	91,21	1.9	19.66	6.6	0.300	7.1	0.043	2.6	0.37	270.1	7.0	266.5	16.7	234.5	153.0	270.1	7.0	NA
WC-10	380	43,042	1.8	18.58	2.2	0.400	3.6	0.054	2.9	0.79	338.2	9.4	341.5	10.5	363.8	50.6	338.2	9.4	NA
WC-11	200	13,331	1.7	19.77	12.9	0.261	13.2	0.037	2.9	0.22	237.2	6.8	235.8	27.9	221.8	299.8	237.2	6.8	NA
WC-12	205	22,983	1.7	20.34	9.4	0.283	9.9	0.042	3.0	0.30	263.3	7.7	252.8	22.2	156.0	221.4	263.3	7.7	NA
WC-13	290	38082	3.2	17.94	4.3	0.492	4.4	0.064	0.9	0.20	399.9	3.5	406.3	14.7	442.6	95.5	399.9	3.5	NA
WC-14	466	23,932	1.8	20.26	3.0	0.252	3.6	0.037	2.0	0.55	234.1	4.6	227.9	7.4	164.8	70.8	234.1	4.6	NA
WC-15	460	53,517	11.7	16.43	1.2	0.842	2.0	0.100	1.6	0.80	616.5	9.2	620.3	9.1	634.2	25.6	616.5	9.2	97.2
WC-16	301	15,594	0.8	19.79	5.7	0.254	6.3	0.036	2.5	0.40	231.1	5.7	230.1	12.9	220.0	132.9	231.1	5.7	NA
WC-17	180	16,561	1.0	17.68	2.9	0.583	3.4	0.075	1.8	0.53	464.8	8.2	466.5	12.9	474.5	64.7	464.8	8.2	NA
WC-19	52	2,393	1.4	22.75	39.7	0.224	40.2	0.037	6.2	0.16	233.9	14.3	205.2	74.9	−113.1	1013.9	233.9	14.3	NA
WC-20	181	7,189	1.1	20.04	13.6	0.228	14.3	0.033	4.4	0.31	209.9	9.0	208.3	26.9	190.3	316.9	209.9	9.0	NA
WC-21	228	48,603	2.6	17.33	4.5	0.622	4.7	0.078	1.5	0.31	485.4	6.9	491.4	18.4	519.1	98.7	485.4	6.9	93.5
WC-22	860	76,091	4.9	18.68	1.2	0.444	1.4	0.060	0.8	0.53	376.5	2.8	373.1	4.5	352.1	27.8	376.5	2.8	NA
WC-23	542	96,916	4.0	13.53	0.7	1.699	1.9	0.167	1.8	0.93	994.1	16.7	1008.3	12.4	1039.2	14.4	1039.2	14.4	95.7
WC-24	35	4,367	2.6	19.23	19.9	0.393	21.2	0.055	7.1	0.33	343.6	23.7	336.2	60.7	285.4	460.2	343.6	23.7	NA
WC-25	113	6,866	1.3	22.79	22.2	0.252	22.8	0.042	5.1	0.22	263.0	13.1	228.1	46.7	−117.8	554.3	263.0	13.1	NA
WC-26	167	7,906	1.1	21.31	15.6	0.255	16.0	0.039	3.4	0.21	248.8	8.2	230.3	32.9	45.2	374.6	248.8	8.2	NA
WC-27	355	18,043	1.3	21.31	4.7	0.233	4.7	0.036	0.6	0.12	227.6	1.3	212.3	9.0	45.5	111.4	227.6	1.3	NA
WC-28	560	42,485	1.6	19.83	2.8	0.246	3.1	0.035	1.3	0.42	223.7	2.9	223.0	6.3	215.3	65.9	223.7	2.9	NA
WC-29	209	30,868	4.1	18.32	6.2	0.384	6.7	0.051	2.6	0.39	320.9	8.1	330.1	18.8	395.5	138.1	320.9	8.1	NA
WC-30	413	29,320	2.3	19.14	4.0	0.296	4.5	0.041	2.1	0.47	260.1	5.4	263.7	10.5	295.7	91.5	260.1	5.4	NA
WC-31	449	15,785	2.1	20.07	2.9	0.260	4.1	0.038	2.9	0.70	239.1	6.8	234.4	8.6	187.3	68.1	239.1	6.8	NA
WC-32	582	103,288	5.4	9.49	0.5	4.417	0.8	0.304	0.6	0.74	1710.8	8.6	1715.5	6.4	1721.2	9.6	1721.2	9.6	99.4
WC-33	165	7,264	1.0	21.65	21.1	0.252	22.5	0.040	7.9	0.35	250.1	19.3	228.2	46.1	7.3	513.6	250.1	19.3	NA

(*continued*)

Appendix 3: Continued

				Isotope Ratios							Apparent Ages, Ma							
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
WC-34	196	18,516	1.2	19.79	8.1	0.266	9.1	0.038	4.2	0.46	241.7	9.9	239.7	19.4	219.5	187.5	241.7	9.9	NA
WC-35	453	30,582	3.9	13.85	0.8	1.584	1.8	0.159	1.6	0.89	952.0	14.5	963.9	11.4	991.1	16.8	991.1	16.8	96.1
WC-36	1346	108,763	2.6	19.49	1.7	0.289	2.7	0.041	2.1	0.78	257.8	5.2	257.5	6.1	254.9	38.8	257.8	5.2	NA
WC-37	90	7,488	2.0	17.88	9.1	0.602	9.3	0.078	1.6	0.17	484.4	7.4	478.4	35.4	450.1	203.5	484.4	7.4	NA
WC-38	585	74,143	2.9	18.56	1.4	0.439	1.5	0.059	0.5	0.33	370.2	1.8	369.6	4.6	365.8	31.8	370.2	1.8	NA
WC-39	125	10,441	1.0	19.70	14.9	0.257	15.2	0.037	3.0	0.20	232.8	6.8	232.5	31.6	230.3	346.3	232.8	6.8	NA
WC-40	619	73,608	2.1	19.92	2.9	0.291	3.6	0.042	2.1	0.58	265.2	5.4	259.1	8.2	204.1	67.8	265.2	5.4	NA
WC-41	233	23,430	2.4	17.04	2.5	0.733	3.4	0.091	2.3	0.67	558.7	12.3	558.0	14.7	555.4	55.2	558.7	12.3	100.6
WC-43	296	15,994	2.1	20.47	5.6	0.249	5.9	0.037	1.8	0.30	234.4	4.1	226.1	12.0	140.5	132.0	234.4	4.1	NA
WC-44	231	55,098	2.2	19.80	5.5	0.363	5.6	0.052	1.3	0.24	327.4	4.3	314.3	15.3	218.7	127.0	327.4	4.3	NA
WC-45	590	68,349	1.6	19.74	2.0	0.263	2.6	0.038	1.7	0.66	238.4	4.1	237.2	5.6	225.1	45.6	238.4	4.1	NA
WC-46	115	7,661	1.6	21.96	25.9	0.229	26.3	0.036	4.9	0.19	230.6	11.1	209.1	49.8	−26.9	635.9	230.6	11.1	NA
WC-47	365	33,458	2.3	18.62	2.8	0.421	3.5	0.057	2.0	0.59	356.3	7.1	356.6	10.5	358.3	64.0	356.3	7.1	NA
WC-48	534	30,272	1.4	19.35	3.1	0.291	4.5	0.041	3.2	0.71	258.3	8.0	259.6	10.2	271.1	71.6	258.3	8.0	NA
WC-49	219	56,657	1.2	13.61	1.2	1.744	2.1	0.172	1.7	0.81	1024.2	15.8	1024.9	13.3	1026.4	24.3	1026.4	24.3	99.8
WC-50	196	11,912	1.3	21.64	9.8	0.259	10.1	0.041	2.2	0.22	256.5	5.6	233.6	21.0	8.8	236.4	256.5	5.6	NA
WC-51	389	20,190	1.3	20.09	5.7	0.244	6.7	0.036	3.5	0.52	225.2	7.7	221.7	13.3	184.9	133.2	225.2	7.7	NA
WC-52	849	190,880	8.1	13.93	0.9	1.468	3.0	0.148	2.9	0.96	891.3	24.1	917.2	18.3	979.8	17.8	979.8	17.8	91.0
WC-53	156	9,028	2.7	20.02	14.2	0.288	14.4	0.042	2.5	0.17	264.0	6.4	256.9	32.7	192.3	331.5	264.0	6.4	NA
WC-54	156	9,408	2.0	21.09	17.5	0.223	17.7	0.034	2.6	0.15	216.2	5.5	204.4	32.7	70.0	418.8	216.2	5.5	NA
WC-55	426	39,605	2.9	18.79	2.8	0.405	3.0	0.055	0.8	0.27	346.2	2.6	345.2	8.6	338.4	64.5	346.2	2.6	NA
WC-56	144	18,725	1.7	21.19	13.9	0.235	14.2	0.036	2.8	0.20	228.3	6.4	214.0	27.4	58.5	332.9	228.3	6.4	NA
WC-57	443	24,812	3.0	18.97	3.4	0.322	3.5	0.044	0.9	0.27	279.1	2.6	283.1	8.6	316.2	76.6	279.1	2.6	NA
WC-58	225	8,402	2.5	19.11	7.5	0.267	8.9	0.037	4.9	0.55	234.0	11.2	240.1	19.1	300.3	170.8	234.0	11.2	NA
WC-59	629	159,099	10.5	14.10	1.0	1.110	2.2	0.113	1.9	0.89	692.9	12.6	758.0	11.5	955.3	19.7	692.9	12.6	72.5
WC-60	253	9,055	1.3	22.13	12.2	0.199	12.4	0.032	2.3	0.19	202.7	4.7	184.3	20.9	−45.7	296.4	202.7	4.7	NA
WC-61	717	20,038	1.3	20.98	4.9	0.121	5.1	0.018	1.5	0.30	117.4	1.8	115.8	5.6	82.6	115.3	117.4	1.8	NA
WC-62	296	19,866	1.3	20.12	4.3	0.300	4.4	0.044	1.2	0.27	276.5	3.2	266.7	10.4	181.6	99.3	276.5	3.2	NA
WC-63	341	21,050	1.8	19.63	4.8	0.248	5.2	0.035	2.0	0.38	223.7	4.4	225.0	10.5	238.0	110.6	223.7	4.4	NA
WC-64	238	18,275	1.3	20.61	9.4	0.205	9.9	0.031	3.2	0.33	194.8	6.2	189.6	17.1	125.2	221.0	194.8	6.2	NA
WC-65	233	18,484	1.3	19.64	6.1	0.249	6.9	0.036	3.1	0.45	225.0	6.9	226.1	14.0	237.6	141.9	225.0	6.9	NA

(*continued*)

Appendix 3: Continued

				Isotope Ratios							Apparent Ages, Ma								
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
WC-66	110	29,394	2.5	9.78	1.0	4.052	1.5	0.288	1.1	0.72	1629.1	15.4	1644.7	12.2	1664.6	19.3	1664.6	19.3	97.9
WC-67	466	45,447	19.8	14.32	1.4	1.329	4.7	0.138	4.5	0.96	834.0	34.9	858.6	27.1	922.7	28.0	834.0	34.9	90.4
WC-68	102	7,286	1.8	21.63	23.6	0.252	24.0	0.040	4.4	0.18	250.3	10.7	228.6	49.1	9.9	574.0	250.3	10.7	NA
WC-69	920	70,984	1.8	19.78	2.0	0.256	2.2	0.037	0.9	0.40	232.1	2.0	231.1	4.6	220.3	46.9	232.1	2.0	NA
WC-70	708	309,646	2.8	14.02	0.5	1.406	1.8	0.143	1.7	0.97	861.8	13.8	891.6	10.5	966.2	9.4	966.2	9.4	89.2
WC-71	64	2,943	1.4	26.31	27.3	0.207	27.8	0.040	5.0	0.18	250.2	12.3	191.3	48.5	−485.0	736.2	250.2	12.3	NA
WC-72	652	25,355	2.1	19.94	3.3	0.250	3.4	0.036	0.8	0.23	228.7	1.8	226.4	6.9	202.2	77.1	228.7	1.8	NA
WC-73	104	5,457	1.3	18.90	14.7	0.227	15.1	0.031	3.5	0.23	197.3	6.8	207.6	28.4	325.4	335.9	197.3	6.8	NA
WC-74	311	41,251	2.2	16.81	2.4	0.756	2.8	0.092	1.4	0.49	568.3	7.4	571.8	12.0	585.5	52.1	568.3	7.4	97.1
WC-75	156	16,412	1.3	20.59	11.9	0.286	12.5	0.043	3.8	0.30	269.6	10.1	255.4	28.3	127.2	281.8	269.6	10.1	NA
WC-76	360	42,851	3.6	18.62	3.3	0.463	4.2	0.063	2.5	0.59	391.3	9.4	386.7	13.4	358.9	75.6	391.3	9.4	NA
WC-77	374	34,115	2.8	19.59	4.1	0.292	4.9	0.042	2.7	0.56	262.1	7.0	260.2	11.3	243.2	93.8	262.1	7.0	NA
WC-78	357	47,520	2.7	18.46	2.7	0.438	3.3	0.059	2.0	0.60	367.3	7.1	368.7	10.4	377.6	60.5	367.3	7.1	NA
WC-79	745	72,799	2.3	19.90	2.5	0.250	2.9	0.036	1.3	0.46	228.9	3.0	227.0	5.8	207.0	58.8	228.9	3.0	NA
WC-80	515	29,579	2.3	18.58	3.2	0.421	3.6	0.057	1.6	0.44	356.1	5.5	357.0	10.8	363.3	72.5	356.1	5.5	NA
WC-81	134	26,604	3.1	12.92	1.8	1.971	1.9	0.185	0.6	0.30	1092.9	5.5	1105.8	12.5	1131.3	35.4	1131.3	35.4	96.6
WC-82	4619	87,796	5.3	20.89	4.1	0.038	4.3	0.006	1.3	0.30	37.2	0.5	38.1	1.6	93.3	97.7	37.2	0.5	NA
WC-83	106	4,924	1.6	19.26	21.7	0.199	22.2	0.028	5.0	0.22	177.0	8.7	184.6	37.5	282.5	501.0	177.0	8.7	NA
WC-84	481	45,592	1.5	17.21	1.4	0.691	2.3	0.086	1.8	0.80	533.2	9.3	533.2	9.5	533.3	30.3	533.2	9.3	100.0
WC-85	102	10,748	3.2	17.12	12.3	0.576	12.6	0.071	2.6	0.21	445.1	11.4	461.7	46.9	545.2	270.7	445.1	11.4	NA
WC-86	737	29,498	1.4	20.12	3.0	0.221	3.3	0.032	1.3	0.40	204.4	2.6	202.5	6.0	180.5	70.6	204.4	2.6	NA
WC-87	591	32,701	1.3	19.34	2.7	0.273	3.1	0.038	1.6	0.52	242.4	3.9	245.2	6.8	271.9	60.9	242.4	3.9	NA
WC-88	290	13,929	1.7	19.63	5.7	0.299	6.1	0.043	2.1	0.35	268.7	5.6	265.5	14.2	237.7	131.8	268.7	5.6	NA
WC-89	323	73,660	3.7	13.49	1.4	1.698	2.7	0.166	2.3	0.85	990.7	20.8	1007.6	17.0	1044.4	28.3	1044.4	28.3	94.9
WC-90	487	18,714	4.1	20.11	4.7	0.246	5.2	0.036	2.2	0.42	226.9	4.8	223.1	10.3	182.7	109.2	226.9	4.8	NA
WC-91	488	32,234	2.3	19.46	3.5	0.290	4.4	0.041	2.7	0.61	258.2	6.8	258.2	10.1	258.4	81.1	258.2	6.8	NA
WC-92	144	11,455	1.4	19.01	8.8	0.304	9.8	0.042	4.4	0.45	264.9	11.5	269.6	23.3	311.3	200.1	264.9	11.5	NA
WC-93	398	43,511	1.3	19.10	5.9	0.257	6.1	0.036	1.3	0.22	225.2	2.9	231.9	12.6	300.8	135.6	225.2	2.9	NA
WC-94	276	14,7088	1.3	9.67	0.5	4.114	2.3	0.289	2.3	0.98	1634.2	32.8	1657.2	18.9	1686.5	8.9	1686.5	8.9	96.9
WC-95	567	61,527	8.6	15.91	1.5	0.691	2.3	0.080	1.8	0.76	494.3	8.4	533.2	9.6	703.5	31.8	494.3	8.4	70.3
WC-96	104	6,315	1.4	18.35	10.5	0.299	11.4	0.040	4.4	0.39	251.3	11.0	265.4	26.6	391.1	235.6	251.3	11.0	NA

(*continued*)

Appendix 3: Continued

				Isotope Ratios							Apparent Ages, Ma							
Analysis	U ppm	206Pb 204Pb	U/Th	206Pb 207Pb	± %	207Pb 235U	± %	206Pb 238U	± %	Error Corr.	206Pb 238U	± Ma	207Pb 235U	± Ma	206Pb 207Pb	± Ma	Best Age Ma	± Ma	Conc %
WC-97	561	34,821	1.8	19.66	3.0	0.267	3.8	0.038	2.3	0.60	241.2	5.4	240.6	8.0	234.5	69.1	241.2	5.4	NA
WC-98	315	21,932	1.6	20.09	6.8	0.262	7.0	0.038	1.7	0.24	241.5	4.0	236.2	14.8	184.3	158.7	241.5	4.0	NA
WC-99	333	21,555	1.9	19.45	6.2	0.270	6.4	0.038	1.7	0.27	241.2	4.1	242.9	13.9	259.4	142.0	241.2	4.1	NA
WC-100	176	9,164	2.1	18.93	9.7	0.279	9.9	0.038	2.0	0.20	242.1	4.8	249.7	22.0	321.4	221.3	242.1	4.8	NA
WC-101	120	67,96	2.4	20.25	11.2	0.258	11.7	0.038	3.4	0.29	239.3	7.9	232.7	24.4	166.5	263.2	239.3	7.9	NA
WC-102	241	7,867	2.2	19.99	5.3	0.251	7.9	0.036	5.9	0.74	230.8	13.3	227.7	16.1	196.3	122.8	230.8	13.3	NA
WC-103	187	8,976	1.3	21.72	11.5	0.247	11.9	0.039	3.2	0.27	246.2	7.7	224.2	24.0	−0.7	277.9	246.2	7.7	NA
WC-104	146	7,143	1.6	22.91	22.2	0.203	22.5	0.034	3.2	0.14	214.1	6.8	187.8	38.5	−130.8	555.4	214.1	6.8	NA
WC-105	490	28,768	3.6	18.57	2.2	0.377	3.3	0.051	2.4	0.74	319.4	7.6	324.9	9.2	364.7	50.6	319.4	7.6	NA
WC-106	84	7,120	1.3	23.43	45.8	0.246	46.4	0.042	7.5	0.16	263.7	19.2	223.1	93.2	−186.4	1201.0	263.7	19.2	NA
WC-107	221	49,958	3.1	18.82	6.2	0.368	6.6	0.050	2.3	0.35	315.9	7.1	318.2	18.0	334.7	139.7	315.9	7.1	NA
WC-108	177	4,572	1.3	19.20	17.3	0.301	17.6	0.042	2.9	0.17	264.6	7.6	267.1	41.3	289.6	398.8	264.6	7.6	NA
WC-109	252	13,528	1.1	19.39	7.8	0.233	8.4	0.033	3.0	0.36	207.9	6.2	212.7	16.1	266.7	179.9	207.9	6.2	NA
WC-110	192	34,056	3.5	16.91	4.4	0.794	4.6	0.097	1.0	0.22	599.0	5.8	593.4	20.5	572.0	96.7	599.0	5.8	104.7

Analyzed at the GeoChron Center at the University of Arizona.
Abbreviations: Conc = concentration; Corr. = correction; N/A = not available; U/Th = uranium–thorium.