

Datashare 37:

Provenance and paleodrainage patterns of Upper Jurassic and Lower Cretaceous synrift sandstones in the Flemish Pass Basin, offshore Newfoundland, east coast of Canada

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AAPG Bulletin, v. 95, no. 8 (August 2011), pp. 1295–1320

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APPENDIX 2: Thin Section Petrography*

Sample	L11 3765.5	L11 3765	L11 3756.5	L11 3640	L11 3634.5	L11 3624	L11 3615.5	L11 3606
%Fw grains	68, 68(r)	60, 61(r)	79, 82(r)	65, 65(r)	70, 72(r)	79, 82(r)	73, 78(r)	70, 80(r)
% FW								
%Qtz	60	50	70	55	55	60	60	55
%Fs	2, 4(r)	1, 3(r)	1, 3(r)	1, 2(r)	1, 3(r)	3, 5(r)	2, 5(r)	3, 7(r)
%Lth	6	8	10	10	14	16	8, 10(r)	12, 15(r)
Lth types	Sd, Ms	Sd, Ms	Sd, Ms	Ls, Ds Sd, Mt	Ls, Ds, Sd	Ls, Ds, Sd	Sd, Ms, Mt (qtz)	Sd, Ms
% Matrix	0	0	1	0	0	0	0	0
% Cement	30	35	4	32	7	1	2	<<1
% Porosity	4	5	15	3	23	20	25	30
Mtx types								
Cem types	D, Kl, Qz	D, Kl, Qz	DI, Kl, Qz, Cy	DI, Kl, Cy	DI,	DI	DI, Kl, Cy	DI
Primary pore types	ig, itg (?)	ig, itg (?)	ig	ig	ig, itg (?)	ig	ig	ig
Secondary pore types	gr, itg	gr, itg	gr, itg, cm (?)	itg	gr, itg, cm (?)	gr	Gr, itg cm (?)	gr, itg
Auth mins								
Acc/Other	Org		Zr, Tm, Gl	Gl, Od	Od	Zr, Cl, Od		
Grn size range (mm)	0.2–2.0	0.2–1.0	0.2–1.2	0.1–3.0	0.3–1.0	0.2–0.8	0.3–1.5	0.2–0.6
Wentworth size class	fine-v.coarse	fine-coarse	fine-v.coarse	v.fine-granule	med-coarse	fine-coarse	med-v.coarse	fine-coarse
Average size	0.6 (coarse)	0.5 (m-c)	0.6 (coarse)	0.7 (coarse)	0.4 (medium)	0.35 (medium)	0.6 (coarse)	0.4 (medium)
Sorting	moderate	moderate	moderate	poor	well	well	well	well
Fw roundness	ang-sbr, og	ang-sbr, og	ang-sbr, og	sba-rnd, eh	sba-rnd, eh	sba-rnd, eh	sba-rnd, eh	sbr-rnd
Q	85.7	82.0	84.3	82.1	76.4	75.9	80.0	71.4
F	5.7	4.9	3.6	3.0	4.2	3.8	6.7	9.1
L	8.6	13.1	12.0	14.9	19.4	20.3	13.3	19.5
Total QFL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Name	Sublitharenite	Sublitharenite	Sublitharenite	Sublitharenite	Sublitharenite	Sublitharenite	Sublitharenite	Sublitharenite
T maturity	Submature	Submature	Submature	Submature	Mature	Mature	Mature	Mature
M maturity	Submature	Submature	Submature	Submature	Submature	Submature	Submature	Immature

*Proportions are visually estimated using Folk (1951). QFL proportions are normalized to 100%. QFL = normalized proportions of quartz-feldspar-lithic framework grains; Sd = sedimentary; Ms = metasedimentary; Ls = limestone; Ds = dolostone; Mt = metamorphic; FW = framework; Fs = feldspar; T = textural; M = mineralogical; (r) = restored prediagenetic value (estimate); ig = intergranular; itg = intragranular; Zr = zircon; Qtz = quartz; DI = dolomite; Kl = kaolinite; Cl = chlorite; CC = calcite; Cy = clay; Org = organic material; Tm = tourmaline; Od = ooid; Gl = glauconite; Rt = rutile; Sid = siderite; Py = pyrite; Ig = intergranular; Itg = intragranular; Fr = fracture; Gr = grain dissolution; Cm = cement dissolution; Ang = angular; Sba = subangular; Sbr = subrounded; Rnd = rounded; Og = overgrowths present; Eh = euhedral; Mf = microfossils present.

APPENDIX 2. Continued

L11 3426	178 3304.5 m	178 3199.4 m	178 3209	178 3232.7	178 3273.5	178 3292.2	178 2183 m	178 2180 m	178 2177.8	178 2171
85, 55, 55(r)	95 5	86 65	85 70	81 60	81 65	95 15	45 40	52 47	68 60	65 50
1 30, 30(r)	0 90	1, 3?(r) 20	1, 4?(r) 16	1, 3?(r) 20	1, 5?(r) 15	0 80	2 3	3 2	3 5	3 10
Sd, Ls, Ls(od), Ds		Sd, Ls, Ds	Ls, Sd, Ms	Ls, Sd, Ms	Ls, Sd, Ms	Sd	Sd	Sd	Sd	Sd
0		4	5	4	14	0	50	40	2	15
15 <<1	5	<<1 10	<<1 10	<<1 15	5 0	5 0	<<1 5	<<1 8	<<1 30	<<1 20
DI	CC	DI	DI ig	DI ig fr	DI ig fr	DI	Sid ig itg??	Sid ig itg??	Sid ig	Sid ig
Py Gl, Zr, Tm, Cl, Od	Od	Zr, Tm	Sid Zr, Tm, org	Zr, Tm, org		Py Gl, Org	Py, Sid Gl, Mf, Org, Zr, Tm	Py, Sid Gl, Mf, Org, Zr, Tm	Py, Sid Gl, Mf, Org, Zr, Tm	Py, Sid Gl, Mf, Org, Zr, Tm, Rt
0.05-0.8 v.fine-coarse 0.15 (fine) moderate-poor ang-sbr	0.1-1.3 poor v.ang-ang	0.07-0.3 v.fine-med 0.2 (fine) well ang-sbr	0.1-0.3 fine-med 0.2 (fine) well ang-sbr	0.1-0.3 fine-med 0.2 (fine) well ang-sbr	0.1-0.3 fine-med 0.2 (fine) well ang-sbr	0.3-0.8 moderate ang-sba	0.05-0.15 v.fine-fine 0.08 (v.fine) well ang-sba	0.05-0.15 v.fine-fine 0.08 (v.fine) well ang-sba	0.05-0.2 0.09 well ang-sba	0.05-0.17 0.08 well ang-sba
64.0 1.2 34.9 100.0	74.2 3.4 22.5 100.0	77.8 4.4 17.8 100.0	72.3 3.6 24.1 100.0	77.4 4.8 17.9 100.0	88.9 4.4 6.7 100.0	5.3 0.0 94.7 100.0	90.4 5.8 3.8 100.0	88.2 4.4 7.4 100.0	79.4 4.8 15.9 100.0	15.8 0.0 84.2 100.0
Lithic arenite Submature Immature	Lithic arenite Submature Immature	Sublitharenite Mature Submature	Sublitharenite Mature Submature	Sublitharenite Mature Submature	Lithic wacke Immature Submature	Lithic arenite Mature Immature	Lithic wacke Immature Submature	Lithic wacke Immature Submature	Sublitharenite Immature Submature	Lithic wacke Immature Submature

APPENDIX 3: U-Pb Isotopic Age Data from Detrital Zircons

Sample	Grain ID	Measured Isotopic Ratios							Calculated Ages										
		207Pb/ 235U	1s error	206Pb/ 238U	1s error	Rho	207Pb/ 206Pb	1s error	207Pb/ 235U	1s error	206Pb/ 238U	1s error	207Pb/ 206Pb	1s error	U-Pb/ Pb-Pb Concordancy	Concordia age (Ma)	2s error Ma	MSWD (of concordance)	Probability
L113760Z	_001	2.315	0.160	0.179	0.010	0.420	0.088	0.001	1217	49	1061	57	1372	17	77	1150	91	7.22	0.007
L113760Z	_003	12.125	0.216	0.496	0.010	0.547	0.178	0.001	2614	17	2595	42	2637	9	98	2616	33	0.30	0.584
L113760Z	_004	19.342	0.417	0.571	0.009	0.363	0.241	0.001	3059	21	2911	37	3130	8	93				Discordant
L113760Z	_006	0.476	0.038	0.066	0.002	0.167	0.057	0.001	395	26	413	11	505	34	82	411	21	0.44	0.505
L113760Z	_007	0.578	0.023	0.075	0.002	0.262	0.058	0.000	463	15	468	10	536	18	87	467	18	0.07	0.787
L113760Z	_008	1.609	0.041	0.158	0.003	0.375	0.072	0.001	974	16	946	17	975	18	97	961	27	2.33	0.127
L113760Z	_009	2.072	0.032	0.190	0.002	0.352	0.079	0.000	1139	10	1123	11	1172	12	96	1132	18	1.76	0.185
L113760Z	_010	2.074	0.049	0.187	0.003	0.351	0.081	0.001	1140	16	1103	17	1223	20	90	1122	27	3.95	0.047
L113760Z	_011	0.507	0.011	0.064	0.001	0.349	0.055	0.000	417	7	402	6	421	19	96	407	10	3.57	0.059
L113760Z	_012	0.737	0.022	0.095	0.002	0.262	0.057	0.001	560	13	584	9	496	23	118	577	16	2.89	0.089
L113760Z	_013	1.726	0.031	0.170	0.002	0.349	0.074	0.000	1018	11	1014	12	1051	12	96	1016	19	0.12	0.734
L113760Z	_014	0.704	0.025	0.083	0.002	0.282	0.063	0.001	541	15	515	10	697	29	74	521	18	2.91	0.088
L113760Z	_015	35.593	0.640	0.757	0.014	0.515	0.333	0.001	3655	18	3631	51	3629	7	100	3657	35	0.28	0.596
L113760Z	_016	5.693	0.150	0.325	0.008	0.481	0.123	0.001	1930	23	1814	40	1996	8	91	1922	46	11.11	0.001
L113760Z	_017	0.500	0.017	0.067	0.001	0.280	0.056	0.001	412	11	417	8	471	22	88	415	14	0.19	0.661
L113760Z	_018	4.166	0.069	0.291	0.004	0.407	0.102	0.000	1667	14	1649	20	1666	9	99	1663	26	0.99	0.319
L113760Z	_020	0.515	0.014	0.067	0.001	0.298	0.055	0.000	422	10	420	7	426	19	98	420	12	0.05	0.825
L113760Z	_021	0.476	0.014	0.063	0.001	0.309	0.055	0.001	395	9	397	7	431	23	92	396	13	0.02	0.899
L113760Z	_022	14.765	0.243	0.544	0.010	0.541	0.194	0.001	2800	16	2801	40	2776	9	101	2800	31	0.00	0.984
L113760Z	_023	1.644	0.027	0.160	0.002	0.370	0.072	0.001	987	11	959	11	994	15	96	974	18	5.43	0.020
L113760Z	_024	13.004	0.334	0.475	0.011	0.452	0.193	0.001	2680	24	2506	48	2768	9	91				Discordant
L113760Z	_025	5.262	0.068	0.317	0.004	0.453	0.118	0.001	1863	11	1775	18	1923	8	92				Discordant
L113760Z	_026	14.135	0.270	0.541	0.010	0.507	0.191	0.001	2759	18	2789	44	2749	11	101	2757	36	0.63	0.429
L113760Z	_030	0.486	0.014	0.065	0.001	0.313	0.055	0.001	402	10	408	7	418	21	97	406	13	0.26	0.610
L113760Z	_031	0.782	0.021	0.093	0.002	0.375	0.060	0.000	587	12	575	11	604	17	95	580	19	0.77	0.380
L113760Z	_032	4.200	0.110	0.289	0.007	0.478	0.103	0.001	1674	22	1635	36	1684	17	97	1670	43	1.45	0.229
L113760Z	_033	0.494	0.017	0.066	0.001	0.267	0.057	0.001	408	12	412	7	493	24	83	411	14	0.12	0.725
L113760Z	_034	0.715	0.026	0.093	0.002	0.227	0.058	0.001	548	15	573	9	524	26	110	568	17	2.60	0.107
L113760Z	_035	6.354	0.142	0.367	0.007	0.437	0.123	0.001	2026	20	2015	34	2003	8	101	2025	39	0.13	0.722
L113760Z	_037	13.831	0.236	0.523	0.008	0.450	0.190	0.001	2738	16	2714	34	2739	11	99	2738	32	0.66	0.418
L113760Z	_038	1.844	0.040	0.170	0.003	0.404	0.076	0.001	1061	14	1014	16	1089	15	93	1043	25	7.94	0.005
L113760Z	_039	0.888	0.020	0.103	0.002	0.366	0.061	0.000	645	11	631	10	642	14	98	637	17	1.54	0.215
L113760Z	_042	5.918	0.112	0.327	0.006	0.453	0.129	0.001	1964	16	1826	27	2078	8	88	1946	33	31.70	0.000
L113760Z	_043	2.068	0.102	0.202	0.005	0.266	0.076	0.001	1138	34	1188	29	1108	26	107	1168	49	1.73	0.188
L113760Z	_044	0.984	0.029	0.109	0.003	0.416	0.065	0.001	696	15	667	15	772	16	86	682	26	3.17	0.075
L113760Z	_045	1.352	0.026	0.140	0.002	0.337	0.069	0.001	868	11	846	10	885	18	96	855	17	3.35	0.067
L113760Z	_048	0.524	0.016	0.067	0.001	0.365	0.056	0.001	428	10	417	9	466	22	90	421	16	0.95	0.330

L113760Z	_049	0.801	0.048	0.101	0.003	0.223	0.062	0.001	598	27	621	16	676	32	92	616	30	0.68	0.410
L113760Z	_050	0.460	0.039	0.067	0.001	0.089	0.075	0.002	385	27	417	6	1066	48	39	416	12	1.45	0.229
L113760Z	_051	0.815	0.024	0.096	0.002	0.278	0.061	0.001	605	14	592	9	652	20	91	596	17	0.81	0.368
L113760Z	_055	2.412	0.088	0.203	0.004	0.297	0.083	0.001	1246	26	1193	24	1268	16	94	1215	40	3.21	0.073
L113760Z	_057	2.630	0.059	0.215	0.005	0.536	0.086	0.000	1309	16	1256	27	1343	11	94	1306	33	5.21	0.022
L113760Z	_062	0.521	0.014	0.065	0.001	0.241	0.057	0.001	426	9	409	5	488	26	84	412	10	3.03	0.082
L113760Z	_063	0.383	0.013	0.047	0.001	0.259	0.057	0.001	329	9	298	5	501	31	60	302	10	10.80	0.001
L113760Z	_064	6.552	0.125	0.352	0.008	0.625	0.139	0.001	2053	17	1942	40	2213	16	88	Discordant			
L113760Z	_069	0.566	0.026	0.076	0.001	0.181	0.060	0.001	456	17	474	8	594	25	80	472	15	1.13	0.287
L113760Z	_072	0.519	0.011	0.065	0.001	0.298	0.055	0.000	425	7	407	5	430	20	95	411	9	5.85	0.016
L113760Z	_073	5.080	0.068	0.327	0.004	0.432	0.112	0.001	1833	11	1822	18	1838	9	99	1831	22	0.40	0.528
L113760Z	_079	0.497	0.021	0.064	0.002	0.315	0.057	0.000	410	14	400	10	492	16	81	403	19	0.46	0.499
L113760Z	_080	4.910	0.063	0.308	0.004	0.490	0.111	0.000	1804	11	1732	19	1815	5	95	Discordant			
L113760Z	_082	0.312	0.011	0.047	0.001	0.253	0.051	0.001	275	8	298	5	244	30	122	293	9	7.06	0.008
L113760Z	_083	4.933	0.081	0.314	0.004	0.432	0.111	0.000	1808	14	1760	22	1823	8	97	1800	27	5.72	0.017
L113760Z	_087	3.998	0.060	0.282	0.003	0.353	0.101	0.001	1634	12	1599	15	1646	10	97	1622	22	4.83	0.028
L113760Z	_088	0.503	0.009	0.062	0.001	0.338	0.057	0.000	414	6	389	4	492	17	79			Discordant	
L113760Z	_089	7.425	0.093	0.382	0.005	0.542	0.137	0.000	2164	11	2085	24	2192	5	95			Discordant	
L113760Z	_091	0.673	0.019	0.089	0.001	0.236	0.057	0.001	523	11	553	7	483	26	114	546	13	6.36	0.012
L113760Z	_092	1.481	0.079	0.162	0.002	0.142	0.078	0.001	923	32	969	14	1151	26	84	963	26	2.03	0.154
L113760Z	_095	1.699	0.029	0.165	0.002	0.436	0.073	0.000	1008	11	987	14	1019	9	97	1002	21	2.47	0.116
L113760Z	_096	3.303	0.071	0.257	0.004	0.359	0.094	0.000	1482	17	1473	20	1507	8	98	1478	30	0.19	0.664
L113760Z	_097	1.126	0.049	0.110	0.001	0.152	0.079	0.002	766	23	671	8	1182	38	57			Discordant	
L113760Z	_098	0.800	0.022	0.091	0.002	0.356	0.063	0.001	597	12	562	10	706	19	80	575	18	7.07	0.008
L113760Z	_099	0.795	0.027	0.096	0.002	0.333	0.061	0.001	594	15	591	13	624	20	95	592	22	0.02	0.886
L113760Z	_101	0.697	0.020	0.087	0.001	0.260	0.059	0.001	537	12	538	8	572	25	94	538	14	0.01	0.933
L113760Z	_102	6.395	0.120	0.356	0.006	0.425	0.128	0.001	2032	17	1964	27	2068	7	95	2022	33	7.22	0.007
L113760Z	_103	0.527	0.013	0.066	0.001	0.330	0.055	0.001	430	9	410	7	399	25	103	416	12	4.61	0.032
L113760Z	_104	6.579	0.057	0.366	0.003	0.527	0.125	0.000	2056	8	2009	16	2027	5	99			Discordant	
L113760Z	_105	0.153	0.009	0.022	0.001	0.207	0.056	0.001	145	8	142	4	460	40	31	142	7	0.15	0.696
L113760Z	_106	0.775	0.022	0.095	0.002	0.285	0.061	0.001	583	12	586	9	632	18	93	585	16	0.07	0.784
L113760Z	_107	1.394	0.038	0.155	0.002	0.272	0.069	0.001	886	16	929	13	901	27	103	913	23	5.82	0.016
L113760Z	_108	3.002	0.112	0.226	0.005	0.322	0.089	0.001	1408	28	1311	29	1407	14	93			Discordant	
L113760Z	_109	0.783	0.024	0.098	0.002	0.258	0.059	0.001	587	14	600	9	577	25	104	597	17	0.82	0.366
L113760Z	_110	13.555	0.185	0.506	0.007	0.522	0.187	0.001	2719	13	2639	31	2716	9	97			Discordant	
L113760Z	_111	0.780	0.019	0.091	0.002	0.345	0.060	0.001	585	11	562	9	605	20	93	571	16	3.82	0.051
L113760Z	_112	3.976	0.060	0.278	0.004	0.438	0.101	0.000	1629	12	1582	18	1638	8	97	1621	24	7.67	0.006
L113760Z	_113	0.524	0.017	0.066	0.001	0.283	0.061	0.001	428	11	409	7	626	26	65	413	14	2.59	0.108
L113760Z	_114	0.486	0.010	0.063	0.001	0.333	0.055	0.000	402	7	391	5	405	16	97	395	9	2.60	0.107
L113760Z	_115	0.112	0.006	0.021	0.001	0.238	0.042	0.001	108	5	137	3	-242	47	-57			Discordant	
L113760Z	_116	4.366	0.090	0.288	0.005	0.438	0.107	0.000	1706	17	1632	26	1747	7	93	1693	33	9.65	0.002
L113760Z	_117	11.311	0.301	0.425	0.011	0.473	0.189	0.001	2549	25	2283	48	2730	8	84			Discordant	
L113760Z	_118	1.881	0.034	0.177	0.002	0.386	0.075	0.000	1075	12	1052	14	1062	10	99	1065	21	2.46	0.117

APPENDIX 3. Continued

Sample	Grain ID	Measured Isotopic Ratios							Calculated Ages										
		207Pb/ 235U	1s error	206Pb/ 238U	1s error	Rho	207Pb/ 206Pb	1s error	207Pb/ 235U	1s error	206Pb/ 238U	1s error	207Pb/ 206Pb	1s error	U-Pb/ Pb-Pb Concordancy	Concordia age (Ma)	2s error Ma	MSWD (of concordance)	Probability
L113760Z	_119	3.507	0.071	0.256	0.004	0.397	0.097	0.000	1529	16	1471	21	1561	7	94	1512	30	7.44	0.006
L113760Z	_120	1.078	0.021	0.119	0.002	0.345	0.063	0.000	743	10	726	9	709	14	102	733	16	2.19	0.139
L113760Z	_121	0.528	0.027	0.064	0.002	0.303	0.058	0.001	431	18	403	12	535	29	75	409	23	2.25	0.134
L113615Z	_001	0.877	0.078	0.100	0.005	0.284	0.064	0.006	639	42	614	29	680	29	90	620	54	0.33	0.560
L113615Z	_002	0.825	0.031	0.110	0.003	0.396	0.055	0.003	611	17	670	19	488	26	137			Discordant	
L113615Z	_003	0.919	0.034	0.103	0.003	0.360	0.065	0.003	662	18	634	16	675	25	94	645	28	2.00	0.150
L113615Z	_004	0.201	0.019	0.024	0.001	0.175	0.062	0.006	186	16	151	5	662	58	23	152	10	4.80	0.030
L113615Z	_005	0.477	0.035	0.064	0.003	0.295	0.054	0.005	396	24	397	17	458	35	87	397	31	0.00	0.950
L113615Z	_006	0.522	0.022	0.070	0.002	0.308	0.054	0.003	427	15	434	11	413	29	105	432	20	0.22	0.640
L113615Z	_007	0.742	0.033	0.098	0.003	0.309	0.055	0.003	564	19	600	16	424	38	142	587	28	3.10	0.079
L113615Z	_008	0.914	0.042	0.109	0.003	0.303	0.061	0.003	659	22	669	18	667	20	100	666	32	0.18	0.670
L113615Z	_009	7.785	0.411	0.429	0.017	0.366	0.132	0.009	2206	48	2302	75	2063	17	112	2223	90	0.70	0.190
L113615Z	_010	5.382	0.215	0.359	0.012	0.416	0.109	0.006	1882	34	1977	57	1754	18	113	1894	67	3.30	0.071
L113615Z	_011	0.988	0.048	0.104	0.003	0.348	0.069	0.004	698	24	635	20	923	31	69	656	36	5.80	0.016
L113615Z	_012	5.666	0.175	0.327	0.010	0.502	0.126	0.005	1926	27	1824	49	1927	12	95	1922	53	5.90	0.016
L113615Z	_013	0.846	0.047	0.101	0.003	0.249	0.061	0.004	622	26	619	16	753	30	82	619	30	0.02	0.890
L113615Z	_014	0.538	0.028	0.069	0.002	0.304	0.056	0.003	437	19	433	13	477	23	91	434	25	0.06	0.810
L113615Z	_015	0.849	0.042	0.104	0.003	0.257	0.059	0.003	624	23	638	16	696	24	92	634	29	0.33	0.560
L113615Z	_017	2.877	0.074	0.238	0.004	0.362	0.088	0.003	1376	19	1379	23	1366	18	101	1377	34	0.01	0.910
L113615Z	_018	2.598	0.076	0.225	0.005	0.353	0.084	0.003	1300	22	1308	25	1251	15	105	1303	38	0.10	0.760
L113615Z	_019	0.502	0.029	0.072	0.002	0.185	0.050	0.003	413	20	450	9	431	28	104	445	18	3.40	0.066
L113615Z	_020	0.837	0.087	0.099	0.006	0.304	0.062	0.007	618	48	607	36	650	24	93			Discordant	
L113615Z	_021	5.548	0.169	0.343	0.008	0.380	0.117	0.004	1908	26	1903	38	1839	13	103	1907	50	0.02	0.890
L113615Z	_022	0.724	0.064	0.105	0.003	0.159	0.050	0.005	553	38	641	17	639	33	100	629	33	5.40	0.020
L113615Z	_023	0.916	0.042	0.103	0.002	0.242	0.064	0.003	660	22	633	14	777	34	81	638	25	1.40	0.240
L113615Z	_024	0.713	0.021	0.090	0.002	0.382	0.058	0.002	546	12	555	12	554	19	100	551	20	0.37	0.540
L113615Z	_025	0.495	0.035	0.069	0.002	0.229	0.052	0.004	408	24	433	13	384	28	113	428	25	1.07	0.300
L113615Z	_026	2.137	0.059	0.200	0.004	0.332	0.078	0.003	1161	19	1173	20	1110	15	106	1167	32	0.32	0.570
L113615Z	_028	3.150	0.084	0.238	0.005	0.396	0.096	0.003	1445	20	1375	26	1386	14	99	1422	38	7.30	0.007
L113615Z	_029	0.788	0.032	0.108	0.002	0.236	0.053	0.002	590	18	660	12	505	24	131			Discordant	
L113615Z	_030	0.174	0.014	0.021	0.001	0.304	0.059	0.006	163	12	136	7	774	41	18	139	13	0.49	0.027
L113615Z	_031	0.785	0.041	0.096	0.003	0.325	0.059	0.004	588	23	590	19	579	24	102	590	34	0.01	0.930
L113615Z	_034	0.715	0.056	0.090	0.004	0.263	0.057	0.005	548	33	558	22	581	25	96	556	40	0.09	0.760
L113615Z	_035	0.846	0.035	0.102	0.002	0.292	0.060	0.003	623	19	628	14	658	23	95	626	26	0.06	0.800
L113615Z	_036	12.237	0.436	0.502	0.012	0.344	0.177	0.008	2623	33	2622	53	2594	18	101	2623	54	0.00	0.980
L113615Z	_037	6.873	0.250	0.359	0.012	0.465	0.139	0.007	2095	32	1977	58	2077	10	95	2086	65	5.40	0.021
L113615Z	_038	0.489	0.037	0.066	0.002	0.231	0.054	0.004	405	25	411	14	519	26	79	410	26	0.07	0.800

L113615Z	_039	0.358	0.044	0.061	0.003	0.183	0.042	0.006	311	33	385	17	17	36	2312	372	31	4.90	0.026
L113615Z	_040	3.985	0.076	0.291	0.005	0.459	0.099	0.003	1631	15	1647	25	1496	12	110	1633	31	0.48	0.490
L113615Z	_042	6.276	0.133	0.366	0.008	0.530	0.124	0.004	2015	19	2009	39	1877	11	107	2015	37	0.04	0.850
L113615Z	_043	2.671	0.142	0.236	0.007	0.283	0.082	0.005	1320	39	1368	37	1344	29	102	1345	60	1.08	0.300
L113615Z	_044	0.837	0.031	0.101	0.002	0.291	0.060	0.003	617	17	618	13	600	26	103	618	23	0.00	0.970
L113615Z	_045	0.491	0.039	0.069	0.003	0.226	0.051	0.005	406	27	432	15	348	34	124	427	28	0.91	0.340
L113615Z	_046	0.133	0.015	0.022	0.001	0.191	0.045	0.006	127	14	138	6	199	45	69	136	12	0.63	0.430
L113615Z	_050	0.719	0.035	0.094	0.002	0.256	0.056	0.003	550	21	577	14	462	21	125	570	26	1.50	0.220
L113615Z	_051	2.206	0.095	0.195	0.005	0.324	0.082	0.004	1183	30	1151	29	1153	16	100	1166	49	0.85	0.360
L113615Z	_052	1.405	0.062	0.180	0.005	0.305	0.057	0.003	891	26	1069	27	503	28	212				
																			Discordant
L113615Z	_053	4.357	0.154	0.319	0.007	0.317	0.099	0.004	1704	29	1783	35	1626	22	110	1732	50	4.42	0.036
L113615Z	_054	0.331	0.020	0.047	0.001	0.253	0.052	0.004	291	15	293	9	333	24	88	293	17	0.03	0.867
L113615Z	_055	4.976	0.274	0.307	0.017	0.506	0.118	0.009	1815	47	1725	84	1753	10	98	1812	93	1.56	0.212
L113615Z	_056a	0.504	0.034	0.067	0.002	0.224	0.054	0.004	414	23	419	12	523	30	80	418	23	0.04	0.841
L113615Z	_056b	15.598	0.336	0.544	0.012	0.508	0.208	0.006	2853	21	2800	50	2762	10	101	2855	41	1.52	0.218
L113615Z	_057	0.820	0.038	0.101	0.003	0.284	0.059	0.003	608	21	621	16	592	23	105	617	29	0.33	0.565
L113615Z	_061	0.475	0.023	0.064	0.001	0.229	0.054	0.003	394	16	401	9	462	30	87	400	16	0.17	0.679
L113615Z	_062	14.084	0.259	0.519	0.010	0.525	0.197	0.005	2755	17	2696	43	2680	13	101	2759	34	2.65	0.103
L113615Z	_063	0.503	0.025	0.067	0.002	0.262	0.055	0.003	414	17	416	11	378	28	110	416	20	0.02	0.887
L113615Z	_065	0.794	0.067	0.098	0.003	0.178	0.059	0.005	593	38	603	17	769	30	78	602	33	0.06	0.803
L113615Z	_066	0.909	0.095	0.123	0.004	0.163	0.053	0.006	656	51	749	24	601	37	125	734	45	3.36	0.067
L113615Z	_067	19.544	0.508	0.594	0.018	0.579	0.239	0.009	3069	25	3006	72	2955	9	102	3076	48	1.07	0.301
L113615Z	_068	0.550	0.028	0.071	0.002	0.268	0.056	0.003	445	18	440	11	471	21	93	441	21	0.07	0.797
L113615Z	_069	0.845	0.056	0.098	0.003	0.236	0.063	0.005	622	31	601	18	710	30	85	605	34	0.43	0.510
L113615Z	_070	0.793	0.046	0.099	0.003	0.283	0.058	0.004	593	26	611	19	553	29	110	605	34	0.42	0.517
L113615Z	_071	1.008	0.043	0.103	0.003	0.347	0.071	0.004	708	22	630	18	790	24	80				
																			Discordant
L113615Z	_072	14.773	0.557	0.537	0.016	0.407	0.200	0.010	2801	36	2771	69	2716	12	102	2799	71	0.23	0.635
L113615Z	_073	0.836	0.045	0.087	0.003	0.334	0.070	0.004	617	25	539	19	847	15	64				
																			Discordant
L113615	_001	0.161	0.009	0.024	0.001	0.358	0.049	0.000	152	8	152	6	161	21	95	152	11	0.01	0.927
L113615	_002	14.826	0.226	0.562	0.010	0.555	0.187	0.001	2804	15	2876	39	2712	10	106	2797	29	4.54	0.033
L113615	_003	0.370	0.035	0.056	0.002	0.199	0.053	0.001	319	26	353	13	337	35	105	348	25	1.69	0.194
L113615	_004	0.159	0.007	0.023	0.001	0.329	0.050	0.000	150	6	149	4	187	23	80	149	8	0.02	0.888
L113615	_005	0.527	0.021	0.068	0.002	0.423	0.060	0.001	429	14	423	14	598	24	71	426	23	0.18	0.674
L113615	_006	10.333	0.382	0.451	0.015	0.450	0.162	0.001	2465	34	2402	67	2480	10	97	2462	69	1.14	0.286
L113615	_007	0.595	0.028	0.079	0.003	0.427	0.057	0.001	474	18	491	19	504	26	98	482	30	0.75	0.388
L113615	_008	0.832	0.072	0.099	0.008	0.446	0.060	0.001	615	40	611	45	618	33	99	613	72	0.01	0.929
L113615	_009	0.488	0.024	0.070	0.003	0.374	0.053	0.001	403	16	438	15	332	32	132	421	26	3.75	0.053
L113615	_010	0.772	0.015	0.094	0.001	0.330	0.061	0.000	581	8	582	7	639	16	91	582	12	0.01	0.909
L113615	_011	0.147	0.003	0.022	0.000	0.307	0.048	0.000	139	3	140	2	112	18	125	140	3	0.05	0.825
L113615	_012	0.394	0.019	0.055	0.003	0.489	0.054	0.001	337	14	343	16	366	25	94	339	26	0.16	0.691
L113615	_013	12.951	0.862	0.527	0.031	0.448	0.179	0.002	2676	63	2728	133	2644	20	103	2677	125	0.19	0.665
L113615	_014	0.123	0.012	0.022	0.001	0.274	0.058	0.001	118	11	139	7	514	54	27	134	13	3.89	0.049
L113615	_015	15.190	0.194	0.556	0.008	0.585	0.193	0.001	2827	12	2850	34	2772	6	103	2825	23	0.60	0.439

APPENDIX 3. Continued

Sample	Grain ID	Measured Isotopic Ratios							Calculated Ages										
		207Pb/ 235U	1s error	206Pb/ 238U	1s error	Rho	207Pb/ 206Pb	1s error	207Pb/ 235U	1s error	206Pb/ 238U	1s error	207Pb/ 206Pb	1s error	U-Pb/ Pb-Pb Concordancy	Concordia age (Ma)	2s error Ma	MSWD (of concordance)	Probability
L113615	_016	4.866	0.129	0.307	0.007	0.420	0.115	0.001	1796	22	1728	34	1872	8	92	1783	44	4.66	0.031
L113615	_018	3.927	0.138	0.289	0.011	0.547	0.099	0.001	1619	28	1634	56	1603	18	102	1619	57	0.10	0.747
L113615	_019	0.540	0.016	0.067	0.001	0.334	0.059	0.000	439	11	418	8	554	17	75	424	15	3.57	0.059
L113615	_020	0.373	0.018	0.053	0.002	0.401	0.054	0.001	322	13	335	13	359	23	93	329	22	0.79	0.375
L113615	_022	0.846	0.061	0.107	0.004	0.276	0.067	0.001	622	34	654	25	852	42	77	644	44	0.77	0.380
L113615	_023	0.729	0.034	0.088	0.004	0.512	0.059	0.001	556	20	545	25	581	29	94	553	38	0.24	0.627
L113415Z	_001	0.854	0.043	0.103	0.002	0.231	0.064	0.001	627	23	634	14	730	25	87	633	26	0.08	0.775
L113415Z	_002	0.419	0.021	0.061	0.002	0.268	0.052	0.001	355	15	383	10	272	27	141	376	18	3.35	0.067
L113415Z	_004	0.793	0.036	0.099	0.002	0.250	0.061	0.001	593	20	611	13	655	19	93	607	24	0.76	0.384
L113415Z	_005	1.612	0.059	0.160	0.005	0.393	0.071	0.000	975	23	956	25	952	13	100	967	40	0.47	0.491
L113415Z	_007	0.860	0.038	0.098	0.002	0.252	0.064	0.001	630	21	602	13	739	25	81	607	24	1.74	0.187
L113415Z	_008	0.451	0.031	0.061	0.002	0.179	0.056	0.001	378	22	382	9	437	27	88	382	18	0.05	0.830
L113415Z	_009	0.442	0.019	0.060	0.001	0.272	0.055	0.001	372	13	373	8	426	20	88	373	16	0.01	0.929
L113415Z	_010	0.941	0.044	0.104	0.003	0.309	0.063	0.001	673	23	638	18	714	28	89	649	32	2.04	0.153
L113415Z	_011	0.875	0.023	0.099	0.002	0.423	0.060	0.000	638	12	610	13	608	15	100	625	21	4.32	0.038
L113415Z	_012	0.620	0.017	0.077	0.002	0.426	0.056	0.000	490	10	476	11	449	14	106	483	18	1.58	0.209
L113415Z	_013	0.818	0.030	0.096	0.002	0.331	0.060	0.001	607	17	594	14	585	19	101	598	25	0.55	0.459
L113415Z	_014	2.275	0.108	0.214	0.005	0.252	0.081	0.001	1205	34	1253	27	1213	21	103	1234	47	1.67	0.197
L113415Z	_015	0.738	0.031	0.091	0.002	0.243	0.058	0.001	561	18	561	11	532	26	106	561	21	0.00	0.993
L113415Z	_016	3.303	0.151	0.232	0.012	0.560	0.092	0.000	1482	36	1344	62	1475	10	91	1479	71	7.31	0.007
L113415Z	_017	2.198	0.088	0.196	0.006	0.361	0.078	0.001	1180	28	1154	31	1141	14	101	1169	48	0.62	0.431
L113415Z	_018	0.711	0.024	0.087	0.002	0.352	0.058	0.000	545	14	537	12	535	16	100	540	21	0.29	0.593
L113415Z	_019	0.905	0.043	0.102	0.003	0.300	0.061	0.001	655	23	624	17	640	28	97	632	31	1.60	0.205
L113415Z	_020	0.848	0.038	0.100	0.002	0.271	0.061	0.001	623	21	616	14	632	20	97	618	26	0.13	0.721
L113415Z	_021	1.125	0.042	0.113	0.004	0.515	0.066	0.000	765	20	688	25	806	11	85	742	39	11.53	0.001
L113415Z	_022	2.492	0.067	0.209	0.005	0.450	0.081	0.000	1270	19	1222	27	1214	10	101	1258	37	3.63	0.057
L113415Z	_023	0.653	0.021	0.092	0.002	0.328	0.051	0.001	511	13	566	11	262	29	216				
L113415Z	_024	0.537	0.017	0.072	0.001	0.306	0.056	0.000	437	11	450	8	435	19	103	446	15	1.25	0.264
L113415Z	_025	0.688	0.031	0.087	0.002	0.298	0.057	0.001	531	18	540	14	505	21	107	537	25	0.20	0.655
L113415Z	_026	10.379	0.249	0.452	0.011	0.488	0.154	0.001	2469	22	2405	47	2396	8	100	2470	44	2.44	0.118
L113415Z	_027	0.498	0.033	0.068	0.002	0.237	0.056	0.001	410	23	423	13	462	24	91	421	25	0.31	0.580
L113415Z	_029	0.774	0.027	0.100	0.002	0.320	0.058	0.001	582	15	615	13	540	22	114	602	23	3.98	0.046
L113415Z	_030	13.267	0.531	0.452	0.019	0.531	0.193	0.001	2699	38	2405	85	2768	9	87				
L113415Z	_031	0.891	0.033	0.100	0.003	0.390	0.061	0.000	647	18	613	17	623	14	98	628	29	3.08	0.079
L113415Z	_032	3.046	0.077	0.243	0.005	0.437	0.086	0.001	1419	19	1403	28	1332	14	105	1416	37	0.41	0.521
L113415Z	_033	0.551	0.018	0.072	0.001	0.315	0.057	0.001	445	12	449	9	475	20	94	448	16	0.06	0.803
L113415Z	_035	0.519	0.028	0.069	0.003	0.354	0.056	0.001	424	19	431	16	453	22	95	429	28	0.11	0.738

L113415Z	_036	0.643	0.050	0.078	0.003	0.220	0.062	0.001	504	31	484	16	691	33	70	487	30	0.41	0.520
L113415Z	_037	0.592	0.025	0.071	0.002	0.326	0.059	0.001	472	16	441	12	585	26	75	450	22	3.30	0.069
L113415Z	_038	0.513	0.016	0.065	0.002	0.389	0.055	0.000	421	11	409	10	427	16	96	414	17	1.15	0.284
L113415Z	_039	0.916	0.018	0.104	0.002	0.383	0.061	0.000	660	10	637	9	634	13	100	648	16	4.72	0.030
L113415Z	_040	7.433	0.272	0.348	0.009	0.360	0.140	0.001	2165	33	1924	44	2233	11	86				
																			Discordant
L113415Z	_042	0.757	0.066	0.094	0.004	0.247	0.059	0.001	573	38	580	24	578	21	100	579	44	0.04	0.841
L113415Z	_043	0.498	0.042	0.067	0.003	0.261	0.056	0.001	410	29	417	18	443	22	94	416	33	0.06	0.807
L113415Z	_044	0.958	0.051	0.122	0.003	0.199	0.063	0.001	682	26	744	15	714	26	104	732	28	5.31	0.021
L113415Z	_048	0.978	0.016	0.113	0.002	0.540	0.061	0.000	692	8	690	12	648	10	106	692	16	0.08	0.774
L113415Z	_049	0.894	0.025	0.100	0.003	0.516	0.061	0.000	649	14	613	17	628	11	98	639	26	5.29	0.021
L113415Z	_050	0.835	0.037	0.093	0.003	0.406	0.061	0.001	616	20	573	20	654	22	88	592	34	3.98	0.046
L113415Z	_053	0.770	0.033	0.092	0.003	0.321	0.059	0.001	580	19	566	15	568	24	100	571	27	0.46	0.497
L113415Z	_055	0.572	0.022	0.068	0.002	0.288	0.060	0.001	460	15	426	9	607	25	70	433	18	4.92	0.027
L113415Z	_056	0.522	0.022	0.069	0.002	0.313	0.055	0.001	426	15	427	11	411	23	104	427	20	0.00	0.948
L113415Z	_057	0.824	0.040	0.106	0.003	0.243	0.060	0.001	610	23	652	15	601	24	109	641	27	3.21	0.073
L113415Z	_058	11.816	0.268	0.490	0.012	0.547	0.173	0.001	2590	21	2572	53	2584	9	100	2591	42	0.16	0.691
L113415Z	_061	0.831	0.018	0.100	0.002	0.439	0.060	0.000	614	10	616	11	613	13	100	615	18	0.02	0.880
L113415Z	_062	0.468	0.028	0.066	0.002	0.240	0.056	0.001	390	19	410	11	459	30	89	406	21	1.10	0.294
L113415Z	_063	0.863	0.097	0.100	0.003	0.134	0.078	0.002	632	53	613	18	1139	53	54	614	35	0.12	0.730
L113415Z	_064	0.907	0.029	0.103	0.002	0.347	0.063	0.001	655	16	630	13	697	17	90	640	24	2.31	0.129
L113415Z	_066	0.998	0.054	0.103	0.003	0.312	0.070	0.001	703	28	631	20	924	28	68	650	38	5.99	0.014
L113415Z	_067	0.494	0.033	0.062	0.003	0.390	0.058	0.001	408	22	386	19	531	26	73	394	35	0.87	0.352
L113415Z	_068	0.703	0.041	0.096	0.002	0.212	0.060	0.001	541	25	590	14	598	26	99	580	26	3.87	0.049
L113415Z	_069	2.484	0.048	0.207	0.004	0.567	0.080	0.000	1267	14	1211	24	1191	8	102	1267	28	8.26	0.004
L113415Z	_070	4.092	0.095	0.287	0.008	0.626	0.099	0.001	1653	19	1624	42	1602	10	101	1656	37	0.72	0.397
L113415Z	_074	0.419	0.044	0.078	0.002	0.119	0.058	0.001	355	31	485	12	521	48	93				Discordant
L113415Z	_076	12.399	0.276	0.495	0.012	0.545	0.177	0.001	2635	21	2591	52	2621	7	99	2639	41	0.99	0.320
L113415Z	_078	0.621	0.059	0.090	0.002	0.135	0.066	0.001	491	37	553	14	798	37	69	547	26	2.96	0.085
L113415Z	_079	0.737	0.037	0.103	0.003	0.274	0.056	0.001	560	22	632	17	439	26	144	607	29	9.43	0.002
L113415Z	_081	0.868	0.051	0.106	0.003	0.232	0.063	0.001	635	27	648	17	709	31	91	645	31	0.23	0.630
L113415Z	_082	3.349	0.071	0.242	0.005	0.475	0.092	0.000	1493	17	1395	25	1476	10	95				Discordant
L113415Z	_084	0.542	0.017	0.067	0.002	0.441	0.055	0.000	440	11	420	11	431	11	97	430	19	2.82	0.093
L113415Z	_085	2.576	0.051	0.217	0.004	0.507	0.080	0.000	1294	15	1267	23	1209	11	105	1291	29	1.83	0.176
L113415Z	_086	2.675	0.057	0.223	0.005	0.518	0.081	0.000	1322	16	1299	26	1212	10	107	1320	31	1.01	0.314
L113415Z	_087	0.701	0.034	0.091	0.002	0.210	0.060	0.001	539	20	561	11	610	23	92	558	21	1.12	0.289
L113415Z	_088	0.834	0.032	0.099	0.002	0.300	0.060	0.001	616	18	610	14	621	27	98	612	24	0.09	0.765
L113415Z	_089	3.671	0.097	0.270	0.006	0.455	0.093	0.000	1565	21	1539	33	1486	9	104	1561	41	0.75	0.387
L113415Z	_090	0.836	0.028	0.100	0.002	0.367	0.060	0.000	617	15	612	14	604	17	101	614	24	0.08	0.778
L113415Z	_091	0.723	0.060	0.091	0.004	0.256	0.060	0.001	552	36	559	23	616	22	91	558	42	0.04	0.848
L113415Z	_092	2.227	0.135	0.195	0.009	0.393	0.079	0.001	1190	42	1150	50	1184	14	97	1175	77	0.59	0.443
L113415Z	_094	2.137	0.117	0.176	0.008	0.426	0.082	0.001	1161	38	1042	45	1257	19	83	1114	71	6.88	0.009
L113415(2)	_001	0.438	0.014	0.060	0.001	0.255	0.054	0.001	369	10	373	6	389	26	96	372	11	0.20	0.658
L113415(2)	_004	0.493	0.010	0.066	0.001	0.330	0.055	0.000	407	7	412	5	403	16	102	411	9	0.54	0.462
L113415(2)	_007	0.666	0.022	0.085	0.002	0.290	0.059	0.000	518	14	526	10	551	17	95	524	18	0.29	0.592

APPENDIX 3. Continued

Sample	Grain ID	Measured Isotopic Ratios							Calculated Ages										
		207Pb/ 235U	1s error	206Pb/ 238U	1s error	Rho	207Pb/ 206Pb	1s error	207Pb/ 235U	1s error	206Pb/ 238U	1s error	207Pb/ 206Pb	1s error	U-Pb/ Pb-Pb Concordancy	Concordia age (Ma)	2s error Ma	MSWD (of concordance)	Probability
L113415(2)	_008	0.457	0.016	0.060	0.001	0.258	0.056	0.001	382	11	376	7	447	24	84	377	12	0.24	0.621
L113415(2)	_009	2.162	0.057	0.201	0.003	0.281	0.079	0.001	1169	18	1183	16	1170	16	101	1177	27	0.48	0.489
L113415(2)	_010	0.451	0.008	0.061	0.001	0.289	0.055	0.000	378	5	384	4	400	20	96	382	7	0.97	0.325
L113415(2)	_011	0.439	0.017	0.064	0.001	0.193	0.057	0.001	370	12	401	6	492	35	82	397	11	6.91	0.009
L113415(2)	_012	6.660	0.142	0.374	0.006	0.405	0.129	0.001	2067	19	2048	30	2081	7	98	2064	37	0.47	0.495
L113415(2)	_013	0.482	0.013	0.061	0.001	0.282	0.056	0.001	399	9	384	6	456	25	84	388	11	2.61	0.106
L113415(2)	_014	0.533	0.015	0.069	0.001	0.278	0.057	0.001	434	10	428	6	474	21	90	430	12	0.34	0.558
L113415(2)	_015	6.027	0.123	0.354	0.007	0.501	0.121	0.001	1980	18	1951	35	1968	7	99	1979	36	0.90	0.342
L113415(2)	_016	0.591	0.023	0.075	0.002	0.293	0.058	0.001	471	14	463	10	514	26	90	465	18	0.28	0.597
L113415(2)	_017	6.736	0.101	0.380	0.005	0.416	0.128	0.001	2077	13	2078	22	2065	10	101	2078	26	0.00	0.969
L113415(2)	_020	0.897	0.034	0.105	0.002	0.285	0.063	0.001	650	18	642	13	702	28	91	644	24	0.20	0.657
L113415(2)	_021	15.216	0.603	0.542	0.020	0.471	0.200	0.001	2829	38	2791	85	2829	6	99	2829	75	0.26	0.611
L113415(2)	_023	0.815	0.019	0.100	0.001	0.249	0.060	0.000	605	11	614	7	601	16	102	612	12	0.58	0.448
L113415(2)	_025	3.592	0.133	0.265	0.007	0.343	0.101	0.001	1548	29	1518	34	1640	12	93	1536	52	0.68	0.411
L113415(2)	_026	0.867	0.027	0.104	0.001	0.217	0.062	0.001	634	15	639	8	666	24	96	638	15	0.10	0.753
I783255Z	_002	0.680	0.059	0.086	0.004	0.259	0.058	0.001	527	36	533	23	546	31	98	531	43	0.02	0.881
I783255Z	_004	0.641	0.052	0.088	0.003	0.200	0.063	0.001	503	32	542	17	701	29	77	535	32	1.40	0.237
I783255Z	_006	0.822	0.058	0.104	0.004	0.300	0.059	0.001	609	32	640	26	563	27	114	629	45	0.79	0.374
I783255Z	_007	0.503	0.038	0.070	0.002	0.218	0.057	0.001	414	26	434	14	505	29	86	431	26	0.62	0.432
I783255Z	_008	0.802	0.058	0.101	0.003	0.200	0.065	0.001	598	33	623	17	758	25	82	619	32	0.58	0.448
I783255Z	_009	3.793	0.133	0.278	0.009	0.462	0.094	0.001	1591	28	1579	45	1510	11	105	1590	56	0.09	0.762
I783255Z	_010	0.731	0.037	0.088	0.003	0.380	0.059	0.000	557	22	545	20	551	17	99	550	35	0.27	0.606
I783255Z	_011	7.087	0.253	0.381	0.015	0.558	0.127	0.001	2122	32	2080	71	2058	10	101	2125	63	0.52	0.471
I783255Z	_013	0.659	0.047	0.075	0.004	0.399	0.060	0.001	514	29	469	26	611	37	77	486	46	2.18	0.140
I783255Z	_014	0.815	0.025	0.090	0.003	0.509	0.061	0.001	605	14	555	16	633	18	88				Discordant
I783255Z	_015	5.138	0.209	0.334	0.011	0.421	0.107	0.001	1842	35	1857	55	1757	12	106	1845	67	0.08	0.778
I783255Z	_016	2.608	0.094	0.218	0.007	0.416	0.083	0.001	1303	27	1271	35	1279	19	99	1294	50	0.90	0.343
I783255Z	_019	0.708	0.028	0.086	0.003	0.369	0.059	0.000	544	17	533	15	564	16	94	537	26	0.33	0.564
I783255Z	_020	0.539	0.036	0.084	0.002	0.216	0.051	0.001	438	24	520	15	234	37	223	500	27	11.32	0.001
I783255Z	_022	0.787	0.056	0.085	0.005	0.391	0.064	0.001	589	32	528	28	729	25	73	551	50	3.34	0.068
I783255Z	_025	1.350	0.042	0.116	0.005	0.630	0.073	0.001	868	18	708	26	1013	28	70				Discordant
I783255Z	_026	9.817	0.349	0.428	0.011	0.367	0.152	0.001	2418	33	2298	50	2371	13	97	2392	64	6.04	0.014
I783255Z	_027	0.612	0.017	0.070	0.002	0.586	0.057	0.001	485	10	435	13	497	22	87				Discordant
I783255Z	_028	3.744	0.311	0.235	0.015	0.386	0.108	0.001	1581	67	1361	79	1763	19	77	1483	125	7.22	0.007
I783255Z	_029	0.771	0.103	0.096	0.007	0.260	0.058	0.001	580	59	593	39	522	43	114	590	72	0.04	0.839
I783255Z	_030	0.524	0.032	0.061	0.002	0.274	0.062	0.001	428	21	385	12	689	25	56	392	24	4.07	0.044
I783255Z	_031	0.556	0.020	0.071	0.002	0.387	0.056	0.000	449	13	441	12	459	18	96	444	21	0.27	0.603

I783255Z	_034	1.756	0.066	0.164	0.006	0.448	0.074	0.001	1029	24	981	30	1050	15	93	1014	45	2.74	0.098
I783255Z	_035	5.686	0.214	0.300	0.010	0.448	0.132	0.001	1929	32	1691	50	2119	14	80			Discordant	
I783255Z	_041	0.880	0.063	0.100	0.004	0.273	0.064	0.001	641	34	612	23	755	34	81	619	42	0.64	0.425
I783255Z	_042	6.339	0.381	0.350	0.015	0.351	0.131	0.001	2024	53	1936	71	2106	18	92	1997	99	1.48	0.223
I783255Z	_043	0.662	0.023	0.080	0.002	0.394	0.059	0.001	516	14	496	13	585	19	85	505	23	1.70	0.192
I783255Z	_044	0.804	0.050	0.098	0.004	0.336	0.061	0.001	599	28	603	24	653	26	92	602	42	0.02	0.881
I783255Z	_045	1.059	0.048	0.119	0.003	0.320	0.065	0.001	733	23	724	20	771	18	94	728	35	0.13	0.714
I783255Z	_046	0.851	0.036	0.099	0.003	0.326	0.063	0.001	625	20	611	16	694	17	88	616	29	0.43	0.512
I783255Z	_049	1.860	0.058	0.186	0.004	0.355	0.082	0.001	1067	21	1102	22	1244	25	89	1082	35	2.07	0.150
I783255Z	_050	0.559	0.052	0.066	0.003	0.221	0.066	0.001	451	34	409	16	802	28	51	414	31	1.47	0.226
I783255Z	_053	0.751	0.025	0.090	0.002	0.411	0.062	0.001	569	14	554	14	657	18	84	562	24	0.87	0.352
I783255Z	_054	2.078	0.074	0.184	0.004	0.333	0.083	0.001	1142	25	1090	24	1265	22	86	1114	40	3.35	0.067
I783255Z	_055	20.460	0.463	0.628	0.015	0.524	0.226	0.001	3113	22	3141	59	3023	8	104	3111	43	0.29	0.589
I783255Z	_060	7.919	0.278	0.415	0.012	0.396	0.135	0.001	2222	32	2236	53	2158	13	104	2224	62	0.09	0.770
I783255Z	_063	0.771	0.044	0.099	0.003	0.256	0.063	0.001	580	25	606	17	709	25	85	599	31	0.95	0.331
I783255Z	_064	0.890	0.072	0.102	0.007	0.419	0.062	0.001	646	39	626	41	675	18	93	637	67	0.23	0.633
I783255Z	_066	6.844	0.255	0.373	0.013	0.474	0.131	0.001	2091	33	2045	62	2118	11	97	2089	66	0.73	0.393
I783255Z	_067	0.616	0.028	0.077	0.002	0.321	0.061	0.001	488	17	476	13	651	23	73	480	24	0.39	0.530
I783255Z	_068	6.799	0.342	0.375	0.015	0.408	0.130	0.001	2086	45	2051	72	2092	11	98	2080	87	0.26	0.609
I783255Z	_069	2.432	0.176	0.210	0.012	0.395	0.083	0.001	1252	52	1230	64	1270	26	97	1245	95	0.11	0.737
I783255Z	_072	1.075	0.058	0.093	0.002	0.210	0.079	0.002	741	28	576	13	1160	38	50			Discordant	
I783255Z	_073	0.883	0.047	0.105	0.003	0.283	0.063	0.001	643	25	645	18	693	23	93	645	33	0.01	0.916
I783255Z	_074	3.933	0.212	0.280	0.013	0.419	0.101	0.001	1621	44	1593	64	1645	13	97	1615	84	0.21	0.644
I783255Z	_075	0.754	0.063	0.101	0.004	0.235	0.059	0.001	571	37	620	23	569	27	109	608	43	1.68	0.195
I783255Z	_076	0.671	0.020	0.071	0.002	0.496	0.059	0.001	521	12	445	13	556	26	80			Discordant	
I783255Z	_077	0.572	0.024	0.070	0.002	0.340	0.062	0.001	459	15	438	12	670	26	65	445	22	1.76	0.185
I783255Z	_078	4.942	0.182	0.319	0.012	0.507	0.108	0.001	1810	31	1783	58	1760	11	101	1809	62	0.27	0.600
I783255Z	_079	0.698	0.032	0.087	0.002	0.305	0.061	0.001	538	19	539	15	622	30	87	538	26	0.00	0.968
I783255Z	_084	0.896	0.036	0.099	0.003	0.323	0.068	0.001	650	19	608	15	858	18	71	621	27	4.27	0.039
I783255Z	_087	0.490	0.070	0.072	0.002	0.092	0.069	0.001	405	48	448	11	898	43	50	446	23	0.84	0.360
I783255Z	_088	0.798	0.031	0.095	0.002	0.327	0.061	0.001	596	17	587	14	649	19	90	590	25	0.24	0.624
I783255Z	_090	3.012	0.099	0.235	0.006	0.420	0.089	0.001	1411	25	1359	34	1404	12	97	1397	48	2.49	0.115
I783255Z	_092	0.643	0.026	0.075	0.001	0.243	0.063	0.001	504	16	466	9	711	31	66	471	17	5.49	0.019
I783255Z	_094	0.568	0.028	0.076	0.002	0.309	0.057	0.001	457	18	470	14	490	21	96	465	25	0.44	0.509
I783255Z	_095	0.895	0.064	0.109	0.005	0.292	0.062	0.001	649	34	669	27	673	27	100	663	47	0.30	0.585
I783255Z	_096	0.535	0.023	0.068	0.003	0.430	0.055	0.001	435	15	425	15	423	24	101	430	26	0.36	0.550
I783255Z	_097	0.820	0.071	0.097	0.003	0.187	0.077	0.001	608	40	597	19	1131	32	53	598	36	0.07	0.789
I783255Z	_098	0.801	0.066	0.100	0.005	0.300	0.063	0.001	598	37	615	29	693	22	89	609	52	0.19	0.661
I783255Z	_099	0.524	0.030	0.065	0.002	0.307	0.072	0.001	428	20	409	14	976	35	42	413	26	0.86	0.354
I783255Z	_100	2.436	0.038	0.205	0.004	0.561	0.085	0.000	1253	11	1200	19	1322	8	91			Discordant	
I783255Z	_101	2.490	0.048	0.210	0.004	0.481	0.080	0.000	1269	14	1231	21	1204	10	102	1263	27	4.35	0.037
I78_3255	_098	0.914	0.067	0.102	0.005	0.353	0.070	0.001	659	36	628	31	923	34	68	640	55	0.64	0.423
I78_3255	_002	0.901	0.077	0.104	0.012	0.695	0.071	0.001	652	41	637	72	951	29	67	654	81	0.08	0.775

APPENDIX 3. Continued

Sample	Grain ID	Measured Isotopic Ratios							Calculated Ages										
		207Pb/ 235U	1s error	206Pb/ 238U	1s error	Rho	207Pb/ 206Pb	1s error	207Pb/ 235U Ma	1s error Ma	206Pb/ 238U Ma	1s error Ma	207Pb/ 206Pb Ma	1s error Ma	U-Pb/ Pb-Pb Concordancy	Concordia age (Ma)	2s error Ma	MSWD (of concordance)	Probability
1782175Z	_001	0.949	0.033	0.105	0.003	0.387	0.064	0.001	677	17	641	17	750	23	85	657	28	3.66	0.056
1782175Z	_002	3.201	0.166	0.235	0.010	0.413	0.097	0.001	1457	40	1361	53	1565	17	87	1428	76	3.57	0.059
1782175Z	_003	10.343	0.359	0.441	0.015	0.489	0.162	0.002	2466	32	2354	67	2479	19	95	2466	64	3.76	0.053
1782175Z	_005	1.650	0.186	0.102	0.004	0.170	0.098	0.004	989	71	626	23	1590	69	39				Discordant
1782175Z	_008	7.349	0.155	0.382	0.011	0.691	0.130	0.001	2155	19	2086	52	2095	15	100	2168	34	2.80	0.094
1782175Z	_009	0.918	0.026	0.103	0.003	0.485	0.062	0.000	661	14	632	16	659	17	96	652	25	3.59	0.058
1782175Z	_010	1.632	0.113	0.152	0.009	0.422	0.074	0.001	983	44	911	50	1052	27	87	953	79	2.03	0.154
1782175Z	_012	0.756	0.044	0.094	0.004	0.324	0.061	0.001	572	26	580	21	644	25	90	577	37	0.09	0.759
1782175Z	_013	0.851	0.058	0.098	0.005	0.350	0.066	0.001	625	32	602	28	818	21	74	611	49	0.44	0.509
1782175Z	_014	4.691	0.229	0.281	0.011	0.390	0.122	0.001	1766	41	1594	54	1986	14	80				Discordant
1782175Z	_015	1.079	0.062	0.099	0.004	0.333	0.080	0.001	743	30	611	22	1186	29	52				Discordant
1782175Z	_018	0.587	0.034	0.077	0.004	0.454	0.058	0.001	469	22	477	24	533	31	90	472	39	0.12	0.730
1782175Z	_020	0.906	0.066	0.106	0.004	0.251	0.067	0.001	655	35	648	23	843	38	77	649	42	0.04	0.847
1782175Z	_022	1.245	0.565	0.203	0.009	0.047	0.105	0.004	821	255	1192	46	1722	75	69	1175	90	2.94	0.086
1782175Z	_023	2.423	0.373	0.239	0.009	0.124	0.115	0.003	1249	111	1384	48	1886	40	73	1364	90	1.51	0.220
1782175Z	_025	0.839	0.044	0.095	0.004	0.443	0.062	0.001	618	24	584	26	682	28	86	603	43	1.68	0.194
1782175Z	_026	0.821	0.041	0.098	0.004	0.420	0.061	0.001	609	23	603	24	640	28	94	606	40	0.05	0.832
1782175Z	_029	0.563	0.023	0.070	0.002	0.405	0.055	0.000	454	15	435	14	431	13	101	443	25	1.35	0.246
1782175Z	_031	5.604	0.187	0.351	0.010	0.418	0.115	0.001	1917	29	1937	47	1874	16	103	1920	56	0.22	0.638
1782175Z	_032	2.511	0.104	0.204	0.006	0.360	0.087	0.001	1275	30	1196	33	1361	16	88	1238	53	4.83	0.028
1782175Z	_033	0.863	0.023	0.101	0.002	0.329	0.060	0.000	632	12	619	10	616	17	101	624	18	0.88	0.347
1782175Z	_034	1.135	0.029	0.119	0.003	0.425	0.065	0.000	770	14	724	15	775	12	93	749	24	8.85	0.003
1782175Z	_037	5.864	0.343	0.325	0.012	0.303	0.129	0.001	1956	51	1815	56	2083	11	87	1889	89	4.87	0.027
1782175Z	_039	0.848	0.024	0.095	0.002	0.356	0.060	0.000	624	13	588	11	609	17	97	601	20	6.65	0.010
1782175Z	_040	0.748	0.138	0.094	0.004	0.103	0.063	0.001	567	80	582	21	699	36	83	581	42	0.03	0.859
1782175Z	_041	1.824	0.052	0.171	0.004	0.369	0.075	0.001	1054	19	1018	20	1058	14	96	1037	32	2.74	0.098
1782175Z	_042	1.079	0.203	0.105	0.020	0.506	0.068	0.001	743	99	646	117	875	29	74	707	188	0.80	0.372
1782175Z	_043	0.453	0.029	0.061	0.002	0.211	0.058	0.001	379	20	384	10	522	31	73	383	19	0.05	0.825
1782175Z	_044	2.372	0.046	0.201	0.003	0.443	0.082	0.000	1234	14	1178	18	1238	10	95				Discordant
1782175Z	_046	0.618	0.048	0.069	0.007	0.651	0.061	0.001	489	30	432	42	631	23	69	484	60	3.13	0.077
1782175Z	_047	0.835	0.029	0.099	0.002	0.283	0.062	0.001	616	16	608	11	684	18	89	610	21	0.24	0.625
1782175Z	_049	10.322	0.577	0.371	0.018	0.445	0.196	0.005	2464	52	2034	87	2795	45	73				Discordant
1782175Z	_050	20.434	1.542	0.496	0.012	0.162	0.271	0.007	3112	73	2597	52	3313	38	78				Discordant
1782175Z	_051	0.750	0.030	0.090	0.003	0.400	0.061	0.001	569	18	553	17	631	28	88	560	29	0.68	0.408
1782175Z	_052	2.492	0.070	0.210	0.005	0.448	0.082	0.001	1270	20	1231	28	1236	14	100	1261	39	2.16	0.142
1782175Z	_054	0.860	0.045	0.104	0.002	0.229	0.062	0.001	630	24	637	15	677	24	94	636	27	0.08	0.772

l782175Z	_056	1.168	0.112	0.098	0.002	0.124	0.093	0.003	786	53	601	14	1485	56	40				Discordant	
l782175Z	_057	0.539	0.021	0.067	0.002	0.415	0.056	0.001	438	14	420	13	461	27	91	428	23	1.51	0.219	
l782175Z	_058	0.747	0.087	0.092	0.004	0.174	0.063	0.001	566	51	566	22	701	29	81	566	43	0.00	1.000	
l782175Z	_059	0.695	0.021	0.069	0.001	0.267	0.068	0.001	536	13	428	7	857	29	50				Discordant	
l782175Z	_061	5.049	0.121	0.312	0.008	0.510	0.109	0.001	1828	20	1750	37	1786	10	98	1825	41	5.87	0.015	
l782175Z	_062	7.508	0.154	0.398	0.009	0.533	0.127	0.001	2174	18	2158	40	2060	9	105	2175	37	0.23	0.632	
l782175Z	_065	14.530	0.365	0.537	0.012	0.443	0.183	0.001	2785	24	2772	50	2678	8	104	2785	48	0.08	0.773	
l782175Z	_066	0.634	0.020	0.067	0.002	0.421	0.061	0.001	499	13	421	11	623	25	68				Discordant	
l782175Z	_067	0.792	0.025	0.093	0.002	0.380	0.060	0.001	592	14	574	13	611	20	94	582	23	1.49	0.222	
l782175Z	_068	0.868	0.054	0.101	0.004	0.299	0.062	0.001	634	29	621	22	671	18	92	625	40	0.19	0.661	
l782175Z	_069	4.860	0.113	0.310	0.007	0.463	0.109	0.001	1795	20	1739	33	1779	10	98	1789	39	3.75	0.053	
l782175Z	_070	2.406	0.158	0.207	0.011	0.388	0.081	0.000	1245	47	1213	56	1228	12	99	1233	85	0.30	0.586	
l782175Z	_071	14.940	0.289	0.534	0.011	0.541	0.189	0.001	2811	18	2758	47	2735	8	101	2816	36	1.78	0.182	
l782175Z	_072	4.672	0.115	0.263	0.006	0.453	0.122	0.001	1762	21	1507	30	1979	9	76				Discordant	
l782175Z	_074	7.111	0.156	0.384	0.008	0.498	0.128	0.001	2125	20	2094	39	2070	10	101	2125	39	0.83	0.361	
l782175Z	_075	1.140	0.046	0.112	0.003	0.280	0.071	0.001	773	22	686	15	957	26	72				Discordant	
l782175Z	_076	8.529	0.224	0.428	0.010	0.457	0.136	0.001	2289	24	2295	46	2177	8	105	2289	48	0.02	0.879	
l782175Z	_077	15.621	0.282	0.554	0.009	0.444	0.195	0.001	2854	17	2842	37	2785	7	102	2854	34	0.12	0.724	

APPENDIX 4: Qualitative Detrital Zircon Data*

Sample	Grain ID	S. Area	AR	Morph	Zoning	Conc Age	2 σ	Th	U	Th/U
L113760Z	_003	23929	1.227	ang/bk	unz	2616	33	152	201	0.757
L113760Z	_006	18164	1.194	ang/bk	oc, pl	411	21	111	115	0.964
L113760Z	_007	20053	1.130	sba-sbr	sec + oc, ocn	467	18	270	308	0.877
L113760Z	_008	29260	1.688	sbr-rnd	oc, ct, ocn	961	27	55	86	0.640
L113760Z	_009	23305	1.359	sbr	oc, ct, ocn	1132	18	58	157	0.371
L113760Z	_010	17317	1.409	sba	ot	1122	27	25	55	0.456
L113760Z	_011	18593	1.068	ang/bk	unz	407	10	239	266	0.899
L113760Z	_012	16287	1.228	sba	unz	577	16	83	94	0.878
L113760Z	_013	19084	1.730	sba-sbr	oc, ct, ocn	1016	19	59	162	0.366
L113760Z	_014	9960	1.052	sh/sbr	oc, ct, ocn	521	18	41	67	0.609
L113760Z	_015	9918	1.284	sh	oc, ct, cn	3657	35	67	108	0.617
L113760Z	_017	13866	1.346	sba	oc, ct, cn	415	14	265	309	0.858
L113760Z	_018	11780	1.081	sbr	oc, ct, ocn	1663	26	64	164	0.394
L113760Z	_020	11077	1.477	sbr-sba	ot	420	12	185	325	0.569
L113760Z	_021	12825	1.706	sba	ot	396	13	2	541	0.004
L113760Z	_022	7539	1.287	ang/bk	unz	2800	31	15	70	0.209
L113760Z	_023	9720	1.346	sbr	ot	974	18	59	122	0.479
L113760Z	_026	12620	1.062	sba	oc, ct, ocn	2757	36	57	53	1.065
L113760Z	_030	8364	1.090	sbr	sec	406	13	206	299	0.691
L113760Z	_031	2846	1.103	ang	oc, ct, ocn	580	19	177	290	0.610
L113760Z	_032	7057	1.130	sbr	oc, ct, ocn	1670	43	39	49	0.793
L113760Z	_033	9489	1.522	sbr	sec + oc, ocn	411	14	124	247	0.504
L113760Z	_034	8254	2.125	sh	ot	568	17	74	91	0.812
L113760Z	_035	9880	1.200	sba	oc, ct, ocn	2025	39	74	216	0.340
L113760Z	_037	8577	1.574	ang/sh	oc, ct, ocn	2738	32	23	34	0.686
L113760Z	_038	5320	1.250	sbr	oc, pl	1043	25	86	157	0.550
L113760Z	_039	3937	1.176	eh/bk	sec + oc	637	17	253	328	0.772
L113760Z	_042	4864	1.330	sh	oc, ct, ocn	1946	33	84	252	0.333
L113760Z	_043	5772	1.382	sba	unz	1168	49	16	35	0.459
L113760Z	_044	9207	1.240	rnd	ot	682	26	313	296	1.057
L113760Z	_045	8045	1.291	sbr	sec	855	17	73	120	0.603
L113760Z	_048	4967	1.073	eh	sec + oc, ocn	421	16	302	349	0.866
L113760Z	_049	6779	1.747	sbr	unz	616	30	44	61	0.714
L113760Z	_050	4582	1.300	eh	oc, ct, ocn	416	12	143	453	0.316
L113760Z	_051	8280	1.323	eh	sec + oc, ocn	596	17	101	135	0.750
L113760Z	_055	5305	1.244	sbr	ot	1215	40	27	134	0.203
L113760Z	_057	2645	1.030	sh	oc, ct, ocn	1306	33	122	185	0.659
L113760Z	_062	10359	1.202	sbr	oc, ct, ocn	412	10	65	136	0.479
L113760Z	_069	3156	1.098	sba	unz	472	15	202	247	0.816
L113760Z	_072	8462	1.630	ang	oc, pl	411	9	131	190	0.687
L113760Z	_073	3126	1.056	rnd	sec + oc, ocn	1831	22	45	111	0.404
L113760Z	_079	2364	1.130	ang	ot	403	19	300	577	0.519
L113760Z	_082	4416	1.320	eh	oc, ct, cn	293	9	64	155	0.413
L113760Z	_083	5132	1.340	sbr	oc, ct, ocn	1800	27	139	141	0.991
L113760Z	_087	10116	2.110	sbr	ot	1622	22	124	131	0.949
L113760Z	_091	6304	1.986	rnd	oc, ct, cn	546	13	46	108	0.423
L113760Z	_092	4150	1.382	sbr	ot	963	26	45	147	0.305
L113760Z	_095	7611	1.202	sbr	oc, ct, ocn	1002	21	84	357	0.235
L113760Z	_096	3382	1.267	sbr	oc, ct, ocn	1478	30	101	303	0.332
L113760Z	_098	7585	1.126	eh	oc, ct, ocn	575	18	139	141	0.991
L113760Z	_099	4473	1.563	sh	oc, ct, ocn	592	22	191	270	0.706
L113760Z	_101	6167	1.691	sbr-sba	oc, pl	538	14	202	147	1.368
L113760Z	_102	7524	1.512	sbr	sec	2022	33	124	172	0.722
L113760Z	_103	8683	1.833	ang	sec + oc, cn	416	12	125	158	0.792
L113760Z	_105	4625	1.324	sh	oc, ct, cn	142	7	91	137	0.665
L113760Z	_106	4716	1.343	ang/sh	oc, ct, ocn	585	16	117	235	0.497

APPENDIX 4. Continued

Sample	Grain ID	S. Area	AR	Morph	Zoning	Conc Age	2 σ	Th	U	Th/U
L113760Z	_107	8185	1.350	sba	ot	913	23	32	38	0.847
L113760Z	_109	19182	1.037	rnd	ot	597	17	115	129	0.893
L113760Z	_111	10435	1.108	sh	oc, ct, cn	571	16	149	208	0.717
L113760Z	_113	7349	2.230	eh	oc, ct, ocn	413	14	48	164	0.292
L113760Z	_114	10161	1.275	ang-sba	sec + oc, ocn	395	9	558	624	0.894
L113760Z	_118	8615	1.724	sba	oc, ct, ocn	1065	21	126	360	0.349
L113760Z	_120	9432	1.243	ang	oc, ct, cn	733	16	118	362	0.326
L113760Z	_121	12335	1.250	eh	oc, ct, cn	409	23	184	157	1.170
L113615Z	_001	39648	1.408	sh, sba/bk	oc, ct, ocn	620	54	88	105	0.840
L113615Z	_003	32788	1.184	sba-sbr	ot	645	28	89	103	0.867
L113615Z	_004	24514	1.118	eh, bk	oc, ct, ocn	152	10	376	442	0.851
L113615Z	_005	37072	1.461	sbr	oc, pl	397	31	58	128	0.454
L113615Z	_006	31066	1.356	eh-sh, bk	sec + oc	432	20	100	126	0.789
L113615Z	_007	53578	1.427	sbr	oc, pl	587	28	71	100	0.716
L113615Z	_008	20370	1.374	eh-sh	oc, ct, cn	666	32	172	179	0.962
L113615Z	_009	17080	1.458	ang-sba	oc, ct, ocn	2223	90	34	108	0.318
L113615Z	_010	14056	1.03	ang-sba	ot	1894	67	28	82	0.344
L113615Z	_011	25060	1.035	ang	unz	656	36	26	41	0.644
L113615Z	_012	19334	1.123	sba-sbr	sec, cn	1922	53	168	151	1.115
L113615Z	_013	17066	1.281	sbr	oc, ct, ocn	619	30	52	71	0.737
L113615Z	_014	32130	1.27	eh-sh/bk	sec, cn	434	25	376	308	1.219
L113615Z	_015	22358	1.313	eh-sh/bk	oc, ct, cn	634	29	91	113	0.801
L113615Z	_017	11648	1.309	rnd	oc, ct, ocn	1377	34	41	83	0.494
L113615Z	_018	11928	1.632	sba	oc, ct, ocn	1303	38	41	230	0.180
L113615Z	_019	13034	1.688	eh, bk	oc, ct, ocn	445	18	163	252	0.650
L113615Z	_021	9954	1.286	sbr, bk	unz	1907	50	41	97	0.425
L113615Z	_022	10066	1.521	sba, bk	ot	629	33	77	105	0.728
L113615Z	_023	17136	1.252	ang-sba	sec, ocn	638	25	47	72	0.654
L113615Z	_024	20944	1.441	sba-ang/bk	oc, ct, cn	551	20	92	274	0.335
L113615Z	_025	12376	1.158	sbr/bk	oc, ct, ocn	428	25	110	190	0.579
L113615Z	_026	6580	1.174	sh/bk	ot	1167	32	27	181	0.148
L113615Z	_030	25592	1.503	ang/bk	oc, ct, ocn	139	13	49	81	0.606
L113615Z	_031	10486	1.312	rnd, bk	oc, ct, ocn	590	34	66	140	0.476
L113615Z	_034	8190	1.079	sbr-rnd	oc, ct, ocn	556	40	67	136	0.491
L113615Z	_035	6342	1.217	ang	ot	626	26	68	173	0.393
L113615Z	_036	8414	1.333	sbr, bk	ot	2623	54	17	32	0.527
L113615Z	_037	6118	1.707	sh/bk	oc, pl	2086	65	70	165	0.427
L113615Z	_038	23114	1.667	sba-sbr	oc, ct, ocn, xc	410	26	54	95	0.569
L113615Z	_039	22680	1.487	sba	oc, ct, ocn	372	31	52	83	0.619
L113615Z	_040	5320	1	sbr-rnd	oc, ct, ocn	1633	31	63	152	0.411
L113615Z	_042	7308	1.57	sba-sbr, bk	oc, ct, ocn	2015	37	49	168	0.289
L113615Z	_043	11578	1.39	sbr	ot	1345	60	25	25	1.013
L113615Z	_044	13454	1.061	ang	unz	618	23	77	70	1.096
L113615Z	_045	24304	1	sba-ang/bk	ot	427	28	70	93	0.755
L113615Z	_046	14588	1.049	eh, bk	oc, ct, cn	136	12	51	108	0.476
L113615Z	_050	9618	1.062	ang	oc, pl	570	26	61	174	0.353
L113615Z	_051	11802	1.275	sbr	oc, ct, ocn	1166	49	77	194	0.395
L113615Z	_053	7854	1.04	sba-sbr, bk	unz	1732	51	9	22	0.426
L113615Z	_054	8526	1.319	sh	oc, ct, cn	293	17	224	436	0.513
L113615Z	_055	7084	1.746	sba-sbr	oc, pl	1812	93	71	305	0.233
L113615Z	_056a	8540	1.224	eh-sh	oc, ct, cn	418	23	71	305	0.233
L113615Z	_056b	4004	1.113	sbr-rnd, bk		2855	41	90	103	0.867
L113615Z	_057	6188	1.314	sh/bk	unz	617	29	84	85	0.982
L113615Z	_061	5852	1.047	eq-elp, sh	oc, ct, ocn	400	16	108	182	0.592
L113615Z	_062	7210	1.031	sba-sbr	sec + oc	2759	35	19	70	0.265
L113615Z	_063	7728	1.314	sba-ang	oc, ct, ocn	416	20	127	221	0.572

APPENDIX 4. Continued

Sample	Grain ID	S. Area	AR	Morph	Zoning	Conc Age	2 σ	Th	U	Th/U
L113615Z	_065	33460	1.479	sh/bk	sec + oc	602	33	105	155	0.675
L113615Z	_066	24402	1.259	sbr-rnd	oc, pl, ocn	734	45	29	82	0.356
L113615Z	_067	20734	1.123	sba-sbr	sec + oc	3076	48	62	92	0.680
L113615Z	_068	12306	1.376	sba-sbr	oc, pl	441	21	189	337	0.560
L113615Z	_069	8526	1.319	ang-sba	oc, ct, ocn	605	34	143	201	0.713
L113615Z	_070	17150	1.1	sh	ot	605	34	21	58	0.356
L113615Z	_072	26642	1.12	eq, ang	oc, pl	2799	71	73	69	1.061
L113615	_011	6346	1.064	ang/bk	oc, pl	140	2	2567	1123	2.285
L113615	_001	36246	1.323	ang/bk	oc, cn, ocn	152	11	867	991	0.874
L113615	_002	17081	1.514	eh/bk	ot	2798	29	103	83	1.247
L113615	_003	15023	1.335	eh-sh	oc, ct, cn	348	25	50	99	0.504
L113615	_004	9021	1.239	eh	sec + oc, cn	149	8	576	724	0.796
L113615	_005	8849	1.143	sh/sbr	oc, ct, cn	426	23	102	167	0.613
L113615	_006	8644	1.5	sbr	oc, ct, cn	2462	69	108	515	0.211
L113615	_007	8026	1.333	sba	ot	482	30	46	130	0.354
L113615	_008	6620	1.287	ang-sba	sec, cn	613	72	85	116	0.736
L113615	_009	6757	1.745	sh, bk	ot	421	26	59	81	0.727
L113615	_010	6517	1.17	sh	oc, ct, cn	582	12	62	307	0.201
L113615	_012	5214	1.287	sh, bk	sec + oc, cn	339	26	358	1146	0.312
L113615	_013	4768	1.1	ang	ot	2677	130	83	64	1.293
L113615	_014	21029	1.1	sh, bk	oc, ct, cn	134	13	90	112	0.807
L113615	_015	4322	1.237	sba-sbr	oc, ct, ocn	2825	24	246	361	0.680
L113615	_016	4013	1.146	ang	ot	1783	44	121	317	0.382
L113615	_018	3773	1.593	sbr	ot	1619	57	107	116	0.929
L113615	_019	2950	1.094	sh	ot	424	15	310	479	0.648
L113615	_020	2950	1.774	ang/bk	oc, ct, ocn	329	22	814	1108	0.734
L113615	_022	2401	1.321	sba-sbr	ot	644	44	35	85	0.412
L113415Z	_001	9842	1.378	sba	oc, pl	633	26	90	88	1.018
L113415Z	_002	9856	2.38	eh	oc, ct, cn	376	18	41	78	0.527
L113415Z	_004	16856	1.287	eh	oc, ct, ocn	607	24	199	326	0.609
L113415Z	_005	8653	1.43	sbr-rnd	oc, pl	967	40	407	313	1.300
L113415Z	_007	7140	2.047	sh/sbr	oc, ct, ocn	607	24	64	138	0.463
L113415Z	_008	7700	1.224	sh, bk	ot	382	18	154	375	0.412
L113415Z	_009	8792	2.169	sh, bk	oc, ct, cn	373	16	77	371	0.209
L113415Z	_010	10724	1.506	sh/sbr	sec + oc, ct, ocn	649	32	134	132	1.014
L113415Z	_011	6664	1.853	sba-sbr	ot	625	21	289	228	1.265
L113415Z	_012	6132	1.123	sh, bk	oc, ct, ocn	483	18	424	554	0.766
L113415Z	_013	5516	1	sh, bk	oc, ct, ocn, xc	598	25	87	162	0.536
L113415Z	_014	10360	1.159	sba-sbr	oc, ct, ocn	1234	47	41	29	1.427
L113415Z	_015	8218	1.286	rnd	sec, ct, ocn, xc	561	21	84	74	1.140
L113415Z	_017	8358	1.378	sbr, bk	oc, ct, ocn	1169	48	37	156	0.234
L113415Z	_018	9114	1.267	sbr, bk	oc, ct, ocn	540	21	332	241	1.376
L113415Z	_019	12852	1	sbr, bk	unz	632	31	44	48	0.913
L113415Z	_020	6972	1.089	sbr	oc, ct, cn	618	26	202	140	1.438
L113415Z	_022	10122	1.324	ang	ot	1258	37	82	264	0.310
L113415Z	_024	6944	1.413	sbr	sec + oc, ct, cn	446	15	115	298	0.384
L113415Z	_025	10234	1.479	sbr-rnd	sec + oc, ct, cn	537	25	77	159	0.486
L113415Z	_026	7336	1.276	sba	oc, ct, ocn	2469	45	49	137	0.361
L113415Z	_027	2954	1.133	eh	sec + oc, nct, cn	421	25	159	179	0.887
L113415Z	_029	8162	1.333	sba-sbr	sec + oc, ct, cn	602	23	103	117	0.883
L113415Z	_031	8148	1.119	rnd	sec, cn	628	29	9	566	0.015
L113415Z	_032	6006	2.382	sbr	oc, ct, cn	1416	37	38	92	0.414
L113415Z	_033	6482	2.547	eh, bk	oc, pl	448	16	195	188	1.033
L113415Z	_035	3570	1.103	eh, bk	oc, ct, ocn	429	28	402	439	0.917
L113415Z	_036	6062	1.133	sh/sba	ot	487	30	70	86	0.817
L113415Z	_037	6496	1.38	sh, bk	oc, ct, cn	450	22	189	406	0.466

APPENDIX 4. Continued

Sample	Grain ID	S. Area	AR	Morph	Zoning	Conc Age	2 σ	Th	U	Th/U
L113415Z	_038	9142	1.446	sh, bk	oc, ct, ocn	414	17	149	483	0.308
L113415Z	_039	5796	1.4	sh	sec + oc, ct, cn	648	16	200	383	0.521
L113415Z	_042	3598	1.383	sh	sec + oc, ct, ocn	579	44	177	196	0.901
L113415Z	_043	3836	1.103	sh, bk	sec + oc, ct, cn	416	33	147	230	0.641
L113415Z	_044	3682	1.383	sba	sec + oc, ct, ocn	732	28	108	125	0.868
L113415Z	_048		1.33	ang/bk	ot	692	16	253	886	0.285
L113415Z	_049	9324	1.933	sh	oc, ct, ocn	639	26	1143	1146	0.998
L113415Z	_050	6342	1.747	eh	sec + oc, ct, cn	592	34	94	287	0.329
L113415Z	_053	6706	1.494	sbr	oc, ct, ocn	571	27	62	88	0.703
L113415Z	_055	9170	1.306	ang	oc, pl	433	18	76	49	1.539
L113415Z	_056	9492	1	ang-sba	sec + oc, ct, ocn	427	20	103	120	0.858
L113415Z	_057	9856	1.103	sbr, bk	oc, ct, ocn	641	27	67	69	0.975
L113415Z	_058	5838	1.17	ang-sba	oc, ct, ocn	2591	42	120	227	0.528
L113415Z	_061	4102	1.756	eh	oc, ct, ocn	615	18	289	387	0.746
L113415Z	_062	8806	1	sba	oc, pl	406	21	174	74	2.335
L113415Z	_063	10388	1.263	rnd	oc, ct, oc, xc	614	35	37	64	0.580
L113415Z	_064	7224	1	ang	sec, nct	640	24	95	140	0.678
L113415Z	_066	4914	1.5	sba	ot	650	38	14	25	0.551
L113415Z	_067	4116	1.75	eh, bk	oc, pl	394	45	84	97	0.866
L113415Z	_068	8792	1.09	sbr	oc, ct, ocn	580	26	37	88	0.428
L113415Z	_070	5936	1.329	sba	oc, pl	1656	37	383	360	1.062
L113415Z	_076	6437	1.13	rnd, bk	unz	2638	41	252	447	0.563
L113415Z	_078	17514	1.185	sba	oc, pl	547	26	45	74	0.619
L113415Z	_081	11578	2.176	sbr	ot	643	31	9	40	0.226
L113415Z	_084	7672	1.386	rnd	oc, ct, ocn	430	19	626	949	0.659
L113415Z	_085	8232	1.076	sbr	oc, ct, ocn	1291	29	64	153	0.418
L113415Z	_086	21028	1.024	sbr	sec, nct	1320	31	122	326	0.374
L113415Z	_087	16282	1.517	sbr, bk	oc, ct, cn	558	21	99	115	0.857
L113415Z	_088	11984	1	rnd	sec + oc, ct, ocn	612	24	46	70	0.648
L113415Z	_089	15652	1.053	ang	oc, ct, ocn	1561	41	135	345	0.390
L113415Z	_090	26138	1.059	sba-sbr	ot	614	24	136	247	0.551
L113415Z	_091	11368	1.164	sbr-rnd	oc, ct, ocn	558	42	75	112	0.671
L113415Z	_092	4200	1.169	sba	unz	1175	77	47	123	0.385
L113415Z	_094	12000	1.8	eh	N/A	1111	71	201	264	0.763
L113415(2)	_001	17941	2.012	sh	ot	372	11	30	170	0.179
L113415(2)	_004	6432	1.612	eh/bk	oc, ct, ocn	411	9	159	290	0.547
L113415(2)	_007	7103	1.14	sbr	oc, ct, cn	524	18	293	267	1.097
L113415(2)	_008	9457	1.67	sh/bk	oc, ct, ocn	377	12	94	228	0.412
L113415(2)	_009	11089	1.052	rnd/bk	unz	1177	27	128	75	1.714
L113415(2)	_010	6589	2.11	eh	oc, ct, cn	382	7	108	403	0.267
L113415(2)	_011	9898	1.023	ang	oc, ct, ocn	397	11	41	103	0.400
L113415(2)	_012	7356	1.95	eh	oc, ct, cn	2064	37	95	136	0.697
L113415(2)	_013	5311	1.21	sh	ot	388	11	71	403	0.176
L113415(2)	_014	8934	1.16	sba	oc, ct, ocn	430	12	237	298	0.794
L113415(2)	_015	9117	1.25	sba	oc, ct, ocn	1979	36	125	151	0.830
L113415(2)	_016	10326	1.91	sh	oc, ct, cn	465	18	70	146	0.481
L113415(2)	_017	7528	1.14	sbr	unz	2078	26	39	67	0.581
L113415(2)	_020	6584	2.24	sbr	ot	644	24	66	91	0.730
L113415(2)	_021	4692	1.91	sbr	ot	2829	75	43	151	0.287
L113415(2)	_023	6319	1.09	rnd	ot	2078	26	193	365	0.527
L113415(2)	_025	7899	1.12	sbr/bk	ot	1536	52	49	185	0.262
L113415(2)	_026	4763	1.18	sbr	oc, ct, cn	638	15	283	241	1.175
I783255Z	_002	8162	1.616	sh-sbr	oc, ct, cn	531	43	104	62	1.681
I783255Z	_004	5054	1.147	sh	oc, ct, cn	535	32	111	175	0.635
I783255Z	_006	6188	1.128	sh	unz	629	45	28	38	0.732
I783255Z	_007	5782	1.078	eh	sec + oc, cn	431	26	135	144	0.938

APPENDIX 4. Continued

Sample	Grain ID	S. Area	AR	Morph	Zoning	Conc Age	2 σ	Th	U	Th/U
l783255Z	_008	5166	1.146	sba-sbr	oc, ct, ocn	619	32	43	115	0.378
l783255Z	_009	12040	1.413	sba-sbr	oc, ct, ocn	1590	56	53	180	0.297
l783255Z	_010	4648	1.5	sba-sbr	oc, ct, ocn	550	35	173	222	0.780
l783255Z	_011	4970	1.462	sba	sec + oc, ocn	2125	63	141	356	0.397
l783255Z	_013	6258	1.111	sh	sec + oc, cn	486	46	289	302	0.959
l783255Z	_015	7714	1.349	rnd	oc, ct, ocn	1845	67	118	144	0.819
l783255Z	_016	5796	1.293	sba	oc, ct, ocn	1294	50	29	93	0.309
l783255Z	_019	4970	1.098	sba	ot	537	26	290	311	0.932
l783255Z	_022	5992	1.493	sba	oc, ct, cn	551	50	108	135	0.805
l783255Z	_026	7532	1.211	sbr	oc, ct, ocn	2392	64	40	82	0.479
l783255Z	_028	4858	1.469	sh	oc, ct, cn	1483	130	46	89	0.516
l783255Z	_029	2758	1.143	ang	unz	590	72	42	40	1.047
l783255Z	_030	2730	1.143	sh	oc, ct, ocn	392	24	98	431	0.227
l783255Z	_031	4130	1.344	sh	oc, ct, cn	444	21	296	383	0.772
l783255Z	_034	5362	1.479	sba-sbr	sec + oc, cn	1014	45	163	246	0.662
l783255Z	_041	5572	1.333	rnd	oc, ct, cn	619	42	48	46	1.046
l783255Z	_042	3794	1.5	sbr	oc, ct, ocn	1997	99	20	34	0.609
l783255Z	_043	3962	1.281	sh	oc, ct, cn	505	23	144	265	0.542
l783255Z	_044	4690	1.133	sh	oc, ct, ocn	602	42	230	239	0.964
l783255Z	_045	9898	1.392	sba	oc, ct, ocn	728	35	14	169	0.086
l783255Z	_046	8820	2	sh	oc, ct, cn	616	29	137	238	0.577
l783255Z	_049	3570	1.231	rnd	ot	1082	35	292	155	1.891
l783255Z	_050	4116	1.667	eh	unz	414	31	43	83	0.511
l783255Z	_053	8218	2.643	eh	oc, ct, cn	562	24	148	260	0.570
l783255Z	_054	2310	1.561	sbr	ot	1114	40	134	178	0.753
l783255Z	_055	4508	1.385	sba	sec + oc, cn	3111	43	111	161	0.692
l783255Z	_060	9772	1.101	sh	sec, cn	2224	62	31	45	0.694
l783255Z	_063	5068	1.286	sh	oc, ct, cn	599	31	92	170	0.539
l783255Z	_064	5978	1.183	sbr	oc, ct, ocn	637	67	365	316	1.155
l783255Z	_066	5404	2.143	sbr	sec + oc, ocn	2089	66	76	160	0.475
l783255Z	_067	5404	1.714	eh, bk	oc, ct, ocn	480	24	71	149	0.480
l783255Z	_068	4410	1	sbr	ot	2080	87	39	115	0.337
l783255Z	_069	3850	1.545	ang	ot	1245	95	49	224	0.217
l783255Z	_073	5236	1.147	sh	oc, ct, cn	645	33	117	114	1.030
l783255Z	_074	4508	1.2	sba	oc, pl	1615	84	70	101	0.689
l783255Z	_075	5152	1.667	rnd	oc, ct, ocn	608	43	76	95	0.792
l783255Z	_077	3052	1.25	sh, bk	oc, ct, ocn	445	22	122	179	0.684
l783255Z	_078	5404	1	rnd	ot	1809	62	73	100	0.730
l783255Z	_079	9716	1.24	sba	oc, ct, ocn	538	26	59	149	0.396
l783255Z	_084	2380	1.667	sh	oc, ct, cn	621	27	96	195	0.494
l783255Z	_087	1610	1.765	ang	unz	446	23	348	598	0.582
l783255Z	_088	7014	3.019	sh	oc, ct, cn	590	25	54	278	0.193
l783255Z	_090	7658	1.124	sbr	oc, ct, ocn, xc	1397	48	66	209	0.317
l783255Z	_092	5474	1.092	sh, ang/bk	oc, ct, ocn	471	17	278	776	0.358
l783255Z	_094	5950	1.627	sh	ot	465	25	249	311	0.800
l783255Z	_095	5096	1.049	sbr	ot	663	47	53	71	0.744
l783255Z	_096	4298	1.147	eh, ang/bk	ot	430	26	134	140	0.957
l783255Z	_097	2380	1.306	sh, ang/bk	oc, ct, ocn	598	36	83	137	0.608
l783255Z	_098	4970	1.324	sh	sec + oc, cn	609	52	229	248	0.922
l783255Z	_099	4984	3.375	eh-sh	sec + oc, cn	413	26	182	199	0.916
l783255Z	_101	13664	1.043	sbr	unz	1263	27	653	534	1.223
l782175Z	_001	5642	1.047	sba-sbr	oc, pl	657	28	154	160	0.967
l782175Z	_002	3850	1.344	sh, ang/bk	ot	1428	76	87	168	0.522
l782175Z	_003	4578	1.053	sba-sbr	ot	2466	64	58	52	1.110
l782175Z	_008	4816	1.098	eh, bk	oc, pl	2168	34	267	491	0.542
l782175Z	_009	4298	1.403	sbr-rnd, bk	oc, pl, xc	652	25	681	1181	0.577

APPENDIX 4. Continued

Sample	Grain ID	S. Area	AR	Morph	Zoning	Conc Age	2 σ	Th	U	Th/U
I782175Z	_010	5880	1.627	sh, bk	oc, ct, ocn	953	79	302	212	1.421
I782175Z	_011	4228	1	sh	sec + oc, ct, ocn	577	37	180	243	0.741
I782175Z	_012	4550	1.469	sh	sec + oc, ct, ocn	611	49	165	329	0.503
I782175Z	_013	4018	1.469	sbr-rnd	ot	1709	78	345	341	1.010
I782175Z	_017	3542	1.5	sh-eh, bk	oc, ct, cn	472	39	93	137	0.684
I782175Z	_019	3276	1.755	sh, bk	oc, ct, cn, xc	649	42	28	43	0.639
I782175Z	_021	3780	1.224	sbr-sba	oc, ct, ocn	1175	90	243	435	0.559
I782175Z	_022	6650	2.65	ang, bk	unz	1364	90	282	203	1.390
I782175Z	_024	7700	1.211	sbr	sec, ct, cn	603	43	213	273	0.781
I782175Z	_025	2436	1.556	sbr-rnd	N/A	606	40	74	110	0.677
I782175Z	_026	3892	1.127	sh	oc, ct, ocn	443	25	397	857	0.463
I782175Z	_028	5558	1.479	sba-sbr	ot	1920	56	64	103	0.622
I782175Z	_029	5152	1.643	sba-sbr	unz	1238	53	127	41	3.108
I782175Z	_030	5320	1.146	sh-eh, bk	oc, ct, ocn, xc	624	18	63	169	0.371
I782175Z	_031	4858	1.147	sh, bk	oc, ct, ocn	749	24	341	439	0.777
I782175Z	_035	5740	1.235	sh	oc, ct, ocn	601	20	141	202	0.699
I782175Z	_036	2632	1.071	sbr-rnd	ot	581	42	53	107	0.491
I782175Z	_037	4424	1.286	sba-sbr	oc, ct, ocn	1037	32	52	170	0.307
I782175Z	_038	3080	1.489	sba	ot	707	190	257	239	1.076
I782175Z	_039	3276	1.109	sba	unz	383	19	28	67	0.413
I782175Z	_040	4466	1.284	ang	ot	1219	26	53	223	0.239
I782175Z	_042	N/A	N/A	ang	oc, ct, ocn	484	60	74	335	0.222
I782175Z	_043	3444	1.442	sh	oc, ct, cn	610	21	187	225	0.831
I782175Z	_046	3878	1.617	sh	oc, ct, ocn	560	29	36	91	0.398
I782175Z	_047	5418	1.333	sbr	oc, ct, ocn	1261	39	103	177	0.582
I782175Z	_051	3864	1.333	sbr	oc, ct, ocn, xc	605	27	327	400	0.816
I782175Z	_052	3542	1.5	ang-sba	ot	428	23	149	103	1.443
I782175Z	_053	6846	1.232	sba-sbr	ot	566	43	108	70	1.532
I782175Z	_055	5376	1.448	sba-sbr	ot	1825	41	167	219	0.761
I782175Z	_058	9688	2	sbr, bk	ot, xc	2785	48	96	203	0.471
I782175Z	_060	5782	1.435	eh, bk	oc, ct, ocn	582	23	73	158	0.461
I782175Z	_061	5432	1.38	sba	oc, ct, ocn	625	40	207	201	1.032
I782175Z	_062	5852	1.302	sba-sbr	oc, ct, ocn	1789	39	105	149	0.705
I782175Z	_063	5656	1.047	ang-sba	oc, ct, ocn	1233	85	102	247	0.415
I782175Z	_064	26740	1.043	sba	oc, ct, cn, xc	2815	36	114	301	0.380
I782175Z	_068	6846	1.167	sba	sec + oc, ct, ocn	2289	48	135	247	0.548
I782175Z	_069	21588	1.292	sbr, bk	oc, pl, xc	2854	35	71	192	0.371
I782175Z	_070	5656	1.047	ang-sba	oc, ct, ocn	1233	85	102	247	0.415
I782175Z	_071	26740	1.043	sba	oc, ct, cn, xc	2815	36	114	301	0.38
I782175Z	_074	4592	1.038	sba-sbr	unz	2125	39	81	116	0.702
I782175Z	_076	6846	1.167	sh, sba/bk	sec + oc, ct, ocn	2289	48	135	247	0.548
I782175Z	_077	21588	1.292	sbr, bk	oc, pl, xc	2854	35	71	192	0.371

*S. Area = surface area, measured in μm^2 ; AR = aspect ratio, measured as the ratio of length/width (in μm); Morph = grain morphology; Eh = euhedral; Sh = subhedral; Ang = angular; Sba = subangular; Sbr = subrounded; Rnd = rounded; Bk = broken, inferred as broken during drilling or sample preparation; Zoning = growth zoning of zircon crystals, as determined by scanning electron microscope in back-scattered electron mode; Oc, ct = oscillatory, concentric; Oc, pl = oscillatory, planar; Sec = sector zoning; Ot = other zoning, mainly convoluted or irregular zoning types; Unz = unzoned; Sec + Oc = sector and oscillatory zoning; Conc age = concordia age, in Ma; 2 σ = 2- σ error of concordia age, in Ma; Th = thorium concentration, in ppm; U = uranium concentration, in ppm; Th/U = ratio of Th (ppm)/U (ppm).

APPENDIX 5: Detrital Heavy Mineral Counts*

Sample	L-11 3760	L-11 3615	L-11 3620	L11 3625	L11 3405	L-11 3410	L-11 3415	L11 3420	I78 4135	I-78 3765	I-78 3295	I-78 3300	I-78 3255	I78 3260	I78 3265	I-78 2165	I-78 2170	I-78 2175	I-78 2180
Z	44	28	12	26	38	33	159	213	12	16	64	31	73	53	105	86	34	48	93
Mz	2	4	2	3	10	21	64	32	2	5	29	24	11	9	13	32	9	17	32
T	55	42	22	33	75	57	222	221	22	21	77	71	69	48	76	103	150	12	226
At	2	57	28	28	14	13	3	22	11	3	1	3	8	9	12	89	37	9	12
Crm	2	2	5	3	0	2	6	4	0	0	0	0	2	1	2	9	0	2	3
Il	0	4	6	2	0	0	1	4	0	4	4	1	1	0	6	326	177	209	251
Rt	6	21	16	27	79	76	218	284	12	15	83	92	6	63	95	394	422	348	383
Tit	1	6	2	3	0	3	28	1	1	3	3	3	17	0	3	19	15	25	21
Total	112	164	93	125	216	205	701	781	60	67	261	225	187	183	312	1058	844	670	1021
ZTR	96.3	59.9	62.5	71.7	88.9	83.0	89.9	92.9	76.7	86.7	88.2	87.8	92.5	90.1	90.8	82.8	92.9	94.0	94.1
% Z	39.3	17.1	12.9	20.8	17.6	16.1	22.7	27.3	20.0	23.9	24.5	13.8	39.0	29.0	33.7	8.1	4.0	7.2	9.1
% Mz	1.8	2.4	2.2	2.4	4.6	10.2	9.1	4.1	3.3	7.5	11.1	10.7	5.9	4.9	4.2	3.0	1.1	2.5	3.1
% T	49.1	25.6	23.7	26.4	34.7	27.8	31.7	28.3	36.7	31.3	29.5	31.6	36.9	26.2	24.4	9.7	17.8	1.8	22.1
% At	1.8	34.8	30.1	22.4	6.5	6.3	0.4	2.8	18.3	4.5	0.4	1.3	4.3	4.9	3.8	8.4	4.4	1.3	1.2
% Crm	1.8	1.2	5.4	2.4	0.0	1.0	0.9	0.5	0.0	0.0	0.0	0.0	1.1	0.5	0.6	0.9	0.0	0.3	0.3
% Il	0.0	2.4	6.5	1.6	0.0	0.0	0.1	0.5	0.0	6.0	1.5	0.4	0.5	0.0	1.9	30.8	21.0	31.2	24.6
% Rt	5.4	12.8	17.2	21.6	36.6	37.1	31.1	36.4	20.0	22.4	31.8	40.9	3.2	34.4	30.4	37.2	50.0	51.9	37.5
% Tit	0.9	3.7	2.2	2.4	0.0	1.5	4.0	0.1	1.7	4.5	1.1	1.3	9.1	0.0	1.0	1.8	1.8	3.7	2.1

*Zr = Zircon grain counts; Mz = Monazite grain counts; Tr = Tourmaline grain counts; Ap = Apatite grain counts; Cr = Chromite grain counts; Il = Ilmenite grain counts; Rt = Rutile grain counts; Ti = Titanite grain counts; ZTR = $(Zr + Tr + Rt) / (Zr + Tr + Rt + Ap + Mz + Cr + Ti) \times 100\%$; % Zr = $(Zr / Zr + Mz + Tr + Ap + Cr + Il + Rt + Ti) \times 100\%$; % Mz = $(Mz / Zr + Mz + Tr + Ap + Cr + Il + Rt + Ti) \times 100\%$; % Tr = $(Tr / Zr + Mz + Tr + Ap + Cr + Il + Rt + Ti) \times 100\%$; % Ap = $(Ap / Zr + Mz + Tr + Ap + Cr + Il + Rt + Ti) \times 100\%$; % Cr = $(Cr / Zr + Mz + Tr + Ap + Cr + Il + Rt + Ti) \times 100\%$; % Il = $(Il / Zr + Mz + Tr + Ap + Cr + Il + Rt + Ti) \times 100\%$; % Rt = $(Rt / Zr + Mz + Tr + Ap + Cr + Il + Rt + Ti) \times 100\%$; % Ti = $(Ti / Zr + Mz + Tr + Ap + Cr + Il + Rt + Ti) \times 100\%$.

APPENDIX 5. Continued

Sample	Mz	Ap	Cr	Il	Rt	Ti	Tr	Zr
Area % of Mineral Phases, Normalized to Total Area% Mz + Ap + Crm + Il + Rt + T + Z								
L-11 3760	0.695558	2.243264	0.972324	0.662783	3.954843	22.86963	20.51712	48.08449
L-11 3615	2.182629	37.62101	2.354735	0.471338	25.65176	18.16511	4.199019	9.354403
L-11 3620	0.264326	27.40253	0.842538	6.376852	26.52695	26.09034	8.378174	4.118286
L11 3625	2.438435	21.9569	2.007036	0.340369	30.77661	2.895778	24.48153	15.10334
L11 3405	1.927676	6.030839	0	0	39.36903	0	37.23674	15.43572
L-11 3410	3.659259	2.157886	1.286121	0	46.80084	0.069956	26.82021	19.20573
L-11 3415	4.734892	0.081637	0.68658	0.175831	30.87937	13.02619	26.63848	23.77703
L11 3420	2.384697	0	0.301237	0.939619	39.46385	0.059557	29.29117	27.55987
I78 4135	1.653644	18.28018	0	0	40.65489	1.028055	28.09679	10.28644
I-78 3765	5.957109	2.382844	0	2.184273	28.19698	2.621128	19.34075	39.31692
I-78 3295	7.03387	1.747647	0	0.808895	44.65426	0.616817	20.80673	24.33178
I-78 3300	7.359149	0.568911	0	0.575029	43.23423	0.82278	33.10087	14.33902
I-78 3255	6.69509	0.28733	0.605555	3.602435	2.144159	23.86999	15.10489	47.69055
I78 3260	1.832878	4.043064	0.03412	0	47.2	0	24.14377	22.74617
I78 3265	2.530701	0.252562	0.637843	1.200488	33.31825	0.757683	25.73334	35.56913
I-78 2165	1.964486	4.113069	1.265606	27.22081	52.51586	1.97272	3.740503	7.206944
I-78 2170	0.710373	2.607638	0.024091	15.00009	62.343	1.352	13.44126	4.521546
I-78 2175	0.944013	2.638171	1.444399	29.12496	38.25039	1.542388	20.82493	5.23074
I-78 2180	1.661085	0.401479	0.403063	26.14789	45.11783	2.966534	18.55052	4.751602
H-28 5005	0.888593	5.729443	2.765253	1.531831	8.786471	7.871352	24.07825	48.34881
H-28 5010	1.074226	11.70459	4.632601	4.349124	8.452069	16.17307	34.05446	19.55987
H-28 5015	4.166666	17.35445	5.486244	6.477926	8.349329	11.37236	27.13532	19.65771
H-28 5020	0	0.40949	1.813455	1.683457	14.13065	3.002925	61.95645	17.00357
H-28 5025	0.250059	1.22685	2.664688	1.187778	29.56943	6.931312	51.66054	6.509339
Weight % of Mineral Phases, Normalized to Total Weight% Mz + Ap + Crm + Il + Rt + T + Z								
L-11 3760	0.880496	1.781778	1.086042	0.789652	4.22106	19.86785	15.27781	56.09531
L-11 3615	2.969797	32.11863	2.827036	0.603602	29.4281	16.96221	3.360823	11.7298
L-11 3620	0.361111	23.48941	1.015625	8.199344	30.55535	24.46129	6.7329	5.184965
L11 3625	3.270325	18.47697	2.375075	0.429636	34.80157	2.665282	19.31388	18.66726
L11 3405	2.569062	5.043103	0	0	44.23779	0	29.19195	18.9581
L-11 3410	4.624271	1.711033	1.434084	0	49.86573	0.060671	19.93717	22.36705
L-11 3415	6.061489	0.065574	0.775538	0.211854	33.33004	11.44417	20.05994	28.05139
L11 3420	3.000466	0	0.334431	1.112702	41.8652	0.051427	21.6792	31.95658
I78 4135	2.231219	15.47606	0	0	46.24995	0.95195	22.30016	12.79066
I-78 3765	4.844936	3.721792	0	2.198363	27.52804	2.686737	25.54603	33.4741
I-78 3295	8.617049	1.343376	0	0.932668	46.12382	0.518583	14.99405	27.47045
I-78 3300	9.439663	0.457882	0	0.694208	46.7579	0.724288	24.97581	16.95025
I-78 3255	8.182231	0.22033	0.652997	4.143644	2.209382	20.02006	10.85885	53.7125
I78 3260	2.309566	3.196593	0.037935	0	50.14611	0	17.89588	26.41392
I78 3265	3.127786	0.195858	0.695588	1.396448	34.71974	0.64266	18.70868	40.51323
I-78 2165	2.290801	3.009429	1.302205	29.87518	51.63298	1.578707	2.565781	7.744925
I-78 2170	0.860278	1.981434	0.025742	17.0969	63.65586	1.123639	9.575106	5.681043
I-78 2175	1.163484	1.3895	1.570747	33.78456	39.74804	1.304602	15.09789	5.94117
I-78 2180	2.019646	0.306275	0.432427	29.92223	46.25225	2.475336	13.26762	5.32421
H-28 5005	1.112193	4.499545	3.053892	1.804506	9.27234	6.761199	17.7277	55.76862
H-28 5010	1.473918	10.07659	5.608473	5.616299	9.777749	15.22887	27.48543	24.73267
H-28 5015	5.561822	14.53513	6.461688	8.138336	9.396761	10.41782	21.30661	24.18182
H-28 5020	0	0.369524	2.301276	2.27873	17.13483	2.963889	52.41519	22.53655
H-28 5025	0.35437	1.090905	3.331994	1.584245	35.33108	6.741073	43.06513	8.5012

H285025T14	H285025T15	H285025T16	H285025T19	H285025T21	H285025T23	H285025T22	H285025T6	H285025T8	H285025T12	H285025T20
35.88	36.11	35.71	35.72	44.29	35.54	35.4	36.25	35.01	35.65	36
1.61	0.55	0.72	0.27	0	1.71	0.99	0.43	0.51	0.27	0.68
32.77	35.31	32.29	32.97	38.98	30.57	32.65	34.23	34.56	35.19	34.22
0	0	0.01	0	0	0	0	0	0	0	0
7.98	5.89	6.38	8.42	2.63	10.57	6.6	9.39	12.73	11.12	7.52
5.7	6.25	7.18	6.13	0.56	5.3	6.41	4.18	1.84	2.43	5.62
0.47	0.75	1.15	0.71	0.46	0.3	0.53	0.12	0.29	0.11	0.45
0.06	0.01	0.01	0.07	0	0.07	0.01	0	0.01	0.22	0.01
2.01	1.74	1.81	1.89	0.19	2.18	2.02	1.63	1.72	1.83	2.01
0.04	0.04	0.02	0.02	0.08	0.04	0.02	0.03	0.06	0.05	0.04
3.68	3.74	3.65	3.65	4.1	3.6	3.63	3.67	3.62	3.66	3.7
10.67	10.84	10.58	10.58	11.88	10.44	10.51	10.63	10.48	10.6	10.72
0.28	0.29	0.23	0.07	3.13	0.11	0.24	0.18	0.24	0.27	0.26
101.15	101.53	99.74	100.51	106.3	100.43	99	100.73	101.06	101.4	101.22
0	0	0	0	0	0	0	0	0	0	0
101.15	101.53	99.74	100.51	106.3	100.43	99	100.73	101.06	101.4	101.22
5.846	5.789	5.867	5.868	6.477	5.916	5.856	5.927	5.804	5.843	5.835
0.154	0.211	0.133	0.132	0.000	0.084	0.144	0.073	0.196	0.157	0.165
3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6.000	6.000	6.000	6.000	6.000	5.914	6.000	6.000	6.000	6.000	6.000
0.000	0.000	0.000	0.000	0.000	0.086	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.138	0.461	0.120	0.253	0.718	0.000	0.221	0.524	0.558	0.640	0.371
0.198	0.066	0.089	0.033	0.000	0.214	0.123	0.053	0.064	0.033	0.083
0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
1.385	1.493	1.758	1.502	0.122	1.229	1.580	1.019	0.455	0.593	1.357
0.008	0.001	0.001	0.010	0.000	0.010	0.001	0.000	0.001	0.030	0.001
1.088	0.790	0.877	1.157	0.322	1.472	0.913	1.284	1.765	1.524	1.020
0.184	0.188	0.155	0.045	1.838	0.077	0.161	0.120	0.157	0.180	0.168
3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
0.082	0.128	0.203	0.125	0.072	0.053	0.093	0.020	0.051	0.019	0.078
0.634	0.541	0.578	0.604	0.054	0.704	0.647	0.516	0.554	0.582	0.632
0.008	0.008	0.005	0.004	0.015	0.009	0.005	0.005	0.012	0.010	0.009
4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Structural formulae were calculated on the basis of 31 anions (O, OH, F), following the methodology of Tindle et al. (2003). Weight percent oxides of B₂O₃, H₂O (as OH) and Li₂O₃ were calculated, assuming the appropriate stoichiometric amounts of B (3 atoms per formula unit), H + F (4 atoms per formula unit), and Li. The amount of Li assigned to the Y site is determined by subtracting the amount of cations in the T + Z + Y sites from the ideal sum of the cations occupying the sites (15 atoms per formula unit) (Li = 15 - [T + Z + Y] or Li = 15 - [Si + Al + Mg + Fe + Mn + Zn + Ti]). All Fe and Mn were assumed to be Fe²⁺ and Mn²⁺.

APPENDIX 6B: Silicate Standard Analyses and Error

No.	SiO ₂	TiO ₂	Al ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	Total
KK1	40.534	4.721	14.845	10.412	0.086	12.804	10.432	2.525	2.036	98.420
KK2	40.872	4.803	15.147	10.397	0.109	12.923	10.240	2.548	2.018	99.082
KK3	40.386	4.819	15.082	10.260	0.094	12.862	10.177	2.601	2.067	98.365
KK4	40.343	4.775	14.900	10.400	0.102	12.911	10.345	2.491	2.011	98.290
KK5	40.598	4.676	15.025	10.670	0.099	12.579	10.115	2.602	2.073	98.437
KK6	40.545	4.821	14.114	10.431	0.118	12.919	10.431	2.464	2.090	98.021
KK7	40.579	4.743	14.487	10.576	0.121	12.900	10.288	2.503	2.030	98.312
KK8	40.665	4.799	15.009	10.407	0.106	12.733	10.249	2.550	2.097	98.632
KK9	40.400	4.755	15.028	10.285	0.061	12.494	10.394	2.687	2.046	98.155
KK10	40.617	4.774	14.469	10.548	0.093	12.603	9.410	2.580	2.037	97.167
KK11	40.919	4.825	14.468	10.457	0.133	12.824	9.513	2.543	1.977	97.722
KK12	41.019	4.576	14.913	10.326	0.081	12.363	10.309	2.615	2.178	98.380
KK13	40.682	4.765	15.046	10.487	0.078	12.819	10.425	2.539	2.059	98.904
KK13	40.733	4.755	14.928	10.362	0.064	12.877	10.476	2.498	2.004	98.696
KK14	41.003	4.724	14.956	10.497	0.074	12.589	10.376	2.586	2.000	98.806
KK15	40.544	4.786	15.073	10.501	0.104	12.846	10.415	2.565	2.001	98.922
KK16	40.825	4.688	14.797	10.474	0.114	12.867	10.355	2.495	2.034	98.723
Average	40.663	4.753	14.840	10.441	0.096	12.760	10.232	2.552	2.045	98.414
1 Sigma	0.208	0.063	0.286	0.105	0.020	0.170	0.306	0.056	0.048	0.475
Precision	99.49	98.66	98.07	99.00	78.90	98.67	97.00	97.80	97.66	99.52
KK*	40.37	4.38	14.9	10.92	0.09	12.8	10.3	2.6	2.05	98.41
Accuracy	99.28	92.15	99.60	95.41	93.49	99.68	99.34	98.13	99.74	100.00

*Analytical precision of measurements of each oxide are given by 100% less the 1 σ errors of average values from repeat analyses of a silicate reference material (Kakanwui kaersutite [kk], see Mason and Allen [1972], Reay et al. [1989]), and analytical accuracy is given by the percent similarity between the average values from repeat kk analysis and accepted values of kk.