

Table DR 1: Whole rock geochemistry^a for the Dysart and Redstone thrust sheets, Southern Ontario, Grenville Province.

Dysart thrust sheet:

	KA2	KA4	KA5	KA9	KA10	KA11	KA30	KA31	KA35	KA36	KA37	KA38
SiO ₂	47.90	67.40	69.10	50.20	66.40	71.30	72.40	47.30	71.40	46.00	67.80	45.40
Al ₂ O ₃	12.20	14.30	18.50	14.30	15.80	14.20	14.00	12.30	13.70	16.10	14.90	15.6
Fe ₂ O ₃	18.10	4.29	0.56	10.00	4.78	1.70	3.60	20.60	3.57	13.40	5.20	13.30
MgO	4.38	1.83	0.22	8.34	1.98	0.29	0.96	4.28	0.95	7.71	1.44	8.24
CaO	8.95	3.83	3.63	11.60	5.11	0.66	3.80	8.00	3.73	10.50	4.94	10.50
Na ₂ O	3.14	3.82	5.54	3.24	4.34	2.68	4.58	3.12	4.59	3.56	4.60	3.33
K ₂ O	0.89	2.93	1.79	0.70	1.44	6.93	0.39	0.46	0.37	1.04	0.91	0.90
TiO ₂	3.04	0.27	0.02	0.50	0.35	0.16	0.41	3.51	0.41	1.39	0.48	1.36
P ₂ O ₅	0.32	0.14	< 0.01	0.24	0.19	0.02	0.08	0.72	0.08	0.10	0.17	0.11
MnO	0.28	0.07	0.01	0.26	0.08	0.01	0.04	0.32	0.04	0.20	0.06	0.19
Cr ₂ O ₃	< 0.01	0.01	< 0.01	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01	0.02
LOI	0.87	0.75	0.97	1.13	0.74	0.56	0.63	0.51	1.25	1.16	0.46	1.20
SUM	100.1	99.7	100.4	100.6	101.2	98.5	100.9	101.2	100.1	101.2	101.0	100.2
Latitude (N) ^b	45° 4.039'	45° 4.039'	45° 4.039'	45° 4.101'	45° 4.101'	45° 4.101'	45° 5.737'	45° 5.737'	45° 7.074'	45° 7.074'	45° 6.385'	45° 6.385'
Longitude (W) ^b	78° 32.241'	78° 32.241'	78° 32.241'	78° 29.481'	78° 29.481'	78° 29.481'	78° 35.653'	78° 35.653'	78° 31.517'	78° 31.517'	78° 33.039'	78° 33.039'
Rock type	Amphi-bolite	Foliated grano-diorite	Non-foliated grano-diorite	Amphi-bolite	Foliated tonalite	Late, granitic dike	Foliated tonalite	Amphi-bolite	Foliated tonalite	Amphi-bolite	Foliated diorite	Amphi-bolite

Redstone thrust sheet:

	KA18	KA19	KA20	KA21	KA23	KA25	KA26	KA28
SiO ₂	65.0	47.10	66.50	47.40	67.20	62.60	61.40	46.10
Al ₂ O ₃	18.80	15.40	17.80	16.10	19.20	19.60	20.00	17.40
Fe ₂ O ₃	3.14	12.90	2.36	13.10	1.08	3.52	3.79	12.40
MgO	1.10	8.72	1.20	8.00	0.38	1.41	1.63	8.27
CaO	4.50	10.90	3.86	8.21	4.01	4.84	5.37	9.87
Na ₂ O	5.77	2.72	5.66	3.27	6.17	6.32	6.31	3.59
K ₂ O	1.24	0.40	1.55	2.13	1.42	1.15	1.15	0.62
TiO ₂	0.40	1.30	0.28	1.25	0.11	0.42	0.49	1.24
P ₂ O ₅	0.12	0.16	0.11	0.14	0.05	0.14	0.17	0.17
MnO	0.04	0.20	0.04	0.31	< 0.01	0.04	0.05	0.18
Cr ₂ O ₃	< 0.01	0.06	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02
LOI	0.61	1.34	1.02	1.15	0.53	0.64	0.63	1.00
SUM	100.7	101.2	100.5	101.2	100.2	100.7	101.0	101.0
Latitude (N) ^b	45° 9.621'	45° 9.621'	45° 9.621'	45° 9.621'	45° 10.521'	45° 10.521'	45° 10.521'	45° 10.521'
Longitude (W) ^b	78° 34.229'	78° 34.229'	78° 34.229'	78° 34.229'	78° 35.922'	78° 35.922'	78° 35.922'	78° 35.922'
Rock type	Diorite	Amphi-bolite	Diorite	Amphi-bolite	High-alkali diorite	Diorite	Diorite	Amphi-bolite

^a Major element analyses are reliable above the detection limit (0.01 wt%). All oxide values are given in wt%. Samples were analyzed using X-ray fluorescence (XRF76C) of glass disks at SGS Mineral Services Geochemical Laboratory in Toronto (see <http://www.geochem.sgs.com> for details).

^b Latitude and Longitude locations are relative to the WGS84 ellipsoid.

Table DR 2: Trace element geochemistry¹ for the Dysart and Redstone thrust sheets, Southern Ontario, Grenville Province

	Dysart	KA2	KA4	KA5	KA9	KA10	KA30	KA31	KA37	KA38	Redstone	KA25	KA28
	Detection ²												
Ag	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ce	0.1	27.5	76.5	18.0	49.3	60.0	37.0	49.1	44.5	16.3	23.9	15.4	
Co	0.5	65.1	57.2	66.1	49.6	58.8	41.0	60.0	41.8	65.8	34.0	68.7	
Cs	0.1	<0.1	0.8	0.3	<0.1	0.5	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	
Cu	5	112	31	10	21	23	<5	51	15	91	<5	102	
Dy	0.05	9.31	2.00	0.42	2.11	2.31	4.19	16.80	5.78	4.20	1.64	4.39	
Er	0.05	6.00	0.86	0.27	0.90	1.26	2.95	10.40	3.77	2.59	0.78	2.75	
Eu	0.05	2.41	1.30	1.01	1.46	1.50	0.75	3.89	1.34	1.23	0.70	1.39	
Ga	1	26	18	21	16	20	15	27	18	20	23	21	
Gd	0.05	8.78	3.90	0.49	3.58	3.68	3.53	15.80	5.12	4.20	1.95	4.11	
Hf	1	5	3	<1	2	3	3	11	3	2	4	2	
Ho	0.05	2.02	0.33	0.07	0.36	0.42	0.90	3.58	1.27	0.93	0.30	0.92	
La	0.1	9.1	37.4	12.8	23.9	29.1	19.3	20.0	20.5	7.8	11.2	6.6	
Lu	0.05	0.70	0.14	<0.05	0.12	0.18	0.38	1.59	0.50	0.41	0.10	0.36	
Mo	2	<2	<2	2	<2	<2	3	2	3	4	<2	<2	
Nb	1	4	11	2	3	14	6	11	7	2	2	3	
Nd	0.1	23.4	32.8	5.8	27.5	28.4	17.4	42.5	25.5	12.2	12.7	11.9	
Ni	5	18	<5	<5	84	5	6	18	30	112	10	97	
Pr	0.05	4.53	8.87	1.74	6.93	7.43	4.49	8.52	6.22	2.59	3.12	2.43	
Rb	0.2	5.9	77.9	15.3	3.9	40.6	1.9	3.2	4.7	11.2	5.9	5.0	
Sm	0.1	6.9	5.1	0.7	5.2	5.4	3.5	12.9	6.0	3.3	2.5	3.2	
Sn	1	<1	<1	<1	2	1	<1	4	1	2	<1	<1	
Ta	0.5	0.6	1.3	0.8	<0.5	1.4	1.1	1.1	0.9	<0.5	<0.5	<0.5	
Tb	0.05	1.47	0.44	0.08	0.45	0.46	0.6	2.80	0.86	0.71	0.24	0.74	
Th	0.1	1.0	6.9	5.1	2.2	7.0	3.4	1.7	1.7	0.5	0.2	0.5	
Tl	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Tm	0.05	0.79	0.14	<0.05	0.13	0.16	0.40	1.56	0.46	0.41	0.07	0.37	

U	0.05	0.72	0.88	0.96	0.74	1.07	0.78	0.96	0.72	0.53	0.09	0.11
V	5	523	100	<5	235	138	46	276	60	274	64	254
W	1	236	585	841	173	565	582	307	651	157	433	182
Y	0.5	56.2	10.8	2.8	10.0	13.3	24.8	96.4	31.7	24.6	8.5	25.2
Yb	0.1	5.1	1.0	0.2	0.8	1.2	2.9	10.1	3.5	2.4	0.8	2.5
Zr	0.5	187.0	135.0	30.2	59.0	129.0	107.0	408.0	114.0	68.1	168.0	82.7
Latitude (N) ³		45° 4.039'	45° 4.039'	45° 4.039'	45° 4.101'	45° 4.101'	45° 5.737'	45° 5.737'	45° 6.385'	45° 6.385'	45° 10.521'	45° 10.521'
Longitude (W) ³		78° 32.241'	78° 32.241'	78° 32.241'	78° 29.481'	78° 29.481'	78° 35.653'	78° 35.653'	78° 33.039'	78° 33.039'	78° 35.922'	78° 35.922'
Rock type		Amphi- bolite	Foliated grano- diorite	Non- foliated grano- diorite	Amphi- bolite	Foliated tonalite	Foliated tonalite	Amphi- bolite	Foliated diorite	Amphi- bolite	Diorite	Amphi- bolite

¹ All trace element values are given in ppm. Samples analyzed using ICP-MS (IMS95A) after lithium metaborate fusion at SGS Mineral Services Geochemical Laboratory in Toronto (see <http://www.geochem.sgs.com> for details).

² Trace element analyses are reliable above the detection limits listed in ppm.

³ Latitude and Longitude locations are relative to the WGS84 ellipsoid.

Table DR 3: zircon U–Pb isotope data from individual spot analyses.

KA25: 1327.1 +4.1/-8.6 [+13.9/-15.8] Ma, 95.9% conf., n=20^a45°10.521'N lat., 78°35.922'W long.^j

Analysis No.	Loc. ^b	CL ^c	Trace elements			Isotope ratios ^{d, e}				Ages (Ma) ^{f, g}				disc. ^h %
			U (ppm)	Th (ppm)	U/Th	$\frac{^{238}\text{U}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{206}\text{Pb}}{^{238}\text{U}}$	\pm 2σ	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm 2σ	
1 ⁱ	c	o	52	13	3.9	4.350	0.079	0.0847	0.0008	1333	22	1308	19	-2
2	c	h	53	35	1.5	4.780	0.085	0.0821	0.0009	1224	20	1248	21	2
3	c	o	45	23	1.9	5.173	0.104	0.0763	0.0009	1141	21	1103	23	-3
4	c	o	127	49	2.8	4.401	0.108	0.0844	0.0006	1322	30	1302	13	-2
6 ⁱ	c	h	106	24	5.1	4.316	0.097	0.0856	0.0007	1342	27	1329	15	-1
7 ⁱ	c	o	122	16	8.1	4.354	0.091	0.0851	0.0005	1332	25	1319	12	-1
8 ⁱ	c	o	56	20	2.9	4.388	0.077	0.0854	0.0009	1323	21	1324	19	0
9 ⁱ	m	o	32	13	2.5	4.462	0.117	0.0847	0.0010	1302	31	1309	23	1
10 ⁱ	c	o	51	22	2.4	4.371	0.101	0.0848	0.0008	1327	28	1310	19	-1
11 ⁱ	c	o	168	92	1.8	4.359	0.078	0.0857	0.0005	1330	21	1331	11	0
12 ⁱ	c	o	151	12	12.8	4.266	0.076	0.0855	0.0005	1357	22	1326	10	-2
13	c	o	85	41	2.3	4.177	0.099	0.0859	0.0006	1382	30	1335	14	-3
14 ⁱ	c	h	81	34	2.4	4.354	0.083	0.0852	0.0007	1335	24	1321	15	-1
15	r	h	31	20	1.6	5.263	0.152	0.0787	0.0011	1120	30	1165	28	4
16	c	o	70	29	2.5	4.638	0.090	0.0800	0.0006	1258	22	1196	15	-5
17	c	o	38	15	2.8	4.572	0.107	0.0854	0.0008	1277	27	1325	18	4
18	c	h	65	40	1.7	4.539	0.087	0.0828	0.0007	1283	22	1265	17	-1
19	m	o	66	22	3.1	4.335	0.077	0.0844	0.0006	1338	21	1301	13	-3
20 ⁱ	c	h	86	57	1.5	4.259	0.085	0.0854	0.0005	1362	25	1326	12	-3
21	c	o	62	25	2.4	4.662	0.104	0.0824	0.0008	1252	26	1255	18	0
22	c	o	64	31	2.1	4.686	0.101	0.0823	0.0007	1246	24	1252	16	0
23 ⁱ	c	h	30	17	1.9	4.331	0.099	0.0862	0.0011	1338	28	1343	25	0
24	c	o	68	37	1.8	4.335	0.094	0.0865	0.0007	1337	26	1348	15	1
25 ⁱ	c	h	47	31	1.5	4.301	0.087	0.0856	0.0009	1350	25	1328	19	-2

26	c	o	83	34	2.4	4.537	0.099	0.0817	0.0007	1283	25	1238	17	-4
27	m	o	59	6	5.6	4.172	0.092	0.0849	0.0007	1391	29	1314	15	-6
28	c	o	234	141	1.6	4.261	0.122	0.0864	0.0004	1357	35	1347	9	-1
29	c	o	54	28	1.9	4.303	0.096	0.0868	0.0009	1346	27	1355	21	1
30	c	h	86	39	2.2	4.744	0.092	0.0823	0.0007	1232	22	1252	17	2
31 ⁱ	c	o	54	19	2.9	4.312	0.087	0.0851	0.0008	1344	25	1317	17	-2
32 ⁱ	c	o	106	60	1.7	4.286	0.079	0.0857	0.0005	1351	22	1331	12	-1
33 ⁱ	c	h	32	13	2.8	4.354	0.100	0.0860	0.0010	1332	28	1338	22	0
34 ⁱ	c	o	63	31	2.1	4.476	0.084	0.0849	0.0006	1299	22	1312	14	1
35	c	o	112	43	2.6	4.636	0.084	0.0829	0.0005	1258	21	1267	12	1
36 ⁱ	c	o	81	50	1.6	4.440	0.075	0.0858	0.0007	1311	21	1333	15	2
37 ⁱ	r	h	85	32	2.6	4.284	0.084	0.0858	0.0005	1352	24	1334	12	-1
38 ⁱ	m	o	64	27	2.4	4.318	0.086	0.0863	0.0008	1342	24	1345	17	0
39	m	o	150	20	7.3	4.490	0.087	0.0841	0.0005	1298	23	1296	12	0
40 ⁱ	m	o	92	35	2.7	4.388	0.096	0.0857	0.0005	1326	26	1331	11	0

KA30: 1131.0 +9.5/-11.6 [+14.8/-16.2] Ma, 97.8% conf., n=13^a
 45°5.737'N lat., 78°35.653'W long.^j

Analysis No.	Loc. ^b	CL ^c	Trace elements			Isotope ratios ^{d, e}			Ages (Ma) ^{f, g}					
			U (ppm)	Th (ppm)	U/Th	$\frac{^{238}\text{U}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{206}\text{Pb}}{^{238}\text{U}}$	\pm 2σ	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm 2σ	disc. ^h %
1	m	h	276	125	2.2	5.435	0.151	0.0774	0.0009	1093	27	1130	22	3
2 ⁱ	m	h	1708	185	9.2	5.225	0.109	0.0774	0.0008	1136	20	1131	20	0
3	c	h	1500	806	1.8	4.214	0.091	0.0874	0.0009	1372	27	1370	20	0
4 ⁱ	r	h	1155	97	11.8	5.233	0.104	0.0769	0.0008	1127	21	1118	20	-1
5	c	m	387	102	3.8	5.727	0.108	0.0786	0.0008	1037	18	1161	21	12
8 ⁱ	m	h	1733	235	7.3	5.198	0.103	0.0775	0.0008	1134	21	1133	20	0
10	c	m	2203	226	10.3	5.322	0.170	0.0812	0.0009	1109	32	1226	21	11
11	c	m	1526	752	2.0	5.274	0.142	0.0818	0.0008	1119	27	1240	20	11
13	r	h	635	93	7.1	4.921	0.085	0.0822	0.0009	1195	18	1251	21	5

16	c	h	341	138	2.4	5.491	0.087	0.0766	0.0008	1078	16	1109	21	3
17	c	h	966	370	2.6	4.507	0.087	0.0856	0.0009	1291	23	1329	20	3
18	c	h	255	117	2.2	5.618	0.085	0.0779	0.0008	1055	15	1145	22	9
21	r	h	1254	158	7.8	5.741	0.112	0.0767	0.0008	1035	19	1113	20	8
22	c	h	479	465	1.0	5.479	0.060	0.0766	0.0008	1081	11	1109	21	3
24 ⁱ	r	h	1200	75	16.3	5.200	0.084	0.0769	0.0008	1133	17	1119	20	-1
26 ⁱ	c	m	1364	167	8.0	5.141	0.116	0.0768	0.0008	1149	25	1116	21	-3
27	c	o	490	16	35.7	4.861	0.078	0.0813	0.0009	1205	17	1229	21	2
28 ⁱ	m	h	989	188	5.1	5.266	0.069	0.0772	0.0008	1120	14	1125	20	0
30	c	m	594	36	16.6	4.924	0.073	0.0795	0.0008	1191	16	1186	20	0
31	c	m	993	280	3.5	5.160	0.114	0.0862	0.0009	1142	23	1342	20	17
32 ⁱ	r	h	1686	202	8.2	5.118	0.079	0.0778	0.0008	1150	16	1140	20	-1
33	c	m	1089	290	3.8	4.031	0.063	0.0865	0.0009	1428	20	1350	20	-5
34 ⁱ	r	h	1019	46	22.3	5.271	0.086	0.0772	0.0008	1122	16	1125	20	0
35	c	h	1895	460	4.1	6.180	0.103	0.0832	0.0009	966	15	1274	20	32
36 ⁱ	r	h	1012	114	9.0	5.173	0.078	0.0773	0.0008	1139	16	1128	21	-1
37	c	m	1721	303	7.2	5.074	0.098	0.0825	0.0009	1159	21	1258	20	9
38 ⁱ	r	h	1745	179	9.4	5.058	0.077	0.0781	0.0008	1162	16	1150	20	-1
39	c	o	1089	500	2.1	5.187	0.108	0.0825	0.0009	1136	22	1258	20	11
40 ⁱ	r	h	1626	255	6.2	5.214	0.092	0.0775	0.0008	1131	18	1135	20	0
41	c	m	1134	111	10.5	5.797	0.101	0.0768	0.0008	1026	16	1116	20	9
42	c	m	1360	690	1.9	4.490	0.115	0.0867	0.0009	1295	30	1353	20	4
44 ⁱ	c	h	1655	193	8.3	5.086	0.091	0.0777	0.0008	1157	19	1140	20	-1
45 ⁱ	c	m	1747	153	11.2	5.171	0.091	0.0780	0.0008	1139	19	1147	20	1

KA37: $1313.2 +16.2/-22.1$ [$+20.7/-25.6$] Ma, 96.9% conf., n=6^a
 45°6.385'N lat., 78°33.039'W long.^j

Analysis No.	Loc. ^b	CL ^c	Trace elements			Isotope ratios ^{d, e}				Ages (Ma) ^{f, g}				disc. ^h %
			U (ppm)	Th (ppm)	U/Th	$\frac{^{238}\text{U}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{206}\text{Pb}}{^{238}\text{U}}$	\pm 2σ	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm 2σ	
2 ⁱ	c	m	1608	698	2.2	4.333	0.086	0.0856	0.0009	1338	24	1329	20	-1
3	r	h	191	11	19.6	5.325	0.102	0.0762	0.0009	1109	20	1100	24	-1
5	c	m	1916	554	3.4	4.608	0.113	0.0861	0.0009	1270	29	1340	20	6
6	m	o	186	16	11.9	4.950	0.091	0.0782	0.0009	1185	20	1152	22	-3
7	c	h	341	29	11.7	5.373	0.092	0.0783	0.0008	1099	17	1155	21	5
8	c	m	1265	525	2.4	4.570	0.086	0.0829	0.0008	1275	22	1268	20	-1
10 ⁱ	c	m	1241	638	2.0	4.444	0.075	0.0853	0.0009	1308	20	1323	20	1
11	c	h	218	2	4.0	5.356	0.112	0.0758	0.0009	1103	21	1088	24	-1
14	c	m	1501	331	4.6	4.710	0.120	0.0856	0.0009	1240	29	1329	21	7
15	c	h	315	42	7.6	5.402	0.096	0.0756	0.0008	1094	18	1085	22	-1
17	c	h	157	677	0.2	5.391	0.099	0.0812	0.0009	1096	18	1225	22	12
18 ⁱ	c	m	1241	390	3.2	4.570	0.134	0.0845	0.0009	1275	34	1303	20	2
19	c	h	1335	442	3.1	4.757	0.104	0.0844	0.0009	1229	25	1302	20	6
20	c	o	296	25	12.3	5.200	0.108	0.0773	0.0009	1133	22	1130	22	0
22	c	o	1187	245	5.2	4.943	0.117	0.0833	0.0009	1187	26	1277	21	8
23 ⁱ	c	m	970	292	3.4	4.488	0.107	0.0839	0.0009	1296	28	1291	20	0
24 ⁱ	c	h	1213	598	2.0	4.423	0.096	0.0854	0.0009	1313	26	1325	20	1
27	c	m	1432	375	3.9	4.537	0.101	0.0837	0.0009	1283	26	1285	20	0
28	c	h	90	461	0.2	5.316	0.105	0.0854	0.0011	1111	20	1324	24	19
30 ⁱ	c	m	795	552	1.4	4.502	0.140	0.0843	0.0009	1292	36	1300	21	1
31	c	h	199	288	0.7	5.476	0.078	0.0788	0.0009	1081	14	1168	22	8

KA4: $1343.6 \pm 5.6/-4.7$ [$+14.6/-14.2$] Ma, 93.6% conf., n=19^a
 45°4.039'N lat., 78°33.436'W long.^j

Analysis No.	Loc. ^b	CL ^c	Trace elements			Isotope ratios ^{d, e}				Ages (Ma) ^{f, g}				disc. ^h %
			U (ppm)	Th (ppm)	U/Th	$\frac{^{238}\text{U}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{206}\text{Pb}}{^{238}\text{U}}$	\pm 2σ	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm 2σ	
1	c	o	124	46	2.7	4.281	0.024	0.0852	0.0008	1353	7	1319	18	-2
2	c	o	64	25	2.7	4.264	0.031	0.0846	0.0008	1359	9	1307	19	-4
3 ⁱ	r	o	1430	705	2.0	4.277	0.022	0.0866	0.0007	1354	6	1352	15	0
4 ⁱ	c	o	139	48	3.0	4.252	0.022	0.0871	0.0008	1362	6	1362	18	0
5 ⁱ	c	o	180	110	1.7	4.254	0.025	0.0862	0.0007	1361	7	1342	17	-1
6 ⁱ	c	o	101	40	2.6	4.252	0.024	0.0857	0.0008	1362	7	1331	17	-2
7	c	o	240	119	2.2	4.348	0.034	0.0862	0.0007	1334	9	1344	16	1
8	m	o	261	108	2.5	4.207	0.023	0.0863	0.0007	1375	7	1346	16	-2
9 ⁱ	m	o	305	170	1.8	4.292	0.026	0.0868	0.0007	1350	7	1355	16	0
10 ⁱ	c	o	272	134	2.0	4.279	0.027	0.0862	0.0007	1354	8	1342	16	-1
12 ⁱ	c	o	306	168	1.8	4.239	0.025	0.0864	0.0007	1365	7	1346	16	-1
13 ⁱ	m	o	167	81	2.0	4.299	0.031	0.0860	0.0008	1348	9	1339	17	-1
14 ⁱ	m	o	212	78	2.7	4.292	0.037	0.0865	0.0008	1350	10	1349	17	0
15	r	h	2111	1204	1.7	4.250	0.023	0.0885	0.0007	1362	7	1394	15	2
16 ⁱ	c	o	278	100	2.7	4.275	0.027	0.0865	0.0007	1355	8	1349	16	0
18 ⁱ	m	o	331	133	2.4	4.338	0.028	0.0869	0.0007	1337	8	1358	16	2
19	m	o	823	313	2.5	4.263	0.027	0.0911	0.0008	1358	8	1449	16	7
20	c	h	144	79	1.8	4.170	0.035	0.0864	0.0008	1385	11	1347	17	-3
21 ⁱ	c	o	358	137	2.5	4.301	0.028	0.0863	0.0007	1347	8	1344	16	0
22	r	h	980	129	7.3	4.970	0.030	0.0798	0.0006	1182	7	1191	15	1
23	c	o	244	125	1.9	4.431	0.037	0.0861	0.0008	1312	10	1341	17	2
24	r	h	2260	209	10.6	5.048	0.038	0.0857	0.0007	1165	8	1332	15	14
25	m	o	530	292	1.8	4.660	0.033	0.0876	0.0007	1253	8	1374	15	10
26 ⁱ	c	o	119	69	1.7	4.357	0.034	0.0858	0.0008	1333	10	1333	18	0
27 ⁱ	m	o	250	142	1.7	4.312	0.030	0.0861	0.0007	1344	8	1341	16	0

28 ⁱ	c	o	65	28	2.3	4.286	0.037	0.0860	0.0008	1351	10	1339	19	-1
29	c	o	267	107	2.5	4.209	0.034	0.0858	0.0007	1374	10	1333	17	-3
30	c	o	151	58	2.5	4.515	0.041	0.0843	0.0008	1290	10	1299	17	1
31	c	o	481	262	1.8	4.963	0.037	0.0863	0.0007	1183	8	1345	15	14
32	c	o	217	109	2.0	4.195	0.035	0.0864	0.0007	1379	10	1346	16	-2
33 ⁱ	c	o	167	64	2.6	4.322	0.032	0.0854	0.0008	1342	9	1324	17	-1
34	c	o	509	387	1.3	4.419	0.029	0.0865	0.0007	1315	8	1350	15	3
35 ⁱ	m	o	115	50	2.3	4.401	0.029	0.0853	0.0008	1320	8	1322	19	0
36	c	o	216	95	2.4	4.348	0.028	0.0851	0.0007	1334	8	1318	16	-1
37	r	h	739	1	160.0	4.890	0.036	0.0797	0.0006	1199	8	1188	16	-1
38	c	h	83	32	2.5	4.640	0.039	0.0841	0.0008	1258	10	1296	19	3
39	r	h	2608	90	29.6	5.397	0.032	0.0768	0.0006	1097	6	1115	15	2
40 ⁱ	c	o	244	196	1.2	4.371	0.034	0.0863	0.0007	1328	9	1344	16	1

KA5: 1111.8 +8.6/-6.0 [+14.1/-12.6] Ma, 95% conf., n=27^a

45°4.039'N lat., 78°33.436'W long.^j

Analysis No.	Loc. ^b	CL ^c	Trace elements			Isotope ratios ^{d, e}				Ages (Ma) ^{f, g}				disc. ^h %
			U (ppm)	Th (ppm)	U/Th	$\frac{^{238}\text{U}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{206}\text{Pb}}{^{238}\text{U}}$	\pm 2σ	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm 2σ	
1	c	h	1754	70	24.6	5.491	0.033	0.0757	0.0009	1078	6	1088	25	1
2 ⁱ	c	o	439	217	2.0	5.258	0.027	0.0764	0.0010	1122	5	1105	25	-2
3 ⁱ	m	o	835	335	2.4	5.322	0.028	0.0768	0.0010	1110	6	1117	25	1
4 ⁱ	c	o	681	308	2.1	5.379	0.032	0.0773	0.0010	1099	6	1128	25	3
5	m	h	1123	417	2.6	6.046	0.121	0.0769	0.0009	986	18	1119	25	14
6	r	h	1727	86	20.6	5.516	0.033	0.0758	0.0009	1074	6	1089	24	1
7 ⁱ	c	o	634	280	2.2	5.274	0.033	0.0770	0.0010	1119	7	1120	25	0
8 ⁱ	c	o	922	337	2.6	5.342	0.029	0.0767	0.0009	1106	6	1113	25	1
9 ⁱ	c	o	889	334	2.6	5.394	0.035	0.0768	0.0010	1096	7	1116	25	2
10 ⁱ	r	h	1987	13	187.0	5.313	0.031	0.0775	0.0009	1112	6	1134	24	2
11 ⁱ	c	h	939	311	2.9	5.339	0.034	0.0769	0.0009	1107	7	1119	24	1

12 ⁱ	c	o	243	113	2.1	5.397	0.032	0.0764	0.0010	1096	6	1107	26	1
13 ⁱ	r	h	2337	169	13.4	5.271	0.033	0.0772	0.0009	1120	7	1125	24	1
15	r	h	3980	548	7.0	5.319	0.048	0.0780	0.0009	1110	9	1148	24	3
17	c	m	6100	1247	4.7	5.391	0.049	0.0792	0.0010	1097	9	1177	24	7
18 ⁱ	c	h	1708	693	2.4	5.263	0.030	0.0773	0.0009	1122	6	1128	24	1
19 ⁱ	r	h	2175	151	13.6	5.277	0.031	0.0773	0.0009	1119	6	1129	24	1
20 ⁱ	r	h	950	500	1.8	5.313	0.034	0.0766	0.0009	1112	7	1112	25	0
21 ⁱ	c	o	469	182	2.5	5.405	0.035	0.0754	0.0010	1094	7	1080	25	-1
22 ⁱ	c	o	451	98	4.5	5.373	0.035	0.0754	0.0010	1100	6	1080	25	-2
23 ⁱ	c	o	602	142	4.1	5.379	0.035	0.0757	0.0010	1099	7	1087	26	-1
24 ⁱ	m	h	907	181	4.8	5.322	0.037	0.0757	0.0009	1110	7	1088	25	-2
25 ⁱ	m	h	1533	460	3.2	5.258	0.033	0.0765	0.0009	1122	7	1107	24	-1
26	r	m	3810	390	9.5	5.225	0.041	0.0779	0.0009	1129	8	1144	24	1
27	c	h	2600	165	15.5	5.195	0.113	0.0794	0.0010	1134	23	1183	24	4
28 ⁱ	m	h	804	253	3.0	5.244	0.036	0.0764	0.0010	1125	7	1106	25	-2
29 ⁱ	c	h	438	352	1.2	5.311	0.037	0.0759	0.0010	1112	7	1092	26	-2
30	r	h	4800	479	9.7	8.584	0.501	0.0752	0.0010	711	39	1074	26	51
31	c	h	224	120	1.9	5.656	0.064	0.0765	0.0010	1050	11	1109	27	6
32 ⁱ	c	h	1955	798	2.3	5.285	0.036	0.0765	0.0009	1117	7	1108	24	-1
33	r	h	2792	728	3.7	5.845	0.065	0.0771	0.0009	1018	10	1125	24	10
34 ⁱ	c	o	1185	527	2.1	5.241	0.038	0.0764	0.0009	1126	7	1106	24	-2
35	c	o	608	135	4.4	5.168	0.043	0.0759	0.0010	1140	9	1093	25	-4
36 ⁱ	c	h	1872	828	2.2	5.266	0.033	0.0762	0.0009	1121	6	1099	24	-2
37 ⁱ	r	h	2164	133	15.6	5.252	0.033	0.0771	0.0009	1123	6	1124	24	0
38 ⁱ	c	h	2210	809	2.6	5.258	0.041	0.0773	0.0009	1122	8	1129	24	1
39	c	h	1829	85	20.2	4.876	0.036	0.0800	0.0010	1203	8	1196	24	-1
40 ⁱ	c	h	1871	603	2.9	5.244	0.036	0.0770	0.0009	1125	7	1122	24	0
41 ⁱ	r	o	905	278	3.1	5.211	0.038	0.0761	0.0009	1132	8	1098	25	-3

KA31: 1086.6 +7.6/-1.9 [+13.4/-11.0] Ma, 95% conf., n=27^a
 45°5.737'N lat., 78°35.653'W long.^j

Analysis No.	Loc. ^b	CL ^c	Trace elements			Isotope ratios ^{d, e}				Ages (Ma) ^{f, g}				disc. ^h %
			U (ppm)	Th (ppm)	U/Th	$\frac{^{238}\text{U}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm $2\sigma^e$	$\frac{^{206}\text{Pb}}{^{238}\text{U}}$	\pm 2σ	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	\pm 2σ	
1 ⁱ	c	h	641	111	5.7	5.464	0.039	0.0756	0.0008	1084	7	1083	21	0
2 ⁱ	r	o	567	204	2.7	5.565	0.040	0.0751	0.0008	1065	7	1071	21	1
3 ⁱ	c	o	386	113	3.3	5.356	0.037	0.0768	0.0008	1104	7	1116	21	1
4 ⁱ	r	s	405	111	3.6	5.394	0.041	0.0763	0.0008	1096	8	1102	21	1
5 ⁱ	c	o	407	140	2.8	5.362	0.037	0.0762	0.0008	1102	7	1101	21	0
6 ⁱ	c	h	504	113	4.5	5.456	0.039	0.0757	0.0008	1085	7	1087	21	0
7 ⁱ	c	o	330	112	2.9	5.426	0.041	0.0762	0.0008	1091	8	1100	21	1
8 ⁱ	r	s	430	145	3.0	5.571	0.037	0.0750	0.0008	1064	6	1069	21	0
9	c	m	542	93	5.9	5.035	0.033	0.0797	0.0008	1168	7	1190	20	2
10	c	h	442	35	44.0	5.233	0.041	0.0773	0.0008	1127	8	1128	21	0
11 ⁱ	r	h	403	106	3.8	5.420	0.041	0.0758	0.0008	1091	8	1090	21	0
12	c	o	202	87	2.3	4.494	0.036	0.0849	0.0009	1295	9	1313	21	1
13 ⁱ	c	o	443	165	2.7	5.411	0.041	0.0762	0.0008	1094	8	1100	21	1
14 ⁱ	c	o	546	92	6.0	5.464	0.039	0.0758	0.0008	1083	7	1089	21	1
15 ⁱ	m	h	299	94	3.2	5.432	0.047	0.0760	0.0008	1089	9	1094	21	0
16 ⁱ	m	h	339	38	10.8	5.414	0.041	0.0760	0.0008	1093	7	1096	22	0
17	c	m	746	151	4.9	4.924	0.046	0.0796	0.0008	1192	10	1188	20	0
18 ⁱ	c	h	538	162	3.4	5.501	0.042	0.0760	0.0008	1077	8	1096	21	2
19.1	c	h	411	80	5.1	4.778	0.057	0.0787	0.0009	1225	13	1164	22	-5
19.2	c	h	587	12	58.0	5.319	0.045	0.0777	0.0008	1110	9	1138	22	2
20 ⁱ	m	o	543	119	4.6	5.498	0.036	0.0756	0.0008	1077	6	1085	21	1
21	m	h	320	19	23.8	5.110	0.039	0.0788	0.0009	1152	8	1167	23	1
22	r	h	365	99	3.8	5.233	0.038	0.0775	0.0008	1128	8	1133	21	0
23	c	m	621	69	9.4	5.131	0.037	0.0790	0.0008	1148	8	1172	20	2
24	c	m	651	141	4.9	5.035	0.035	0.0799	0.0008	1168	7	1195	20	2

25 ⁱ	m	h	287	63	4.7	5.382	0.041	0.0762	0.0008	1098	8	1100	22	0
26 ⁱ	c	s	391	39	10.3	5.414	0.044	0.0757	0.0008	1093	8	1088	21	0
27 ⁱ	m	s	466	99	4.8	5.470	0.048	0.0749	0.0008	1082	9	1066	21	-1
28	m	h	378	111	3.5	4.810	0.039	0.0802	0.0009	1217	9	1201	21	-1
29 ⁱ	c	s	619	217	3.0	5.485	0.042	0.0756	0.0008	1079	8	1085	21	0
30	c	m	942	153	6.3	5.040	0.038	0.0792	0.0008	1166	8	1178	20	1
31 ⁱ	m	h	448	18	27.1	5.376	0.040	0.0757	0.0008	1099	8	1087	21	-1
32 ⁱ	c	o	711	236	3.0	5.405	0.041	0.0754	0.0008	1094	7	1079	21	-1
33	c	m	511	76	9.7	5.013	0.048	0.0780	0.0008	1173	10	1147	21	-2
34 ⁱ	r	s	691	216	3.1	5.371	0.040	0.0754	0.0008	1101	8	1078	21	-2
35 ⁱ	c	o	677	210	3.0	5.426	0.044	0.0756	0.0008	1090	8	1085	22	0
36 ⁱ	c	o	1056	242	3.9	5.385	0.046	0.0757	0.0008	1098	9	1087	21	-1
37	r	o	1433	334	3.6	5.540	0.049	0.0741	0.0008	1069	9	1045	21	-2
38 ⁱ	m	h	862	16	29.0	5.402	0.044	0.0757	0.0008	1094	8	1086	21	-1
39 ⁱ	r	s	1216	257	3.9	5.495	0.042	0.0744	0.0008	1078	7	1051	22	-2
40 ⁱ	c	o	1173	337	2.9	5.414	0.041	0.0755	0.0008	1094	8	1082	21	-1
41	c	o	967	218	3.7	5.181	0.046	0.0772	0.0008	1137	9	1127	21	-1

^a Reported ages are calculated using the *TuffZirc* algorithm of Ludwig (2003) on $^{207}\text{Pb}/^{206}\text{Pb}$ ages of concordant spot analyses. Age errors without brackets are analytic errors only calculated by the *TuffZirc* algorithm and reported at the indicated confidence level; age errors with brackets include analytic errors on the weighted average added in quadrature with 1% (2σ) systematic errors observed within daily operations at the UCSB dual-ICP lab; n refers to the number of analyses used in the weighted average.

^b Loc. refers to the location of spot analysis within the zircon grain: c = core, m = mantle, r = rim.

^c CL refers to the zircon CL zoning characteristics of the spot analysis: o = oscillatory, h = homogenous, m = mottled, s = sector.

^d All isotope ratios and ages are corrected using the Iolite U–Pb data reduction software (Paton et al., 2010) and 91500 as an external zircon standard. Radiogenic ^{204}Pb was below the detection limit the instrument and ratios are not ^{204}Pb corrected.

^e Absolute isotope ratio errors are 2σ internal analytical errors only and do not include systematic errors.

^f $^{238}\text{U}/^{206}\text{Pb}$ ages and absolute errors were calculated using the Iolite U–Pb data reduction software (Paton et al., 2010) with ^{238}U decay constant of 1.55125×10^{-10} . Errors are 2σ analytical errors only and do not include systematic errors.

^g $^{207}\text{Pb}/^{206}\text{Pb}$ ages and absolute age errors were calculated from Iolite $^{207}\text{Pb}/^{206}\text{Pb}$ values using Isoplot (Ludwig, 2003) with U decay constants and composition as follows: $^{235}\text{U} = 9.8485 \times 10^{-10}$, $^{238}\text{U} = 1.55125 \times 10^{-10}$, $^{238}\text{U}/^{235}\text{U} = 137.88$. Errors are 2σ analytical errors only and do not include systematic errors.

^h Disc. refers to % discordance calculated as follows: ($^{207}\text{Pb}/^{206}\text{Pb}$ Age/ $^{238}\text{U}/^{206}\text{Pb}$ Age)-1)*100.

ⁱ Concordant analyses used by the *TuffZirc* algorithm of Ludwig (2003) to calculate the reported $^{207}\text{Pb}/^{206}\text{Pb}$ sample age and errors.

^j Latitude and Longitude locations are relative to the WGS84 ellipsoid.

References

Ludwig, K., 2003. User's Manual for Isoplot 3.00, A Geochronological Toolkit for Microsoft Excel. Berkeley Geochronology Center Special Publication 4.

Paton, C., Woodhead, J., Hellstrom, J., Herget, J., Greig, A., Maas, R., 2010. Improved laser ablation U-Pb zircon geochronology through robust down-hole fractionation correction. *Geochemistry Geophysics Geosystems* 11, Q0AA06 doi: 10.1029/2009GC002618.

Agustsson, et al, Fig. DR1: KA25 CL images

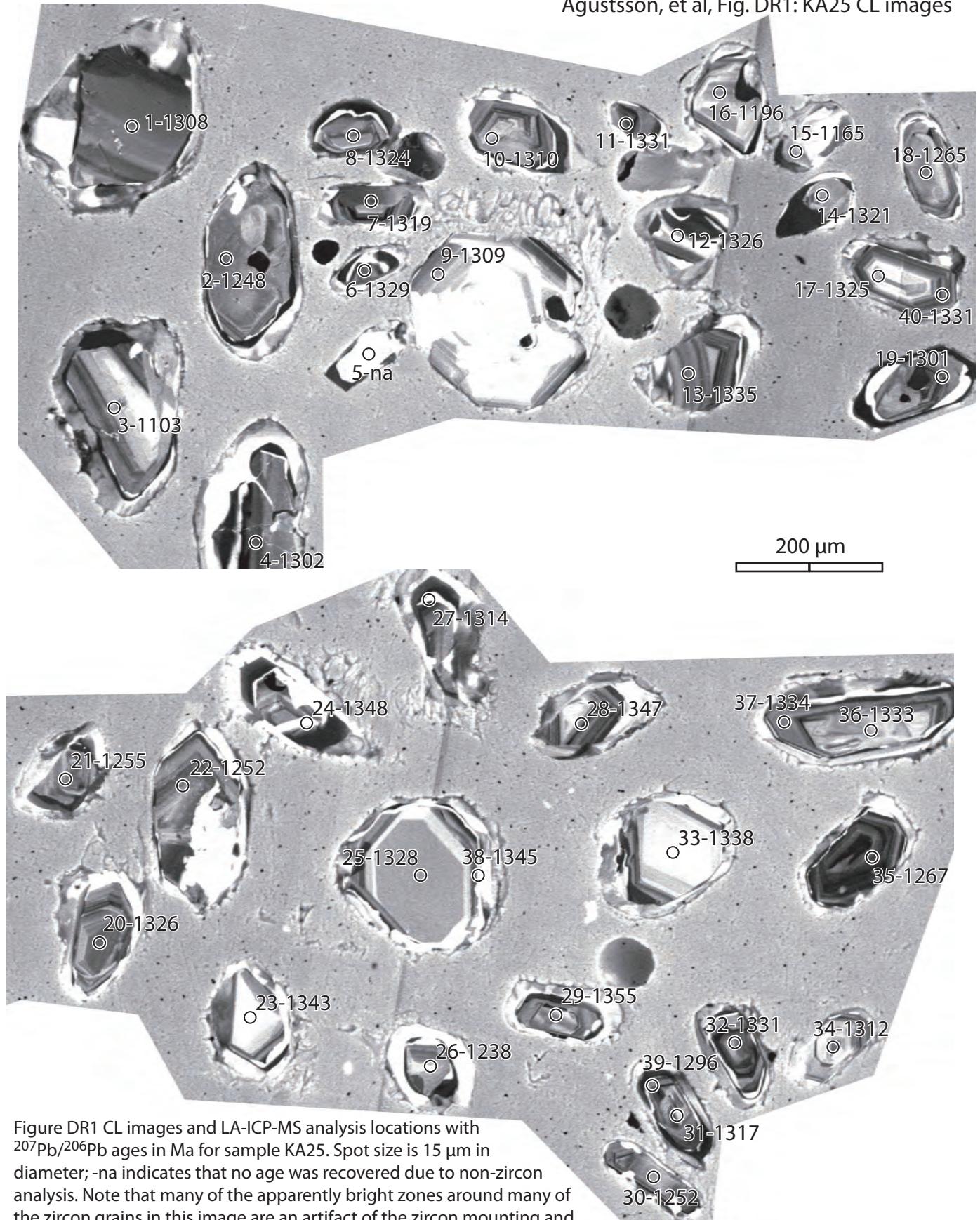


Figure DR1 CL images and LA-ICP-MS analysis locations with $^{207}\text{Pb}/^{206}\text{Pb}$ ages in Ma for sample KA25. Spot size is 15 μm in diameter; -na indicates that no age was recovered due to non-zircon analysis. Note that many of the apparently bright zones around many of the zircon grains in this image are an artifact of the zircon mounting and polishing process that has formed moats around many of the zircon grains that appear bright in CL.

Agustsson, et al., Fig. DR2: KA4 CL images



Figure DR2 : CL images and LA-ICP-MS analysis locations with $^{207}\text{Pb}/^{206}\text{Pb}$ ages in Ma for sample KA4. Spot size is 20 μm in diameter; -t indicates that ion multipliers collected Pb tripped during the analysis and no age was recovered.

Agustsson, et al., Fig. DR3: KA30 CL images

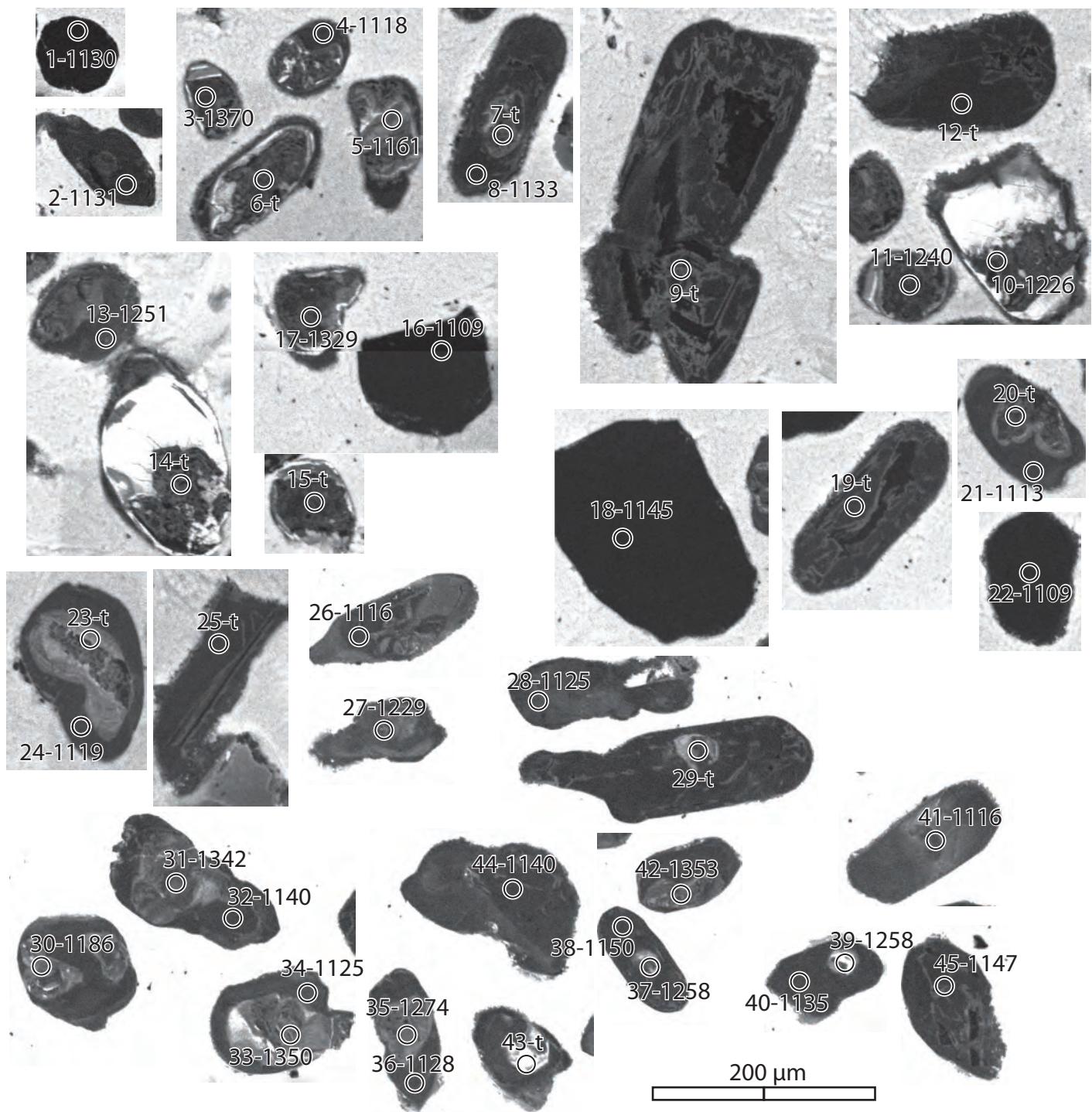


Figure DR3: CL images and LA-ICP-MS analysis locations with $^{207}\text{Pb}/^{206}\text{Pb}$ ages in Ma for sample KA30. Spot size is 15 μm in diameter; -t indicates that ion multipliers collected Pb tripped during the analysis and no age was recovered.

Agustsson, et al., Fig. DR4: KA37 CL images

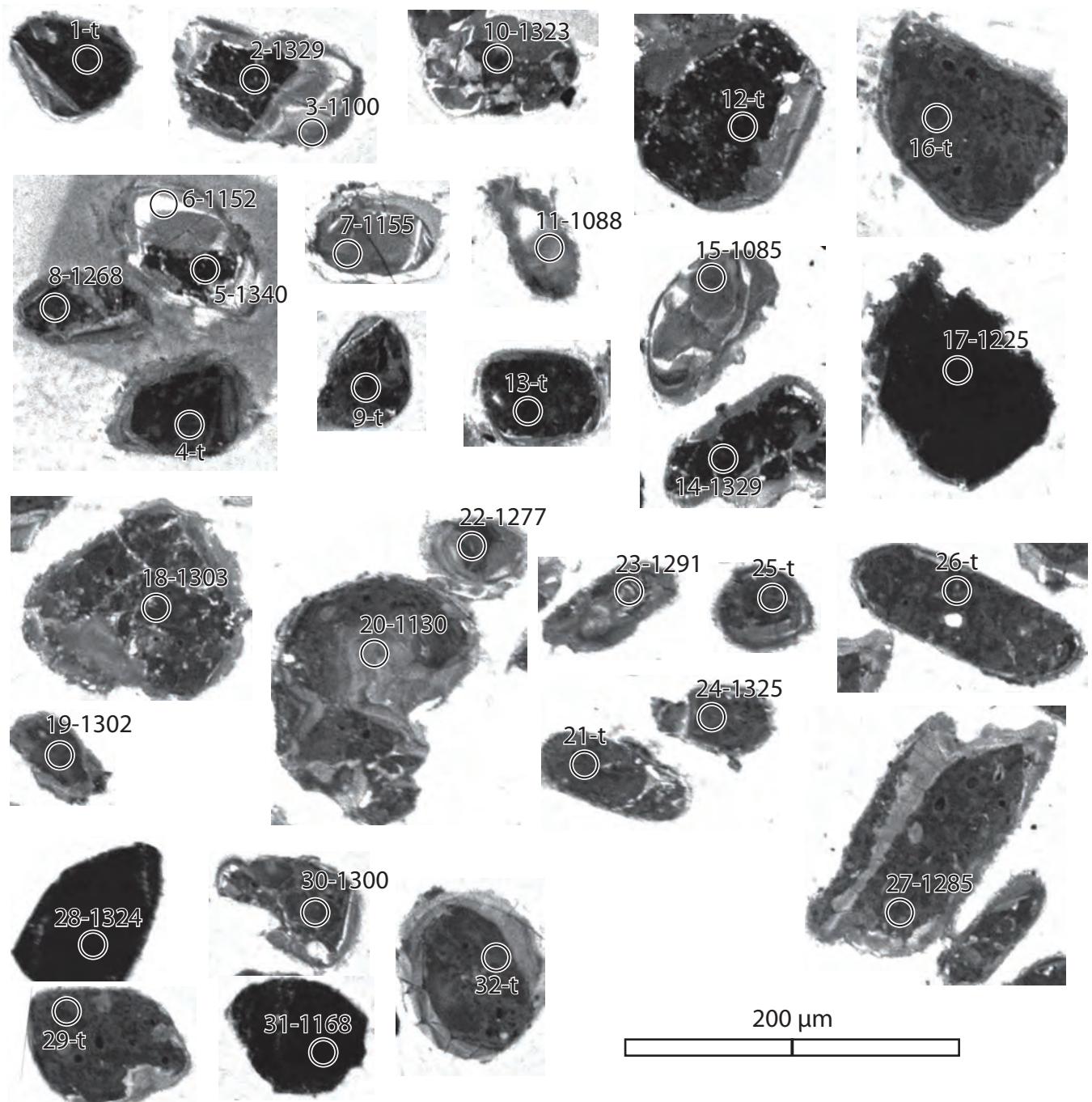
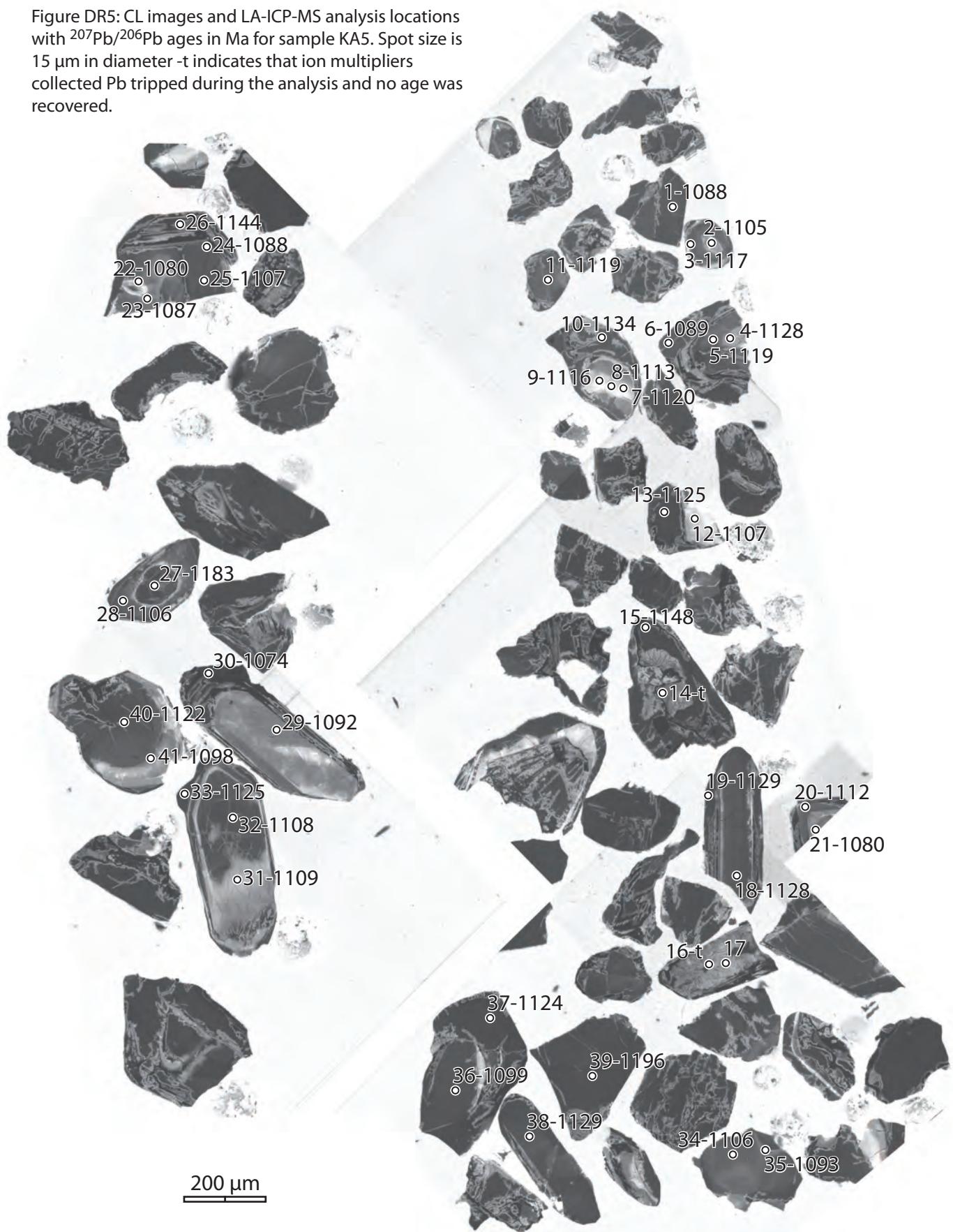


Figure DR4: CL images and LA-ICP-MS analysis locations with $^{207}\text{Pb}/^{206}\text{Pb}$ ages in Ma for sample KA37. Spot size is 15 μm in diameter; -t indicates that ion multipliers collected Pb tripped during the analysis and no age was recovered.

Agustsson, et al., Fig. DR5: KA5CL images

Figure DR5: CL images and LA-ICP-MS analysis locations with $^{207}\text{Pb}/^{206}\text{Pb}$ ages in Ma for sample KA5. Spot size is 15 μm in diameter -t indicates that ion multipliers collected Pb tripped during the analysis and no age was recovered.



Agustsson, et al., Fig. DR6: KA31 CL images

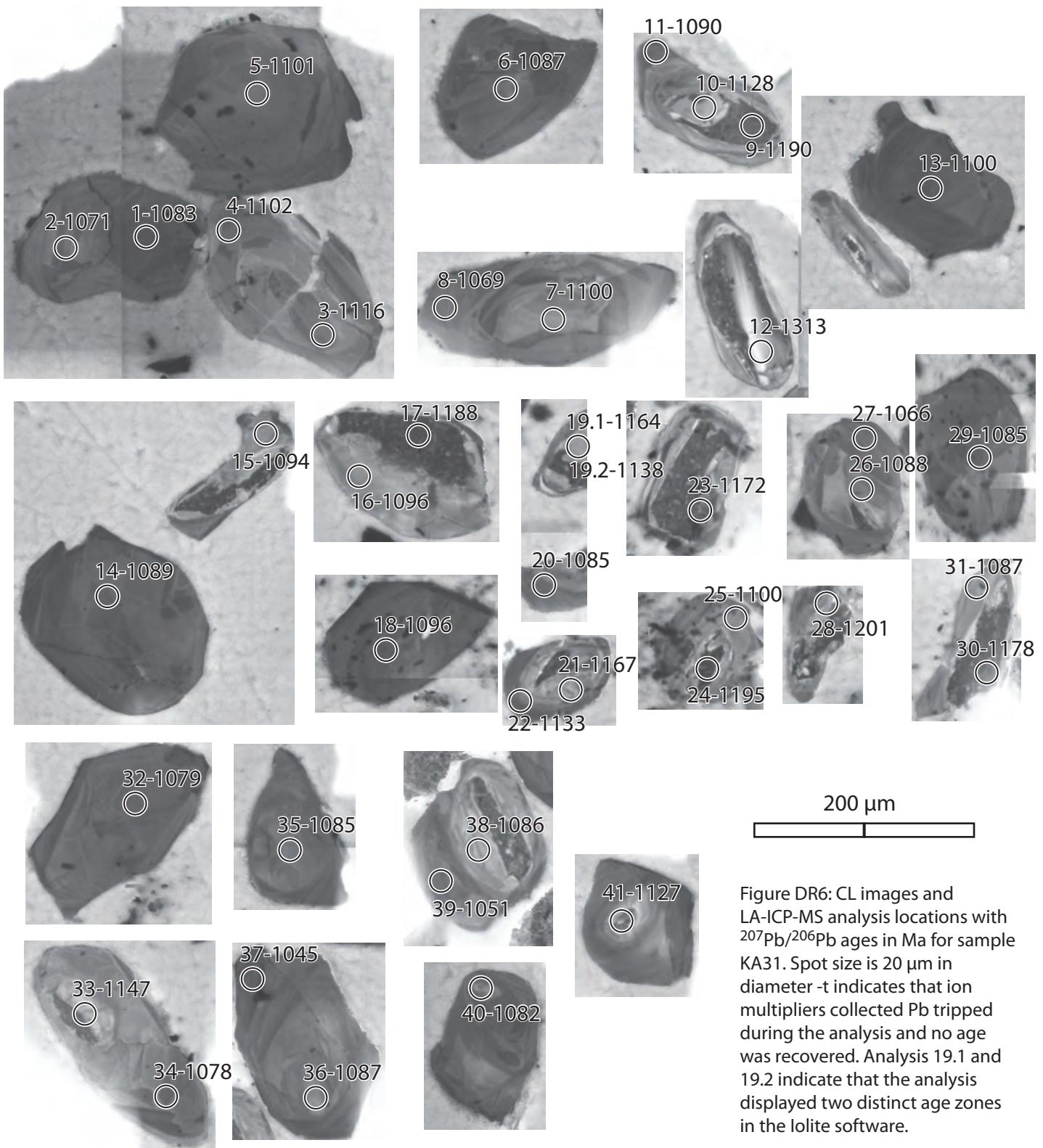


Figure DR6: CL images and LA-ICP-MS analysis locations with $^{207}\text{Pb}/^{206}\text{Pb}$ ages in Ma for sample KA31. Spot size is 20 μm in diameter - t indicates that ion multipliers collected Pb tripped during the analysis and no age was recovered. Analysis 19.1 and 19.2 indicate that the analysis displayed two distinct age zones in the lolite software.