DATA REPOSITORY ITEMS: CONTENTS AND CAPTIONS

Section DR-M: Figures related to Metamorphic petrology and P-T determinations. See Figure 6 in paper for summary diagram.

Figure DR-M1: Equilibrium phase diagram calculated for sample BM33 using the Berman (1988) thermodynamic dataset and assuming water saturation. Gray area outlines observed mineral assemblage.

Figure DR-M2: Equilibrium phase diagram calculated for sample BM33 using the Berman (1988) thermodynamic dataset and assuming $P_{H2O} = 0.7\ P_{total}$. Gray area outlines observed mineral assemblage.

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Figure DR-M4: Equilibrium phase diagram calculated for sample BM33 using the Holland and Powell (1998) thermodynamic dataset and assuming $P_{H2O} = 0.7\ P_{total}$. Gray area outlines observed mineral assemblage.

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Figure DR-M8: Equilibrium phase diagram calculated for sample BM19A1 using the Holland and Powell (1998) thermodynamic dataset and assuming $P_{H2O} = 0.7\ P_{total}$. Gray area outlines observed mineral assemblage.

Figure DR-M9: Electron Microprobe X-ray maps for sample 01BM-33 illustrating composition gradients and textures typical of samples form the Burro Mountains. Element illustrated is indicated in the upper left hand corner of each image. Warmer colors indicate higher concentrations. Note relict shape of the garnet, particularly evident in the Fe, K and Al X-ray maps as well as the increase in Mn near the garnet rims. Also note the lack of contact between garnet and sillimanite in the Al map. Most samples examined do not have plagioclase in the rims of garnets. 01BM-33 is also the only sample in this study that contains epidote.

Table DR-M1: Mineral assemblages in metasedimentary rocks

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Table DR1: SHRIMP U-Pb Geochronology Data

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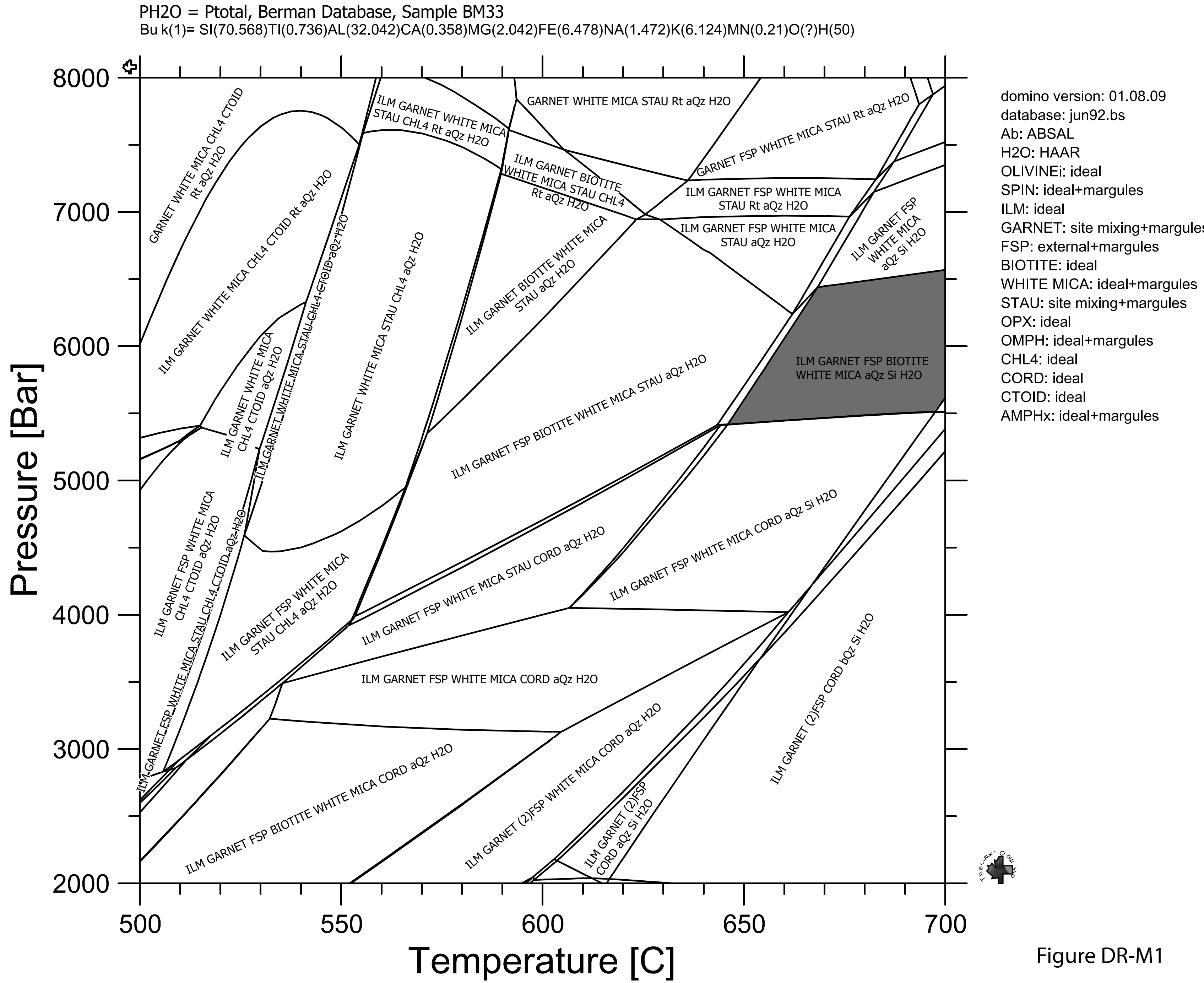
Table DR3: Monazite Electron Microprobe data

Section DR4: $^{40}Ar/^{39}Ar$ Methods, Spectra, and Data Tables


PH2O = Ptotal, Berman Database, Sample BM33
Bu k(1)= SI(70.568)TI(0.736)AL(32.042)CA(0.358)MG(2.042)FE(6.478)NA(1.472)K(6.124)MN(0.21)O(?)H(50)
Pressure [Bar]
Temperature [C]
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6000
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550
600
650
700
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ILM GARNET WHITE MICA CHL4 CTOID Rt aQz H2O
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GARNET WHITE MICA STAU Rt aQz H2O
GARNET FSP WHITE MICA STAU Rt aQz H2O
ILM GARNET BIOTITE WHITE MICA STAU CHL4 Rt aQz H2O
ILM GARNET FSP WHITE MICA STAU Rt aQz H2O
ILM GARNET FSP WHITE MICA STAU aQz H2O
ILM GARNET FSP WHITE MICA aQz Si H2O
ILM GARNET WHITE MICA STAU CHL4 CTOID aQz H2O
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ILM GARNET FSP WHITE MICA STAU CHL4 CTOID aQz H2O
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SPIN: ideal+margules
ILM: ideal
GARNET: site mixing+margules
FSP: external+margules
BIOTITE: ideal
WHITE MICA: ideal+margules
STAU: site mixing+margules
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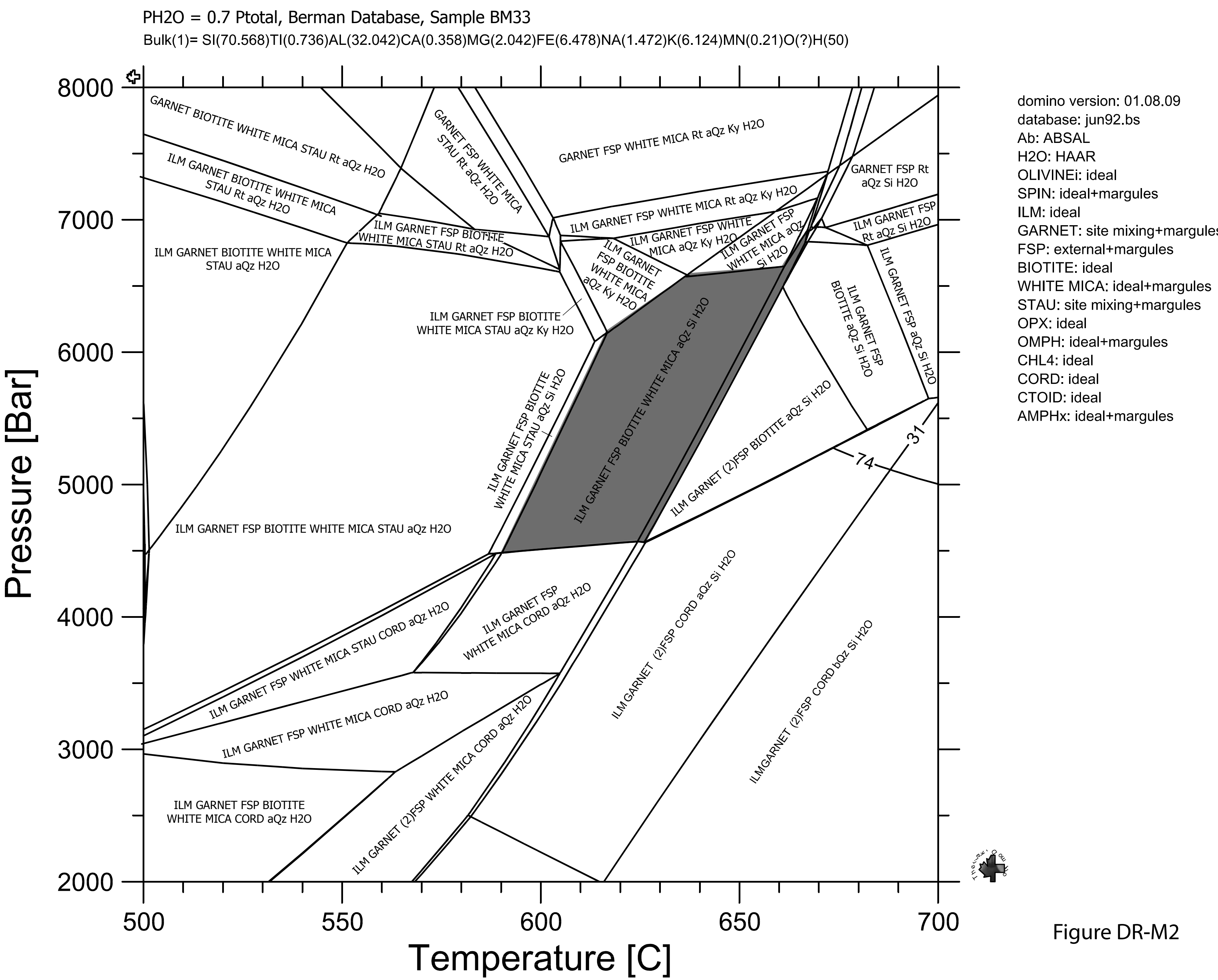
OMPH: ideal+margules
CHL4: ideal
CORD: ideal
CTOID: ideal
AMPHx: ideal+margules

Figure DR-M1



PH2O = 0.7 Ptotal, Berman Database, Sample BM33
Bulk(1)= SI(70.568)TI(0.736)AL(32.042)CA(0.358)MG(2.042)FE(6.478)NA(1.472)K(6.124)MN(0.21)O(?)H(50)
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SPIN: ideal+margules
ILM: ideal
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FSP: external+margules
BIOTITE: ideal
WHITE MICA: ideal+margules
STAU: site mixing+margules
OPX: ideal
OMPH: ideal+margules
CHL4: ideal
CORD: ideal
CTOID: ideal
AMPHx: ideal+margules
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74
31
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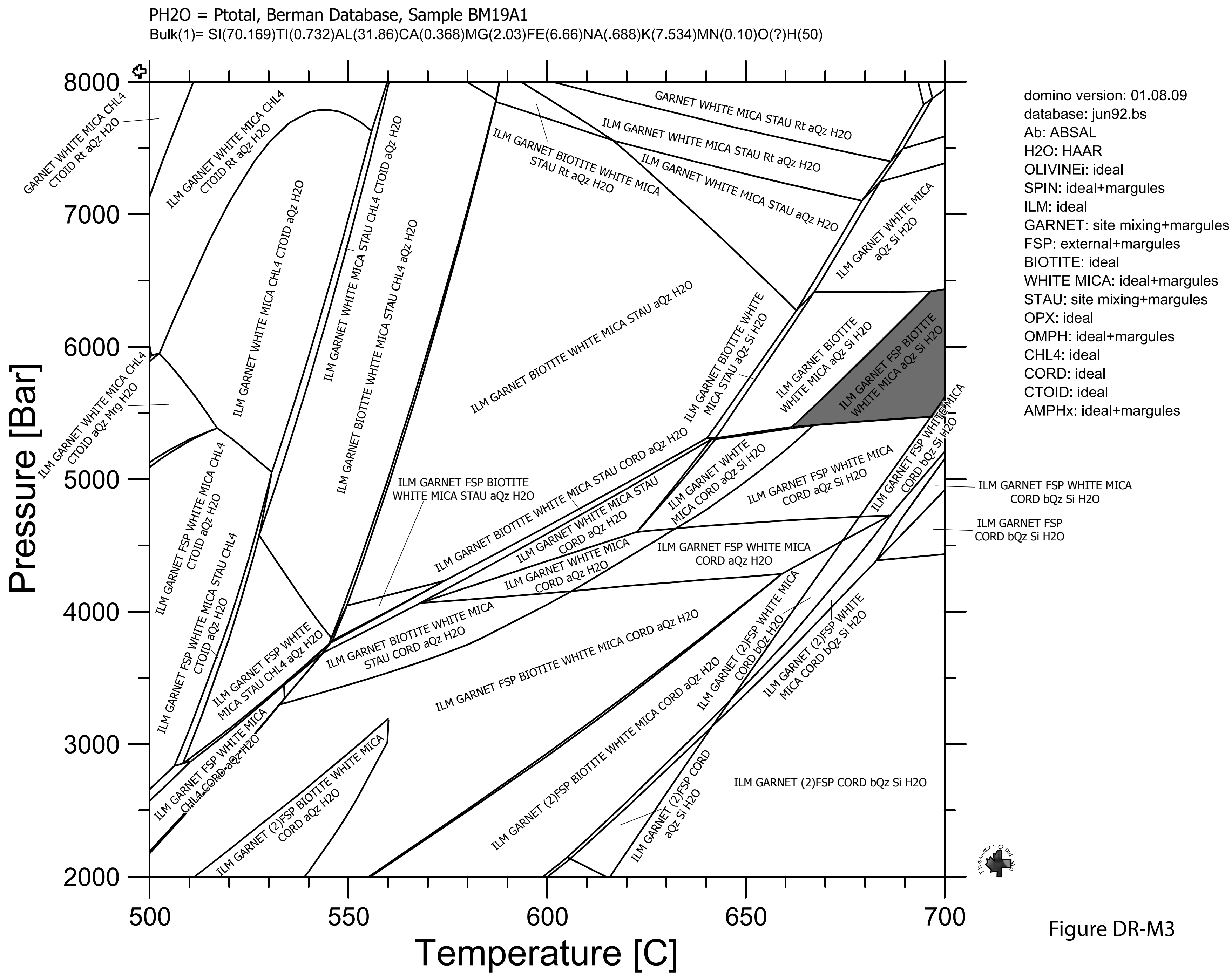
Figure DR-M2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Temperature [C]
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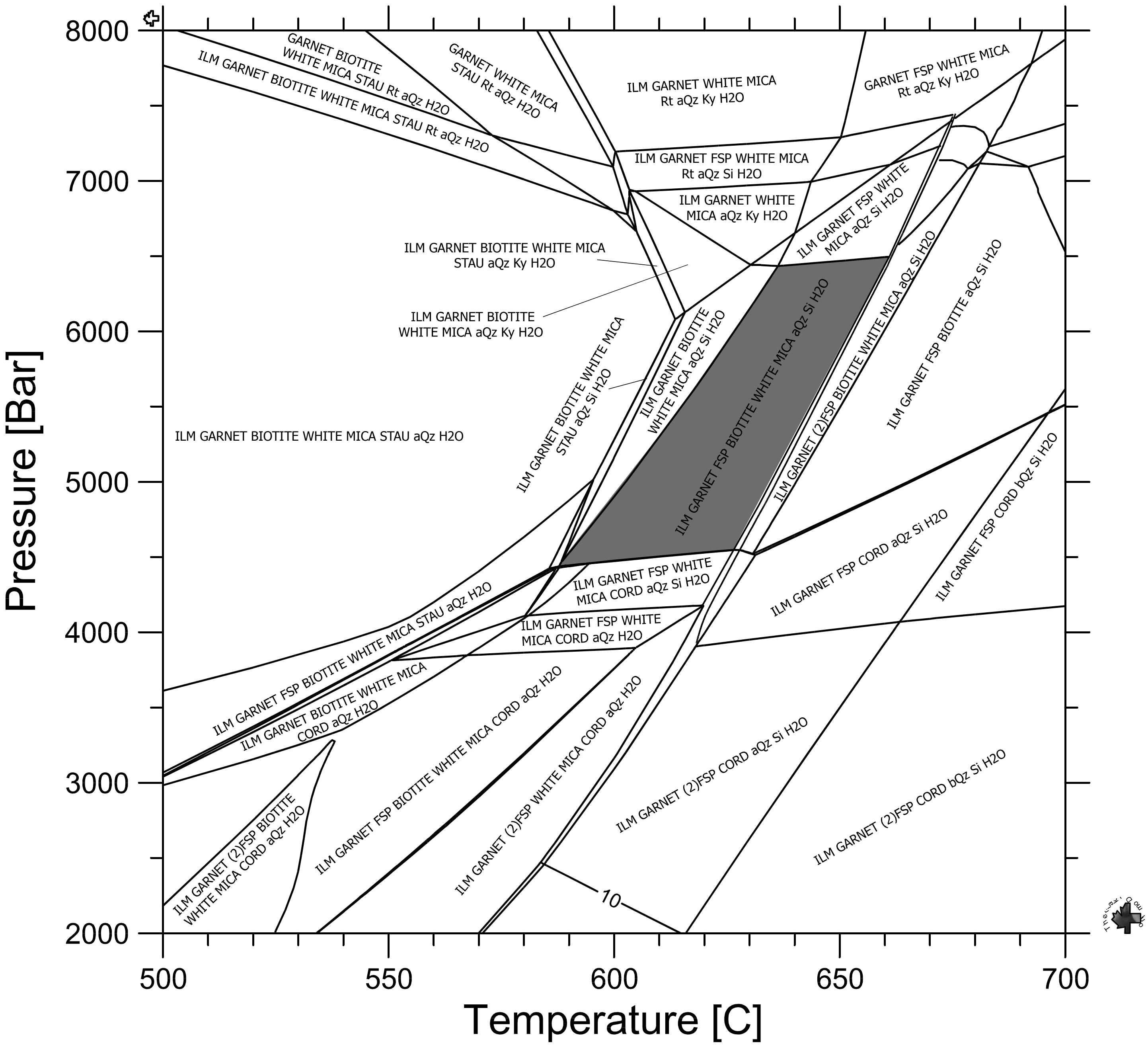
ILM: ideal
GARNET: site mixing+margules
FSP: external+margules
BIOTITE: ideal
WHITE MICA: ideal+margules
STAU: site mixing+margules
OPX: ideal
OMPH: ideal+margules
CHL4: ideal
CORD: ideal
CTOID: ideal
AMPHx: ideal+margules

Figure DR-M3

PH2O = 0.7 Ptotal, Berman Database, Sample BM19A1
Bulk(1)= SI(70.169)TI(0.732)AL(31.86)CA(0.368)MG(2.03)FE(6.66)NA(.688)K(7.534)MN(0.10)O(?)H(50)



domino version: 01.08.09
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Ab: ABSAL
H2O: HAAR
OLIVINEi: ideal
SPIN: ideal+margules
ILM: ideal
GARNET: site mixing+margules
FSP: external+margules
BIOTITE: ideal
WHITE MICA: ideal+margules
STAU: site mixing+margules
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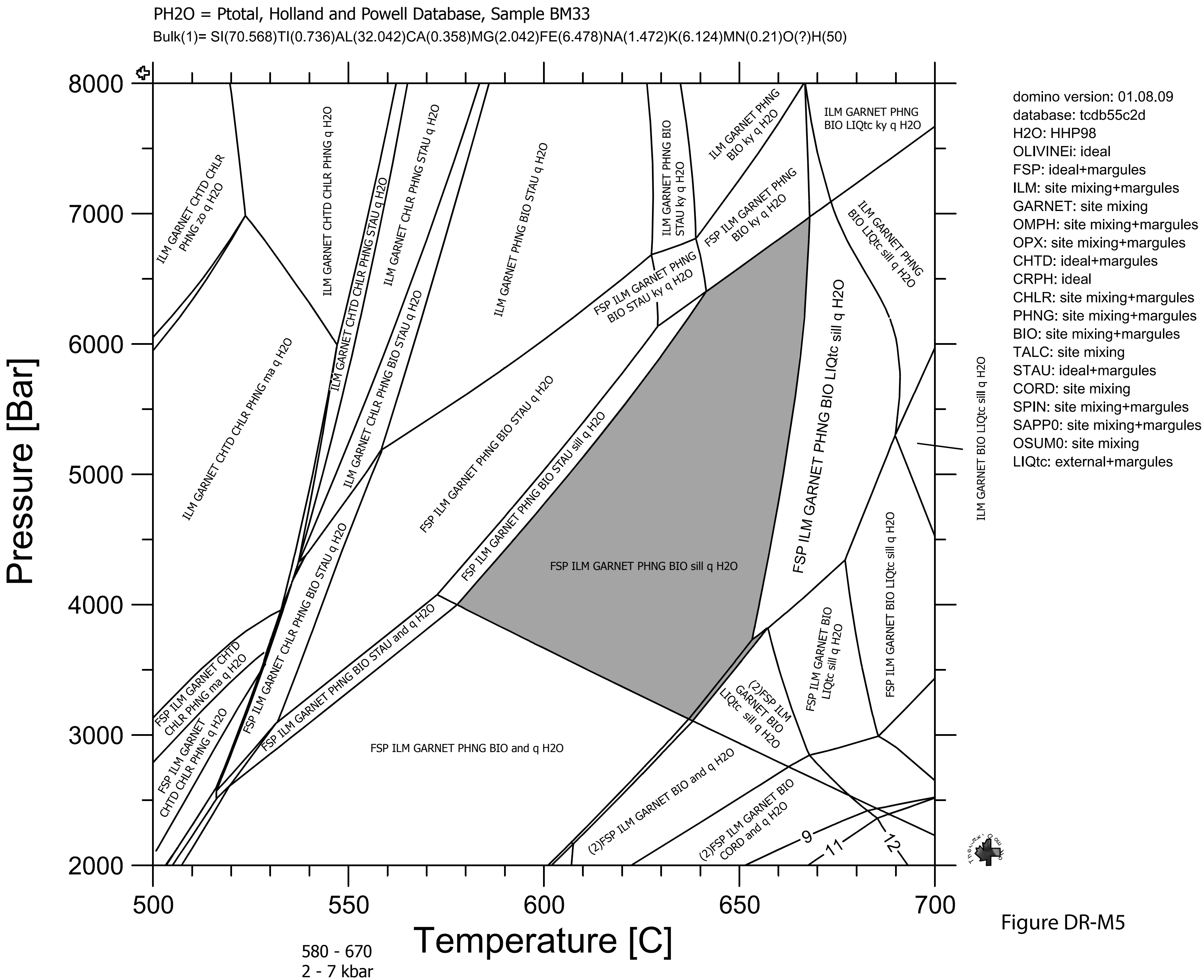
OMPH: ideal+margules
CHL4: ideal
CORD: ideal
CTOID: ideal
AMPHx: ideal+margules

Figure DR-M4


PH2O = Ptotal, Holland and Powell Database, Sample BM33
Bulk(1)= SI(70.568)TI(0.736)AL(32.042)CA(0.358)MG(2.042)FE(6.478)NA(1.472)K(6.124)MN(0.21)O(?)H(50)
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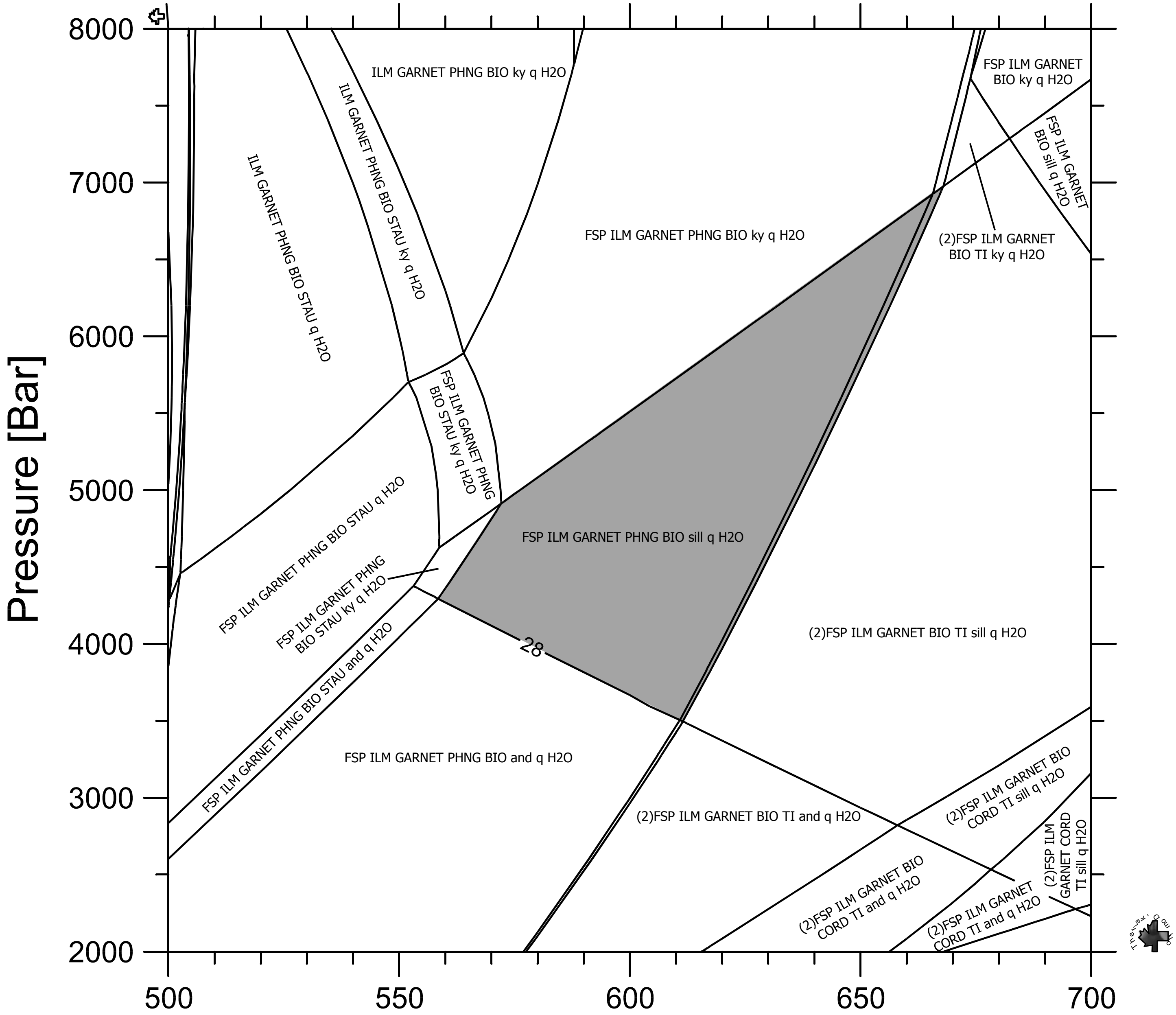
OMPH: site mixing+margules
OPX: site mixing+margules
CHTD: ideal+margules
CRPH: ideal
CHLR: site mixing+margules
PHNG: site mixing+margules
BIO: site mixing+margules
TALC: site mixing
STAU: ideal+margules
CORD: site mixing
SPIN: site mixing+margules
SAPP0: site mixing+margules
OSUM0: site mixing
LIQtc: external+margules
580 - 670
2 - 7 kbar

Figure DR-M5

PH2O = 0.7 Ptotal, Holland and Powell Database, Sample BM33

Bulk(1)= SI(70.568)TI(0.736)AL(32.042)CA(0.358)MG(2.042)FE(6.478)NA(1.472)K(6.124)MN(0.21)O(?)H(50)



560-670 C
3.5 - 7 kbar

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database: tcdb55c2d
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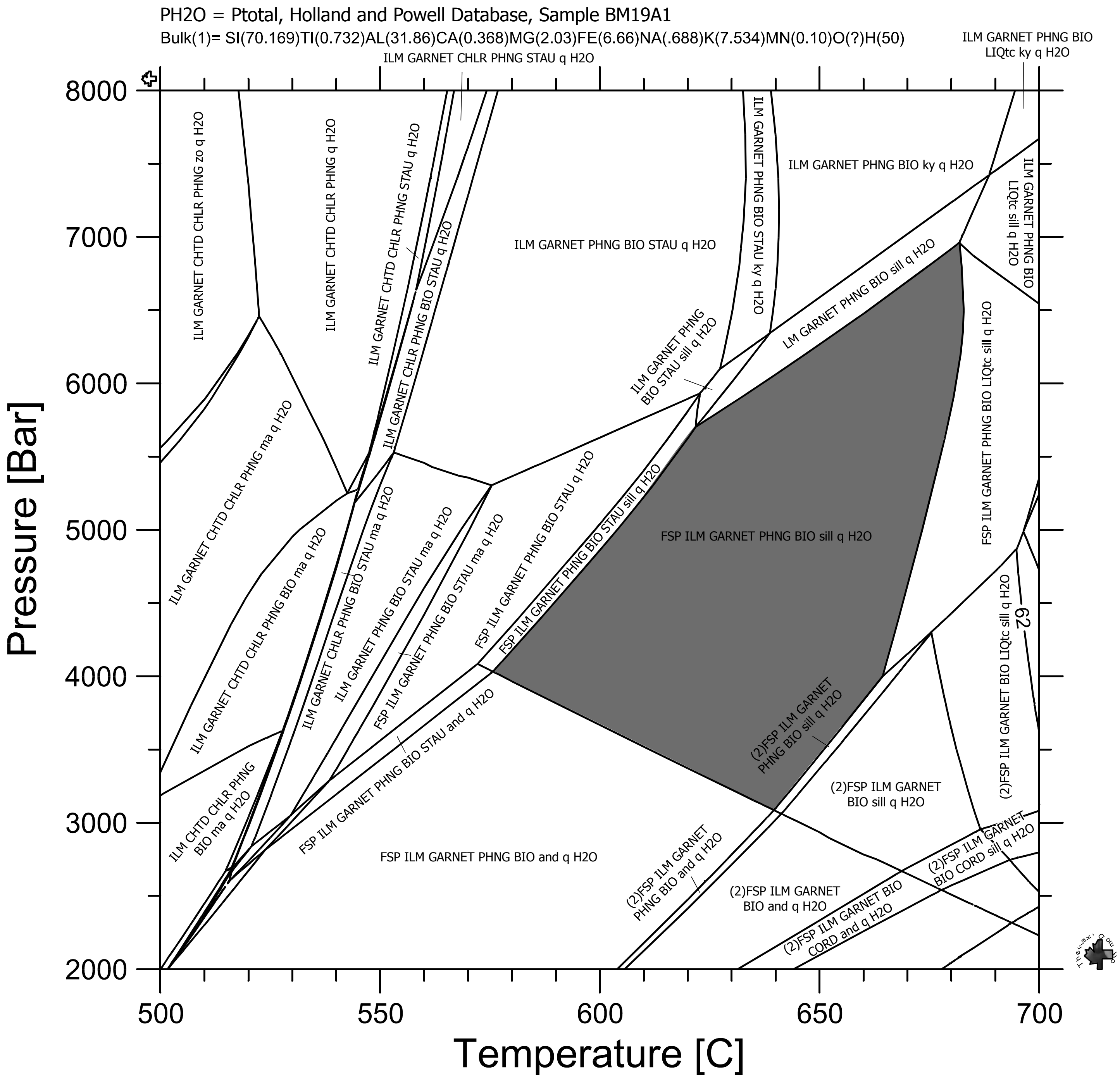
ILM: site mixing+margules
GARNET: site mixing
OMPH: site mixing+margules
OPX: site mixing+margules
CHTD: ideal+margules
CRPH: ideal
CHLR: site mixing+margules
PHNG: site mixing+margules
BIO: site mixing+margules
TALC: site mixing
STAU: ideal+margules
CORD: site mixing
SPIN: site mixing+margules
SAPP0: site mixing+margules
OSUM0: site mixing
LIQtc: external+margules

Figure DR-M6



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GARNET: site mixing
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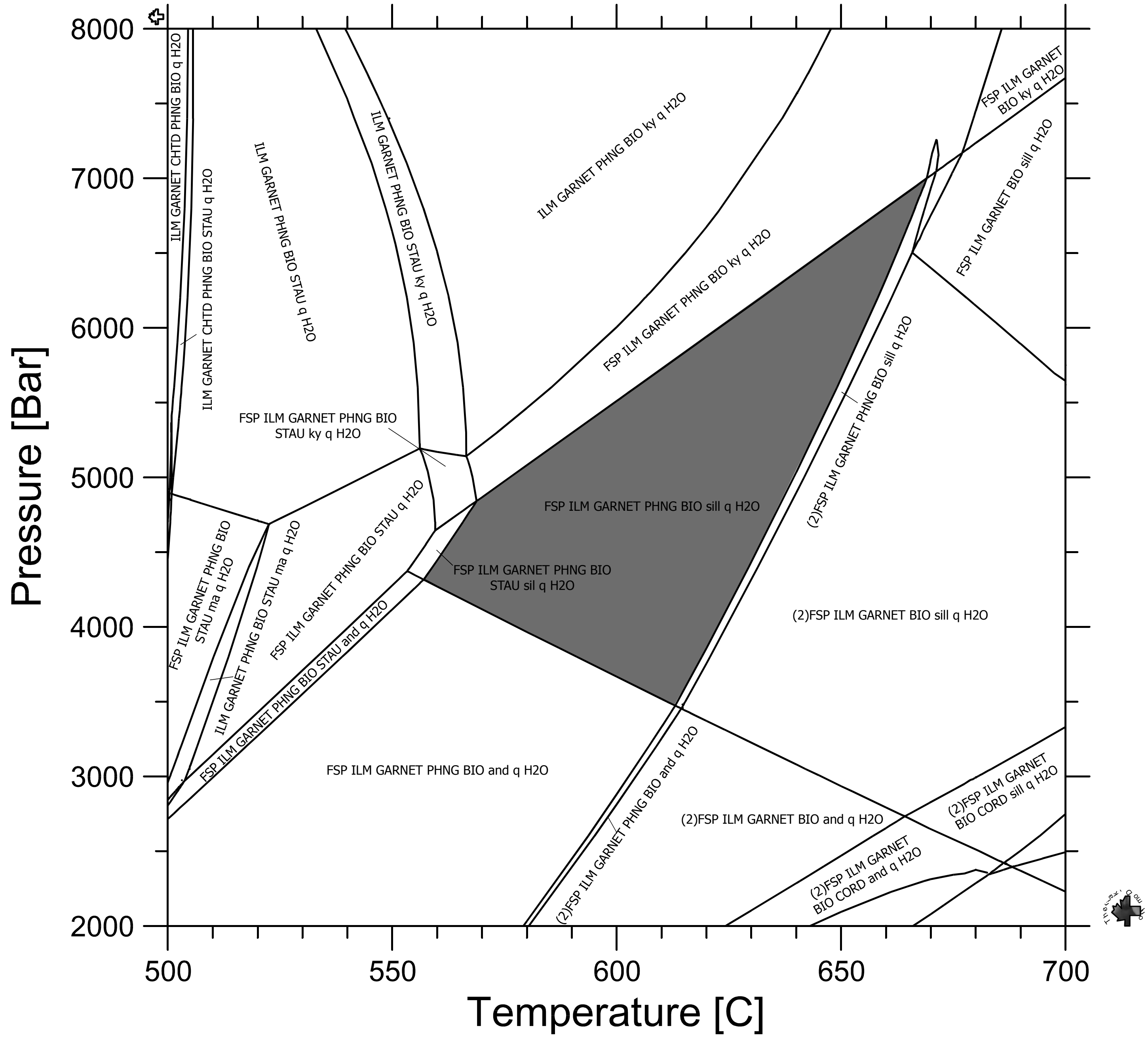
OPX: site mixing+margules
CHTD: ideal+margules
CRPH: ideal
CHLR: site mixing+margules
PHNG: site mixing+margules
BIO: site mixing+margules
TALC: site mixing
STAU: ideal+margules
CORD: site mixing
SPIN: site mixing+margules
SAPP0: site mixing+margules
OSUM0: site mixing
LIQtc: external+margules

Figure DR-M7

PH2O = 0.7 Ptotal, Holland and Powell Database, Sample BM19A1

Bulk(1)= SI(70.169)TI(0.732)AL(31.86)CA(0.368)MG(2.03)FE(6.66)NA(.688)K(7.534)MN(0.10)O(?)H(50)



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ILM: site mixing+margules
GARNET: site mixing
OMPH: site mixing+margules
OPX: site mixing+margules
CHTD: ideal+margules
CRPH: ideal
CHLR: site mixing+margules
PHNG: site mixing+margules
BIO: site mixing+margules
TALC: site mixing
STAU: ideal+margules
CORD: site mixing
SPIN: site mixing+margules
SAPP0: site mixing+margules
OSUM0: site mixing
LIQtc: external+margules

Figure DR-M8

Figure DR-M9: Electron Microprobe X-Ray Maps for Sample 01BM-33

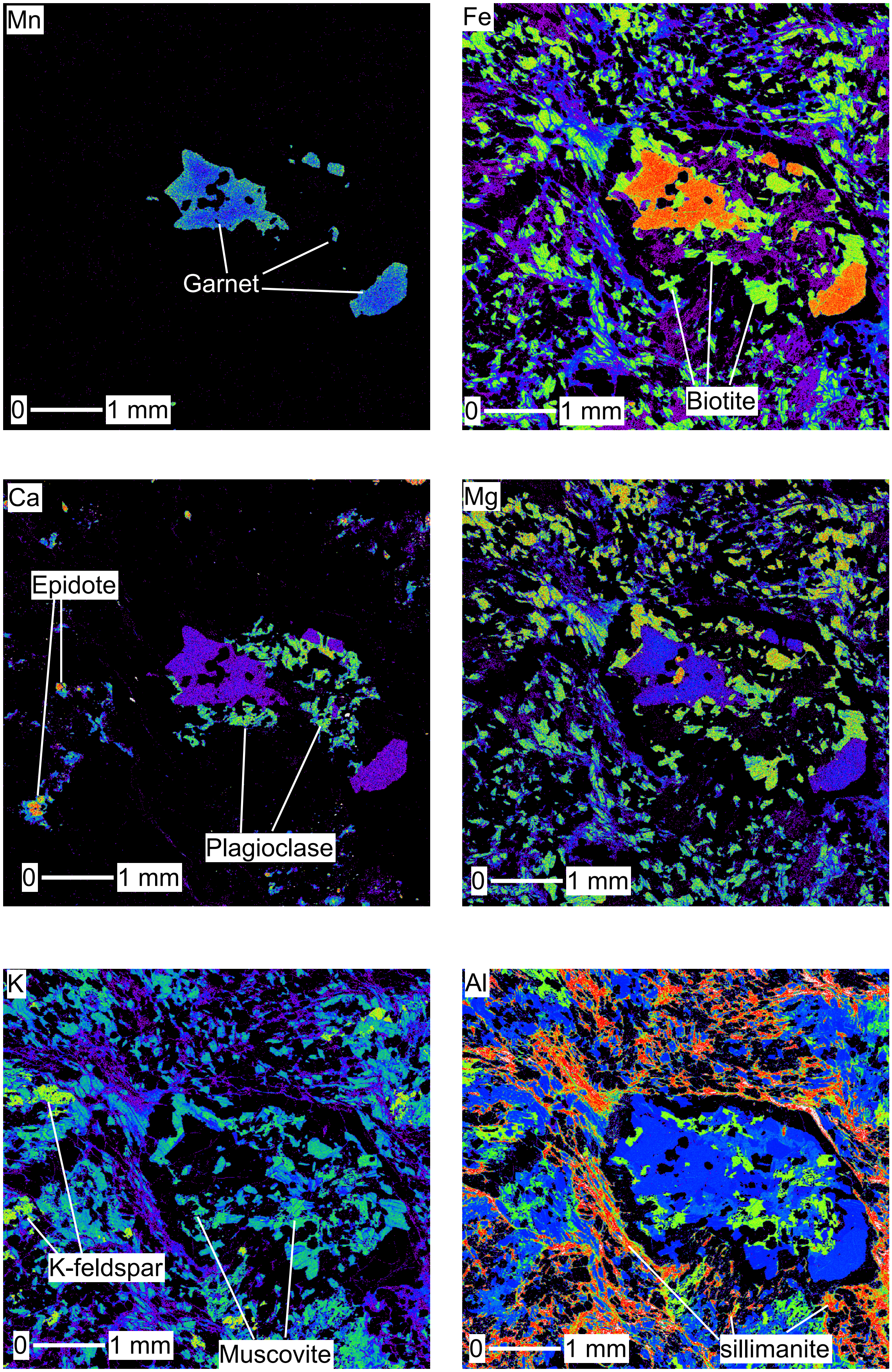


Table DR-M1: Mineral assemblages in metasedimentary rocks

Sample	BM33	01BM-37	05BM-180	01BM-59	01BM-34	01BM19-A1	01BM19-A2	01BM-9
Biotite	x	x	x	x	x	x	x	x
Muscovite	x	x	x	x	x	x	x	x
Quartz	x	x	x	x	x	x	x	x
Plagioclase	x	x	x	x	x	x	x	x
K-feldspar	x	x			x			x
Sillmanite	x	x		x	x	x	x	x
Chlorite	x				x	x	x	x
Oxides	x	x	x	x	x	x	x	x
Garnet	x	x		x	x	x	x	x
Epidote	x							

Table DR-M2: Electron Microprobe Data

Sample	BM33	BM19A1	BM19A2
Garnet	Core	Core	Core
Fe	2.169	2.061	5.491
Mg	0.180	0.166	0.521
Mn	0.572	0.705	1.328
Ca	0.059	0.056	0.150
Almandine	0.728	0.690	0.733
Pyrope	0.060	0.056	0.070
Spessartine	0.192	0.236	0.177
Grossular	0.020	0.019	0.020
Fe/(Fe+Mg)	0.923	0.000	0.913
Mg/(Mg+Fe)	0.077	0.075	0.087
Garnet	Rim	Rim	Rim
Fe	2.143	2.147	5.156
Mg	0.150	0.136	0.464
Mn	0.687	0.698	1.730
Ca	0.034	0.698	0.111
Almandine	0.711	0.583	0.691
Pyrope	0.050	0.037	0.062
Spessartine	0.228	0.190	0.232
Grossular	0.011	0.190	0.015
Fe/(Fe+Mg)	0.935	0.940	0.917
Mg/(Mg+Fe)	0.065	0.060	0.083
Biotite	Average of 18	Average of 20	Average of 12
Si	5.826	5.764	5.769
Al IV	2.174	2.236	2.231
Al VI	1.620	1.655	1.725
Al Total	3.794	3.891	3.956
Ti	0.414	0.289	0.291
Fe	3.655	3.674	3.589
Mn	0.035	0.036	0.038
Mg	1.367	1.295	1.296
Ca	0.004	0.014	0.013
K	1.485	0.436	0.445
Na	0.053	0.095	0.090
Fe/(Fe+Mg)	0.728	0.739	0.735
Mg/(Mg+Fe)	0.272	0.261	0.265
Phl	0.194	0.187	0.188
Ann	0.518	0.531	0.520

Sample	BM33	BM19A1	BM19A2
Muscovite	Average of 18	Average of 15	Average of 14
Si	6.694	6.607	6.581
Al IV	1.306	1.393	1.419
Al VI	4.863	4.714	4.855
Al Tot	6.168	6.106	6.274
Ti	0.077	0.076	0.039
Fe	0.311	0.317	0.262
Mn	0.002	0.001	0.005
Mg	0.096	0.081	0.062
Ca	0.003	0.004	0.013
Na	0.100	0.182	0.2
K	1.485	0.599	0.582
X_{MU}	0.832	0.667	0.652
X_{PA}	0.063	0.232	0.251
Plagioclase	Plagioclase Rim		
Ca	0.156		
Na	0.795		
K	0.000		
Ab	0.836		
Na	0.164		
Kfs	0.000		

Table DR1. SHRIMP U-Pb geochronology data

Sample	Spot	% comm 206	U (ppm)	Th (ppm)	Th/U	207r /235	% err	206r /238	% err	err corr	206Pb/238U age (Ma)	± 1s (Ma)	207Pb/206Pb age (Ma)	± 1s (Ma)	%concordant
Amphibolite															
05BM-174	8	0.01	415	156	0.38	3.21	0.7	.2530	0.4	.566	1453	6	1470	12	99
05BM-174	3	0.02	1112	395	0.36	2.56	0.9	.2023	0.5	.532	1171	6	1467	15	80
05BM-174	7	0.02	353	156	0.44	3.17	0.8	.2506	0.4	.576	1440	6	1462	12	99
05BM-174	5	0.03	448	172	0.38	3.21	0.7	.2542	0.4	.571	1460	6	1461	11	100
05BM-174	2	0.03	373	133	0.36	3.31	0.7	.2622	0.4	.576	1505	6	1460	12	103
05BM-174	6	<0.01	353	113	0.32	3.22	0.8	.2565	0.4	.582	1474	6	1447	12	102
05BM-174	4	0.05	243	93	0.38	3.35	1.0	.2687	0.6	.577	1543	8	1436	15	107
Biotite-hornblende granodiorite															
05BM-184	12	0.09	294	106	0.36	3.24	1.1	.2530	0.6	.525	1432	8	1483	18	97
05BM-184	10	0.01	269	201	0.75	3.20	1.1	.2516	0.6	.576	1425	9	1472	17	97
05BM-184	9	<0.01	332	200	0.60	3.12	1.0	.2458	0.6	.595	1394	8	1468	15	95
05BM-184	5	0.03	188	108	0.58	3.18	1.2	.2517	0.7	.582	1426	9	1462	18	98
05BM-184	4	0.12	220	228	1.03	3.19	1.2	.2521	0.6	.541	1428	9	1462	19	98
05BM-184	1	0.06	361	176	0.49	3.05	0.9	.2420	0.5	.531	1374	7	1453	15	95
05BM-184	3	0.30	338	144	0.43	3.09	1.2	.2478	0.5	.415	1407	7	1436	21	98
05BM-184	11	0.16	191	91	0.47	3.12	1.4	.2508	0.7	.519	1424	10	1431	23	99
05BM-184	7	0.04	241	114	0.47	3.26	1.0	.2628	0.6	.569	1490	9	1428	16	104
05BM-184	2	0.17	171	75	0.44	3.08	1.4	.2481	0.7	.481	1410	9	1428	24	99
Biotite-hornblende granodiorite															
03BM-108	3	10.35	423	170	0.40	2.92	5.3	.2352	0.7	.135	1357	7	1427	101	95
03BM-108	7	0.18	194	146	0.75	3.13	1.3	.2505	0.6	.503	1442	9	1438	21	100
03BM-108	1	0.09	262	149	0.57	3.18	1.0	.2547	0.6	.585	1465	9	1438	16	102
03BM-108	11	0.03	317	131	0.41	3.09	1.0	.2455	0.6	.667	1413	9	1452	14	97
03BM-108	6	0.03	691	286	0.41	2.90	0.6	.2301	0.3	.597	1327	4	1454	9	91
03BM-108	8	0.11	135	56	0.41	3.15	1.3	.2501	0.8	.579	1438	11	1455	20	99
03BM-108	2	0.07	478	200	0.42	3.11	0.8	.2463	0.4	.582	1416	6	1457	12	97
03BM-108	4	0.84	307	138	0.45	3.09	2.2	.2442	1.8	.816	1404	25	1462	24	96
03BM-108	10	0.00	385	202	0.52	3.24	0.8	.2531	0.5	.635	1452	7	1483	11	98
03BM-108	9	0.00	211	100	0.48	3.24	1.1	.2521	0.7	.633	1446	9	1491	16	97
03BM-108	5	0.10	234	113	0.48	3.21	1.0	.2491	0.6	.588	1429	8	1495	15	96
Burro Mountain granite															
03BM-107	3	0.39	177	88	0.50	3.04	1.9	.2425	0.9	.490	1408	11	1504	19	94
03BM-107	4	0.08	332	418	1.26	3.19	1.0	.2552	0.6	.610	1453	5	1473	12	99
03BM-107	7	0.06	180	144	0.80	3.17	1.3	.2454	0.8	.620	1421	6	1472	12	97
03BM-107	6	0.03	830	513	0.62	3.22	0.7	.2531	0.4	.532	1380	6	1464	10	94
03BM-107	5	0.01	1121	1319	1.18	3.16	0.5	.2499	0.3	.696	1436	5	1460	7	98
03BM-107	8	0.05	510	196	0.38	3.04	0.7	.2398	0.4	.611	1428	8	1459	13	98
03BM-107	9	0.11	465	167	0.36	3.15	0.8	.2473	0.5	.592	1440	8	1455	13	99
03BM-107	10	0.02	317	326	1.03	3.14	0.9	.2484	0.6	.631	1431	6	1454	22	98
03BM-107	1	0.05	332	329	0.99	3.16	0.9	.2505	0.5	.627	1396	12	1443	31	97
03BM-107	2	1.44	807	936	1.16	3.14	1.2	.2489	0.4	.335	1467	8	1438	15	102
Burro Mountain granite															
03BM-90b	3	1.06	138	76	0.55	2.96	1.5	.2300	0.8	.553	1338	11	1497	24	89
03BM-90b	1	0.25	518	211	0.41	3.15	0.7	.2482	0.4	.623	1442	6	1468	10	98
03BM-90b	9	0.46	776	354	0.46	3.16	1.0	.2491	0.4	.377	1448	5	1464	17	99
03BM-90b	5	0.56	406	153	0.38	3.12	1.1	.2481	0.5	.469	1443	7	1452	18	99
03BM-90b	6	0.38	201	66	0.33	3.05	1.2	.2430	0.7	.593	1415	9	1450	18	98
03BM-90b	4	0.21	172	68	0.40	3.11	1.3	.2479	0.8	.598	1442	11	1446	19	100
Burro Mountain granite															
04BM-148	3	<0.01	404	172	0.43	3.10	1.7	.2431	1.6	.915	1397	22	1478	13	95
04BM-148	17	0.05	366	116	0.32	3.17	0.9	.2490	0.5	.574	1411	7	1474	14	96
04BM-148	15	0.04	283	106	0.37	3.24	1.0	.2544	0.6	.577	1441	8	1472	15	98

04BM-148	5	0.01	1331	562	0.42	3.19	1.6	.2510	1.5	.937	1441	21	1472	11	98
04BM-148	9	0.05	1486	172	0.12	3.33	1.6	.2632	1.5	.967	1510	22	1465	8	103
04BM-148	8	0.01	3959	1194	0.30	3.58	1.5	.2829	1.5	.990	1619	24	1463	4	111
04BM-148	13	0.07	762	337	0.44	3.29	1.8	.2605	1.7	.947	1495	25	1462	11	102
04BM-148	14	0.04	596	235	0.39	3.19	0.7	.2529	0.4	.574	1433	6	1459	11	98
04BM-148	12	0.00	332	148	0.45	3.26	1.8	.2579	1.6	.904	1481	24	1459	15	102
04BM-148	16	0.09	541	216	0.40	3.12	0.8	.2472	0.4	.545	1402	6	1458	12	96
04BM-148	7	0.04	460	174	0.38	3.09	1.8	.2446	1.6	.904	1407	22	1457	14	97
04BM-148	10	0.01	3440	233	0.07	3.44	1.5	.2731	1.5	.988	1565	23	1455	4	108
04BM-148	1	0.01	857	84	0.10	3.02	1.7	.2398	1.6	.951	1381	21	1451	10	95
04BM-148	6	0.05	665	332	0.50	3.23	1.7	.2575	1.6	.937	1480	22	1444	11	102
04BM-148	4	0.01	1567	1419	0.91	3.17	1.6	.2539	1.5	.972	1460	22	1440	7	101
04BM-148	11	0.01	2120	2525	1.19	3.11	1.6	.2491	1.5	.975	1434	21	1435	7	100
04BM-148	2	0.11	695	696	1.00	3.17	1.7	.2555	1.6	.923	1470	22	1427	13	103
Burro Mountain granite															
05BM-185	4	0.10	344	92	0.27	3.16	0.9	.2460	0.5	.563	1393	7	1492	14	93
05BM-185	9	0.21	154	57	0.37	3.20	1.4	.2503	0.7	.529	1417	10	1485	22	95
05BM-185	3	0.23	190	62	0.32	3.15	1.4	.2473	0.7	.507	1401	10	1475	23	95
05BM-185	6	0.05	286	139	0.49	3.34	1.1	.2631	0.7	.578	1488	9	1468	18	101
05BM-185	2	0.01	183	88	0.48	3.16	1.3	.2490	0.7	.537	1411	10	1466	21	96
05BM-185	8	0.04	351	162	0.46	3.34	0.9	.2650	0.5	.571	1499	7	1455	14	103
05BM-185	1	0.22	145	73	0.50	3.14	1.6	.2503	0.8	.495	1420	11	1449	26	98
05BM-185	10	0.02	243	107	0.44	3.25	1.0	.2584	0.6	.568	1464	8	1448	16	101
05BM-185	7	0.05	195	136	0.70	3.23	1.2	.2578	0.7	.570	1462	10	1441	18	101
05BM-185	5	0.03	499	251	0.50	3.11	0.8	.2489	0.4	.544	1413	6	1438	12	98

TABLE DR2. COMPLETE U-Pb ZIRCON DATA COLLECTED BY LA-MC-ICPMS

	Composition		Isotopic ratios						Apparent ages (Ma)								
Spot	U (ppm)	U/Th	206Pb/204Pb	207Pb*/235U	± (%)	206Pb*/238U	± (%)	error corr.	206Pb*/238U	± 1s (Ma)	207Pb*/235U	± 1s (Ma)	207Pb*/206Pb*	± 1s (Ma)	Best Age (Ma)	± 1s (Ma)	Conc. (%)
04BM-137																	
T11	337	3.7	7837	3.58954	3.8	0.26183	3.6	0.96	1499	49	1547	30	1613	20	1613	20	93
T18	763	3.1	3503	3.13110	2.0	0.22730	1.6	0.81	1320	19	1440	15	1622	22	1622	22	81
T10	233	2.8	12959	3.46070	8.4	0.25090	8.2	0.98	1443	107	1518	66	1625	29	1625	29	89
T12	199	2.4	14292	3.92264	1.9	0.28426	1.0	0.52	1613	14	1618	15	1626	30	1626	30	99
T8	190	1.2	21236	4.07422	2.3	0.29369	1.7	0.75	1660	25	1649	19	1635	29	1635	29	102
C5	485	1.0	16132	3.50159	1.8	0.25212	1.6	0.90	1449	21	1528	14	1638	15	1638	15	89
T3	192	2.5	13169	3.58713	5.7	0.25745	5.5	0.97	1477	73	1547	45	1644	26	1644	26	90
C3	218	1.2	7329	3.73670	2.9	0.26800	2.3	0.82	1531	32	1579	23	1645	30	1645	30	93
T2	246	2.0	2210	3.12131	6.7	0.22326	6.0	0.90	1299	71	1438	52	1650	55	1650	55	79
T16	368	1.9	5369	3.17664	10.9	0.22680	10.8	0.99	1318	129	1451	84	1653	24	1653	24	80
T9	170	1.1	21382	3.88400	3.1	0.27672	2.3	0.76	1575	32	1610	25	1657	37	1657	37	95
T14	167	1.5	11179	3.95782	1.5	0.28162	0.9	0.58	1600	13	1626	12	1659	23	1659	23	96
C9	325	2.2	5990	4.25126	2.1	0.30194	1.9	0.91	1701	29	1684	18	1663	16	1663	16	102
T7	260	1.8	11881	4.07926	2.3	0.28916	2.1	0.91	1637	30	1650	19	1667	17	1667	17	98
T13	289	2.0	4094	3.99328	1.6	0.28302	1.0	0.61	1607	14	1633	13	1667	23	1667	23	96
C4	205	1.3	1128	3.74307	3.8	0.26435	1.0	0.25	1512	13	1581	31	1673	68	1673	68	90
T4	125	1.1	29190	3.96291	3.2	0.27915	1.0	0.30	1587	14	1627	26	1678	57	1678	57	95
T20	435	1.1	4142	3.71584	1.6	0.26164	1.3	0.80	1498	18	1575	13	1679	18	1679	18	89
C8	358	1.1	10273	3.87311	5.3	0.27270	5.2	0.97	1554	71	1608	43	1679	25	1679	25	93
T1	208	1.3	25530	4.21301	4.0	0.29615	3.7	0.91	1672	54	1677	33	1682	32	1682	32	99
T17	360	0.8	10930	3.99061	2.2	0.27939	1.9	0.84	1588	26	1632	18	1689	22	1689	22	94
C6	330	0.8	2685	3.93793	2.1	0.27469	0.7	0.34	1565	10	1622	17	1696	36	1696	36	92
C7	400	1.0	2173	4.19245	2.3	0.29046	1.2	0.50	1644	17	1673	19	1709	37	1709	37	96
C10	284	0.8	21597	3.92996	2.6	0.27005	1.9	0.70	1541	25	1620	21	1724	35	1724	35	89
03BM-83																	
1	190	0.4	722118	4.07093	1.0	0.29369	0.8	0.83	1660	12	1648	8	1634	11	1634	11	102
2	112	0.5	129417	4.05550	4.2	0.29253	4.1	0.97	1654	60	1645	34	1634	18	1634	18	101
3	323	0.3	572113	4.07906	2.0	0.29404	1.9	0.98	1662	28	1650	16	1635	8	1635	8	102
4	438	0.5	17792	3.44870	2.3	0.25156	2.3	0.98	1447	30	1516	18	1613	8	1613	8	90
5	297	0.3	342332	4.03108	1.7	0.29215	1.7	0.98	1652	24	1640	14	1625	7	1625	7	102
6	354	0.3	321147	3.99423	2.3	0.28856	2.3	0.98	1634	33	1633	19	1631	8	1631	8	100
7	230	0.4	417053	3.97912	3.2	0.28737	3.2	0.99	1628	45	1630	26	1632	10	1632	10	100
8	405	0.3	48033	3.88846	3.6	0.27995	3.6	0.99	1591	50	1611	29	1638	8	1638	8	97
9	300	0.5	371547	4.01827	1.8	0.29130	1.7	0.96	1648	25	1638	15	1625	10	1625	10	101
10	394	0.3	910317	4.09393	1.8	0.29588	1.8	0.98	1671	26	1653	15	1631	7	1631	7	102
11	435	0.3	188218	4.03751	2.2	0.29137	2.2	0.99	1648	32	1642	18	1633	6	1633	6	101
12	311	0.3	289138	4.04152	1.7	0.29158	1.7	0.98	1649	25	1643	14	1634	7	1634	7	101
05BM-183																	
7	195	5.3	59149	3.57218	6.6	0.26123	6.5	0.99	1496	87	1543	52	1609	13	1609	13	93
5	65	0.6	2473	4.19796	9.0	0.30204	8.2	0.91	1701	122	1674	74	1639	70	1639	70	104
18	239	1.1	626773	4.26002	3.7	0.30547	3.6	0.99	1718	55	1686	30	1645	11	1645	11	104
6	82	0.8	140084	4.11438	2.0	0.29450	1.7	0.87	1664	25	1657	16	1649	18	1649	18	101
15	133	1.3	189340	4.03491	2.4	0.28694	2.0	0.86	1626	29	1641	19	1661	22	1661	22	98
3	259	1.9	271954	4.18990	4.0	0.29670	4.0	0.99	1675	59	1672	33	1668	10	1668	10	100
14	188	1.5	180770	4.07320	2.3	0.28692	2.2	0.97	1626	32	1649	19	1678	10	1678	10	97
16	218	0.9	254259	4.21786	0.8	0.29670	0.6	0.79	1675	10	1678	7	1681	9	1681	9	100
12	221	1.1	387456	4.16974	2.2	0.29315	2.2	0.97	1657	32	1668	18	1682	9	1682	9	99
2	425	1.6	603322	4.33689	1.6	0.30392	1.6	0.98	1711	24	1700	13	1688	6	1688	6	101
9	411	1.7	115847	4.03166	4.6	0.28242	4.6	1.00	1604	65	1641	37	1688	7	1688	7	95
17	261	1.5	274706	4.29589	4.9	0.30087	4.9	1.00	1696	73	1693	40	1689	5	1689	5	100
10	154	1.6	258391	4.18242	2.9	0.29246	2.8	0.96	1654	41	1671	24	1692	15	1692	15	98
4	204	1.9	40096	4.36303	2.8	0.30196	2.8	0.97	1701	41	1705	23	1711	12	1711	12	99
13	227	4.7	245759	4.59649	3.3	0.31587	3.3	0.99	1770	51	1749	28	1724	8	1724	8	103
1	398	2.2	619422	4.70957	1.9	0.31255	1.9	0.99	1753	29	1769	16	1788	5	1788	5	98
10BM-195																	
9	725	2.3	20301	2.49048	1.7	0.19951	1.7	0.97	1173	18	1269	13	1437	9	1437	9	82
5	1463	1.8	110881	2.95117	3.6	0.23497	3.6	1.00	1361	44	1395	27	1448	6	1448	6	94
4	1899	2.8	80770	2.86095	6.0	0.22731	6.0	1.00	1320	72	1372	45	1453	3	1453	3	91
8	1075	3.3	18267	3.23190	4.4	0.25497	4.3	1.00	1464	57	1465	34	1466	5	1466	5	100
3	892	1.5	36172	3.09233	1.8	0.24392	1.8	0.99	1407	23	1431	14	1466	4	1466	4	96
13	288	2.8	517970	3.26789	3.5	0.25752	3.5	0.99	1477	46	1473	27	1468	8	1468	8	101
11	764	2.1	617425	3.22193	1.5	0.25384	1.5	0.99	1458	20	1462	12	1469	4	1469	4	99
2	441	2.6	370229	3.26346	1.9	0.25702	1.9	0.97	1475	25	1472	15	1469	9	1469	9	100
15	1028	4.6	445983	3.40182	2.5	0.26778	2.5	1.00	1530	34	1505	20	1470	3	1470	3	104
7	297	2.5	6310	3.30912	2.7	0.26030	2.4	0.88	1491	32	1483	21	1472	25	1472	25	101
14	1234	1.3	58984	3.01297	2.8	0.23663	2.7	0.98	1369	34	1411	21	1474	10	1474	10	93
10BM-202																	
1	351	1.7	343230	4.09431	2.2	0.29521	2.2	0.98	1668	32	1653	18	1635	7	1635	7	102
2	435	2.5	351754	4.05653	0.9	0.29195	0.9	0.94	1651	13	1646	7	1638	6	1638	6	101
3	461	2.5	42809	4.10785	2.8	0.29618	2.8	1.00	1672	42	1656	23	1635	5	1635	5	102
4	901	2.2	67857	4.04852	2.9	0.29190	2.9	1.00	1651	43	1644	24	1635	4	1635	4	101
8	464	2.6	25188	4.14385	2.9	0.29712	1.5	0.52	1677	22	1663	24	1645	46	1645	46	102
9	593	2.8	22694	3.84368	3.1	0.28130	3.1	0.99	1598	44	1602	25	1607	9	1607	9	99
11	349	2.2	307716	4.09460	1.9	0.29542	1.9	0.99	1669	27	1653	15	1634	5	1634	5	102
12	445	1.8	12702	3.97509	3.7	0.28736	3.6	0.97	1628	51	1629	30	1630	17	1630	17	100

13	888	2.8	26083	3.98971	2.5	0.28864	2.5	0.99	1635	36	1632	20	1629	7	1629	7	100
14	491	2.4	38110	4.01841	2.2	0.28996	2.2	0.99	1641	32	1638	18	1634	6	1634	6	100
15	408	1.6	43910	3.99466	2.6	0.29305	2.6	0.98	1657	38	1633	21	1603	9	1603	9	103
16	885	2.5	28212	4.07143	1.9	0.29466	1.9	0.99	1665	28	1649	15	1628	4	1628	4	102
17	501	2.4	726539	4.02516	2.0	0.29003	2.0	0.99	1642	29	1639	16	1636	4	1636	4	100
18	284	2.2	280300	4.01729	1.7	0.28990	1.7	0.99	1641	25	1638	14	1633	5	1633	5	100
19	273	1.9	62484	3.95352	1.5	0.28639	1.4	0.94	1623	20	1625	12	1626	9	1626	9	100
20	826	3.1	219784	4.00221	1.8	0.28945	1.8	1.00	1639	27	1635	15	1629	3	1629	3	101
10BM-204																	
6	676	3.2	4092	2.65650	3.4	0.20950	3.3	0.97	1226	37	1316	25	1467	17	1467	17	84
12	272	0.8	22323	3.35046	1.9	0.26293	1.8	0.95	1505	24	1493	15	1476	11	1476	11	102
14	877	2.4	20414	2.59348	1.8	0.20419	1.7	0.99	1198	19	1299	13	1470	4	1470	4	81
18	544	1.9	8314	2.95698	3.4	0.23252	3.4	0.99	1348	41	1397	26	1472	9	1472	9	92
20	723	0.7	3155	2.37098	5.6	0.18634	5.6	1.00	1102	57	1234	40	1473	11	1473	11	75
25	664	2.0	5050	2.77027	1.6	0.21867	1.5	0.98	1275	18	1348	12	1465	6	1465	6	87
26	793	2.4	3113	2.36394	3.5	0.18635	3.4	0.96	1102	34	1232	25	1467	19	1467	19	75

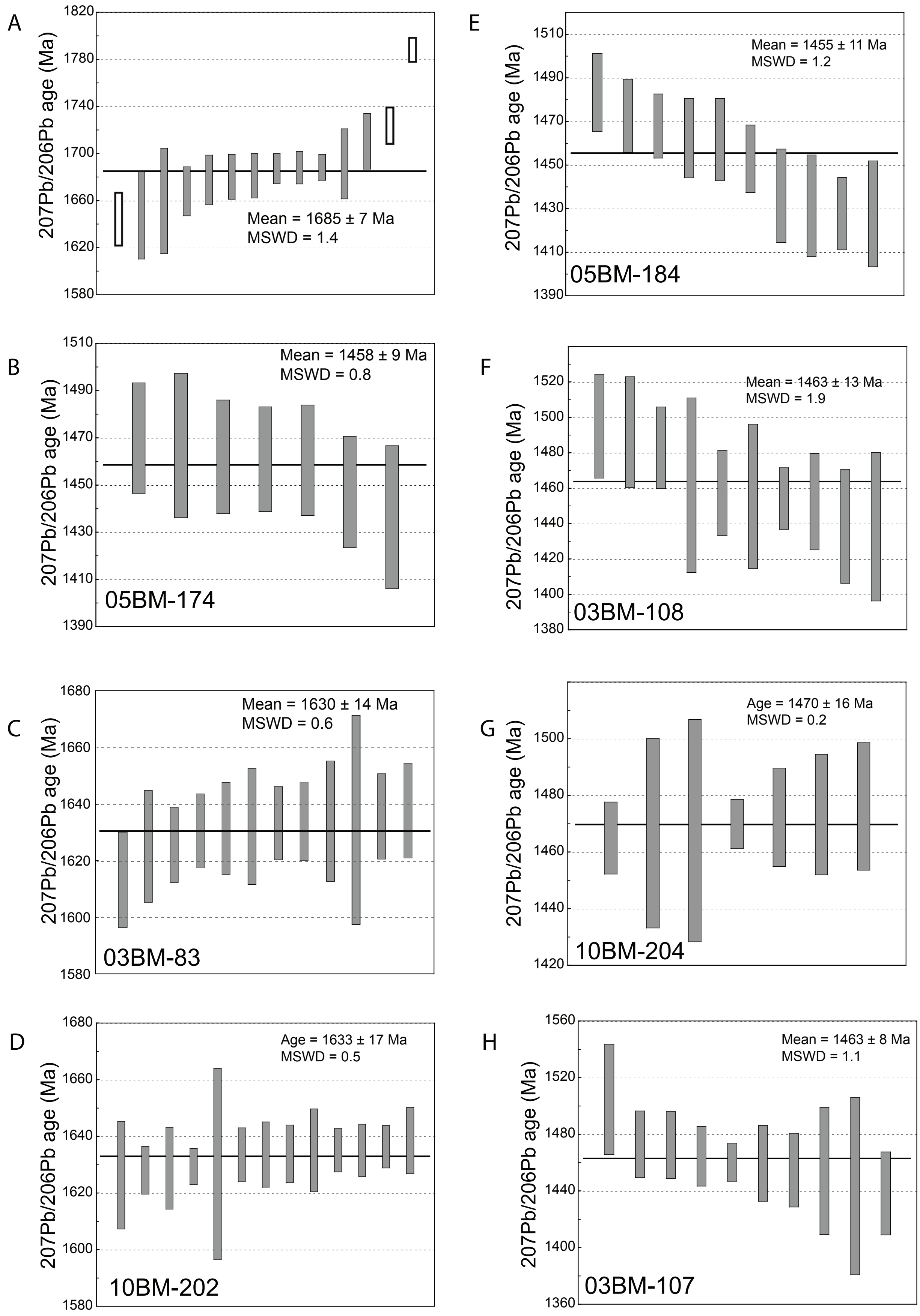

A
Mean = 1685 ± 7 Ma
MSWD = 1.4
B
Mean = 1458 ± 9 Ma
MSWD = 0.8
05BM-174
C
Mean = 1630 ± 14 Ma
MSWD = 0.6
03BM-83
D
Age = 1633 ± 17 Ma
MSWD = 0.5
10BM-202
E
Mean = 1455 ± 11 Ma
MSWD = 1.2
05BM-184
F
Mean = 1463 ± 13 Ma
MSWD = 1.9
03BM-108
G
Age = 1470 ± 16 Ma
MSWD = 0.2
10BM-204
H
Mean = 1463 ± 8 Ma
MSWD = 1.1
03BM-107
207Pb/206Pb age (Ma)

Figure DR1

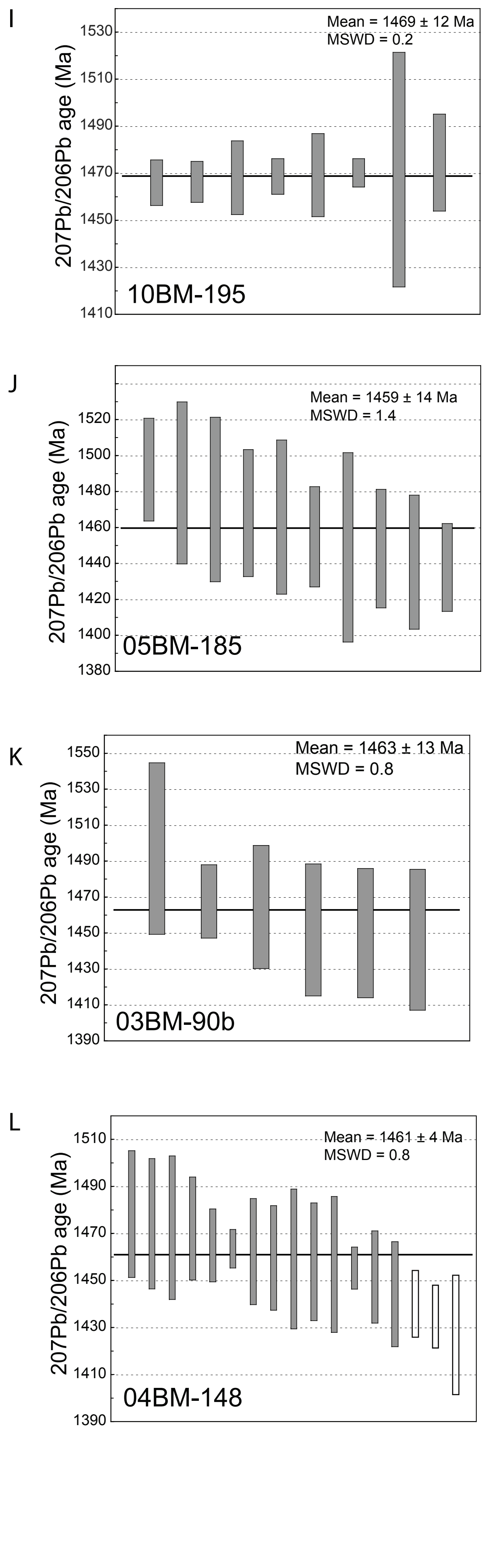

I
Mean = 1469 ± 12 Ma
MSWD = 0.2
207Pb/206Pb age (Ma)
1530
1510
1490
1470
1450
1430
1410
10BM-195
J
Mean = 1459 ± 14 Ma
MSWD = 1.4
207Pb/206Pb age (Ma)
1520
1500
1480
1460
1440
1420
1400
1380
05BM-185
K
Mean = 1463 ± 13 Ma
MSWD = 0.8
207Pb/206Pb age (Ma)
1550
1530
1510
1490
1470
1450
1430
1410
1390
03BM-90b
L
Mean = 1461 ± 4 Ma
MSWD = 0.8
207Pb/206Pb age (Ma)
1510
1490
1470
1450
1430
1410
1390
04BM-148

Figure DR2

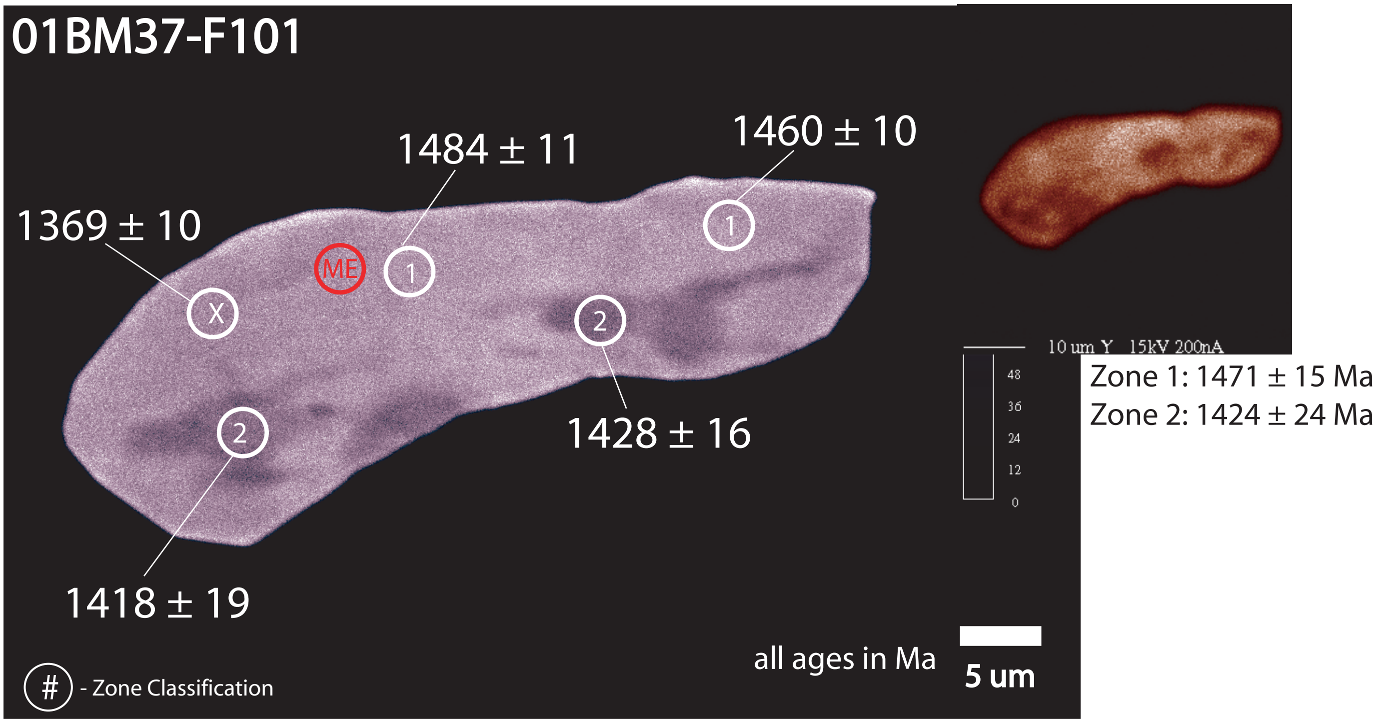
DR3: MONAZITE GEOCHRONOLOGY ANALYTICAL METHODS

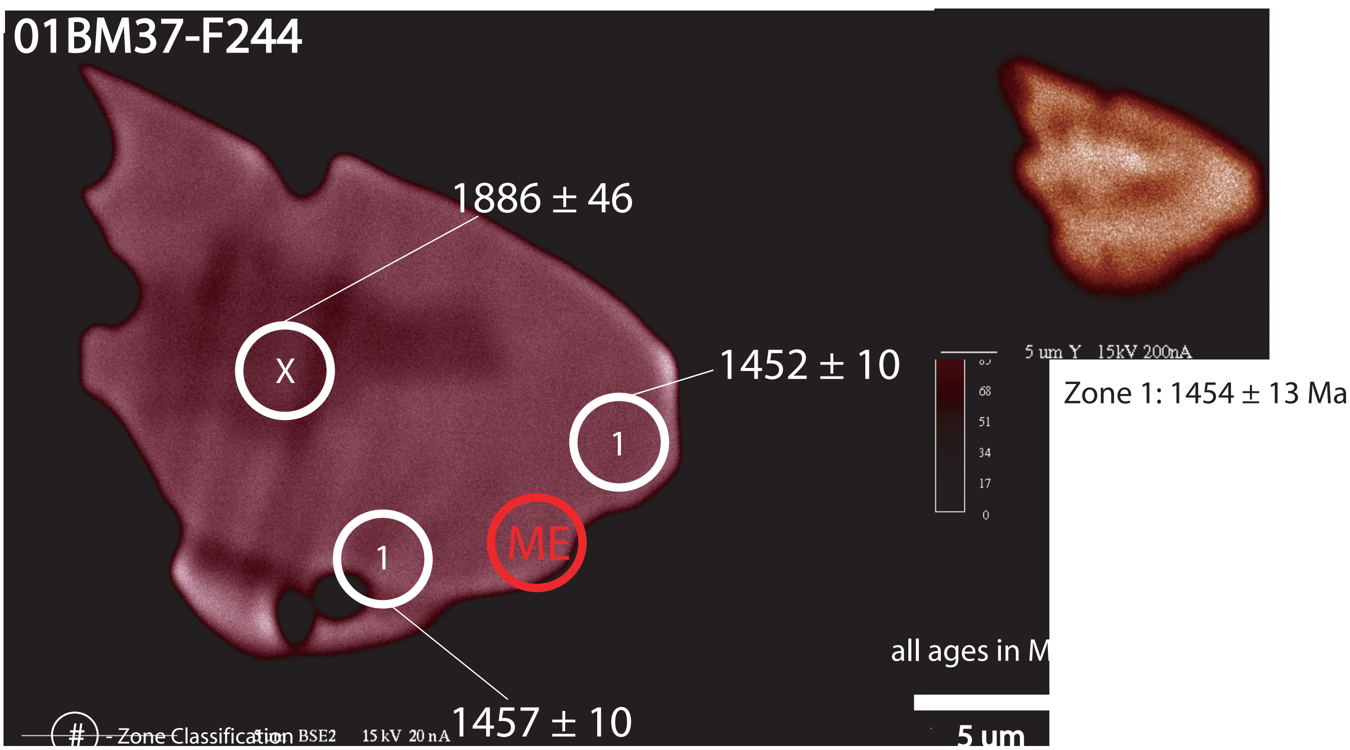
Polished thin sections of samples were prepared, carbon coated, and mapped for elements Si, Fe, and Ce at an accelerating voltage of 15 kV, probe current of 200 nA and a beam size of 10 μm. The Ce maps (25x25 mm) allowed identification of the full range of monazite grains present in individual samples. This technique is preferred over optical or backscattered electron identification of monazite, which may only allow identification of the larger monazite grains in a sample. Based on the Ce maps, monazite grains with a range of sizes and morphologies were identified, and a population of 6–8 representative grains was selected for further analysis. We then produced detailed Th, U, Y and Pb maps of each grain. The purpose of this mapping was to identify different chemical domains, which may correspond to different age domains, in the monazite grains. The size of the map was determined by the size of the grain, and the mapping was carried out at an accelerating voltage of 15 kV, probe current of 200 nA, using the PET crystal for analysis of Th and U; the TAP crystal for Y, and a LPET crystal for Pb. Using the detailed chemical maps as a guide, major component analysis of the monazite grains was carried out, focusing attention of areas of grains with obviously different Th concentrations. These analyses included Ce, P, Si, Ca, Y, Th, La and a set of additional REE.

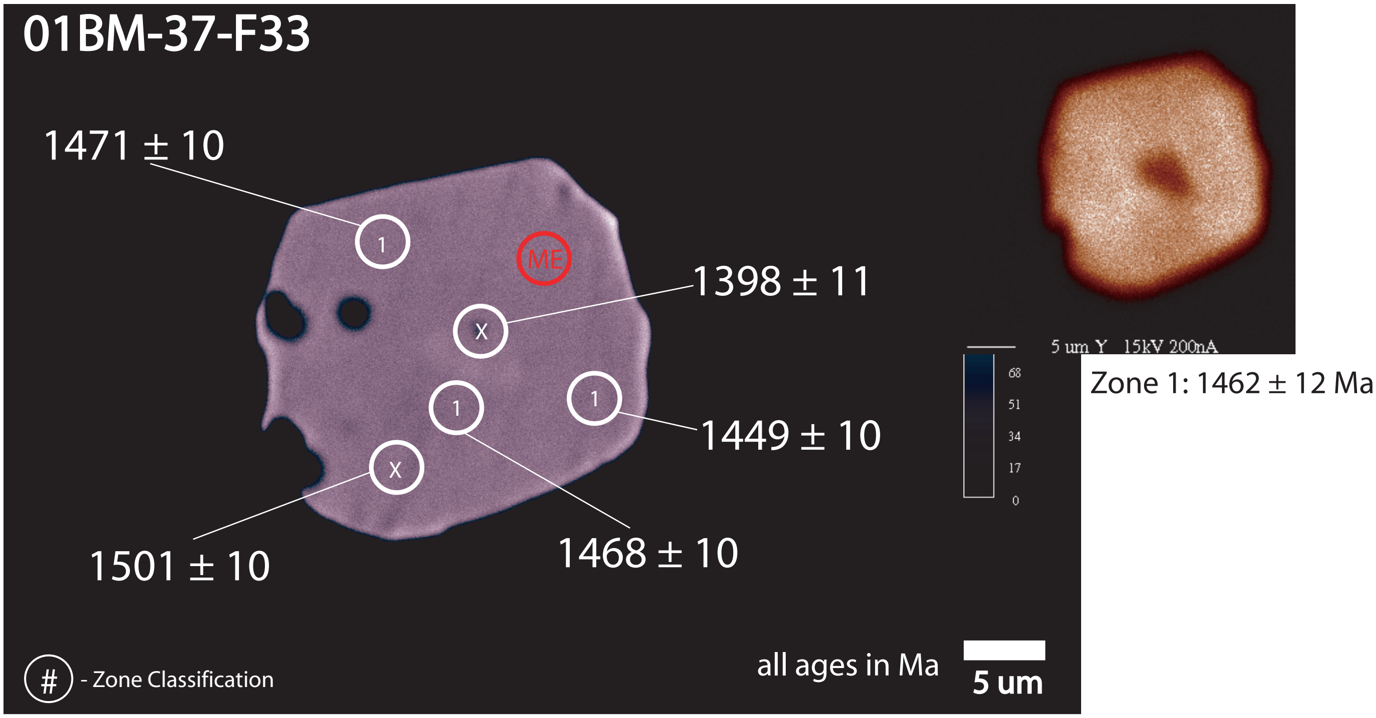
Quantitative analysis of the Th, U, Y and Pb concentration of monazite is the final and most complex step of the analytical procedure. These analyses were done using the “trace analysis” capabilities of the Cameca software, which allows the chosen trace elements to be analyzed instrumentally, but other elements to be entered into a file for calculation of matrix effects. Y is analyzed to correct for interference on the Pb peak. Y was analyzed with a TAP crystal, Th and U using a standard PET crystal, and Pb using a large PET crystal for better count rates. For these analyses, the Th (Mα) was calibrated using ThO_2, Y (Lα) using a yttrium garnet, U (Mβ) using UO_2, and Pb (Mα) using pyromorphite. Count times on peak were 300, 400, 400, and 600 seconds, respectively, using a probe current of 200 nA, and an accelerating voltage of 15 kV, yielding a visible beam size of around 3 μm and an effective excitation volume of probably closer to 5 μm in diameter. Calibration took place immediately prior to analysis with no intervening sample changes. The age equation was then solved using the Th, U, and Pb concentrations for each analytical spot on monazite.

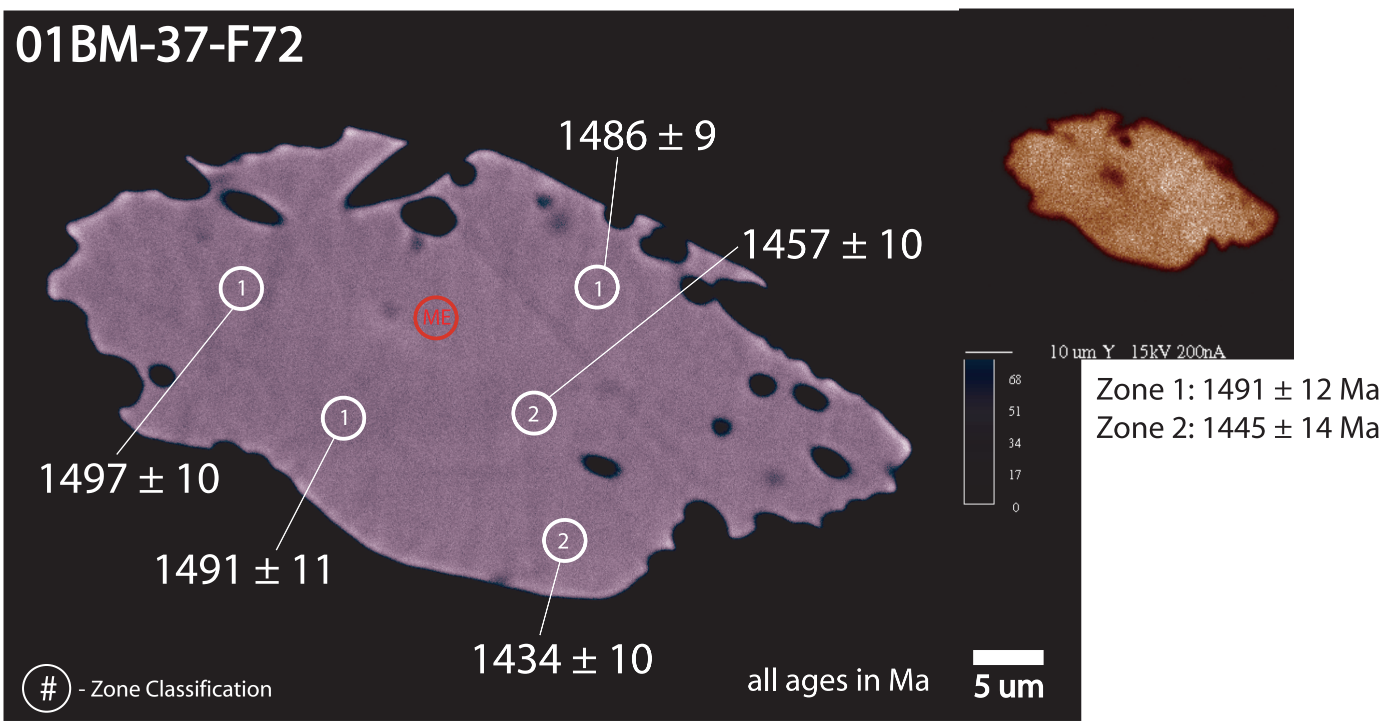
Analysis of a ~1.41 Ga monazite from the Tusas Mountains obtained from Michael Williams at U. Massachusetts was analyzed as an internal standard and yielded ages of 1418 ± 19 Ma and 1428 ± 16 Ma. Michael Williams also analyzed several spots on grains F105, F22, and F58 from sample 01BM-33. Their age populations were within 0.7-2.9% of our results, and all but one were within analytical uncertainty, despite that there were different spots within the grain being analyzed. We made assessments of zones and age clusters in each grain, and from these one or several weighted averages were calculated for each grain. These age populations, noted on the BSE images in the DR and in Table 3 are used in the interpretations. Because of the wide range of ages observed in the samples, the data were plotted on relative probability diagrams that take into consideration the age and uncertainties (Ludwig, 2003). See Table DR3 for data.

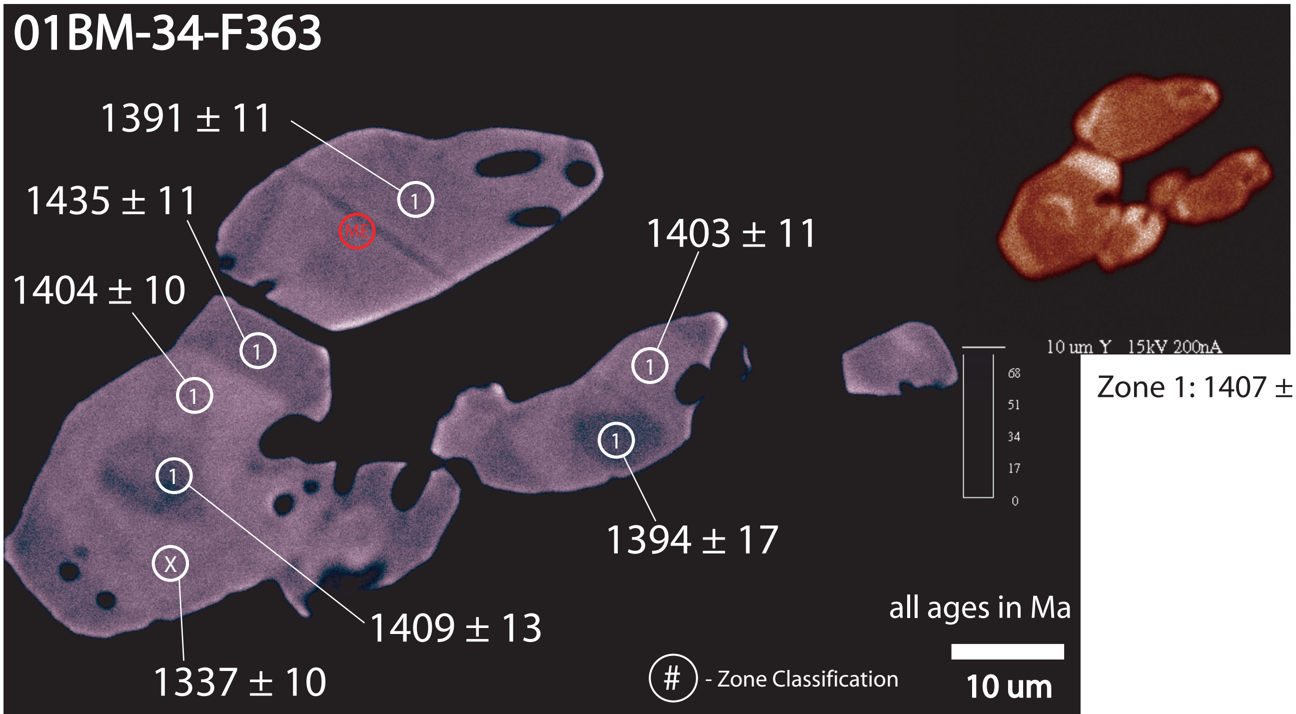
FIGURE DR3: The following images are BSE images of monazite grains, together with Y maps. Samples and ages are listed in Table DR3 following all of the images. Ages in each zone were averaged and listed in Table 3 in the manuscript.


01BM37-F101
1484 ± 11
1460 ± 10
1369 ± 10
ME
1
1
X
2
2
1428 ± 16
1418 ± 19
10 um Y 15kV 200nA
48
36
24
12
0
Zone 1: 1471 ± 15 Ma
Zone 2: 1424 ± 24 Ma
all ages in Ma
5 um
- Zone Classification

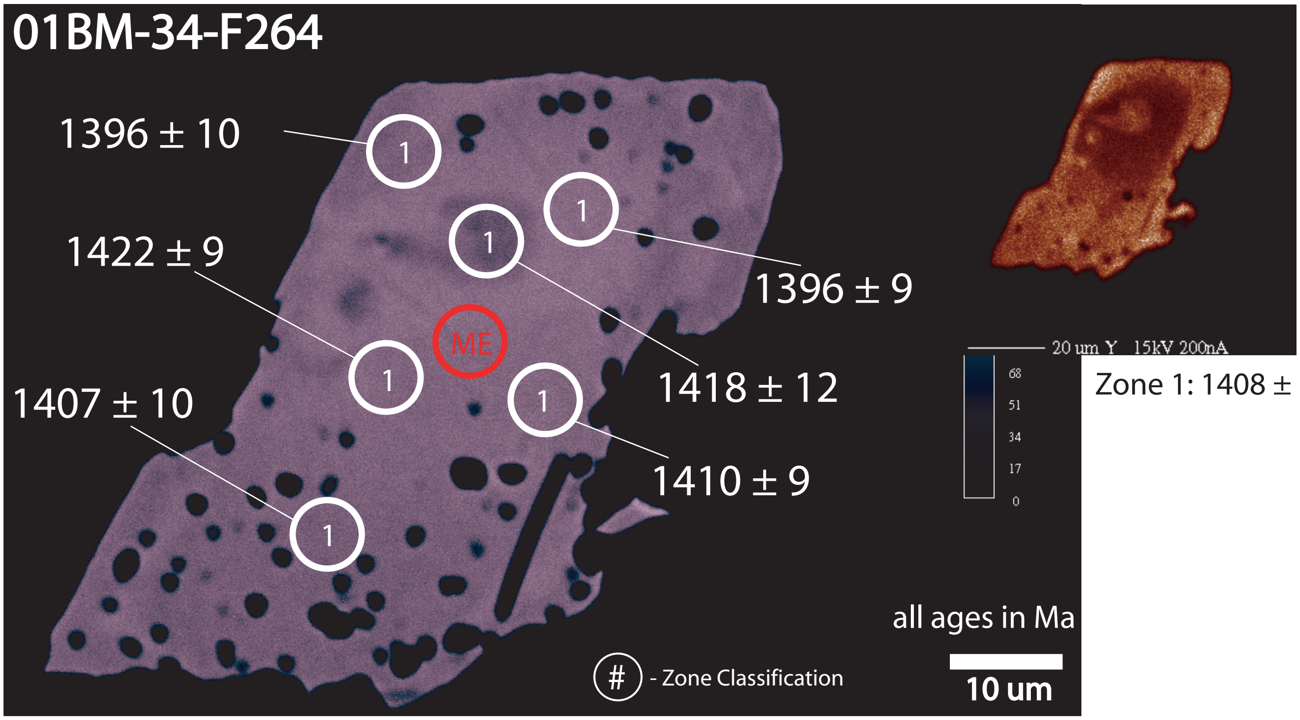

01BM37-F244
1886 ± 46
X
1452 ± 10
1
1
ME
5 um Y 15kV 200nA
68
51
34
17
0
Zone 1: 1454 ± 13 Ma
all ages in M
- Zone Classification
BSE2
15 kV 20 nA
1457 ± 10
5 um


01BM-37-F33
1471 ± 10
1398 ± 11
1449 ± 10
1501 ± 10
1468 ± 10
ME
1
X
- Zone Classification
all ages in Ma
5 um
5 um Y 15kV 200nA
68
51
34
17
0
Zone 1: 1462 ± 12 Ma

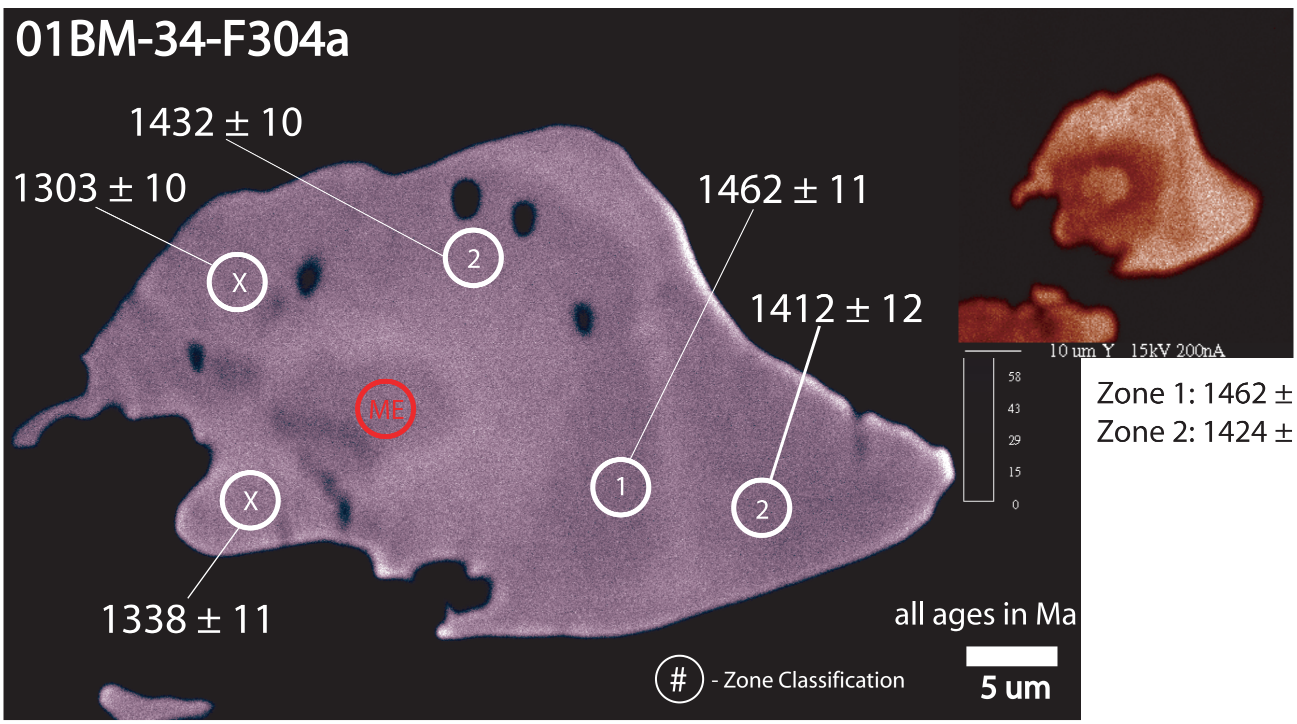

01BM-37-F72
1486 ± 9
1457 ± 10
1497 ± 10
1491 ± 11
1434 ± 10
ME
1
2
- Zone Classification
all ages in Ma
5 um
10 um Y 15kV 200nA
68
51
34
17
0
Zone 1: 1491 ± 12 Ma
Zone 2: 1445 ± 14 Ma



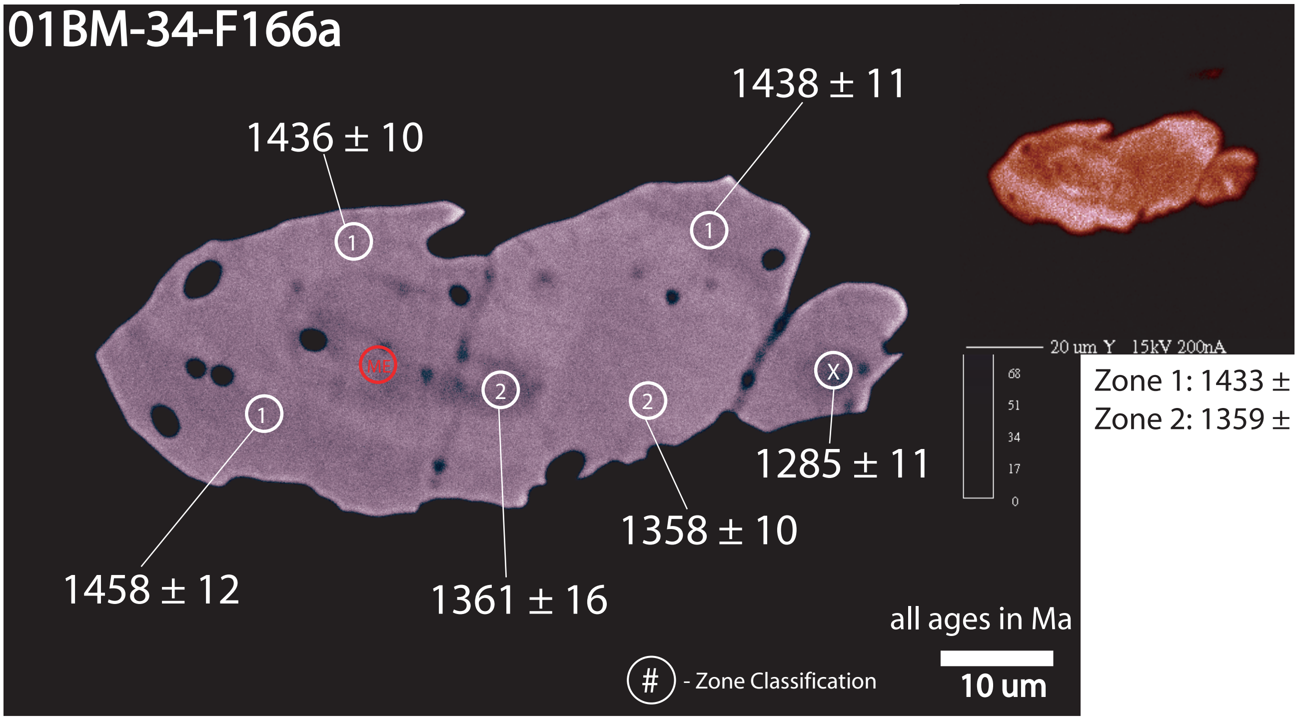
Zone 1: 1407 ± 9 Ma



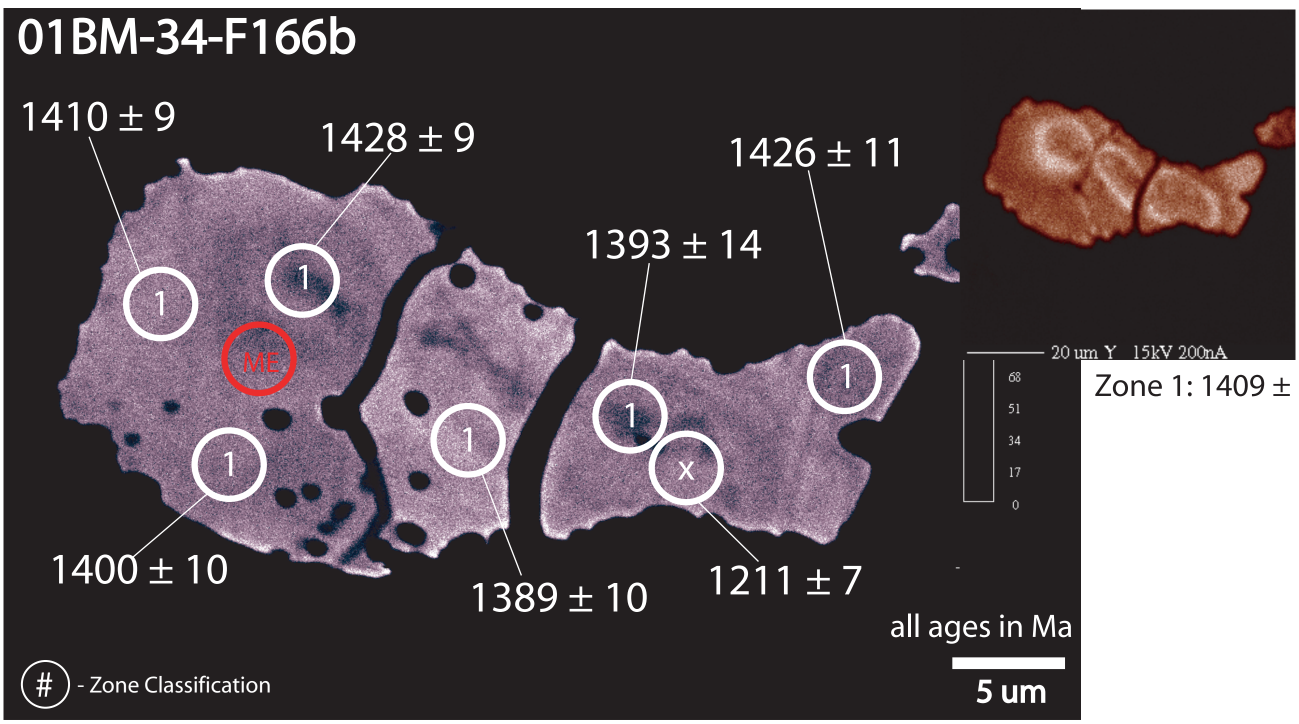
Zone 1: 1408 ± 11 Ma



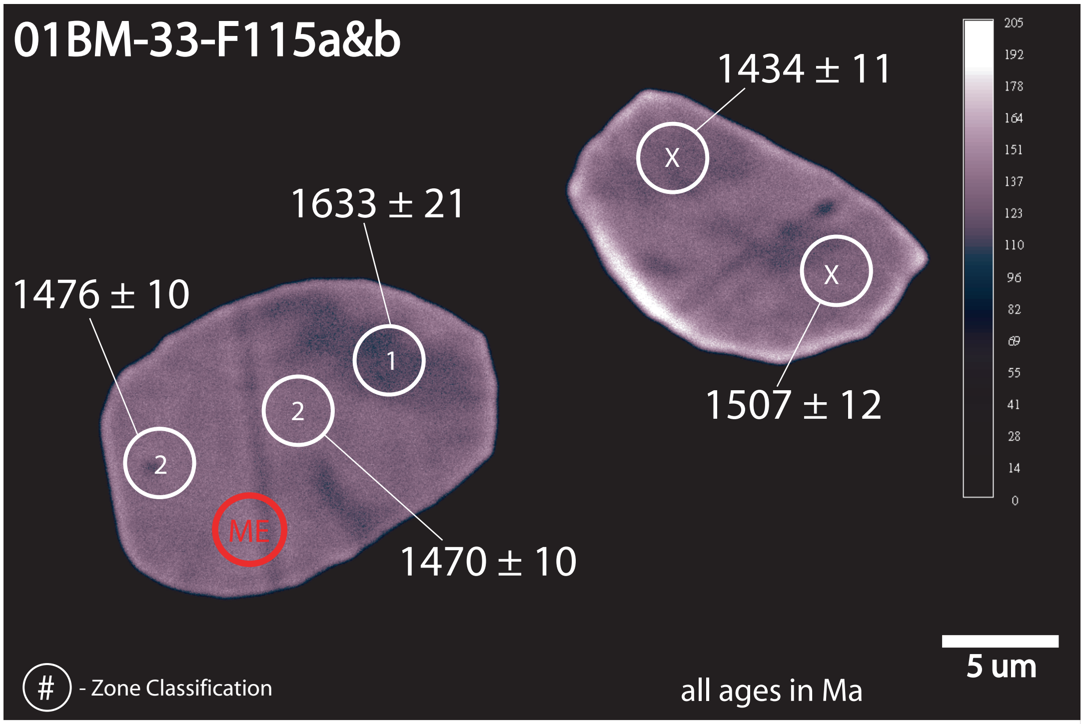
Zone 1: 1462 ± 11 Ma
Zone 2: 1424 ± 15 Ma



Zone 1: 1433 ± 13 Ma
Zone 2: 1359 ± 17 Ma

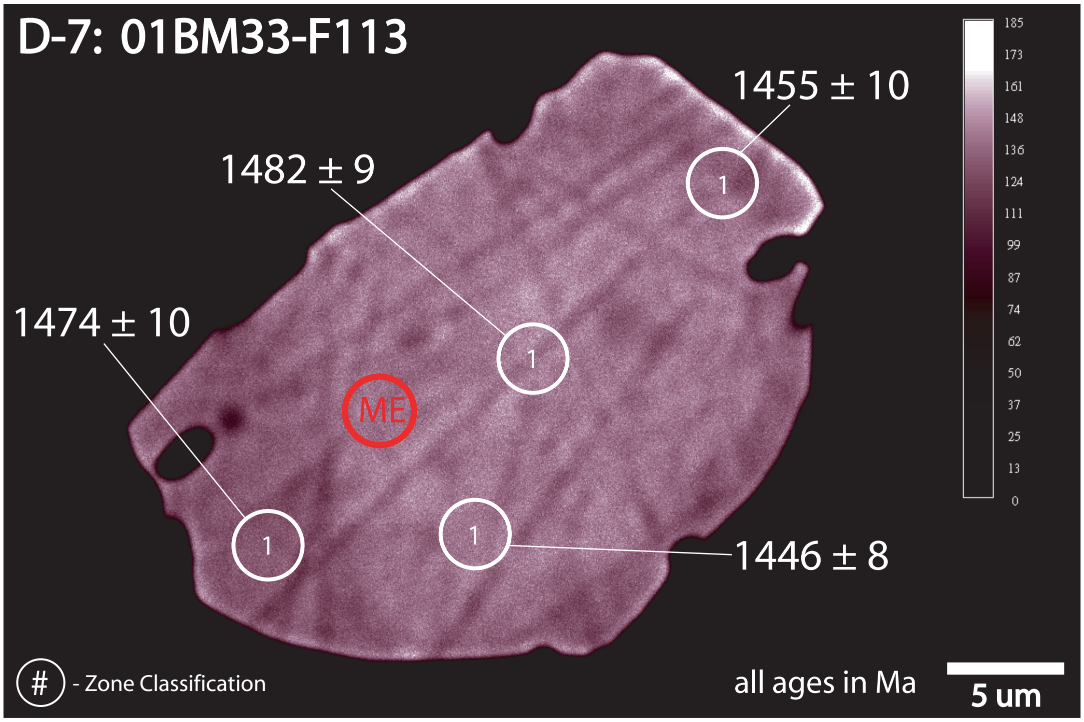


Zone 1: 1409 ± 17 Ma

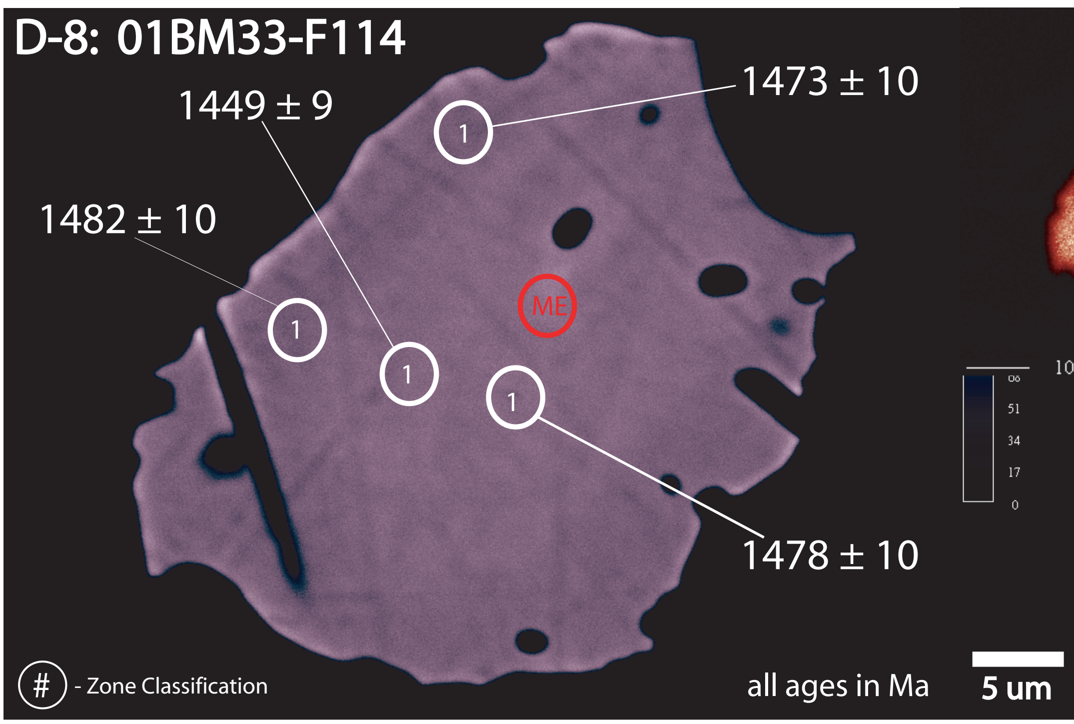


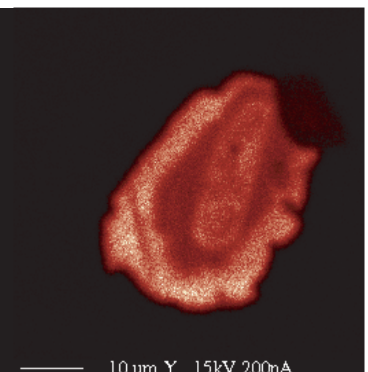
No Y map
F115a:
Zone 1: 1633 ± 21 Ma
Zone 2: 1473 ± 13 Ma

F115b: no consistent ages

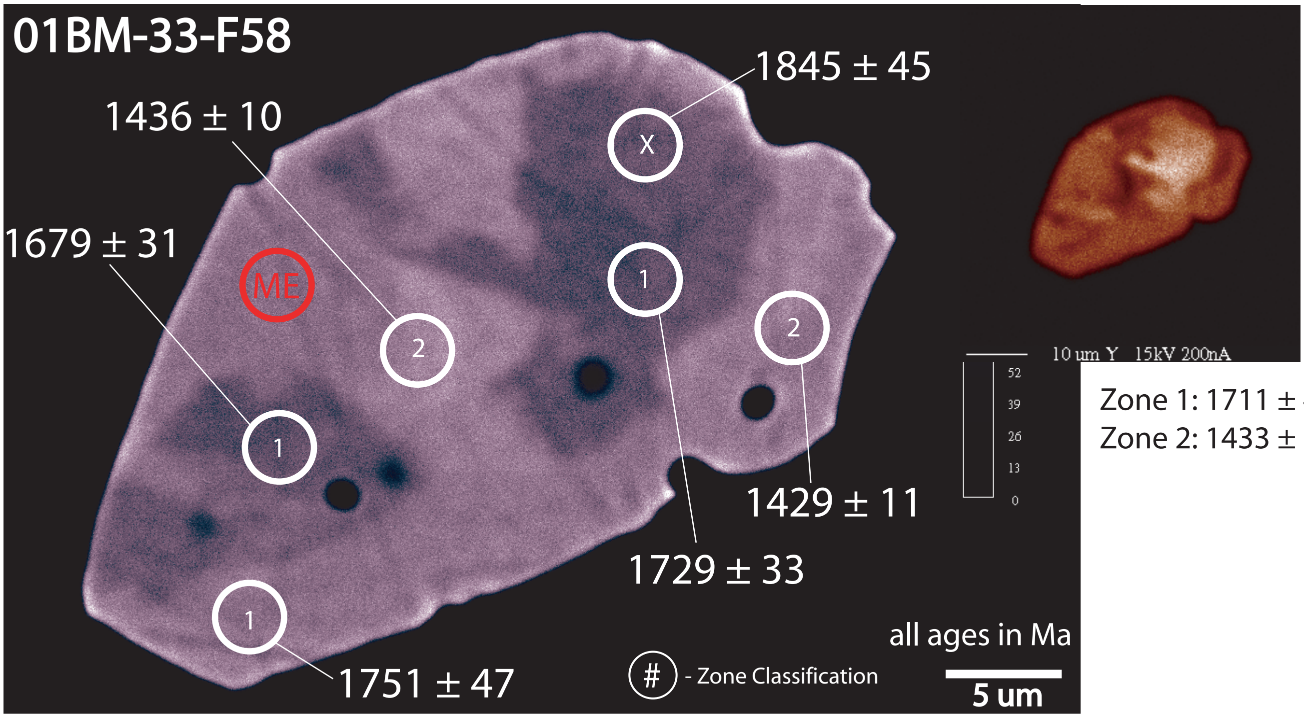


No Y map
Zone 1: 1464 ± 27 Ma

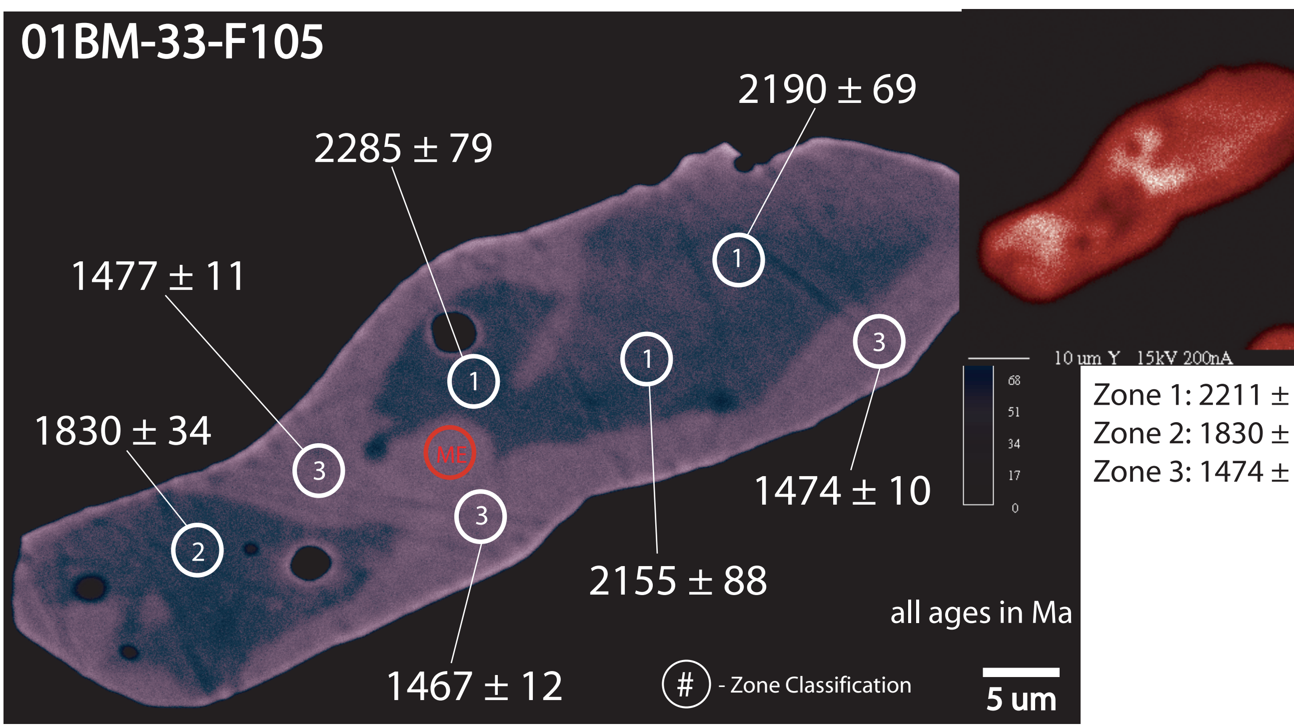




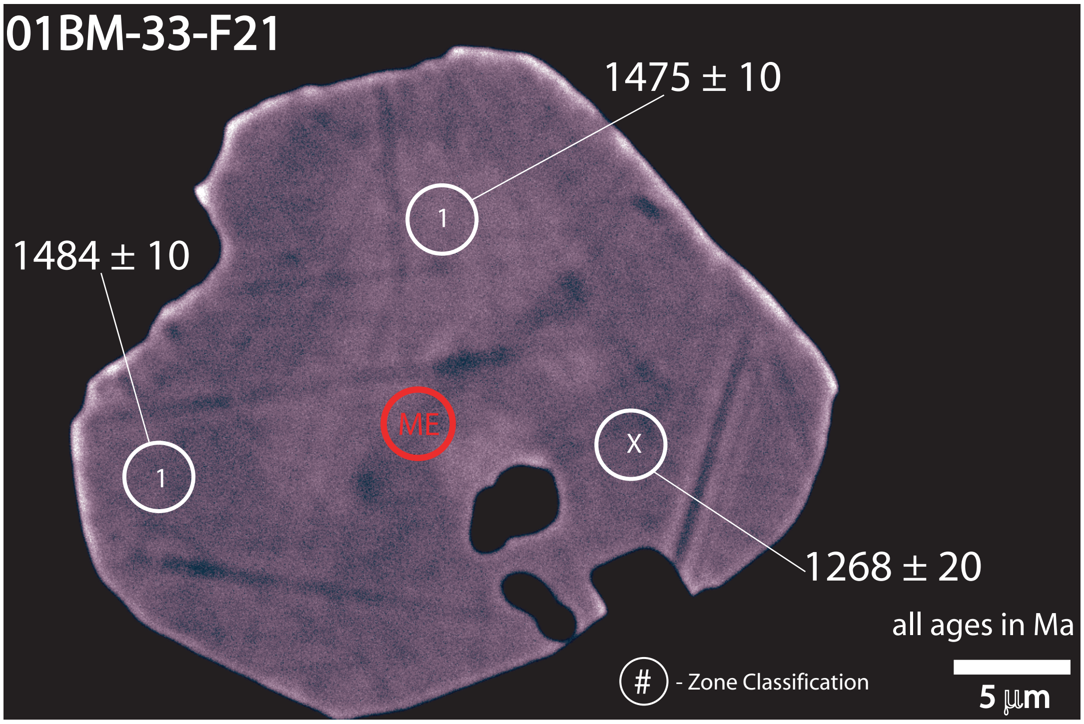
Zone 1: 1470 ± 25 Ma



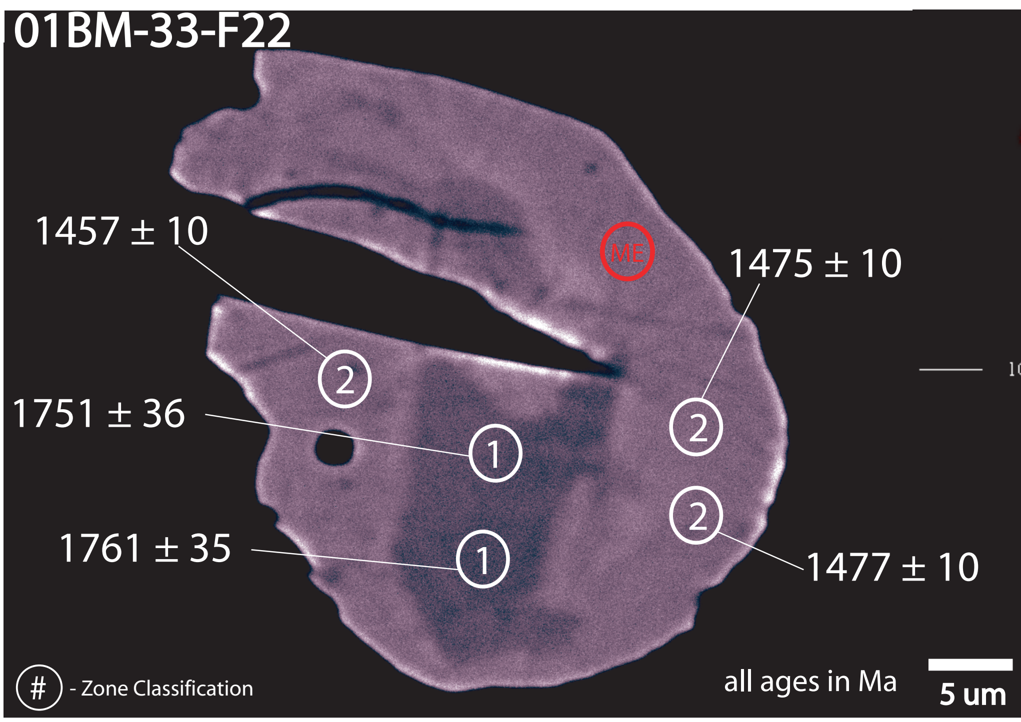
Zone 1: 1711 ± 40 Ma
Zone 2: 1433 ± 14 Ma

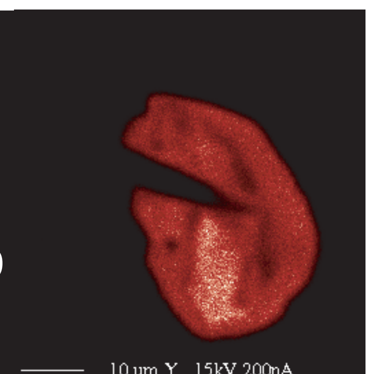


Zone 1: 2211 ± 87 Ma
Zone 2: 1830 ± 34 Ma
Zone 3: 1474 ± 13 Ma

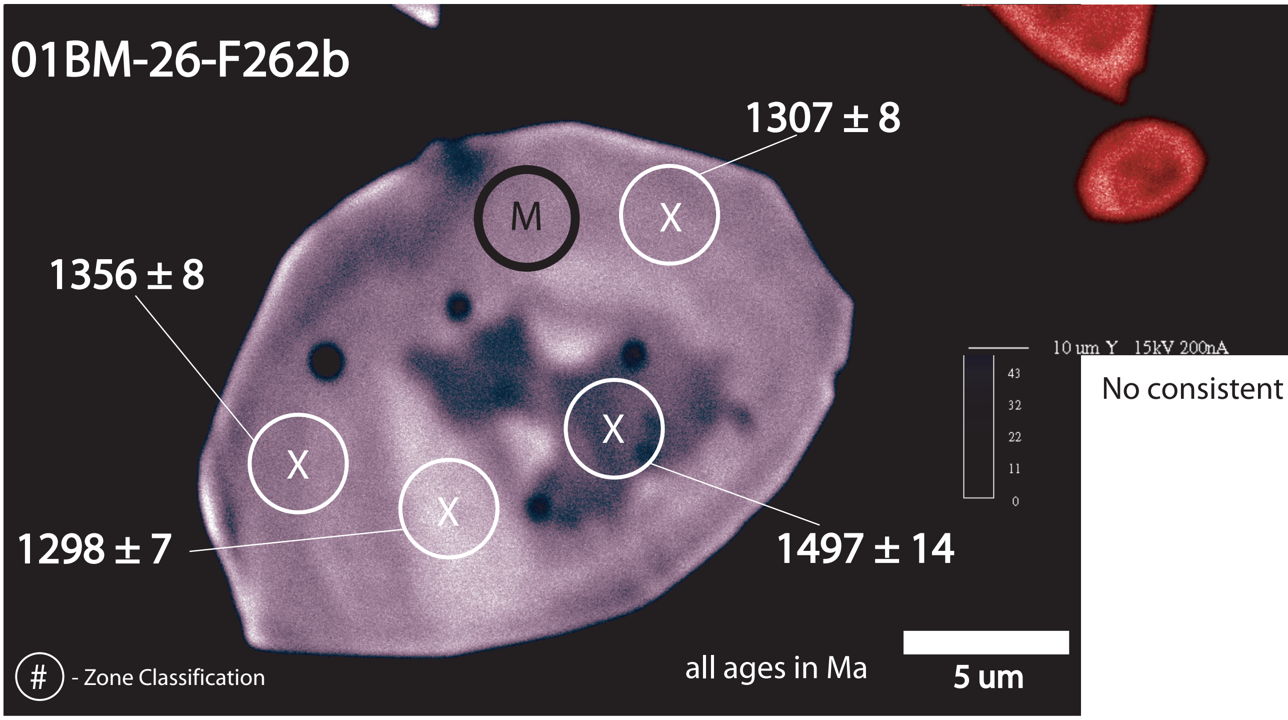


No Y map
Zone 1: 1479 ± 14 Ma

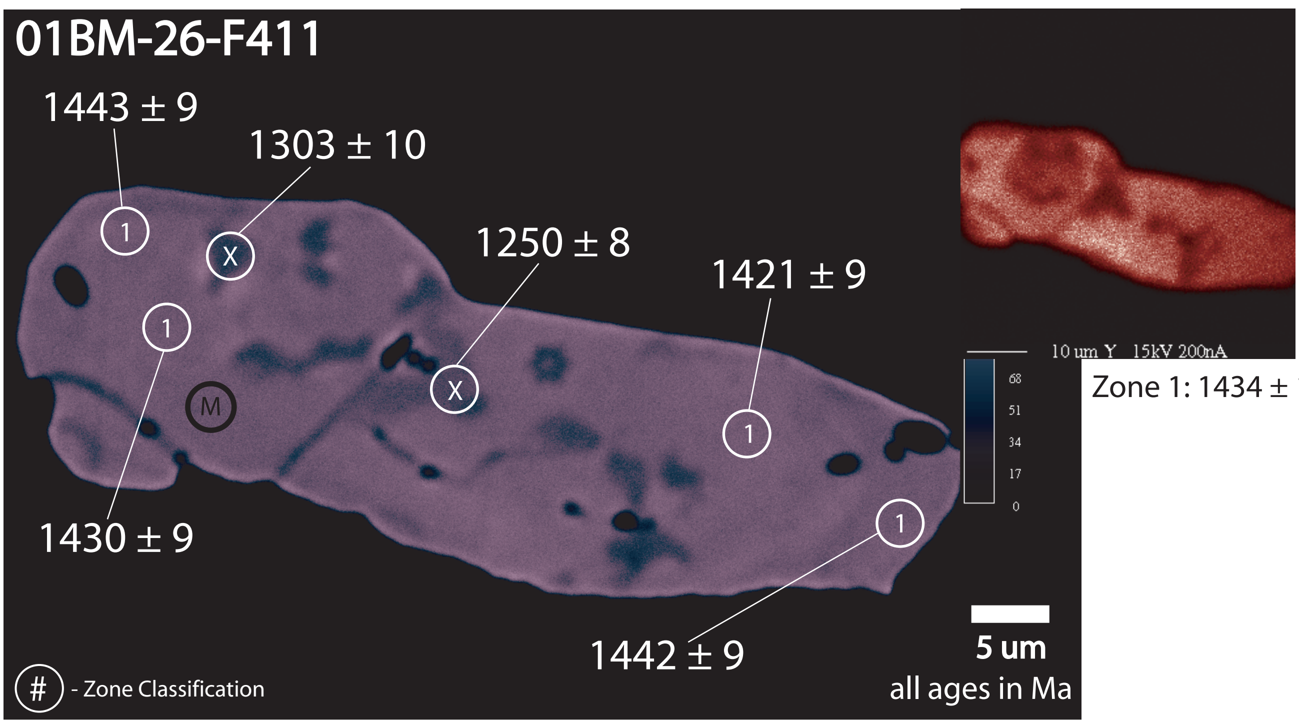




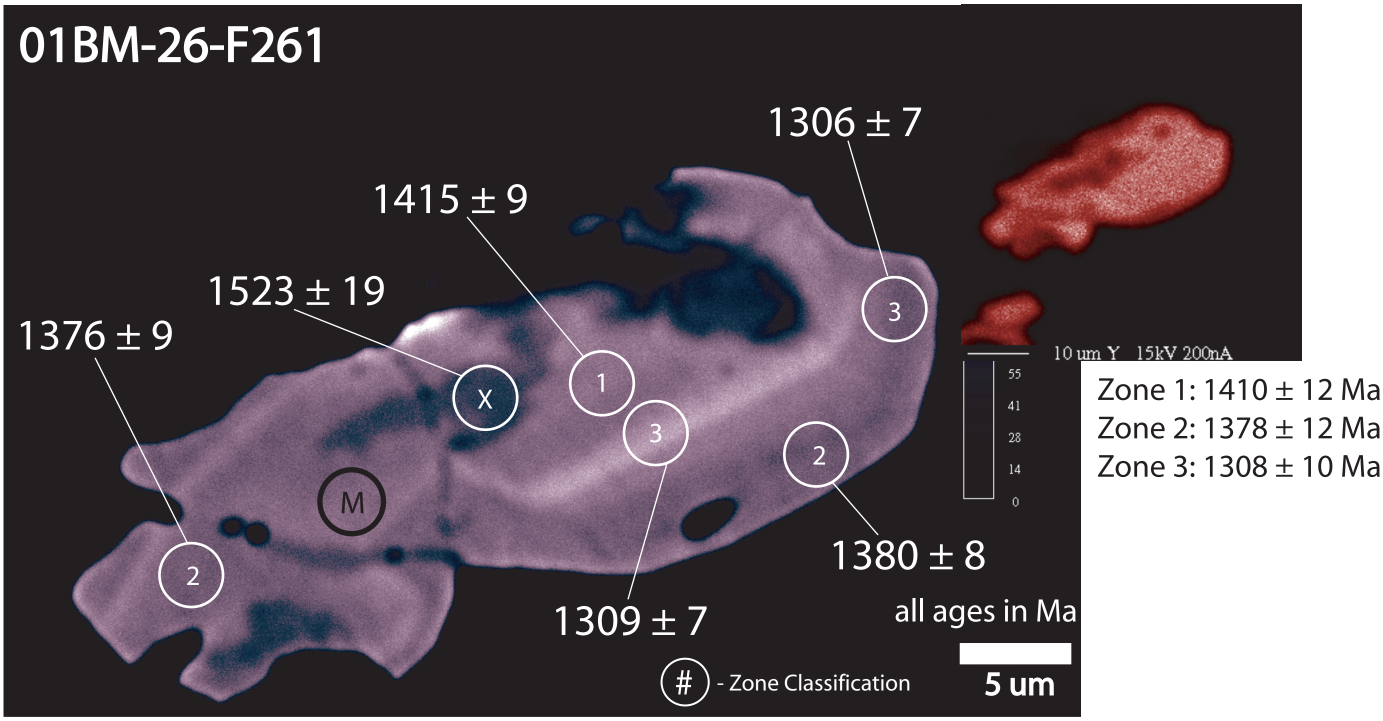
Zone 1: 1756 ± 49 Ma
Zone 2: 1470 ± 11 Ma

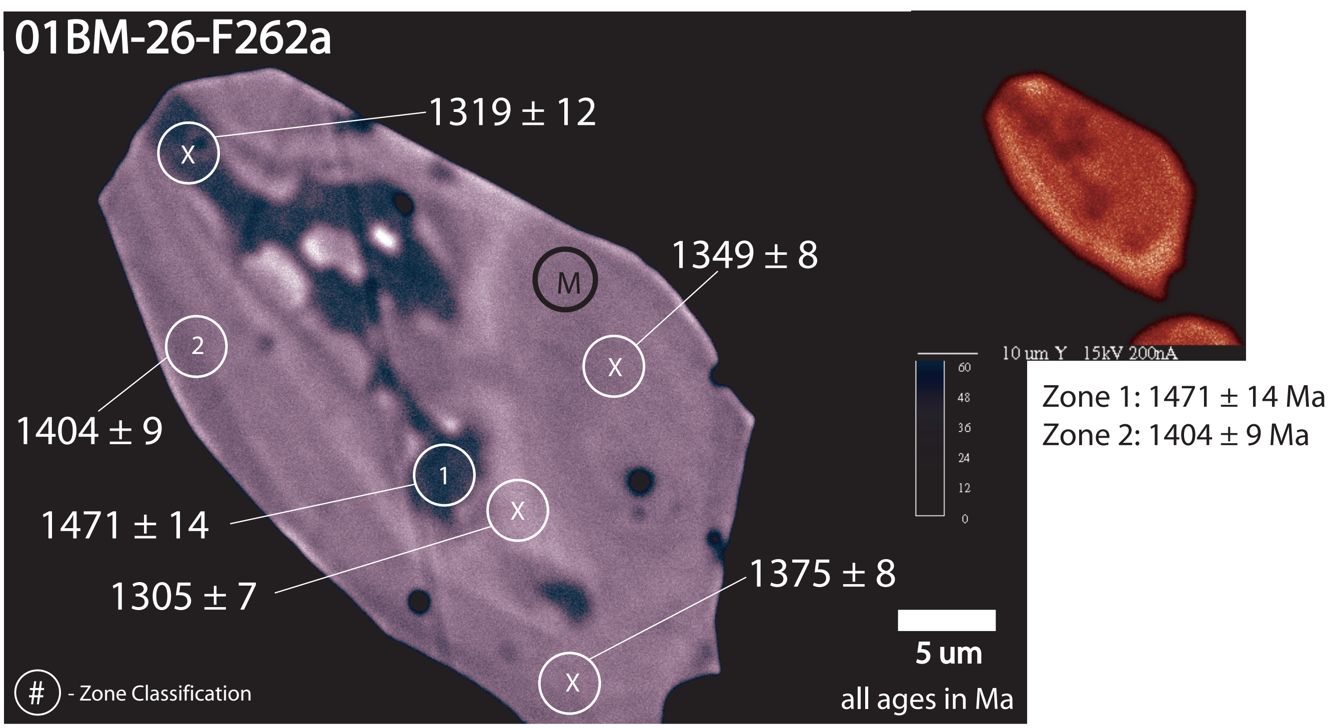


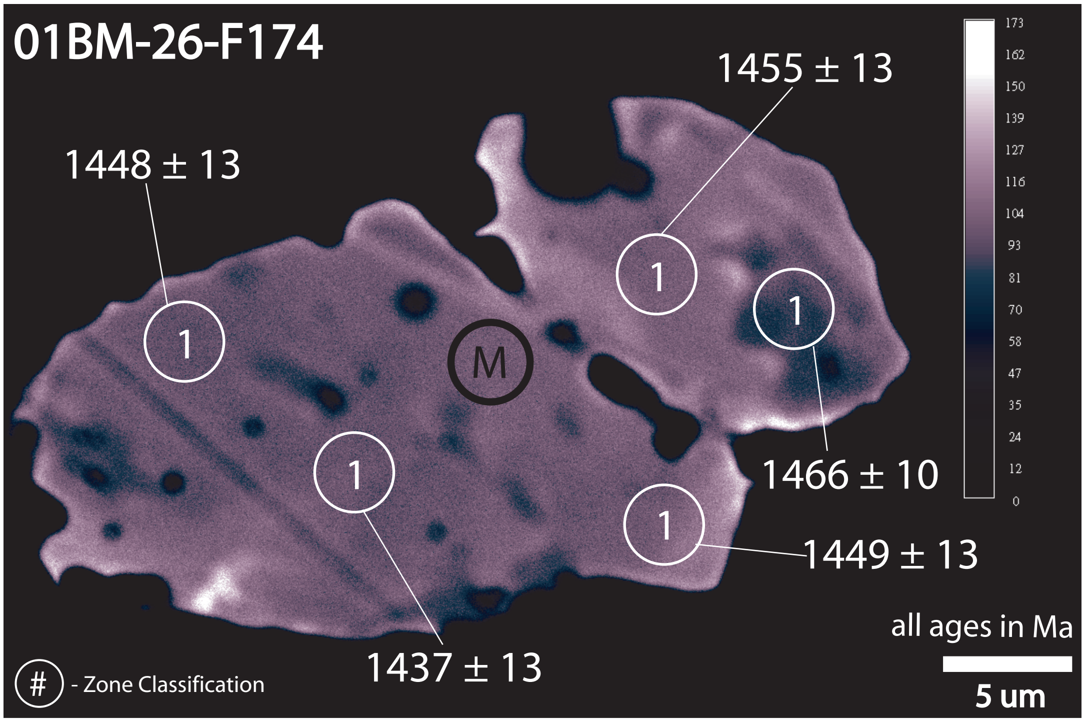
No consistent ages



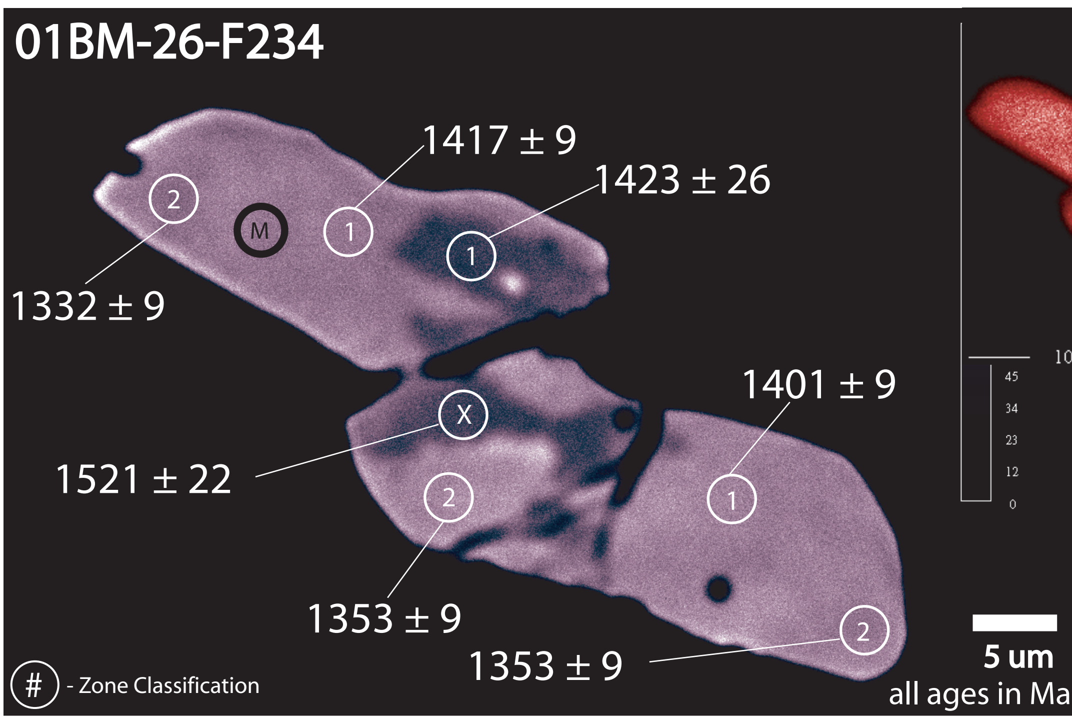
Zone 1: 1434 ± 17 Ma

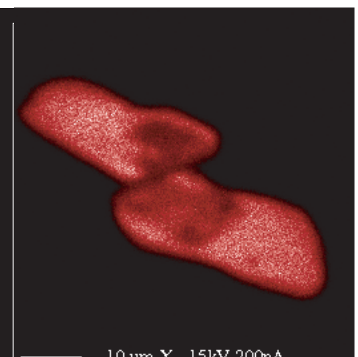

01BM-26-F261
1306 ± 7
1415 ± 9
1523 ± 19
1376 ± 9
X
1
3
3
2
M
2
1380 ± 8
1309 ± 7
10 um Y 15kV 200nA
55
41
28
14
0
Zone 1: 1410 ± 12 Ma
Zone 2: 1378 ± 12 Ma
Zone 3: 1308 ± 10 Ma
all ages in Ma
5 um
- Zone Classification


01BM-26-F262a
1319 ± 12
X
1349 ± 8
M
2
X
1404 ± 9
1
1471 ± 14
X
1305 ± 7
1375 ± 8
X
10 um Y 15kV 200nA
60
48
36
24
12
0
Zone 1: 1471 ± 14 Ma
Zone 2: 1404 ± 9 Ma
5 um
all ages in Ma
- Zone Classification

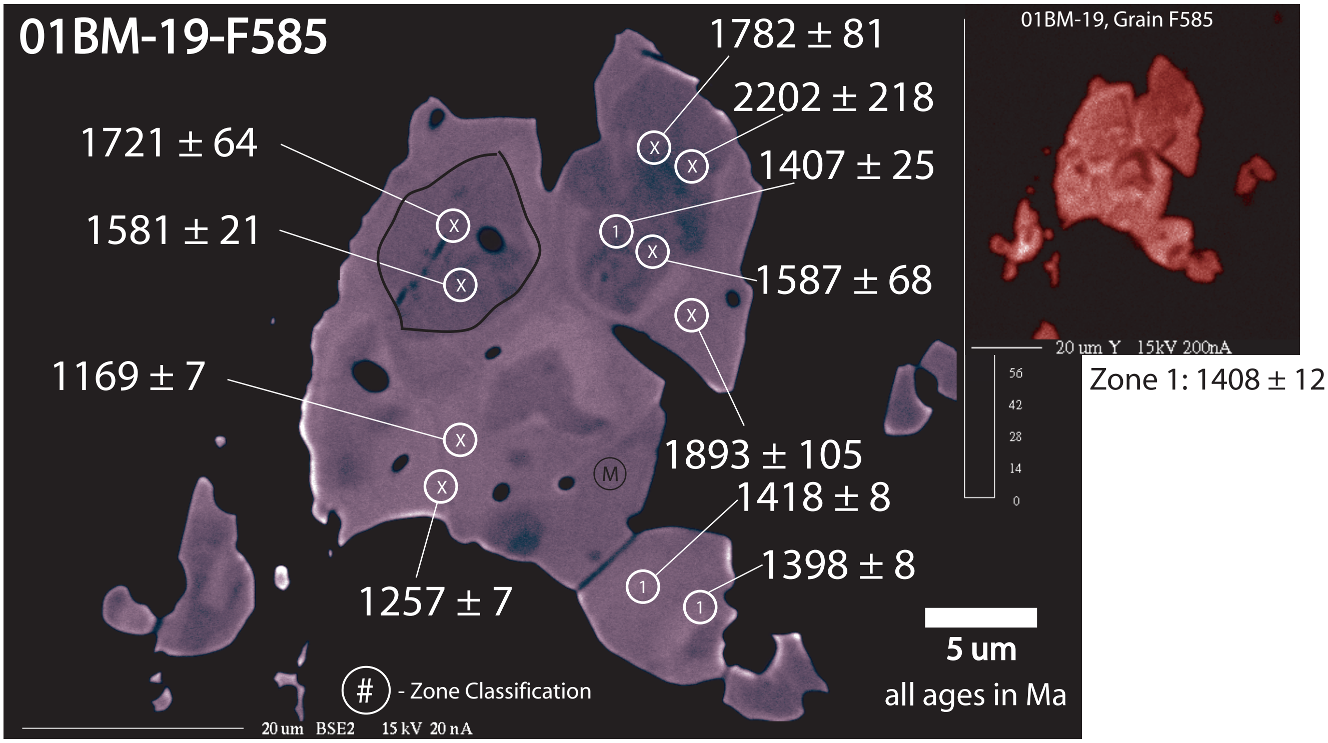


No chemical map.
Zone 1: 1453 ± 11 Ma

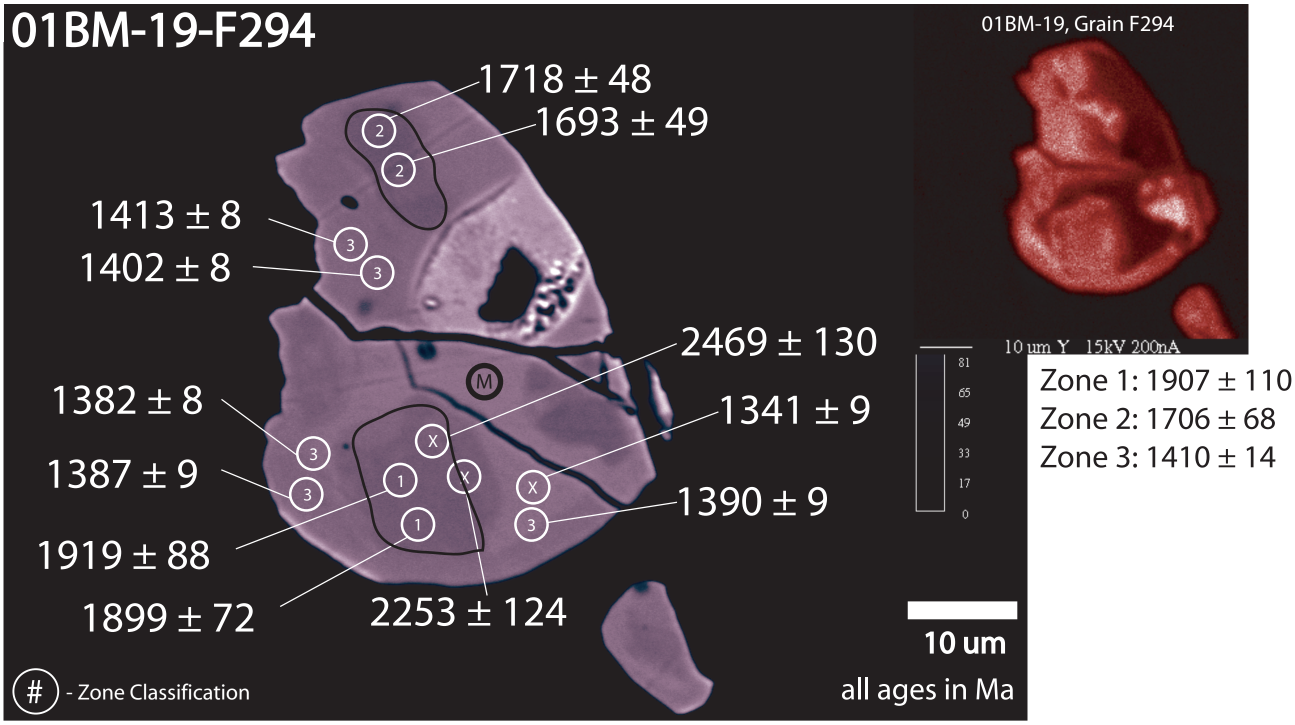


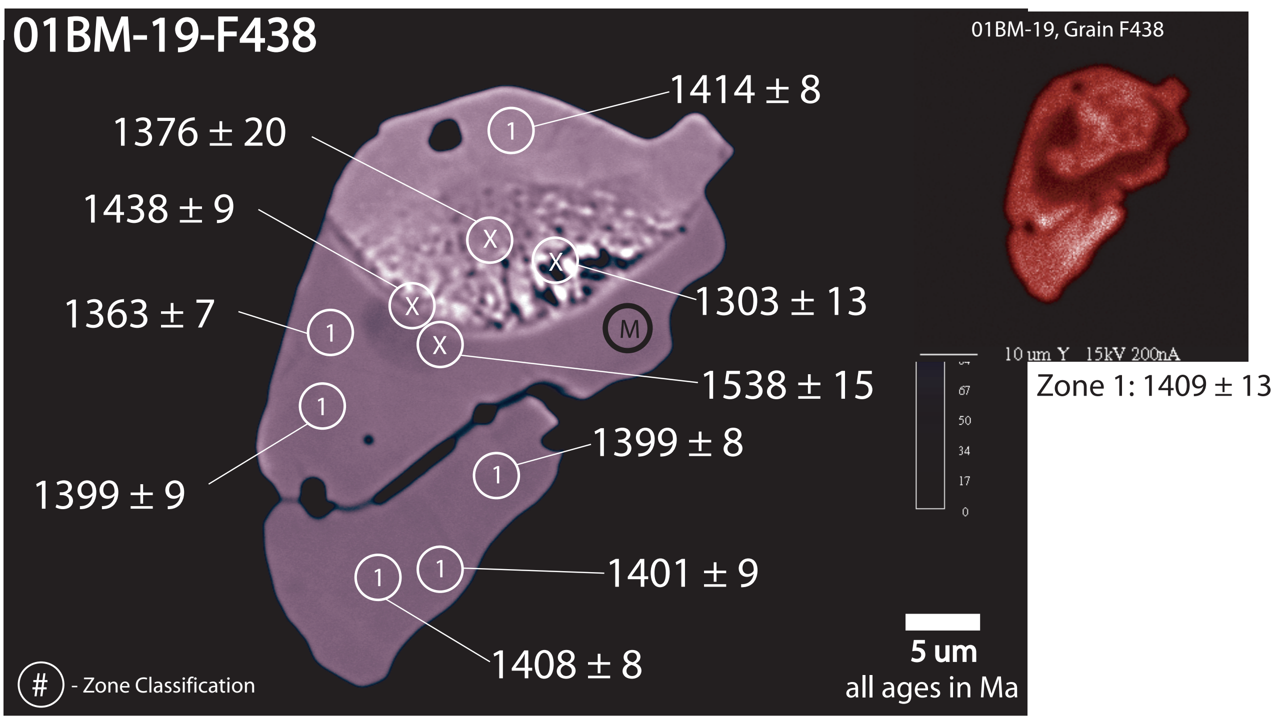


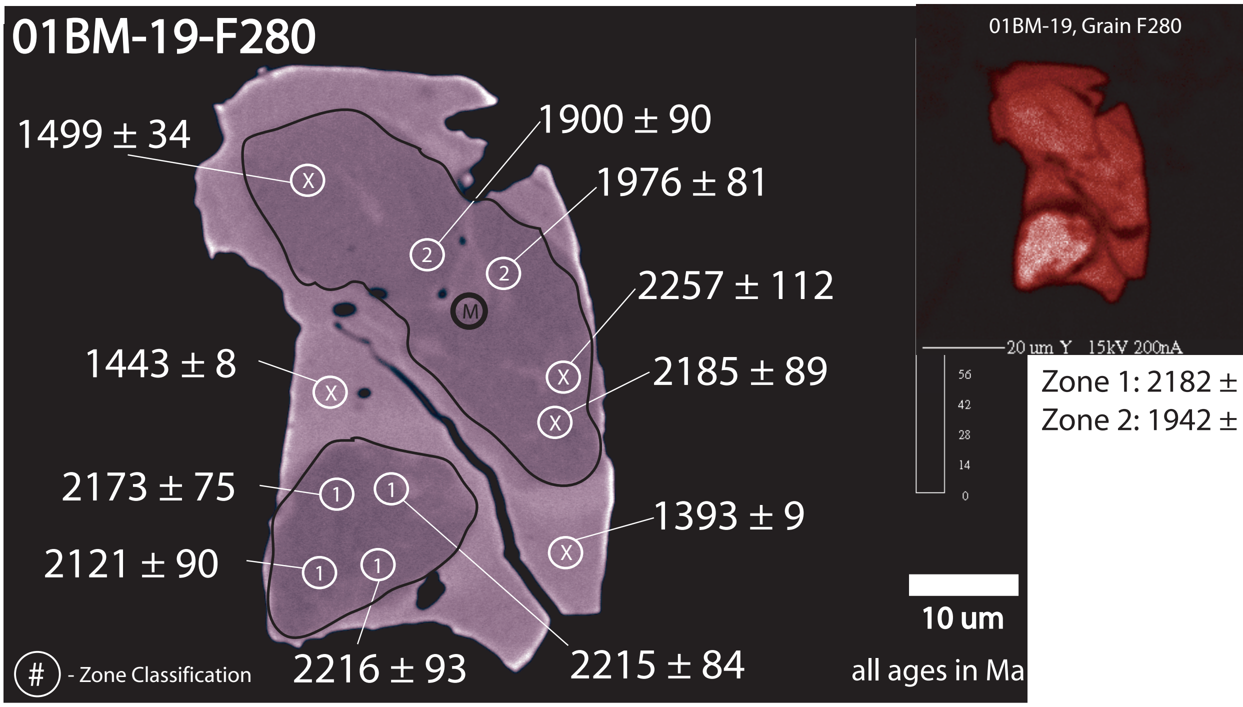
Zone 1: 1410 ± 12 Ma
Zone 2: 1346 ± 31 Ma



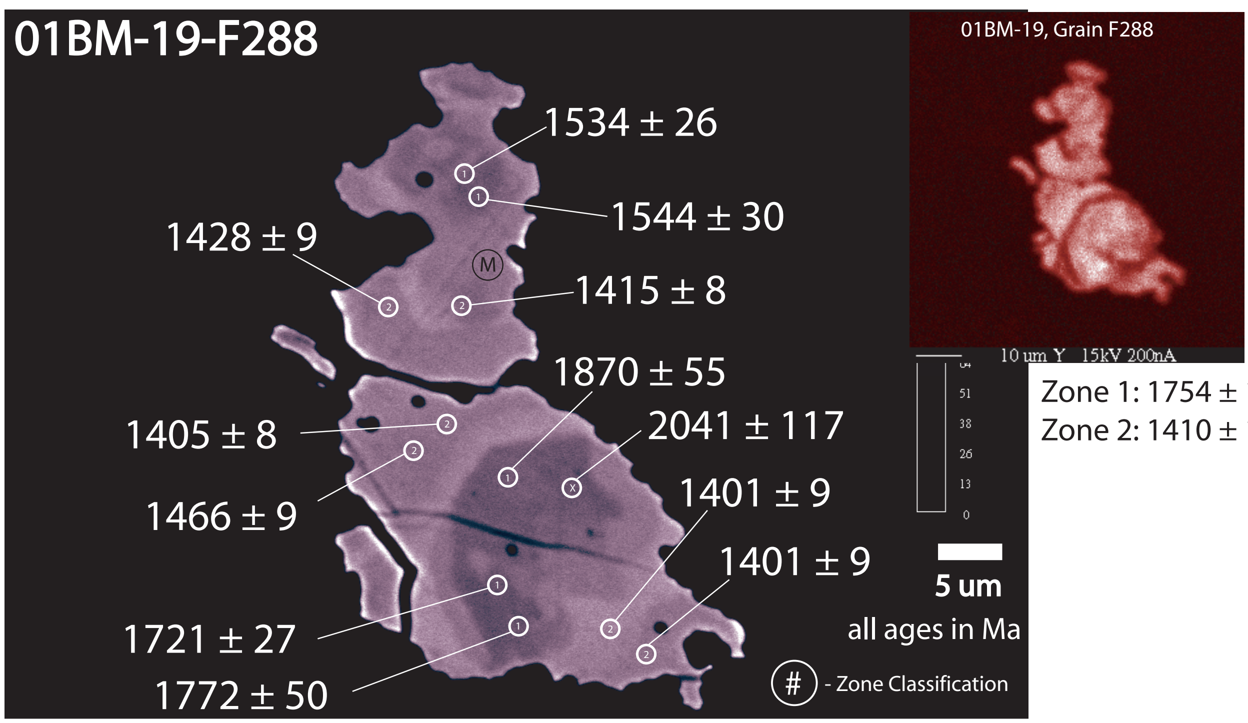
01BM-19-F585
1782 ± 81
2202 ± 218
1721 ± 64
1407 ± 25
1581 ± 21
1587 ± 68
1169 ± 7
1893 ± 105
1418 ± 8
1398 ± 8
1257 ± 7
5 um
all ages in Ma
- Zone Classification
20 um BSE2 15 kV 20 nA
01BM-19, Grain F585
20 um Y 15kV 200nA
56
42
28
14
0
Zone 1: 1408 ± 12


01BM-19-F294
01BM-19, Grain F294
1718 ± 48
1693 ± 49
1413 ± 8
1402 ± 8
2469 ± 130
1382 ± 8
1341 ± 9
1387 ± 9
1390 ± 9
1919 ± 88
1899 ± 72
2253 ± 124
10 um
all ages in Ma
- Zone Classification
10 um Y 15kV 200nA
Zone 1: 1907 ± 110
Zone 2: 1706 ± 68
Zone 3: 1410 ± 14

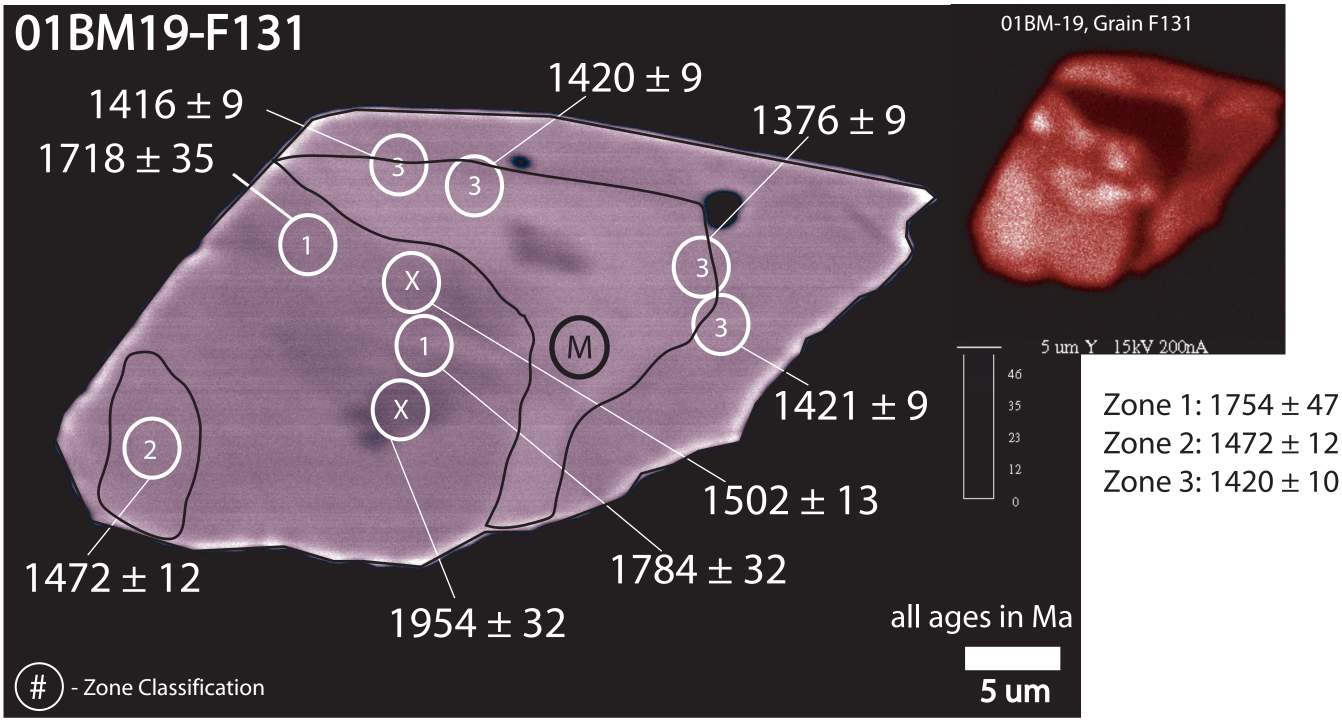

01BM-19-F438
01BM-19, Grain F438
1414 ± 8
1376 ± 20
1438 ± 9
1303 ± 13
1363 ± 7
1538 ± 15
1399 ± 8
1399 ± 9
1401 ± 9
1408 ± 8
5 um
all ages in Ma
- Zone Classification
10 um Y 15kV 200nA
Zone 1: 1409 ± 13



Zone 1: 2182 ± 85 Ma
Zone 2: 1942 ± 120 Ma



Zone 1: 1754 ± 160
Zone 2: 1410 ± 14


01BM19-F131
1416 ± 9
1420 ± 9
1376 ± 9
1718 ± 35
1421 ± 9
1502 ± 13
1472 ± 12
1784 ± 32
1954 ± 32
all ages in Ma
5 um
- Zone Classification
01BM-19, Grain F131
5 um Y 15kV 200nA
Zone 1: 1754 ± 47
Zone 2: 1472 ± 12
Zone 3: 1420 ± 10

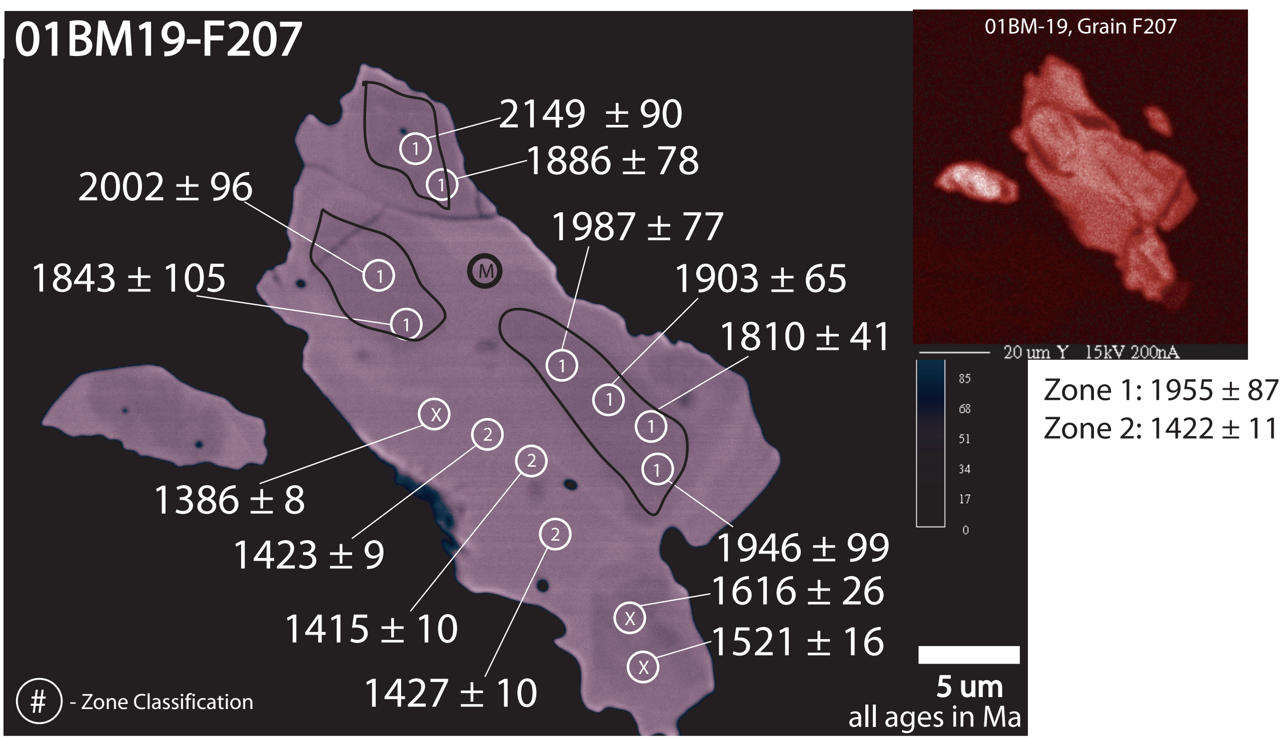

01BM19-F207
2149 ± 90
1886 ± 78
2002 ± 96
1987 ± 77
1843 ± 105
1903 ± 65
1810 ± 41
1386 ± 8
1423 ± 9
1946 ± 99
1616 ± 26
1415 ± 10
1521 ± 16
1427 ± 10
- Zone Classification
5 um
all ages in Ma
01BM-19, Grain F207
20 um Y 15kV 200nA
Zone 1: 1955 ± 87
Zone 2: 1422 ± 11

Table DR3: Monazite Electron Microprobe Data

Sample	Grain	Analysis	Age (Ma)	± 1s (Ma)	Y (wt.%)	± (1s)	Th (wt.%)	± (1s)	U (wt.%)	± (1s)	Pb (wt.%)	± (1s)
01BM19	F131	3A	1376	9	0.9290	0.0021	4.1589	0.0141	0.4964	0.0050	0.3748	0.0022
01BM19	F131	4B	1416	9	0.6826	0.0021	4.6359	0.0194	0.4588	0.0049	0.4086	0.0022
01BM19	F131	4A	1420	9	0.6784	0.0019	4.2632	0.0144	0.4563	0.0050	0.3847	0.0022
01BM19	F131	3B	1421	9	0.5325	0.0019	4.5524	0.0191	0.4121	0.0048	0.3936	0.0022
01BM19	F131	5B	1472	12	1.8276	0.0038	2.8885	0.0136	0.3294	0.0046	0.2783	0.0020
01BM19	F131	2A	1502	13	1.6697	0.0028	2.4316	0.0104	0.3275	0.0047	0.2520	0.0020
01BM19	F131	2B	1718	35	1.8409	0.0038	0.4756	0.0060	0.1803	0.0042	0.0935	0.0017
01BM19	F131	1A	1784	32	1.6958	0.0028	0.4707	0.0060	0.2277	0.0044	0.1113	0.0017
01BM19	F131	1B	1955	32	1.8863	0.0039	1.0440	0.0080	0.1226	0.0044	0.1403	0.0018
01BM19	F207	6B	1386	8	1.7160	0.0036	3.6884	0.0163	1.0118	0.0059	0.4651	0.0023
01BM19	F207	7A	1415	10	1.6048	0.0027	3.5703	0.0129	0.5158	0.0050	0.3537	0.0022
01BM19	F207	6A	1423	9	1.8632	0.0030	3.7027	0.0132	0.6359	0.0053	0.3929	0.0022
01BM19	F207	7B	1427	10	1.6258	0.0035	3.8127	0.0166	0.4409	0.0048	0.3554	0.0021
01BM19	F207	1B	1521	16	1.3087	0.0030	0.5348	0.0062	0.5931	0.0049	0.1885	0.0018
01BM19	F207	1A	1616	26	1.3657	0.0025	0.3517	0.0057	0.3269	0.0045	0.1168	0.0017
01BM19	F207	2B	1810	41	2.0069	0.0040	0.5322	0.0062	0.1262	0.0041	0.0874	0.0017
01BM19	F207	4A	1843	105	1.8839	0.0029	0.2537	0.0055	0.0385	0.0041	0.0373	0.0016
01BM19	F207	5A	1886	78	1.9401	0.0030	0.3310	0.0057	0.0560	0.0042	0.0508	0.0017
01BM19	F207	3A	1903	65	1.8843	0.0029	0.4669	0.0060	0.0518	0.0041	0.0618	0.0017
01BM19	F207	2A	1946	99	1.7292	0.0028	0.2456	0.0055	0.0472	0.0041	0.0414	0.0016
01BM19	F207	3B	1987	77	1.8900	0.0038	0.3600	0.0057	0.0492	0.0040	0.0539	0.0016
01BM19	F207	4B	2002	96	1.9262	0.0039	0.2321	0.0053	0.0516	0.0040	0.0433	0.0016
01BM19	F207	5B	2149	90	2.2080	0.0043	0.2332	0.0053	0.0592	0.0040	0.0503	0.0016
01BM19	F280	6B	1143	8	1.8706	0.0038	4.0800	0.0176	0.6608	0.0053	0.3351	0.0021
01BM19	F280	7B	1394	9	0.6222	0.0020	4.8535	0.0201	0.4135	0.0048	0.4053	0.0022
01BM19	F280	5B	1499	34	2.1318	0.0042	0.4097	0.0059	0.1972	0.0042	0.0807	0.0016
01BM19	F280	4B	1900	90	2.1053	0.0042	0.1390	0.0051	0.0769	0.0040	0.0414	0.0016
01BM19	F280	4A	1976	81	2.1844	0.0032	0.1173	0.0052	0.0990	0.0042	0.0490	0.0016
01BM19	F280	1B	2121	90	2.2741	0.0044	0.1158	0.0050	0.0838	0.0041	0.0474	0.0016
01BM19	F280	2B	2173	75	2.4676	0.0047	0.0762	0.0050	0.1158	0.0041	0.0576	0.0016
01BM19	F280	3B	2185	89	2.1187	0.0042	0.1073	0.0050	0.0866	0.0040	0.0490	0.0016
01BM19	F280	2A	2215	84	2.6182	0.0036	0.1553	0.0053	0.0894	0.0042	0.0568	0.0017
01BM19	F280	1A	2216	93	2.5607	0.0036	0.0540	0.0051	0.0971	0.0042	0.0493	0.0017
01BM19	F280	3A	2257	112	2.0154	0.0031	0.0773	0.0051	0.0737	0.0041	0.0422	0.0016
01BM19	F288	5A	1401	9	0.9822	0.0022	3.9194	0.0136	0.4803	0.0050	0.3633	0.0022
01BM19	F288	5B	1402	9	1.4409	0.0033	4.5706	0.0192	0.5770	0.0051	0.4282	0.0022
01BM19	F288	6A	1405	8	1.7191	0.0028	3.5491	0.0129	0.8217	0.0056	0.4197	0.0023
01BM19	F288	4A	1415	8	2.0499	0.0031	4.1694	0.0142	0.7720	0.0056	0.4523	0.0024
01BM19	F288	4B	1429	9	1.0402	0.0026	4.2877	0.0182	0.4533	0.0048	0.3890	0.0022
01BM19	F288	6B	1466	9	1.7223	0.0036	4.1264	0.0177	0.7301	0.0054	0.4566	0.0023
01BM19	F288	3B	1535	26	1.4817	0.0032	0.7380	0.0067	0.2282	0.0043	0.1127	0.0017
01BM19	F288	3A	1544	30	1.5239	0.0026	0.6806	0.0065	0.1945	0.0044	0.1008	0.0017
01BM19	F288	2B	1721	27	1.1187	0.0027	1.2128	0.0081	0.1118	0.0041	0.1312	0.0017
01BM19	F288	2A	1772	50	1.9995	0.0031	0.2467	0.0055	0.1492	0.0043	0.0689	0.0017
01BM19	F288	1B	1871	55	2.0586	0.0041	0.1280	0.0051	0.1510	0.0041	0.0636	0.0016
01BM19	F288	1A	2041	117	1.5755	0.0027	0.0975	0.0052	0.0645	0.0041	0.0354	0.0016
01BM19	F294	6A	1341	9	0.6339	0.0019	4.6177	0.0151	0.3812	0.0049	0.3676	0.0022
01BM19	F294	5A	1382	8	1.8888	0.0030	4.2351	0.0144	0.7189	0.0055	0.4330	0.0023
01BM19	F294	5B	1388	9	0.9002	0.0024	4.6554	0.0194	0.4589	0.0049	0.4015	0.0022
01BM19	F294	6B	1390	9	0.3089	0.0016	4.8231	0.0200	0.3185	0.0046	0.3802	0.0021
01BM19	F294	4A	1402	8	2.0452	0.0031	4.1424	0.0142	0.6921	0.0054	0.4280	0.0023
01BM19	F294	4B	1413	8	1.8663	0.0038	5.0168	0.0207	0.6613	0.0053	0.4810	0.0023
01BM19	F294	3A	1693	49	2.0366	0.0031	0.4559	0.0060	0.1052	0.0042	0.0694	0.0017
01BM19	F294	3B	1719	48	1.9942	0.0040	0.2697	0.0054	0.1464	0.0041	0.0676	0.0016
01BM19	F294	1B	1899	72	1.6200	0.0034	0.1178	0.0051	0.1096	0.0041	0.0494	0.0016
01BM19	F294	2A	1919	88	1.4426	0.0025	0.1993	0.0054	0.0702	0.0042	0.0438	0.0016
01BM19	F294	1A	2253	124	1.6638	0.0027	0.0959	0.0051	0.0607	0.0041	0.0381	0.0016
01BM19	F294	2B	2470	131	1.8161	0.0037	0.0701	0.0049	0.0601	0.0040	0.0395	0.0016
01BM19	F438	2A	1303	13	1.8108	0.0029	2.1534	0.0099	0.3566	0.0047	0.2063	0.0019
01BM19	F438	3A	1363	7	1.4744	0.0026	4.1984	0.0143	1.0631	0.0061	0.4993	0.0024
01BM19	F438	2B	1376	20	1.9056	0.0039	1.3370	0.0086	0.2169	0.0043	0.1362	0.0018
01BM19	F438	3B	1399	9	0.7205	0.0022	5.2071	0.0213	0.4238	0.0048	0.4321	0.0022
01BM19	F438	5B	1399	8	2.2432	0.0044	3.9700	0.0172	1.0777	0.0061	0.5039	0.0024

01BM19	F438	4A	1401	9	1.6352	0.0028	4.2124	0.0143	0.5990	0.0052	0.4102	0.0023
01BM19	F438	4B	1408	8	2.0193	0.0041	3.9302	0.0171	0.9002	0.0057	0.4639	0.0023
01BM19	F438	6B	1414	8	2.1056	0.0042	4.3390	0.0184	0.7506	0.0055	0.4584	0.0023
01BM19	F438	1B	1434	9	1.0894	0.0027	5.3797	0.0219	0.3817	0.0048	0.4459	0.0023
01BM19	F438	1A	1538	15	1.5128	0.0026	1.5509	0.0085	0.4487	0.0048	0.2266	0.0019
01BM19	F585	4B	1169	7	1.5223	0.0033	3.6129	0.0160	1.3526	0.0066	0.4453	0.0023
01BM19	F585	4B	1257	7	1.5631	0.0027	3.4584	0.0127	1.0637	0.0061	0.4149	0.0023
01BM19	F585	5A	1398	8	1.8720	0.0030	3.4556	0.0127	0.8514	0.0057	0.4184	0.0023
01BM19	F585	2B	1407	25	1.3059	0.0029	0.6134	0.0063	0.2569	0.0043	0.1007	0.0017
01BM19	F585	5B	1418	8	1.9626	0.0040	3.3895	0.0153	0.9054	0.0057	0.4331	0.0022
01BM19	F585	1B	1582	21	1.4851	0.0032	0.3362	0.0056	0.4423	0.0046	0.1434	0.0017
01BM19	F585	2A	1587	63	1.4081	0.0025	0.1711	0.0053	0.1196	0.0042	0.0466	0.0016
01BM19	F585	1A	1721	64	1.6017	0.0027	0.3001	0.0056	0.0880	0.0042	0.0524	0.0016
01BM19	F585	3B	1783	81	1.2139	0.0028	0.0894	0.0049	0.0984	0.0040	0.0395	0.0016
01BM19	F585	6B	1894	105	1.4563	0.0032	0.1999	0.0052	0.0478	0.0040	0.0359	0.0016
01BM19	F585	3A	2202	218	1.0998	0.0022	0.0395	0.0049	0.0372	0.0041	0.0209	0.0016
01BM26	F234	1	1332	9	2.0497	0.0039	5.8026	0.0224	0.2689	0.0047	0.4157	0.0023
01BM26	F234	2	1417	9	2.1749	0.0041	6.2892	0.0240	0.2651	0.0047	0.4746	0.0024
01BM26	F234	3	1423	27	0.9808	0.0022	1.2059	0.0073	0.0853	0.0040	0.1004	0.0017
01BM26	F234	4	1521	22	1.4812	0.0030	1.5103	0.0083	0.1299	0.0042	0.1411	0.0017
01BM26	F234	5	1353	9	1.9767	0.0038	6.1757	0.0236	0.2235	0.0046	0.4358	0.0023
01BM26	F234	6	1401	9	2.0883	0.0039	5.7706	0.0222	0.2096	0.0046	0.4227	0.0023
01BM26	F234	7	1354	9	1.9736	0.0038	5.5605	0.0215	0.2332	0.0046	0.3998	0.0022
01BM26	F441	1	1443	9	2.1326	0.0040	6.3807	0.0243	0.2778	0.0047	0.4927	0.0024
01BM26	F441	2	1430	9	2.0817	0.0039	6.3274	0.0241	0.2131	0.0046	0.4694	0.0024
01BM26	F441	3	1303	10	1.3445	0.0028	4.2473	0.0172	0.1969	0.0044	0.2972	0.0020
01BM26	F441	4	1250	8	1.4262	0.0029	5.6005	0.0217	0.5356	0.0051	0.4296	0.0023
01BM26	F441	5	1421	9	2.0348	0.0039	6.3503	0.0242	0.2571	0.0047	0.4777	0.0024
01BM26	F441	6	1442	9	1.9160	0.0037	5.8203	0.0224	0.2222	0.0046	0.4415	0.0023
01BM26	F261	1	1523	20	1.1648	0.0025	1.4516	0.0081	0.1957	0.0043	0.1531	0.0017
01BM26	F261	2	1415	9	2.0088	0.0038	6.7078	0.0254	0.2241	0.0047	0.4914	0.0024
01BM26	F261	3	1309	7	2.1021	0.0040	8.7650	0.0323	0.3204	0.0050	0.5970	0.0026
01BM26	F261	4	1380	8	2.0441	0.0039	6.4411	0.0245	0.2984	0.0048	0.4784	0.0024
01BM26	F261	5	1306	7	2.1347	0.0040	9.0712	0.0333	0.3800	0.0051	0.6263	0.0027
01BM26	F261	6	1376	9	1.8773	0.0036	6.2718	0.0239	0.2425	0.0047	0.4535	0.0023
01BM26	F262a	1	1404	9	2.1501	0.0040	6.5977	0.0250	0.2429	0.0047	0.4848	0.0024
01BM26	F262a	2	1375	8	2.1347	0.0040	6.9299	0.0261	0.2464	0.0047	0.4961	0.0024
01BM26	F262a	3	1349	8	1.8073	0.0035	6.5559	0.0249	0.2179	0.0046	0.4563	0.0023
01BM26	F262a	4	1305	7	1.8279	0.0036	8.6846	0.0320	0.2536	0.0048	0.5755	0.0026
01BM26	F262a	5	1470	11	1.4826	0.0030	3.1449	0.0135	0.3437	0.0046	0.2982	0.0020
01BM26	F262a	6	1319	11	1.3414	0.0028	3.1547	0.0136	0.2789	0.0045	0.2522	0.0019
01BM26	F262b	1	1496	14	1.2946	0.0027	3.1017	0.0134	0.1383	0.0043	0.2500	0.0019
01BM26	F262b	2	1298	7	1.8978	0.0037	9.2820	0.0340	0.2818	0.0049	0.6139	0.0027
01BM26	F262b	3	1356	8	2.0422	0.0039	6.2611	0.0239	0.3187	0.0048	0.4629	0.0024
01BM26	F262b	4	1307	8	2.0014	0.0038	6.8603	0.0259	0.2850	0.0048	0.4743	0.0024
01BM26	F174	1	1448	13	1.7424	0.0034	3.2803	0.0140	0.1126	0.0043	0.2482	0.0019
01BM26	F174	2	1449	13	1.6342	0.0032	3.3636	0.0143	0.1347	0.0043	0.2589	0.0019
01BM26	F174	3	1466	10	1.2280	0.0026	3.4185	0.0144	0.5574	0.0050	0.3664	0.0021
01BM26	F174	4	1455	13	1.6160	0.0032	3.3142	0.0141	0.1192	0.0043	0.2531	0.0019
01BM26	F174	5	1437	13	1.6320	0.0032	3.3706	0.0143	0.1230	0.0043	0.2544	0.0019
01BM33	F105	3	2284	79	2.7459	0.0050	0.1055	0.0043	0.1015	0.0041	0.0588	0.0016
01BM33	F105	4	2191	69	2.4216	0.0044	0.0811	0.0043	0.1252	0.0041	0.0623	0.0016
01BM33	F105	2	2155	87	2.2983	0.0042	0.0569	0.0042	0.0991	0.0041	0.0483	0.0016
01BM33	F105	1	1829	34	2.8438	0.0051	0.2097	0.0046	0.2528	0.0043	0.1023	0.0017
01BM33	F105	7	1478	11	2.1179	0.0040	3.3885	0.0144	0.3365	0.0046	0.3157	0.0021
01BM33	F105	5	1474	11	1.9479	0.0037	3.4003	0.0144	0.4265	0.0048	0.3372	0.0021
01BM33	F105	6	1467	13	1.3430	0.0028	2.1283	0.0102	0.4111	0.0047	0.2448	0.0019
01BM33	F113	3	1481	9	1.3570	0.0028	4.5929	0.0183	0.4530	0.0049	0.4256	0.0023
01BM33	F113	1	1474	10	2.0821	0.0039	3.4640	0.0146	0.5187	0.0050	0.3639	0.0021
01BM33	F113	2	1455	10	1.9342	0.0037	3.5596	0.0149	0.4440	0.0048	0.3472	0.0021
01BM33	F113	4	1446	9	0.8771	0.0021	4.4029	0.0177	0.5884	0.0051	0.4333	0.0023
01BM33	F114	3	1483	10	1.8748	0.0036	3.2604	0.0139	0.5033	0.0049	0.3482	0.0021
01BM33	F114	1	1478	10	1.6336	0.0032	4.6053	0.0184	0.3026	0.0046	0.3895	0.0022
01BM33	F114	4	1474	11	1.8926	0.0036	3.3303	0.0141	0.3972	0.0047	0.3251	0.0021

01BM33	F114	2	1450	9	1.0953	0.0024	3.7466	0.0155	0.5803	0.0051	0.3891	0.0022
01BM33	F115	2	1633	22	2.0241	0.0038	1.0600	0.0069	0.2462	0.0043	0.1508	0.0017
01BM33	F115	5	1507	13	2.0496	0.0039	2.5778	0.0117	0.3152	0.0046	0.2607	0.0019
01BM33	F115	1	1476	10	1.5405	0.0031	3.5059	0.0147	0.5515	0.0050	0.3742	0.0021
01BM33	F115	3	1470	9	1.6914	0.0033	3.6107	0.0151	0.5807	0.0051	0.3869	0.0022
01BM33	F115	4	1434	11	1.8866	0.0036	3.0364	0.0132	0.4297	0.0047	0.3039	0.0020
01BM33	F21	3	1483	10	2.3005	0.0043	3.9353	0.0162	0.4845	0.0049	0.3907	0.0022
01BM33	F21	1	1475	10	2.2491	0.0042	3.8026	0.0157	0.4580	0.0049	0.3728	0.0022
01BM33	F21	2	1268	21	1.4397	0.0029	1.1555	0.0072	0.2123	0.0043	0.1127	0.0017
01BM33	F22	2	1761	35	2.4980	0.0046	0.3648	0.0050	0.2058	0.0043	0.0959	0.0017
01BM33	F22	1	1751	36	2.4457	0.0045	0.3760	0.0050	0.1940	0.0042	0.0926	0.0017
01BM33	F22	5	1477	11	2.1301	0.0040	3.4976	0.0147	0.3928	0.0047	0.3366	0.0021
01BM33	F22	4	1475	10	1.9601	0.0037	3.3360	0.0142	0.6040	0.0051	0.3760	0.0022
01BM33	F22	3	1457	10	2.1156	0.0040	3.6282	0.0152	0.4562	0.0049	0.3556	0.0021
01BM33	F58	1	1845	46	2.3731	0.0044	0.2892	0.0048	0.1510	0.0042	0.0770	0.0016
01BM33	F58	5	1751	46	2.4457	0.0037	0.3760	0.0149	0.1940	0.0045	0.0926	0.0020
01BM33	F58	2	1728	33	2.9682	0.0053	0.3402	0.0049	0.2322	0.0043	0.1005	0.0017
01BM33	F58	6	1679	31	1.8821	0.0036	0.4855	0.0053	0.2167	0.0043	0.1023	0.0017
01BM33	F58	3	1436	9	1.5738	0.0031	3.8488	0.0159	0.5569	0.0050	0.3872	0.0022
01BM33	F58	4	1429	10	1.9333	0.0037	3.7181	0.0154	0.3421	0.0046	0.3273	0.0021
01BM34	F166a	1	1361	16	1.5181	0.0033	1.8919	0.0112	0.2592	0.0044	0.1779	0.0018
01BM34	F166a	2	1285	11	1.4619	0.0032	2.7843	0.0136	0.4152	0.0047	0.2518	0.0019
01BM34	F166a	3	1358	10	1.6882	0.0036	4.0710	0.0171	0.2445	0.0045	0.3102	0.0020
01BM34	F166a	4	1438	11	2.0529	0.0041	4.0969	0.0173	0.1672	0.0044	0.3137	0.0021
01BM34	F166a	5	1458	12	2.0457	0.0041	3.8290	0.0165	0.1400	0.0043	0.2938	0.0020
01BM34	F166a	6	1436	10	1.5012	0.0033	4.0468	0.0171	0.3074	0.0046	0.3419	0.0021
01BM34	F304	1	1412	12	2.0303	0.0041	3.8032	0.0164	0.1431	0.0043	0.2832	0.0020
01BM34	F304	2	1462	11	1.7754	0.0037	3.9778	0.0169	0.2630	0.0045	0.3337	0.0021
01BM34	F304	3	1338	11	1.3272	0.0030	2.5313	0.0130	0.5108	0.0048	0.2677	0.0019
01BM34	F304	4	1432	10	1.7184	0.0036	4.1176	0.0173	0.3951	0.0047	0.3662	0.0021
01BM34	F304	5	1303	10	1.4029	0.0031	3.6498	0.0160	0.4128	0.0047	0.3068	0.0020
01BM34	F363	1	1394	17	1.2132	0.0028	1.5006	0.0101	0.2668	0.0044	0.1586	0.0018
01BM34	F363	2	1409	13	1.5239	0.0033	2.0790	0.0117	0.4137	0.0046	0.2320	0.0019
01BM34	F363	3	1337	10	1.3537	0.0031	4.1913	0.0175	0.3340	0.0046	0.3313	0.0021
01BM34	F363	4	1435	11	2.1845	0.0043	4.1927	0.0175	0.2318	0.0045	0.3348	0.0021
01BM34	F363	5	1391	11	1.3935	0.0031	4.1908	0.0175	0.2177	0.0044	0.3192	0.0021
01BM34	F363	6	1404	10	1.6151	0.0035	4.6071	0.0186	0.2665	0.0045	0.3609	0.0021
01BM34	F363	7	1403	11	1.2998	0.0030	4.2001	0.0175	0.2012	0.0044	0.3188	0.0021
01BM34	F264	1	1418	12	1.4789	0.0032	2.6718	0.0133	0.3671	0.0046	0.2615	0.0019
01BM34	F264	2	1396	9	1.0398	0.0026	5.2950	0.0204	0.3488	0.0047	0.4204	0.0022
01BM34	F264	3	1410	9	1.2400	0.0029	4.6297	0.0187	0.3611	0.0047	0.3849	0.0022
01BM34	F264	4	1407	10	1.7989	0.0037	4.3402	0.0179	0.3904	0.0047	0.3731	0.0022
01BM34	F264	5	1422	9	1.4824	0.0033	5.0930	0.0199	0.4373	0.0048	0.4366	0.0023
01BM34	F264	6	1396	10	1.3029	0.0030	4.2415	0.0176	0.2997	0.0046	0.3422	0.0021
01BM34	F166b	1	1393	14	1.4784	0.0032	2.2455	0.0122	0.3165	0.0045	0.2178	0.0019
01BM34	F166b	2	1211	7	1.5748	0.0034	5.0200	0.0197	0.8822	0.0056	0.4501	0.0023
01BM34	F166b	3	1428	9	1.5561	0.0034	3.6865	0.0161	0.5936	0.0051	0.3827	0.0022
01BM34	F166b	4	1410	9	1.7098	0.0036	4.8758	0.0193	0.3186	0.0047	0.3918	0.0022
01BM34	F166b	5	1400	10	1.5621	0.0034	4.3527	0.0179	0.3020	0.0046	0.3513	0.0021
01BM34	F166b	6	1389	10	1.6696	0.0035	3.8928	0.0167	0.2965	0.0046	0.3181	0.0021
01BM34	F166b	7	1426	11	2.0720	0.0042	3.9599	0.0169	0.2105	0.0044	0.3122	0.0020
01BM37	F101	4	1484	11	3.0161	0.0040	3.0161	0.0143	0.4283	0.0047	0.3138	0.0020
01BM37	F101	3	1460	10	3.4221	0.0043	3.4221	0.0154	0.4886	0.0049	0.3504	0.0021
01BM37	F101	5	1369	10	3.3382	0.0044	3.3382	0.0152	0.5562	0.0050	0.3370	0.0021
01BM37	F244	1	1886	46	0.4562	0.0044	0.4562	0.0072	0.1168	0.0041	0.0822	0.0016
01BM37	F244	2	1457	10	3.4562	0.0042	3.4562	0.0155	0.5735	0.0050	0.3720	0.0021
01BM37	F244	3	1452	10	3.5085	0.0044	3.5085	0.0157	0.5779	0.0050	0.3753	0.0022
01BM37	F33	3	1501	10	3.2654	0.0043	3.2654	0.0150	0.5245	0.0050	0.3590	0.0021
01BM37	F33	2	1471	10	3.0203	0.0043	3.0203	0.0144	0.5454	0.0050	0.3398	0.0021
01BM37	F33	4	1449	10	3.4353	0.0046	3.4353	0.0155	0.5970	0.0051	0.3745	0.0022
01BM37	F33	1	1398	11	2.6962	0.0034	2.6962	0.0134	0.5250	0.0049	0.2951	0.0020
01BM37	F33	5	1468	10	2.1363	0.0043	3.2626	0.0150	0.5369	0.0050	0.3531	0.0021
01BM37	F72	3	1497	10	3.3523	0.0044	3.3523	0.0153	0.5074	0.0049	0.3599	0.0021
01BM37	F72	2	1491	11	2.9082	0.0041	2.9082	0.0140	0.4542	0.0048	0.3146	0.0020

01BM37	F72	4	1486	9	3.7355	0.0046	3.7355	0.0163	0.5967	0.0051	0.4053	0.0022
01BM37	F72	1	1457	10	3.3837	0.0043	3.3837	0.0153	0.4816	0.0049	0.3453	0.0021
01BM37	F72	5	1434	10	3.3403	0.0043	3.3403	0.0152	0.5867	0.0051	0.3612	0.0021

DR4: $^{40}Ar/^{39}Ar$ Methods, Spectra, and Data Tables

$^{40}Ar/^{39}Ar$ METHODS AND AGE CALCULATIONS

Age spectrum incremental heating methods were used to obtain the $^{40}Ar/^{39}Ar$ data. All isotopic data were measured with a MAP-215-50 mass spectrometer equipped with either a Johnston or Balzers electron multiplier. The multipliers were operated at about 2.2 and 1.4 kV, respectively and yields gains above the faraday collector of about 7000 to 20000. Typical sensitivity values were 1-2e-16 mol/pA and 0.5-0.9E-17 mol/pA for the furnace and laser systems, respectively. Resolution at 5% peak-height at mass 40 was typically 475 to 600. Additional information about the New Mexico Geochronology Research Laboratory can be found within New Bureau of Geology and Mineral Resources open file report OF-AR-1 at http://geoinfo.nmt.edu/publications/openfile/argon/home.html.

Furnace Step-Heating:

Furnace step heating occurred using a double vacuum Mo resistance furnace. Heating times varied from 4-7 minutes for each step. All furnace samples were gettered during heating using a SAES GP-50 getter operated at ~450°C. Following heating, gas was expanded to a second-stage of the extraction line were it was reacted with 2 GP-50 getters (one at 20°C, one at ~450°C) and a W filament operated at about 2000°C. Typical 2nd stage gettering time was 2-4 minutes. The furnace thermocouple was calibrated by melting copper foil and typically the recorded temperature underestimated the sample temperature by 40-100°C. Estimated accuracy of the heating temperature is ±15°C for any given step.

Blanks were run before, during and after the step heating and typically yielded values of $2x10^{-15}$, $1.2x10^{-17}$, $5x10^{-18}$, $4x10^{-18}$, and $8x10^{-18}$ moles for masses 40, 39, 38, 37 and 36, respectively.

Laser Step-Heating and Total Fusion:

Some samples are step-heated with a Synrad 50 W CO_2 laser using a defocused beam with a heating time of 1-2 minutes. Gas was cleaned during heating and for an additional 3 to 5 minutes using 2 GP-50 getters (one at 20°C, one at ~450°C), a W filament operated at about 2000°C and reaction with a cold finger operated at –140°C. Blanks plus backgrounds were typically: $5x10^{-16}$, 6 $x10^{-18}$, 1 $x10^{-18}$, 3 $x10^{-18}$, 3 $x10^{-18}$ moles for masses 40, 39, 38, 37 and 36, respectively.

Irradiations, Flux monitoring and age calculations:

Irradiations were preformed at the University of Michigan Ford reactor (position L-67), Hamilton, Canada McMaster reactor (position 5C) and the Denver USGS TRIGA reactor (central thimble).

Fluence gradients were monitored with Fish Canyon (FC-2) sanidine. Typically fusing 4 crystals from each location monitored 4 to 6 locations within individual sample trays. A sine curve or plane was fit to the mean value of each location and J-factors were determined for the unknowns based on their geometry and the calculated curve. J-factor errors ranged between at 0.1 to 0.5% (1σ). Correction factors for interfering reactions were measured with K-glass and CaF_2. Typically 4 to 5 grains of each were fused with the CO_2 laser to obtain a weighted mean value for each correction factor.

Reported ages for step-heated samples are weighed by the inverse variance for the indicated steps. MSWD values are calculated for each weighted mean and errors are determined using the method of Taylor (1982). If the MSWD value is greater than 1, the error is multiplied by the square root of the MSWD. No strict plateau criteria were adhered to; rather weighted means were calculated for the flattest parts of each age spectrum. Total gas ages and errors are calculated by summing the intensities and quadratically summing the uncertainties from each heating step. Isochron analysis was evaluated and due to high radiogenic yields and data clustering isochron determinations did not improve age determinations and are not presented.

Monitor age and decay constants

In this study, the relationships between the U/Pb zircon and $^{40}Ar/^{39}Ar$ results are critical in evaluating the timing of magmatism (zircon) and cooling ($^{40}Ar/^{39}Ar$) and therefore a brief mention of the intercalibration of the two dating methods is required. Several studies over the past decade have evaluated both the age of FC-2 and the ^{40}K decay constants (e.g., Renne et al., 1998; Min et al., 2000; Schmitz and Bowring, 2001; Kuiper et al., 2008; Renne et al., 2009). General agreement is that both the age of FC-2 and ^{40}K decay constant requires modification to obtain consistency between the Ar/Ar method and the U/Pb method. Kuiper et al. (2008) determined a new age of FC-2 at 28.201 Ma relative to the astronomical time scale and also used the decay constant reported Min et al. (2000). The latter did not influence the conclusions of their work, but the choice of decay constant is much more important for older samples like those reported here and therefore we adopt the recent findings of Renne et al. (2009) with minor modifications. New data since the writing of Renne et al. (2009) yield an age of 28.305 Ma for FC-2 and a ^{40}K total decay constant of 5.54294 ± 0.0093E-10/a (P. Renne, pers. comm., 2010). This new decay constant error is a major improvement compared to estimates by Min et al. (2000) and provides total external errors for ca. 1400 Ma argon ages of less than 1 Ma. We use the generally accepted closure temperature estimates of 550 °C for hornblende (Harrison, 1981), 400°C for muscovite (Harrison et al., 2009) and 350 °C for biotite (Harrison et al., 1985) for interpretation of the cooling history.

All ages are calculated relative to FC-2 with and assigned age of 28.305 Ma and a total decay constant of 5.54962E-10 (Renne et al., 2009, Renne, pers. com., 2010). We recognize that these values have not been through rigorous review but feel that they best reflect our present knowledge.

Age Interpretations

$^{40}Ar/^{39}Ar$ dates are interpreted from age spectrum experiments. Very few age spectra yield multiple and consecutive concordant age steps as shown by high MSWD values (Table 1; DR). Complexity generally stems from hornblende with age variations correlated to variable K/Ca values, biotite with hump-shaped spectra, and muscovite with gradients. These variations primarily result from minor alteration causing both radiogenic argon loss and spectra artifacts related to ^{39}Ar recoil (e.g., Lo and Onstott, 1989) and/or complex thermal histories where within crystal age variations are not well imaged by step-heating (Hodges et al., 1994). Preferred ages are determined for each sample and require both objective and subjective choices when interpreting the spectra. Criteria similar to those outlined by Schneider et al. (2007) are used and rely on interpretations that consider radiogenic argon loss related to heating events, ^{39}Ar recoil, and K/Ca spectra. Most spectra have multiple consecutive heating steps that are flat or slightly complex and preferred ages are determined by weighted mean combination. Weight mean age errors are increased by the square root of the MSWD when it is >1. For hump-shaped biotite spectra the oldest steps of the spectra yield the preferred age despite the high MSWD values, but we note that the use of the total gas age does not significantly impact the thermal history analysis. For some samples, a very restricted (oldest) part of the spectrum is used to determine a preferred age and it is recognized that age choice is somewhat arbitrary, but generally assumes that complexity towards young age is related to alteration and/or partial degassing by younger intrusions.

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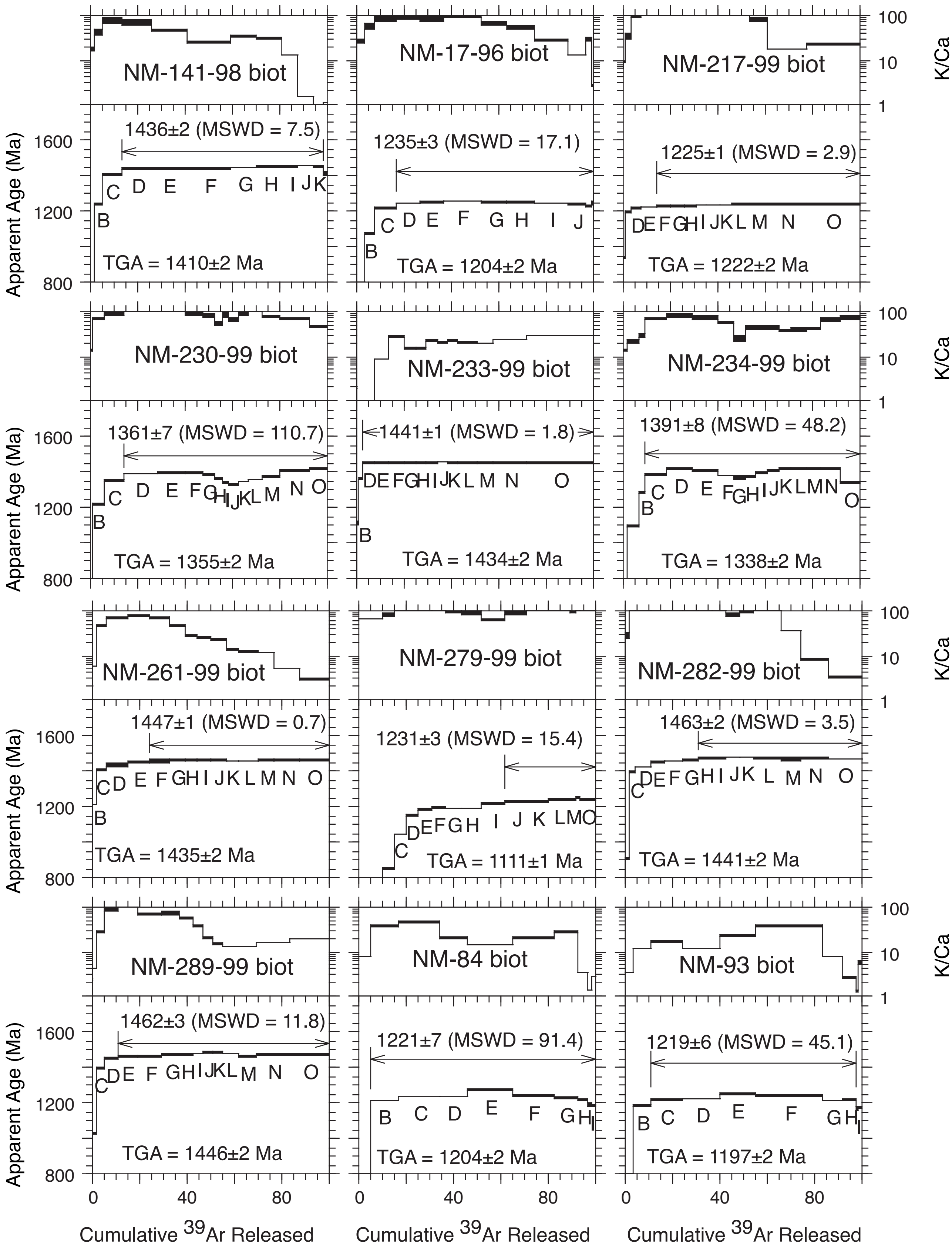
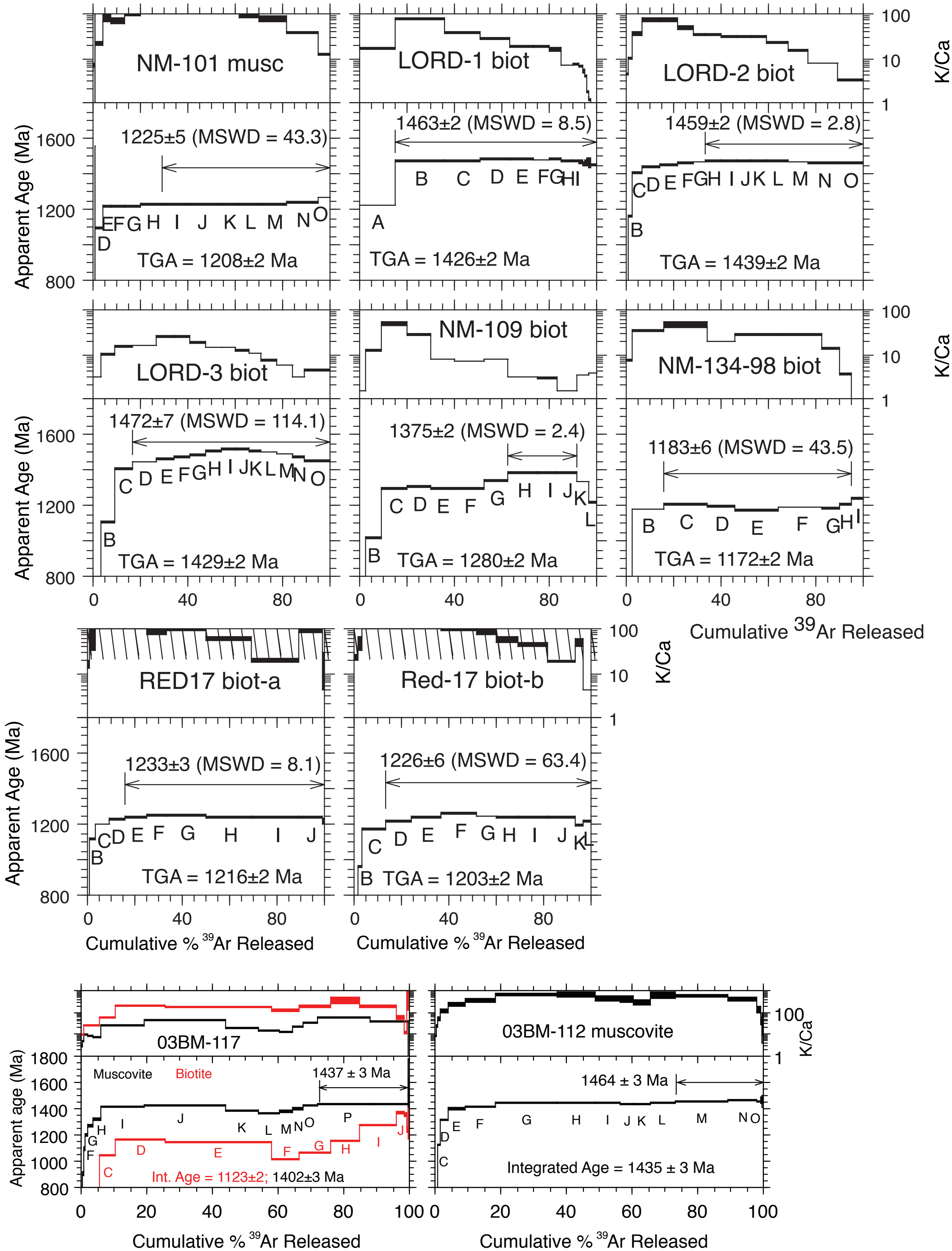


Burro Mountain mica age spectra



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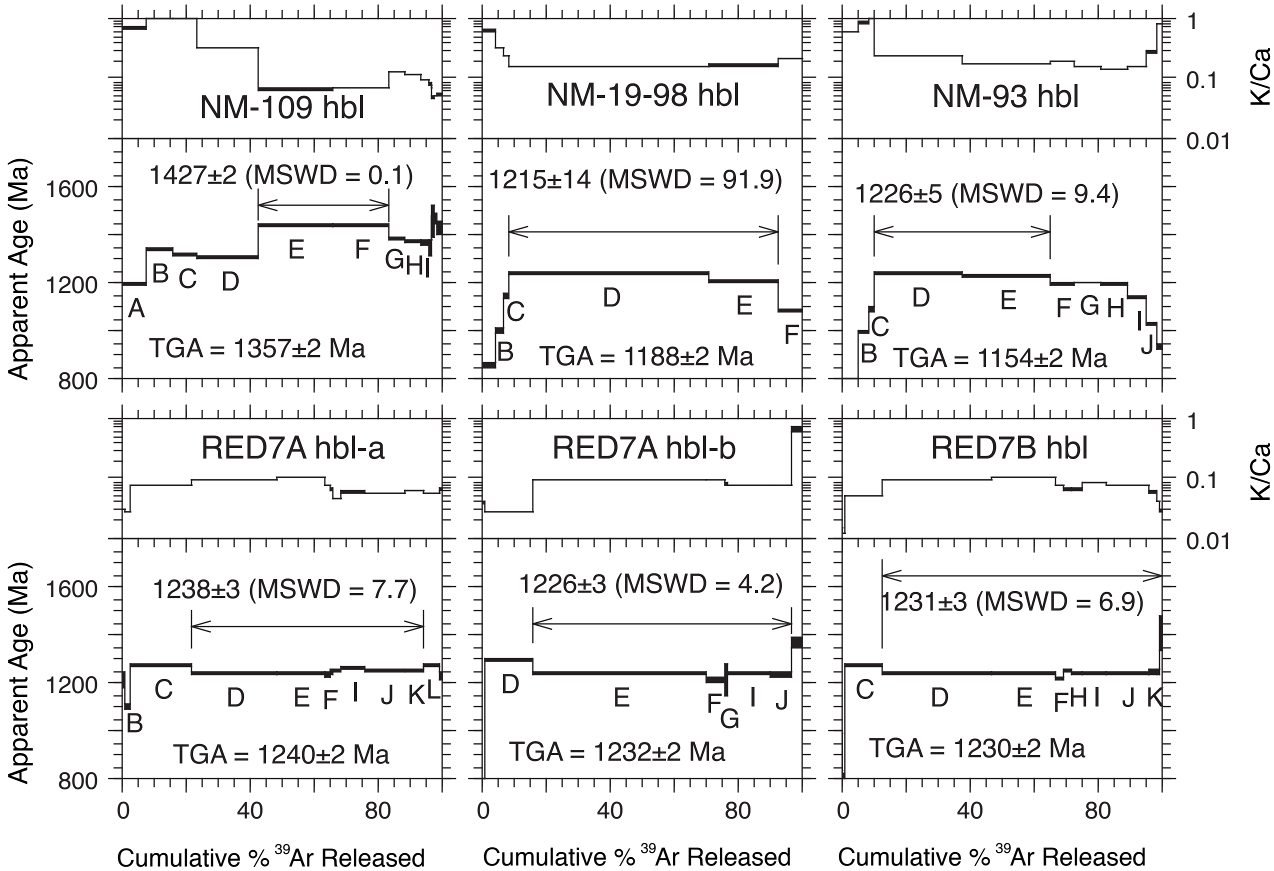
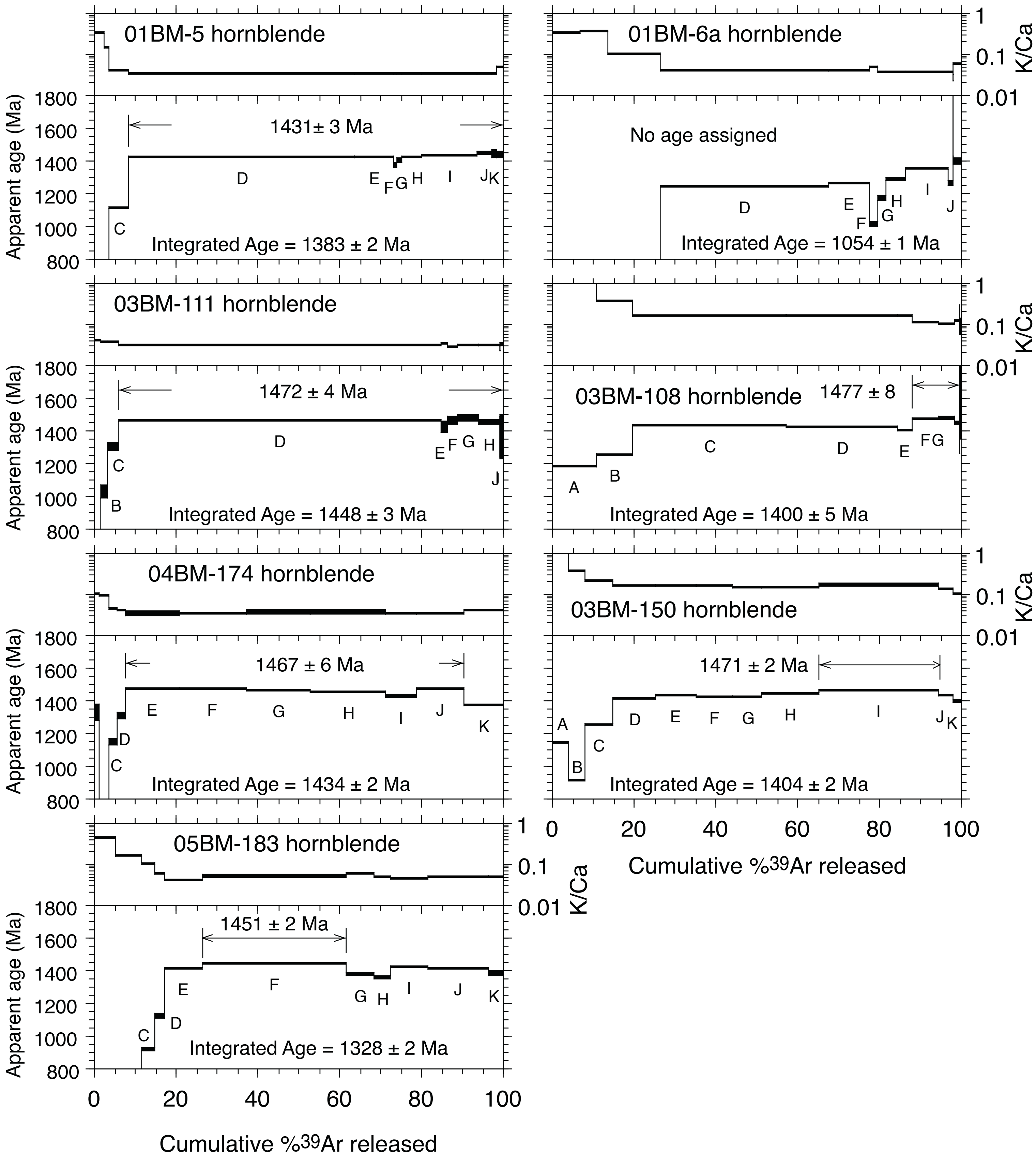


Burro Mountain hornblende age spectra



Burro Mountain hornblende age spectra

	ID	Power/Temp (Watts/°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	NM-141-98 biot, D4:100, 0.44 mg biotite, J=0.0078262, D=1.00361±0.00157, NM-100, Lab#=9901-01										
#	A	650	47.14	0.0317	47.34	1.36	16.1	70.3	2.0	422.6	3.2
#	B	750	126.9	0.0128	12.04	2.20	39.9	97.2	5.1	1229.9	2.7
#	C	850	148.9	0.0069	3.234	5.90	74.5	99.4	13.7	1400.0	2.4
	D	920	152.5	0.0078	1.655	9.01	65.6	99.7	26.7	1426.1	2.3
	E	1000	153.7	0.0115	1.973	10.32	44.4	99.6	41.6	1433.4	2.5
	F	1075	153.3	0.0217	1.853	12.26	23.5	99.6	59.2	1431.2	2.5
	G	1110	153.5	0.0156	1.297	7.68	32.6	99.8	70.3	1433.9	2.0
	H	1180	154.7	0.0176	1.601	7.62	29.0	99.7	81.3	1440.9	2.4
	I	1210	154.7	0.0415	0.9215	4.70	12.3	99.8	88.1	1442.0	2.3
	J	1250	155.1	0.3570	1.124	4.40	1.4	99.8	94.5	1444.8	2.5
	K	1300	154.6	0.6597	1.118	3.12	0.77	99.8	99.0	1441.6	2.8
#	L	1650	155.0	0.4882	22.40	0.714	1.0	95.8	100.0	1403.1	5.9
	Integrated age ± 1σ			n=12		69.3		K2O=7.73 %		1393.1	1.9
	Plateau ± 1σ		steps D-K	n=8	MSWD=7.50	59.1	31.7		85.3	1436.4	2.5
	NM-17-96 biot, D10:100, 0.48 mg biotite, J=0.0076588, D=1.00361±0.00157, NM-100, Lab#=9905-01										
#	A	650	35.04	0.0196	21.19	2.04	26.0	82.1	2.8	365.5	1.8
#	B	750	104.9	0.0095	5.338	2.99	53.6	98.5	6.9	1062.1	2.4
#	C	850	123.2	0.0063	1.804	6.93	80.7	99.6	16.4	1206.4	2.3
	D	920	127.2	0.0053	1.104	7.26	95.8	99.7	26.4	1236.2	2.3
	E	1000	127.6	0.0065	1.716	7.64	78.1	99.6	36.9	1237.7	1.9
	F	1075	128.9	0.0052	1.200	11.53	98.9	99.7	52.7	1247.7	1.9
	G	1110	127.4	0.0082	1.422	7.84	62.6	99.7	63.4	1237.1	2.2
	H	1180	127.4	0.0098	1.396	8.63	51.9	99.7	75.3	1237.0	2.1
	I	1210	127.2	0.0188	0.6897	10.34	27.1	99.8	89.4	1236.9	1.8
	J	1250	125.7	0.0417	0.9725	5.27	12.2	99.8	96.7	1225.8	2.1
	K	1300	125.0	0.0181	3.788	1.85	28.2	99.1	99.2	1214.8	2.4
	L	1650	134.6	0.2114	27.20	0.570	2.4	94.0	100.0	1234.1	6.1
	Integrated age ± 1σ			n=12		72.9		K2O=7.62 %		1189.0	1.7
	Plateau ± 1σ		steps D-L	n=9	MSWD=17.14	60.9	61.9		83.6	1235.2	3.1
	NM-217-99; G2:122, 0.89 mg bt, J=0.0155366, D=1.00394±0.00121, NM-122, Lab#=51144-01										
#	A	1	69.36	0.0716	181.1	0.588	7.1	22.8	0.2	403	16
#	B	2	44.91	0.0599	5.647	2.60	8.5	96.3	1.2	936.6	2.9
#	C	2	59.51	0.0159	1.664	5.77	32.1	99.2	3.4	1184.9	2.0
#	D	3	60.75	0.0049	0.5570	12.6	104.0	99.7	8.2	1207.8	2.2
#	E	3	61.10	0.0038	0.2457	16.8	135.7	99.9	14.6	1214.1	1.9
	F	4	61.66	0.0029	0.1098	15.9	177.8	99.9	20.7	1222.8	2.2
	G	4	61.48	0.0025	0.1290	13.8	202.9	99.9	26.0	1220.1	2.2
	H	5	61.64	0.0031	0.0915	12.8	165.3	100.0	30.9	1222.6	2.1
	I	5	61.65	0.0035	0.0829	12.9	147.1	100.0	35.8	1222.8	1.9
	J	6	61.75	0.0023	0.0586	13.6	225.9	100.0	41.0	1224.3	1.7
	K	6	61.77	0.0047	0.1093	13.6	108.7	99.9	46.1	1224.4	2.1
	L	7	61.95	0.0045	0.1200	19.6	113.3	99.9	53.6	1227.0	1.8
	M	8	61.98	0.0065	0.0524	19.7	78.0	100.0	61.2	1227.6	1.9
	N	10	62.40	0.0301	0.0738	42.9	16.9	100.0	77.6	1233.7	2.5
	O	25	62.05	0.0239	0.0935	58.7	21.4	100.0	100.0	1228.5	2.3
	Integrated age ± 1σ			n=15		261.7		K2O=7.27 %		1205.6	1.5
	Plateau ± 1σ		steps F-O	n=10	MSWD=2.92	223.3	89.1		85.4	1225.1	1.4

	ID	Power/Temp (Watts/°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	NM-230-99; G4:122, Biotite, 1.21 mg, J=0.0155878, D=1.00394±0.00121, NM-122, Lab#=51145-01										
#	A	1	41.37	0.0386	34.85	6.85	13.2	75.1	1.6	720.6	2.4
#	B	2	61.16	0.0078	2.465	21.4	65.7	98.8	6.5	1208.4	1.8
#	C	2	70.32	0.0059	0.7757	37.3	86.2	99.7	15.0	1343.9	3.0
	D	3	72.84	0.0041	0.4499	59.4	125.2	99.8	28.6	1378.9	2.6
	E	3	73.20	0.0036	0.4417	51.8	141.8	99.8	40.4	1383.7	2.7
	F	4	73.10	0.0059	0.6229	34.2	86.5	99.7	48.3	1381.8	2.2
	G	4	72.46	0.0063	0.7699	19.4	80.5	99.7	52.7	1372.7	1.9
	H	5	70.75	0.0098	0.7724	14.0	52.0	99.7	55.9	1349.8	2.1
	I	5	69.46	0.0061	0.8065	13.6	83.0	99.7	59.0	1332.2	2.2
	J	6	68.63	0.0079	0.6055	16.8	64.2	99.7	62.9	1321.6	2.6
	K	6	69.55	0.0055	0.5572	17.1	92.1	99.8	66.8	1334.3	2.3
	L	7	70.37	0.0035	0.4276	28.4	147.9	99.8	73.3	1346.0	2.0
	M	8	71.78	0.0071	0.3786	32.6	72.1	99.8	80.8	1365.2	2.5
	N	10	74.15	0.0076	0.2427	51.7	66.9	99.9	92.6	1397.0	3.0
	O	25	74.56	0.0113	0.5317	32.3	45.1	99.8	100.0	1401.3	2.7
	Integrated age ± 1σ			n=15		436.9		K2O=8.90 %		1337.8	1.6
	Plateau ± 1σ		steps D-O	n=12	MSWD=114.05	371.5	95.0		85.0	1361.1	7.2
	NM-233-99; G5:122, Biotite, 1.02 mg, J=0.0156521, D=1.00394±0.00121, NM-122, Lab#=51146-01										
#	A	1	42.58	0.2856	37.73	1.026	1.8	73.9	0.4	730.4	9.1
#	B	2	54.26	0.7958	4.044	2.55	0.64	97.9	1.2	1102.5	3.7
#	C	2	70.92	1.035	2.858	6.14	0.49	98.9	3.3	1349.5	2.8
	D	3	77.16	0.5982	1.558	12.34	0.85	99.5	7.5	1436.3	2.5
	E	3	77.19	0.0628	0.6777	18.4	8.1	99.7	13.8	1439.0	2.6
	F	4	77.10	0.0200	0.2480	18.2	25.5	99.9	20.1	1439.5	2.3
	G	4	77.35	0.0367	0.2297	14.6	13.9	99.9	25.1	1442.8	2.3
	H	5	77.43	0.0362	0.1996	14.0	14.1	99.9	29.9	1444.0	2.2
	I	5	77.34	0.0245	0.2258	13.19	20.9	99.9	34.4	1442.7	2.2
	J	6	77.47	0.0261	0.2635	12.77	19.6	99.9	38.7	1444.2	2.2
	K	6	76.80	0.0233	0.3172	13.4	21.9	99.9	43.3	1435.3	2.8
	L	7	76.98	0.0255	0.2027	23.4	20.0	99.9	51.3	1438.0	2.2
	M	8	76.96	0.0283	0.1975	20.2	18.0	99.9	58.2	1437.9	2.5
	N	10	77.44	0.0224	0.1697	41.2	22.8	99.9	72.3	1444.1	2.5
	O	25	77.41	0.0188	0.3266	81.0	27.1	99.9	100.0	1443.2	3.3
	Integrated age ± 1σ			n=15		292.4		K2O=7.04 %		1417.4	1.8
	Plateau ± 1σ		steps D-O	n=12	MSWD=1.74	282.7	20.6		96.7	1440.7	1.4

	ID	Power/Temp (Watts/°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	NM-234-99; G7:122, Biotite, 0.94 mg, J=0.0157765, D=1.00394±0.00121, NM-122, Lab#=51147-01										
#	A	1	45.96	0.0380	61.22	5.89	13.4	60.6	2.2	665.1	3.2
#	AB	0	53.60	0.0252	6.092	13.9	20.2	96.6	7.3	1087.9	1.9
#	B	2	64.75	0.0182	2.544	6.69	28.0	98.8	9.7	1270.6	2.4
	C	2	72.00	0.0076	1.695	25.4	66.8	99.3	19.1	1374.3	2.4
	D	3	73.86	0.0065	0.8425	29.7	78.4	99.7	30.0	1402.6	2.6
	E	3	72.99	0.0073	0.8011	28.5	70.2	99.7	40.5	1391.3	2.4
	F	4	71.31	0.0095	0.8930	18.2	53.7	99.6	47.2	1368.4	2.3
	G	4	70.26	0.0208	1.133	13.7	24.5	99.5	52.2	1353.1	5.9
	H	5	71.14	0.0119	0.9077	11.98	43.0	99.6	56.6	1365.9	2.2
	I	5	72.37	0.0122	0.9667	12.64	41.9	99.6	61.2	1382.3	2.0
	J	6	73.14	0.0119	0.8195	14.4	42.9	99.7	66.5	1393.1	1.8
	K	6	73.76	0.0142	0.4686	12.42	36.0	99.8	71.1	1402.8	2.1
	L	7	73.93	0.0134	0.4058	18.6	38.0	99.8	77.9	1405.2	2.1
	M	8	74.03	0.0124	0.3147	16.9	41.2	99.9	84.1	1406.9	2.1
	N	10	73.84	0.0081	0.2439	22.1	63.0	99.9	92.2	1404.7	2.2
#	O	25	68.21	0.0074	0.2672	21.1	69.3	99.9	100.0	1328.6	1.7
	Integrated age ± 1σ			n=16		272.0		K2O=7.05 %		1338.1	1.6
	Plateau ± 1σ		steps C-N	n=12	MSWD=48.15	224.5	54.5		82.5	1390.7	4.6
	NM-261-99; G8:122, Biotite, 1.22 mg, J=0.0158032, D=1.0036401±0.0011, NM-122, Lab#=51148-01										
#	A	1	35.91	0.2580	32.49	2.69	2.0	73.3	0.6	635.1	3.9
#	B	2	60.28	0.0963	3.450	8.50	5.3	98.3	2.4	1203.3	2.1
#	C	2	73.44	0.0118	1.298	18.8	43.2	99.5	6.4	1397.0	2.0
#	D	3	75.14	0.0076	0.3653	40.1	67.1	99.9	15.0	1423.0	3.3
#	E	3	76.35	0.0069	0.1508	43.8	73.7	99.9	24.4	1439.7	2.9
	F	4	76.83	0.0077	0.1731	38.5	65.9	99.9	32.6	1445.7	3.0
	G	4	77.07	0.0111	0.1530	31.0	45.9	99.9	39.3	1449.0	2.4
	H	5	77.19	0.0187	0.1058	26.4	27.2	100.0	44.9	1450.7	2.2
	I	5	77.10	0.0214	0.0980	27.6	23.8	100.0	50.8	1449.6	2.7
	J	6	76.88	0.0233	0.1076	27.3	21.9	100.0	56.7	1446.7	2.6
	K	6	76.79	0.0389	0.0940	25.0	13.1	100.0	62.0	1445.6	2.5
	L	7	76.79	0.0428	0.1161	37.8	11.9	100.0	70.1	1445.5	2.4
	M	8	76.85	0.0469	0.1197	32.0	10.9	100.0	77.0	1446.3	2.8
	N	10	76.87	0.1027	0.1246	51.6	5.0	100.0	88.0	1446.7	2.8
	O	25	77.20	0.1802	0.1451	55.9	2.8	100.0	100.0	1451.0	3.1
	Integrated age ± 1σ			n=15		466.8		K2O=9.30 %		1417.6	1.6
	Plateau ± 1σ		steps F-O	n=10	MSWD=0.70	353.0	21.2		75.6	1447.7	1.3

	ID	Power/Temp (Watts/°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	NM-279-99; G10:122, Biotite, 1.59 mg, J=0.015752, D=1.0036401±0.0011, NM-122, Lab#=51149-01										
#	A	1	20.51	0.0081	10.63	47.1	63.1	84.7	10.5	442.6	1.0
#	B	2	38.23	0.0065	2.422	23.5	78.9	98.1	15.8	846.4	1.6
#	C	2	49.24	0.0041	1.603	22.4	124.0	99.0	20.8	1038.1	1.6
#	D	3	55.76	0.0043	0.9750	22.7	118.2	99.5	25.8	1143.5	1.9
#	E	3	57.99	0.0038	0.8734	24.6	135.4	99.6	31.3	1177.7	2.1
#	F	4	58.59	0.0049	0.8971	25.1	103.8	99.5	36.9	1186.5	2.3
#	G	4	58.14	0.0055	0.9498	28.8	93.4	99.5	43.3	1179.6	2.1
#	H	5	58.13	0.0060	1.037	39.2	85.7	99.5	52.1	1179.1	1.9
#	I	5	59.92	0.0089	0.8035	44.0	57.4	99.6	61.9	1206.6	1.9
	J	6	60.74	0.0058	0.5432	41.3	88.0	99.7	71.2	1219.8	1.9
	K	6	60.94	0.0026	0.4109	41.4	198.9	99.8	80.4	1223.3	2.3
	L	7	61.70	0.0038	0.4322	39.7	133.7	99.8	89.3	1234.2	2.9
	M	8	61.53	0.0043	0.3790	11.61	118.8	99.8	91.9	1232.0	2.1
	N	10	62.03	0.0020	0.2596	10.05	254.8	99.9	94.1	1239.8	1.6
	O	25	61.61	0.0029	0.3385	26.4	178.6	99.8	100.0	1233.3	2.4
	Integrated age ± 1σ			n=15		447.8		K2O=6.87 %		1098.3	1.3
	Plateau ± 1σ		steps J-O	n=6	MSWD=15.38	170.5	151.5		38.1	1230.9	3.5
	NM-282-99; G11:122, Biotite, 0.86 mg, J=0.0156878, D=1.0036401±0.0011, NM-122, Lab#=51150-01										
#	A	1	39.52	0.0634	71.09	1.84	8.0	46.8	0.7	466.6	5.3
#	B	2	41.88	0.0189	4.674	3.51	27.0	96.7	2.0	896.4	2.4
#	C	2	73.76	0.0040	3.173	7.35	128.6	98.7	4.8	1386.6	2.3
#	D	3	74.96	0.0020	0.6800	16.4	252.4	99.7	11.1	1412.2	2.6
#	E	3	77.14	0.0015	0.2322	16.8	337.1	99.9	17.5	1442.2	2.0
#	F	4	77.41	0.0042	0.1998	18.5	122.6	99.9	24.5	1445.9	2.1
#	G	4	78.00	0.0031	0.1263	16.7	166.0	100.0	30.9	1453.7	2.2
	H	5	78.70	0.0049	0.1314	17.0	103.5	100.0	37.3	1462.6	2.9
	I	5	78.88	0.0035	0.1072	14.7	144.6	100.0	42.9	1465.0	2.1
	J	6	79.03	0.0066	0.1993	15.6	76.8	99.9	48.8	1466.5	2.2
	K	6	79.02	0.0054	0.0675	15.3	93.7	100.0	54.6	1467.0	2.0
	L	7	78.96	0.0041	0.1361	30.3	125.3	99.9	66.2	1466.0	2.4
	M	8	78.17	0.0149	0.1565	21.9	34.1	99.9	74.5	1455.8	3.6
	N	10	78.30	0.0672	0.1217	31.2	7.6	100.0	86.4	1457.7	2.5
	O	25	78.19	0.1595	0.1318	35.8	3.2	100.0	100.0	1456.3	2.6
	Integrated age ± 1σ			n=15		262.9		K2O=7.49 %		1424.0	1.6
	Plateau ± 1σ		steps H-O	n=8	MSWD=3.52	181.8	62.7		69.1	1463.2	1.9

	ID	Power/Temp (Watts/°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	NM-289-99; H1:122, Biotite, 0.89 mg, J=0.0157066, D=1.0036401±0.0011, NM-122, Lab#=51151-01										
#	A	1	46.14	0.2301	63.43	1.55	2.2	59.4	0.5	653.6	7.1
#	B	2	51.50	0.1281	11.93	4.44	4.0	93.2	2.1	1023.2	2.6
#	C	2	74.26	0.0189	6.173	9.52	27.0	97.5	5.4	1382.7	1.9
#	D	3	77.36	0.0060	1.129	17.4	85.4	99.6	11.4	1442.9	2.0
	E	3	77.65	0.0044	0.3242	24.0	116.0	99.9	19.8	1449.7	2.3
	F	4	77.69	0.0079	0.2849	28.5	64.6	99.9	29.7	1450.4	2.6
	G	4	78.39	0.0070	0.1877	21.9	73.2	99.9	37.3	1459.7	2.4
	H	5	78.55	0.0095	0.1525	16.6	53.9	99.9	43.0	1461.9	2.5
	I	5	79.12	0.0144	0.2545	12.26	35.4	99.9	47.3	1468.8	2.0
	J	6	79.08	0.0256	0.3081	11.56	19.9	99.9	51.3	1468.1	2.5
	K	6	79.62	0.0351	0.1403	11.75	14.5	100.0	55.4	1475.6	2.4
	L	7	78.89	0.0424	0.1564	19.6	12.0	99.9	62.2	1466.3	2.2
	M	8	77.96	0.0429	0.1853	22.2	11.9	99.9	69.9	1454.3	2.3
	N	10	78.54	0.0346	0.0953	38.7	14.7	100.0	83.4	1462.0	2.5
	O	25	78.14	0.0272	0.1083	47.8	18.8	100.0	100.0	1456.8	2.9
	Integrated age ± 1σ		n=15			287.8		K2O=7.91 %		1428.8	1.6
	Plateau ± 1σ	steps E-O	n=11		MSWD=11.78	255.0	38.9		88.6	1461.7	2.7
	NM-84 biot, B4:100, 0.74 mg biotite, J=0.0078043, D=1.00361±0.00157, NM-100, Lab#=9890-01										
#	A	650	59.83	0.0675	11.16	6.02	7.6	94.5	5.0	667.4	1.6
	B	750	120.2	0.0143	1.325	14.43	35.8	99.7	17.1	1202.2	2.5
	C	850	122.9	0.0112	0.3353	20.9	45.7	99.9	34.7	1223.7	2.0
	D	920	123.0	0.0255	0.6471	14.16	20.0	99.8	46.5	1224.1	2.0
	E	1000	128.8	0.0370	0.5430	22.2	13.8	99.9	65.1	1265.7	2.5
	F	1075	123.9	0.0257	0.5798	20.9	19.8	99.9	82.6	1230.5	1.9
	G	1110	122.6	0.0198	0.6931	12.23	25.8	99.8	92.9	1220.9	2.0
	H	1180	121.3	0.1612	2.337	4.94	3.2	99.4	97.0	1208.0	2.2
	I	1210	118.7	0.3937	6.880	1.695	1.3	98.3	98.5	1179.3	3.6
	J	1250	117.7	0.1915	4.084	1.827	2.7	99.0	100.0	1178.1	3.6
	Integrated age ± 1σ		n=10			119.3		K2O=7.93 %		1189.2	1.7
	Plateau ± 1σ	steps B-J	n=9		MSWD=91.38	113.3	24.8		95.0	1220.5	7.3
	NM-93 biot, B4:100, 0.50 mg biotite, J=0.0078076, D=1.00361±0.00157, NM-100, Lab#=9889-01										
#	A	650	52.38	0.1583	13.63	3.00	3.2	92.3	3.6	585.5	2.2
#	B	750	116.7	0.0456	3.110	6.62	11.2	99.2	11.4	1172.7	2.2
	C	850	121.4	0.0324	0.9635	11.17	15.8	99.8	24.7	1212.0	2.2
	D	920	121.5	0.0451	0.8163	13.44	11.3	99.8	40.7	1213.2	2.0
	E	1000	125.7	0.0231	1.135	12.71	22.1	99.7	55.8	1243.0	2.3
	F	1075	123.6	0.0141	0.6818	23.7	36.2	99.8	83.9	1228.3	1.8
	G	1110	120.2	0.0685	1.442	7.24	7.5	99.7	92.5	1202.5	2.4
	H	1180	121.1	0.2012	2.558	4.26	2.5	99.4	97.6	1206.9	3.0
#	I	1210	116.7	0.4152	8.414	0.965	1.2	97.9	98.7	1161.5	6.1
#	J	1250	116.6	0.0960	6.361	1.097	5.3	98.4	100.0	1164.9	4.7
	Integrated age ± 1σ		n=10			84.2		K2O=8.28 %		1182.8	1.7
	Plateau ± 1σ	steps C-H	n=6		MSWD=45.14	72.5	21.1		86.1	1219.2	6.1

	ID	Power/Temp (Watts/°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	RED17, Biotite, three crystals, 0.22 mg, J=0.0156724, D=1.01349±0.00137, nm-68, Lab#=7999-01										
#	A	650	13.70	0.0347	9.153	2.25	14.7	80.2	1.6	292.4	2.3
#	B	750	54.81	0.0081	5.229	2.48	62.8	97.2	3.4	1105.3	2.3
#	C	830	59.21	0.0017	0.8098	8.32	295.6	99.6	9.5	1191.7	2.3
#	D	900	61.11	0.0022	0.6993	9.44	236.2	99.7	16.3	1220.1	2.0
	E	970	61.71	0.0028	0.3905	12.5	184.2	99.8	25.4	1230.1	2.1
	F	1050	62.85	0.0056	0.4574	10.9	90.4	99.8	33.4	1246.2	2.7
	G	1120	62.37	0.0052	0.2788	24.0	97.3	99.9	50.8	1240.0	2.4
	H	1180	61.64	0.0087	0.3194	25.8	58.7	99.8	69.5	1229.3	3.2
	I	1240	61.62	0.0271	0.1938	28.1	18.8	99.9	89.9	1229.7	2.0
	J	1350	61.66	0.0047	0.1947	13.4	109.5	99.9	99.7	1230.2	2.4
	K	1650	62.07	0.0497	6.310	0.415	10.3	97.0	100.0	1209.9	8.5
	Integrated age ± 1σ			n=11		137.6		K2O=15.33 %		1201.0	1.7
	Plateau ± 1σ		steps E-K	n=7	MSWD=8.08	115.2	79.4		83.7	1233.4	2.9
	Red-17 biot, B4:100, 0.41 mg biotite, J=0.0076892, D=1.00361±0.00157, NM-100, Lab#=9894-01										
#	A	650	24.82	0.0240	23.79	1.076	21.3	71.6	2.1	236.6	3.2
#	B	750	92.13	0.0111	7.784	0.976	45.8	97.5	3.9	957.1	3.6
#	C	850	116.9	0.0035	0.7742	4.92	146.9	99.8	13.3	1165.9	2.0
	D	920	122.6	0.0023	0.3740	5.82	217.2	99.9	24.5	1208.6	1.9
	E	1000	125.2	0.0037	0.7698	6.42	136.7	99.8	36.8	1226.4	2.1
	F	1075	129.1	0.0050	0.6848	7.89	102.5	99.8	51.9	1253.8	2.0
	G	1110	126.6	0.0061	1.148	4.28	83.0	99.7	60.1	1235.5	2.1
	H	1180	125.5	0.0094	1.139	4.88	54.3	99.7	69.4	1227.4	2.2
	I	1210	125.6	0.0117	0.8980	6.66	43.4	99.8	82.1	1228.9	2.2
	J	1250	125.9	0.0284	0.9480	6.01	18.0	99.8	93.6	1230.7	2.1
	K	1300	120.6	0.0113	2.175	1.80	45.0	99.5	97.1	1190.4	2.8
	L	1650	125.7	0.1280	11.24	1.53	4.0	97.4	100.0	1207.8	3.0
	Integrated age ± 1σ			n=12		52.3		K2O=6.37 %		1187.9	1.7
	Plateau ± 1σ		steps D-L	n=9	MSWD=63.35	45.3	89.5		86.7	1226.0	5.9
	NM-109 hbl, D7:100, 1.81 mg hornblende, J=0.0077635, D=1.00361±0.00157, NM-100, Lab#=9903-01										
#	A	750	129.2	0.7704	37.20	1.13	0.66	91.5	7.8	1187.0	3.6
#	B	810	139.4	0.0594	3.544	1.25	8.6	99.3	16.4	1328.1	2.8
#	C	875	136.4	0.0847	3.500	1.01	6.0	99.2	23.3	1307.6	3.6
#	D	1020	134.0	1.630	3.655	2.84	0.31	99.3	42.9	1292.7	2.5
	E	1080	153.2	8.101	5.393	3.44	0.063	99.4	66.6	1426.0	2.3
	F	1120	153.4	7.552	5.289	2.45	0.068	99.4	83.4	1427.1	2.4
#	G	1150	145.7	4.044	4.646	0.825	0.13	99.3	89.1	1373.1	3.9
#	H	1180	144.1	4.741	4.858	0.632	0.11	99.3	93.5	1362.9	4.9
#	I	1210	143.0	5.667	6.648	0.377	0.090	99.0	96.1	1353.7	6.6
#	J	1240	143.3	6.745	16.82	0.116	0.076	96.9	96.9	1336.2	16.2
#	K	1275	158.6	7.123	25.74	0.072	0.072	95.6	97.4	1421.2	25.9
#	L	1325	172.1	11.26	63.40	0.052	0.045	89.7	97.7	1441.7	34.1
#	M	1400	162.1	10.71	23.63	0.190	0.048	96.2	99.0	1452.5	10.8
#	N	1650	166.8	10.11	55.15	0.141	0.050	90.7	100.0	1421.5	13.4
	Integrated age ± 1σ			n=14		14.5		K2O=0.40 %		1342.0	2.0
	Plateau ± 1σ		steps E-F	n=2	MSWD=0.10	5.9	0.1		40.6	1426.5	1.9

	ID	Power/Temp (Watts/°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	NM-19-98 hbl, D2:100, 2.13 mg hornblende, J=0.0077661, D=1.00361±0.00157, NM-100, Lab#=9900-01										
#	A	750	115.9	0.8615	135.5	0.985	0.59	65.5	5.0	845.9	5.1
#	B	810	96.74	1.639	13.91	0.338	0.31	95.9	6.7	989.7	6.6
#	C	875	113.4	2.203	9.017	0.376	0.23	97.8	8.6	1133.0	6.2
	D	1020	124.0	3.491	2.094	12.5	0.15	99.7	71.6	1227.8	2.0
	E	1080	120.3	3.271	2.554	4.15	0.16	99.6	92.5	1199.8	2.2
#	F	1120	105.4	2.546	6.015	1.48	0.20	98.5	100.0	1078.5	2.6
	Integrated age ± 1σ			n=6		19.8	K2O=0.46 %			1173.8	1.9
	Plateau ± 1σ		steps D-E	n=2	MSWD=91.89	16.6	0.15		84.0	1214.9	14.0
	NM-93 hbl, B8:100, 2.38 mg hornblende, J=0.0077248, D=1.00361±0.00157, NM-100, Lab#=9892-01										
#	A	750	47.80	0.9151	39.14	1.81	0.56	75.9	5.7	452.9	2.6
#	B	810	95.60	0.6168	8.048	0.932	0.83	97.6	8.7	989.1	3.4
#	C	875	106.5	0.4683	6.191	0.592	1.1	98.3	10.6	1080.1	4.5
	D	1020	125.1	2.179	2.046	8.66	0.23	99.7	38.0	1229.8	2.0
	E	1080	123.6	3.071	1.918	8.61	0.17	99.7	65.3	1220.5	2.3
#	F	1120	118.9	2.850	2.399	2.29	0.18	99.6	72.6	1184.8	2.6
#	G	1150	119.8	3.497	2.980	2.77	0.15	99.5	81.4	1190.9	2.1
#	H	1180	119.2	3.763	3.546	2.57	0.14	99.4	89.5	1186.1	2.3
#	I	1210	111.9	3.459	2.872	1.97	0.15	99.5	95.8	1132.9	2.5
#	J	1240	98.16	1.918	4.031	0.815	0.27	98.9	98.4	1021.1	3.4
#	K	1275	87.40	0.6510	7.274	0.513	0.78	97.6	100.0	923.0	4.8
	Integrated age ± 1σ			n=11		31.5	K2O=0.66 %			1140.5	1.7
	Plateau ± 1σ		steps D-E	n=2	MSWD=9.36	17.3	0.20		54.8	1225.7	4.7
	RED7A, Hornblende, 3.11 mg, J=0.0157924, D=1.01349±0.00137, nm-68, Lab#=7996-01										
#	A	800	166.2	17.35	369.5	0.829	0.029	35.1	1.4	1200.7	15.7
#	B	900	62.38	19.39	42.39	0.668	0.026	82.4	2.5	1093.6	7.0
#	C	1000	64.51	7.091	7.105	11.5	0.072	97.6	21.9	1261.4	2.2
	D	1050	61.53	5.518	3.139	15.8	0.092	99.2	48.5	1232.3	2.2
	E	1080	61.52	5.264	3.092	8.90	0.097	99.2	63.5	1232.0	1.9
	F	1100	61.47	6.800	4.705	0.994	0.075	98.6	65.2	1226.9	5.3
	G	1120	62.10	8.026	5.885	0.839	0.064	98.2	66.6	1233.3	5.5
	H	1140	62.62	11.25	7.082	1.23	0.045	98.1	68.7	1241.5	3.7
	I	1160	63.23	8.878	6.090	4.34	0.057	98.3	76.0	1250.4	2.3
	J	1180	62.58	9.007	6.535	7.61	0.057	98.1	88.9	1239.3	2.2
	K	1200	62.72	8.327	7.312	3.55	0.061	97.6	94.8	1236.7	2.5
#	L	1300	64.83	9.549	9.417	2.62	0.053	96.9	99.3	1260.5	2.7
#	M	1650	63.76	8.236	16.17	0.433	0.062	93.5	100.0	1213.4	8.3
	Integrated age ± 1σ			n=13		59.3	K2O=0.46 %			1224.8	1.8
	Plateau ± 1σ		steps D-K	n=8	MSWD=7.74	43.3	0.079		73.0	1237.5	2.7

	ID	Power/Temp (Watts/°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	Red-7A hbl, B7:100, 2.21 mg hornblende, J=0.0077565, D=1.00361±0.00157, NM-100, Lab#=9891-01										
#	A	750	280.1	13.32	760.8	0.123	0.038	20.1	1.5	667.7	32.4
#	D	1020	140.1	18.71	37.13	1.21	0.027	93.3	16.2	1287.1	3.2
	E	1080	124.1	5.548	3.503	4.44	0.092	99.5	70.0	1227.2	2.1
	F	1120	122.4	5.747	7.500	0.500	0.089	98.6	76.1	1206.7	5.4
	G	1150	120.6	6.284	3.800	0.057	0.081	99.5	76.8	1202.1	34.4
	I	1210	125.2	7.118	6.498	1.10	0.072	98.9	90.1	1230.9	3.0
	J	1240	125.1	7.030	8.119	0.580	0.073	98.5	97.2	1226.5	5.0
#	N	1650	160.0	0.8194	57.08	0.232	0.62	89.5	100.0	1360.1	10.3
	Integrated age ± 1σ			n=8		8.24	K2O=0.18 %			1217.1	2.2
	Plateau ± 1σ		steps E-J	n=5	MSWD=4.16	6.68	0.087		81.0	1226.4	3.3
	RED7B, Hornblende, 3.48 mg, J=0.015829, D=1.01349±0.00137, nm-68, Lab#=7997-01										
#	A	800	262.7	34.40	763.9	0.410	0.015	15.1	0.7	905.9	37.8
#	B	900	67.96	43.08	129.8	0.430	0.012	48.6	1.4	786.8	13.4
#	C	1000	65.58	10.24	12.11	6.84	0.050	95.8	12.7	1263.1	2.6
	D	1050	61.16	5.756	3.496	20.6	0.089	99.1	46.7	1227.9	2.7
	E	1080	61.26	5.160	3.175	12.5	0.099	99.1	67.4	1229.7	2.5
	F	1100	60.81	6.854	7.148	1.22	0.074	97.4	69.4	1208.7	4.3
	G	1120	61.95	8.068	3.642	1.88	0.063	99.3	72.5	1243.0	4.5
	H	1140	62.08	8.107	6.432	1.95	0.063	98.0	75.7	1232.8	2.8
	I	1160	61.92	6.397	5.186	4.44	0.080	98.3	83.0	1232.8	2.7
	J	1180	62.20	7.124	6.489	7.88	0.072	97.8	96.0	1232.6	2.3
	K	1200	62.02	8.901	6.066	1.71	0.057	98.3	98.8	1235.0	3.4
	L	1300	62.98	13.05	11.80	0.646	0.039	96.1	99.9	1231.6	6.0
	M	1650	71.00	18.81	1.597	0.065	0.027	101.4	100.0	1397.6	35.2
	Integrated age ± 1σ			n=13		60.7	K2O=0.42 %			1214.4	2.0
	Plateau ± 1σ		steps D-M	n=10	MSWD=6.85	53.0	0.084		87.3	1231.0	2.8
	NM-101 musc, E3:100, 0.73 mg muscovite, J=0.007777, D=1.00361±0.00157, NM-100, Lab#=9908-01										
#	A	600	47.11	0.0922	111.8	0.443	5.5	29.8	0.3	192.4	13.1
#	B	650	47.73	0.0759	14.76	1.334	6.7	90.9	1.4	531.5	3.9
#	C	700	65.14	-0.2310	-97.3743	0.014	-	144.2	1.4	998.9	273.5
#	D	775	106.2	0.0253	5.964	3.83	20.2	98.3	4.4	1083.1	2.4
#	E	825	121.1	0.0061	2.146	4.24	83.4	99.5	7.7	1204.1	2.5
#	F	875	121.7	0.0077	1.576	7.89	66.4	99.6	13.9	1209.4	2.3
#	G	900	121.8	0.0046	1.580	8.74	109.9	99.6	20.8	1210.3	1.9
#	H	925	122.5	0.0038	1.177	10.98	132.5	99.7	29.4	1216.4	2.0
	I	975	122.9	0.0021	0.5311	13.30	246.3	99.9	39.8	1220.6	2.3
	J	1010	122.5	0.0029	0.6153	16.57	177.4	99.9	52.8	1216.9	1.9
	K	1050	122.8	0.0039	1.112	11.73	131.8	99.7	62.0	1218.3	2.1
	L	1110	122.9	0.0059	0.9726	10.46	86.8	99.8	70.2	1219.5	1.9
	M	1200	123.3	0.0067	1.222	14.68	76.3	99.7	81.7	1222.0	2.0
	N	1300	124.2	0.0137	0.7693	17.70	37.2	99.8	95.6	1228.9	2.6
	O	1650	129.8	0.0424	6.317	5.59	12.0	98.6	100.0	1257.5	2.2
	Integrated age ± 1σ			n=15		127.5	K2O=8.63 %			1193.2	1.7
	Plateau ± 1σ		steps I-O	n=7	MSWD=43.31	90.0	116.8		70.6	1225.2	5.3

	ID	Power/Temp (Watts/°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	LORD-1, F10:122, 0.71 mg bt, J=0.0157158, D=1.00394±0.00121, NM-122, Lab#=51141-01										
#	A	2	61.77	0.0328	4.737	26.2	15.6	97.7	15.5	1214.7	1.6
	B	3	78.38	0.0070	0.3761	34.5	72.4	99.9	36.0	1459.4	2.4
	C	4	78.36	0.0145	0.5496	26.1	35.2	99.8	51.4	1458.5	2.6
	D	5	79.27	0.0184	0.6881	20.6	27.8	99.7	63.6	1469.6	2.2
	E	6	79.24	0.0281	0.6538	16.6	18.2	99.8	73.5	1469.4	2.5
	F	7	79.01	0.0283	0.5784	12.01	18.1	99.8	80.6	1466.8	2.3
	G	8	79.45	0.0340	0.6980	8.31	15.0	99.7	85.5	1472.0	1.9
	H	9	78.77	0.0770	0.5613	7.83	6.6	99.8	90.2	1463.8	2.3
	I	10	78.59	0.0741	0.5232	4.42	6.9	99.8	92.8	1461.7	2.8
	J	11	78.58	0.0831	1.549	2.65	6.1	99.4	94.3	1457.6	4.1
	K	12	78.02	0.1045	1.779	1.86	4.9	99.3	95.4	1449.6	5.9
	L	13	78.29	0.1321	2.167	1.322	3.9	99.2	96.2	1451.7	6.9
	M	14	78.94	0.2983	3.223	0.992	1.7	98.8	96.8	1456.4	8.8
	N	15	78.26	0.4349	4.178	0.787	1.2	98.5	97.3	1444.2	10.9
	O	16	80.05	0.4647	8.238	0.741	1.1	97.0	97.7	1451.8	11.6
	P	25	78.99	0.6024	7.849	3.85	0.85	97.1	100.0	1439.8	3.1
	Integrated age ± 1σ			n=16		168.7		K2O=5.81 %		1409.1	1.7
	Plateau ± 1σ		steps B-P	n=15	MSWD=8.47	142.5	33.3		84.5	1463.3	2.4
	LORD-2, F11:122, 0.86 mg bt, J=0.0156813, D=1.00394±0.00121, NM-122, Lab#=51142-01										
#	A	1	62.99	0.1222	112.6	2.90	4.2	47.1	1.1	698.0	5.9
#	B	2	59.09	0.0545	8.881	4.61	9.4	95.6	2.8	1154.9	2.7
#	C	2	74.92	0.0154	3.550	11.79	33.0	98.6	7.2	1400.2	2.4
#	D	3	76.76	0.0074	1.437	19.6	68.6	99.4	14.5	1432.3	2.4
#	E	3	77.23	0.0075	0.6130	20.9	68.0	99.8	22.2	1441.5	2.6
#	F	4	77.90	0.0110	0.3519	17.2	46.5	99.9	28.6	1451.1	1.9
#	G	4	78.25	0.0153	0.4517	14.4	33.4	99.8	34.0	1455.4	1.9
	H	5	78.64	0.0155	0.4217	17.1	33.0	99.8	40.4	1460.4	2.2
	I	5	78.85	0.0167	0.3920	17.2	30.5	99.9	46.8	1463.2	2.4
	J	6	78.81	0.0176	0.4277	17.4	29.0	99.8	53.2	1462.6	2.3
	K	6	78.57	0.0180	0.2636	17.4	28.3	99.9	59.7	1460.1	2.3
	L	7	78.44	0.0240	0.2817	23.9	21.3	99.9	68.6	1458.4	2.1
	M	8	78.35	0.0357	0.1897	22.3	14.3	99.9	76.9	1457.6	2.1
	N	10	77.90	0.0712	0.2389	33.8	7.2	99.9	89.4	1451.7	3.1
	O	25	78.07	0.1659	0.8892	28.4	3.1	99.7	100.0	1451.6	2.9
	Integrated age ± 1σ			n=15		268.9		K2O=7.66 %		1422.3	1.7
	Plateau ± 1σ		steps H-O	n=8	MSWD=2.75	177.4	18.3		66.0	1458.8	1.7

	ID	Power/Temp (Watts/°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	LORD-3, G1:122, 0.58 mg bt, J=0.0155634, D=1.00394±0.00121, NM-122, Lab#=51143-01										
#	A	1	28.51	0.1756	24.71	7.12	2.9	74.4	3.5	521.7	2.2
#	B	2	54.33	0.0544	3.499	11.84	9.4	98.1	9.2	1100.2	2.1
#	C	2	74.61	0.0365	1.498	16.9	14.0	99.4	17.5	1396.8	2.1
	D	3	77.23	0.0336	0.7056	19.3	15.2	99.7	26.9	1433.8	2.2
	E	3	78.30	0.0217	0.8481	16.7	23.5	99.7	35.0	1447.0	2.1
	F	4	79.24	0.0217	0.7884	13.4	23.5	99.7	41.5	1459.1	2.6
	G	4	80.42	0.0293	1.063	13.27	17.4	99.6	48.0	1473.0	2.5
	H	5	82.44	0.0375	1.041	13.4	13.6	99.6	54.5	1498.3	2.4
	I	5	82.76	0.0380	0.5811	13.07	13.4	99.8	60.8	1504.0	2.4
	J	6	82.75	0.0428	0.4842	11.32	11.9	99.8	66.3	1504.2	2.6
	K	6	81.93	0.0508	0.4244	10.53	10.0	99.9	71.5	1494.2	2.5
	L	7	81.56	0.0725	0.3518	13.8	7.0	99.9	78.2	1489.9	2.5
	M	8	80.55	0.0922	0.2213	12.33	5.5	99.9	84.2	1477.9	2.4
	N	10	79.23	0.1776	0.3897	11.61	2.9	99.9	89.9	1460.7	2.3
	O	25	78.05	0.1231	0.6836	20.8	4.1	99.8	100.0	1444.5	2.4
	Integrated age ± 1σ			n=15		205.3		K2O=8.74 %		1401.5	1.6
	Plateau ± 1σ		steps D-O	n=12	MSWD=114.10	169.4	12.5		82.5	1472.2	7.4
	NM-109 biot, E1#2:100, 0.57 mg biotite, J=0.0077799, D=1.00361±0.00157, NM-100, Lab#=9907-01										
#	A	650	54.79	0.3564	31.59	2.76	1.4	83.0	3.1	553.9	2.8
#	B	750	98.57	0.0443	10.66	5.85	11.5	96.8	9.6	1011.8	2.1
#	C	850	132.3	0.0113	2.137	9.69	45.2	99.5	20.3	1283.7	2.1
#	D	920	134.0	0.0192	2.586	9.10	26.6	99.4	30.4	1294.9	2.1
#	E	1000	132.5	0.0687	2.558	9.22	7.4	99.4	40.7	1284.7	2.1
#	F	1075	132.0	0.0754	2.723	11.32	6.8	99.4	53.3	1280.8	2.3
#	G	1110	138.8	0.0711	1.837	9.05	7.2	99.6	63.3	1329.8	2.2
	H	1180	144.8	0.1722	1.428	10.92	3.0	99.7	75.4	1370.8	2.3
	I	1210	145.7	0.1826	1.383	7.65	2.8	99.7	83.9	1377.0	2.4
	J	1250	145.9	0.3465	1.952	6.97	1.5	99.6	91.7	1376.9	2.4
#	K	1300	138.0	0.1617	1.946	4.76	3.2	99.6	97.0	1323.6	2.2
#	L	1650	123.7	0.1430	9.577	2.72	3.6	97.7	100.0	1207.0	3.3
	Integrated age ± 1σ			n=12		90.0		K2O=7.80 %		1265.2	1.8
	Plateau ± 1σ		steps H-J	n=3	MSWD=2.44	25.5	2.5		28.4	1374.7	2.3

	ID	Power/Temp (Watts/°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	NM-134-98 biot, D1:100, 0.43 mg biotite, J=0.0077214, D=1.00361±0.00157, NM-100, Lab#=9899-01										
#	A	650	73.85	0.0766	17.56	2.65	6.7	93.0	3.3	776.0	2.8
#	B	750	117.2	0.0153	1.978	10.38	33.4	99.5	16.0	1169.6	1.9
	C	850	121.1	0.0113	0.6960	15.36	45.0	99.8	34.8	1200.4	2.1
	D	920	119.3	0.0277	0.6830	9.28	18.4	99.8	46.2	1187.4	2.1
	E	1000	116.3	0.0185	0.8191	14.78	27.6	99.8	64.3	1165.5	1.8
	F	1075	118.1	0.0190	0.6338	14.98	26.8	99.8	82.6	1179.1	1.9
	G	1110	118.0	0.0406	1.621	6.41	12.6	99.6	90.5	1175.9	2.1
	H	1180	121.3	0.1516	3.407	3.91	3.4	99.2	95.3	1196.1	2.3
#	I	1210	125.7	0.6912	2.096	2.59	0.74	99.6	98.5	1231.5	3.2
#	J	1250	126.2	0.6658	4.928	1.259	0.77	98.9	100.0	1229.5	4.7
	Integrated age ± 1σ			n=10		81.6		K2O=9.44 %		1157.6	1.7
	Plateau ± 1σ	steps C-H		n=6	MSWD=43.51	64.7	27.3		79.3	1182.7	5.5

Notes:

Isotopic ratios corrected for blank, radioactive decay, and mass discrimination, not corrected for interfering reactions.
Errors quoted for individual analyses include analytical error only, without interfering reaction or J uncertainties.
Integrated age calculated by summing isotopic measurements of all steps.
Integrated age error calculated by quadratically combining errors of isotopic measurements of all steps.
Plateau age is inverse-variance-weighted mean of selected steps.
Plateau age error is inverse-variance-weighted mean error (Taylor, 1982) times root MSWD where MSWD>1.
Plateau error is weighted error of Taylor (1982).
Decay constants after Renne et al., 2009, Renne Pers. Com.
X preceding sample ID denotes analyses excluded from plateau age calculations.
Weight percent K_2O calculated from ^{39}Ar signal, sample weight, and instrument sensitivity.
Ages calculated relative to FC-2 Fish Canyon Tuff sanidine interlaboratory standard at 28.305 Ma
Decay Constant (LambdaK (total)) = 5.54962±0.0093e-10/a

Irradiation	Reactor	(39Ar/37Ar)Ca;±	(36Ar/37Ar)Ca ±	(40Ar/39Ar)K ±
NM-68	U of Michigan	0.00070;0.00005	0.00027;0.00001	0.0247;0.0004
NM-100	U of Michigan	0.00076;0.00002	0.00028;000003	0.0275;0.00011
NM-122	U of Michigan	0.00070;0.00005	0.00027;0.00001	0.028;0.003
NM-178	McMaster	0.00071;0.00002	0.000282;0.000005	0.0316;0.0002
NM-188	McMaster	0.00067;0.00001	0.000274;0.000002	0.0233;0.0012
NM-218	Denver	0.00070;0.00005	0.00028;0.00002	0.010;0.002