

SUPPORTING INFORMATION

Permian magmatism and metamorphism in the Dent Blanche nappe: constraints from field observations and geochronology

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Mineral	Biotite	Biotite	Biotite	Biotite	Biotite	Biotite	Biotite	Biotite	Biotite	Biotite
SiO ₂	35.32	34.76	35.50	35.21	35.32	33.84	34.44	34.55	33.14	34.54
TiO ₂	3.51	3.48	3.56	3.39	3.29	4.84	3.65	2.95	4.28	3.10
Al ₂ O ₃	17.97	17.71	18.02	18.10	18.25	17.17	17.62	17.59	16.98	17.03
Cr ₂ O ₃	0.05	0.07	0.04	0.05	0.07	0.06	0.06	0.06	0.05	0.04
FeO	19.61	20.74	19.53	21.14	21.60	21.65	21.54	22.34	23.06	21.97
MnO	0.27	0.19	0.26	0.30	0.28	0.30	0.22	0.24	0.19	0.19
MgO	9.00	8.80	8.85	7.83	7.59	7.34	7.97	8.08	8.12	7.87
CaO	0.03	0.03	0.06	0.02	0.02	0.04	0.05	0.01	0.07	0.08
Na ₂ O	0.11	0.09	0.11	0.07	0.13	0.08	0.05	0.05	0.02	0.00
K ₂ O	9.46	9.40	9.47	9.65	8.23	9.03	9.25	9.22	8.67	8.87
P ₂ O ₅	bdl	0.02	bdl	0.01	bdl	0.04	bdl	0.04	0.09	0.06
Total	95.32	95.31	95.40	95.78	94.79	94.39	94.85	95.13	94.67	93.76
Atom site distribution (22 anhydrous oxygen basis)										
Si	5.40	5.35	5.42	5.40	5.44	5.29	5.35	5.37	5.20	5.43
Ti	0.40	0.40	0.41	0.39	0.38	0.57	0.43	0.34	0.51	0.37
Al	3.24	3.21	3.24	3.27	3.31	3.16	3.22	3.22	3.14	3.15
Cr	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Fe	2.51	2.67	2.49	2.71	2.78	2.83	2.80	2.90	3.03	2.89
Mn	0.04	0.03	0.03	0.04	0.04	0.04	0.03	0.03	0.03	0.03
Mg	2.05	2.02	2.01	1.79	1.74	1.71	1.84	1.87	1.90	1.84
Ca	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Na	0.03	0.03	0.03	0.02	0.04	0.02	0.02	0.01	0.01	0.00
K	1.84	1.85	1.84	1.89	1.62	1.80	1.83	1.83	1.74	1.78
P	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01
<i>XMg</i>	0.45	0.43	0.45	0.40	0.39	0.38	0.40	0.39	0.39	0.39
<i>T</i> (°C)	701	698	704	690	685	741	705	668	727	681

Table S1 Selection of quantified analyses and structural formulas of biotite from #R22 (bdl = below detection limit). All iron is assumed to be Fe²⁺.

Rock type	Granite
Sample n°	J504
SiO ₂	56.88
Al ₂ O ₃	18.84
Fe ₂ O ₃	6.60
MnO	0.11
MgO	1.80
CaO	4.33
Na ₂ O	3.05
K ₂ O	4.47
TiO ₂	0.92
P ₂ O ₅	0.48
LOI	2.32
Total	99.78
<i>Trace elements (ppm)</i>	
As	0.495
Ba	663
Be	3.13
Bi	0.061
Cd	0.132
Co	10.2
Cr	7.18
Cs	6.61
Cu	bdl
Ga	26.7
Ge	1.86
Hf	8.04
In	0.073
Mo	bdl
Nb	18.7
Ni	bdl
Pb	9.04
Rb	168
Sc	15.9
Sb	0.095
Sn	3.09
Sr	249
Ta	1.47
Th	27.3
U	2.19
V	81.1
W	0.804
Y	30.2
Zn	83.3
Zr	304
<i>REE elements (ppm)</i>	
La	129
Ce	244
Pr	24.9
Nd	82.5
Sm	12.2
Eu	1.43
Gd	8.92
Tb	1.15
Dy	6.27
Ho	1.16
Er	2.81
Tm	27.3
Yb	2.18
Lu	0.325
ΣREE	544

Table S2 Whole-rock major and trace-elements compositions of the Mont Morion granite (bdl = below detection limit; LOI = Loss on Ignition). All Fe was measured as Fe₂O₃.

Label	U (ppm)	Th (ppm)	Th/U	$^{206}\text{Pb}/^{238}\text{U}$ Age (Ma)	err 1 sigma (Ma)	$^{206}\text{Pb}/^{238}\text{U}$	1 sigma %	$^{207}\text{Pb}/^{235}\text{U}$	1 sigma %	$^{207}\text{Pb}/^{206}\text{Pb}$	1 sigma %	Rho
J504-5C	228	114	0.52	287.6	4.5	0.04567	1.58	0.3324	2.79	0.05279	2.30	0.564
J504-7C	1338	82	0.06	288.1	3.0	0.04570	1.07	0.3268	1.55	0.05187	1.13	0.686
J504-6C	948	68	0.07	289.9	3.2	0.04601	1.13	0.3315	1.60	0.05226	1.13	0.705
J504-2C	567	96	0.17	290.1	3.2	0.04599	1.13	0.3268	1.84	0.05153	1.45	0.614
J504-3C	282	83	0.30	290.2	3.2	0.04594	1.12	0.3190	2.39	0.05036	2.11	0.471
J504-10C	1226	103	0.09	291.0	3.4	0.04614	1.18	0.3284	1.55	0.05162	1.01	0.762
J504-8C	593	112	0.19	291.1	2.9	0.04616	1.02	0.3286	1.77	0.05164	1.45	0.576
J504-11C	537	144	0.28	291.1	3.2	0.04625	1.09	0.3390	2.41	0.05316	2.14	0.454
J504-1C	852	83	0.10	291.8	3.0	0.04635	1.03	0.3388	1.67	0.05301	1.32	0.613
J504-9C	1623	245	0.16	300.1	3.0	0.04766	1.00	0.3452	1.32	0.05252	0.86	0.757
J504-4C	906	189	0.22	304.2	3.1	0.04830	1.01	0.3473	1.72	0.05215	1.39	0.590
J504-12C	1149	73	0.07	333.9	4.0	0.05304	1.23	0.3749	2.02	0.05127	1.60	0.607

Table S3 SHRIMP U-Pb analyses of zircons (#J504).

Zircon/Zone	10c	11c	12c	1c	2c	3c	4c	5c	6c	7c	8c	9c	20c	21c	22c
Sample	J504	J504	J504	J504	J504	J504	J504	J504	J504	J504	J504	J504	J504	J504	J504
Ti	3.96	1.97	2.87	2.66	bdl	3.59	3.33	7.60	bdl	bdl	bdl	3.69	bdl	2.99	4.27
Y	2339	1188	2272	1189	996	954	1974	1661	2307	2075	1166	1691	1321	2574	2094
La	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.18	bdl	bdl	0.34
Ce	1.22	6.47	1.20	10.7	3.54	10.1	1.65	11.8	1.32	1.39	5.86	7.33	9.64	2.05	14.4
Pr	0.03	bdl	bdl	bdl	bdl	bdl	bdl	0.08	0.03	bdl	bdl	0.06	bdl	bdl	0.29
Nd	0.66	0.40	0.52	0.43	0.20	0.81	bdl	1.66	0.81	0.53	0.38	1.24	0.78	0.80	3.27
Sm	2.41	1.60	2.26	1.58	1.20	1.47	2.00	3.98	3.05	1.48	1.62	2.70	2.81	3.09	8.00
Eu	0.10	0.08	0.10	0.29	bdl	0.29	bdl	0.77	0.12	0.09	0.08	0.27	0.69	0.11	1.05
Gd	27.8	15.6	27.6	11.9	12.7	11.7	20.5	29.6	23.0	22.2	13.3	21.5	21.5	28.7	38.8
Tb	13.0	6.28	12.7	5.15	4.82	4.76	9.83	10.1	12.9	10.8	5.53	8.48	8.92	14.2	14.0
Dy	187	90.6	194	87.1	73.5	74.2	152	146	187	176	86.9	131	113	211	192
Ho	68.7	36.7	69.5	36.2	31.2	30.2	59.0	57.2	70.8	62.3	37.0	53.3	43.5	76.9	70.9
Er	324	190	306	198	161	152	274	269	315	278	188	277	209	342	325
Tm	68.2	45.0	64.1	49.0	37.3	34.3	58.8	57.5	66.2	58.8	43.7	63.0	43.5	74.3	70.0
Yb	607	454	584	508	364	337	559	522	582	519	439	616	422	716	679
Lu	111	87.7	111	114	76.2	71.6	115	105	113	98.4	91.6	130	81.4	143	135
Hf	12509	12280	12188	11162	11616	10944	13003	9271	12527	12801	12118	11811	10722	12081	10095
Ta	2.51	3.49	3.39	3.03	2.40	1.86	3.04	1.85	3.20	2.49	2.88	4.16	0.54	3.44	1.78
Th	99.4	135	91.3	167	80.7	150	84.6	157	93.8	87.4	94.3	191	112	116	298
U	1576	563	1166	601	515	477	864	341	1150	1345	468	784	241	1218	573
Th/U	0.06	0.24	0.08	0.28	0.16	0.31	0.10	0.46	0.08	0.06	0.20	0.24	0.47	0.10	0.52
Lu _N /Sm _N	278	331	296	435	384	294	345	159	224	401	340	290	174	279	101
Eu/Eu*	0.01	0.01	0.01	0.04		0.04		0.05	0.01	0.01	0.01	0.02	0.06	0.01	0.04

Table S4 LA-ICP-MS analyses of zircon (#J504). Concentration are given in p.p.m.. The subscript “N” indicates values normalized to chondrite. $Eu/Eu^* = 2Eu_N/(Gd_N+Sm_N)$.

Mineral/Zone	Aln	Aln	Aln	Aln	Aln	Aln
Sample	J504	J504	J504	J504	J504	J504
No.	J504_10	J504_18	J504_24	J504_13	J504_14	J504_20
SiO2	33.90	32.20	31.94	33.07	34.69	34.49
Sm2O3	0.21	0.19	0.23	0.22	0.10	0.13
ThO2	0.98	1.35	1.42	1.09	1.03	0.83
Al2O3	20.29	17.81	17.97	17.88	20.21	19.71
PbO	0.02	bdl	bld	bdl	0.03	0.02
CaO	13.79	10.98	11.47	9.60	14.02	13.39
Nd2O3	2.88	3.43	3.43	3.65	2.78	2.93
Y2O3	0.26	0.23	0.21	0.11	0.21	0.14
MgO	0.36	0.76	0.71	0.77	0.36	0.36
UO2	0.04	0.04	0.05	0.02	0.04	0.03
TiO2	0.98	1.35	0.26	0.28	0.25	0.25
Gd2O3	0.03	0.06	0.10	0.04	0.02	0.08
MnO	0.26	0.33	0.37	0.53	0.28	0.28
Na2O	bdl	bdl	bld	bdl	bdl	bdl
Dy2O3	0.05	0.04	0.01	0.04	0.04	0.05
Ce2O3	8.47	10.24	9.51	10.95	8.23	8.97
P2O5	bdl	bdl	bld	bdl	bdl	bdl
FeO	11.39	13.00	12.64	13.02	11.21	11.28
La2O3	4.17	4.73	4.40	5.02	3.85	4.20
SrO	bdl	bdl	bld	bdl	bdl	bdl
Pr2O3	1.36	1.41	1.36	1.60	1.05	1.27
Total	96.50	97.35	98.05	97.90	98.40	98.40
Si	3.01	2.99	3.01	3.08	3.06	3.08
Al	2.12	1.95	1.99	1.96	2.10	2.07
Mg	0.05	0.11	0.01	0.11	0.05	0.05
Ti	0.07	0.09	0.02	0.08	0.07	0.06
Fe ³⁺	0.09	0.12	0.21	0.00	0.05	0.03
Fe ²⁺	0.75	0.89	0.79	1.01	0.78	0.81
Na	0.00	0.00	0.00	0.00	0.00	0.00
Ca	1.31	1.09	1.16	0.96	1.33	1.28
Mn ²⁺	0.02	0.03	0.03	0.04	0.02	0.02
Sr	0.00	0.00	0.00	0.00	0.00	0.00
Y	0.01	0.01	0.01	0.01	0.01	0.01
La	0.14	0.16	0.15	0.17	0.13	0.14
Ce	0.27	0.35	0.33	0.37	0.27	0.29
Pr	0.04	0.05	0.05	0.05	0.03	0.04
Nd	0.09	0.11	0.12	0.12	0.09	0.09
Sm	0.01	0.01	0.01	0.01	0.00	0.00
Eu	0.00	0.00	0.00	0.00	0.00	0.00
Gd	0.00	0.00	0.00	0.00	0.00	0.00
Tb	0.00	0.00	0.00	0.00	0.00	0.00
Dy	0.00	0.00	0.00	0.00	0.00	0.00
Ho	0.00	0.00	0.00	0.00	0.00	0.00
Er	0.00	0.00	0.00	0.00	0.00	0.00
Tm	0.00	0.00	0.00	0.00	0.00	0.00
Yb	0.00	0.00	0.00	0.00	0.00	0.00
Pb	0.00	0.00	0.00	0.00	0.00	0.00
Th	0.02	0.03	0.03	0.02	0.02	0.02
U	0.00	0.00	0.00	0.00	0.00	0.00

Table S5 Representative EMPA analyses of the epidote group minerals (#J504). Structural formulae have been calculated on the basis of 12.5 oxygens and 8 cations. Fe²⁺ is calculated by charge balance to 25 negative charges (bdl = below detection limit).

Label	Th/U	Common ^{206}Pb (%)	Common ^{208}Pb (%)	Total $^{238}\text{U}/^{206}\text{Pb}$	% error	Total $^{207}\text{Pb}/^{206}\text{Pb}$	% err	7corr $^{206}\text{Pb}/^{238}\text{U}$	% err	7corr $^{206}\text{Pb}/^{232}\text{Th}$	% err	207corr $^{206}\text{Pb}/^{238}\text{U}$ Age (Ma)	err 1 sigma (Ma)	207corr $^{208}\text{Pb}/^{232}\text{Th}$ Age (Ma)	err 1 sigma (Ma)
J504-37 ^{TW}	25	10.7	2.9	22.51	2.05	0.1369	0.54	0.03968	0.66	0.01320	2.01	251 out	5	265	5
J504-32 ^{TW}	71	13.9	1.5	20.34	2.10	0.1629	10.30	0.04234	1.03	0.01333	2.02	267	8	268	5
J504-34	64	8.3	1.0	20.85	2.08	0.1183	0.74	0.04398	0.67	0.01345	2.01	277	6	270	5
J504-36	54	9.0	1.2	20.95	2.08	0.1242	0.69	0.04342	0.67	0.01352	2.01	274	6	271	5
J504-31	66	9.5	1.0	20.76	2.10	0.1278	0.80	0.04361	0.68	0.01367	2.19	275	6	274	6
J504-18	50	8.0	1.2	20.67	2.07	0.1164	4.54	0.04449	0.70	0.01367	2.22	281	6	274	6
J504-33	50	8.1	1.2	20.64	2.08	0.1171	0.74	0.04451	0.67	0.01371	2.01	281	6	275	5
J504-35	40	8.2	1.5	21.11	2.08	0.1172	0.70	0.04351	0.67	0.01377	2.12	275	6	277	6
J504-15	57	8.2	1.0	20.48	2.07	0.1173	0.66	0.04484	0.67	0.01394	2.24	283	6	280	6
J504-20	28	23.8	6.3	18.68	2.07	0.2428	0.46	0.04078	0.67	0.01410	2.01	258 out	5	283	6
J504-14	57	6.8	0.8	21.03	2.09	0.1067	0.83	0.04430	0.67	0.01419	2.01	279	6	285	6
J504-16	42	7.8	1.3	20.52	2.06	0.1149	0.66	0.04490	0.66	0.01424	2.18	283	6	286	6
J504-12	43	16.6	2.8	19.58	2.07	0.1847	0.53	0.04260	0.67	0.01426	2.01	269	6	286	6
J504-19	59	6.4	0.8	20.83	2.09	0.1034	0.85	0.04494	0.67	0.01433	2.01	283	6	288	6
J504-13	20	4.4	1.5	21.50	2.03	0.08705	0.50	0.04448	0.65	0.01448	2.01	281	6	291	6
J504_10	54	7.4	1.0	20.18	2.07	0.1116	0.65	0.04589	0.67	0.01449	2.11	289	6	291	6
J504-17	39	7.6	1.4	20.73	2.07	0.1132	0.69	0.04456	0.67	0.01451	2.01	281	6	291	6
J504_9	47	8.0	1.2	20.10	2.08	0.1165	2.94	0.04576	0.68	0.01485	2.18	288	6	298	6
J504_11	29	7.5	1.8	20.11	2.07	0.1124	0.63	0.04600	0.67	0.01506	2.01	290	6	302	6

TW = excluded from Tera Wasserburg plot because not fitting the regression
out = outlier excluded from average age calculation

Table S6 SHRIMP U-Th-Pb analyses of allanite (#J504).

Label	Domain	U (ppm)	Th (ppm)	Th/U	²⁰⁶ Pb/ ²³⁸ U Age (Ma)	err 2 sigma (Ma)	²⁰⁶ Pb/ ²³⁸ U 1 sigma %	²⁰⁷ Pb/ ²³⁵ U 1 sigma %	²⁰⁷ Pb/ ²⁰⁶ Pb 1 sigma %	Rho			
R26-22a07	core	35	16	0.46	3203	139	0.64345	2.17	23.49	8.75	0.26899	0.01	1.940
R26-21a07	core	241	126	0.52	2004	69	0.36462	1.71	6.264	3.36	0.12996	0.00	0.896
R26-22a06	core	134	78	0.58	1961	84	0.35550	2.14	6.578	5.08	0.13483	0.00	1.130
R26-22d13	core	36	31	0.85	1733	89	0.30841	2.58	3.213	6.25	0.11032	0.00	0.860
R26-22d07	core	150	174	1.16	1731	66	0.30805	1.92	5.072	4.58	0.11870	0.00	1.153
R26-22a13	core	132	98	0.74	1614	66	0.28460	2.04	4.485	4.95	0.12018	0.00	1.067
R26-22c09	core	396	131	0.33	997	35	0.16723	1.78	2.356	4.69	0.10182	0.00	1.035
R26-22c13	core	87	66	0.76	646	35	0.10543	2.72	0.8196	7.62	0.06586	0.00	0.429
R26-22a09	core	200	105	0.53	596	31	0.09693	2.64	0.7869	6.44	0.06514	0.00	0.723
R26-22d09	core	803	60	0.07	578	21	0.09384	1.85	0.7763	3.32	0.06108	0.00	0.695
R26-22a12	core	115	116	1.00	577	23	0.09357	1.99	0.7789	7.12	0.06178	0.00	0.930
R26-22c061	rim	619	75	0.12	563	27	0.09134	2.36	0.6871	5.07	0.05577	0.00	0.610
R26-21a12	core	208	202	0.97	553	17	0.08964	1.52	0.6799	5.99	0.05771	0.00	0.895
R26-22b06	core	558	257	0.46	553	21	0.08955	1.90	0.7169	5.40	0.05617	0.00	0.969
R26-21a11	core	892	140	0.16	547	16	0.08851	1.49	0.7317	3.14	0.06065	0.00	0.644
R26-22c12	core	116	66	0.57	536	26	0.08664	2.42	0.7187	8.73	0.05195	0.00	0.916
R26-21a08	core	189	108	0.57	534	22	0.08637	2.03	0.7113	5.90	0.0544	0.00	0.533
R26-22a15	core	534	202	0.38	527	18	0.08514	1.69	0.7211	3.64	0.06124	0.00	0.457
R26-22a08	core	271	85	0.32	524	21	0.08463	1.96	0.7216	5.90	0.06202	0.00	0.858
R26-22a14	core	1514	409	0.27	523	17	0.08452	1.58	0.7117	2.90	0.06029	0.00	0.628
R26-22b05	core	806	146	0.18	477	14	0.07684	1.51	0.6916	5.08	0.06379	0.00	1.018
R26-2106	core	908	161	0.18	452	14	0.07260	1.54	0.5999	3.09	0.06068	0.00	0.551
R26-22c062	core	619	75	0.12	345	16	0.05492	2.33	0.3695	6.14	0.05080	0.00	0.487
R26-22d14	rim	634	60	0.10	304	15	0.04828	2.40	0.4391	4.88	0.06459	0.00	0.645
R26-22d08	rim	1842	117	0.06	285	10	0.04515	1.75	0.3221	2.87	0.05215	0.00	0.481
R26-22d12	rim	1006	41	0.04	284	27	0.04501	4.74	0.3494	7.37	0.05788	0.00	0.810
R26-22d15	rim	842	67	0.08	283	11	0.04487	2.02	0.3294	3.90	0.05283	0.00	0.423
R26-22c07	rim	954	84	0.09	282	10	0.04478	1.83	0.3255	4.29	0.05232	0.00	0.463
R26-22c08	rim	1204	178	0.15	281	10	0.04456	1.85	0.3003	3.58	0.05050	0.00	0.386
R26-22d06	rim	1468	104	0.07	281	10	0.04454	1.79	0.3224	2.97	0.05323	0.00	0.550
R26-22c14	rim	1513	203	0.13	279	9	0.04428	1.64	0.3146	3.24	0.05198	0.00	0.373
R26-22c15	rim	819	52	0.06	276	10	0.04370	1.90	0.3005	4.16	0.05177	0.00	0.343
R22-e12	rim	208	202	0.97	291	9	0.04617	1.59	0.3418	4.06	0.05289	0.00	0.467
R22-e06	rim	975	111	0.11	286	9	0.04533	1.51	0.3039	3.03	0.05032	0.00	0.409
R22-e09	rim	764	92	0.12	285	9	0.04523	1.53	0.3403	3.64	0.05416	0.00	0.461
R22-e14	rim	862	120	0.14	285	8	0.04523	1.45	0.3204	2.78	0.05146	0.00	0.466
R22-e07	rim	955	147	0.15	285	8	0.04512	1.35	0.3176	3.35	0.05230	0.00	0.302
R22-e15	rim	1356	128	0.09	284	8	0.04512	1.47	0.3196	2.85	0.05052	0.00	0.374
R22-e13	rim	1002	148	0.15	283	8	0.04495	1.43	0.3325	2.84	0.05341	0.00	0.331
R22-e08	rim	775	106	0.14	283	9	0.04491	1.56	0.3539	3.53	0.05607	0.00	0.518

Table S7 LA-ICP-MS U-Pb analyses of zircons (#R26 and #R22).

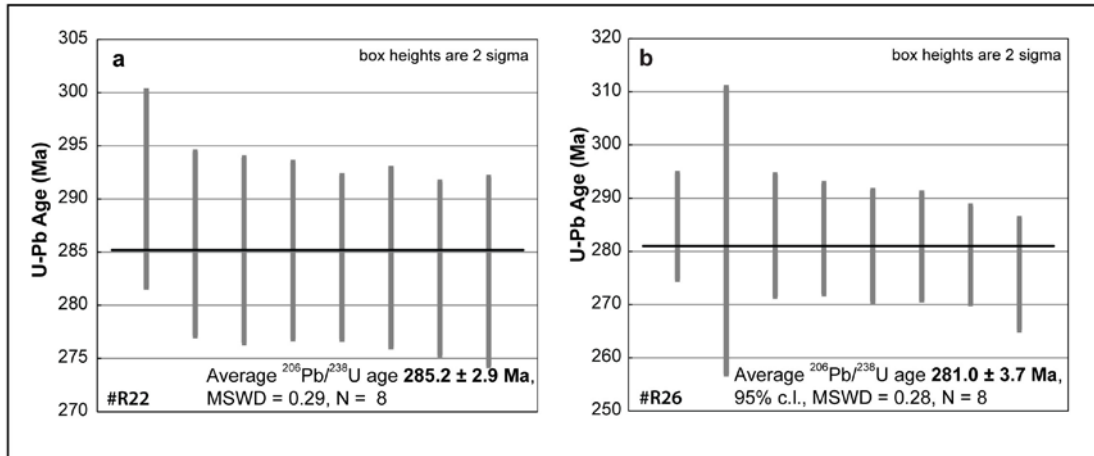


Figure S1 Average U-Pb ages from gneisses #R22 and #R26.

Zircon/Zone	27A03	27A04	27A05	27A06	27A07	27A08	27A09	27A10	27A11	27A12	27A13	27A14	27A15	27A16	27A17	27A18	27B03	27B04	27B05
Sample	R26822	R26822	R26822	R26822	R26822	R26822	R26822	R26822	R26822	R26822	R26822	R22715	R22715	R22715	R22715	R22715	R22715	R22715	R22715
Y	1216	1093	414	878	1140	830.2	1055	907	1302	1447	1816	1257	1480	1131	1502	1316	1433	1094	1243
La	0.016	0.017	0.085	0.021	bdl	bdl	0.011	bdl	bdl	0.026	bdl	0.059	bdl	bdl	bdl	0.014	0.045	bdl	bdl
Ce	12.7	1.50	6.71	2.98	3.31	25.0	2.37	4.74	2.96	5.81	4.36	1.79	2.33	2.31	1.87	2.48	2.96	2.08	3.35
Pr	0.058	0.017	0.032	0.018	0.014	0.090	0.161	0.013	bdl	0.191	0.140	0.033	bdl	0.024	0.025	0.021	0.044	0.032	0.049
Nd	0.805	0.099	0.231	0.275	0.170	1.45	3.17	0.222	0.177	3.34	2.69	0.345	0.469	0.498	0.532	0.459	0.781	0.381	0.628
Sm	1.98	0.605	0.476	1.00	1.11	3.51	6.09	1.05	1.04	6.74	6.83	1.15	2.03	1.52	1.39	1.89	2.38	1.64	1.97
Eu	0.564	0.069	0.183	0.171	0.066	0.723	0.392	0.042	0.044	0.793	0.368	bdl	0.184	0.044	0.077	0.049	0.107	0.082	0.123
Gd	14.4	7.45	3.46	9.07	9.54	19.8	29.5	10.3	11.8	38.6	39.5	12.5	15.3	12.5	12.9	13.8	17.7	12.1	16.2
Tb	5.59	4.47	1.45	3.74	4.98	6.25	8.57	4.29	5.54	11.7	13.3	5.75	6.50	5.26	6.27	6.14	7.33	4.84	7.26
Dy	85.0	72.3	22.6	58.4	76.9	75.7	105	62.7	91.3	146	169	90.1	98.7	72.9	106	86.7	115	73.1	108
Ho	36.8	33.0	11.0	26.0	34.8	27.6	37.0	26.9	41.4	52.7	63.3	39.4	41.6	32.7	47.3	38.1	46.1	30.8	42.6
Er	211	207	71	152	202	131	169	149	241	238	308	222	234	192	268	208	244	169	233
Tm	52.0	54.9	18.9	40.7	51.3	26.5	33.0	34.7	55.9	46.2	60.4	52.1	58.2	41.5	58.4	46.7	57.1	41.3	51.7
Yb	532	607	212	444	549	246	272	361	560	390	547	503	584	427	576	490	544	388	480
Lu	116	137	51.8	100	123	50.1	52.7	80.9	121	73.6	107	102	125	92.1	117	103	118	82.1	104
Hf	10229	11719	8164	12622	11045	8875	7188	11403	12475	7845	8694	11220	11041	10539	9736	10126	10371	8839	9836
Pb	206	192	280	156	237	139	39	205	174	110	140	137	167	180	165	173	217	145	156
Th	99.2	36.1	42.3	61.3	85.3	165	50.5	116	60.3	126	135	60.3	102	112	82.0	111	148	99.4	88.6
U	830	803	629	787	1096	243	89	955	882	242	358	700	882	835	731	758	988	731	658
Th/U	0.12	0.04	0.07	0.08	0.08	0.68	0.57	0.12	0.07	0.52	0.38	0.09	0.12	0.13	0.11	0.15	0.15	0.14	0.13
Lu _N /Sm _N	353	1367	656	601	668	85.8	52.1	465	705	65.8	94.5	535	371	364	508	329	300	301	319
Eu/Eu*	0.23	0.06	0.32	0.12	0.04	0.21	0.07	0.03	0.02	0.12	0.05	\	0.07	0.02	0.04	0.02	0.04	0.04	0.05

Table S8 LA-ICP-MS analyses of zircon (#R26 and #R22). Concentration are given in p.p.m.. The subscript “N” indicates values normalized to chondrite. Eu/Eu* = 2Eu_N/(Gd_N+Sm_N).