

Supplementary Materials: Geology, Apatite Geochronology, and Geochemistry of the Ernest Henry Inter-Lens: Implications for a Re-Examined Deposit Model

Bradley W. Cave, Richard Lilly, Stijn Glorie and Jack Gillespie

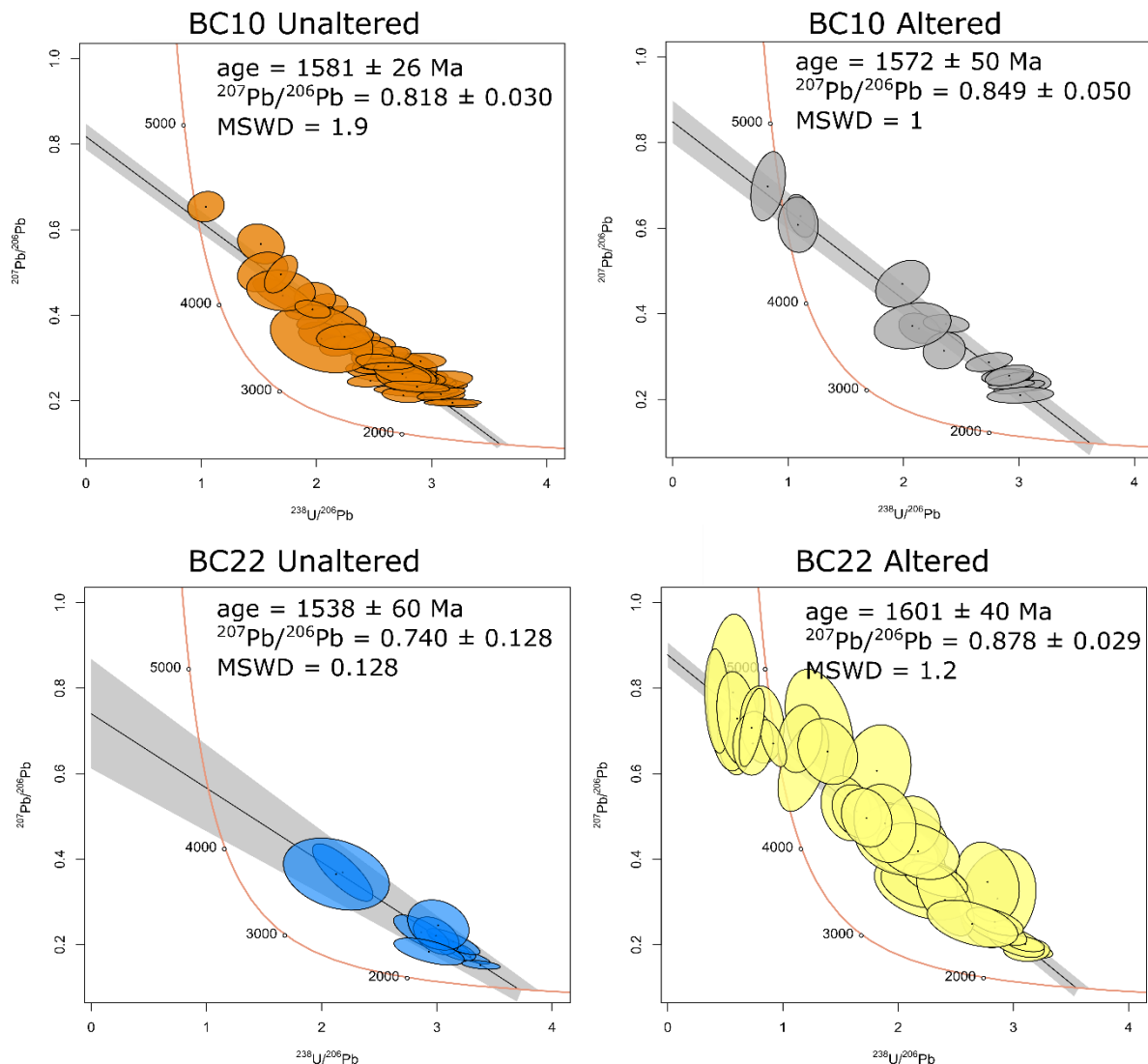


Figure S1. Individual geochronology results of altered and unaltered apatite.

Table S1. LA-ICP-MS parameters used in this study. Normal text represents parameters used during geochronology and trace element analysis. Text in italics represents the parameters used during the acquisition of trace element maps.

ICP-MS			
Brand and model		Agilent 7900× ICP-MS	
Forward power (W)		1350	
Gas flow (L/min)			
Cool (Ar)		15	
Auxiliary (Ar)		0.89	
Carrier (He)		0.35	
Sample (Ar)		1.06	
Laser			
Type of laser		ArF Excimer	
Brand and model		Resolution LR (Resonetics)	
Laser wavelength (nm)		193	
Pulse duration (ns)		20	
Spot Size (μm)		29	7
Laser Energy (mJ)		40	65
Repetition rate (Hz)		5	10
Energy attenuation (%)		50	100
Laser Fluence (J/cm ⁻²)		2.8	3.5
Laser warm up (background collection) (s)		30	10
Data Acquisition Parameters			
Data acquisition protocol		Time-resolved analysis	
Cleaning method		Firing 5 pulses followed by washout	
		24, 29, 31, 35, 43, 51, 55, 75, 88, 89, 90, 139, 140, 141, 146,	
Scanned masses		147, 153, 157, 159, 163, 165, 166, 169, 172, 175, 202, 204,	
		206, 207, 208, 232, 238	
Detection mode		Pulse counting	
Detector Deadtime (ns)		3.68	
Background collection (s)		30	
Ablation Time (s)		30	Variable
Washout (s)		20	
Settling Time (s)		0.053	0.089
		2 × NIST610,	
Ablation Sequence		2 × Madagascar,	1 × NIST610,
		2 × McClure Mountain,	10 × Unknown
		15 × Unknown	
Standardisation and Data Reduction			
Primary standard		Madagascar	NIST610
Secondary standard		McClure Mountain,	
		NIST610	
Data reduction software		Iolite, In House Excel	

Table S2. Apatite LA-ICP-MS U-Pb isotopic composition of altered and unaltered BC10 and BC22 samples. Errors associated with each measurement are absolute.

Sample	Sample Name	$^{238}\text{U}/^{206}\text{Pb}$	Prop 2 σ	$^{207}\text{Pb}/^{206}\text{Pb}$	Prop 2 σ	Error Correlation
	BC10A1	3.13	0.22	0.20	0.01	−0.63
	BC10A2	2.48	0.17	0.33	0.02	0.21
	BC10A3	2.77	0.18	0.26	0.01	0.15
	BC10A4	2.87	0.20	0.24	0.01	−0.14
	BC10A5	3.02	0.16	0.22	0.01	−0.18
	BC10A6	2.62	0.19	0.27	0.02	0.04
	BC10A7	2.22	0.17	0.39	0.03	−0.01
	BC10A8	2.38	0.15	0.34	0.02	0.39
	BC10A9	2.80	0.17	0.29	0.02	−0.26
	BC10A10	2.92	0.17	0.25	0.01	−0.04
	BC10A11	3.07	0.18	0.22	0.01	−0.24
	BC10A12	2.99	0.17	0.23	0.01	−0.07
	BC10A13	2.99	0.17	0.23	0.01	−0.09
	BC10A14	3.04	0.19	0.24	0.01	−0.25
	BC10A15	2.92	0.19	0.26	0.01	−0.07
	BC10A16	2.77	0.15	0.28	0.01	−0.03
	BC10A17	2.92	0.20	0.23	0.01	−0.45
	BC10A18	2.84	0.17	0.29	0.02	−0.39
	BC10A19	3.11	0.16	0.24	0.01	0.04
	BC10A20	2.89	0.16	0.24	0.01	0.17
	BC10A21	2.80	0.21	0.24	0.02	−0.58
	BC10A22	2.90	0.20	0.23	0.01	0.11
	BC10A23	2.99	0.18	0.25	0.01	−0.39
BC10 (unaltered)	BC10A24	2.86	0.20	0.24	0.01	−0.40
	BC10A25	2.99	0.17	0.25	0.01	0.06
	BC10A26	2.90	0.17	0.25	0.01	−0.08
	BC10A27	2.52	0.22	0.27	0.02	−0.32
	BC10A28	1.52	0.17	0.57	0.04	−0.18
	BC10A29	2.91	0.18	0.29	0.02	0.01
	BC10A30	3.18	0.20	0.20	0.01	0.06
	BC10A31	2.11	0.13	0.43	0.02	−0.07
	BC10A32	1.04	0.13	0.65	0.03	0.11
	BC10A33	3.03	0.27	0.25	0.02	0.34
	BC10A34	2.03	0.15	0.36	0.02	−0.20
	BC10A35	2.83	0.27	0.22	0.01	−0.35
	BC10A36	2.98	0.21	0.23	0.01	−0.47
	BC10A37	2.75	0.15	0.21	0.01	−0.24
	BC10A38	2.87	0.16	0.24	0.02	0.41
	BC10A39	2.86	0.18	0.25	0.01	0.10
	BC10A40	2.92	0.17	0.25	0.01	−0.21
	BC10A41	2.85	0.15	0.26	0.01	0.34
	BC10A42	2.82	0.17	0.24	0.01	0.41
	BC10A43	1.90	0.14	0.41	0.02	0.11
	BC10A44	1.99	0.15	0.44	0.03	−0.01
	BC10A45	2.47	0.16	0.25	0.01	0.18
	BC10A46	2.85	0.17	0.24	0.01	0.57
	BC10A47	2.62	0.14	0.31	0.02	0.28
	BC10A48	3.08	0.17	0.22	0.01	0.52

	BC10A49	2.61	0.17	0.30	0.02	0.44
	BC10A50	2.00	0.14	0.39	0.02	0.62
	BC10A51	2.49	0.15	0.28	0.01	0.16
	BC10A52	2.84	0.16	0.25	0.01	0.43
	BC10A53	1.71	0.21	0.45	0.03	−0.69
	BC10A54	2.79	0.17	0.25	0.02	−0.22
	BC10A55	2.49	0.16	0.30	0.02	−0.09
	BC10A56	2.19	0.13	0.33	0.02	0.19
	BC10A57	2.78	0.22	0.26	0.03	−0.25
	BC10A58	2.48	0.15	0.32	0.02	−0.16
	BC10A59	1.53	0.18	0.50	0.04	0.20
	BC10A60	2.04	0.36	0.35	0.07	−0.28
	BC10A61	1.69	0.24	0.46	0.04	−0.10
	BC10A62	1.69	0.12	0.50	0.04	0.50
	BC10A63	2.25	0.20	0.35	0.02	0.15
	BC10A64	2.60	0.21	0.29	0.02	−0.41
	BC10A65	2.75	0.20	0.26	0.02	−0.47
	BC10A66	2.87	0.23	0.23	0.01	−0.37
	BC10A67	2.62	0.18	0.28	0.01	0.13
	BC10A68	1.97	0.13	0.41	0.02	−0.36
BC10 (altered)	BC10B1	3.01	0.22	0.25	0.02	−0.33
	BC10B2	2.89	0.18	0.25	0.02	0.08
	BC10B3	0.83	0.12	0.70	0.07	0.31
	BC10B4	1.11	0.10	0.63	0.04	−0.33
	BC10B5	3.00	0.18	0.23	0.01	0.59
	BC10B6	2.74	0.17	0.29	0.02	0.40
	BC10B7	2.94	0.16	0.23	0.01	0.44
	BC10B8	2.93	0.16	0.25	0.01	0.61
	BC10B9	2.14	0.15	0.37	0.03	−0.25
	BC10B10	1.99	0.19	0.47	0.05	0.31
	BC10B11	2.37	0.16	0.38	0.02	−0.19
	BC10B12	2.92	0.17	0.26	0.02	0.39
	BC10B13	1.09	0.14	0.61	0.05	−0.04
	BC10B14	2.35	0.15	0.31	0.04	0.09
	BC10B15	3.01	0.24	0.21	0.02	0.19
	BC10B16	2.08	0.27	0.37	0.04	0.21
BC22A (unaltered)	BC22A1	3.29	0.14	0.17	0.01	−0.79
	BC22A2	3.11	0.14	0.20	0.02	−0.88
	BC22A3	2.18	0.21	0.37	0.06	−0.78
	BC22A4	2.13	0.38	0.37	0.07	−0.28
	BC22A5	3.16	0.14	0.19	0.02	−0.58
	BC22A6	2.87	0.20	0.23	0.03	−0.69
	BC22A7	3.38	0.14	0.15	0.01	−0.43
	BC22A8	2.99	0.16	0.22	0.04	−0.40
	BC22A9	3.01	0.22	0.25	0.05	−0.21
	BC22A10	2.93	0.25	0.18	0.03	−0.60
	BC22A11	3.14	0.19	0.21	0.03	−0.78
BC22B (altered)	BC22B1	3.11	0.19	0.20	0.02	−0.65
	BC22B2	1.32	0.24	0.71	0.11	−0.34
	BC22B3	0.57	0.12	0.67	0.06	−0.18
	BC22B4	0.57	0.18	0.79	0.15	0.04
	BC22B5	0.43	0.09	0.77	0.10	−0.18

BC22B (altered)	BC22B6	0.61	0.15	0.73	0.09	−0.25
	BC22B7	1.89	0.22	0.48	0.08	−0.14
	BC22B8	1.73	0.18	0.50	0.06	−0.16
	BC22B9	2.84	0.20	0.25	0.03	−0.55
	BC22B10	2.65	0.32	0.25	0.05	−0.44
	BC22B11	2.87	0.27	0.31	0.09	0.16
	BC22B12	3.12	0.16	0.19	0.02	−0.03
	BC22B13	3.02	0.20	0.21	0.03	−0.57
	BC22B14	1.82	0.24	0.61	0.09	0.11
	BC22B15	2.19	0.18	0.40	0.05	−0.34
	BC22B16	2.22	0.35	0.33	0.06	−0.36
	BC22B17	1.55	0.18	0.52	0.06	−0.19
	BC22B18	1.99	0.29	0.44	0.05	−0.53
	BC22B19	2.18	0.27	0.34	0.05	−0.32
	BC22B20	3.11	0.14	0.20	0.02	−0.42
	BC22B21	2.84	0.23	0.24	0.03	−0.68
	BC22B22	2.78	0.22	0.35	0.08	−0.21
	BC22B23	1.95	0.18	0.45	0.07	−0.10
	BC22B24	2.33	0.23	0.35	0.03	−0.49
	BC22B25	0.82	0.15	0.72	0.07	−0.08
	BC22B26	2.41	0.20	0.31	0.07	−0.55
	BC22B27	2.03	0.33	0.45	0.07	−0.15
	BC22B28	1.18	0.18	0.62	0.09	0.50
	BC22B29	1.15	0.16	0.68	0.07	0.18
	BC22B30	0.74	0.14	0.67	0.06	0.06
	BC22B31	2.13	0.19	0.48	0.06	−0.01
	BC22B32	0.92	0.09	0.67	0.05	−0.58
	BC22B33	0.73	0.09	0.71	0.08	0.59
	BC22B34	1.39	0.21	0.65	0.06	−0.18
	BC22B35	2.17	0.29	0.42	0.05	−0.29
	BC22B36	1.64	0.18	0.51	0.05	−0.24
