

## Supplementary Data Appendix for McDannell and Issler, *Geochronology* journal (GChron)

### *Title: Simulating sedimentary burial cycles: Investigating the role of apatite fission track annealing kinetics using synthetic data*

#### Synthetic Apatite Fission Track Data

generated using QTQt v. 5.7 and the Ketcham et al. 1999 AFT kinetic model and the RDAAM model for apatite (U-Th)/He from Flowers et al. 2009

#### Forward Model t-T path

Time (Ma)	Temp. C
2000	300
1700	20
1200	20
1000	110
700	20
400	20
300	60
200	20
0	20

#### AFT External Detector Method

Zeta	350 ± 0
$\rho_D$	2500000
Nd	10000

#### AFT Population 1

Ns	Ni	eCl (apfu)	$r_{mr0}$	AFT Age (Ma)	Error (Ma, 1 $\sigma$ )
266	163	-0.1438	0.882	677	67
35	20	-0.1438	0.882	723	203
105	64	-0.1438	0.882	681	108
433	268	-0.1438	0.882	671	52
58	37	-0.1438	0.882	652	137
301	183	-0.1438	0.882	682	64
234	147	-0.1438	0.882	661	70
101	66	-0.1438	0.882	637	101
194	123	-0.1438	0.882	656	76
81	49	-0.1438	0.882	685	124

#### AFT Population 2

277	132	0.0566	0.820	858	91
53	26	0.0566	0.820	835	200
256	123	0.0566	0.820	852	93
59	29	0.0566	0.820	834	189
188	90	0.0566	0.820	855	110
401	195	0.0566	0.820	842	74
215	111	0.0566	0.820	796	93
584	289	0.0566	0.820	829	60
97	47	0.0566	0.820	845	150
681	323	0.0566	0.820	862	58

**AFT Population 3**

203	50	0.7256	0.263	1569	248
331	80	0.7256	0.263	1595	199
315	79	0.7256	0.263	1544	194
87	21	0.7256	0.263	1597	388
401	99	0.7256	0.263	1566	176
207	50	0.7256	0.263	1596	252
241	55	0.7256	0.263	1678	251
383	87	0.7256	0.263	1685	200
24	6	0.7256	0.263	1548	707
28	7	0.7256	0.263	1548	654

**Population 1 Lengths**

c-axis proj. length (μm)	eCl (apfu)
9.994477	-0.1438
11.013192	-0.1438
11.293991	-0.1438
11.326738	-0.1438
11.468609	-0.1438
11.592709	-0.1438
11.59378	-0.1438
11.676818	-0.1438
11.69703	-0.1438
11.808044	-0.1438
11.878978	-0.1438
11.864059	-0.1438
12.012403	-0.1438
12.000959	-0.1438
12.148249	-0.1438
12.099224	-0.1438
12.191548	-0.1438
12.194057	-0.1438
12.295199	-0.1438
12.329617	-0.1438
12.288559	-0.1438
12.435199	-0.1438
12.369963	-0.1438
12.394975	-0.1438
12.499317	-0.1438
12.500896	-0.1438
12.625115	-0.1438
12.570947	-0.1438
12.605888	-0.1438
12.692422	-0.1438
12.698635	-0.1438
12.830657	-0.1438
12.792576	-0.1438
12.933098	-0.1438
12.923919	-0.1438
12.969584	-0.1438
12.982466	-0.1438

**Population 2 Lengths**

c-axis proj. length (μm)	eCl (apfu)
10.572646	0.0566
11.781016	0.0566
12.309372	0.0566
12.491276	0.0566
12.61832	0.0566
12.681312	0.0566
12.907214	0.0566
12.904334	0.0566
13.043555	0.0566
13.117426	0.0566
13.178787	0.0566
13.281459	0.0566
13.300046	0.0566
13.299621	0.0566
13.406635	0.0566
13.406725	0.0566
13.507586	0.0566
13.474576	0.0566
13.615072	0.0566
13.576585	0.0566
13.692743	0.0566
13.680256	0.0566
13.701384	0.0566
13.76251	0.0566
13.782937	0.0566
13.784164	0.0566
13.914994	0.0566
13.92041	0.0566
13.885155	0.0566
13.988583	0.0566
13.981666	0.0566
13.98897	0.0566
14.105799	0.0566
14.112125	0.0566
14.06905	0.0566
14.191834	0.0566
14.213143	0.0566

**Population 3 Lengths**

c-axis proj. length (μm)	eCl (apfu)
11.072646	0.7256
12.281016	0.7256
12.509372	0.7256
12.691276	0.7256
12.81832	0.7256
12.881311	0.7256
13.107214	0.7256
13.104334	0.7256
13.243555	0.7256
13.217425	0.7256
13.278788	0.7256
13.381459	0.7256
13.400046	0.7256
13.49962	0.7256
13.606635	0.7256
13.606725	0.7256
13.707586	0.7256
13.674576	0.7256
13.815072	0.7256
13.776585	0.7256
13.792744	0.7256
13.880256	0.7256
13.901383	0.7256
13.96251	0.7256
13.982937	0.7256
14.084165	0.7256
14.114994	0.7256
14.22041	0.7256
14.185155	0.7256
14.188583	0.7256
14.281665	0.7256
14.28897	0.7256
14.405799	0.7256
14.512126	0.7256
14.469049	0.7256
14.491834	0.7256
14.613143	0.7256

13.11321	-0.1438	14.296952	0.0566	14.696952	0.7256
13.093084	-0.1438	14.286655	0.0566	14.686655	0.7256
13.231376	-0.1438	14.290898	0.0566	14.690899	0.7256
13.198408	-0.1438	14.302502	0.0566	14.802502	0.7256
13.311654	-0.1438	14.364079	0.0566	14.764079	0.7256
13.411748	-0.1438	14.380968	0.0566	14.880968	0.7256
13.526132	-0.1438	14.399599	0.0566	14.899599	0.7256
13.523762	-0.1438	14.474761	0.0566	14.974761	0.7256
13.595348	-0.1438	14.516271	0.0566	15.016271	0.7256
13.690742	-0.1438	14.613955	0.0566	15.113955	0.7256
13.798098	-0.1438	14.600111	0.0566	15.100111	0.7256
13.935953	-0.1438	14.577305	0.0566	15.077305	0.7256
13.913493	-0.1438	14.70774	0.0566	15.20774	0.7256
14.082749	-0.1438	14.700412	0.0566	15.200412	0.7256
14.07636	-0.1438	14.717691	0.0566	15.317692	0.7256
14.207253	-0.1438	14.826674	0.0566	15.326674	0.7256
14.175764	-0.1438	14.819772	0.0566	15.419771	0.7256
14.290418	-0.1438	14.882374	0.0566	15.482374	0.7256
14.378723	-0.1438	14.8838	0.0566	15.4838	0.7256
14.514215	-0.1438	15.010104	0.0566	15.610105	0.7256
14.598187	-0.1438	15.00022	0.0566	15.60022	0.7256
14.72261	-0.1438	15.005157	0.0566	15.705156	0.7256
14.708782	-0.1438	15.091372	0.0566	15.691372	0.7256
14.810141	-0.1438	15.204167	0.0566	15.804167	0.7256
14.841274	-0.1438	15.171587	0.0566	15.771587	0.7256
14.897432	-0.1438	15.297623	0.0566	15.897623	0.7256
14.983712	-0.1438	15.290012	0.0566	15.990012	0.7256
15.024177	-0.1438	15.413465	0.0566	16.013464	0.7256
15.096138	-0.1438	15.495775	0.0566	16.095774	0.7256
15.229821	-0.1438	15.487552	0.0566	16.18755	0.7256
15.311528	-0.1438	15.60983	0.0566	16.209829	0.7256
15.400578	-0.1438	15.693104	0.0566	16.393103	0.7256
15.509271	-0.1438	15.806542	0.0566	16.50654	0.7256
15.615856	-0.1438	15.877684	0.0566	16.477682	0.7256
15.689302	-0.1438	15.991374	0.0566	16.791372	0.7256
15.793824	-0.1438	16.107264	0.0566	16.907265	0.7256
16.113409	-0.1438	16.499939	0.0566	17.099939	0.7256
16.310587	-0.1438	16.892206	0.0566	17.792206	0.7256