Sample	Small aliquot data						Single grain data					
	n	OD (%)	D_e CAM (Gy)	Age CAM (a)	D_e MAM* (Gy)	Age MAM* (a)	n	OD (%)	D_e CAM (Gy)	Age CAM (a)	D_e MAM* (Gy)	Age MAM* (a)
SB1 C36	46	29	1.33 ± 0.06	920 ± 75	1.17 ± 0.10	810 ± 90	75	66	1.20 ± 0.10	830 ± 90	0.92 ± 0.05	**635 ± 55**
SB1 C60	27	20	7.41 ± 0.31	4’660 ± 350	-	-	35	28	7.17 ± 0.38	**4’510 ± 370**	-	-
SB1 F40	40	27	1.30 ± 0.06	955 ± 85	1.15 ± 0.10	845 ± 100	76	62	1.30 ± 0.10	955 ± 100	1.08 ± 0.05	**790 ± 70**
SB1 F140	23	20	5.94 ± 0.27	5’160 ± 430	-	-	40	21	5.88 ± 0.23	**5’100 ± 410**	-	-

Table S1 Small aliquot and single grain De values and ages, calculated using the CAM and MAM.

*Sigma b = 0.2 for small aliquot and 0.28 for single grain data

Sample	K (%)	Th (ppm)	U (ppm)	D (Gy ka^{-1})
SB1 C36	0.85 ± 0.01	6.45 ± 0.10	2.47 ± 0.49	1.45 ± 0.10
SB1 C60	0.95 ± 0.01	7.40 ± 0.18	1.88 ± 0.13	1.59 ± 0.10
SB1 F40	0.70 ± 0.02	6.39 ± 0.33	1.84 ± 0.22	1.36 ± 0.10
SB1 F140	0.52 ± 0.02	5.88 ± 0.26	1.35 ± 0.33	1.15 ± 0.08

Table S2 Dosimetric data

Elemental composition

Depth: Ridge 1	SiO2	Na2O	MgO	K2O	CaO	Al2O3	P2O5	Fe2O3	Ti	Mn	Fe/Al	Fe/Ti
0-10	81.41	0.242	0.65	1.88	0.037	10.1	1127	2.51	0.557	0.038	0.248	4.506
10-20	83.74	0.282	0.57	1.7	0.043	8.6	2588	2.3	0.525	0.043	0.267	4.381
20-30	80.08	0.303	0.71	1.95	0.068	10.4	2702	2.97	0.576	0.048	0.285	5.156
30-40	76.33	0.308	0.90	2.35	0.082	12.6	2588	3.71	0.665	0.094	0.296	5.579
40-50	77.71	0.315	0.86	2.2	0.087	11.9	2908	3.57	0.595	0.038	0.301	6.000
50-60	76.52	0.294	0.94	2.19	0.092	12.0	1825	4.13	0.557	0.027	0.345	7.415
60-70	70.89	0.286	1.20	2.71	0.174	15.0	2281	4.75	0.581	0.048	0.317	8.176
70-80	67.52	0.318	1.38	2.9	0.218	17.0	2121	5.16	0.648	0.036	0.304	7.963
80-90	72.29	0.392	1.14	2.46	0.182	14.0	1383	4.46	0.545	0.044	0.319	8.183
Ridge 3												
10-25	87.26	0.216	0.38	1.27	0.017	6.9	1429	1.55	0.195	0.010	0.224	7.949
30-40	89.26	0.201	0.32	1.15	0.016	5.7	724	1.75	0.178	0.030	0.308	9.831
40-50	86.58	0.228	0.42	1.44	0.020	7.1	524	1.86	0.211	0.031	0.263	8.815
50-60	87.67	0.184	0.44	1.37	0.017	6.7	769	1.84	0.192	0.043	0.273	9.583
60-70	87.57	0.200	0.50	1.37	0.015	7.0	627	1.75	0.174	0.025	0.252	10.057
70-80	85.68	0.210	0.60	1.66	0.017	8.1	772	2.00	0.203	0.032	0.248	9.852
90-100	87.38	0.144	0.50	1.55	0.019	7.0	1310	1.85	0.199	0.028	0.266	9.296
100-110	85.66	0.182	0.60	1.74	0.023	8.2	1239	2.20	0.192	0.025	0.269	11.458
Canal 3												
15-25	84.84	0.223	0.42	1.47	0.047	7.9	1734	1.59	0.226	0.0311	0.201	7.035
25-35	82.04	0.214	0.55	1.65	0.042	8.8	987	3.55	0.217	0.144	0.403	16.359
35-45	79.41	0.235	0.70	1.89	0.045	10.2	637	4.47	0.218	0.105	0.440	20.505
45-55	87.09	0.202	0.51	1.42	0.032	7.1	705	2.02	0.151	0.0832	0.285	13.377
55-65	85.44	0.212	0.64	1.72	0.034	8.4	700	1.97	0.173	0.0372	0.234	11.387
65-75	85.46	0.202	0.636	1.73	0.034	8.4	1270	2.01	0.172	0.0236	0.239	11.686
75-85	86.89	0.205	0.56	1.54	0.029	7.5	1570	1.82	0.142	0.0153	0.242	12.817
85-90	87.6	0.172	0.53	1.57	0.034	7.1	1810	1.77	0.158	0.0177	0.248	11.203
Ridge 4												
0-10	78.74	0.265	0.73	1.87	0.110	11.0	1970	2.69	0.593	0.0558	0.245	4.536
10-20	81.43	0.296	0.66	1.89	0.074	10.2	1050	2.88	0.609	0.0253	0.282	4.729
20-35	72.52	0.283	1.00	2.49	0.132	14.5	1160	4.61	0.649	0.123	0.318	7.103
40-50	71.37	0.283	1.14	2.57	0.164	15.1	1480	4.58	0.631	0.0591	0.303	7.258
50-60	63.05	0.287	1.49	3.01	0.222	18.2	1260	6.77	0.664	0.0504	0.372	10.196
70-80	64.48	0.316	1.46	2.96	0.236	17.7	1200	6.01	0.657	0.0404	0.339	9.148
80-90	62.76	0.336	1.52	3.02	0.240	18.2	1460	6.24	0.664	0.0493	0.343	9.398
90-100	59.48	0.321	1.59	3.14	0.249	19.1	1058	7.40	0.732	0.0404	0.388	10.109
Canal 4												
0-10	77.16	0.257	0.69	2.14	0.107	12.1	1239	2.45	0.674	0.0386	0.203	3.635
10-20	77.23	0.295	0.70	2.08	0.077	11.7	1067	4.10	0.646	0.0463	0.351	6.347
20-30	74.43	0.286	0.87	2.31	0.081	13.0	1298	4.68	0.662	0.0426	0.361	7.069
30-40	68.83	0.287	1.20	2.68	0.122	15.9	1191	5.47	0.618	0.0495	0.344	8.851
50-60	69.23	0.317	1.24	2.71	0.135	15.8	1044	4.74	0.644	0.0452	0.300	7.360
70-80	58.72	0.310	1.59	3.29	0.255	19.3	1108	7.35	0.758	0.0705	0.381	9.697
No field												
0-10	76.99	0.271	0.70	1.96	0.089	12.0	1653	2.30	0.327	0.0187	0.192	7.034
10-20	66.44	0.278	0.95	2.29	0.098	15.0	1521	8.08	0.322	0.0354	0.537	25.093
20-30	63.31	0.273	1.33	2.79	0.098	18.67	1270	5.96	0.338	0.0566	0.319	17.633
30-40	60.14	0.282	1.49	2.99	0.111	19.7	898	6.71	0.362	0.115	0.340	18.536
40-50	63.43	0.252	1.42	2.82	0.114	18.6	843	5.72	0.329	0.026	0.308	17.386
50-60	71.12	0.304	1.22	2.6	0.126	15.9	851	4.22	0.302	0.0147	0.266	13.974
60-70	49.37	0.447	1.55	2.56	0.611	16.1	1630	5.49	0.286	0.0506	0.341	19.196
70-80	65.59	0.317	1.44	2.82	0.182	180.	2710	5.53	0.328	0.0298	0.307	16.860
80-90	60.37	0.328	1.62	3.03	0.246	19.5	2500	6.83	0.374	0.0424	0.351	18.262
0-10	76.99	0.271	0.70	1.96	0.089	12.0	1653	2.30	0.327	0.0187	0.192	7.034

Table S2 Elemental composition