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Article:

Poulton, SW orcid.org/0000-0001-7621-189X, Bekker, A, Cumming, VM et al. (3 more authors) (2021) A 200-million-year delay in permanent atmospheric oxygenation. *Nature*, 592. pp. 232-236. ISSN 0028-0836

<https://doi.org/10.1038/s41586-021-03393-7>

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Supplementary Information

Table S1. Geochemical data for core EBA-1. BD = below detection.

Depth (m)	Formation/ Member	TOC (wt%)	Al (wt%)	Fe _T (wt%)	Fe _{AVS} (wt%)	Fe _{py} (wt%)	Fe _{HR} (wt%)	Fe _{PRS} (wt%)
544.5	Boshoek	0.18	7.69	7.609	BD	0.010	1.513	4.375
545.5	Boshoek	0.17	7.14	5.602	BD	0.005	1.113	2.449
548.0	Boshoek	0.18	8.24	5.563	BD	0.006	0.886	2.349
550.0	Boshoek	0.30	7.86	6.854	BD	0.012	1.179	2.692
558.3	Boshoek	0.10	5.79	5.980	BD	0.006	1.131	2.640
559.2	Boshoek	0.12	8.32	7.027	BD	0.031	0.601	3.014
561.3	Boshoek	0.14	9.89	8.548	BD	0.014	0.966	3.621
561.6	Boshoek	0.16	10.10	6.177	BD	0.005	0.828	3.173
563.0	Boshoek	0.10	10.10	5.041	BD	0.006	0.972	0.841
564.5	Boshoek	0.12	10.34	6.332	BD	0.010	1.166	3.347
567.0	Boshoek	0.13	11.94	5.508	BD	0.135	1.161	2.391
568.0	Boshoek	0.13	12.74	6.277	BD	0.133	1.153	2.733
568.5	Boshoek	0.14	11.92	6.126	BD	0.022	1.166	2.720
569.0	Boshoek	0.15	11.79	5.962	BD	0.096	1.320	2.673
573.3	Boshoek	0.09	6.72	3.944	BD	0.057	1.096	1.686
573.5	Boshoek	0.18	6.60	2.926	BD	0.010	1.013	0.406
573.6	Reitfontein	1.87	12.96	1.964	BD	0.024	0.303	0.411
574.0	Reitfontein	0.34	10.60	4.772	BD	0.006	0.714	2.275
574.4	Reitfontein	0.37	10.31	4.622	BD	0.005	0.804	2.095
575.05	Reitfontein	0.18	8.45	5.620	BD	0.056	1.188	2.869
575.8	Reitfontein	0.17	8.23	6.914	0.044	0.009	1.025	3.833
577.1	Reitfontein	0.17	8.24	6.515	0.001	0.089	0.969	3.508
577.6	Reitfontein	0.19	8.12	7.062	BD	0.020	1.108	3.135
578.6	Reitfontein	0.17	8.56	7.155	BD	0.013	1.569	3.719
580.3	Reitfontein	0.17	8.85	7.031	0.008	0.004	1.139	3.509
581.7	Reitfontein	0.15	6.58	5.825	0.062	0.010	1.319	2.691
582.9	Reitfontein	0.14	8.07	5.947	BD	0.009	1.065	2.848
583.5	Reitfontein	0.22	7.93	6.226	BD	0.013	1.086	2.616
584.4	Reitfontein	0.16	7.79	5.777	0.001	0.002	0.903	2.876
584.8	Reitfontein	0.16	7.50	7.431	BD	0.010	1.185	3.066
585.3	Timeball Hill	0.16	8.57	5.786	BD	0.004	1.086	3.308
585.5	Timeball Hill	0.14	8.45	5.916	BD	0.001	0.869	0.031
586.6	Timeball Hill	0.12	10.96	6.481	BD	0.003	0.805	3.115
588.0	Timeball Hill	0.18	9.33	5.681	BD	0.013	0.972	2.494
595.0	Timeball Hill	0.16	10.60	4.937	0.038	0.027	0.678	2.007
603.5	Timeball Hill	0.25	8.80	6.420	BD	0.014	0.994	3.211
610.0	Timeball Hill	0.35	6.38	3.990	BD	0.008	0.676	1.779
614.5	Timeball Hill	0.36	8.05	5.525	BD	0.011	0.844	0.892
622.0	Timeball Hill	0.33	8.36	5.355	BD	0.017	1.069	2.237
633.5	Timeball Hill	0.08	8.03	6.895	BD	0.004	1.380	0.844
637.0	Timeball Hill	0.07	8.19	6.385	BD	0.005	1.091	2.362
642.5	Timeball Hill	0.10	8.48	6.526	BD	0.013	1.124	3.293
658.0	Timeball Hill	0.22	8.83	6.394	BD	0.037	1.310	3.590
664.0	Timeball Hill	0.34	8.96	6.765	BD	0.008	0.885	0.992
670.0	Timeball Hill	0.38	11.12	6.615	BD	0.006	0.764	3.414
681.0	Timeball Hill	0.32	10.94	6.940	BD	0.005	0.983	3.540
684.0	Timeball Hill	0.30	9.15	7.014	BD	0.021	1.355	4.141
690.0	Timeball Hill	0.36	10.98	6.497	BD	0.200	1.311	3.184
716.0	Timeball Hill	1.50	9.28	4.605	BD	0.005	0.724	0.739
797.0	Timeball Hill	1.01	8.70	4.181	BD	0.007	0.605	2.279
805.0	Timeball Hill	0.40	9.11	5.084	BD	0.002	0.511	2.156
813.0	Timeball Hill	0.51	8.85	8.880	BD	0.002	1.272	4.654

821.5	Timeball Hill	2.54	10.45	6.005	BD	0.016	0.984	2.651
826.2	Timeball Hill	2.69	10.94	5.575	BD	0.060	0.884	2.472
835.5	Timeball Hill	1.36	11.13	4.428	BD	0.027	0.819	0.806
842.0	Timeball Hill	2.14	11.50	5.065	BD	0.038	0.501	1.045
853.2	Timeball Hill	0.25	10.41	5.668	BD	0.001	1.034	2.404
856.0	Timeball Hill	0.43	14.72	12.71	BD	0.001	1.363	5.904
896.0	Galsrand	0.29	10.48	7.048	BD	0.003	0.907	3.154
996.0	Timeball Hill	0.18	12.85	7.284	BD	0.025	0.672	3.066
1008.0	Timeball Hill	0.36	11.65	6.087	BD	0.003	0.751	1.449
1014.5	Timeball Hill	0.40	12.61	6.096	BD	0.001	0.559	0.498
1023.0	Timeball Hill	0.36	11.24	5.860	BD	0.033	0.630	1.951
1032.5	Timeball Hill	0.31	9.60	3.962	BD	0.046	0.839	1.221
1038.0	Timeball Hill	0.47	13.32	7.413	BD	0.025	0.785	1.615
1045.0	Timeball Hill	0.37	12.72	6.319	BD	0.002	0.614	1.504
1053.0	Timeball Hill	0.48	14.31	8.189	BD	0.002	0.668	0.597
1058.0	Timeball Hill	0.42	11.95	7.689	BD	0.694	1.579	2.336
1061.5	Timeball Hill	0.50	11.09	6.378	BD	0.001	0.715	1.295
1067.5	Timeball Hill	0.70	10.72	5.927	BD	0.003	0.702	0.401
1072.0	Timeball Hill	0.57	11.78	7.172	BD	0.005	0.961	0.611
1079.0	Timeball Hill	0.49	11.75	6.264	BD	0.034	0.912	1.964
1087.2	Timeball Hill	0.46	10.47	5.675	BD	0.027	0.791	1.538
1095.5	Timeball Hill	0.65	11.13	5.612	BD	0.007	0.793	0.445
1107.2	Timeball Hill	0.62	11.79	5.746	BD	0.001	0.932	1.044
1110.0	Timeball Hill	0.66	11.46	5.279	BD	0.016	0.703	1.353
1121.5	Timeball Hill	0.80	10.58	5.583	BD	0.036	1.565	1.142
1130.0	Timeball Hill	0.97	11.59	2.824	BD	0.113	0.742	0.352
1137.0	Timeball Hill	1.69	10.43	2.235	BD	0.239	1.306	0.573
1144.5	Timeball Hill	0.94	10.41	3.802	BD	0.096	1.477	1.032
1153.0	Timeball Hill	3.92	11.31	1.640	BD	0.012	0.447	0.249
1155.0	Timeball Hill	0.99	8.92	3.099	BD	0.101	1.414	1.038
1158.5	Timeball Hill	1.85	2.51	24.65	BD	0.654	4.288	4.495
1158.55	Timeball Hill	1.34	1.10	32.84	BD	3.286	6.192	1.147
1158.6	Timeball Hill	2.78	2.98	23.26	0.008	1.400	5.253	3.201
1158.65	Timeball Hill	6.33	6.71	2.309	0.010	1.108	1.957	0.329
1160.0	Timeball Hill	5.20	6.94	8.359	BD	0.673	1.712	1.423
1160.05	Timeball Hill	6.25	7.79	2.282	0.289	0.907	1.834	0.744
1162.0	Timeball Hill	4.69	6.70	1.366	BD	0.123	0.603	0.615
1168.0	Rooihogte	0.45	11.40	2.749	BD	0.137	0.769	0.438
1169.4	Rooihogte	0.36	9.69	4.537	BD	0.001	1.153	0.735
1171.2	Rooihogte	0.30	12.68	1.833	BD	0.066	0.363	0.696
1172.7	Rooihogte	0.20	10.88	1.789	BD	0.002	0.410	0.697
1173.2	Rooihogte	0.33	14.26	1.490	BD	0.025	0.290	0.663
1173.7	Rooihogte	0.38	12.60	2.389	BD	0.086	0.488	0.891
1174.2	Rooihogte	0.23	12.53	2.366	BD	0.119	0.496	0.444
1177.7	Rooihogte	0.23	9.03	5.660	BD	0.053	0.885	2.163
1180.5	Rooihogte	0.24	10.27	7.347	BD	0.006	1.781	3.400
1184.9	Rooihogte	0.24	11.70	4.943	BD	0.001	0.971	2.870
1191.0	Rooihogte	0.25	11.42	6.822	BD	0.030	1.145	1.422
1191.7	Rooihogte	0.21	11.22	5.526	BD	0.006	1.170	2.489
1192.3	Rooihogte	0.40	13.08	4.734	BD	0.035	0.815	0.830
1192.4	Rooihogte	0.67	12.62	3.018	BD	0.001	0.539	1.415
1196.8	Rooihogte	0.64	13.95	3.912	BD	0.025	0.409	1.301

Table S2. Geochemical data for core EBA-2. BD = below detection; ND = not determined.

Depth (m)	Formation/ Member	TOC (wt%)	Al (wt%)	Fe _T (wt%)	Fe _{AVS} (wt%)	Fe _{py} (wt%)	Fe _{HR} (wt%)	Fe _{PRS} (wt%)
794.0	Reitfontein	0.05	7.52	7.894	0.075	0.046	0.672	2.491
795.5	Reitfontein	0.02	5.45	6.327	0.162	0.038	0.786	1.626
802.0	Reitfontein	0.06	5.95	5.901	0.059	0.040	0.573	2.436
802.7	Reitfontein	0.17	4.52	6.842	0.038	0.031	1.285	3.601
808.0	Timeball Hill	0.30	6.98	4.473	BD	0.018	0.600	1.499
819.0	Timeball Hill	0.07	6.77	4.699	BD	0.015	0.388	1.285
830.0	Timeball Hill	0.10	5.61	4.049	BD	0.003	0.420	1.180
833.5	Timeball Hill	0.19	8.34	4.735	BD	0.003	0.331	1.648
850.0	Timeball Hill	0.40	6.94	4.904	0.004	0.024	0.570	2.123
868.0	Timeball Hill	0.15	3.24	3.105	BD	0.003	0.302	1.576
894.0	Timeball Hill	0.29	6.81	4.938	BD	0.010	0.702	2.365
912.0	Timeball Hill	0.38	7.24	5.797	BD	0.006	0.703	2.894
943.0	Timeball Hill	0.86	10.37	6.676	BD	0.050	0.821	3.504
947.5	Timeball Hill	0.86	7.63	8.544	BD	0.004	0.346	2.890
994.0	Timeball Hill	0.66	8.56	3.451	BD	0.017	0.303	1.257
1002.0	Timeball Hill	0.17	6.81	6.280	BD	0.005	0.620	2.159
1007.0	Timeball Hill	0.46	10.27	5.637	0.002	0.009	0.392	1.869
1012.5	Timeball Hill	0.45	11.61	4.779	BD	0.018	0.428	1.810
1013.0	Timeball Hill	0.50	9.49	4.317	BD	0.011	0.302	1.259
1020.0	Timeball Hill	0.18	11.10	24.43	BD	0.012	1.483	9.271
1022.0	Timeball Hill	0.12	9.06	3.359	BD	0.008	0.204	1.051
1091.0	Timeball Hill	0.28	11.13	5.465	BD	0.015	0.713	2.987
1097.0	Timeball Hill	0.20	3.95	26.09	0.023	0.034	4.096	10.62
1104.0	Timeball Hill	0.14	6.60	11.11	BD	0.012	1.018	3.758
1112.0	Timeball Hill	0.29	12.54	5.598	BD	0.006	0.758	3.022
1183.0	Timeball Hill	0.31	13.26	5.396	BD	0.053	0.334	1.298
1191.0	Timeball Hill	0.29	7.69	4.471	BD	0.005	0.419	1.278
1202.0	Timeball Hill	0.30	12.90	5.117	BD	0.005	0.342	1.260
1202.5	Timeball Hill	0.40	12.11	4.931	BD	0.008	0.295	1.146
1215.5	Timeball Hill	0.30	7.44	4.333	BD	0.007	0.355	0.983
1224.0	Timeball Hill	0.39	9.81	4.324	BD	0.027	0.444	1.171
1231.5	Timeball Hill	0.31	5.97	3.921	BD	0.002	0.406	0.793
1242.5	Timeball Hill	0.22	4.73	2.983	BD	0.025	0.865	0.662
1253.5	Timeball Hill	0.63	9.05	5.264	BD	0.014	0.434	1.197
1259.0	Timeball Hill	0.48	9.60	5.184	BD	0.010	0.486	1.244
1266.0	Timeball Hill	0.50	7.66	5.402	BD	0.160	0.755	0.937
1275.5	Timeball Hill	0.68	10.15	5.386	BD	0.021	0.335	1.288
1284.0	Timeball Hill	0.59	8.52	5.360	BD	0.015	0.818	1.241
1288.3	Timeball Hill	0.76	9.14	4.446	BD	0.009	0.551	1.112
1296.0	Timeball Hill	0.69	7.17	4.033	BD	0.011	0.752	1.217
1301.5	Timeball Hill	0.92	9.48	4.627	BD	0.009	0.542	0.991
1304.0	Timeball Hill	0.69	10.88	4.246	BD	0.096	0.579	1.001
1312.0	Timeball Hill	0.95	9.15	3.838	BD	0.026	1.203	1.234
1316.0	Timeball Hill	1.20	9.62	2.667	BD	0.018	0.971	0.897
1319.0	Timeball Hill	1.11	7.36	3.333	BD	0.025	1.318	1.388
1324.5	Timeball Hill	0.51	9.99	1.026	BD	0.032	0.133	0.303
1324.6	Timeball Hill	0.29	4.84	6.501	BD	0.470	5.363	1.004
1325.5	Timeball Hill	0.63	7.98	1.586	BD	0.056	0.472	0.513
1327.0	Timeball Hill	0.68	7.65	7.232	BD	0.041	2.763	2.771
1329.8	Timeball Hill	1.89	8.91	9.339	BD	0.284	2.380	2.814
1330.0	Timeball Hill	3.49	4.38	14.86	0.003	0.091	6.818	4.989
1331.5	Timeball Hill	1.09	5.75	8.270	0052	0.063	3.995	2.507
1331.98	Timeball Hill	1.10	8.68	6.871	BD	0.027	1.324	1.693
1332.01	Timeball Hill	1.23	8.81	6.317	BD	0.058	2.316	2.596

1332.04	Timeball Hill	1.30	5.68	3.723	BD	0.050	1.162	1.423
1332.07	Timeball Hill	1.17	5.32	3.998	BD	0.105	1.959	1.315
1332.1	Timeball Hill	1.14	7.73	2.792	BD	0.086	0.705	0.964
1332.6	Timeball Hill	1.72	8.78	3.579	BD	0.033	0.711	1.033
1332.7	Timeball Hill	1.82	7.25	2.064	0.008	0.028	0.363	0.742
1332.8	Timeball Hill	2.81	8.53	3.155	BD	0.162	0.699	0.964
1333.7	Timeball Hill	4.51	4.54	1.863	0.200	0.450	1.107	0.751
1334.2	Timeball Hill	3.74	5.76	2.501	0.034	0.187	0.808	0.944
1334.3	Timeball Hill	3.30	3.65	3.955	BD	0.824	2.041	1.815
1334.36	Timeball Hill	2.17	3.22	22.57	BD	0.419	14.22	7.107
1334.39	Timeball Hill	2.54	3.11	23.95	0.011	0.143	12.97	7.944
1334.43	Timeball Hill	2.50	3.69	22.64	0.010	0.140	11.07	7.500
1334.46	Timeball Hill	2.27	3.61	22.49	0.007	0.096	7.397	8.225
1334.5	Timeball Hill	1.95	3.51	15.20	BD	5.032	6.888	2.585
1334.6	Timeball Hill	2.92	6.70	2.288	BD	0.089	0.430	ND
1335.54	Rooihogte	1.25	1.77	34.71	BD	0.665	2.544	4.348
1335.6	Rooihogte	3.22	2.30	10.66	0.005	1.560	2.337	2.608
1335.66	Rooihogte	1.25	2.19	30.73	0.030	1.549	4.112	1.949
1335.72	Rooihogte	3.60	1.80	8.061	0.013	1.521	2.169	1.344
1335.78	Rooihogte	4.36	2.66	6.524	BD	1.158	2.333	1.607
1335.84	Rooihogte	2.37	3.13	18.34	BD	1.154	7.304	5.987
1335.93	Rooihogte	3.03	2.47	11.94	BD	0.582	4.951	5.210
1335.97	Rooihogte	2.59	3.64	18.10	BD	1.895	5.844	6.744
1336.03	Rooihogte	2.79	4.07	15.37	0.007	0.284	7.273	4.782
1336.09	Rooihogte	2.24	2.55	21.31	BD	1.268	9.860	7.924
1336.14	Rooihogte	2.07	2.28	20.84	BD	1.120	8.881	10.51
1336.19	Rooihogte	2.19	2.37	16.77	0.004	0.650	6.870	8.094
1336.23	Rooihogte	2.87	2.17	13.78	BD	2.194	6.696	4.632
1336.27	Rooihogte	2.49	2.31	18.84	0.020	0.510	8.325	8.460
1336.29	Rooihogte	2.65	2.59	12.04	BD	1.354	5.803	3.762
1336.33	Rooihogte	1.97	2.96	18.21	BD	0.830	8.536	8.966
1336.35	Rooihogte	1.05	1.99	29.34	0.034	3.372	5.192	2.473
1336.39	Rooihogte	2.93	5.50	1.872	BD	0.086	0.349	0.709
1336.44	Rooihogte	2.95	3.36	2.286	BD	0.485	0.858	0.621
1336.47	Rooihogte	2.01	1.93	8.836	BD	0.289	3.883	3.352
1336.5	Rooihogte	2.53	4.67	11.62	BD	3.187	5.422	2.338
1337.0	Rooihogte	0.41	11.56	0.357	BD	0.013	0.043	ND
1337.2	Rooihogte	0.78	3.52	4.253	0.022	0.063	2.050	1.190
1337.24	Rooihogte	0.64	6.15	2.711	BD	0.058	0.955	0.653
1337.27	Rooihogte	0.63	6.71	2.159	BD	0.275	0.643	0.625
1337.32	Rooihogte	0.57	8.50	0.893	BD	0.226	0.417	0.519
1337.38	Rooihogte	0.87	4.97	1.875	BD	0.288	0.867	0.721
1337.43	Rooihogte	1.37	5.23	1.255	0.007	0.195	0.512	0.559
1337.5	Rooihogte	1.01	2.95	1.679	0.036	0.205	1.120	0.475
1337.7	Rooihogte	2.39	4.16	0.564	0.026	0.180	0.307	0.244
1337.72	Rooihogte	0.56	8.34	1.253	BD	0.094	0.303	0.472
1338.07	Rooihogte	1.43	2.16	18.37	0.051	6.585	7.795	1.297
1338.1	Rooihogte	2.72	1.37	0.562	0.008	0.069	0.334	0.235
1338.13	Rooihogte	3.01	4.91	2.721	0.040	2.012	2.426	0.766
1338.17	Rooihogte	2.70	1.94	13.42	0.152	6.680	7.444	2.031
1338.2	Rooihogte	1.91	1.85	10.69	0.233	9.032	10.04	1.245
1338.3	Rooihogte	1.05	1.87	18.15	0.052	3.505	4.296	0.818
1338.5	Rooihogte	0.44	14.73	0.221	BD	0.012	0.029	0.043
1338.7	Rooihogte	0.56	8.55	0.526	0.028	0.014	0.246	0.154
1339.0	Rooihogte	0.41	15.61	0.462	BD	0.140	0.197	0.187
1340.5	Rooihogte	0.26	9.70	2.210	BD	0.009	0.234	0.637
1343.0	Rooihogte	0.34	5.13	5.495	BD	2.602	2.934	1.065
1344.5	Rooihogte	0.53	8.73	13.03	BD	0.144	1.211	4.497

1345.5	Rooihoogte	0.56	9.29	1.397	BD	0.192	0.285	0.474
1346.0	Rooihoogte	0.39	10.77	1.141	BD	0.193	0.293	0.400
1346.1	Rooihoogte	0.32	7.92	2.004	BD	0.304	0.548	0.838
1346.12	Rooihoogte	0.22	3.25	17.88	0.020	1.180	1.579	1.198
1346.14	Rooihoogte	0.32	4.70	13.18	0.021	1.165	1.532	1.223
1346.16	Rooihoogte	0.81	11.94	1.95	BD	0.872	1.039	0.482
1346.2	Rooihoogte	0.34	9.45	5.457	BD	0.765	0.936	1.067

Table S3. Sulfur isotope data for core EBA-1. Data are for pyrite sulfur, unless where indicated as acid-volatile sulfide (AVS).

Depth (m)	Formation/Member	$\delta^{34}\text{S}_{\text{SO}_2}$ (‰)	$\Delta^{33}\text{S}_{\text{SO}_2}$ (‰)	$\delta^{34}\text{S}_{\text{SF}_6}$ (‰)	$\Delta^{33}\text{S}_{\text{SF}_6}$ (‰)	$\Delta^{36}\text{S}_{\text{SF}_6}$ (‰)
544.5	Boshoek	-19.71	0.53			
545.5	Boshoek	-3.73	0.01			
548.0	Boshoek	-4.10				
550.0	Boshoek	-3.46	-0.09			
558.0	Boshoek	-3.03	0.05			
558.3	Boshoek	-4.20	0.08			
559.2	Boshoek	-4.85	0.87			
561.3	Boshoek	-3.88	0.05			
561.6	Boshoek	-4.20				
563.0	Boshoek	-1.12	0.07			
564.5	Boshoek	-3.22	0.29			
566.5 AVS	Boshoek			-2.182	0.118	-0.219
566.5	Boshoek	-4.73	0.06			
567.0	Boshoek	-2.82	1.44	-3.107	1.425	-1.329
568.0	Boshoek	-2.27	0.23	-2.967	0.213	-0.535
568.5	Boshoek	-3.42	0.05			
569.0	Boshoek	-6.12	0.13	-6.592	0.129	-0.208
573.3	Boshoek	-4.32	0.02	-4.369	0.120	-0.237
573.5	Boshoek	-2.84				
573.6	Reitfontein	-1.57	0.11			
574.0	Reitfontein	-1.19	2.69			
574.4	Reitfontein	-5.63	0.01			
575.05	Reitfontein	-2.53	0.09	-2.761	0.115	-0.167
575.8	Reitfontein	-3.86	0.02			
577.1	Reitfontein	-4.13	1.26			
577.6	Reitfontein	-3.97	0.10			
578.6	Reitfontein	-3.84	0.05			
580.3	Reitfontein	2.18				
581.7	Reitfontein	-2.98	-0.04			
582.9	Reitfontein	-2.64	0.01			
583.5	Reitfontein	-3.76	0.06			
584.4	Reitfontein	-3.52				
584.8	Reitfontein	-2.20	0.06			
585.3	Timeball Hill	-5.12	0.10			
585.5	Timeball Hill	-22.71	-0.05			
586.6	Timeball Hill	-3.14	-0.07			
595.0	Timeball Hill	-4.49	0.06			
603.5	Timeball Hill	-5.84				
610.0	Timeball Hill	-3.10				
614.5	Timeball Hill	-7.64	0.01	-7.25	0.01	0.024
622.0	Timeball Hill	-6.26				
633.5	Timeball Hill	-8.23				
637.0	Timeball Hill	-4.15	-0.15			
642.5	Timeball Hill	-7.78				

658.0	Timeball Hill	-3.82				
662.5	Timeball Hill	4.43	0.25			
664.0	Timeball Hill	2.63	0.01			
670.0	Timeball Hill	1.79				
681.0	Timeball Hill	21.57				
684.0	Timeball Hill	5.10	-0.12			
690.0	Timeball Hill	2.94	1.06	3.548	0.082	0.271
691.0	Timeball Hill	2.63	0.08			
704.5	Timeball Hill	-6.55	0.19			
706	Timeball Hill	-0.98	1.61			
706.8	Timeball Hill	-1.20	0.17			
709.1	Timeball Hill	-1.95	0.00			
709.9	Timeball Hill	-1.84	0.10			
711.1	Timeball Hill	-6.29	0.23			
711.6	Timeball Hill	-2.77	0.09			
712.0	Timeball Hill	-0.95	-0.03			
716.0	Timeball Hill	-1.25	-0.09			
797.0	Timeball Hill	-6.68	-0.01			
805.0	Timeball Hill	-0.37				
821.5	Timeball Hill	-20.26	0.03			
826.2	Timeball Hill	-26.36	0.08	-27.217	0.099	-0.424
831.0	Timeball Hill	-21.93	0.28			
835.5	Timeball Hill	-9.59	0.03	-9.315	0.102	-0.774
842.0	Timeball Hill	-4.09	-0.09			
853.2	Timeball Hill	-12.64				
856.0	Timeball Hill	-7.94				
896.0	Galsrand	2.66				
996.0	Timeball Hill	12.47	-0.10			
1001.0	Timeball Hill	6.99	0.19	7.165	0.035	0.162
1008.0	Timeball Hill	3.52				
1023.0	Timeball Hill	12.16	-0.19			
1038.0	Timeball Hill	4.36	-0.14			
1045.0	Timeball Hill	4.46				
1058.0	Timeball Hill	17.08	-0.06	16.756	0.047	-0.075
1061.5	Timeball Hill	2.26				
1067.5	Timeball Hill	2.01				
1072.0	Timeball Hill	2.13				
1079.0	Timeball Hill	-16.80				
1087.2	Timeball Hill	-0.48				
1095.5	Timeball Hill	0.13	0.00			
1110.0	Timeball Hill	-12.31	-0.01			
1121.5	Timeball Hill	7.66	0.04	7.891	0.032	-0.065
1130.0	Timeball Hill	-1.27	0.69			
1137.0	Timeball Hill	3.23	1.44			
1144.5	Timeball Hill	3.56	-0.02	2.926	-0.039	0.185
1153.0	Timeball Hill	-4.52	-0.10			
1155.0	Timeball Hill	2.76	0.13			
1158.5	Timeball Hill	-23.51	0.11	-23.00	0.12	-0.522
1158.55	Timeball Hill	-25.50	0.2			
1158.6	Timeball Hill	-30.06	0.18			
1158.65	Timeball Hill	-29.62	0.09			
1160.0	Timeball Hill	-29.75	0.07	-28.931	0.063	-0.419
1160.05	Timeball Hill	-28.65	0.19			
1162.0	Timeball Hill	-23.20	0.12			
1164.5	Timeball Hill	-30.09	0.18	-30.7	0.167	-0.681
1168.0	Rooihogte	-11.31	1.77			
1169.4	Rooihogte	-2.02	0.61			
1173.2	Rooihogte	5.24	5.28			

1173.7	Rooihogte	1.81	1.55	1.722	1.763	-1.292
1174.2	Rooihogte	4.28	5.46	4.133	5.906	-5.742
1177.7	Rooihogte	-5.85	1.24			
1180.5	Rooihogte	-24.24				
1191.0	Rooihogte	-0.60	4.14	-0.764	4.921	-4.114
1191.7	Rooihogte	5.28	0.84			
1192.3	Rooihogte	6.94	7.09			
1196.8	Rooihogte	6.25	8.18	6.108	8.760	-8.111

Table S4. Geochemical data for core EBA-2. Data are for pyrite sulfur, unless where indicated as acid-volatile sulfide (AVS).

Depth (m)	Formation/Member	$\delta^{34}\text{S}_{\text{SO}_2}$ (‰)	$\Delta^{33}\text{S}_{\text{SO}_2}$ (‰)	$\delta^{34}\text{S}_{\text{SF}_6}$ (‰)	$\Delta^{33}\text{S}_{\text{SF}_6}$ (‰)	$\Delta^{36}\text{S}_{\text{SF}_6}$ (‰)
794.0	Reitfontein	0.09	0.01			
794.0 AVS	Reitfontein			1.172	0.118	0.054
794.1	Reitfontein			-0.474	0.128	-0.113
794.5	Reitfontein	-1.71	0.20			
795.5	Reitfontein	-1.42	0.06			
795.5 AVS	Reitfontein			0.132	0.128	0.004
795.6	Reitfontein			1.464	0.099	-0.098
796.35	Reitfontein	-2.22	0.16			
802.0	Reitfontein	-3.36	0.16			
802.7	Reitfontein	-1.50	0.65			
803.5	Timeball Hill	-3.58	0.16			
803.7	Timeball Hill	-3.98	0.17			
804.1	Timeball Hill	-3.67	0.15			
804.3	Timeball Hill	-4.32	0.13			
804.5	Timeball Hill	-3.84	0.17			
805.8	Timeball Hill	-4.75	0.09			
806.8	Timeball Hill	-4.29	0.07			
808.0	Timeball Hill	-1.08	1.32			
824.8	Timeball Hill	-2.03	0.09			
849.8	Timeball Hill	5.35	0.11			
850.0	Timeball Hill	-0.61	0.25			
868.0	Timeball Hill	-5.57	0.38			
876.1	Timeball Hill	-1.74	0.16			
896.6	Timeball Hill	-1.24	0.10			
943.0	Timeball Hill	2.27	1.57	2.000	1.935	-1.236
943.1	Timeball Hill	-2.48	0.16			
947.5	Timeball Hill	-2.28	0.11			
948.3	Timeball Hill	-2.41	0.13			
967.7	Timeball Hill	-6.05	0.11			
993.7	Timeball Hill	-5.30	0.08			
994.0	Timeball Hill	-6.96	0.15			
1002.0	Timeball Hill	-7.26	0.12			
1007.0	Timeball Hill	-8.64	0.19			
1011.0	Timeball Hill	-8.53	0.18			
1012.5	Timeball Hill	-5.23	1.01	-4.211	1.354	-0.809
1013.0	Timeball Hill	-8.40	0.12			
1020.0	Timeball Hill	-7.44	0.06			
1022.0	Timeball Hill	-7.29	0.13			
1037.3	Timeball Hill	-8.18	0.10			
1091.0	Timeball Hill	2.51	2.07			
1097.0	Timeball Hill	-5.80	-0.17	-5.809	0.086	-0.072
1104.0	Timeball Hill	-8.58	-0.03			
1183.0	Timeball Hill	6.69	0.14	6.998	0.198	-0.294

1202.0	Timeball Hill	3.89	-0.01			
1202.5	Timeball Hill	9.39	0.36			
1224.0	Timeball Hill	6.49	0.74			
1239.5	Timeball Hill	2.24	0.16			
1242.5	Timeball Hill	8.78	-0.04			
1253.5	Timeball Hill	3.83	0.70			
1259.0	Timeball Hill	1.75	1.37			
1266.0	Timeball Hill	0.18	-0.03	0.574	0.071	0.268
1275.5	Timeball Hill	6.63	2.86			
1284.0	Timeball Hill	1.91	0.56			
1296.0	Timeball Hill	3.61	1.02			
1304.0	Timeball Hill	-0.06	-0.02			
1304.1	Timeball Hill			-0.673	0.034	0.124
1312.0	Timeball Hill	7.60	0.44			
1316.0	Timeball Hill	1.20	0.51			
1324.6	Timeball Hill	-0.84	0.07	-1.046	0.065	0.215
1325.5	Timeball Hill	10.68	0.02	10.876	0.117	0.348
1327.0	Timeball Hill	16.73	-0.13			
1329.8	Timeball Hill	-1.55	-0.21	-1.807	0.081	-0.294
1330.0	Timeball Hill	-27.07	0.18			
1331.5	Timeball Hill	-7.82	0.21			
1332.07	Timeball Hill	-3.22	-0.02			
1332.08	Timeball Hill			-2.099	0.566	-0.221
1332.1	Timeball Hill	6.64	0.10			
1332.7	Timeball Hill	-6.65	0.09			
1332.8	Timeball Hill	-17.88	0.14			
1333.7	Timeball Hill	-20.48	0.69			
1334.2	Timeball Hill	-6.91	-0.08			
1334.3	Timeball Hill	-27.61	0.01	-27.629	0.098	-1.870
1334.36	Timeball Hill	-28.52	0.04			
1334.39	Timeball Hill	-12.32	-0.09			
1334.43	Timeball Hill	-8.56	-0.05			
1334.46	Timeball Hill	-17.63	-0.06			
1334.5	Timeball Hill	-30.43	0.12			
1334.6	Timeball Hill	-15.69	0.11			
1335.54	Rooihogte	-27.60	0.11			
1335.6	Rooihogte	-28.25	0.25			
1335.72	Rooihogte	-30.11	0.16	-29.643	0.152	-0.564
1335.78	Rooihogte	-28.43	0.19			
1335.84	Rooihogte	-29.67	0.25			
1335.93	Rooihogte	-28.96	0.21			
1335.97	Rooihogte	-25.23	0.10			
1336.03	Rooihogte	-17.14	0.18			
1336.09	Rooihogte	-29.01	0.10			
1336.14	Rooihogte	-23.88	0.08			
1336.19	Rooihogte	-25.79	0.08			
1336.23	Rooihogte	-27.82	0.16			
1336.27	Rooihogte	-12.48	0.10			
1336.29	Rooihogte	-28.47	0.08	-28.303	0.146	-0.399
1336.33	Rooihogte	-28.08	0.15			
1336.35	Rooihogte	-27.38	0.21			
1336.39	Rooihogte	-10.42	-0.08			
1336.44	Rooihogte	-25.61	0.00			
1336.47	Rooihogte	-21.20	0.07			
1336.5	Rooihogte	-30.22	0.13			
1337.2	Rooihogte	2.51	2.91	3.257	3.240	-3.028
1337.24	Rooihogte	8.76	2.57	8.753	2.979	-3.202
1337.27	Rooihogte	7.37	0.40			

1337.32	Rooihogte	12.59	0.27			
1337.38	Rooihogte	11.64	0.30			
1337.43	Rooihogte	11.09	0.46			
1337.5	Rooihogte			11.316	0.624	-0.243
1337.7	Rooihogte	14.37	-0.04			
1337.72	Rooihogte	11.35	-0.11			
1337.73	Rooihogte			11.558	0.136	0.159
1338.07	Rooihogte	-27.17	0.14			
1338.13	Rooihogte	-24.25	0.10			
1338.17	Rooihogte	-30.52	0.12	-30.865	0.149	-0.485
1338.2	Rooihogte	-28.32	0.24			
1338.24	Rooihogte	17.11	-0.22	16.27	0.029	0.076
1338.3	Rooihogte	-25.29	0.17			
1339.0	Rooihogte	7.33	-0.08	7.195	0.110	0.320
1343.0	Rooihogte	15.00	-0.02	13.994	0.071	-0.132
1344.5	Rooihogte	8.26	3.62	8.355	3.922	-3.959
1345.5	Rooihogte	6.35	4.71	6.641	5.241	-4.713
1346.0	Rooihogte	12.59	1.76	12.307	2.078	-2.182
1346.1	Rooihogte	12.94	3.35	12.562	3.796	-3.560
1346.14	Rooihogte	13.13	2.69	13.040	3.119	-3.125
1346.16	Rooihogte	7.74	1.98			
1346.17	Rooihogte			14.426	2.432	-2.467
1346.2	Rooihogte	14.37	2.16			
1346.28	Rooihogte	5.99	6.19	6.475	6.696	-6.927