Supplementary data for "Terrestrial environmental reconstructions indicate transient peak warming during the Early Eocene Climatic Optimum." by E.G. Hyland, N.D. Sheldon, and M. Fan.

Figure S1. Comparison of $\delta^{13}C_{cc}$ from Fan et al. (2011) and extrapolated $\delta^{13}C_{cc}$ from this work. Note difference in the shape of running average trends and the overall offset between data sets. Previously published $\delta^{13}C_{cc}$ are not in equilibrium with $\delta^{13}C_{org}$ from the Wind River Basin, and likely many of the analyses represent diagenetically altered samples.

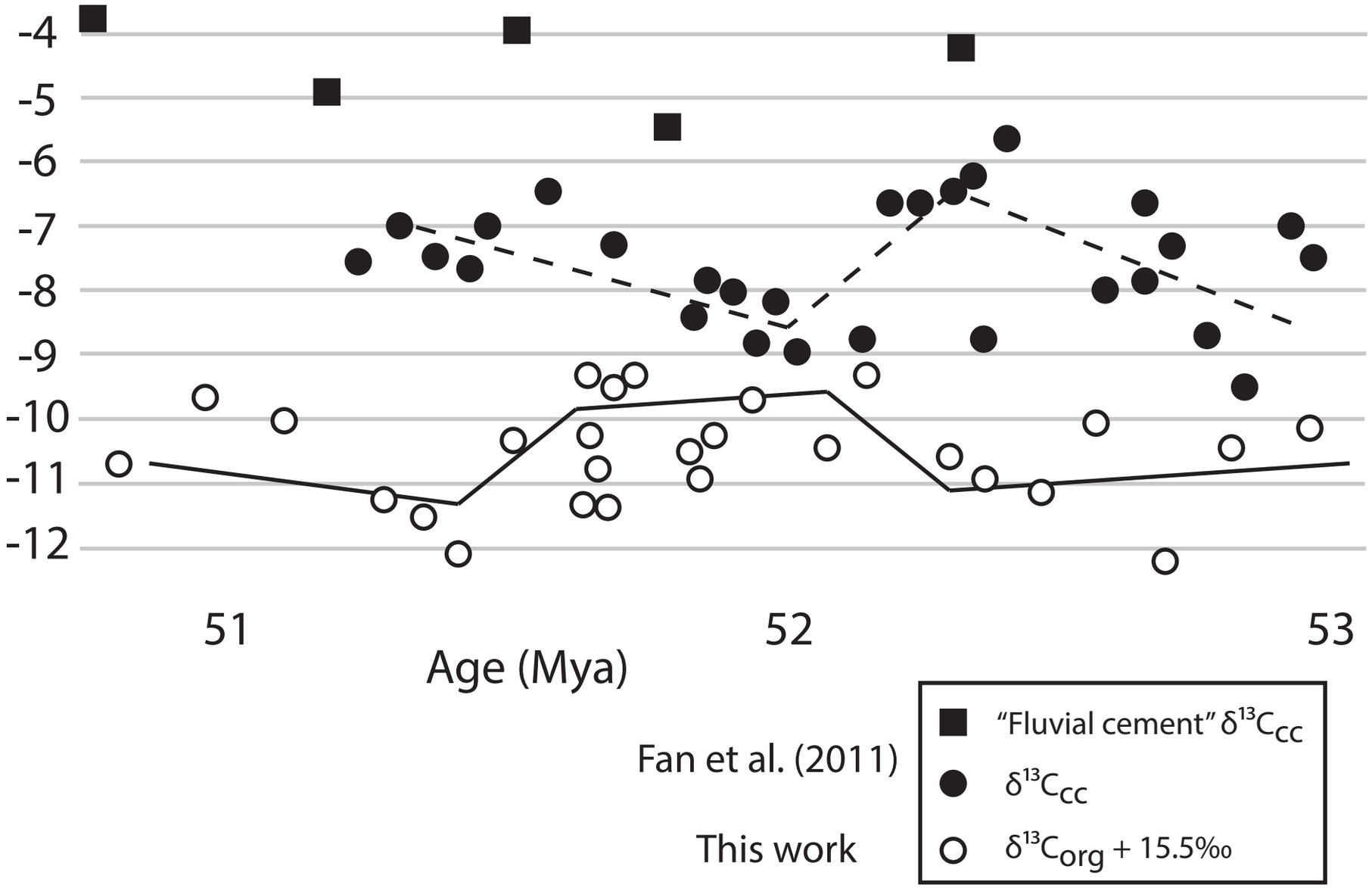

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Figure S2. $\Delta^{13}C_{org}$ ($\delta^{13}C - \delta^{13}C_{mean}$) of paleosol carbon through time. Open circles indicate calculated values, while filled circles indicate mean value of 0.75 Myr bins (indicated by horizontal solid lines).

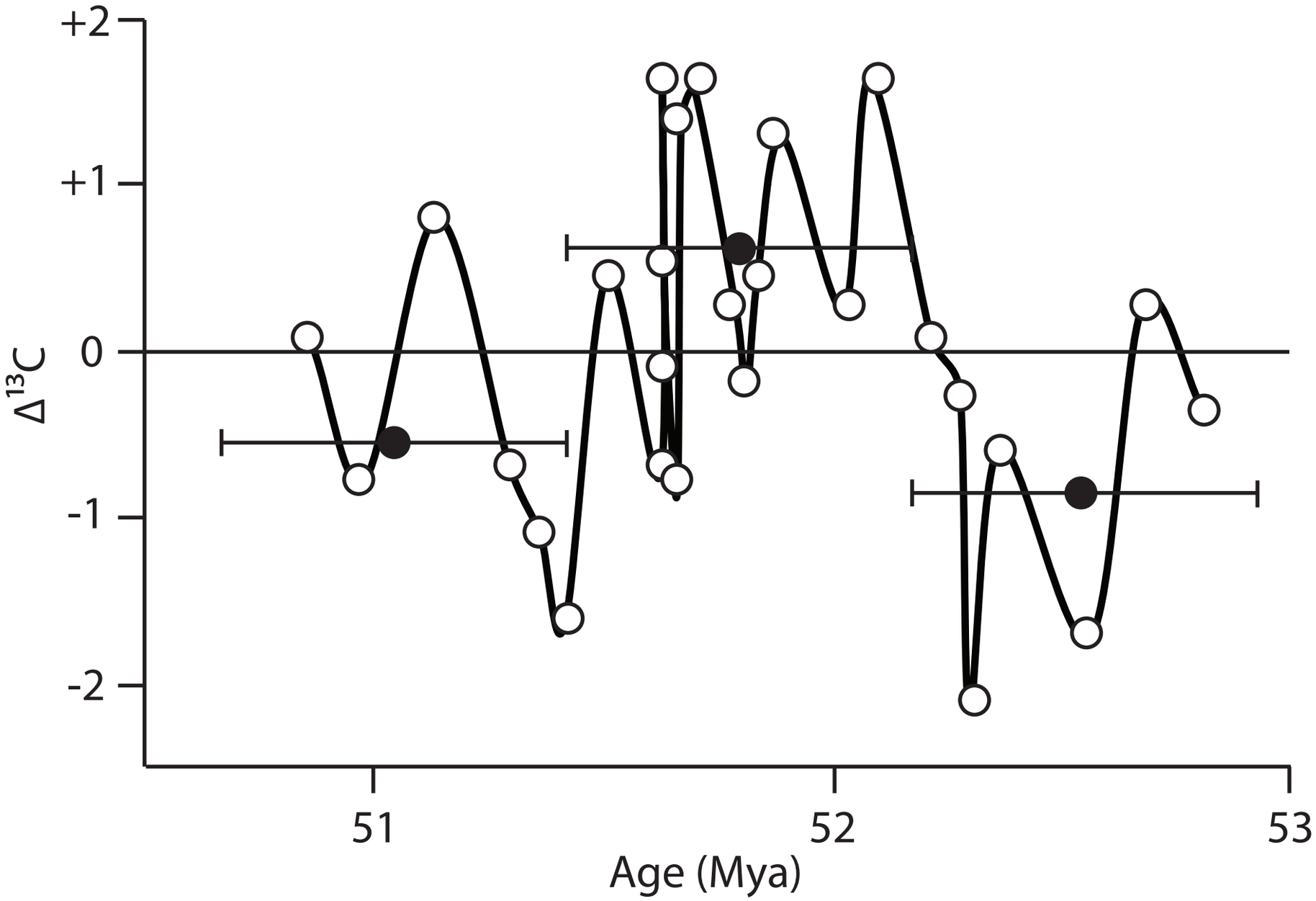

Table S1. Whole rock geochemical ratios of Bt horizons

Sample	Age (Mya)	CIA-K	S	Ti/Al
2DB-7	53.03	33.7	0.48	0.075
2DB-10	53.00	43.8	0.50	0.060
2DB-19	52.92	35.2	0.50	0.072
2DB-30	52.88	45.7	0.47	0.070
2DB-35	52.82	35.1	0.46	0.068
2DB-37	52.80	27.9	0.46	0.070
2DB-41	52.78	33.7	0.49	0.057
2DB-46	52.73	34.3	0.54	0.051
2DB-53	52.64	32.0	0.49	0.070
2DB-55	52.61	22.6	0.52	0.058
2DB-57	52.61	50.3	0.52	0.061
2DB-61	52.36	69.4	0.51	0.039
2DB-64	52.28	48.0	0.47	0.043
2DB-72	52.01	81.5	0.45	0.038
2DB-76	51.84	81.5	0.43	0.047
2DB-79	51.82	43.0	0.38	0.051
2DB-86	51.75	31.5	0.41	0.049
2DB-88	51.70	45.0	0.39	0.051
2DB-92	51.63	80.2	0.41	0.047
2DB-112	51.14	51.7	0.38	0.051
2DB-115	51.10	58.2	0.43	0.053
2DB-117	51.05	51.4	0.38	0.047
2DB-119	50.98	62.0	0.38	0.050
2DB-124	50.84	52.0	0.43	0.051
2DB-127	50.83	70.6	0.42	0.046

Table S2. Isotopic results from $\delta^{13}C_{cc}$ and $\delta^{13}C_{org}$ analyses

Sample	Age (Mya)	$\delta^{13}C_{org}$ (‰ VPDB)	$\delta^{13}C_{cc}$ (‰ VPDB)[a]
2DB-35	52.81	-25.2	-9.5
2DB-49	52.68	-25.6	-----
2DB-59	52.57	-27.6	-8.8
1DB-4	52.37	-26.4	-----
1DB-16	52.30	-28.0	-----
2DB-63	52.28	-26.1	-----
1DB-18	52.22	-25.8	-----
2DB-65	52.09	-24.2	-----
1DB-20	52.03	-25.6	-----
1DB-24	51.90	-24.6	-7.3
2DB-73	51.84	-25.4	-8.0
1DB-31	51.82	-26.1	-----
1DB-39	51.80	-25.6	-----
2DB-87	51.70	-24.3	-----
1DB-42	51.68	-24.5	-----
1DB-45	51.67	-26.7	-----
1DB-51	51.65	-26.0	-----
1DB-48	51.64	-25.4	-----
2DB-91	51.63	-24.2	-----
1DB-55	51.63	-26.6	-----
1DB-66	51.51	-25.4	-----
1DB-73	51.42	-27.5	-----
2DB-94	51.37	-26.9	-----
2DB-109	51.30	-26.5	-----
2DB-111	51.14	-25.0	-8.4
2DB-118	50.98	-24.6	-----
2DB-121	50.87	-25.8	-----

a Reported values are averages of multiple analyses on individual nodules.

Table S3. Phytolith counts and compound groups for diagnostic morphotypes

Morphotype (Strömberg, 2003; 2005)	Compound	1DB-76	1DB-68	1DB-54	1DB-37	1DB-24	1DB-20	1DB-11	1DB-1	2DB-121	2DB-111	2DB-100	2DB-93	2DB-54	2DB-42	2DB-11	2DB-2
Rondels (CO-1, CO-2)	POOID	25	9	10	8	4	4	5	6	6	9	6	21	1	3	0	3
Bilobates (Bl-5)	PACCAD	2	2	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Branch elongate (Epi-10)	GRASS-D	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Elongates (Elo-8, Elo-18)	DICOT	58	86	88	61	114	109	94	93	101	94	89	96	79	89	92	87
Mesophyll (Kn-4, M-4)	DICOT	24	40	26	42	19	15	24	25	31	18	27	14	19	27	27	34
Trichome (Tri-4)	DICOT	7	14	23	6	3	7	3	4	0	2	8	5	0	0	2	0
Sphere (Cl-1)	DICOT	0	0	0	0	18	14	18	23	14	11	17	8	26	17	29	21
Block (Blo-3)	CONI	28	11	18	27	24	25	25	28	16	19	23	20	45	36	39	32
Echinate (Clm-2)	PALM	6	11	11	7	0	1	0	2	3	3	3	3	0	3	0	1
Block (Blo-6)	FI-GEN	34	8	14	18	22	21	34	19	16	22	18	17	29	13	14	13
Sphere (Cl-4)	FI-GEN	4	12	13	14	8	16	6	10	23	19	19	15	15	11	13	14
Block (Kn-1)	FI-GEN	20	15	11	20	6	10	2	9	3	10	14	13	9	12	9	10
Others (Elo-1, etc.)	OTH	46	66	81	108	136	97	68	55	69	78	87	93	74	71	63	45
Aquatics (diatoms, etc.)	OTH	0	0	0	7	0	0	0	3	0	0	5	3	4	0	0	0
TOTAL		254	274	295	318	354	320	279	277	282	285	317	308	302	282	288	260
DIAGNOSTIC		208	208	214	203	218	223	211	219	213	207	225	212	224	211	225	215
GI		27	11	10	8	4	5	5	6	6	9	7	21	2	3	0	3
FI		181	197	204	195	214	218	206	213	207	198	218	191	222	208	225	212
%GI		13.0	5.3	4.7	3.9	1.8	2.2	2.4	2.7	2.8	4.3	3.1	9.9	0.9	1.4	0.0	1.4
%FI		87.0	94.7	95.3	96.1	98.2	97.8	97.6	97.3	97.2	95.7	96.9	90.1	99.1	98.6	100.0	98.6