

# Supporting Information

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## SI Methods

In all cases, the tooth or fragment was cleaned with a soft brush to remove loose sediment if present, swabbed with acetone, and then air-dried.

For standard acid hydrolysis mass spectrometry, enamel powder obtained by gentle abrasion with a diamond-tipped drill along the length of a broken or nonocclusal surface was pretreated to remove possible organic and carbonate contaminants. This consisted of a series of washes in 1.5% (vol/vol) sodium hypochlorite solution and then 0.1 M acetic acid, for 30 and 10 min, respectively, interspersed with rinsing in purified H<sub>2</sub>O and centrifuging (1). CO<sub>2</sub> was produced from ~1.5 mg of enamel powder by 100% H<sub>3</sub>PO<sub>4</sub> acid hydrolysis at 72 °C in a GasBench II, and introduced via a continuous-flow gas chromatograph (GC) for measurement in a Thermo Finnigan Delta V. Precision estimated by replicate measurements of NBS 19, and the CararaZ interlaboratory standard, was 0.1‰ for both <sup>13</sup>C/<sup>12</sup>C and <sup>18</sup>O/<sup>16</sup>O. Replicate (*n* = 10) measurements of each of the fossil enamel (bioapatite) standards, LT4 and LT6, indicated slightly lower precision for LT4 (see below).

For laser ablation (LA) determinations, the sample tooth was placed alongside two enamel fragment standards (LT4 and LT6) in a 23-mm-diameter laser chamber with a ZnSe window, and purged with helium (He) until outgassing ceased. Small amounts (10–30 nmol) of CO<sub>2</sub> were generated by four to five laser shots fired using a New Wave MIR 10 CO<sub>2</sub> laser (10.6 μm) operating at 100 W and 5% power for 40-ms pulse duration (equivalent to

0.13 mJ), in a He atmosphere. The resultant gas was cryogenically purified before introduction of CO<sub>2</sub> to the continuous-flow GC–isotope ratio mass spectrometer. Each sample was measured in a short transect of four to five scans (each consisting of four to five adjacent shots), spaced 0.5 mm apart, so that several <sup>δ</sup><sup>13</sup>C values were generated for each specimen (Tables S2 and S3). Measurements were blank corrected. Systematic isotope fractionation and fractionation associated with laser ablation production of CO<sub>2</sub> was monitored by coanalysis of the two internal tooth enamel standards in each run. LA mass spectrometry determinations are less precise than acid hydrolysis mass spectrometry (2), and additionally measurements along an enamel transect are more variable because enamel increments themselves are isotopically variable, compared with powdered bulk enamel. This applies also to the two enamel fragments used as standards. However, it was necessary to use enamel fragments because of the sensitivity of LA to the sample material. Comparison of the <sup>δ</sup><sup>13</sup>C results obtained by both methods for the two enamel standards, and three KT faunal specimens, showed agreement within these constraints (see Table S3 for the KT data). Multiple LA analyses of <sup>δ</sup><sup>13</sup>C LT4 ( $X = -8.03 \pm 0.80$ ; *n* = 45) and LT6 ( $X = -0.49 \pm 1.01$ ; *n* = 53) over ~6 mo gave values similar to the acid hydrolysis data ( $X = -7.73 \pm 0.15$  and  $-1.20 \pm 0.06$ ‰; *n* = 10). Laser-carbonate apparent fractionation ( $\epsilon^*_{\text{LASER-carb}}$ ) was estimated using a regression comparison calculated from these two enamel standards in each run. All measurements were carried out in the Bradford University Stable Light Isotope Laboratory.

1. Sponheimer M, et al. (2005) Hominins, sedges, and termites: New carbon isotope data from the Sterkfontein valley and Kruger National Park. *J Hum Evol* 48(3):301–312.

2. Passey BH, Cerling TE (2006) In situ stable isotope analysis (<sup>δ</sup><sup>13</sup>C, <sup>δ</sup><sup>18</sup>O) of very small teeth using laser ablation GC/IRMS. *Chem Geol* 235:238–249.

**Table S1. Summary of the  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  data obtained for KT faunal enamel from sites KT12 and KT13 used in Fig. 2**

Reference no.	Site	Species	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$
KT12/H1a	KT12	<i>A. bahrelghazali</i>	-4.4	
KT12 P3/H2	KT12	<i>A. bahrelghazali</i>	-0.8	
KT13-96-H1	KT13	<i>A. bahrelghazali</i>	-2.5	32.8
TC9000*	KT13	Alcelaphini	0.1	36.6
TC6100*	KT4	Alcelaphini	0.6	32.9
TC5600*	KT12	Alcelaphini	1.8	35.8
TC10400*	KT12	Alcelaphini	1.8	35.6
TC6400*	KT4	Alcelaphini	1.9	34.4
TC8900*	KT13	Alcelaphini	2.2	35.3
TC400*	KT13	<i>Hipparion cf. hasumense</i>	0.2	30.2
TC200*	KT12	<i>Hipparion cf. hasumense</i>	1.7	38.7
KT13-96-447	KT13	Equidae	-1.6	29.1
KT13-96-515	KT13	Equidae	-0.7	30.7
KT12-95-016	KT12	Equidae	-0.3	30.9
KT13-96-379	KT13	Equidae	0.5	33.9
KT13-96-516	KT13	Equidae	1.3	31.6
KT12-95-007	KT12	Equidae	1.4	29.9
TC7500*	KT12	<i>Kolpochoerus afarensis</i>	-1.2	30.1
TC7300*	KT12	<i>Notochoerus euilus</i>	0.9	33.8
TC7600*	KT13	<i>Notochoerus euilus</i>	1.3	33.7
KT12-98 (1)	KT12	Suidae	-0.6	30.0
KT12-98 (2)	KT12	Suidae	-1.3	29.4
KT12-96-048	KT12	Suidae	-1.5	26.9
KT13-96-149	KT13	Suidae	-1.3	27.8
KT12-98 No # 5	KT12	Suidae	-1.3	29.4
KT12-96-046	KT12	Suidae	0.3	30.5
KT12-96-050	KT12	Suidae	0.6	30.5
KT12-98 No #	KT12	Suidae	2.2	30.0
TC7700*	KT13	Loxodonta sp.	0.1	29.7
TC7800*	KT8	Loxodonta sp.	0.6	29.5
TC7900*	KT9	Loxodonta sp.	-0.5	31
TC12600*	KT	<i>Stegodon kaisensis</i>	-1.7	29.1
TC10600*	KT13	Reduncini	-4.5	32.9
TC10500*	KT13	Reduncini	0.4	33.9
TC10550*	KT13	Reduncini	1.8	31.1
TC5400*	KT12	Bovini	-5.4	36.9
TC8800*	KT12	Bovini	-1.3	35.3
TC10700*	KT12	Bovini	-1.1	33.5
TC12100*	KB3	Paracamelus sp.	-11.8	35.7
TC12300*	KB3	Paracamelus sp.	-10.5	33.8
TC12200*	KB3	Paracamelus sp.	-10.4	33.9
TC12500*	KB3	<i>Diceros bicornis</i>	-10.7	31.5
TC10300*	KB26	Giraffa sp.	-10.2	34.4
TC10200*	KB3	Giraffa sp.	-9.8	31.6

Data are from the present study, whereas those marked an asterisk (\*) are from ref. 1. Some values are reported for KT sites other than KT12 and 13, and six specimens at the base of the table are from the older site of Kossom Bougoudi (1), shown here because no suitable browser tooth enamel from the KT sites was available for isotopic measurement.  $\delta^{13}\text{C}$  values are reported relative to VPDB, and  $\delta^{18}\text{O}$  values relative to VSMOW.  $\delta^{18}\text{O}$  is reported only for samples determined by acid hydrolysis, and where samples were determined by both LA and acid hydrolysis, only the latter  $\delta^{13}\text{C}$  values are reported in this table.

1. Zazzo A, et al. (2000) Herbivore paleodiet and paleoenvironmental changes at Chad during the Pliocene using stable isotope ratios of tooth enamel carbonate. *Paleobiology* 26: 294–309.

