

Electronic Supplemental Material (ESM) for:

First fossils of hyenas (*Chasmaporthetes*, Hyaenidae, Carnivora) from north of the

Arctic Circle

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Reference Cited in ESM

Barnosky, A. D., Holmes, M., Kirchholtes, R., Lindsey, E., Maguire, K. C., Poust, A. W., ...

Wogan, G. O. (2014). Prelude to the Anthropocene: Two new North American Land Mammal Ages (NALMAs). *The Anthropocene Review*, 1(3), 225–242.

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Figure S1. Late Cenozoic North American Land Mammal Ages (NALMA) discussed in study. Uncertainty in age bin boundaries are indicated with overlapping bin shades. Age ranges after Barnosky et al. (2014).

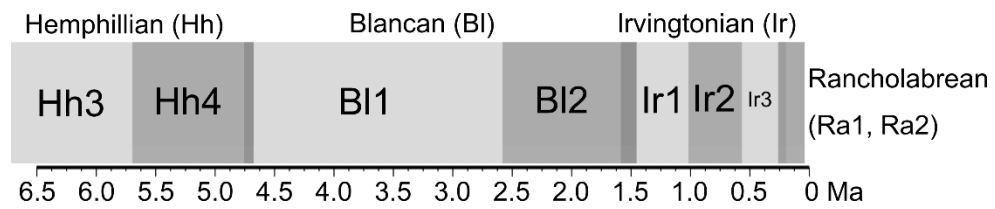


Table S1. Dental measurements of *Chasmaporthetes* dentition from around the world. AF, Africa; AS, Asia; EU, Europe; NA, North America; l, length; w, width; p3, lower third premolar; m1, lower first molar (carnassial); tr, m1 trigonid. For specimen collection abbreviations see text.

Species	Region	Locality	Specimen No.	lp3	wp3	lm1	ltrm1	wm1	wm1/ltrm1	ltrm1/lm1
<i>C. australis</i>	AF	Langebaanweg	SAM PQ_L20988	23.4	12.1	28.5	23.2	12.9	0.56	0.81
<i>C. australis</i>	AF	Langebaanweg	SAM PQ- L13033A			29.3	25.2	12.7	0.50	0.86
<i>C. australis</i>	AF	Langebaanweg	SAM PQ-L14199	23.1	12.6					
<i>C. australis</i>	AF	Langebaanweg	SAM PQ-L21789	23.6	13.0					
<i>C. australis</i>	AF	Langebaanweg	SAM PQ-L22204	22.5	12.1	28.4	23.4	13.2	0.56	0.82
<i>C. australis</i>	AF	Langebaanweg	SAM PQ-L50009			24.9	20.0	11.5	0.58	0.80
<i>C. australis</i>	AF	Toros Menalla	TM112-00-98	23.7	12.8	30.5	25.2	13.4	0.53	0.83
<i>C. nitidula</i>	AF	Olduvai	NMT Old 69	17.9	10.2	26.1	22.0	9.5	0.43	0.84
<i>C. nitidula</i>	AF	Swartkrans	Sk 301	21.4	11.9					
<i>C. nitidula</i>	AF	Swartkrans	Sk 302	19.4	10.4					
<i>C. nitidula</i>	AF	Swartkrans	Sk 304	20.5	11.5					
' <i>C.</i> <i>silberbergi</i>	AF	Swartkrans	Sk 300	20.3	12.1					
<i>C. cf. C. ossifragus</i>	AS	Mazegou	IVPP V7280	21.0	11.2	27.2	22.5	11.6	0.52	0.83

<i>C. cf. C. ossifragus</i>	AS	Nihewan	IVPP V7281			27.3	23.5	12.2	0.52	0.86
<i>C. kani</i>	AS	Yushe	IVPP V7275	20.6	11.9	25.3	20.1	11.3	0.56	0.79
<i>C. kani</i>	AS	Yushe	IVPP V7276	19.9	10.0	24.4	20.5	10.9	0.53	0.84
<i>C. kani</i>	AS	Yushe	IVPP V7277	21.1	11.4					
<i>C. kani</i>	AS	Yushe	IVPP V7278	20.7	11.0					
<i>C. lunensis</i>	AS	Beregovaia	IGM2975-19	19.7	10.4	24.7	20.3	10.8	0.53	0.82
<i>C. lunensis</i>	AS	Kuruksai	IGM 3120-249	18.6	10.0	25.1	20.3	10.9	0.54	0.81
<i>C. lunensis</i>	AS	Kuruksai	IGM 3120-26			24.6	20.3	11.3	0.56	0.83
<i>C. lunensis</i>	AS	Kuruksai	IGM 3120-352	18.7	10.0	24.9	20.4	10.9	0.53	0.82
<i>C. lunensis</i>	AS	Mazegou	F:AM 99781	18.9	9.9	23.6	19.6	9.3	0.47	0.83
<i>C. lunensis</i>	AS	Shamar	IGM 3381-2	19.7	10.0	24.7	20.6	10.9	0.53	0.83
<i>C. lunensis</i>	AS	Shamar	IGM3381-203	19.1	10.2	24.5	20.7	10.9	0.53	0.84
<i>C. lunensis</i>	AS	Shamar	IGM3381-325	19.4	9.2	24.1	20.2	10.9	0.54	0.84
<i>C. lunensis</i>	AS	"Chao Chuang"	F:AM 50458			26.7	22.1	11.1	0.50	0.83
<i>C. lunensis</i>	AS	"Ma Tzu Kou"	F:AM 99781	19.3	9.8	23.6	19.5	9.2	0.47	0.83
<i>C. lunensis</i>	AS	"Ma Tzu Kou"	F:AM 99790			23.7	19.5	9.7	0.50	0.82
<i>C. lunensis</i>	AS	Shouyang	F:AM 99785	18.2	10.2	24.7	20.8	11.5	0.55	0.84
<i>C. lunensis</i>	AS	Shouyang	F:AM 99786	19.5	11.4	26.5	22.5	12.7	0.56	0.85
<i>C. lunensis</i>	AS	Shouyang	F:AM 99787	18.5	10.2		20.7	11.4		

<i>C. lunensis</i>	AS	Xiliexi	IVPP V15162	21.4	11.7	26.2	25.0	11.9	0.48	0.95
<i>C. lunensis</i> (cf. <i>C. ossifragus</i>)	AS	Mianchi Loc D	PIU M1976	20.6	11.1	28.2	24.5	11.7	0.48	0.87
<i>C. lunensis</i> (<i>kani</i>)	AS	Shouyang	F:AM 99788	20.5	11.8	26.4	22.0	11.7	0.53	0.83
<i>C. progressus</i>	AS	Qinxian	IVPP V7279			25.5	21.5	11.9	0.55	0.84
<i>C. gangsriensis</i>	AS	Zhada	IVPP V18566.3	20.0*	10.3*	23.2	18.7	11.2	0.60	0.81
<i>C. gangsriensis</i>	AS	Zhada	IVPP V18566.4	20.0	10.7	23.4*		-		
<i>C. borissiaki</i>	EU	Dermedzhi	IPM	19.3	10.2	24.8	20.4	9.8	0.48	0.82
<i>C. lunensis</i>	EU	Odessa	OGU-3246-18	20.8	10.0	25.2	20.9	10.5	0.50	0.83
<i>C. lunensis</i>	EU	Odessa	OGU-6	19.7	10.0	24.8	20.7	10.8	0.52	0.83
<i>C. lunensis</i>	EU	Olivola	MNHN Oli-27				23.0	12.0	0.52	
<i>C. lunensis</i>	EU	St. Vallier	MNHN161817	21.3	11.4					
<i>C. lunensis</i> (<i>bielawskyi</i>)	EU	Roccaneyra	UCB211221	20.6	11.0	24.5	20.2	11.5	0.57	0.82
<i>C. melei</i>	EU	Sardinia	MAN 65729	17.2	10.0					
<i>C. ossifragus</i>	NA	Anita	USNM10223			26.1		8.5		
<i>C. ossifragus</i>	NA	Benson	F:AM 23390	21.9	11.4					
<i>C. ossifragus</i>	NA	Cita Canyon	PPM(JWT) 2343	22.4	11.8	25.1	22.5	10.4	0.46	0.90
<i>C. ossifragus</i>	NA	El Golfo	IGM10001	21.0	10.7*	22.4		9.3*		
<i>C. ossifragus</i>	NA	Inglis IA	UF 18088	19.8	10.9	29.3	25.0	12.2	0.49	0.85
<i>C. ossifragus</i>	NA	Inglis IA	UF18089			28.7		12.1		

<i>C. ossifragus</i>	NA	Old Crow 11A	CMN 24958	19.1	11.6					
<i>C. ossifragus</i>	NA	Old Crow 11A	CMN 38053			29.1	22.3	13.1	0.59	0.77
