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Ecological conditions during the Middle to Upper Palaeolithic transition (MIS 3) in Iberia: the cold-adapted faunal remains from Mainea, northern Iberian Peninsula

Article in *Boreas* · December 2020

DOI: 10.1111/bor.12501

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Fig. S1. Geographical distribution of sites with presence of *Mammuthus primigenius* in the Iberian Peninsula. 1) Buján; 2) Las Caldas; 3) La Güelga; 4) El Cierro; 5) La Lloseta; 6) Jou Puerta; 7) Cueto de la Mina; 8) Mina Dolores; 9) Mina Ángel; 10) Morín; 11) Minas de Heras; 12) Pámanes; 13) Labeko Koba; 14) Urtiagako Leizea; 15) Clot de Llop; 16) L'Arbreda; 17) Cau de les Goges; 18) Teixonerres; 19) Riera de Sant Llorenç; 20) Riera dels Canyars; 21) Padul; 22) Cruz Quebrada; 23) Algar de Joao Ramos; 24) Butarque; 25) Arenero Casa Eulogio; 26) Arriaga; 27) Edar Culebro; 28) Aldehuela. Mainea is represented by a red star. See references in Table S1.

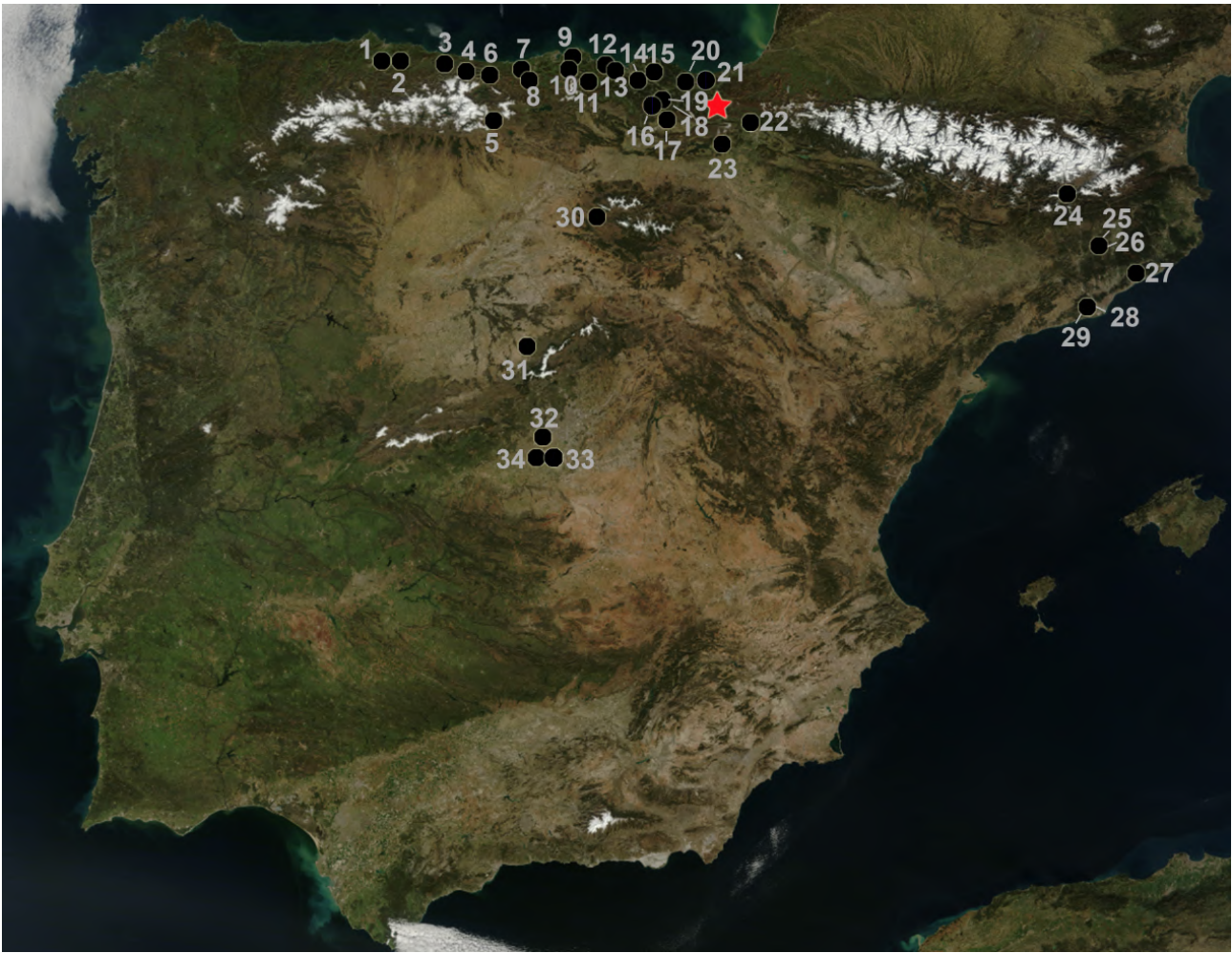


Fig. S2. Geographical distribution of sites with presence of *Coelodonta antiquitatis* in the Iberian Peninsula. 1) La Parte; 2) Cueva de la Xana; 3) Rexidora; 4) Jou Puerta; 5) Peña de Mudá; 6) Unquera; 7) Las Cáscaras; 8) La Gándara; 9) Cueva de Nando; 10) Cueva de San Pedro; 11) Cobrante; 12) Covacho de Arenillas; 13) El Cuco; 14) Cantera de la vía; 15) Lezika; 16) Labeko Koba; 17) Arrikruz; 18) Lezetxiki; 19) Artazu VIII; 20) Baio; 21) Urtiagako Leizea; 22) Abauntz; 23) Legintxiki; 24) Olopte B; 25) El Toll; 26) Teixonerres; 27) Arenys de Mar; 28) Riera de Sant Llorenç; 29) Riera dels Canyars; 30) La Mina; 31) Portalón del Tejadilla; 32) Arroyo Culebro; 33) Aldehuela; 34) Los Rosales. Mainea is represented by a red star. From these, Mainea, Jou Puerta, Labeko Koba, Urtiagako Leizea, and Aldehuela are the sites where both *Coelodonta antiquitatis* and *Mammuthus primigenius* have been found in the same site. See references in Table S2.

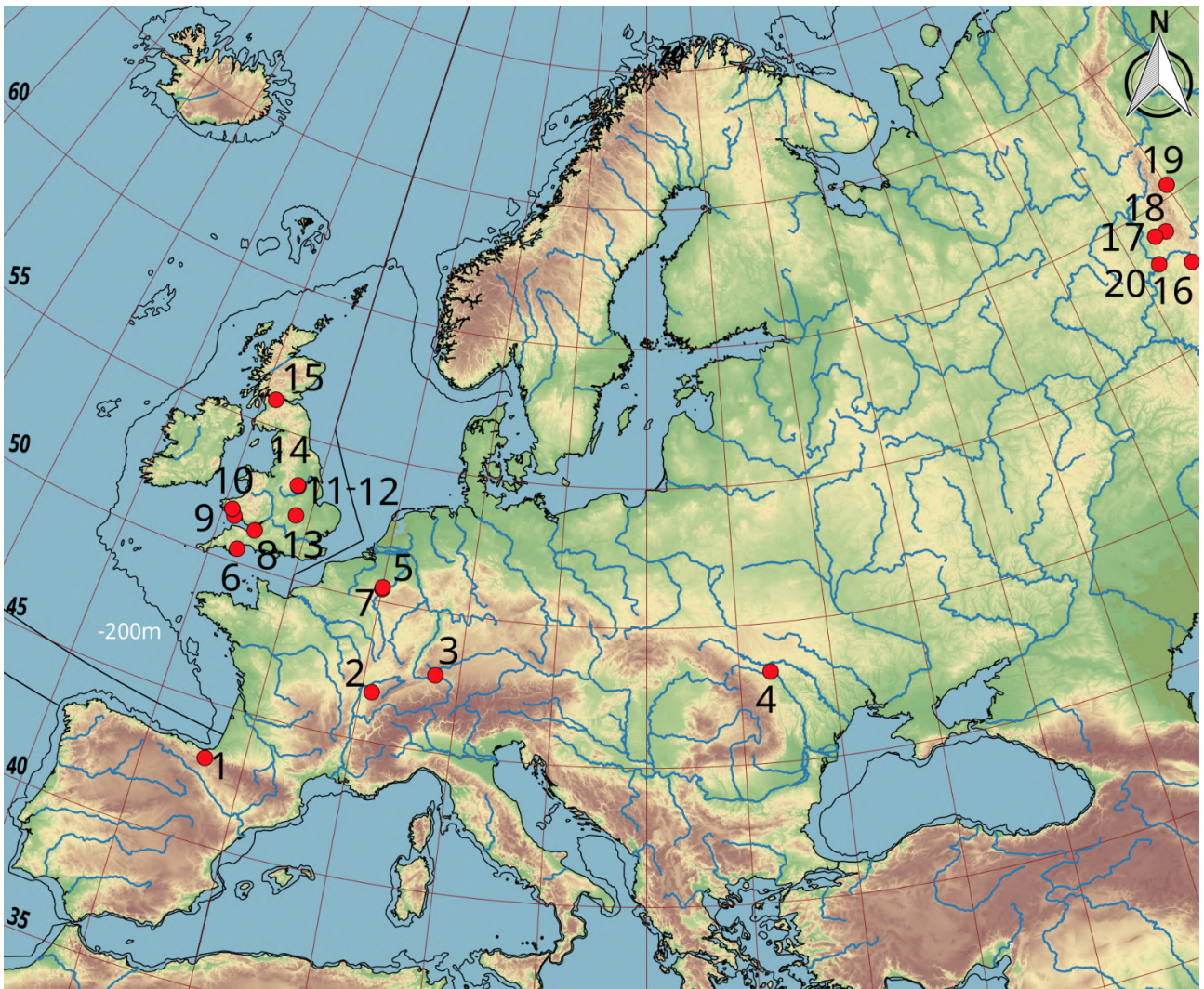


Fig. S3. Location of Mainea (1) together with the rest of the European sites from which samples were used for the isotopic study: 2) Grotte de Chaze II; 3) Kesslerloch; 4) Duruitoarea Veche; 5) Goyet; 6) Kent's Cavern; 7) Scladina; 8) Picken's Hole; 9) Goat's Hole; 10) Coygan Cave; 11) Clifford Hill; 12) Robin Hood Cave; 13) Pin Hole; 14) Ash Tree Cave; 15) Hungryside; 16) Chermiskoe; 17) Nizhnie Gari; 18) Grotto Kumishsky; 19) Grotto Rasik; 20) Grotto Chermuhovo. Base cartography obtained from the European Environment Agency. Rivers and bathymetry obtained from Natural Earth.

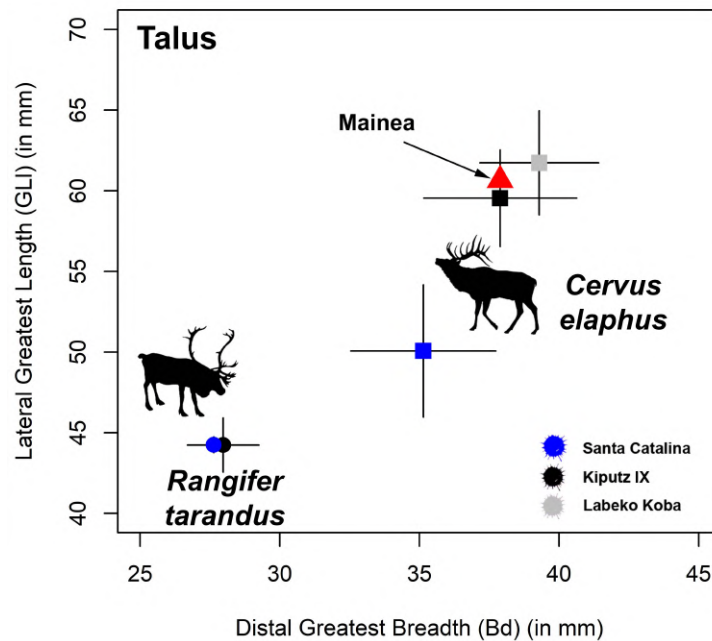
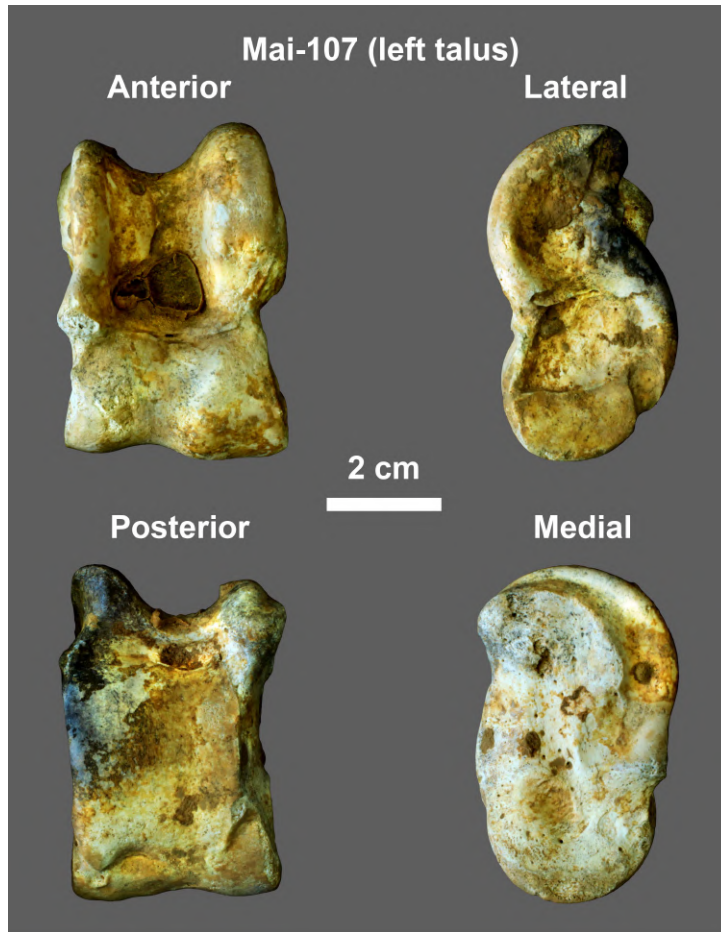


Fig. S4. *Cervus elaphus* talus from Mainea (Mai-107) in different views (top). Bivariate plot comparing the Mainea remain with other *Cervus elaphus* and *Rangifer tarandus* tali from north-Iberian sites (mean \pm 1 SD). The red deer remain from Mainea lays between the mean values of red deers from Labeko Koba and Kiputz IX, and is significantly larger than the *Rangifer tarandus* sample means (Table S4).

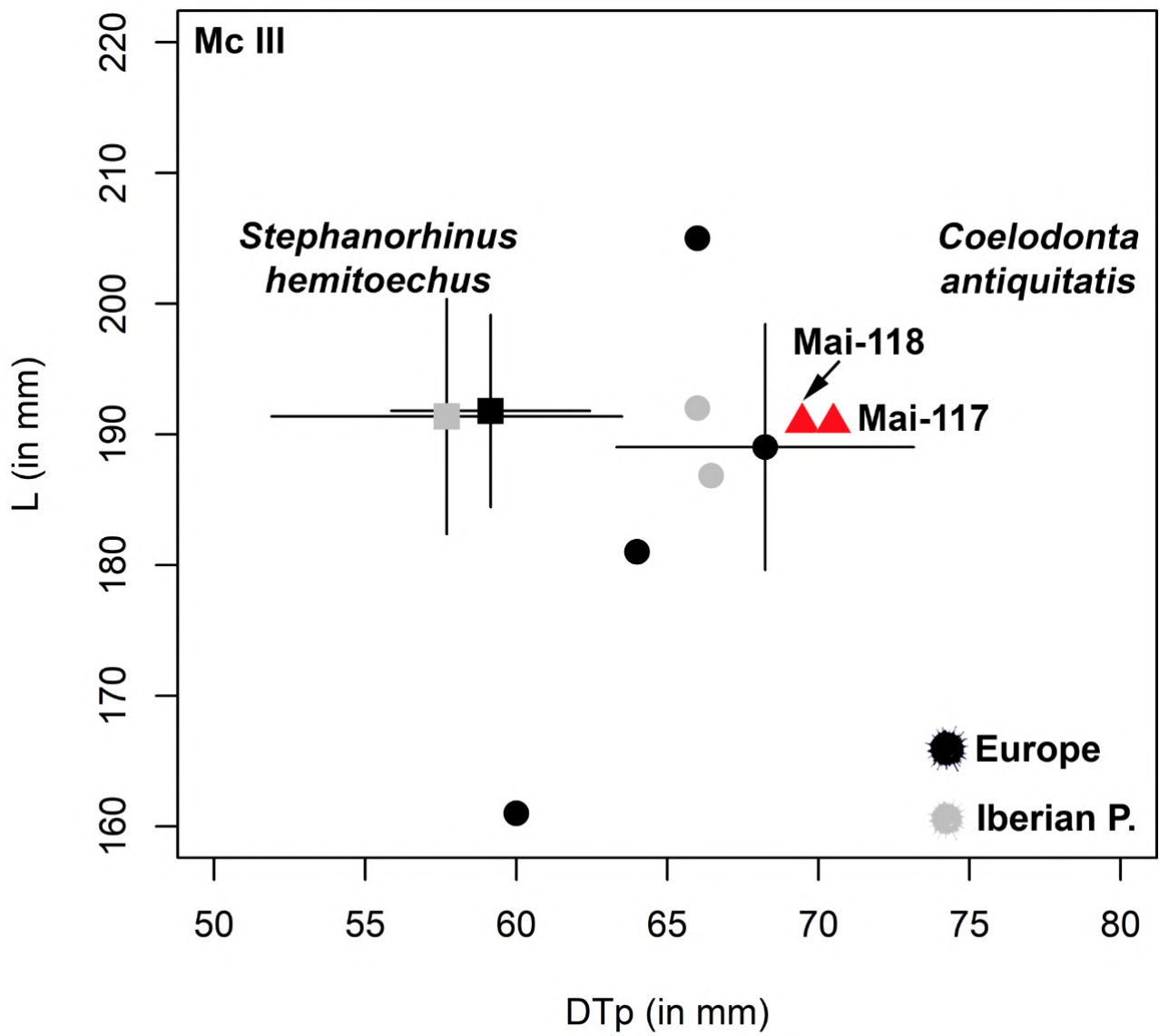


Fig. S5. Bivariate plot of third metacarpal length (L) and transverse diameter of the proximal epiphysis (DTp) of the Mainea *Coelodonta antiquitatis* specimens compared to other woolly rhinoceros and *Stephanorhinus hemitoechus* Pleistocene specimens and samples (represented by the mean \pm 1 standard deviation) from European and Iberian sites (see Table S12 for the references).

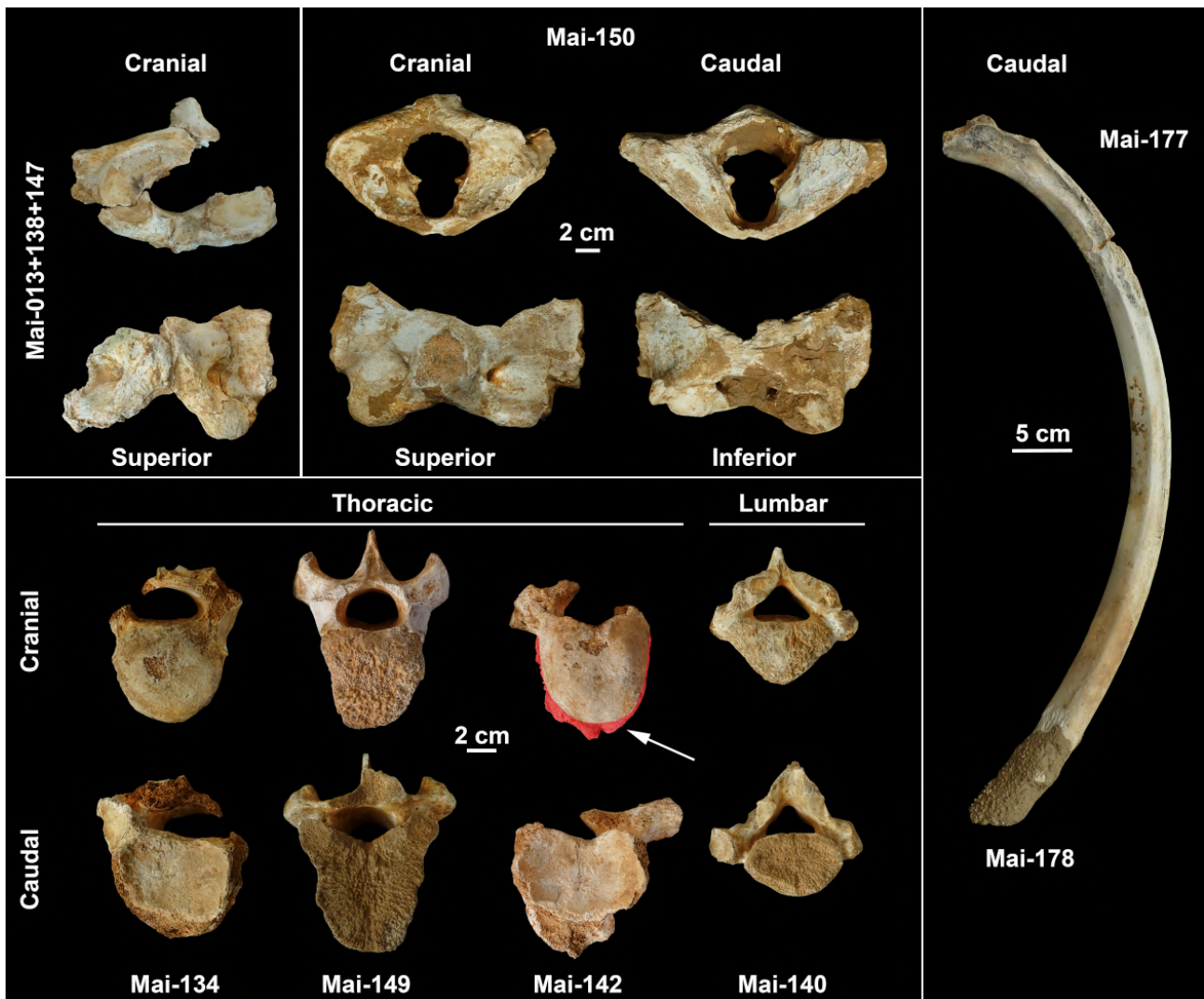


Fig. S6. Selected postcranial elements of the *Coelodonta antiquitatis* axial skeleton from Mainea: two first cervical vertebrae (atlas), three thoracic vertebrae and a lumbar vertebra. Vertebrae Mai-149 and Mai-140 show no fused epiphyses, but a size similar to the adult individual and thus we associate them to the young adult individual. In red: bone abnormal growth (osteophytes) in Mai-142. Mai-177+178: almost complete right rib in caudal view showing carbonate encrusting on the sternal-most preserved area.

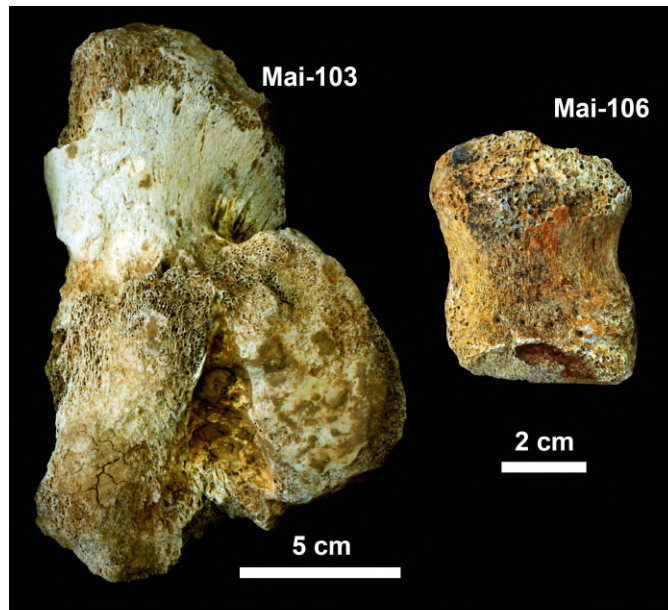


Fig. S7. Selected postcranial remains of *Mammuthus primigenius* from Mainea: right calcaneus (Mai-103) and proximal phalanx (Mai-106).

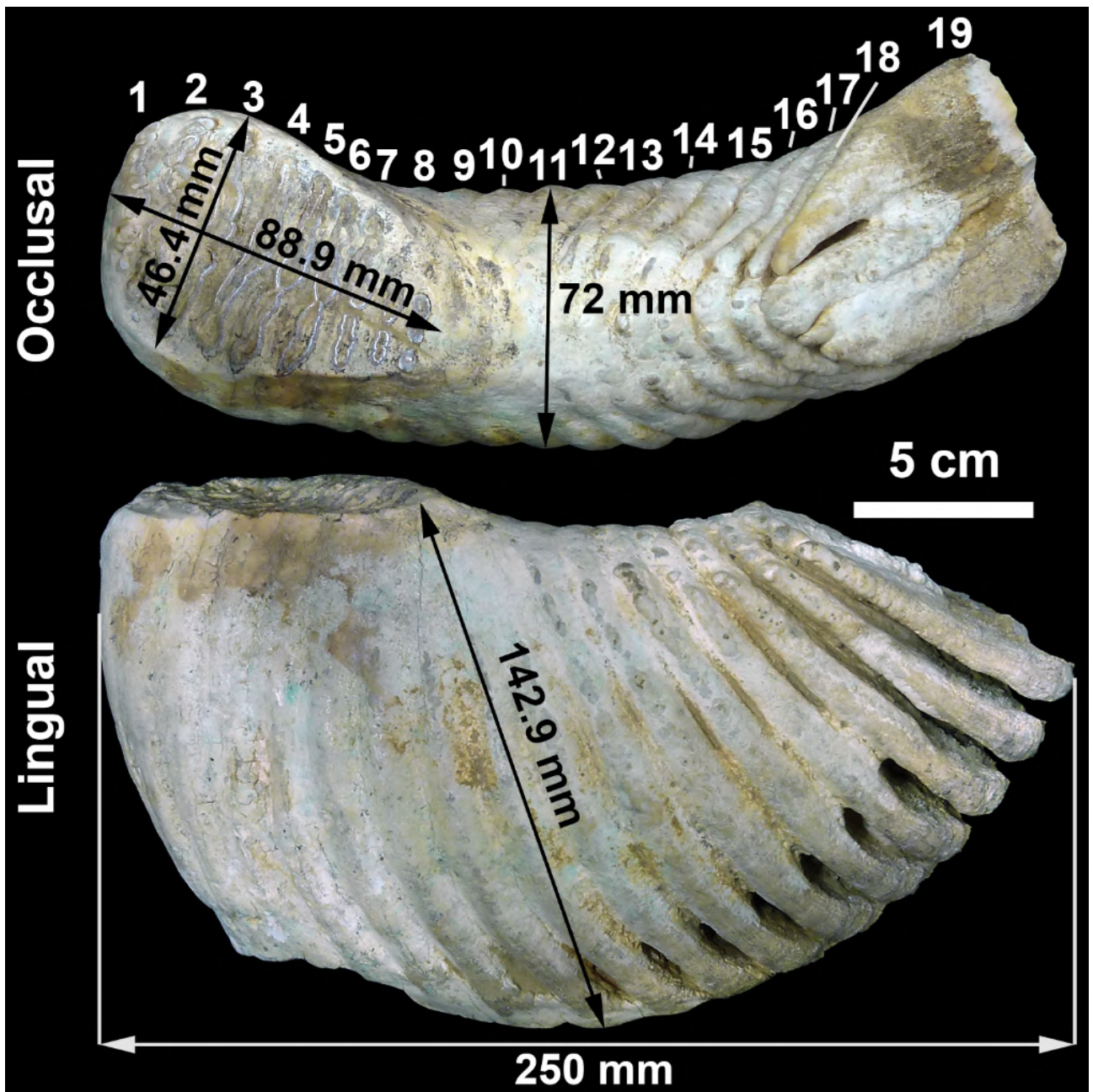


Fig. S8. Occlusal and lingual views of the m3 from Mainea (Mai-234) showing the preserved length (250 mm).

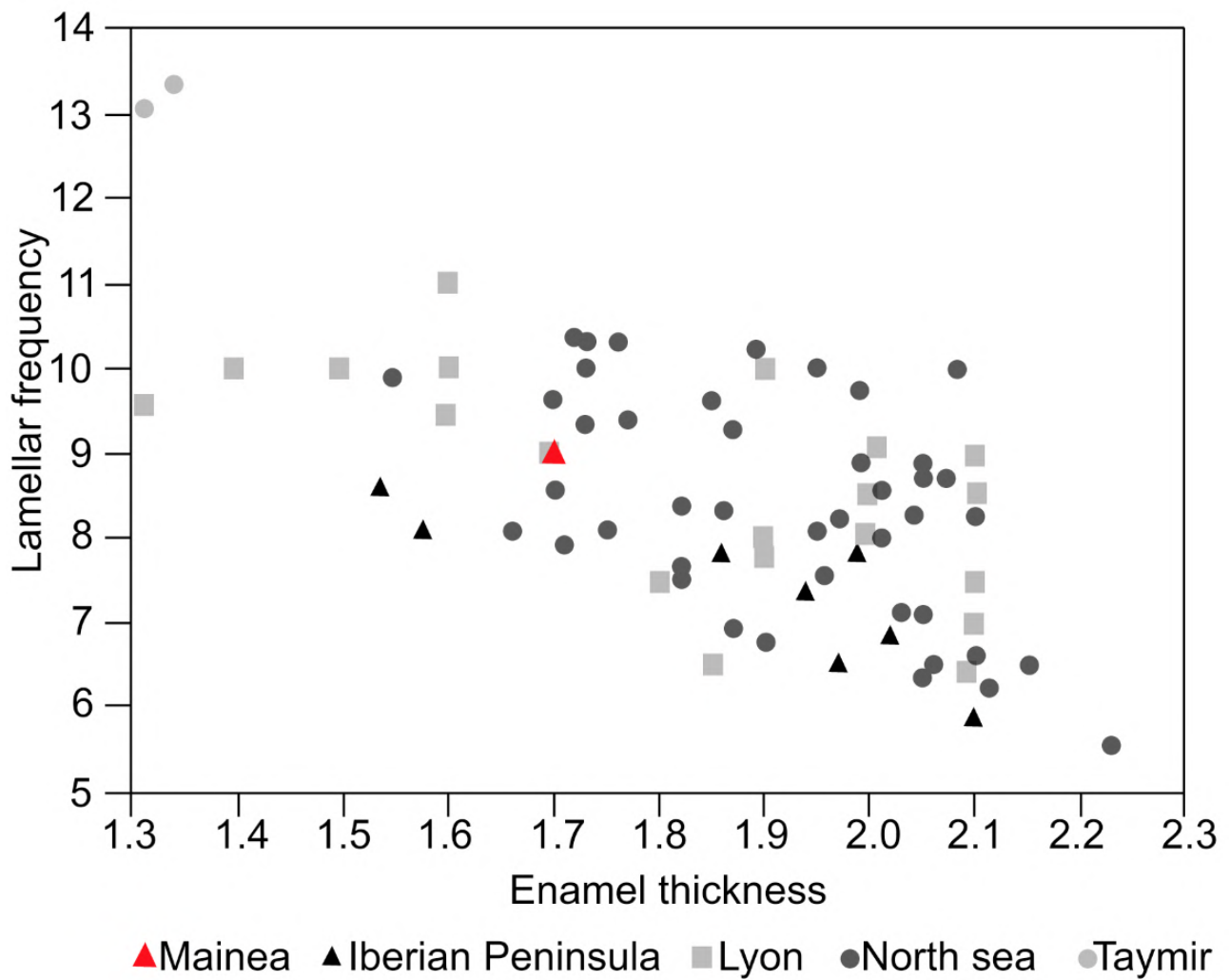


Fig. S9. Comparison of *Mammuthus primigenius* enamel thickness and lamellar frequency in the lower third molar from Mainea with various Eurasian localities (modified from Álvarez-Lao & García 2012). The Mainea specimen are compared with a sample mainly coming from the North Sea, and also from the Iberian Peninsula, Lyon area (France), and Taimyr. Measurements of enamel thickness are given in mm.

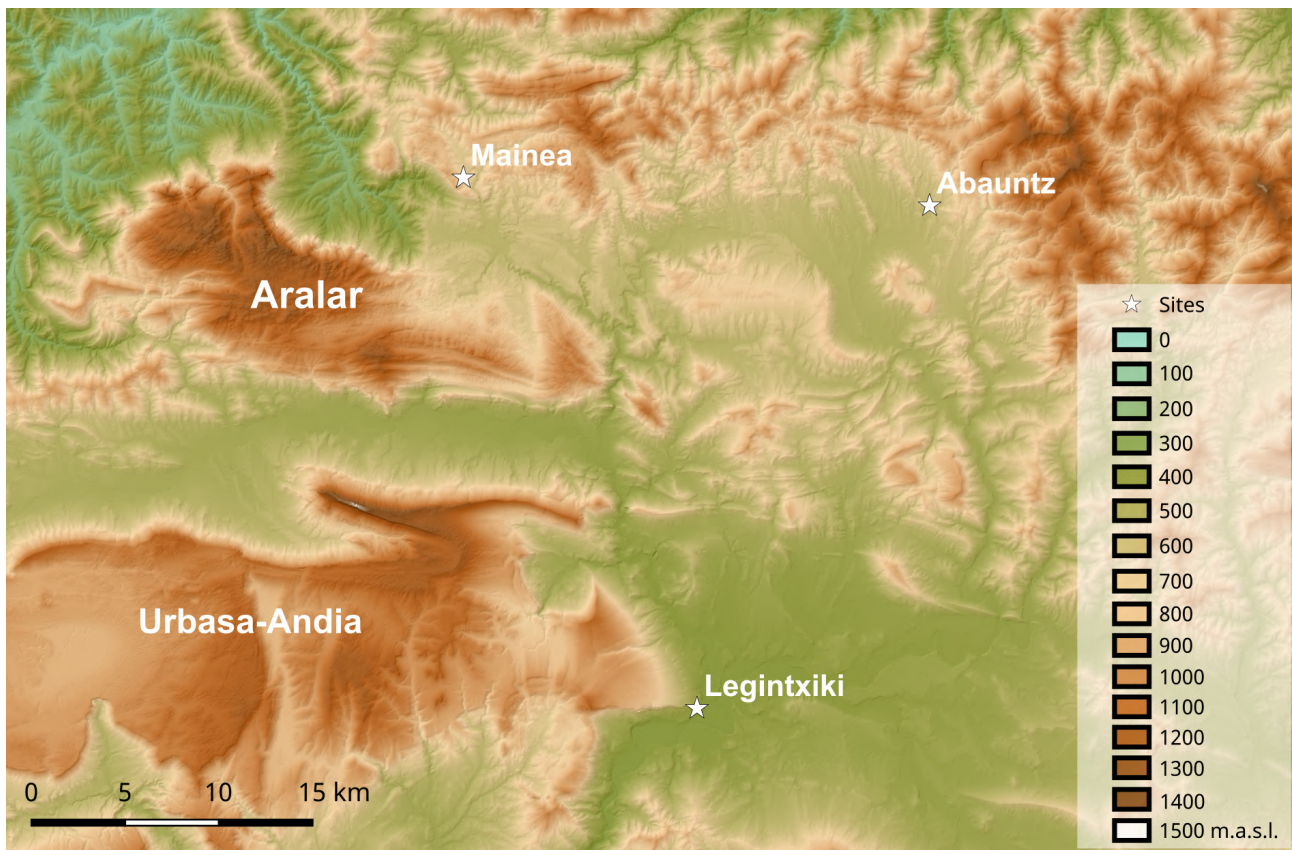


Fig. S10. Location of Mainea and other nearby sites with cold-adapted faunas. Data from IGN (MDT 5 m). Note that the whole area is more than 500 m above sea level, and there are two additional plateaus nearby, Aralar and Urbasa-Andia, at more than 1,000 m above sea level.

Table S1. Sites where *Mammuthus primigenius* remains have been found in the Iberian Peninsula together with their location and archaeological and chronological dates.

Site	Locality, province	Level	General chronology	Archaeological context and chronological context ^a	Reference(s)
Mainea	Uitzu, Navarre		MIS 3	46,354-44,428 cal BP (Beta-522535)	This paper
Buján	Incio, Lugo		-	-	Torre Enciso 1962
Las Caldas*	Priorio, Uviéu, Asturias	4-5	MIS 2	Final Solutrean (21,415 -19,869 cal BP); Ly-2422)	Altuna & Mariezkurrena 2017; Corchón Rodríguez 2017
		7	MIS 2	Upper Solutrean (22,900-21,475 cal BP); Ly-2423)	Altuna & Mariezkurrena 2017; Corchón Rodríguez 2017
		9	MIS 2	Upper Solutrean (23,952-22,865 cal BP); Ly-2424; 22,618-20,814 cal BP -AMS; Ua-15315)	Altuna & Mariezkurrena 2017; Corchón Rodríguez 2017
		11	MIS 2	Upper Solutrean (22,909-21,449 cal BP -AMS; Ua-15316)	Altuna & Mariezkurrena 2017; Corchón Rodríguez 2017
		12	MIS 2	Middle Solutrean (23,756-22,396 cal BP, Ly-2425; 24,023-22,938 cal BP; Ly-2426)	Altuna & Mariezkurrena 2017; Corchón Rodríguez 2017
		18	MIS 2	Middle Solutrean (23,737-22,393 cal BP; Ly-2429)	Altuna & Mariezkurrena 2017; Corchón Rodríguez 2017
La Güelga	Cangas de Onís, Asturias		MIS 3	>34.4 and <36.8 ka cal BP	Álvarez-Lao & García 2010
El Cierro*	Ribeseya, Asturias		Late Pleistocene	Solutrean	Corchón Rodríguez 1999
La Lloseta	Ribeseya, Asturias		MIS 2	Lower Magdalenian	Álvarez Lao 2007
Jou Puerta	Llanes, Asturias	-	MIS 3 (Late Pleistocene)	(#) 30,275 ± 105 cal BP (Beta-31318); 34,235 ± 374 cal BP (Beta-313520); 36,655 ± 205 cal BP (Beta-313519)	Álvarez-Lao 2014
Cueto de la Mina*	Llanes, Asturias		MIS 2	23.5 ka cal BP	Castaños 1982; Stuart <i>et al.</i> 2002
Mina Dolores	Udías, Cantabria		-	-	Adams 1877; Harlé 1912
Mina Ángel	Udías, Cantabria		-	-	Harlé 1912
Morín	Villaescusa, Cantabria		Late Pleistocene	Gravettian	Altuna 1971a,b
Minas de Heras	Medio Cudeyo, Cantabria		-	-	Álvarez-Lao 2007
Pámanes	Liérganes, Cantabria		MIS 2 (in the limit with MIS3)	25,957-25,055 and 27,830-26,476 ka cal BP (from the same mammoth sample)	Carballo 1912; Álvarez-Lao and García 2010

Labeko Koba	Arrasate, Gipuzkoa	VII	MIS 3 (Late Pleistocene)	41,713-39,391 cal BP (OxA-21793); 41,608-39,251 cal BP (OxA-21840); 42,347-40,270 cal BP (OxA-X-2314-43); 42,514-40,531 cal BP (OxA-21766)	Altuna & Mariezkurrena 2000; Arrizabalaga 2000; Wood <i>et al.</i> 2014
		IX upper	MIS 3 (Late Pleistocene)	43,975-41,500 cal BP (OxA-23199); 42,087-39,855 cal BP (OxA-22559)	
Urtiagako Leizea	Deba, Gipuzkoa	-	-	-	Altuna 1984
Clot de Llop	Olot, Girona		-	-	Harlé 1912
L'Arbreda	Serinyà, Girona	H**	MIS 3 (Late Pleistocene)	Archaic Aurignacian; 38,226-35,326 cal BP (SANU-29018); 41,462-37,866 cal BP (SANU-29017); 42,173-39,558 cal BP (SANU-29019); 42,070-39,429 cal BP (SANU-29016); 37,718-35,165 cal BP (SANU-29014); 40,051-37,090 cal BP (OxA-21674); 42,020-39,727 cal BP (OxA-21665); 42,087-39,855 cal BP (OxA-21784); 42,002-39,834 cal BP (OxA-21664)	Galobart <i>et al.</i> 1996; Wood <i>et al.</i> 2014;
		J	MIS 3 (Late Pleistocene)	(#) Mousterian; between 71 and 44.4 ka BP	Ajaja 1994; Wood <i>et al.</i> 2014; Rufi <i>et al.</i> 2018;
Cau de les Goges*	Sant Julià de Ramis, Girona		Late Pleistocene	Solutrean	Obermaier 1925
Teixoneres	Moià, Barcelona	III	-	(#) >51 ka BP- 44.21 ka cal BP	Talamo <i>et al.</i> 2016; Álvarez-Lao <i>et al.</i> 2017
Riera de Sant Llorenç	Viladecans, Barcelona	-	MIS 4?	-	Daura <i>et al.</i> 2013
Riera dels Canyars	Gavà, Barcelona	-	MIS 3 (Late Pleistocene)	(#) c. 39.6 ka cal BP (from several charcoal samples)	Daura <i>et al.</i> 2013
Padul	Padul, Granada		MIS 3 (Late Pleistocene)	31,094-28,835; 36,006-31,580; 41,394-36,218; 42,224-39,310 ka cal BP	Álvarez-Lao & García 2010
Cruz Quebrada	Oeiras, Estremadura		-	-	Cardoso & Regala 2002
Algar de João Ramos	Redonda (Alcobaça), Estremadura		-	18,183-16,382 cal BP (chronology of the level, but the fossil attributed to <i>M. primigenius</i> might be allochthonous)	Cardoso 1996; Sousa & Figueiredo 2001
Butarque	Villaverde, Madrid		-	-	Álvarez-Lao and García 2010
Arenero Casa Eulogio	Vaciamadrid, Madrid		-	-	Sesé and Soto 2002
Arriaga	Vaciamadrid,		-	-	Sesé & Soto 2002

	Madrid				
Edar Culebro	Getafe, Madrid		-	-	Álvarez-Lao & García 2010
Aldehuela	Getafe, Madrid		-	-	Sesé & Soto 2002

^a Dates have been calibrated using Oxcal v. 4.4. software (Bronk Ramsey 1998, 2009) and the Intcal120 calibration curve (Reimer *et al.* 2020) except sites marked by a #, for which the uncalibrated dates are not available and thus the published calibrated dates are provided.

* Tooth fragments, some of which have been worked on (Corchón Rodríguez 1999, 2017; Álvarez-Lao 2007)

** Ivory fragment. With respect to L'Arbreda, Galobart *et al.* (1996) do not rule out that these remains (anthropically worked defense remains) were imported.

Here we do not include the presence of a proboscidean classified as a possible mammoth ("*Mammuthus?*"; Rosell *et al.* 2012) from level J of Abric Romaní (Rosell *et al.* 2012). Additionally, the lamella fragment from bed 2 of Figueira Brava, traditionally assigned to *Mammuthus primigenius*, based on morphological and chronological criteria, though the enamel thickness values were intermediate between *E. antiquus* and *M. primigenius* (Antunes & Cardoso 1992), was recently reassigned to *E. antiquus* following new data obtained from the site (Zilhão *et al.* 2020).

Table S2. Sites where *Coelodonta antiquitatis* remains have been found in the Iberian Peninsula together with their location and archaeological and chronological dates.

Site	Locality, province	Level	General chronology	Archaeological context and chronological context ^a	MNI	Reference
Mainea	Uitzi, Navarre	-	MIS 3 (Late Pleistocene)	46,354-44,428 cal BP (Beta-522535)	5	This study
La Parte	Siero, Asturias	C	MIS 6 (Middle Pleistocene)	188,497 ± 11,000 BP; 141,479 ± 8,500 BP (U-Th series)	1	Álvarez-Lao & García-García 2006
Cueva de la Xana	Nava, Asturias	-	-	-	1	Álvarez-Lao & García 2011b
Rexidora	Cuerres, Asturias	-	MIS 3 (Late Pleistocene)	44,515 ± 855 cal BP (Beta-366977)	2	Álvarez-Lao <i>et al.</i> 2015
Jou Puerta	Llanes, Asturias	-	MIS 3 (Late Pleistocene)	(#) 30,275 ± 105 cal BP (Beta-31318); 34,235 ± 374 cal BP (Beta-313520); 36,655 ± 205 cal BP (Beta-313519)	3	Álvarez-Lao 2014
La Peña de Mudá	Mudá, Palencia	-	-	-	1	Álvarez-Lao & García 2011a,b
Unquera	Unquera, Cantabria	-	-	-	1	Harlé 1912
Las Cáscaras	Ruiloba, Cantabria	-	-	-	1	Carballo (1910) in Álvarez-Lao & García 2011
La Gándara	Udías, Cantabria	-	-	-	1	Naranjo & Garza 1875 in Álvarez-Lao & García 2011a,b
Cueva de Nando	Ajo, Cantabria	d	-	-	1	Fuentes & Mejjide 1979
Cueva de San Pedro	Navajeda, Cantabria	-	-	-	1	Domingo <i>et al.</i> 2005
Cobrante	San Miguel de Aras, Cantabria	6	-	Proto-Aurignacian with evidence of admixture with Middle Paleolithic tools: 41,569-39,161 cal BP (OxA-32505); >44,800 (OxA-32506)	1	Castaños Ugarte 2009; Marín-Arroyo <i>et al.</i> 2018
Covacho de Arenillas	Islares, Cantabria	II	MIS 3 (Late Pleistocene)	** 33,780 +1,700,-1,400 BP (GrN-19597); 34,660 +1,600, -1,300 (GrN-19599)	?	Castaños in press, in Castaños 1996
El Cuco	Castro Urdiales, Cantabria	X	MIS 3 (Late Pleistocene)	(46,333-44,024 cal BP, OxA-27196; 50,493-46,917 cal BP, OxA-27115)-AMS (On <i>Patella vulgata</i> shells)	?	Castaños & Castaños 2007; Rasines del Río <i>et al.</i> 2011; Gutiérrez-Zugasti <i>et al.</i> 2018

		XIII		Middle Paleolithic 51,625*-46,989 cal BP, OxA-30851)-AMS (On a <i>Patella vulgata</i> shell)	2	
Cantera de la vía	Bilbao, Biscay	-	-	-	1	Altuna 1974
Lezika	Kortezubi, Biscay	-	-	-	5	Castaños <i>et al.</i> 2009
Labeko Koba	Arrasate, Gipuzkoa	Sima and DRS	Late Pleistocene	-	2	Altuna & Mariezkurrena 2000; Arrizabalaga 2000; Wood <i>et al.</i> 2014
		VII		41,713-39,391 cal BP (OxA-21793); 41,608-39,251 cal BP (OxA-21840); 42,347-40,270 cal BP (OxA-X-2314-43); 42,514-40,531 cal BP (OxA-21766)	4	
		IX upper		43,975-41,500 cal BP (OxA-23199); 42,087-39,855 cal BP (OxA-22559)	7	
Arrikruz	Oñati, Gipuzkoa	-	-	-	1	Altuna 1979
Lezetxiki	Arrasate, Gipuzkoa	II	Late Pleistocene	Solutrean in its upper part and Gravettian in its lower part	1	Altuna 1972
		IIIa	Late Pleistocene	Late Aurignacian	1	Altuna 1972
Artazu VIII	Arrasate, Gipuzkoa	-	Late Pleistocene	-		Murelaga <i>et al.</i> 2015
Baio	Zestoa, Gipuzkoa	-	-	-	1	Altuna & Mariezkurrena 2010
Urtiagako Leizea	Deba, Gipuzkoa	-	MIS 3 (Late Pleistocene)	35,766-32,250 cal BP (Ua-37426)	1	Altuna & Mariezkurrena 2010
Abauntz	Arraitz, Navarre	f	Late Pleistocene	Solutrean; 26,382-25,377 cal BP (GrN-21011)	1	Altuna <i>et al.</i> 2001-2002; Utrilla <i>et al.</i> 2015
Legintxiki	Etxauri, Navarre	IIIb	Late Pleistocene	(#) (>17.025), Gravettian (Indeterminate Perigordian)		Nuin 1995-1996; Castaños 1996
Olopte B	Isòvol, Girona	6	Würm II	-	-	Villalta 1972
El Toll	Moià, Barcelona		-	-	1	Thomas & Villalta 1957
Arenys de Mar	Arenys de Mar, Barcelona	Sand quarry	-	-	1	Harlé 1920
Teixoneres	Barcelona	II	MIS 3 (Late Pleistocene)	(#) 44.21-33.06 ka cal BP	2	Talamo <i>et al.</i> 2016; Álvarez-Lao <i>et al.</i> 2017
		III		(#) >51 ka BP- 44.21 ka cal BP	4	Talamo <i>et al.</i> 2016; Álvarez-Lao <i>et al.</i> 2017
Riera de Sant	Viladecans,	-	MIS4?	-	?	Daura <i>et al.</i> 2013

Llorenç	Barcelona					
Riera dels Canyars	Gavà, Barcelona	-	MIS 3 (Late Pleistocene)	(#) c. 39.6 ka cal BP (from several charcoal samples)	2	Daura <i>et al.</i> 2013
La Mina	Hortigüela, Burgos	-	MIS 3 (Late Pleistocene)	(#) 52.5 ka BP (aminochronology)	1	Díez <i>et al.</i> 2008; Arceredillo 2015, 2016
Portalón del Tejadilla	Perogordo, Segovia	CAM1	MIS 3 (Late Pleistocene)	35,463-34,701 cal BP (Beta-488205)	3	Sala <i>et al.</i> 2020
Arroyo Culebro	Getafe, Madrid	-	Early Late Pleistocene	-	3	Arsuaga Ferreras & Aguirre Enríquez 1979
Aldehuela	Madrid	Sand quarry	-	-	1	Sesé & Soto 2002
Los Rosales	Getafe, Madrid	Sand quarry	-	-	1	Cerdeño 1990; Álvarez-Lao & García 2011a,b

^a Dates have been calibrated using Oxcal v. 4.4. software (Bronk Ramsey 1998, 2009) and the Intcal120 calibration curve (Reimer *et al.* 2020) except sites marked by a #, for which the uncalibrated dates are not available and thus the published calibrated dates are provided.

* Date may extend out of range

** Uncalibrated.

Table S3. Isotopic values, along with Latitude, Longitude, Altitude and dating of the *Mainea Coelodonta antiquitatis* tooth (P2, Mai-112) in comparison with other European sites.

Location ^a	Region/Country	Latitude (in °)	Longitude (in °)	Altitude (in m)	Dating (years uncal BP)	Calibrated (2 σ years cal BP) ^b			$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	Reference	
						From	To	Mean				
1	Mainea	Navarre	43.03	-1.91	727	42,740 ± 600	46,354	44,428	45,391	-19.9	4.5	This study
2	Grotte de Chaze II	France	46.76	5.54	287	13,890 ± 80	17,073	16,591	16,832 ^c	-20.3	5.3	Bocherens <i>et al.</i> 2011
3	Kesslerloch	Switzerland	47.75	8.69	478	14,330 ± 110	17,835	17,104	17,470 ^c	-19.9	2.1	Bocherens <i>et al.</i> 2011
4	Duruitoarea Veche	Moldova	48.27	26.65	134	38,500 ± 500	42,911	42,080	42,496	-19.4	7.2	Stuart and Lister, 2012
5	Goyet	Belgium	50.44	5.01	157					-20.0	4.3	Bocherens <i>et al.</i> 2011
			50.44	5.01	157					-20.4	5.7	Bocherens <i>et al.</i> 2011
			50.44	5.01	157					-20.8	5.9	Bocherens <i>et al.</i> 2011
						Mean ± SD			-20.4 ± 0.4	5.3 ± 0.87		
6	Kent's Cavern	Torquay, Devonshire, England	50.47	-3.50	57	35,150 ± 330	40,988	39,632	40,310	-19.4	6.5	Higham <i>et al.</i> 2006
			50.47	-3.50	57	35,650 ± 330	41,346	40,041	40,694	-19.4	7.4	Higham <i>et al.</i> 2006
			50.47	-3.50	57	36,040 ± 330	41,761	40,556	41,159	-19.8	6.4	Higham <i>et al.</i> 2006
			50.47	-3.50	57	36,370 ± 320	41,935	40,901	41,418	-20.8	5.7	Higham <i>et al.</i> 2006
			50.47	-3.50	57	37,200 ± 550	42,398	41,197	41,798	-20.1	6.2	Higham <i>et al.</i> 2006
			50.47	-3.50	57	45,000 ± 2,200	54,985*	44,649	49,817	-19.9	6.4	Higham <i>et al.</i> 2006
						Mean ± SD			-19.9 ± 0.52	6.44 ± 0.55		
7	Scladina	Belgium	50.51	5.02	138					-21.1	5.4	Bocherens <i>et al.</i> 2011
			50.51	5.02	138					-20.9	5.5	Bocherens <i>et al.</i> 2011
			50.51	5.02	138					-20.3	6.9	Bocherens <i>et al.</i> 2011
			50.51	5.02	138					-20.0	6.4	Bocherens <i>et al.</i> 2011
			50.51	5.02	138					-21.1	5.3	Bocherens <i>et al.</i> 2011
			50.51	5.02	138					-20.4	7.5	Bocherens <i>et al.</i> 2011
			50.51	5.02	138					-20.6	5.5	Bocherens <i>et al.</i> 2011
						Mean ± SD			-20.63 ± 0.42	6.07 ± 0.87		
8	Picken's Hole	Compton Bishop,	51.29	-2.87	58	40,200 ± 700	44,499	42,615	43,557	-19.7	5.3	Jacobi <i>et al.</i> 2009

		Somerset, England	51.29	-2.87	58	>44,000				-20.1	5.0	Jacobi <i>et al.</i> 2009
									Mean ± SD	-19.9 ± 0.28	5.15 ± 0.21	
9	Goat's Hole	Paviland, Wales	51.55	-4.25	68	32,870 ± 200	38,167	36,655	37,411	-20.2	5.3	Jacobi & Higham 2008
			51.55	-4.25	68	33,800 ± 200	39,426	37,872	38,649	-20.2	5.4	Jacobi & Higham 2008
			51.55	-4.25	68	42,650 ± 800	46,933	44,156	45,545	-19.8	6.0	Jacobi & Higham 2008
										Mean ± SD	-20.07 ± 0.23	5.57 ± 0.38
10	Coygan Cave	Laugharne, Carmarthenshire, Wales	51.76	-4.49	47	45,800 ± 1,400	54,585*	45,624	50,105	-20	2.6	Jacobi <i>et al.</i> 2009
11	Clifford Hill	Northamptonshire, England	52.23	-0.82	55	49,800 ± 1,000	-	50,769*		-20	4.7	Jacobi <i>et al.</i> 2009
12	Robin Hood Cave	Creswell Crag, Derbyshire, England	53.26	-1.20	91	40,550 ± 400	44,355	42,985	43,670	-19.5	3.7	Jacobi <i>et al.</i> 2009
13	Pin Hole	Creswell Crag, Derbyshire, England	53.26	-1.19	96	41,900 ± 900	46,293	43,097	44,695	-19.4	5.2	Jacobi <i>et al.</i> 2009
			53.26	-1.19	96	43,350 ± 650	47,209	44,679	45,944	-19.8	1.8	Higham <i>et al.</i> 2006
			53.26	-1.19	96	43,700 ± 1,000	48,370	44,603	46,487	-19.2	6.0	Jacobi <i>et al.</i> 2009
			53.26	-1.19	96	45,000 ± 750	49,123	45,835	47,479	-19.2	4.7	Higham <i>et al.</i> 2006
			53.26	-1.19	96	49,000 ± 800	-	50,243*		-20.2	2.7	Higham <i>et al.</i> 2006
			53.26	-1.19	96	49,000 ± 1,300	-	49,482*		-19.6	3.2	Jacobi <i>et al.</i> 2009
			53.26	-1.19	96	50,200 ± 1,400	-	50,553*		-19.4	4.0	Higham <i>et al.</i> 2006
			53.26	-1.19	96	52,500 ± 2,800	-	50,553*		-19.8	3.5	Higham <i>et al.</i> 2006
			53.26	-1.19	96	52,900 ± 1,900	-	54,946*		-19.5	2.5	Jacobi <i>et al.</i> 2009
			53.26	-1.19	96	53,300 ± 3,400	-	50,488*		-19.9	3.8	Jacobi <i>et al.</i> 2009
			53.26	-1.19	96	53,400 ± 1,700	-	54,962*		-19.6	3.1	Higham <i>et al.</i> 2006
			53.26	-1.19	96	54,000 ± 2,900	-	54,938*		-20.1	2.4	Higham <i>et al.</i> 2006
			53.26	-1.19	96	55,900 ± 4,000	-	54,948*		-20.0	4.4	Higham <i>et al.</i> 2006
			53.26	-1.19	96	>43,000				-19.7	8.3	Higham <i>et al.</i> 2006
			53.26	-1.19	96	>51,400				-19.7	3.4	Higham <i>et al.</i> 2006
								Mean ± SD	-19.67 ± 0.3	3.93 ± 1.65		
14	Ash Tree	England,	53.27	-1.23	128	37,540 ± 370	42,423	41,644	42,034	-19.5	4.6	Jacobi <i>et al.</i> 2009

	Cave	Whitwell, Derbyshire										
15	Hungryside	Scotland, Bishopbriggs, Dunbartonshire	55.92	-4.19	63	32,250 ± 700	39,010	35,369	37,190	-19.5	0.8	Jacobi <i>et al.</i> 2009
16	Cheremiskoe	Russia	57.45	60.95	260	42,900 ± 800	47,178	44,342	45,760	-18.6	6.1	Stuart & Lister 2012
17	Nizhnie Gari	Urals, Russia	58.17	56.57	172	36,050 ± 400	41,875	40,462	41,169	-19.5	4.9	Stuart & Lister 2012
18	Grotto Kumishsky	Urals, Russia	59.04	58.17	385	33,670 ± 300	39,405	37,562	38,484	-19.6	5.4	Stuart & Lister 2012
19	Grotto Rasik	Urals, Russia	59.08	57.33	228	31,540 ± 260	36,355	35,349	35,852	-19.7	4.2	Stuart & Lister 2012
20	Grotto Cheremuhovo	Urals, Russia	60.4	60.05	233	33,650 ± 600	40,022	36,895	38,459	-19.5	5.1	Stuart & Lister 2012

^aThe number refers to the numbers used in Fig. S3.

^bDates have been calibrated using Oxcal v. 4.4. software (Bronk Ramsey 1998, 2009) and the Intcal120 calibration curve (Reimer *et al.* 2020).

^cNot used in the regression analysis.

*Date may extend out of range

Table S4. *Cervus elaphus* talus measurements (in mm) from Mainea in comparison with other red deer and reindeer samples from Iberian sites.

Taxon	Label/Site	Side	Greatest lateral length (GLl)	Greatest medial length (GLm)	Greatest lateral thickness (Dl)	Greatest medial thickness (Dm)	Greatest distal width (Bd)	References
<i>Cervus elaphus</i>	Mai-14 (Mainea)	Left	60.65	56.71	33.29	30.07	37.85	This study
<i>Cervus elaphus</i>	Kiputz IX	Mean ± SD	59.54 ± 3.0	55.26 ± 2.54	32.40 ± 1.57		37.89 ± 2.74	Castaños 2017
		Range	52.0-66.5	49.0-60.0	27.5-35.5		29.0-43.0	
		<i>n</i>	86	86	86		85	
	Santa Catalina	Mean ± SD	50.07 ± 4.1	52.1 ± 3.5	31.0 ± 1.69		35.14 ± 2.6	Castaños Ugarte 2014
		Range	42.5-60.0	41.0-56.0	29.0-35.5		27.0-38.0	
		<i>n</i>	14	14	12		14	
	Labeko Koba	Mean ± SD	61.73 ± 3.23	57.11 ± 2.69	33.73 ± 1.45		39.29 ± 2.13	Altuna & Mariezkurrena 2000
		Range	55.0-65.0	52.5-61.5	31.0-35.0		34.5-42.0	
		<i>n</i>	13	11	13		12	
<i>Rangifer tarandus</i>	Kiputz IX	Mean ± SD	44.24 ± 1.68	41.78 ± 1.58	24.78 ± 1		27.97 ± 1.28	Castaños 2017
		Range	41.5-48.0	39.0-45.5	23.0-27.0		25.0-30.5	
		<i>n</i>	41	41	41		40	
	Santa Catalina	Mean ± SD	44.25 ± 0.49	42.14 ± 0.41	24.61 ± 0.23		27.63 ± 0.27	Castaños Ugarte 2014
		Range	42.0-47.0	40.0-44.0	23.5-25.5		26.0-29.0	
		<i>n</i>	10	10	9		11	

Table S5. Raw dimensions (in mm) of the *Coelodonta antiquitatis* cranium from Mainea compared with other Iberian and European sites and results of the z-score analysis between the Iberian specimens and a European *C. antiquitatis* sample (Guérin, 1980).

Site (label)	Chronology	Height of the occipital (HO)	Greatest width foramen magnum (GWF)	Greatest width between occipital condyles (WOC)	Width between temporal crests (WTC)	Lowest width between temporals (WmT)	Greatest width (W)	Occipital width (WO)	References
Mainea (Mai-1)	LP	142.0**	56.0	153.0	196.0	87.0	324.0	(315.0)	This study
Arroyo Culebro	LP	153.0	44.0	160.0	250.0	90.0		300.0	Arsuaga Ferreras & Aguirre Enríquez 1979
		150.0	<u>42.0</u>	153.0	215.0	70.0	370.0	280.0	
European sites	MP/LP	175.2 ± 13.45 (141.0-208.0) n=51	59.9 ± 5.9 (43.0-76.0) n=55	157.4 ± 9.3 (142.0-177.0) n=53	206.9 ± 20.87 (150.0-257.0) n=55	90.5 ± 18.51 (53.0-136.0) n=53	334 ± 19.64 (296.0-383.0) n=35		Guérin 1980

Values with a * or ** are significantly different from the rhinoceros sample provided by Guérin (1980) (* = $p < 0.05$; ** = $p < 0.01$). Underlined values are outside the range of the European *C. antiquitatis* sample. Values in bold indicate those values that are significantly different and/or outside the range of the *Coelodonta antiquitatis* European sample.

LP=Late Pleistocene; MP=Middle Pleistocene.

Table S6. Raw dimensions (in mm) of *Coelodonta antiquitatis* upper premolars from Mainea compared with other Iberian and European sites and results of the z-score analysis between the Iberian specimens and a European *C. antiquitatis* sample (Guérin, 1980).

Tooth	Site	Label	Chronology	Side	Occlusal antero-posterior diameter (DAPo)	Basal antero-posterior diameter (DAPb)	Greatest length (L)	Transverse diameter of anterior lobe (DTa)	Transverse diameter of posterior lobe (DTp)	Greatest width (W)	References
P2	Mainea	Mai-112	LP	R	26.2	24.9	26.2	27.6	30.9	29.9	This study
	Cueva de Nando		LP							32.4	Álvarez-Lao & García 2011b
	Arenys de Mar			L			32.0			41.5	Álvarez-Lao & García 2011b
					R			32.5		41.0	Álvarez-Lao & García 2011b
	European sites		MP/LP				32.13 ± 3.16 (25.0-37.0) <i>n</i> = 26			34.43 ± 3.93 (27.5-42.0) <i>n</i> = 29	Guérin 1980
P3	Mainea	Mai-113	LP	L	35.1	28.8	35.1	37.2	35.8	39.4	This study
	Lezika I	LEK.128.244	LP	R	36.8	30.9	37.1	38.2	38.1	39.7	This study
	Cueva de Nando		LP				42.0			38.0	Álvarez-Lao & García 2011b
	Peña de Mudá						36.6			44.2	Álvarez-Lao & García 2011b
	Arenys de Mar			L			36.5			49.0	Álvarez-Lao & García 2011b
					R			34.5		51.2	Álvarez-Lao & García 2011b
	European sites		MP/LP	Mean ± SD (range) <i>n</i>			38.28 ± 2.25 (33.0-43.0) <i>n</i> = 56			42.06 ± 2.81 (35.0-47.5) <i>n</i> = 57	Guérin 1980
P4	Mainea	Mai-114/115	LP	L/R	(33.6)/(34.0)	33.5/34.2	39.8/41.3	44.2/42.5	37.6/47.2	47.1/47.2	This study
	Lezika I	LEK.3C.267	-	R	40.4	37.9	39.6	49.0	44.9	53.1	This study
		LEK.3C.242	-	R	36.0	36.9	39.9	45.9	41.7	46.1	This study

	LEK.3C.243	-	L	34.6	36.4	39.4	(46.3)	41.9	44.3	This study
Cueva de Nando		LP				49.3			47.0	Álvarez-Lao & García 2011b
Arenys de Mar			L			43.8			54.5	Álvarez-Lao & García 2011b
			R			43.5			49.5	Álvarez-Lao & García 2011b
European sites		MP/LP	Mean ± SD (range) <i>n</i>			43.17 ± 3.86 (37.0-51.5) <i>n</i> = 47			48.53 ± 2.43 (44.0-55.5) <i>n</i> = 22	Guérin 1980

Significant values in z-score analysis. Values with a * or ** are significantly different from the rhinoceros sample provided by Guérin (1980) (* = $p < 0.05$; ** = $p < 0.01$). Underlined values are outside the range of the European *C. antiquitatis* sample. Values in bold indicate those values that are significantly different and/or outside the range of the *Coelodonta antiquitatis* European sample.

Values between parentheses are estimated. LP=Late Pleistocene; MP=Middle Pleistocene. R= right. L= left.

Table S7. Raw dimensions (in mm) of *Coelodonta antiquitatis* upper molars from Mainea compared with other Iberian and European sites and results of the z-score analysis between the Iberian specimens and a European *C. antiquitatis* sample (Guérin, 1980).

Tooth	Site	Label	Chronology	Side	Occlusal antero-posterior diameter (DAPo)	Basal antero-posterior diameter (DAPb)	Greatest length (L)	Transverse diameter of anterior lobe (DTa)	Transverse diameter of posterior lobe (DTp)	Greatest width (W)	References
M1	Mainea	Mai-93/94	LP	L/R	53.1/52.6	39.5/41.8	53.1/52.6	54.5/50.6	44.9/47.3	52.5/50.6	This study
	Lezika	LEK.3C.269	-	R	49.1	35.9	46.8	56.5	51.6	56.9	This study
	Jou Puerta	JP-94-95	LP	R			50.0			50.2	Álvarez-Lao <i>et al.</i> 2014
	Arrikrutz		LP	R			49.0			54.0	Altuna 1979
	Cueva de Nando		LP	R			47.0			59.5*	Álvarez-Lao & García 2011b
			LP				59.5*			57.0	Álvarez-Lao & García 2011b
	Labeko Koba	LK.11D	LP	R	54.9	45.2	54.9	57.91	53.33	57.68	This study
		LK.116.-345.20	LP	L	(48.5)	47.1	48.86	55.04	48.63	53.68	This study
European sites		MP/LP	Mean ± SD (range) <i>n</i>			50.85 ± 3.39 (43.5-58.5) <i>n</i> = 43			52.72 ± 3.20 (43.5-61.0) <i>n</i> = 47	Guérin 1980	
M2	Mainea	Mai-93	LP	L	46.9	45.4	58.0	40.6	44.24	55.9	This study
	Lezika I	LEK.3C.268	-	R	59.1	47.0	57.6	57.2	47.0	60.2	This study
		LEK.L28.241		R	48.3	52.0	59.2	56.3	48.3	53.8	This study
	Labeko Koba	LK.110.329.270	LP	L	51.3	51.5	59.0	55.2	47.7	60.8	This study
		LK.11C.-321-12		L	54.2	44.8	53.1	57.9	50.6	58.0	This study
	Cueva de Nando		LP				56.6			51.0	Álvarez-Lao & García 2011b
	European sites			Mean ± SD (range) <i>n</i>			56.42 ± 3.65 (47.0-65.5) <i>n</i> = 59			55.79 ± 3.35 (45.0-63.0) <i>n</i> = 62	Guérin 1980

M3	Mainea	Mai-93/116	LP	L/R		(55.9)/55.4		52.0/52.0	-		This study
	Lezika I	LEK.3C.266	-	L		57.3		46.2	-		This study
	Cueva de Nando		LP			52.3			-		Álvarez-Lao & García 2011b
	Labeko Koba	LK.38.-230.191	LP	L		59.1		57.1	-		This study
		LK.38.-225.188	LP	L		53.1		48.0	-		This study
		LK.13F.-338.442	LP	L		56.3		49.5	-		This study
	Arroyo Culebro					52.0		56.0	-		Arsuaga Ferreras & Aguirre Enríquez 1979
						52.0		46.0	-		Arsuaga Ferreras & Aguirre Enríquez 1979
	European sites		MP/LP	Mean ± SD (range) <i>n</i>		58.0 ± 4.39 (44.0-70.0) <i>n</i> = 69		51.12 ± 3.04 (41.0-60.0) <i>n</i> = 67	-		Guérin 1980

Significant values in z-score analysis. Values with a * or ** are significantly different from the rhinoceros sample provided by Guérin (1980) (* = $p < 0.05$, ** = $p < 0.01$). Underlined values are outside the range of the European *C. antiquitatis* sample. Values in bold indicate those values that are significantly different and/or outside the range of the *Coelodonta antiquitatis* European sample.

Values between parentheses are estimated. LP=Late Pleistocene; MP=Middle Pleistocene. R= right. L= left.

Table S8. Raw dimensions (in mm) of *Coelodonta antiquitatis* mandibular bodies of immature individuals from Mainea^a.

Label	Side	Depth of the mandible behind d1	Depth of the mandible behind d2	Depth of the mandible behind d3	Depth of the mandible behind d4	Width of the mandible at d1	Width of the mandible at d2	Width of the mandible at d3	Width of the mandible at d4
Mai-72	Right	51.4	53.9	57.6	60.5	33.0	44.4	40.8	43.0
Mai-73	Left	50.0	61.4	58.3	49.8	36.5	40.0	46.0	

^a Measurements following Made (2010). Depth = in the superior-inferior direction; width in the vestibulo-lingual direction.

Table S9. Raw dimensions (in mm) of *Coelodonta antiquitatis* mandibular bodies of adult individuals from Mainea compared with other European sites^a.

Site	Label	Chronology	Side	Symphysis length (11)	Transverse diameter condyle (14)	Height condyle above lower border of mandible (15)	Minimum width symphysis (18)	Maximum antero-posterior diameter of the facet of the condyle (21)	Reference
Mainea	Mai-76	LP	Right	(113.0)			(59.5)		This study
	Mai-78	LP	Right		(65.4)	215.0		25.92	This study
Neumark Nord	E I, 42	MP	Right		88.7			18.3	Made 2010
European site		MP/LP	Mean ± SD (Min-Max) <i>n</i>	119.64 ± 20.77 (73-158) <i>n</i> = 21	99.83 ± 6.55 (90-109) <i>n</i> = 9	263.82 ± 33.91 (200-334) <i>n</i> = 14			Guérin 1980

^a Variables following Made (2010).

Values between parentheses are estimated. LP= Late Pleistocene; MP= Middle Pleistocene.

Table S10. Raw dimensions (in mm) of the *Coelodonta antiquitatis* deciduous molars (d2-d3-d4) from Mainea compared with other Iberian and European sites and results of the z-score analysis between the Iberian specimens and a European *C. antiquitatis* sample (Guérin, 1980).

Tooth	Site	Label	Chronology	Side	Occlusal antero-posterior diameter (DAPo)	Basal antero-posterior diameter (DAPb)	Greatest length (L)	Transverse diameter of anterior lobe (DTa)	Transverse diameter of posterior lobe (DTp)	Greatest width (W)	References
d2	Mainea	Mai-72/74	LP	L/R	27.2/27.6	27.3/27.3	27.3/27.3	14.5/14.5	17.1/17.1	17.1/17.0	This study
	European sites		MP/LP	Mean ± SD (range) n			27.23 ± 1.19 (26.0-29.5) n = 11			16.33 ± 1.01 (15.0-18.5) n = 12	Guérin 1980
d3	Mainea	Mai-72/73	LP	L/R	39.3/40.0	36.4/36.2	37.6/37.6	15.3/19.2	21.4/21.2	21.6/21.5	This study
	Lezika I	LEK.3C.296	-	R	35.2	33.2	34.4	17.4	20.8	20.9	This study
	Labeko Koba	LK.11D.-329.268	LP	L	39.4	37.1	39.2	18.4	21.6	20.6	This study
	Lezetxiki	LZ.1B.622	LP	R	37.7	37.9	38.7	22.2	23.8	21.6	This study
	European sites		MP/LP	Mean ± SD (range) n			37.17 ± 1.68 (34.5-41.5) n = 21			20.44 ± 1.49 (17.0-24.0) n = 24	Guérin 1980
	Labeko Koba	LK.13C.-320.8	LP	R	34.0	34.6	35.9	15.9	17.5	18.9	This study
d4	Mainea	Mai-72/73	LP	L/R	42.0/40.8	38.0/37.6	46.4/46.4	20.6/19.7	21.4/21.5	21.6/20.9	This study
	Lezika I	LEK.3C.296	-	R	39.3	33.6	40.2	19.0	22.2	21.0	This study
	Labeko Koba	LK.13F.-370.445	LP	L	44.5	41.6	46.2	22.6	23.7	23.7	This study
	Jou Puerta	JP-5	LP	L			39.4			23.25	Álvarez-Lao 2014
		JP-5	LP	R			38.5			23.3	
		JP-96+97+98	LP	L			41.8			21.8	
		JP99+100+101	LP	R			41.5			22.3	
	European sites		MP/LP	Mean ± SD (range) n			42.33 ± 4.27 (37.0-51.0) n = 12			22.54 ± 2.35 (19.0-25.5) n = 6	Guérin 1980

Significant values in z-score analysis. Values with a * or ** are significantly different from the rhinoceros sample provided by Guérin (1980) (* = $p < 0.05$; ** = $p < 0.01$). Underlined values are outside the range of the European *C. antiquitatis* sample. Values in bold indicate those values that are significantly different and/or outside the range of the *Coelodonta antiquitatis* European sample.

LP=Late Pleistocene; MP=Middle Pleistocene. R= right. L= left.

Table S11. Raw dimensions (in mm) of the lower molars of *Coelodonta antiquitatis* from Mainea compared with Iberian and European sites and results of the z-score analysis between the Iberian specimens and a European *C. antiquitatis* sample (Guérin, 1980).

Tooth	Site	Label	Chronology	Side	Occlusal antero-posterior diameter (DAPo)	Basal antero-posterior diameter (DAPb)	Greatest length (L)	Transverse diameter of anterior lobe (DTa)	Transverse diameter of posterior lobe (DTp)	Greatest width (W)	References
m1	Mainea	Mai-109	LP	L	43.3	39.6	44.4	32.5	31.5	33.0	This study
	Labeko Koba	LK.7D.2.93	LP	R	53.05	41.77	53.53	30.49	28.73	31.03	This study
		LK.3B.-232.190	LP	L				30.97		31.03	This study
	European sites		MP/LP	Mean ± SD (range) <i>n</i>			47.71 ± 3.6 (38.0 -56.0) <i>n</i> = 31			29.34 ± 2.32 (23.0-33.0) <i>n</i> = 43	Guérin 1980
m2	Mainea	Mai-111	LP	R			>37.3	29.2		>30.0	This study
	Mainea	Mai-110	LP	L	48.0	42.9	46.7	(29.0)	(26.8)	28.8	This study
	Labeko Koba	LK.7D.293	LP	R	48.2	44.1	54.3	32.4	26.2	32.2	This study
	European sites		MP/LP	Mean ± SD (range) <i>n</i>			50.69 ± 3.04 (42.5-58.5) <i>n</i> = 45			31.39 ± 2.52 (24.0-38.5) <i>n</i> = 52	Guérin 1980

Significant values in z-score analysis. Values with a * or ** are significantly different from the rhinoceros sample provided by Guérin (1980) (* = $p < 0.05$, ** = $p < 0.01$). Values in bold indicate those values that are significantly different and/or outside the range of the *Coelodonta antiquitatis* European sample.

Values between parentheses are estimated. LP=Late Pleistocene; MP=Middle Pleistocene. R= right. L= left.

Table S12. Raw dimensions (in mm) of the *Coelodonta antiquitatis* third metacarpals from Mainea compared with other Iberian and European sites and results of the z-score analysis between the Iberian specimens and a European *C. antiquitatis* sample (Guérin, 1980).

Taxon	Site	Label	Chronology	Side	Length (L)	Transverse diameter proximal epiphysis (Dtp)	Antero-posterior diameter proximal epiphysis (DAPp)	Transverse diameter distal epiphysis (DTd)	Minimum width diaphysis (Wmd)	Antero-posterior diameter distal facet (DAPdf)	Transverse diameter distal facet (DTdf)	References
<i>C. antiquitatis</i>	Mainea	Mai-117	LP	L	191.0	70.4	52.4	68.7	57.5	55.0	59.9	This study
		Mai-118	LP	R	191.0	69.5	54.7	<u>74.4*</u>	61.4	51.3	62.2	This study
	Labeko Koba	LK.7D.-319.516	LP	R		81.5**	54.1		59.5			This study
		LK.11F.-352.800	LP	L	186.83	66.5	49.4	63.6	51.5	47.4	55.1	This study
	El Toll					67.0	55.0					Álvarez-Lao & García 2011b
	Jou Puerta	JP-40	LP	L	192.0	66.0	56.3	64.7	60.2			Álvarez-Lao 2014
	European sites		MP/LP	Mean ± SD (range) <i>n</i>	189.03 ± 9.42 (162-213) <i>n</i> = 79	68.24 ± 4.92 (59.5-79) <i>n</i> = 90	52.2 ± 4.13 (42.5-61.5) <i>n</i> = 80	65.75 ± 3.85 (57.5-74.0) <i>n</i> = 77		50.78 ± 3.16 (44.0-57.5) <i>n</i> = 68	56.1 ± 3.72 (49.0-65.0) <i>n</i> = 77	
<i>S. hemitoechus</i>	European sites	MP/LP	Mean ± SD (range) <i>n</i>	191.79 ± 7.36 (175-203) <i>n</i> = 19	59.15 ± 3.29 (53.5-65.0) <i>n</i> = 20	50.26 ± 4.51 (42.5-57.0) <i>n</i> = 17	59.38 ± 3.99 (52.0-66.0) <i>n</i> = 21		45.42 ± 2.11 (43.0-50.5) <i>n</i> = 18	51.89 ± 2.16 (48.5-56.0) <i>n</i> = 19		Guérin 1980

Significant values in z-score analysis. Values with a * or ** are significantly different from the rhinoceros sample provided by Guérin (1980) (* = $p < 0.05$, ** = $p < 0.01$). Underlined values are outside the range of the European *C. antiquitatis* sample. Values in bold indicate those values that are significantly different and/or outside the range of the *Coelodonta antiquitatis* European sample. LP=Late Pleistocene; MP=Middle Pleistocene. R= Right. L= Left.

Table S13. Raw dimensions (in mm) of the Mainea *Coelodonta antiquitatis* coxal bone compared with other Iberian and European samples of both woolly rhinoceros and *Stephanorhinus hemitoechus*.

Taxon	Site	Label	Chronology	Side	Length of the acetabulum including the lip (LA)	Length of the acetabulum on the rim (LAR)	Height of the acetabulum (Ha)	Smallest height of the shaft of ilium (SH)	Smallest breadth of the shaft of ilium (SB)	Smallest circumference of the shaft of ilium (SC)	Inner length of the foramen obturatum (Lfo)	Reference
<i>C. antiquitatis</i>	Mainea	Mai-92	LP	Right	123.7	113.7	94.6	65.3	53.6	200.0	(112.0)	This study
	Labeko Koba	LK.9D.313	LP	Right	111.0	105.0		72.3				Altuna and Mariezkurena 2000
	Labeko Koba	LK.9D.313	LP	Right	113.8	110.97						This study
	Jou Puerta	JP-16 (subadult)	LP	Right		100.2			44.5		103.8	Álvarez-Lao 2014
	Petershagen	1978/2-37	LP		116.0				55.0			Diedrich, 2008
	Zapuj	683		Left					56.0			Borsuk-Białynicka 1973
				Right					59.0			Borsuk-Białynicka 1973
<i>Stephanorhinus hemitoechus</i>	Valle Radice	(P40/68)	LP			94.8						Pandolfi and Tagliacozzo 2015
	Arago	(E16 2699)	MP			93.17						Lacombat 2005
	Orgnac 3	(G11-226)	MP			88.0	73.73	70.0				Lacombat 2005
	Orgnac 3	(D12-545)	MP			90.36	73.0	56.35				Lacombat 2005

Table S14. Raw dimensions (in mm) of a *Coelodonta antiquitatis* femur from Mainea and comparison with rhinoceroses from other Iberian and European sites.

Taxon	Site	Label	Chronology	Side	Maximum length (L)	Antero-posterior diameter articular surface of the head (DAPpf)	References	
<i>C. antiquitatis</i>	Mainea	Mai-126+127+128	LP	Left	551.0	100.7	This study	
	Labeko Koba	LK.13E.357	LP	Right		102.6	This study	
	Aven de Coulon		LP			94.0	Bonifay 1961	
	Fulaerhtzi		LP			110.0	Bonifay 1961	
	Petershagen	1978/2-18	LP	Right	515.0		Diedrich, 2008	
	Zapuj		LP			440.0	97.0	Borsuk-Białynicka 1973
			LP			445.0	94.0	Borsuk-Białynicka 1973
European sites		MP/LP	Mean ± SD (range) <i>n</i>	522.20 ± 28.52 (467.0-576.0) <i>n</i> = 27	99.22 ± 6.25 (87.0-113.0) <i>n</i> = 25	Guérin 1980		
<i>S. hemitoechus</i>	European sites		MP/LP	Mean ± SD (range) <i>n</i>	461.82 ± 21.88 (434.0-503.0) <i>n</i> = 11	88.77 ± 3.94 (80.5-94.0) <i>n</i> = 11	Guérin 1980	

LP= Late Pleistocene; MP= Middle Pleistocene. R= Right. L= Left.

Table S15. Comparative measurements of the *Mammuthus primigenius* m3 compared to other individuals from the Iberian Peninsula and additional European samples.

Site	Label/ Specimen	Side	Occlusal length (in mm)	Greatest width (including cement) (in mm)	Occlusal width (in mm)	Plates in use	Average enamel thickness (in mm)	Lamellar frequency	References
Mainea	Mai-226	Right	88.9	72	46.4	9	1.70	9	This study
Padul	Mandible 1	Left	191	101	94	13	2.02	6.8	Álvarez-Lao & García 2012
		Right	201	110	96	13	1.97	6.4	
	Mandible 3	Left	205	85	76	12	2.1	5.82	
Pámanes	Mandible	Left	203		85	15	1.94	7.38	
		Right	203		80	16	1.99	7.88	
Aldehuela	Mandible	Left	217	90	87	10	2.60	5.28	
		Right	197	96	89	13	2.66	6.84	
C. Eulogio	Mandible	Left	168	88	84	14	1.58	8.09	
		Right	188	88	86	15	1.54	8.57	
Buján	2731	Right	205	89	86	16	1.86	7.8	
Edar Culebro	Mandible	Left	125	83	81	10	1.87	8.1	
		Right	130	82	81	10	1.83	7.9	
North sea	Summary statistics	Mean	189.5	81.7	81.7	15.54	1.92	8.31	
		SD	33.63	11.22	11.77	2.72	0.15	1.29	
		Min	103	59	53	9	1.55	5.5	
		Max	245	105	103	21	2.23	10.3	
		<i>n</i>	45	45	45	45	45	45	
Lyon area	Summary statistics	Mean	127.4	83.1		10.84	1.87	8.55	Labe, 1999
		SD	60.64	7.33		4.33	0.25	1.08	
		Min	48	69		6	1.3	6.5	
		Max	268	98		21	2.45	11	
		<i>n</i>	27	31		24	28	30	

Table S16. Comparative dimensions of a *Mammuthus primigenius* calcaneus from Mainea and comparison with a North American site. Measurements are given in mm.

Site	Label	Chronology	Side	Maximum length (L)	Maximum width (W)	Maximum height of the tubercle (H)	References
Mainea	Mai-103	LP	Right	(185.0)	(127.0)	97.0	This study
Ontario		LP	Right		146.7	117.5	Harington <i>et al.</i> 2012
			Left		145.7	118.7	Harington <i>et al.</i> 2012

Table S17. Raw dimensions (in mm) of a *Mammuthus primigenius* phalanx from Mainea compared with other Iberian and European sites.

Site	Chronology	Label	Maximum length (L)	Transverse diameter distal epiphysis (DTd)	Minimum antero-posterior diameter diaphysis (DAPmD)	Minimum transverse diameter diaphysis (DTmD)	References
Mainea	LP	Mai-106	63.5	48.3	31.8	41.2	This study
Padul	LP	Padul 1	95.0	55.0	44.0	46.0	Álvarez-Lao <i>et al.</i> 2009
		Padul 2	83.0	62.0	42.0	54.0	
		Padul 3	78.0	62.0	40.0	59.0	
		Padul 4	61.0	53.0	32.0	41.0	
		Padul 5	52.0	43.0	32.0	39.0	
North Sea	LP	Mean \pm SD (range) <i>n</i>	83.8 \pm 17.5 (42.0-103.0) <i>n</i> = 10	63.0 \pm 11.9 (33.0-75.0) <i>n</i> = 10	42.0 \pm 6.9 (24.0-48.0) <i>n</i> = 10	55.0 \pm 9.9 (34.0-65.0) <i>n</i> = 10	Álvarez-Lao <i>et al.</i> 2009

Table S18. Dimensions (in mm) of the tooth marks measured on *Coelodonta antiquitatis* remains from the Mainea fossil assemblage depending on the bone type.

Tooth mark	Measurement	Type of bone	<i>n</i>	Mean	SD	Minimum	Maximum
Pits	Maximum diameter	Cortical	6	2.31	1.43	0.99	4.89
	Minimum diameter	Cortical	4	1.71	1.43	0.73	3.78
Scores	Maximum width	Spongy	6	3.80	1.55	1.91	6.51
	Minimum width	Cortical	37	1.97	1.04	0.72	6.27

Table S19. Isotopic values of the Mainea *Coelodonta antiquitatis* tooth (P2, Mai-112) in comparison with other taxa from the northern Iberian Peninsula.

Taxon	Site	Chronology/ Cultural attribution	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	Reference(s)
<i>Coelodonta antiquitatis</i>	Mainea	c. 45 ka cal BP	19.9	4.5	This work
<i>Cervus elaphus</i>	Several sites	Mousterian	-20.3 ± 0.4 (from -21.6 to -19.5) $n = 39$	3.4 ± 1.0 (from 3.4 to 6.3) $n = 39$	Jones <i>et al.</i> 2018
	El Castillo (level 18C)	Transitional Aurignacian (c. 43.2-50 ka cal BP)	-20.49 ± 0.29 (from -20.8 to -20.1) $n = 7$	4.00 ± 1.07 (from 2.3 to 4.9) $n = 7$	Jones <i>et al.</i> 2019 and references therein
	Covalejos (level D)	Mousterian (Discoid) (c.40-47 ka cal BP)	-20.60 ± 0.46 (from -21.6 to -20.0) $n = 11$	4.02 ± 1.75 (from 1.4 to 7.3) $n = 11$	Jones <i>et al.</i> 2019 and references therein
<i>Equus ferus</i>	Several sites	Mousterian	-20.2 ± 0.6 (from -21.0 to -19.2) $n = 12$	4.5 ± 1.8 (from 2.5 to 7.6) $n = 12$	Jones <i>et al.</i> 2018
<i>Rangifer tarandus</i>	Kiputz IX	c. 24-15 ka cal BP	-19.64 ± 0.34 (from -20.05 to -19.02) $n = 9$	5.64 ± 1.29 (from 3.75 to 7.97) $n = 9$	Castaños <i>et al.</i> 2014

Data S1

Metric comparative analysis of the woolly rhinoceros remains from Mainea

Cranium

The measurements of the most complete neurocranium are shown in Table S5. The height of the neurocranium is significantly smaller than the European sample, but is still within its lower limits. This could be due to the large cranio-caudal size of the foramen magnum of this specimen, which we believe likely belongs to the young adult individual.

Upper dentition

The measurements of the upper premolars are shown in Supplementary Table S6. The measurements of the upper molars are shown in Supplementary Table S7. Overall, the upper dentition measurements from Mainea fall within the range of variation for European and Iberian specimens, except for the P2 (Mai-112) which is short (but not significantly), close to the lower limits of the European comparative sample.

Mandibles

The measurements of the mandibles belonging to immature individuals are shown in Supplementary Table S8. The measurements of the mandibles belonging to adult individuals are shown in Supplementary Table S9. The adult mandibles from Mainea fall within the range of variation for European specimens.

Lower dentition

The measurements of the deciduous lower dentition are shown in Supplementary Table S10. The preserved deciduous dentition measurements fall within the ranges of variation for European and Iberian specimens.

The measurements of the permanent lower dentition are shown in Supplementary Table S11. The permanent lower molars from Mainea are close to the European and Iberian sample means and, in the case of one of the specimens (Mai-111), the high degree of wear has limited how many metric observations have been carried out on it.

Metacarpals

The measurements of the third metacarpals (Mc IIIs) are shown in Supplementary Table S12. The complete Mc IIIs are similar to the European sample except for the transverse diameter of the distal epiphysis of Mai-118 which is slightly above the range of the European sample provided by Guérin (1980). The transverse diameter of the proximal epiphysis (Dtp) distinguishes *C. antiquitatis* from *Stephanorhinus hemitoechus* (Fig. S5).

Coxal bone

The measurements of the right coxal bone Mai-92 are shown in Table S13. This coxal bone preserves the largest acetabulum of our (restricted) woolly rhinoceros comparison sample and is larger in size, compared with the smaller acetabula of *S. hemitoechus*.

Femur

The measurements of the left femur Mai-126+127+128 are shown in Supplementary Table S14. The length of this femur is around one standard deviation above the European mean value provided by Guérin (1980) but the antero-posterior diameter of the articular surface of the head is

similar. The Mainea femur is above the range of variation of the European *S. hemitoechus* for these two measurements.

Data S2

The Mainea rhinoceros isotopic data compared to other herbivores from the northern Iberian Peninsula

Cervus elaphus

When compared to *Cervus elaphus* isotopic data of similar age from the Cantabrian region, the woolly rhinoceros from Mainea shows: a) $\delta^{13}\text{C}$ values which are slightly above the mean a large Mousterian sample (Jones *et al.* 2018) but outside range of variation of the samples from level D from Covalejos and level 18C from El Castillo (Jones *et al.* 2019); and b) $\delta^{15}\text{N}$ values which are 1 standard deviation above (Jones *et al.* 2018) or similar to the mean (Jones *et al.* 2019).

Equus ferus

The Mainea rhinoceros shows similar isotopic values compared to a limited Mousterian *Equus ferus* sample ($n = 12$) (Jones *et al.* 2019).

Rangifer tarandus

Finally, when compared to the *Rangifer tarandus* sample from Kiputz IX (c. 24-15 ka cal BP; Castaños *et al.*, 2014) the Mainea rhinoceros shows a $\delta^{13}\text{C}$ values similar to the mean but $\delta^{15}\text{N}$ values at lower limits of the range of variation.

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