

**A morphological and morphometric study of the elephant remains from Dmanisi
(Early Pleistocene, Georgia)**

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SUPPLEMENTARY ONLINE MATERIAL

1 – Dmanisi large mammals faunal list:

Homotherium latidens (Owen, 1846), *Megantereon whitei* (Broom, 1937), *Panthera onca georgica* Hemmer et al., 2010, *Acinonyx pardinensis* (Croizet & Jobert, 1828), *Lynx issiodorensis* (Croizet & Jobert, 1828), *Pachycrocuta brevirostris* (Gervais, 1850), *Canis (Xenocyon) lycaonoides* (Kretzoi, 1938), *Canis borjgali* Bartolini-Lucenti et al., 2020, *Vulpes alopecoides* Del Campana, 1913, *Ursus etruscus* Cuvier, 1823, *Lutra* sp., *Martes* sp., *Meles* sp., *Pannonictis* sp., *Mammuthus meridionalis* (Nesti, 1825), *Equus stenonis* Cocchi 1867, *Equus* aff. *altidens* von Reichenau, 1915, *Stephanorhinus etruscus* (Falconer, 1868), *S. hundsheimensis* (Toula, 1902), *Pseudodama nestii* (Azzaroli, 1947), *Praemegaceros obscurus* (Azzaroli, 1953), *Arvernoceros insolitus* Vekua et al., 2010, Alcini indet., *Palaeotragus priasovicus* Godina & Baigusheva, 1985, *Bison (Eobison) georgicus* (Burchak-Abramovich & Vekua, 1994), *Gallogoral meneghinii sickenbergii* Kostopoulos, 1996, *Capra dalii* Bukhsianidze & Vekua, 2006, *Soergelia* cf. *minor*, *Praeovibos* sp., *Pontoceros surprine* Vekua, 2012, Antilopini indet. and *Homo* cf. *erectus* (Dubois, 1894).

2 - Geographic location of Western Eurasian sites where the species *Mammuthus rumanus* and *Mammuthus meridionalis* are present

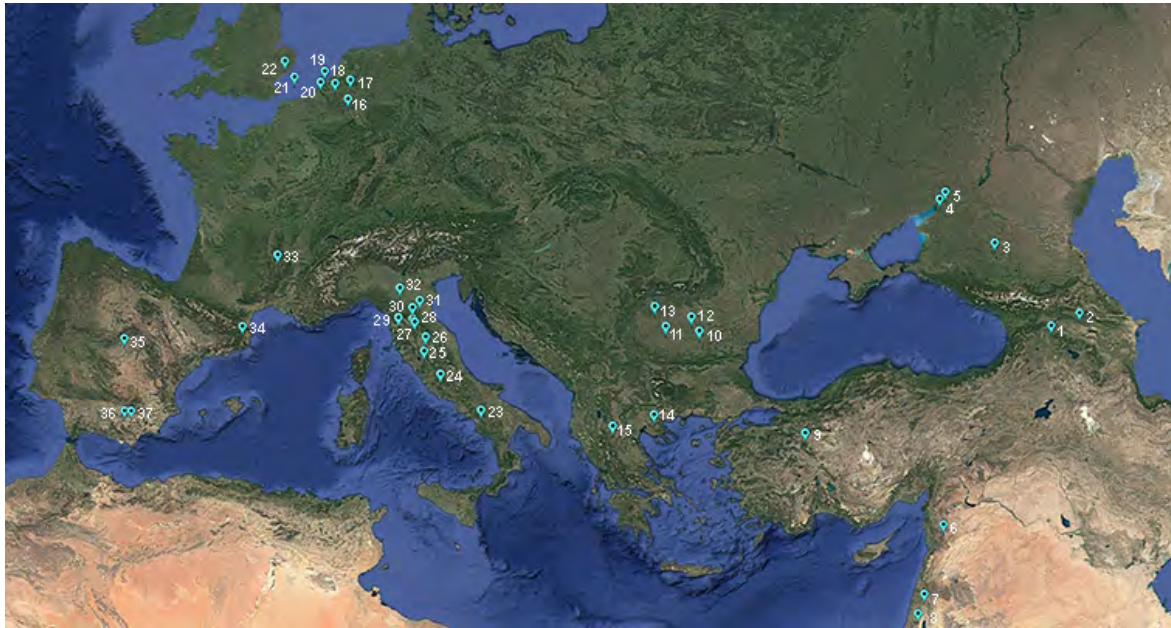


Figure S1 - Georgia: 1 Dmanisi, 2 Taribana, Dedoplistskaro and MDB Georgian National Museum; Russia: 3 Sablya, 4 Khapry, and 5 Liventsovka; Syria: 6 Latamne; Israel: 7 Erq el Ahmar and Ubeydiya; Palestine: 8 Bethlehem; Turkey: 9 Eskişehir-Yukarısöğütönü; Bulgaria: 10 Bossilkovtsi and 11 Galavo; Romania: 12 Mavrodin and 13 Cernătești; Greece: 14 Apollonia-1 and 15 Tsotyliion; Netherlands: 16 Wessen, 17 Alphen a.d. Maas, 18 Dorst, 19 Maasvlakte, 20 Eastern Scheldt and 21 North Sea; England: 22 Red Crag; Italy: 23 La Serre Peccidi, 24 Colle Marino, 25 Frattaguida, 26 Pietrafitta and Farneta; 27 Terranuova, 28 Figline, Castello dell'Incisa and several sites of Upper Valdarno; 29 Montopoli, Peccioli and Laiatico, 30 Vicchio and Ligniti di Lumena, 31 Rio Pradella; 32 Torrente Crostolo; France: 33 Malouteyre and Pranlary; Spain: 34 Incarcial, 35 Depresión Padros-Guaten, 36 Cañada de Bardaes, 37 Venta Micena, Fuente Nueva 3 and Barranco del Paso.

3 - Table S1 - Detailed results of the multivariate morphometric analyses performed: PCA and DFA for both molars. Factor loadings for PCs and DF are shown, together with eigenvalues and percentage of variance explained for each PC.

Upper M3	PCA		DFA
	<i>PC 1</i>	<i>PC 2</i>	<i>DF 1</i>
MDD	0.169	0.911	-0.547
BLD	-0.607	0.472	0.308
TP	0.791	0.468	1.004
F 10 cm	0.748	-0.318	0.407
<i>Eigenvalue</i>	<i>1.582</i>	<i>1.373</i>	
<i>% Variance</i>	<i>39.559</i>	<i>34.319</i>	
Lower m3	PCA		DFA
	<i>PC 1</i>	<i>PC 2</i>	<i>DF 1</i>
MDD	0.945	0.062	-1.135
BLD	0.556	-0.477	0.326
TP	0.788	0.538	1.426
F 10 cm	-0.267	0.814	0.115
<i>Eigenvalue</i>	<i>1.893</i>	<i>1.184</i>	
<i>% Variance</i>	<i>47.326</i>	<i>29.601</i>	

4 - The axial skeleton: images and measurements (in mm)



Figure S2 - Vertebrae (left) and ribs (right). a: Atlas (D1499) in caudal view; b (D4289) and c (D5787): Vertebral fragments; d: (D5220) in anterior view; e (D2293), f (D3422), g (D4515), h (D1279), and i (D7961) in lateral view. Scale bar 5 cm (a-c), 10 cm (d-i).

Table S2. Atlas measurements	D1499	D7959
1: Maximum transversal diameter	257.3	334.9
2: Maximum dorsal-ventral diameter	212.9	233.01
3: Maximum height	84.3	90.6
4: Maximum diameter of the articular surface	106.5	116.8
5: Minimum diameter of the articular surface	88.9	71.9
6: Dorsal-ventral diameter of the medullary cavity	111.8	132.2
7: Maximum diameter dorsal of the medullary cavity	87.2	104.9
8: Maximum diameter ventral of the medullary cavity	61.8	59.6

Table S3. Vertebrae measurements

		1: Maximum dorso-ventral height	2: Maximum transversal diameter	3: Maximum depth
Lumbar vertebra	D5170	175.9	152.3	64.4
Thoracic vertebra	D4289	180.8	120.1	50.8
	D4033	164.2	150.6	70.3
	D7960	182.6	158.2	69.7
	D5460	136.7	122.6	34.4
	D3423	355.4	73.9	36.5
	D5787	228.1	96.8	31.6
Cervical Vertebra	D5410	83.1	90.1	61.5
	D4978	95.7	143.5	58.3
	D4647	116.2	220.8	72.5
Indeterminate Vertebra	D4287	130.9	99.1	41.9
	D4458	95.5	173.1	83.8

Table S4. Ribs measurements

	1: Maximum preserved length	2: Maximum preserved width	3: Maximum preserved depth
D7961	819.15	35.3	55.7
D4565	514.6	64.7	49.6
D3422	497.2	49.1	30.8
D7962	551.55	88.4	51.8
D5906	523.2	54.7	36.8
D4115	440.4	43.9	49.8
D1279	456.7	59.3	37.2
D2419	462	44.2	39.7
D7963	424.7	39.7	18.9
D5270	621.6	106.1	62.9
D7964	270.9	67	40.6
D2293	417.1	93.1	38.1
D7965	743.5	89.2	39.7
D7966	343.9	72.2	35.9
D141	240.5	105.2	34.6
D4649	190.4	60.1	35.9
D3696	139.2	60.3	53.7
D5659	256.8	56.5	46.9
D5148	212.3	56.2	37.5
D7967	258.2	117.2	59.6
D3696	287.7	52.5	62.8
D2223	244	52.7	38.6

5 - The forelimb: images and measurements (in mm)



Figure S3 - a: Humerus (distal) (D7968) in distal view (a1) and proximal view (a2); b: Radius (D5066) in proximal view (b1) and posterior view (b2). Scale bar 5cm.

	D4386	D7968
Side	-	right
1: Maximum preserved length	334.8	144.6
2: Maximum distal medio-lateral preserved diameter	119.9	306.5
3: Maximum distal antero-posterior preserved diameter	137.5	-
4: Antero-posterior diameter of the trochleae and capitulum	-	144.6

	D5066	D2528
1: Maximum preserved length	298.7	-
2: Maximum medio-lateral diameter in the proximal area	295.7	-
3: Maximum antero-posterior diameter in the proximal area	167.4	-
4: Medio-lateral diameter of the articular surface with the external trochleae of the humerus	89.8	77.5
5: Antero-posterior diameter of the articular surface with the external trochleae of the humerus	128.7	123.8
6: Medio-lateral diameter of the articular surface with the middle trochleae of the humerus	58.9	-
7: Antero-posterior diameter of the articular surface with the middle trochleae of the humerus	118.8	-

6 - The carpus: images and measurements (in mm)

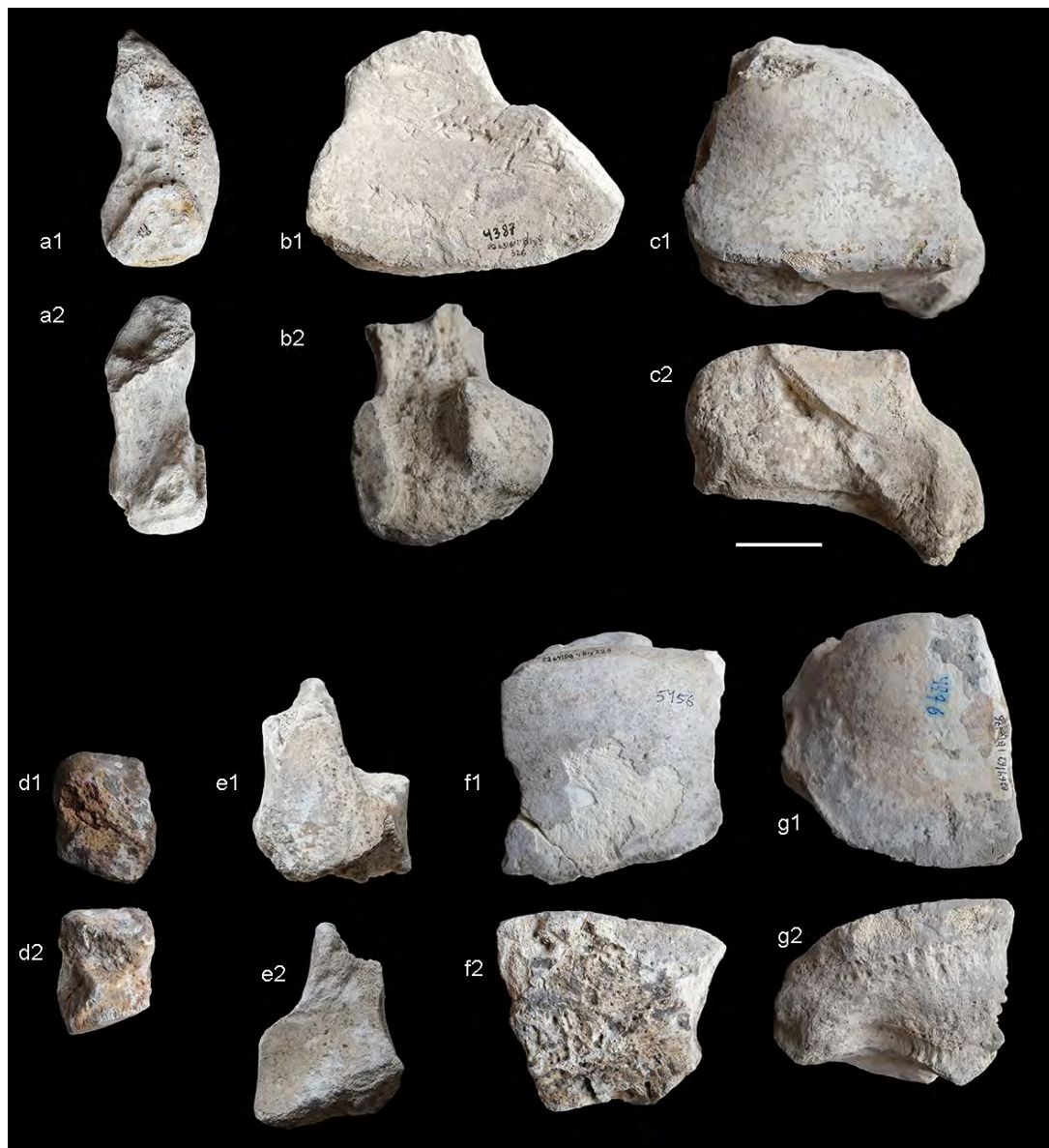


Figure S4 - a: Pisiform (D155) in posterior view (a1) and anterior view (a2); b: Lunar (D4387) in proximal view (b1) and medial view (b2); C. Pyramidal (D5129) in distal view (c1) and lateral view (c2); d: Trapezium (D656) in medial view (d1) and lateral view (d2); e: Trapezoid (D56) in proximal view (e1) and distal view (e2); f: Magnum (D5456) proximal view (f1) and anterior view (f2); and g: Unciform (D4976) in proximal view (g1) and lateral anterior view (g2). Scale bar 5cm.

Table S7. Pisiform measurements	D155
Side	right
1: Maximum preserved length	139.6
2: Maximum medio-lateral diameter	68.2
3: Maximum antero-posterior diameter	55.6
4: Medio-lateral diameter of the articular surface with the pyramidal	54.3
5: Antero-posterior diameter of the articular surface with the pyramidal	56.8

Table S8. Lunar measurements

	D7970	D7971	D5126	D2480	D4693	D1255	D512	D5128	D4387
Side	left	left	-	Left	Left	right	left	left	right
1: Maximum antero-posterior diameter	159.3	150.1	88.3	119.2	74.2	122.3	69.1	117.4	136.2
2: Maximum medio-lateral diameter	160.4	139.1	82.4	152.3	124.1	121.1	127.9	145.4	168.6
3: Maximum height	103.9	102.9	78.3	92.5	59.5	82.1	85.6	97.1	105.3
4: Medio-lateral diameter of the articular surface with the radius	135.8	117.8	-	140.9	-	106.3	-	119.7	126.7
5: Antero-posterior diameter of the articular surface with the radius	137.2	116.7	-	-	-	113.1	-	103.7	126.7
6: Medio-lateral diameter of the articular surface with the ulna	-	-	-	67.1	55.8	52.1	-	52.4	65.8
7: Antero-posterior diameter of the articular surface with the ulna	-	41.2	-	43.6	39.2	29.5	-	40	50.6
8: Medio-lateral diameter of the articular surface with the magnum	149.3	128.8	-	142.4	-	107.2	-	130.9	154.6
9: Antero-posterior diameter of the articular surface with the magnum	146.9	127.9	-	-	-	110.5	-	113.9	128.3
10: Antero-posterior diameter of the major/minor articular surface with the scaphoid	75.1/62.2	-/65.3	-	-	-	43.9/57.5	-	-	-/68.8
11: Medio-lateral diameter of the major/minor articular surface with the scaphoid	30.2/24.1	-/28.9	-	33.7/28.1	-	17.8/22.1	-	-	-/25.3
12: Antero-posterior diameter of the articular surface with the cuneiform	108.7	87.1	-	-	-	-	-	-	69.3
13: Medio-lateral diameter of the articular surface with the cuneiform	27.6	30.1	-	-	-	-	-	-	23.8

Table S9. Pyramidal measurements

	D5815	D5292	D666	D4690	D5129	D1208
Side	left	-	left	left	right	right
1: Maximum antero-posterior diameter	143.3	89.6	109.2	113.6	124.6	150.8
2: Maximum medio-lateral diameter	159.9	89.3	127.1	123.9	143.2	179.1
3: Maximum height	110.1	78.3	76.8	91.8	100.7	99.3
4: Medio-lateral diameter of the articular surface with the ulna	136.6	-	-	-	80	144.3
5: Antero-posterior diameter of the articular surface with the ulna	104.4	-	-	-	117.2	105.1
6: Medio-lateral diameter of the articular surface with the unciform	124.7	-	-	-	116.9	128.2
7: Antero-posterior diameter of the articular surface with the unciform	136.3	-	-	-	136.5	127.7
8: Medio-lateral diameter of the articular surface with the lunar	87	-	-	88.2	86.3	88.9
9: Antero-posterior diameter of the articular surface with the lunar	27.6	-	-	27.5	26.4	30.1
10: Medio-lateral diameter of the articular surface with the pisiform	48.9	-	-	-	44.9	55.6
11: Antero-posterior diameter of the articular surface with the pisiform	81.9	-	-	-	70.2	83.6

Table S10. Trapezium measurements

	D656
Side	left
1: Maximum antero-posterior diameter	51.8
2: Maximum medio-lateral diameter	65.4
3: Maximum height	82.3
4: Medio-lateral diameter of the articular surface with the trapezoid	52.6
5: Antero-posterior diameter of the articular surface with the trapezoid	43.3
6: Medio-lateral diameter of the articular surface with the metacarpus I	52.7
7: Antero-posterior diameter of the articular surface with the metacarpus I	49.7

Table S11. Trapezoid measurements

	D56	D5233
Side	right	right
1: Maximum antero-posterior diameter	117.2	106.5
2: Maximum medio-lateral diameter	98.1	99.4
3: Maximum height	74.4	78.4
4: Antero-posterior diameter of the articular surface with the scaphoid	92.2	-
5: Medio-lateral diameter of the articular surface with the scaphoid	66.1	-
6: Antero-posterior diameter of the articular surface with the metacarpus II	87.4	-
7: Medio-lateral diameter of the articular surface with the metacarpus II	94.8	-
8: Antero-posterior diameter of the articular surface with the trapezium	61.6	60.3
9: Medio-lateral diameter of the articular surface with the trapezium	51.4	66.2
10: Antero-posterior diameter of the major/minor articular surface with the magnum	61.8/49.8	-
11: Medio-lateral diameter of the major/minor articular surface with the magnum	66.8/42.2	-

Table S12. Magnum measurements

	D7973	D3811	D5456	D4574	D7974
Side	right	left	right	right	right
1: Maximum antero-posterior diameter	134.4	143.5	128	181.5	118.2
2: Maximum medio-lateral diameter	142.9	133.9	126.4	127	92.6
3: Maximum height	109.4	144.7	122	136.2	93.8
4: Antero-posterior diameter of the articular surface with the lunar	134.4	143.5	128	-	-
5a: Medio-lateral diameter of the posterior articular surface with the lunar	141.7	111.7	127.1	-	-
5b: Medio-lateral diameter of the anterior articular surface with the lunar	141.9	133.5	124.3	-	-
6: Medio-lateral diameter of the articular surface with the metacarpus III	-	68.4	59.7	-	-
7: Antero-posterior diameter of the articular surface with the metacarpus III	-	107.4	114.5	-	-
8: Medio-lateral diameter of the articular surface with the metacarpus II	-	50.5	49.6	-	-
9: Antero-posterior diameter of the articular surface with the metacarpus II	-	106.2	116.3	-	-
10: Proximo-distal maximum diameter of the anterior/posterior articular surface of the unciform	72.9/53.3	83.4/52.1	77.8	-	-
11: Antero-posterior diameter of the articular surface with the trapezoid	65.8	-	-	-	-
12: Proximo-distal diameter of the articular surface with the trapezoid	76.9	-	-	-	-
13: Maximum proximo-distal diameter of the articular surface of the trapezoid	130.3	110.6	121.3	-	-

Table S13. Unciform measurements

	D7972	D4976	D5069
Side	left	right	right
1: Maximum antero-posterior diameter	124.1	121.2	128.3
2: Maximum medio-lateral diameter	140.6	124.6	121.7
3: Maximum height	125.8	119.8	133.7
4: Medio-lateral diameter of the articular surface with the cuneiform	139.4	124.1	128.6
5: Antero-posterior diameter of the articular surface with the cuneiform	94.3	121.2	128.3
6: Medio-lateral diameter of the articular surface with the metacarpus V	81.3	52.1	-
7: Antero-posterior diameter of the articular surface with the metacarpus V	103.6	87.9	-
8: Medio-lateral diameter of the articular surface with the metacarpus IV	99.8	83.4	-
9: Antero-posterior diameter of the articular surface with the IV metacarpus IV	100.2	92.3	-
10: Medio-lateral diameter of the articular surface with the metacarpus III	98.8	84.2	-
11: Antero-posterior diameter of the articular surface with the metacarpus III	34.9	30.1	-
12: Medio-lateral diameter of the proximal articular surface with the magnum	-	111.2	118.6
13: Antero-posterior diameter of the proximal articular surface with the magnum	-	63.5	74.5

7 - The metacarpus: images and measurements (in mm)



Figure S5 - a: Metacarpus I (D7975) in proximal view (a1) and lateral view (a2); b: Metacarpus II (D7976) in proximal view (b1) and lateral view (b2); c: Metacarpus IV (D7979) in proximal view (c1) and lateral view (c2) and d: Metacarpus V (D5005) in proximal view (d1) and lateral view (d2). Scale bar 5cm.

Table S14. Metacarpus I measurements	D7975
Side	right
1: Maximum preserved length	79.3
2: Maximum medio-lateral diameter in the proximal zone	61.3
3: Maximum antero-posterior diameter in the proximal zone	84.8
4: Antero-posterior diameter of the articular surface with the trapezium	61.7
5: Medio-lateral diameter of the articular surface with the trapezium	23.1
6: Antero-posterior diameter of the articular surface with the trapezoid	81.6
7: Medio-lateral diameter of the articular surface with the trapezoid	53.6
8: Antero-posterior diameter of the articular surface with the metacarpus II	63
9: Medio-lateral diameter of the articular surface with the metacarpus II	16.8

Table S15. Metacarpus II measurements

	D7976	D5232	D7977	D7978	D543
Side	right	right	right	right	-
1: Maximum preserved length	167.5	169.3	233.2	138.6	98.8
2: Maximum medio-lateral diameter in the proximal zone	102.7	86.9	104.1	112.3	98.6
3: Maximum antero-posterior diameter in the proximal zone	115.8	115.1	116.9	138.2	142.8
4: Antero-posterior diameter of the articular surface with the magnum	88.5	90.6	108	94.4	104.9
5: Medio-lateral diameter of the articular surface with the magnum	39.8	55.8	63.8	68.2	65.1
6: Antero-posterior diameter of the articular surface with the trapezoid	109.5	98.9	102.1	104.5	80.6
7: Medio-lateral diameter of the articular surface with the trapezoid	73.2	34.4	55.5	54.9	46.7
8: Maximum antero-posterior diameter in the distal zone	-	-	95.6	-	-
9: Maximum medio-lateral diameter in the distal zone	-	-	92.2	-	-
10: Antero-posterior diameter of the articular surface with the metacarpus III	63.7	94.7	-	37.4	-
11: Medio-lateral diameter of the articular surface with the metacarpus III	31.6	41.2	-	19.7	-
12: Antero-posterior diameter of the articular surface with the trapezium	57.1	75.7	91.4	82.2	-
13: Medio-lateral diameter of the articular surface with the trapezium	44.5	30.4	29.2	26.7	-

Table S16. Metacarpus III measurements

	D685
Side	left
1: Maximum preserved length	134.5
2: Maximum medio-lateral diameter in the proximal zone	92.5
3: Maximum antero-posterior diameter in the proximal zone	102.9
4: Medio-lateral diameter of the articular surface with the magnum	88.7
5: Antero-posterior diameter of the articular surface with the magnum	93.7
6: Medio-lateral maximum diameter in the distal zone	32.9
7: Antero-posterior maximum diameter in the distal zone	72.1
8: Medio-lateral diameter of the articular surface with the metacarpus	60.9
9: Antero-posterior diameter of the articular surface with the metacarpus II	43.1

Table S17. Metacarpus IV measurements

	D5893	D7980	D7979
Side	left	right	left
1: Maximum preserved length	151.1	167.2	228.5
2: Maximum medio-lateral diameter in the proximal zone	105.2	92.3	88.6
3: Maximum antero-posterior diameter in the proximal zone	109.8	99.3	139.9
4: Antero-posterior diameter of the articular surface with the unciform	98.7	92.3	118.4
5: Medio-lateral diameter of the articular surface with the unciform	72.7	83	87.7
6: Antero-posterior maximum diameter in the distal zone	-	-	120.8
7: Medio-lateral maximum diameter in the distal zone	-	-	79.1
8: Antero-posterior diameter of the articular surface with the metacarpus III	86.7	79	72
9: Medio-lateral diameter of the articular surface with the metacarpus III	34.7	28.7	33.5
10: Antero-posterior diameter of the articular surface with the metacarpus V	61.2	73.7	-
11: Medio-lateral diameter of the articular surface with the metacarpus V	17.2	38.6	-

Table S18. Metacarpus V measurements

	D4332	D5005
Side	left	right
1: Maximum preserved length	104.5	173.2
2: Maximum medio-lateral diameter in the proximal zone	85.3	82.7
3: Maximum antero-posterior diameter in the proximal zone	104.9	94.7
4: Medio-lateral diameter of the articular surface with the unciform and cuneiform	67.3	78.8
5: Antero-posterior diameter of the articular surface with the unciform and cuneiform	90.5	37.2
6: Maximum medio-lateral diameter in the distal zone	-	71.1
7: Maximum antero-posterior diameter in the distal zone	-	92.6
8: Antero-posterior diameter of the articular surface with the metacarpus IV	60.5	73.2
9: Medio-lateral diameter of the articular surface with the metacarpus IV	34.2	32.1

8 - The hindlimb: images and measurements (in mm)



Figure S6 - a: Femur head () in proximal view (a1) and internal view (a2); B: Patella (D4149) in anterior view (b1) and medial view (b2); c: Fibula (D4648) in lateral view. Scale bar 5cm.

Table S19. Femur measurements	D4158	D5068	D7982	D7983
1: Maximum preserved length	162.1	111.9	128.9	162.8
2: Medio-lateral proximal diameter	-	-	135.6	142.6
3: Antero-posterior distal diameter	-	-	150.5	96.5
4: Medio-lateral diameter of the proximal articular head	221.2	-	-	-
5: Antero-posterior diameter of the proximal articular head	217.7	-	-	-
6: Medio-lateral diameter of the medial condyle	-	119.1	-	-
7: Antero-posterior diameter of the medial condyle	-	143.9	-	-

Table S20. Patella measurements

	D7984	D5463	D4149
Side	left	right	right
1: Maximum preserved length	160.9	161.9	152.5
2: Maximum preserved medio-lateral diameter	143.8	148.8	120.3
3: Maximum preserved antero-posterior diameter	107.7	103.8	89.4
4: Medio-lateral diameter of the medial articular surface	82.9	90.1	71.3
5: Height of the medial articular surface	123.6	128.8	100.5
7: Height of the lateral articular surface	137.8	131.1	83.1
6: Medio-lateral diameter of the lateral articular surface	62.8	51.9	61.9

Table S21. Fibula measurements

	D4648	D5067	D1279	D2140
1: Maximum preserved length	235.6	198.9	206.3	341.4
2: Antero-posterior distal diameter	158.8	148.2	70.9	49.8
3: Maximum medio-lateral diameter	68.7	78.9	51.1	44.4
5: Antero-posterior diameter of the distal articular surface	158.8	148.2	-	-
6: Height of the distal articular surface	-	122.9	-	-
7: Length of the articular surface with the calcaneum	127.1	123.1	-	-
8: Antero-posterior diameter of the articular surface with the astragalus	-	108.1	-	-

9 - The tarsus: images and measurements (in mm)



Figure S7 - a: Calcaneum (D684) in medial view (a1) and lateral view (a2); b: Astragalus (D667) in distal view (b1) and posterior view (b2); c: Navicular (D904) in proximal view (c1) and posterior view (c2); d: Ectocuneiform (D1739) in proximal view (d1) and posterior view (d2); e: Mesocuneiform (D688) in proximal view (e1) and posterior view (e2); f: Entocuneiform (D665) in proximal view (f1) and posterior view (f2) and g: Cuboid (D687) in distal view (g1) and lateral view (g2). Scale bar 5cm.

Table S22. Calcaneum measurements		D7989	D5462	D5461	D684
Side		left	right	left	right
1: Maximum preserved length		151.6	108.7	93.1	274.7
2: Maximum medio-lateral diameter		185.67	199.9	194.3	209.4
3: Maximum antero-posterior diameter		121.9	131.6	170.8	182.8
4: Medio-lateral diameter of the calcaneum tubercle		-	-	-	105.6
5: Antero-posterior diameter of the calcaneum tubercle		-	-	-	166
6: Medio-lateral diameter of the articular surface with the navicular		-	-	-	99.3
7: Antero-posterior diameter of the articular surface with the navicular		-	-	-	64.3
8: Medio-lateral diameter of the articular surface with the ectal face		-	134.7	125.2	132.3
9: Antero-posterior diameter of the articular surface with the ectal face		-	87.7	77.8	85.6
10: Medio-lateral diameter of the articular surface with the sustentacular face		-	67.7	-	91.8
11: Antero-posterior diameter of the articular surface with the sustentacular face		-	101.2	-	104.1
12: Medio-lateral diameter of the articular surface with the fibula		-	76.9	-	99.5
13: Antero-posterior diameter of the articular surface with the fibula		-	34.3	-	48.2

Table S23. Astragalus measurements	D7985	D7986	D5455	D667	D5071	D2048	D5127	D7987	D7988
Side	left	right	right	right	right	right	left	left	left
1: Maximum preserved length	152.8	180.8	158.3	164.1	141.5	138.4	127.2	175.2	256.6
2: Maximum preserved medio-lateral diameter	156.9	200.4	184.2	193.2	145.8	125.9	128.2	197.1	168.1
3: Maximum preserved height	94.4	123.8	115.8	85.2	103.3	108.5	81.6	110.4	171.6
4: Antero-posterior diameter of the articular surface with the navicular	-	166.4	156.1	160.7	-	-	-	95.8	180.2
5: Medio-lateral diameter of the articular surface with the navicular	-	91.3	92.5	-	-	-	-	141.9	89.8
6: Antero-posterior diameter of the articular surface with the tibia	128.5	146.1	139.9	144.4	-	-	-	135.4	-
7: Medio-lateral diameter of the articular surface with the tibia	138.9	161.2	145.6	147.4	-	-	-	149.5	-
9: Antero-posterior diameter of the articular surface with the ectal face	122.1	99.5	109.9	115.8	-	-	-	125.8	135.2
8: Medio-lateral diameter of the articular surface with ectal face	104.2	135.9	107.3	111.7	-	-	-	122.9	67.1
11: Antero-posterior diameter of the articular surface with the sustentacular face	-	118.9	118.8	112.2	-	-	-	100	119.3
10: Medio-lateral diameter of the articular surface with sustentacular face	-	67.3	52.9	57.7	-	-	-	54.5	61.9
12: Antero-posterior diameter of the articular surface with the fibula	-	93.8	101.2	90.8	-	-	-	114.6	84.5
13: Medio-lateral diameter of the articular surface with fibula	-	66.3	55.7	64.5	-	-	-	52.8	34.8

Table S24. Navicular measurements

	D904	D1906	D2253	D7990
Side	right	right	left	-
1: Maximum preserved medio-lateral diameter	155.2	139.2	188.8	159.8
2: Maximum preserved antero-posterior diameter	123.1	103.3	132.3	106.8
3: Maximum preserved height	50.4	55.4	46.4	48.7
4: Medio-lateral diameter of the articular surface with the astragalus	127.6	-	-	125.3
5: Antero-posterior diameter of the articular surface with the astragalus	86.9	-	-	88.9
6: Medio-lateral diameter of the articular surface with the cuboid	50.4	-	-	-
7: Antero-posterior diameter of the articular surface with the cuboid	78.9	-	-	-
8: Medio-lateral diameter of the articular surface with ectocuneiform	97.9	-	-	-
9: Antero-posterior diameter of the articular surface with the ectocuneiform	60.7	-	-	-
10: Medio-lateral diameter of the articular surface with the mesocuneiform	84.1	-	-	-
11: Antero-posterior diameter of the articular surface with the mesocuneiform	66.7	-	-	-
12: Medio-lateral diameter of the articular surface with the endocuneiform	64.5	-	-	-
13: Antero-posterior diameter of the articular surface with the endocuneiform	38.5	-	-	-
14: Medio-lateral diameter of the articular surface with the calcaneum	69.7	-	-	-
15: Antero-posterior diameter of the articular surface with the calcaneum	34.5	-	-	-

Table S25. Ectocuneiform measurements

	D1739
1: Maximum preserved medio-lateral diameter	84.7
2: Maximum preserved antero-posterior diameter	42.8
3: Maximum preserved height	76.9
4: Medio-lateral diameter of the articular surface with the navicular	68.6
5: Antero-posterior diameter of the articular surface with the navicular	73.1
6: Medio-lateral diameter of the articular surface with the mesocuneiform	19.1
7: Antero-posterior diameter of the articular surface with the mesocuneiform	54.5
8: Medio-lateral diameter of the articular surface with the metatarsus II	77.7
9: Antero-posterior diameter of the articular surface with the metatarsus II	70.8

Table S26. Mesocuneiform measurements	D688
Side	right
1: Maximum preserved medio-lateral diameter	83.7
2: Maximum preserved Antero-posterior diameter	51.3
3: Maximum preserved height	95.3
4: Medio-lateral diameter of the articular surface with the navicular	61.6
5: Antero-posterior diameter of the articular surface with the navicular	79
6: Medio-lateral diameter of the articular surface with the ectocuneiform	51.4
7: Antero-posterior diameter of the articular surface with the ectocuneiform	18.9
8: Medio-lateral diameter of the articular surface with the metatarsus II	80.4
9: Antero-posterior diameter of the articular surface with the metatarsus II	82.2

Table S27. Endocuneiform measurements	D665	D2026	D4554	D1493
Side	right	left	left	left
1: Maximum preserved medio-lateral diameter	70.9	80	76.5	46.5
2: Maximum preserved antero-posterior	46.1	65.6	51.8	48.7
3: Maximum preserved height	121.1	123.5	107.7	97.2
4: Medio-lateral diameter of the articular surface with the navicular	56.9	65.6	65.4	-
5: Antero-posterior diameter of the articular surface with the navicular	94.6	97.1	90.1	-
6: Medio-lateral diameter of the articular surface with the metatarsus V	19.5/27.4	17.1/27.7	16.4/28.7	-
7: Antero-posterior diameter of the articular surface with the metatarsus V	53.3/50.2	59.4/56.7	55.2/71.7	-
8: Medio-lateral diameter of the articular surface with the cuboid	111.11	107.3	100.9	-
9: Antero-posterior diameter of the articular surface with the cuboid	70.5	80.5	77.4	-

Table S28. Cuneiform indeterminate measurements	D2241
1: Maximum preserved medio-lateral diameter	69.3
2: Maximum preserved antero-posterior diameter	40.3
3: Maximum preserved height	104.9

10 - The metatarsus: images and measurements (in mm)



Figure S8 - a: Metatarsal III-IV-V (D689-D686-D1414) in proximal view (a1) and anterior view (a2); Metatarsal III (D2277) in proximal view (b1) and medial view (b2). Scale bar 5 cm.

Table S29. Metatarsus II measurements	
	D2591
Side	left
1: Maximum preserved length	93.6
2: Medio-lateral proximal diameter	91.7
3: Antero-posterior distal diameter	89.2

Table S30. Metatarsus III measurements

	D1414	D905	D3949	D2277
Side	left	left	right	right
1: Maximum preserved length	62.7	111.3	153.8	224.6
2: Maximum medio-lateral diameter in the proximal zone	73.6	111.1	68.5	103.4
3: Maximum antero-posterior diameter in the proximal zone	95.8	119.1	92.4	144.1
4: Medio-lateral diameter of the articular surface with the entocuneiform	-	-	59.2	95.8
5: Antero-posterior diameter of the articular surface with the entocuneiform	-	-	88.3	138.5
6: Medio-lateral diameter of the articular surface with the 1st phalanx	-	-	44.3	112.8
7: Antero-posterior diameter of the articular surface with the 1st phalanx	-	-	77.8	110.4
8: Medio-lateral diameter of the articular surface with the metatarsus IV	80	-	-	118
9: Antero-posterior diameter of the articular surface with the metatarsus IV	27.3	-	-	23
10: Medio-lateral diameter of the articular surface with the metatarsus II	27.8	-	-	-
11: Antero-posterior diameter of the articular surface with the metatarsus II	38.1	-	-	-

Table S31. Metatarsus IV measurements

	D7991	D686	D1971
Side	left	left	right
1: Maximum preserved length	100.5	80.9	112.5
2: Maximum medio-lateral diameter in the proximal zone	92.7	92.4	92.3
3: Maximum antero-posterior diameter in the proximal zone	81.1	93.2	95.8
4: Medio-lateral diameter of the articular surface with the cuboid	87.6	84.8	-
5: Antero-posterior diameter of the articular surface with the cuboid	67.8	90.2	-
6: Medio-lateral diameter of the articular surface with the metatarsus III	27.7	29.7	-
7: Antero-posterior diameter of the articular surface with the metatarsus III	55.2	48.8	-
8: Medio-lateral diameter of the articular surface with the metatarsus V	58	69.2	68.7
9: Antero-posterior diameter of the articular surface with the metatarsus V	19.4	21.4	26.7

Table S32. Metatarsus V measurements

	D689
Side	left
1: Maximum preserved length	57.7
2: Maximum medio-lateral diameter in the proximal zone	70.8
3: Maximum antero-posterior diameter in the proximal zone	93.6
4: Medio-lateral diameter of the articular surface with the cuboid	56.9
5: Antero-posterior diameter of the articular surface with the cuboid	78.9
8: Medio-lateral diameter of the articular surface with the metatarsus IV	22.2
9: Antero-posterior diameter of the metatarsus articular surface with the metatarsus IV	52.2

Table S33. Metapodial indeterminate measurements

	1: Maximum preserved length	2: Medio-lateral proximal diameter	3: Antero-posterior proximal diameter
D4553	90.5	63.1	50.01
D5130	74.6	74.4	66.4
D4832	99.3	67.3	93.2
D7992	99.1	80.7	93.2
D7993	77.7	67.7	74.1
D7994	75.1	55	75.4

11 - The phalanges: images and measurements (in mm)



Figure S9 - a: Proximal Phalanx (D599) in proximal view (a1) and lateral view (a2); B: Medial Phalanx (D598) in proximal view (b1) and lateral view (b2). Scale bar 5cm.

	Proximal				Medial
	D599	D7996	D655	D750	D598
1: Maximum preserved height	64.7	82.5	91.6	74.5	49.9
2: Medio-lateral proximal diameter	70.7	98.7	75.3	69.8	66.7
3: Antero-posterior proximal diameter	61.6	77.4	60	60.4	44.3
4: Medio-lateral proximal diameter of the articular surface	57.1	83.5	64.1	-	61.5
5: Antero-posterior proximal diameter of the articular surface	55.6	64.1	46.8	-	44.1
6: Medio-lateral diameter of the distal articular surface	52.4	-	62.9	52.9	45.4
7: Antero-posterior diameter of the distal articular surface	39.9	-	48.1	46.2	19.6

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