

Table S1 – Pego do Diabo: rabbit material in layer 3 radiocarbon sample ICEN-491 (a).

Body part	N
Skull (and fragments)	1
Loose teeth	32
Mandible (and fragments)	26
Maxilla (and fragments)	7
Vertebra	5
Sacrum	4
Rib (and fragments)	2
Scapula (proximal)	2
Humerus (distal)	12
Ulna (proximal)	8
Radius (distal)	1
Pelvis (and fragments)	52
Femur (whole)	3
Femur (proximal)	19
Femur (distal)	9
Tibia (proximal)	8
Tibia (distal)	32
Astragalus	3
Calcaneum	39
Metapodial	100
Phalanx	43
Tarsal/Carpal bone	4
Diaphysial fragments	4
Total	416

(a) Data from lab submission form; all the rabbit bones in this sample came from squares M13 and M14.

Table S2 – Pego do Diabo vs. Gruta do Caldeirão: species percentages (a).

Taxon	PGD-2 Aurignacian	PGD-1/2D Aurignacian	PGD-1/2D/2/REM Aurignacian	CAL Mousterian	CAL EUP	CAL Solutrean	CAL Magdalenian
Aurochs	-	5	–	1	-	+	2
Ibex	5	15	6	10	20	9	1
Ibex/Chamois	-	-	9	2	7	5	2
Chamois	2	3?	5	4	3	5	1
Red deer	60	28	43	41	35	56	37
Roe deer	-	3?	–	1	1	1	1
Wild boar	-	5	3	2	-	+	6
Equid	10	8	16	20	15	9	3
Hare	2	-	2	-	2	-	10
Beaver	-	-	–	+	-	-	+
Hyaena	2	+	1	5	3	-	-
Bear	2	3	1	1	8	+	-
Badger	-	15	1	-	-	3	11
Lion	-	-	–	-	2	+	-
Leopard	2	-	–	1	-	2	2
Lynx	7	13	6	9	3	13	17
Wildcat	-	-	–	-	-	1	3
Wolf	2	3	3	2	-	+	-
Fox	5	-	3	1	1	+	5
N (excluding rabbits)	42	39	459	122	116	267	175.5
N (rabbits) (c)	(32)	(70)	707	(171)	(220)	(2209)	(2275)

(a) CAL = Gruta do Caldeirão; PGD-2 = Pego do Diabo, layer 2; PGD-1/2D = Pego do Diabo, layer 1 plus disturbed areas of layer 2. PGD-1/2D/2/REM = Pego do Diabo, layer 2 plus all other disturbed contexts whose Pleistocene faunal content was inferred to derive from layer 2 [60-61]. The numbers from [60-61] are NISP for the total assemblage. The other counts are “PoSAC” [65]. The data for Caldeirão are after [65] for the larger mammals and after [66] for the rabbits.

Table S3 – Pego do Diabo: OxA-failed AMS samples.

Square	Number	Level	Description	Age class	Observations
L11	1	2 (spit 2a)	Shaft fragment	Adult	<i>Equus/Bos</i> size
M11	4	2 (spit 2a)	<i>Equus</i> metacarpal	Juvenile	–
M11	10	2 (spit 2a)	Second phalanx, <i>Cervus elaphus</i>	Adult	Carnivore-damaged
M11	11	2 (spit 2a)	Second phalanx, <i>Cervus elaphus</i>	Adult	–
M11	12	2 (spit 2a)	Second phalanx, <i>Cervus elaphus</i>	Adult	–
M11	16	2 (spit 2b)	First phalanx, <i>Cervus elaphus</i>	Juvenile	–
M11	17	2 (spit 2b)	Astragalus, <i>Cervus elaphus</i>	Juvenile	–
M11	21	2 (spit 2b)	Radius, <i>Cervus elaphus</i>	Juvenile	–
M11	25	2 (spit 2b)	Second phalanx, <i>Cervus elaphus</i>	Juvenile	–
M11	30	2 (spit 2b)	Tibia, <i>Cervus elaphus</i>	Juvenile	–
L11	sc33(20)	3	Shaft fragment	Adult	<i>Equus/Bos</i> size
L11	sc33(27)	3	Shaft fragment	Adult	<i>Equus/Bos</i> size
L11	sc33(29)	3	Shaft fragment	Adult	Mineralized; polished surface, with abrasive striations; manganese staining

Table S4 – Pego do Diabo human skeletal remains.

Square	Field #	Layer	Description	Age class (a)	Individual
IN SQUARES ADJACENT TO THE 1960s TRENCH (b)					
M14	–	A2	Lower left canine	Adult, dental wear 3	Adult 1
M13	sc10	2top	Third phalanx	Adult, dental wear 6	Adult 2
M13	sc28	2top	Lower lateral incisor right, worn	Adult, dental wear 6	Adult 2
J12	1	2top	Lower left first molar (1/3 root development)	Infant 1B (2-7 years)	Infant 3 (~4 years)
J12	2	2top	Juvenile right scapula	Infant 1B (2-7 years)	Infant 4 (~5-6 years)
J12	sc24	3 (c)	Intermediate hand phalanx	Adult	–
L-M11	35	1	Lower right third molar	Adult, dental wear 6	Adult 2
IN SEDIMENTS FROM PROFILE COLLAPSE AT THE BOTTOM OF THE 1960s TRENCH					
REM1	–	–	Proximal hand phalanx	Infant 1A (0-2 years)	Infant 1 (~1 year)
REM1	–	–	Upper premolar fragment	Adult, dental wear 3	Adult 1
REM1	–	–	Metcarpal diaphysis	Infant 1A (0-2 years)	Infant 1 (~1 year)
REM1	–	–	Distal epiphysis of radius	Infant 1B (2-7 years)	Infant 4 (~5-6 years)
REM1	17	–	Lower left first molar, wear 1	Infant 1B (2-7 years)	Infant 4 (~5-6 years)
REM1	32	–	Deciduous upper right first incisor, wear with distinct dentine hairline	Infant 1B (2-7 years)	Infant 2 (~3 years)
REM2	–	–	Upper first molar right, level 6 of wear	Adult, dental wear 6	Adult 2
IN SQUARES AT THE ENTRANCE OF THE CAVE (d)					
M9	sc1	2D	Proximal hand phalanx	Infant 1B (2-7 years)	Infant 3 (~4 years)
M7	sc1	2D	Skull vault fragment	Infant 1A (0-2 years)	Infant 1 (~1 year)
M6	sc21	2D	Lower second molar left, level 6 of wear	Adult, dental wear 6	Adult 2
M6	sc26?	2D	Lower incisor, only labial half	Adult, dental wear 3	Adult 1
N6	sc6	2D	Lower left first molar, no wear	Infant 1B (2-7 years)	Infant 2 (~3 years)
N6	sc8	2D	Distal hand phalanx, proximal ½ preserved	Adult	–
L-M5	sc8	2D	Lower right second incisor, wear 3	Adult, dental wear 3	Adult 1
L-M5	sc9	2D	Proximal hand phalanx	Infant 1B (2-7 years)	Infant 4 (~5-6 years)
L-M5	sc10	2D	Proximal hand phalanx	Infant 1B (2-7 years)	Infant 4 (~5-6 years)
L-M5	sc11	2D	Middle hand phalanx	Adult	–
L-M5	sc19	2D	Thoracic vertebra	Adult	–
L-M5	sc31	2D	Deciduous left upper canine, significant wear	Infant 1B (2-7 years)	Infant 4 (~5-6 years)
L-M5	sc23	2D	Parietal fragment with lambda?	Infant 1A (0-2 years)	Infant 1 (~1 year)
L-M5	sc33	2D	Incisor, anterior half, with calculus	Adult	–
L-M5	sc44	2D	Lower left premolar (P4)	Adult, dental wear 3	Adult 1

(a) After [106].

(b) Together with the material from profile collapse recovered at the bottom of the 1960s trench, this scatter of small-sized skeletal elements probably reflects the existence in squares L-M12 of a Holocene funerary context explored (and nearly exhausted) by the unknown excavators of that trench.

(c) J12 corresponded to a small remnant preserved against the north wall of the cave that was almost entirely disturbed by a burrow that extended down to the interface between layers 2 and 3, explaining the presence of this human phalanx, intrusive from the Holocene burial context documented by the material recovered in layers A and 1.

(d) This cluster of small and fragmented material, mostly recovered in squares 5-6 of the grid, right at the entrance, where the sediment fill was only ca.20 cm thick on average, very probably corresponds to sieving or backdirt residue from the trench excavated at the back of the cave in the 1960s.

Table S5 – Pego do Diabo: AMS radiocarbon results obtained for human skeletal remains (a).

Sample	Lab #	Age [¹⁴ C years BP]	cal BC age	Used [g]	Yield [mg]	Yield [%]	C [%]	C:N [ratio]	δ ¹³ C [‰]	δ ¹⁵ N [‰]
J12-2	VERA-4981	4115±45	2880-2570	0.55	10.3	1.9	39 (c)	3.1 (c)	-18.6 ± 0.8 (b) -20.0 (c)	7.4 (c)
J12sc24	VERA-4982	4490±35	3350-3030	0.72	13,3	1.8	43 (c)	3.2 (c)	-15.9 ± 2.9 (b) -19.4 (c)	8.2 (c)
	VERA-4982UF1	4525±40	–	0.48	2.0	0.4	–	–	-19.1 ± 1.0 (b)	–
	VERA-4982UF2	4485±45	–	–	4.0	0.8	–	–	-20.6 ± 0.8 (b)	–

- a) Pretreatments: standard gelatin production and ultrafiltration (UF1 result – gelatin fraction >30 kDa; UF2 result – gelatin fraction <30 kDa). All uncertainties in radiocarbon age and δ¹³C results are 1σ. Calibration used OxCal 3.10 with the INTCAL04 calibration curve, and cal BC results are the 95.4 % probability age ranges.
- b) Determined with the AMS system in the graphitized sample.
- c) Determined via EA-IRMS measurement in a gelatin portion split from the ¹⁴C dated gelatin [EA-IRMS measurement precision of a repeatedly measured standard material: 0.1‰ (1 σ) for δ¹⁵N and δ¹³C].

Table S6 – Pego do Diabo vs. Portuguese Gravettian: relative frequencies of bladelet tool categories (a).

Assemblages	Dufour bladelets		Bladelets with marginal, direct retouch		Backed bladelets and points		Geometrics	
	N	%	N	%	N	%	N	%
AURIGNACIAN								
Pego do Diabo, layers 2+2D	6	86	1	14	–	–	–	–
EARLIER GRAVETTIAN (b)								
Vale Comprido-Barraca	3	12	1	4	21	84	–	–
Fonte Santa	–	–	–	–	4	40	6 (c)	60
LATER GRAVETTIAN (b)								
Terra do Manuel 1940-42	13	5	7	3	234	91	2 (d)	1
Cabeço de Porto Marinho II, lower inf	–	–	–	–	17	100	–	–
Terra do Manuel 1988-89, layer 2s	1	7	–	–	13	93	–	–
Cabeço de Porto Marinho III, middle	1	12	–	–	7	88	–	–

(a) Only assemblages with more than five pieces in the bladelet tool category [41, 54].

(b) In the Gravettian assemblages, the “Dufour bladelet” category is totally comprised of elements whose inverse retouch is marginal, none featuring the kind of semi-abrupt, invasive retouch applied to the ventral side of the alternate-retouched Aurignacian Dufours from Pego do Diabo.

(c) Includes three small fragments of curved, backed pieces classified as segments that probably correspond in fact to broken backed-curved microlithic points, a type represented in the assemblage by a complete specimen of the same module (L=22.3 mm; W=8.5 mm; Th=3.5 mm); curved-backed microlithic point types of identical module are also represented by three specimens in the Early Gravettian from Vale Comprido-Barraca, and by four specimens in the Late Gravettian from Terra do Manuel (three) and Terra do José Pereira (one).

(d) Includes one small segment (L=24.1 mm; W=8.1 mm; Th=2.7 mm) that may well belong in the Neolithic context otherwise represented in the assemblage by a small polished adze, a broken bone pendant, a potsherd and a transversal arrowhead (all probably surface finds, as suggested by similar material from layer 1—the plough zone—of the 1988-89 excavations).

Table S7 – Taphonomically reliable ^{14}C and TL results for the Middle-to-Upper Paleolithic transition in Iberia (a).

Site	Layer	Composition	Method	Lab #	Age [¹⁴ C years BP]	cal BP age
LATEST MIDDLE PALEOLITHIC						
Sima de las Palomas	2e	Burnt bone	AMS ¹⁴ C	OxA-10666	34,450±600	41,650-37,730
	2l	Burnt rabbit bone	AMS ¹⁴ C	OxA-15423	35,030±270	41,880-38,400
Cueva Antón (b)	I-k	<i>Pinus nigra</i> charcoal	AMS ¹⁴ C	OxA-21244	32,890±200	38,670-35,750
Jarama VI	2.2	Charcoal	AMS ¹⁴ C	Beta-56639	32,600±1800	42,080-33,040
	2.1	Charcoal	AMS ¹⁴ C	Beta-56638	29,500±2700	40,200-28,720
Gorham's Cave	Trench 7 m inside from main area	<i>Pinus</i> sp. charcoal	AMS ¹⁴ C	OxA-10295	34,600±900	42,010-37,170
	IV from back of the cave	<i>Pinus</i> sp. charcoal, cone scale	AMS ¹⁴ C	OxA-10230	32,330±390	38,590-34,950
	Context 24	Charcoal	AMS ¹⁴ C	OxA-7857	32,280±420	38,580-34,860
Gruta da Oliveira	8	Burnt bone	AMS ¹⁴ C	GrA-10200	31,900±200	36,320-35,200
		Burnt bone	AMS ¹⁴ C	OxA-8671	32,740±420	38,760-35,440
EARLIEST UPPER PALEOLITHIC						
Cueva Bajondillo (c)	11	Sediments & charcoal	AMS ¹⁴ C	Ua-17150	33,690±1195	42,210-34,770
		Sediments & charcoal	AMS ¹⁴ C	Ua-18050	32,770±1065	40,520-34,400
Gato Preto (d)	C	Burnt flint	TL	British Museum	–	45,900-30,300
Cueva de Mallaetes (e)	XII	Charcoal	¹⁴ C	KN-I/926	29,690±560	34,890-32,930
Gorham's Cave (f)	Context 9	<i>Pinus</i> sp. charcoal	AMS ¹⁴ C	OxA-7076	30,250±700	35,700-33,220
		<i>Pinus</i> sp. charcoal	AMS ¹⁴ C	OxA-7074	30,200±700	35,650-33,170
		<i>Pinus</i> sp. charcoal	AMS ¹⁴ C	OxA-7075	29,800±700	35,210-32,770
		<i>Pinus</i> sp. charcoal	AMS ¹⁴ C	OxA-7077	29,250±650	34,730-32,370
	Context 11	Burnt bone	AMS ¹⁴ C	OxA-7388	29,100±340	34,320-32,760
	Context 13a	<i>Pinus</i> sp. charcoal	AMS ¹⁴ C	OxA-7110	29,250±750	34,850-32,210
	Context 15	Charcoal	AMS ¹⁴ C	OxA-7792	28,680±240	33,860-32,460
	Layer D (Waechter's excavation)	Charcoal	¹⁴ C	GrN-1455	28,700±200	33,830-32,550
		Charcoal	¹⁴ C	GrN-1363	27,860±300	33,020-31,780

(a) After [19, 50, 107]. Calibration used CalPal with the CalPal_2007_HULU calibration curve [33-34], and cal BP results are the 95.4 % probability age ranges.

(b) ABOx-SC method. Two samples from this level treated with the normal ABA method yielded a younger result (~31.1 ka ^{14}C BP in both cases), indicating that residual contaminants could not have been removed by standard pre-treatment techniques, a problem that may explain <32 ka ^{14}C BP charcoal results for other sites of the Iberian Middle Paleolithic.

(c) Because the site is a rock shelter excavated in Middle-Upper Pleistocene travertines, the inclusion of sediment in these samples may have contaminated them with unknown amounts of old carbon; therefore, they should be treated as maximum ages only.

(d) Probability interval calculated from the average (38100±3900 BP) of the results obtained for samples GPR4 and GPR11.

(e) The lithics are not diagnostic, but a bone point from this layer is typical of the later Aurignacian (II or III-IV).

(f) The lack of index fossils precludes assignation of the diagnostically Upper Paleolithic stone tool assemblages recovered from these Gorham's Cave contexts to either the Aurignacian II or the Aurignacian III-IV, but the dating places them firmly within the range of the later Aurignacian and excludes other blade-based technocomplexes of the Iberian Upper Paleolithic (Gravettian and Solutrean).

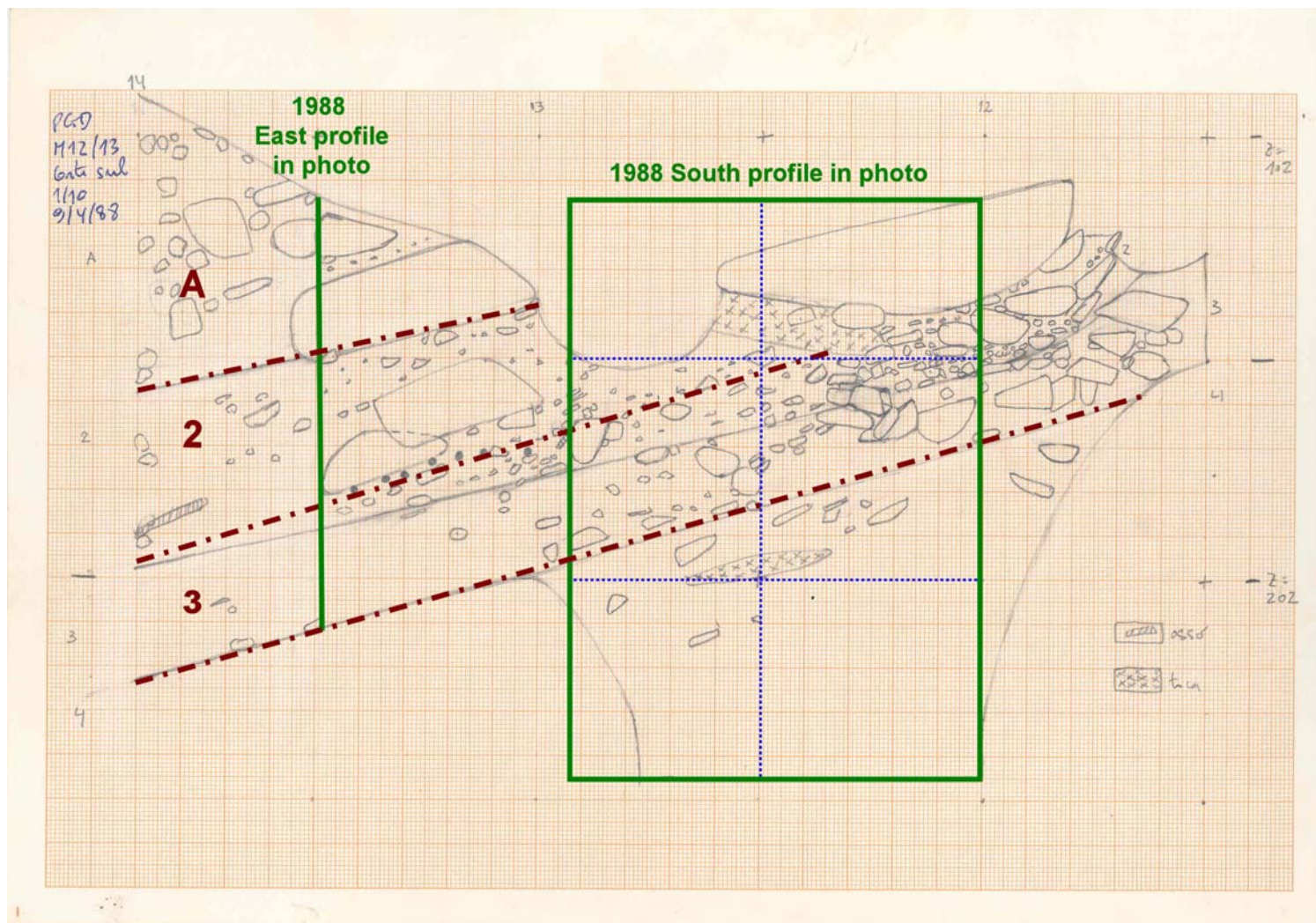


Figure S1. Pego do Diabo: M>N14W-12 profile. Facsimile reproduction of the field drawing, with indication of the position of the profiles whose photographs are given in Figure 5. Note the post-excavation correction of the boundary between layers 2 and 3. This rectification has no implication for the assignment of finds from the 1988-89 field work, as it affects an area where the profile was created by the excavation of the 1960s trench.

PGD
M13
Castelista
1/10
8/4/88

(apto-arruço)
A - argilo, acastanhado, in-
clinado para sul, contendo ce-
râmica mediana, pedregalhos e
osso humano; assenta sobre
2, embora sem discordância
clara. No corte leste, porém,
a inclinação do bloco sobre
aquilo que mencio o topo de 2
é diferente - tende para o hori-
zontal, enquanto os outros
tendem para 82.5° .

(apto-meno)
2 - argilo, acastanhado, in-
clinado para ~~leste~~ leste nos
topos; no leste assenta sobre
3, acastanhado, raramente
corta a parede norte, onde
existe um nível de argila
amarelada (desagregação da
parede?);

(um areia fina)
3 - argilo, amarelado
e mais fino

4 - argilo, amarelado

Junto ao corte leste, a in-
clinação dos sedimentos
de nível grande, tornando-
se mais difícil a que dife-
rença, especialmente entre
2 e 3, o qual se fez fundamentalmente com base no CR, já que, para o
leste, e junto ao corte, a camada 2 se também muito argilo e plástica.

-  cerâmica
-  basalto
-  calcário
-  ossos

argila
amarelada

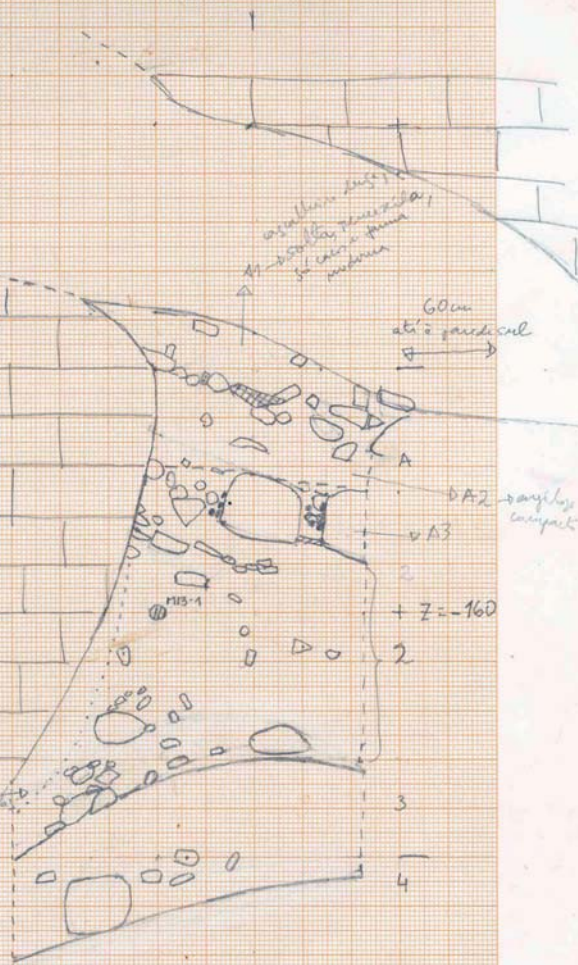


Figure S2. Pego do Diabo: M13>14 profile. Facsimile reproduction of the field drawing.

PCD
M11-L11
2 to max / 3 tops
1/10
6/4/88

2.55

① - 46	② - 53	③ - 63
④ - 54	⑤ - 48	⑥ - 55
⑦ - 66	⑧ - 72	⑨ - 69
⑩ - 72	⑪ - 62	⑫ - 58
⑬ - 73	⑭ - 69	⑮ - 76
⑯ - 77	⑰ - 50	

A camada 2, após a folga por alívio no canto suldeste no topo de 2a, não é a camada 3. A camada 2 é, portanto, relativamente fina em direção ao fundo, dando ideia que, no topo de 3a, há um antigo, era mais espessa devido à descontinuidade a descontinuidade uma depressão no topo de 3. Assim, e se este depósito for um efeito de preenchimento que, para o interior do que, a camada 2 mantém ainda uma certa espessura.

Em L11, durante o decapagem do topo de 3, numa zona de pedimento mais antiga, mas com alguns siltos, chamados por vezes (foia?), que se já paralelamente superior de 2 e 3, aparece uma camada de argila (ou cinza).

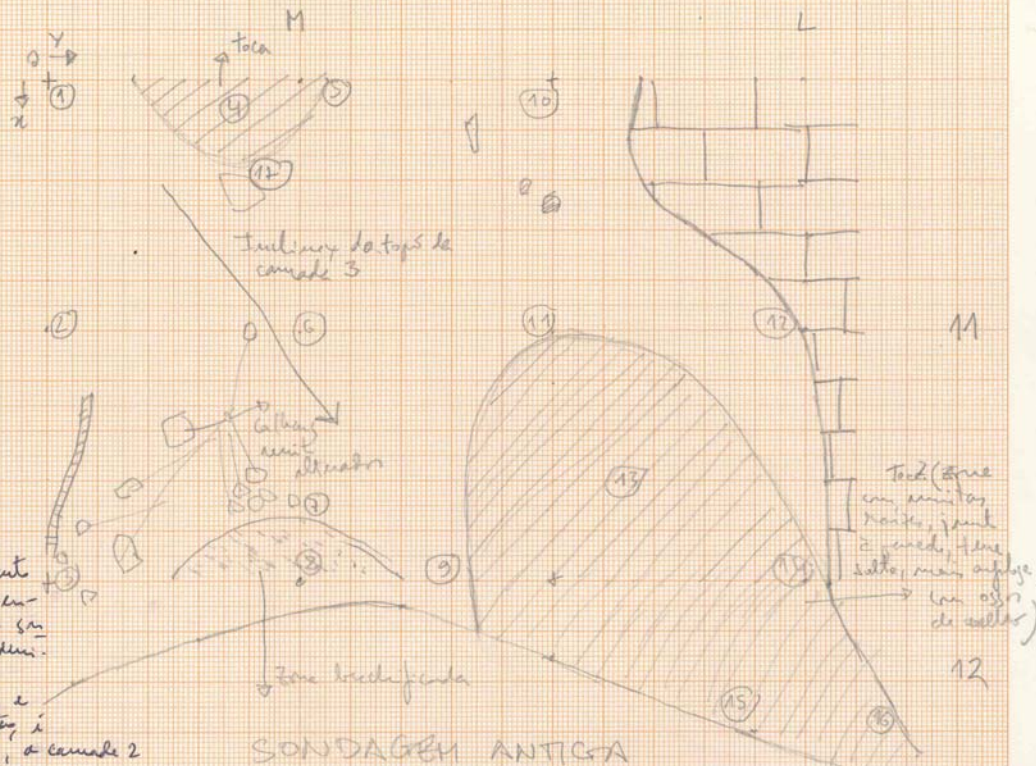


Figure S3. Pego do Diabo: the surface of layer 3 in squares L-M11. Facsimile reproduction of the field drawing.

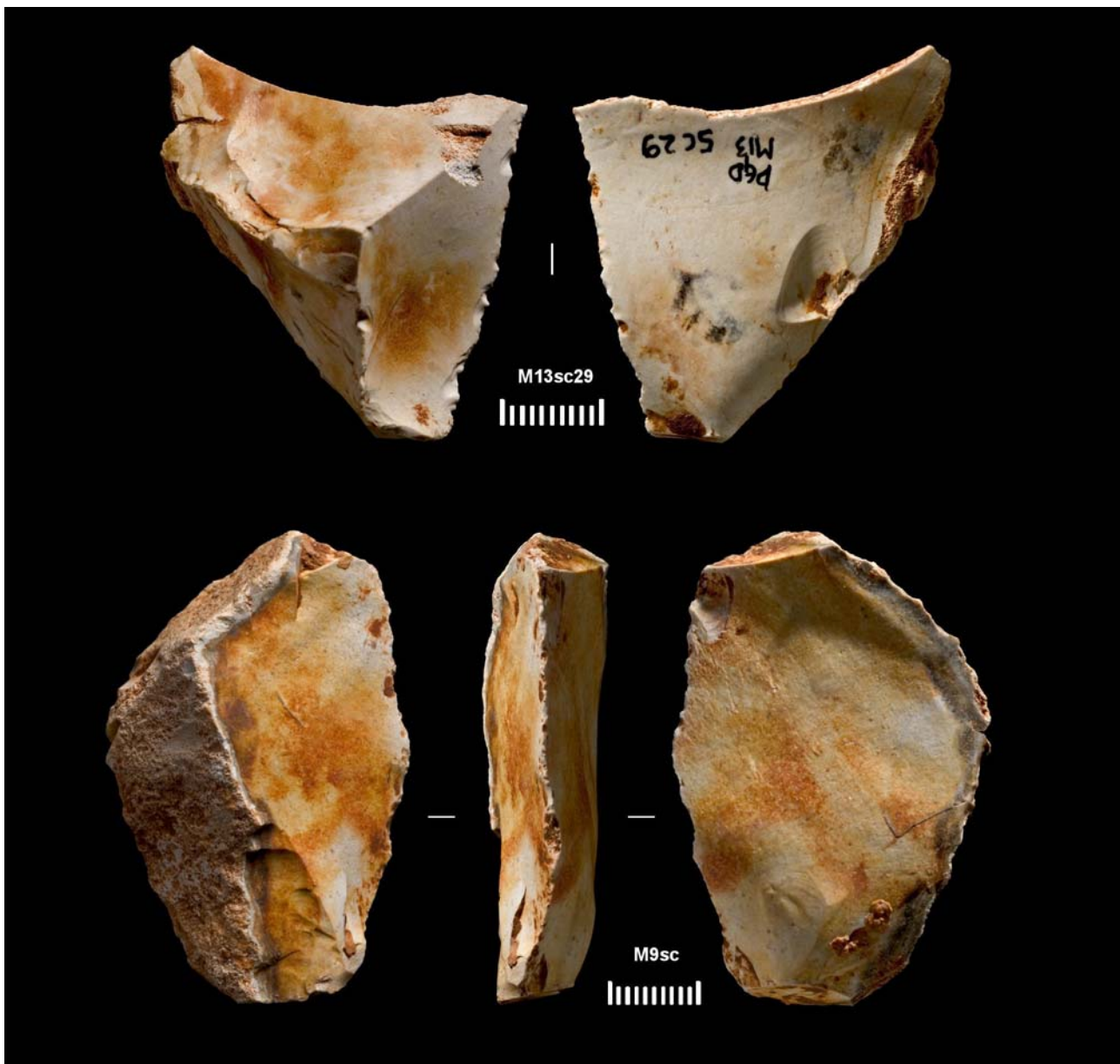


Figure S4. Pego do Diabo: lithics from layers 3-4. Top: flake M13sc29, from layer 3. Bottom: flake from layer 4, square M9. Note the patina and edge damage, which suggest that the accumulation of these and the few other flints of similar appearance recovered in layers 3-4 relates to natural inwash processes, not to human activity at the site. In 1965 or 1966, a group from the Palethnology Department of the Portuguese Speleological Society collected flint flakes in ploughed fields immediately above the limestone ridge where the cave opens (Carl Harpsøe, personal communication, March 07, 2009), and such may well be the provenience of the lithics found in these layers.

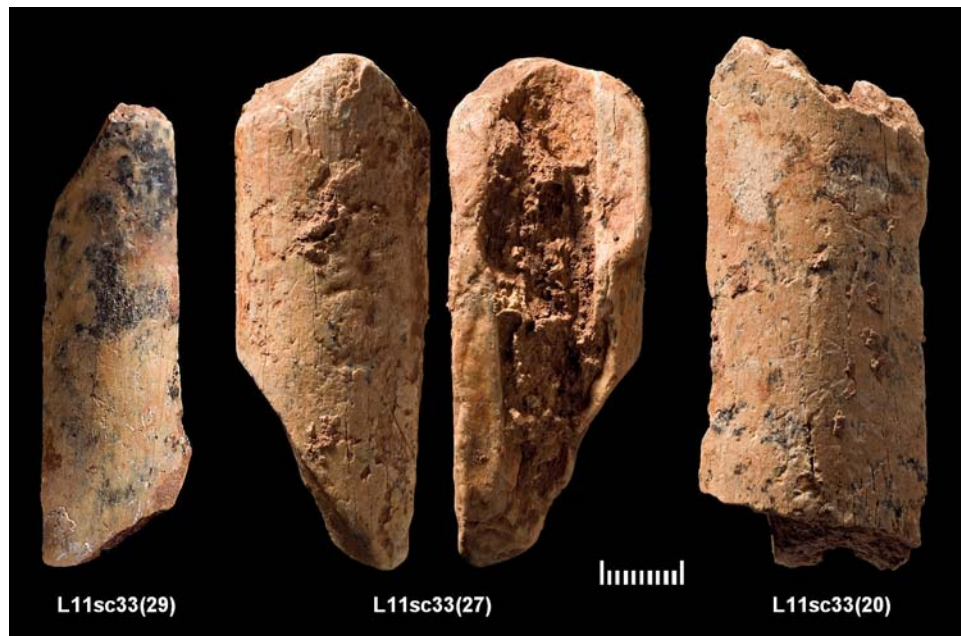


Figure S5. Pego do Diabo: failed radiocarbon samples from layer 3. All come from square L11 (see Table S3 for further detail). Note the manganese staining.

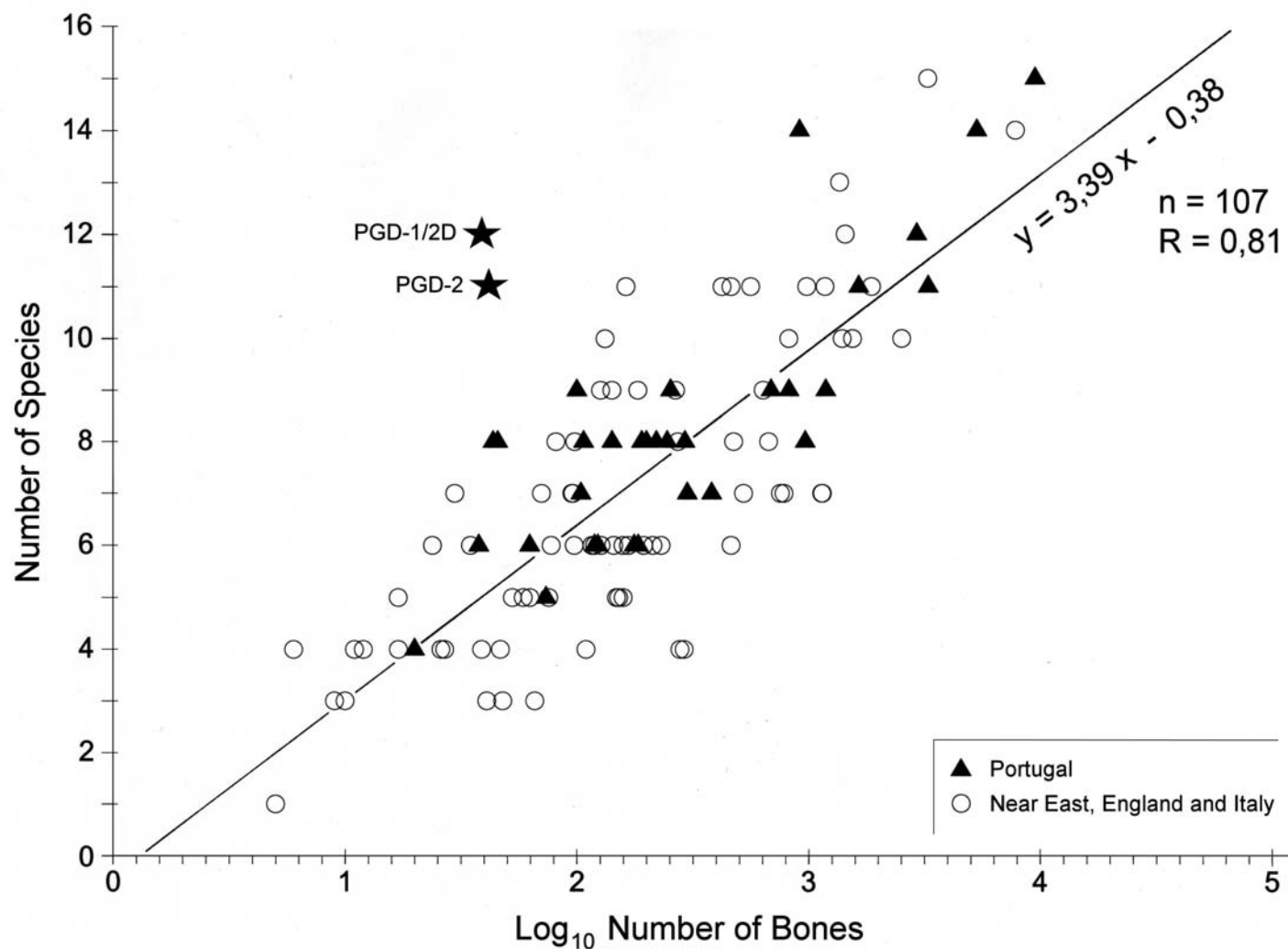


Figure S6. Pego do Diabo: taxonomic diversity in context. A plot of the number of mammal species (of size equal to or greater than a rabbit) against the decimal logarithm of the number of mammal (of size equal to or greater than a rabbit) bones identified to “species” level from 107 archeological sites/levels in Europe and the Near East studied with the PoSAC method [65, 98]. Sheep and goat are treated as a single taxon as are the various species of equids. The numbers of bones range from 5 to 9673 and the numbers of species range from 1 to 15. The abundance of taxa observed in layer 2 of Pego do Diabo is all the more striking because of the small size of the mammal bone assemblage.



Figure S7. Pego do Diabo: OxA-failed radiocarbon samples from layer 2 (spit 2a). For taxonomic and skeletal part details, see Table S3.

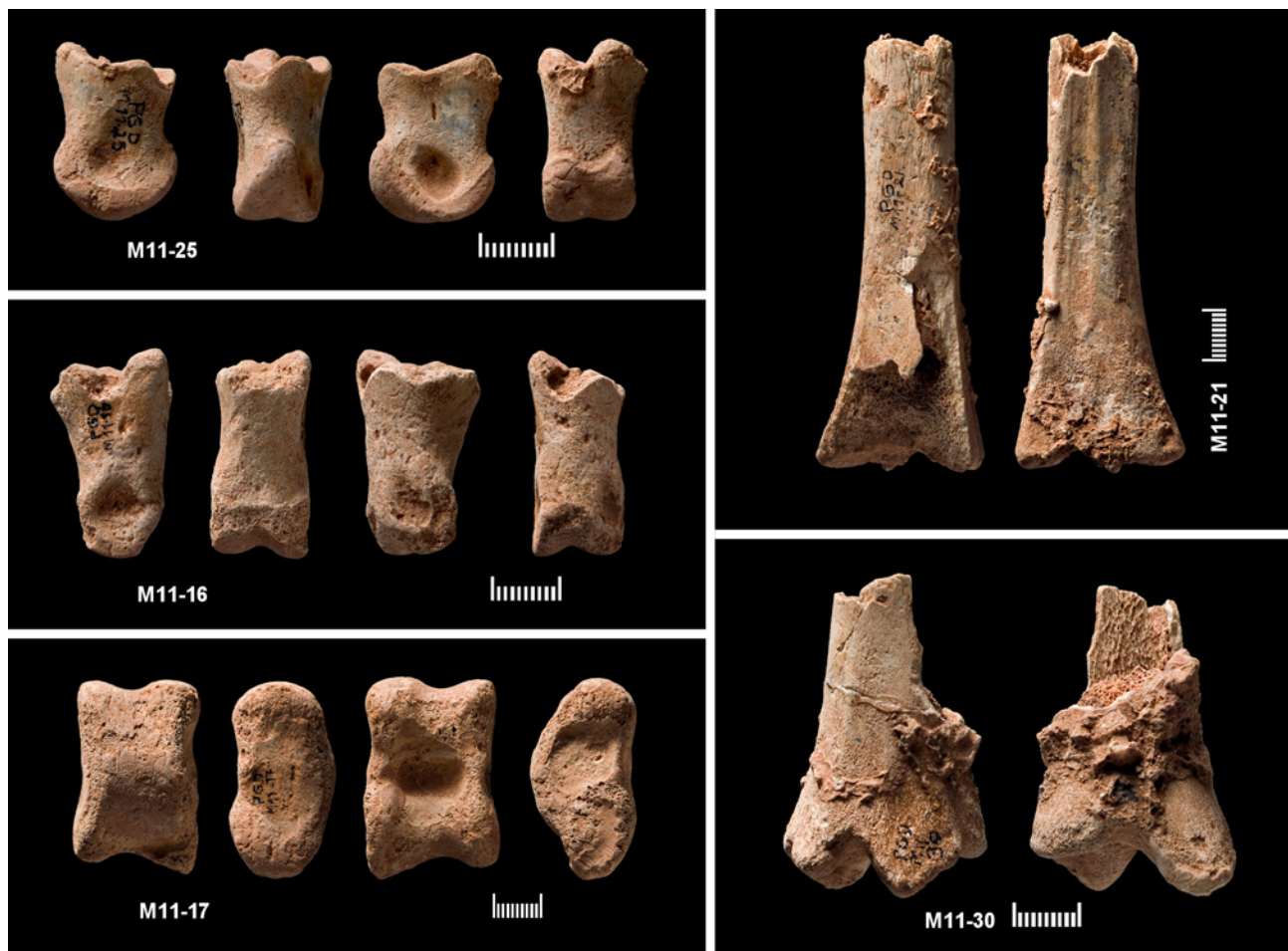


Figure S8. Pego do Diabo: OxA-failed radiocarbon samples from layer 2 (spit 2b). For taxonomic and skeletal part details, see Table S3.



Figure S9. Pego do Diabo: microlith recovered in sediments from profile collapse accumulated at the bottom of the 1960s trench.

The scale is in mm. Although described as a “small microgravette point made of red flint,” and used to support a Gravettian age for layer 2 of Pego do Diabo [55], this microlith is neither made of red flint nor a microgravette. Such elongated segments (or fusiform bipoints) are entirely unknown in the Gravettian of Portugal (none have been recorded among a total of 3291 retouched tools from 15 assemblages [54]). They are not inconsistent with a Mesolithic age, but are of a type that is common in the Neolithic; the freshness and lack of patina are also consistent with a later Holocene age. The item may belong in the funerary context explored by the excavators of the 1960s trench, otherwise represented by the fragmentary human remains recovered in 1988-89 from layers 1 and A of the adjacent squares (see Table S4).

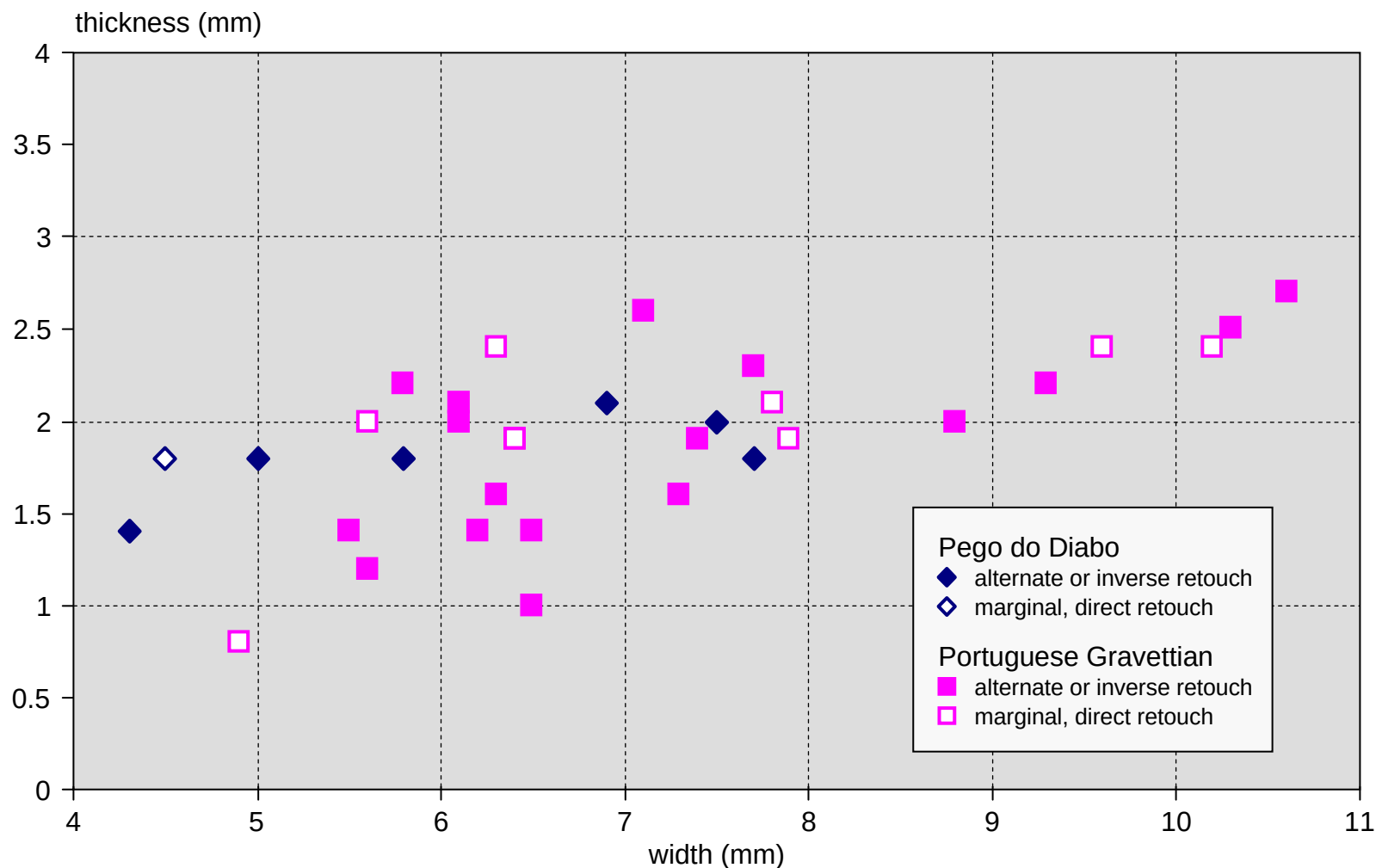


Figure S10. “Dufour bladelets”: Pego do Diabo vs. Portuguese Gravettian. Scatter plot of width versus thickness for the dataset in Table S6 (Dufour bladelets defined inclusively, as in the type-list [57], i.e., subsuming bladelets with marginal, direct retouch only).