

A reconstruction of the spatial distribution of the faunal remains from Goyet, Belgium

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1. Introduction

At the village of Goyet (Namur Province, Belgium) a series of caves occurs. The caves are located at an altitude of 130 m in a Carboniferous limestone cliff on the right bank of the Samson close to the confluence of the Strouvia. The valley of the Samson has a length of about 15 km with a maximum width of around 500 m. After a sinuous course, through a plateau with a maximum height of 280 m, the Samson joins the river Meuse some 3 km north of Goyet. The most important one of the caves, called the third cave by Dupont (1873), is situated 15 m above the Samson. Its entrance is oriented to the southwest (Dupont, 1869, 1873; Rahir, 1908; Van den Broeck *et al.*, 1910). The cave was excavated by Édouard Dupont in 1868, 1869 and 1870 (Dupont, 1873; Dupont, unpublished notes 1905). An extensive historic overview of the research at the Goyet caves is given in Ulrix-Closset (1975), Otte (1979) and Dewez (1987).

2. Stratigraphy

Dupont (1873) subdivided the third cave of Goyet in three parts: Chamber A, B and C (fig. 1). He described in total five bone bearing horizons inside the cave. The bones occur in clayey-sandy loam which Dupont (*ibid.*) called "limon fluvial". In his unpublished notes, dating from 1905, he described the sediment as a yellow clay with stone fragments: "argile jaune plus ou moins blocailleux". The fossil yielding horizons are separated by sterile sediments. Fossil bones are present near the entrance as well as deeper in the cave. Mousterian and Upper Palaeolithic artefacts were found (Ulrix-Closset, 1975).

Chamber A has a length of about 26 m, is 4-5 m wide and 3.8 m high. The entrance has a width of 3.8 m. The twilight zone stretches to the back of the chamber. The total thickness of the excavated layers at the entrance is more or less 1.5 m as deduced from the sediment remains on the walls of the cavern, while at the back of the chamber the thickness was

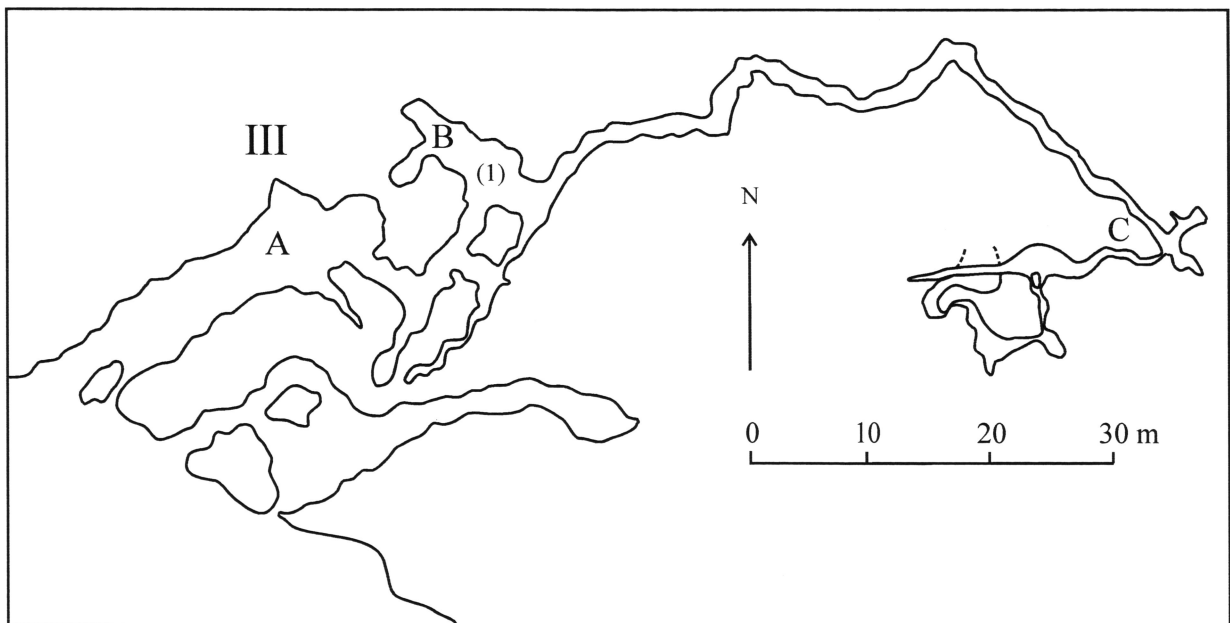


Fig. 1 – Map of the Chambers A, B and C of the third cave of Goyet, modified after Rahir (1908).

around 1.2 m. Dupont (1873) distinguished four bone bearing horizons in this chamber, numbered from top to bottom. In the lower one Palaeolithic artefacts are lacking. The upper three bone horizons contain bones from human refuse and Upper Palaeolithic artefacts dating from the Mousterian, Aurignacian, Gravettian and Magdalenian (Ulrix-Closset, 1975; Otte, 1979; López Bayón *et al.*, 1997). The sterile deposits separating the third from the second bone horizon, and the second from the first have a thickness of resp. 10 to 30 cm, and 10 to 15 cm (Dupont, unpublished notes dating from 1906). Dupont further mentioned in his unpublished notes the presence of a “colonne de stalagmite”, a speleothem, which covered the upper bone horizon and engulfed at its base bones of horse, reindeer and rodents. A number of bones from this horizon are indeed encrusted in calcite (see further).

The bear and hyena assemblages from the horizons in Chamber A were located more to the back of the chamber (Dupont, 1873), and have a different origin (Germonpré, 1996). It is not clear how the carnivores assemblages from these three horizons are interrelated, but it seems probable that they are not connected to the human refuse assemblages.

Chamber B lies behind Chamber A. Dupont (1873) described two bone horizons, which he called from bottom to top bone horizon 5 and bone horizon 4. Bone horizon 5 yielded remains from cave bear and cave lion. The majority of the bones from bone horizon 4 derive from cave bears (Dupont, *ibid.*); they are discussed in Germonpré & Sablin (2001). Chamber C is at a distance of 120 m from the cave entrance (Dupont unpublished note April 1906) and only one bone horizon occurred.

3. Spatial distribution

The bone material collected by Dupont, curated in the Section of Fossil Vertebrates of the Royal Belgian Institute of Natural Sciences, is organized on numbered trays and is accompanied by unpublished notes, signed by Dupont, dating from 1905. Each tray has a unique number and contains often similar bones, for instance: canines, metacarpals, etc. Unfortunately the field notes of Dupont are lost. However, recently some unpublished notes of Vincent, a collaborator of Dupont, were discovered in the archives of the Royal Belgian Institute of Natural Sciences. In general they consist of two types: for each horizon Vincent wrote a list with the remains by species (for example: “Goyet, 3^{ème} caverne, 3^{ème} niveau ossifère, Âge du Mammouth, listes des espèces”) and a list by tray (for example: “Goyet, 3^{ème} caverne, 3^{ème} niveau ossifère, Âge du Mammouth, liste par cadres”).

2238	2239	2237	2891
2785	2190	2763	2833
2764	2773	2762	2765
2786	2774	2789	2194
2800	2807	2821	2804
2788	2787	2820	2202
2203	2240	domesticated 2241	2215
<i>Homo</i>			
2878	2802	2777	2216
2795	2232	2801	2792
2819	2231	2230	2236
2896		2895	
2218	2217	2766	2221
2222	2799	2223	2798
2794	2226	2224	2817
2892	2205	2204	2775
2790	2793	2810	2211
2818	2212	2791	domesticated 2242
domest. <i>Meles</i> 2243	entrance		

Fig. 2 – Schematic representation of the estimated spatial distribution of bones from domesticated animals (domest.), man (*Homo*) and badger (*Meles*) from Chamber A, Horizon 3.

3.1. Chamber A, Horizon 3

In Chamber A, Horizon 3, some 3700 identified bones and hundreds of unnumbered unidentified ones were excavated by Dupont. In what follows for this horizon, the characteristics of the material are based on Dupont (1873, unpublished notes), Vincent (unpublished notes) and Germonpré (in preparation) for the bear remains. A small unpublished note from 1895 was found in the list of “cadres” by Vincent. It groups the numbers of the trays from Horizon 3. The layout forms a rectangular like the shape of the elongated Chamber A. Eighteen rows are present of four numbers each, with one row containing two numbers and the lowest row having only one number. The numbers on top of the schema correspond with the numbers of the carnivores which were found at the back of the cave. The numbers on the bottom refer to the numbers of the bones from human refuse. As Chamber A is depicted by Dupont (1873) with its entrance at the bottom of the page and the back of the chamber at the top and as the numbers of the bones from carnivores and from human refuse correlate with the position resp. at the back and at the entrance of Chamber A, the layout is here interpreted as a schematic representation of the spatial distribution of the fossil remains from Horizon 3. Eighteen rows with a total of sixty-seven “quadrants”, of which two double can thus be imagined (fig. 2). It is possible that the thick black lines on the scheme refer to hiatuses. The “quadrants” probably also contained other numbers, namely those of the archaeological collections. Vincent added for each number following information: “3^{ème} niveau ossifère, limon fluvial, Âge du mammoth” except for numbers 2242 and 2243, presumably situated at the entrance of the cave. For 2242, Vincent wrote “3^{ème} niveau ossifère” only, while for 2243 he wrote: “3^{ème} niveau ossifère, Époque actuelle”. Both “quadrants” contain remains from domesticated goat/sheep, dog, pig, and from fox, badger, and hare. Intrusive material can be expected to be more numerous at the entrance of the cave than deeper inside, where indeed remains from domesticated animals are rare and occur somewhere halfway the chamber (fig. 2). Figure 3 shows the distribution of the gnawing traces and of cut marks. Cut marks are an indication of human interference on skeletal elements, while carnivores can leave their tooth marks on bones as well related as unrelated to bone accumulation by humans. Cut marks occur on bones from the first half of the Chamber while gnawing traces are situated to the back. Many of the gnawing traces are from cave hyaena (Germonpré, in preparation), bones of this carnivore are also found at the back of the chamber. The supposed spatial distribution of the

			▼
2238	2239	2237	2891
▼		▼	
2785	2190	2763	2833
		▼	
2764	2773	2762	2765
		▼	▼
2786	2774	2789	2194
▼	▼	▼	▼
2800	2807	2821	2804
▼	▼	▼	▼
2788	2787	2820	2202
▼			
2203	2240	2241	2215
2878	2802	2777	2216
		▼//	
2795	2232	2801	2792
		//	
2819	2231	2230	2236
2896		2895	
//	//	//	//
2218	2217	2766	2221
//		//	
2222	2799	2223	2798
2794	2226	2224	2817
			//
2892	2205	2204	2775
			//
2790	2793	2810	2211
//		//	
2818	2212	2791	2242
2243	entrance		

Fig. 3 – Schematic representation of the estimated spatial distribution of bones with gnawing traces (▼) and cut marks (//) from Chamber A, Horizon 3.

			<i>Equus</i>
2238	2239	2237	2891
			<i>Equus</i>
2785	2190	2763	2833
2764	2773	2762	2765
		<i>Equus</i>	<i>Equus</i>
2786	2774	2789	2194
2800	2807	2821	2804
2788	2787	2820	2202
2203	<i>Equus</i>		
	2240	2241	2215
2878	2802	2777	2216
2795	2232	2801	<i>Equus</i>
<i>Equus</i>	<i>Equus</i>	<i>Equus</i>	
2819	2231	2230	2236
<i>Equus</i>	<i>Equus</i>	<i>Equus</i>	<i>Equus</i>
2896	2217	2766	2895
<i>Equus</i>		<i>Equus</i>	
2218		2221	
<i>Equus</i>	<i>Equus</i>	<i>Equus</i>	<i>Equus</i>
2222	2799	2223	2798
<i>Equus</i>	<i>Equus</i>	<i>Equus</i>	<i>Equus</i>
2794	2226	2224	2817
2892	<i>Equus</i>		
	2205	2204	2775
2790	2793	2810	2211
2818	2212	2791	2242
2243	entrance		

Fig. 4 – Schematic representation of the estimated spatial distribution of bones from cave bear (*Ursus*) from Chamber A, Horizon 3.

2238	2239	2237	2891
<i>Ursus</i>	<i>Ursus</i>	<i>Ursus</i>	<i>Ursus</i>
2785	2190	2763	2833
<i>Ursus</i>	<i>Ursus</i>	<i>Ursus</i>	<i>Ursus</i>
2764	2773	2762	2765
<i>Ursus</i>	<i>Ursus</i>	<i>Ursus</i>	<i>Ursus</i>
2786	2774	2789	2194
<i>Ursus</i>	<i>Ursus</i>	<i>Ursus</i>	<i>Ursus</i>
2800	2807	2821	2804
<i>Ursus</i>	<i>Ursus</i>	<i>Ursus</i>	<i>Ursus</i>
2788	2787	2820	2202
<i>Ursus</i>			
2203	2240	2241	2215
2878	2802	2777	2216
2795	2232	2801	2792
2819	2231	2230	2236
2896		2895	
2218	2217	2766	2221
<i>Ursus</i>			<i>Ursus</i>
2222	2799	2223	2798
2794	2226	2224	2817
2892	2205	2204	2775
2790	2793	2810	2211
2818	2212	2791	2242
2243	entrance		

Fig. 5 – Schematic representation of the estimated spatial distribution of bones from horse (*Equus*) from Chamber A Horizon 3.

bear remains are given in figure 4. Inside the zone of bear distribution however, it is possible that not all the numbers of the trays correspond to a exact location, as the material was presumably reorganised according to skeletal element. Figure 5 gives the distribution of a typical Upper Palaeolithic prey animal: the horse. Most of the horse bones are situated in the first part of the chamber and were accumulated by humans, with many cut marks and impact points on the bones, as noted by Dupont (*ibid.*) and Vincent (*ibid.*). Hyae-

nas were responsible for the concentration of some horse elements at the back of the chamber. Also the rich horse material was probable reshuffled over its spatial distribution according to type of skeletal element: teeth, long bones, etc.

3.2. Chamber A, Horizon 2

In Horizon 2, 1706 identified bones and several hundreds unnumbered remains were collected. Again

	domes- ticated 2829	2760	2830
HIATUS?			
2797	2758	2756	2825
2826	<i>Meles</i> 2757	2805	2767
2808	2796	2772	2806
domest. <i>Meles</i> 2803	2827	2828	2755
HIATUS?			
2890	2768	domes- ticated 2770	2769
2894		2822	2771
2776	2809	2761	2823
2759	2824	entrance	

Fig. 6 – Schematic representation of the estimated spatial distribution of bones from domesticated animals (domest.), and badger (*Meles*) from Chamber A, Horizon 2.

	<i>Ursus</i> 2829	<i>Ursus</i> 2760	2830
HIATUS?			
<i>Ursus</i> 2797	<i>Ursus</i> 2758	<i>Ursus</i> 2756	<i>Ursus</i> 2825
<i>Ursus</i> 2826	<i>Ursus</i> 2757	<i>Ursus</i> 2805	<i>Ursus</i> 2767
<i>Ursus</i> 2808	<i>Ursus</i> 2796	<i>Ursus</i> 2772	<i>Ursus</i> 2806
2803	2827	2828	2755
HIATUS?			
2890	2768	2770	2769
<i>Ursus</i> 2894		<i>Ursus</i> 2822	2771
2776	2809	2761	2823
2759	2824	entrance	

Fig. 7 – Schematic representation of the estimated spatial distribution of bones from cave bear (*Ursus*) from Chamber A, Horizon 2.

Vincent added a small paper in his list of “cadres” which is interpreted here as a schematic representation of the spatial distribution. It is shorter than the one of Horizon 3 with only nine rows, of four numbers each, except the lowest row which contains two numbers, the upper most row having three numbers and a row with three numbers of which one corresponds to a “cadre double” (number 2894; fig. 6). Two thick lines could correspond to a hiatus. This horizon has not been studied by the present author and all information is

	2829	2760	2830
HIATUS?			
2797	<i>Equus</i> 2758	2756	2825
2826	2757	<i>Equus</i> 2805	2767
2808	2796	2772	2806
2803	2827	2828	2755
HIATUS?			
2890	2768	2770	<i>Equus</i> 2769
<i>Equus</i> 2894		<i>Equus</i> 2822	<i>Equus</i> 2771
<i>Equus</i> 2776	<i>Equus</i> 2809	<i>Equus</i> 2761	<i>Equus</i> 2823
<i>Equus</i> 2759	2824	entrance	

Fig. 8 – Schematic representation of the estimated spatial distribution of bones from horse (*Equus*) from Chamber A, Horizon 2.

from Dupont (1873, unpublished notes) and Vincent (unpublished notes). Also here remains from domesticated animals occur, especially pig. Badger is also present. Both animals occur not only at the front of the chamber but to the back as well (fig. 6). Figure 7 shows the distribution of cave bear at the back of the chamber and figure 8 demonstrates that horse remains were mainly found at the front.

3.3. Chamber A, Horizon 1

In Horizon 1, 1261 identified bones were given a number, 700 unidentified remains were also excavated. All bones were restudied by Germonpré (1996, 1997, unpublished notes). As well for this horizon, a note was found in the file with a grouping of the tray numbers. Only 18 “quadrants” cover Chamber A. Probably there were hiatuses in the horizontal extension of this horizon. Again, large carnivores occur at the back and human refuse at the entrance of Chamber A, in agreement with the information given by Dupont (1873). Figure 9 shows the distribution of cave bear bones. Horse remains, which accumulated mostly through humans, are concentrated in the first part of the cave (fig. 10). The calcite crust, corresponding to a speleothem, is present near the entrance of the chamber and occurs on a total of

<i>Ursus</i> 2811	<i>Ursus</i> 2782	<i>Ursus</i> 2816	<i>Ursus</i> 2812
HIATUS?			
2380	<i>Ursus</i> 2814	2815	2784
2893	2781	2780	2813
2832	2889	2778	2779
2831	2783	entrance	

Fig. 9 – Schematic representation of the estimated spatial distribution of bones from cave bear (*Ursus*) from Chamber A, Horizon 1.

26 bones, including some unnumbered and unidentified ones (fig. 11). The group of animals with a calcite crust on their bones is typical for the Lateglacial: horse (11 bones), reindeer (4 bones), bison (1 bone), unidentified large bovid probably bison (3 bones) and muskox (1 bone). The spatial distribution of the speleothem and of the intrusive and/or domesticated mammals do not overlap, with the exception of one bone in 2778 (fig. 12).

The excavated zones from Chamber A, Horizon 3, Horizon 2 and Horizon 1 partly overlaps: the first four rows at the entrance of the chamber and the last row at the back were probably excavated from top to bottom. Bone horizon 3 had the largest surface. Horizon 2 was less extended than Horizon 3, but more than Horizon 1. Several zones with mixing of Holocene and Weichselian material can be supposed from bone horizon 1 down to bone horizon 3 (fig. 13). As well domesticated animals as badger are present, the latter mammal digs and can mix cave deposits. Also the presence of human bones can point to a disturbance of the sediments. Bones from these zones should be avoided for dating.

Eight AMS dates exists for Chamber A. The lateglacial date on the brown bear from Horizon 3 can be explained by the fact that the bone was found near a zone with intrusive material and that there some

2811	2782	2816	2812
HIATUS?			
<i>Equus</i>			
2380	2814	2815	2784
<i>Equus</i>	<i>Equus</i>	<i>Equus</i>	<i>Equus</i>
2893	2781	2780	2813
<i>Equus</i>		<i>Equus</i>	
2832	2889	2778	2779
	<i>Equus</i>	entrance	
2831	2783		

Fig. 10 – Schematic representation of the estimated spatial distribution of bones from horse (*Equus*) from Chamber A, Horizon 1.

2811	2782	2816	2812
HIATUS?			
2380	2814	2815	2784
⌊			⌊
2893	2781	2780	2813
⌊	⌊	⌊	
2832	2889	2778	2779
	⌊	entrance	
2831	2783		

Fig. 11 – Schematic representation of the estimated spatial distribution of bones with a calcite crust (⌊) Chamber A, Horizon 1.

2811	2782	2816	2812
HIATUS?			
			domest. <i>Meles</i>
2380	2814	2815	2784
2893	2781	2780	2813
		domes- ticated	domest. <i>Homo</i>
		2778	2779
domes- ticated		entrance	
2831	2783		

Fig. 12 – Schematic representation of the estimated spatial distribution of bones from domesticated animals (domest.), man (*Homo*) and badger (*Meles*) from Chamber A, Horizon 1.

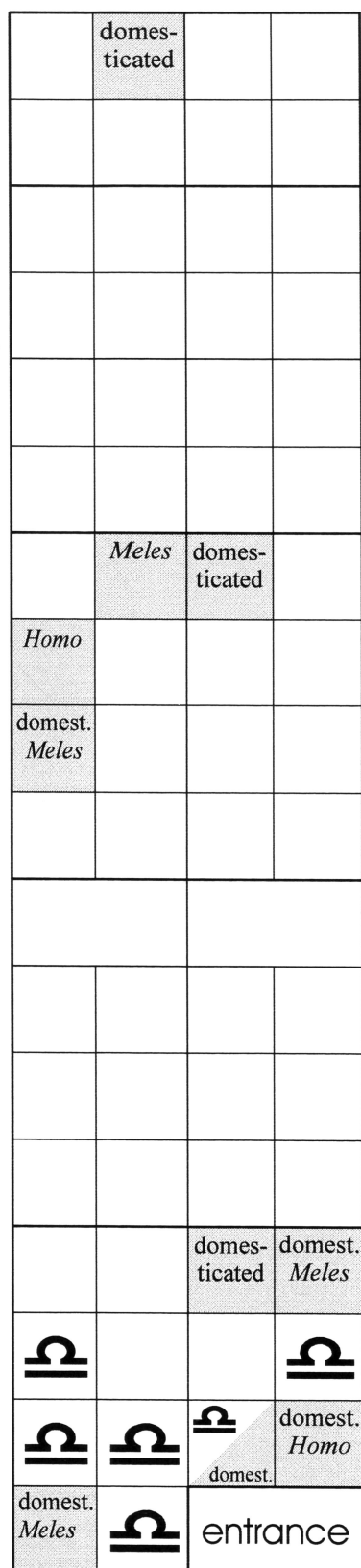


Fig. 13 – Schematic representation of the zones with disturbance of the cave sediments (gray colouring) from Horizon 1 down to Horizon 3, and the extension of the speleothem (⌒) covering Horizon 1.

mixing of the material could have occurred. The other dates from the back of the chamber are from the Pleniglacial and confirm the different origin for the carnivore assemblages as proposed by Germonpré (1996). The AMS dates from the first part of the Chamber place the assemblage from Horizon 1 in the Magdalenian (Table 1).

Although each number is assigned to one tray from one horizon, one exception exists: number 2878 containing human bones from Horizons 1, 2 and 3. No explication was found why this material was grouped. In horizon 1, Vincent mentioned the presence of one human bone in number 2779, that was renumbered and received tag 2878. One human bone from 2878 has an AMS age of 1985 +/- 70 years BP (Preud'homme, 1995-1996) (Table 1).

4. Conclusion

It is clear that the areas where the large carnivores were found, at the back of the Chamber, do not overlap with the ones of the human refuse at the front of the Chamber. It is possible that the bear assemblages from Horizon 3, Horizon 2 and Horizon 1 are from discrete units, horizontally or vertically isolated from each other, or that they are from a continuous bone layer. Although they accumulated naturally, some interference with Palaeolithic visitors exists: in both bear assemblages from Horizon 3 and Horizon 1 a number of remains from the head region are coloured by ochre. It is possible that the Palaeolithic people attached a symbolic meaning to the head of the cave bear (Germonpré, in preparation). Also the relation with the other large carnivores, especially the cave hyaena, is difficult to assess. Two different AMS dates exists for hyaena bones from Horizon 1 (Table 1).

The spatial distribution of the mammalian remains from the human refuse assemblages from Horizons 1 and 2 largely overlaps. The one of Horizon 1 dates from the Magdalenian (Table 1). The Pleniglacial elements from the human refuse assemblage from Horizon 3 have a somewhat different distribution.

Several zones with intrusive and/or domesticated mammals can be distinguished. In those areas some mixing of the sediments and of their content occurred.

5. Acknowledgements

Rosine Orban (KBIN) informed me of the existence of old files from Goyet in the archives of the Royal Belgian Institute of Natural Sciences. Mark Van Strydonck (KIK) is thanked for two free AMS dates.

Species	Element (number)	AMS (y BP)		Reference
		Horizon 1	Horizon 3	
<i>Ursus spelaeus</i> GrA-9605	pisiform (2811)	38,770 +/- 1180-1030		Germonpré & Sablin, 2001
<i>Ursus arctos</i> KIA-13550	mandible (2763)		10,640 +/- 50	Van Strydonck <i>et al.</i> , 2001
<i>Crocota crocuta</i> GrA-2812 UtC 8958	calcaneum (2812) P4 (2812)	27,230 +/- 260 35,000 +/- 400		Germonpré, 1997 Van Strydonck <i>et al.</i> , 2001
<i>Equus</i> GrA-3237 UtC 8957	vertebra (2380) MC acc. (2813)	12,770 +/- 90 12,560 +/- 50		Germonpré, 1997 Van Strydonck <i>et al.</i> , 2001
<i>Ovibos</i> GrA-3238	phalanx (2783)	12,620 +/- 90		Germonpré, 1997
<i>Homo sapiens</i> Oxa-5678	tibia (2878)		1,985 +/- 70	Preud'homme, 1995-1996

Table 1 – AMS dates on bones from Chamber A.

Ann Wauters (KBIN) helped with the drawing of figure 1 and Hugo De Potter (KBIN) helped with the drawing of figures 2 to 13.

6. References

DEWEZ M., 1987. Le Paléolithique Supérieur Récent dans les Grottes de Belgique. *Publications d'Histoire de l'Art et d'Archéologie de l'Université Catholique de Louvain*, 57 : 466 p.

DUPONT E., 1869. (Note sur la découverte d'une caverne à Goyet). *Bulletin de l'Académie royale des Sciences, des Lettres et des Beaux-Arts de Belgique*, 27 (2) : 193.

DUPONT E., 1873. L'homme pendant les âges de la pierre dans les environs de Dinant-sur-Meuse. Deuxième édition, C. Muquardt. Bruxelles : 250 p.

GERMONPRÉ M., 1996. Preliminary results on the mammals of the Magdalenian upper horizon of Goyet (Belgium). *Notae Praehistoricae*, 16 : 75-85.

GERMONPRÉ M., 1997. The Magdalenian upper horizon of Goyet and the late Upper Palaeolithic recolonisation of the Belgian Ardennes. *Bulletin de l'Institut royal des Sciences Naturelles de Belgique, Série Sciences de la Terre*, 67: 167-182.

GERMONPRÉ M., in preparation. Two cave bear assemblages from Goyet (Chamber A, Horizon 1 and 3). Belgium.

GERMONPRÉ M. & SABLIN M., 2001. The cave bear (*Ursus spelaeus*) from Goyet, Belgium. The bear den in Chamber B (bone horizon 4). *Bulletin de l'Institut royal des Sciences Naturelles de Belgique, Série Sciences de la Terre*, 71 : 209-233.

LÓPEZ BAYÓN I, OTTE M., LÉOTARD J.-M. & STRAUS L. G., 1997. L'occupation des grottes au Paléolithique supérieur.

In : Corbiau M. H. (éd.), *Le patrimoine archéologique de Wallonie. Division du Patrimoine*. Namur : 114-116.

OTTE M., 1979. *Le paléolithique supérieur ancien en Belgique*. Monographies d'Archéologie Nationale, 5 : 684 p.

PREUD'HOMME D., 1995-96. *Ossements humains préhistoriques de Reuviau, Chaleux, Magrite, Goyet et de l'Abri des Autours. Province de Namur, Belgique*. Mémoire de licence en Histoire de l'Art et Archéologie, Université Libre de Bruxelles : 156 p.

RAHIR E., 1908. Étude spéléologique des environs de Goyet et de Hotton (Belgique). *Spelunca*, 7 : 131-150.

ULRIX-CLOSSET M., 1975. Le paléolithique moyen dans le bassin mosan en Belgique. Wetteren : 221 p.

VAN DEN BROECK E., MARTEL E. A. & RAHIR E., 1910. *Les cavernes et les rivières souterraines de la Belgique*. Bruxelles, 2 vol. : 1751 p.

VAN STRYDONCK M., LANDRIE M., HENDRIX V., MAES A.; VAN DER BORG K., DE JONG A.F.M., ALDERLIESTEN C. & KEPPENS E., 2001. Royal Institute for Cultural Heritage. *Radiocarbon dates*, VIII. KIK Brussels: 50 p.

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