



**HAL**  
open science

# THE BEARS OF THE AZÉ 1 CAVE (AZÉ, Saône-et-Loire, France) AND THEIR EVOLUTION

Alain Argant, Lionel Barriquand, Jacqueline Argant

► **To cite this version:**

Alain Argant, Lionel Barriquand, Jacqueline Argant. THE BEARS OF THE AZÉ 1 CAVE (AZÉ, Saône-et-Loire, France) AND THEIR EVOLUTION. 25th International Cave Bear Symposium, Sep 2019, Starigrad-Paklenica, Croatia. hal-02554668

**HAL Id: hal-02554668**

**<https://hal.science/hal-02554668>**

Submitted on 26 Apr 2020

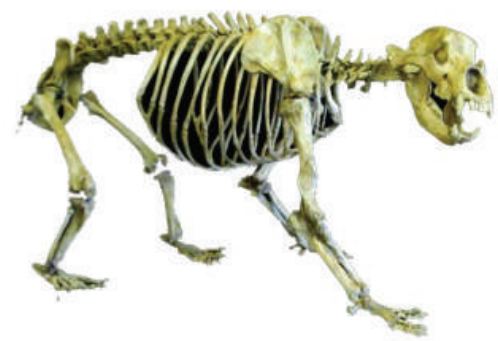
**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



# THE BEARS OF THE AZÉ 1 CAVE (AZÉ, Saône-et-Loire, France) AND THEIR EVOLUTION

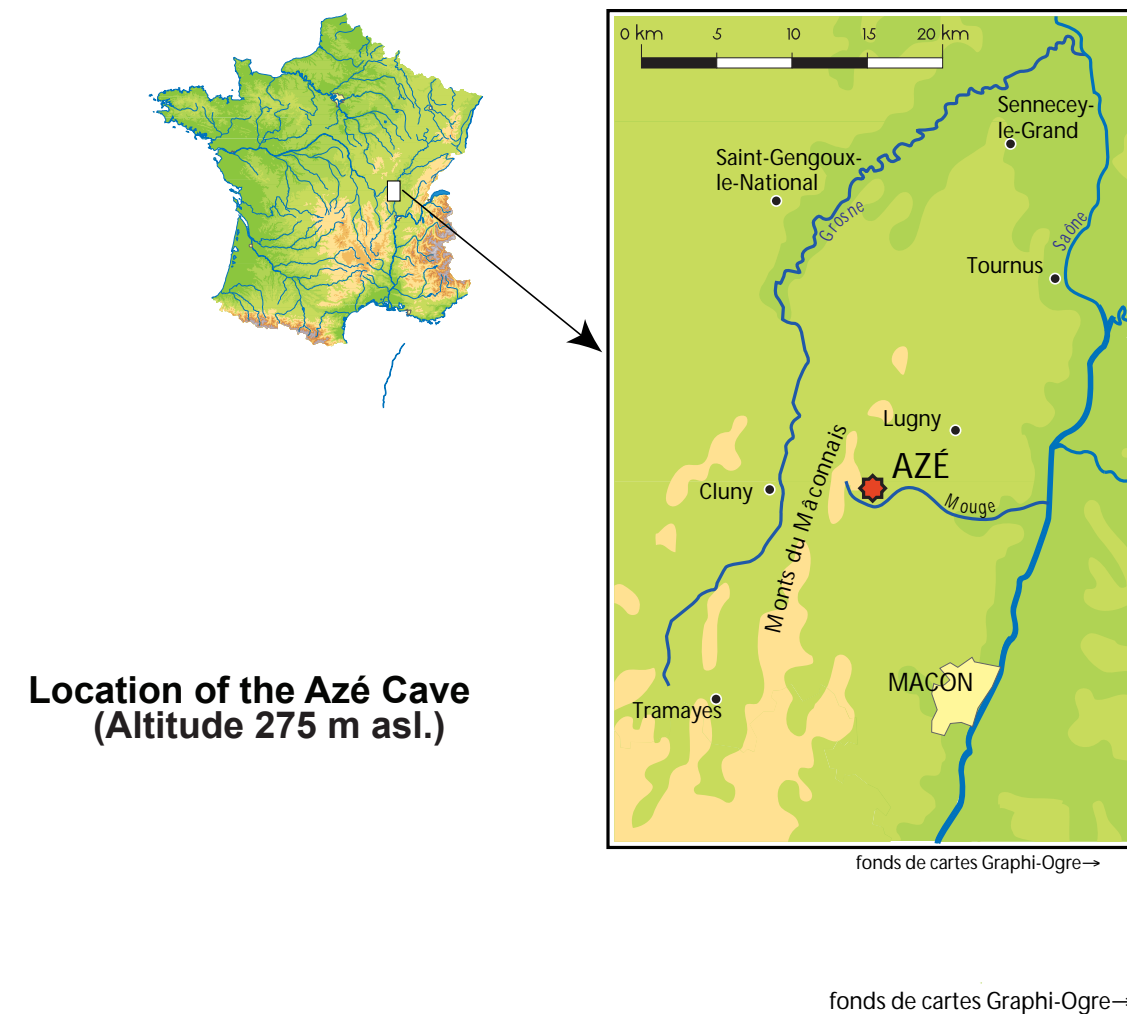
25th International Cave Bear Symposium 2019



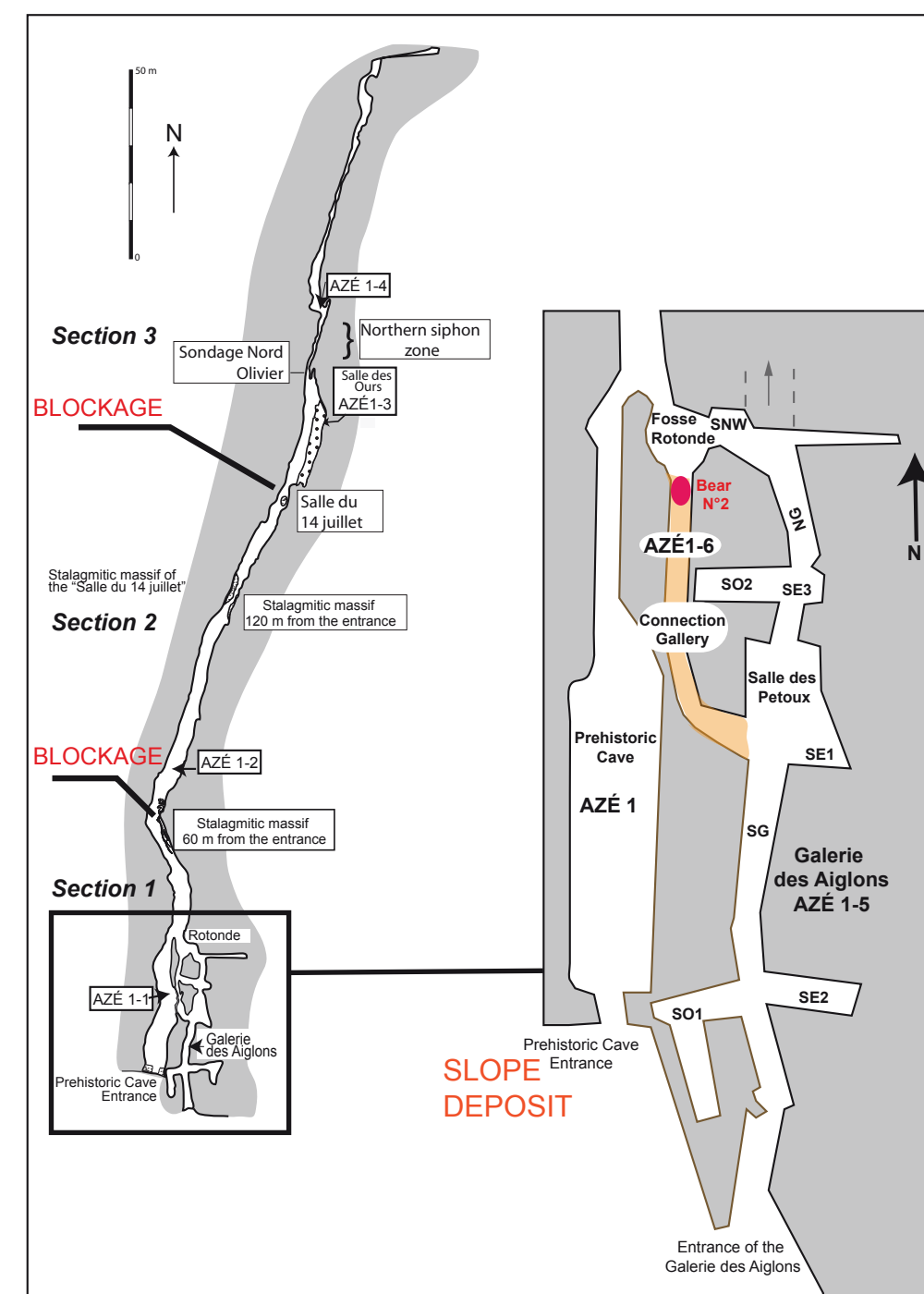
Paklenica national Park, Croatia  
September, 10th - 22nd 2019

Alain Argant (1,2,4), Lionel Barriquand (2,3,4) & Jacqueline Argant (1,2)

- (1) Aix-Marseille Université, LAMPEA, UMR 7269 CNRS, 5 rue du Château de l'Horloge, F-13094 AIX-EN-PROVENCE cedex 2.  
 (2) ARPA, Université Claude Bernard LYON 1, Bâtiment Géode R.1, 2 rue Raphaël Dubois, F-69622 VILLEURBANNE cedex.  
 (3) Université de Savoie, EDYTEM, UMR 5204, Bâtiment « Pôle Montagne », 5 Bd de la mer Caspienne, F- 73376 LE BOURGET-DU-LAC cedex.  
 (4) Association Culturelle du site d'Azé, Rizerolles, F-71260 AZÉ.



Sketch of the Azé 1 Cave and detail of Section 1 and of the Galerie des Aiglons.  
Connecting gallery Azé 1-6 and position of the bear N°2.



- The Azé 1 Cave functioned essentially during the **median and upper Middle Pleistocene**, before its complete filling with sediments and before the obstruction of its entrances by slope deposits;
- Two closed parallel galleries** (Galerie Touristique and Galerie des Aiglons) and **two total stalagmitic blockages**, well dated, determining three separated sections (1, 2, 3), enable a **chronological approach**;
- All the bears found in these galleries are **too old to be dated by 14C-AMS** (beyond the limit of the method, about 50 ka);
- The study of the complete bear N°2 from the Connection Gallery (Argant et al., 2019), between the Galerie Touristique and the Galerie des Aiglons, enables us now a **knowledge of the more recent bears of Azé 1** (probably OIS 5);
- The comparison of the bears of Azé 1 is possible only on P4/, M1/ and M2/, the only teeth visible on the bear N°2 from Azé 1-6. The comparison presented here is based only on **the morphology of the M2/**.



Example : the stalagmitic blockage of the Salle du 14 juillet which isolated the Salle des ours is dated at 190.7 ka at the foot and 113.1 ka at the top.

Left M2/	<i>Ursus deningeri</i>	<i>Ursus spelaeus deningeroides</i>	<i>Ursus spelaeus ladinicus</i>	<i>Ursus arctos</i>	<i>Ursus thibetanus</i>
Occlusal view (Scale x 1,5)					
Reference	AZÉ 1-3 - J 15-41	AZÉ 1-2 - 111	AZÉ 1-6 - Ours N°2	AZÉ 1-5 - JLB-661	AZÉ 1-5- SE2-JLB 473
Dimensions (L x W x HC) mm Degree of wear (W) (PUEMA scale 1 to 5)	42,90 x 21,56 x 10,35 W = 1,5	46,44 x 24,87 x 11,31 W = 0	48,54 x 23,95 x 11,16 W = 2,5	37,70 x 20,44 x 11,03 W = 3,5	15,67 x 10,76 x 4,29 W = 1
Observations	Elongated, flat, small. Weak, racket like shape talon, smooth ornamentation External lingual cingulum not very developed, Steep gradient on lingual edge	More triangular, elongated, flat, big. Well developed talon, with important relief. Long cingulum on lingual edge, strongly developed. Steep gradient on lingual edge.	Long, flat occlusal surface with parallel and relatively narrow edges. Very long talon, sole like shape, slightly granular. Small and long cingulum on lingual edge. Gentle gradient on lingual edge.	Wide and flat, small., Small talon. No visible cingulum (wear). Medium gradient on lingual edge. Metacone clearly smaller than paracone.	
Comparison	 Château (Saône-et-Loire, France)	 Cave of Flatz (Austria)	 Conturines (Italy)	 Flavigny-sur-Ozerain (Côte-d'Or, France)	 Blanon 2 (Saône-et-Loire, France)

AZÉ BEARS	Ka											AZÉ 1 loci					
	478	427	410	375	320	230	200	130	75	50	1	2	3	4	5	6	
<i>U. deningeri</i>	?	+	+	+	+	+					★	★	★	★	★	★	
<i>U. spelaeus deningeroides</i>							+					★			★	★	
<i>U. spelaeus ladinicus</i>							?	+	?								
<i>U. arctos</i>																★	
<i>U. thibetanus</i>															★		

★ presence

## CONCLUSIONS:

The Azé 1 Cave enables to follow the evolution of bears over a long period and it establishes the direct and continuous link in the evolutionary stages and in the dynamics of the populations of bears in the course of time, from the form *U. deningeri* at the end of median Middle Pleistocene (since OIS.11), then *U. spelaeus deningeroides* during the recent Middle Pleistocene (OIS.6) in Azé 1-2 (Argant, 1991). *Ursus spelaeus ladinicus* form occurred probably during OIS. 5.

(1) Is it only a biochronological evolution at the local scale over a long time or (2) was there, in the Mâconnais, a dynamics of populations of bears moving from refuge areas occupied during the major climatic deteriorations, to the previous abandoned sites?

The succession *U. deningeri* - *U. spelaeus deningeroides* probably corresponds to the first hypothesis (1) according to the morphological similarity of the M2/. The second hypothesis (2) seems to be more suitable for *U. spelaeus ladinicus* because of clear morphological differences of its P4/, M1/ and M2/ with the more ancient forms. Of course, this second hypothesis remains to be confirmed with more data.

Anyway, the bear N°2 from Azé 1-6, *U. spelaeus ladinicus*, seems to be different from the more ancient bears (*U. deningeri*, *U. s. deningeroides*) and the three cheek teeth that we could remove from concretion, have characteristics which don't appear on the ancient forms.

## References :

- Argant A., 1991 - Carnivores quaternaires de Bourgogne. Documents des Laboratoires de Géologie de Lyon, n°115, 1-309.  
 Argant A., Argant T., Barriquand L., Argant J., 2019. - The complete Skeleton of the Bear n°2 from the Galerie des Aiglons of the Azé Cave (Saône-et-Loire, France): *Ursus spelaeus ladinicus*  
 Gamble C., 1999. - The Palaeolithic societies of Europe. Cambridge World Archaeology, Cambridge University Press, 505 p.  
 Rabeder G., 1999. - Die Evolution des Höhlenbärengebisses. Verlag der Österreichischen Akademie der Wissenschaften, Band 11, 102 p.  
 Paris M., 2012. - Etude morphodynamique de la denture d'*Ursus deningeri romeiensis* du site de la Nauterie, La Romieu (Gers). Comparaisons biochronologiques et biogéographiques. Mémoire de Master 2, Sciences et Technologies Université Bordeaux I, 73 p.