



HAL
open science

Large game hunting strategies in Middle Palaeolithic of Southern France: contribution of dental cementum analysis through the study of the Canalettes rockshelter and Lazaret cave sites

Audrey Roussel, Gourichon Lionel, Patricia Valensi, Jean-Philip Brugal

► To cite this version:

Audrey Roussel, Gourichon Lionel, Patricia Valensi, Jean-Philip Brugal. Large game hunting strategies in Middle Palaeolithic of Southern France: contribution of dental cementum analysis through the study of the Canalettes rockshelter and Lazaret cave sites. European Association of Archaeologists, Sep 2019, Bern, Switzerland. hal-02454442

HAL Id: hal-02454442

<https://hal.science/hal-02454442>

Submitted on 24 Jan 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.

Large game hunting strategies in Middle Palaeolithic of Southern France: contribution of dental cementum analysis through the study of the Canalettes rockshelter and Lazaret cave sites

Audrey ROUSSEL (Université Côte d'Azur, CNRS, CEPAM, France), Lionel GOURICHON (Université Côte d'Azur, CNRS, CEPAM, France), Patricia VALENSI (Musée de Préhistoire de Tourrette-Levens, CNRS, HNHP, France), Jean-Philip BRUGAL (Aix-Marseille Université CNRS, LAMPEA, France). Corresponding author: audrey.rousseau@cepam.cnrs.fr

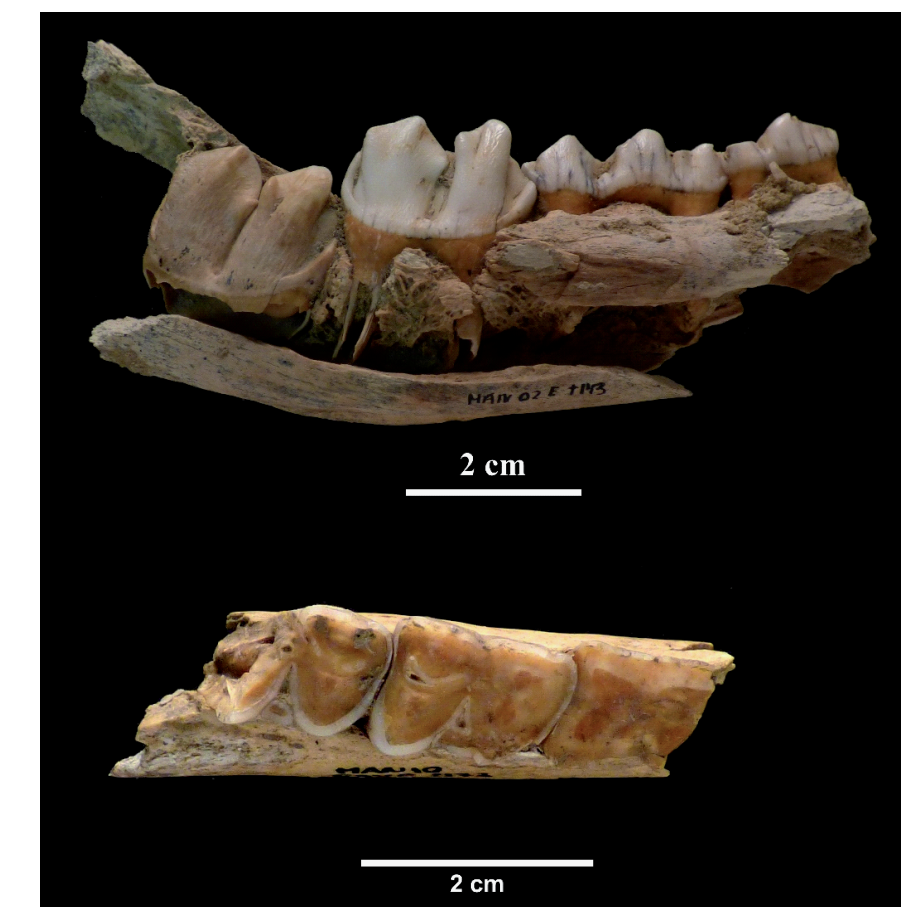
Introduction

Recent zooarchaeological studies undertaken on several **Middle Palaeolithic** sites [e.g. 1,4,5,7] have questioned previous models implying opportunistic large game exploitation and highlighted more **complex food procurement strategies** (collective vs specialized hunting, meat storage and deferred consumption, etc.). However, this topic research remains limited due to the small number of sites carefully studied as well as the scarcity of high-resolution data. In this perspective, we propose to assess two main parameters: the **demographic composition** of the hunted animal populations and the **seasonality of their acquisition**. Both are critical to address **mobility and settlements patterns** of Neanderthal and pre-Neanderthal communities in Southern France.

Context

Lazaret Cave on the **Mediterranean coast** (Nice, Alpes-Maritimes) and the rockshelter of **Les Canalettes** located in the mid-altitude zone of **Causse du Larzac** (Aveyron) are two archaeological sites from Southern France [8,14,18]. The horizons studied here are respectively the Unit UA29 (MIS 6) and the layer 4 (MIS 5a). **Red deer** (*Cervus elaphus*) and **ibex** (*Capra ibex*) are the main prey at Lazaret Cave, and **horse** (*Equus germanicus*), **red deer** and **large bovines** (*Bos primigenius*, *Bison priscus*) are dominant at Les Canalettes.

Methods

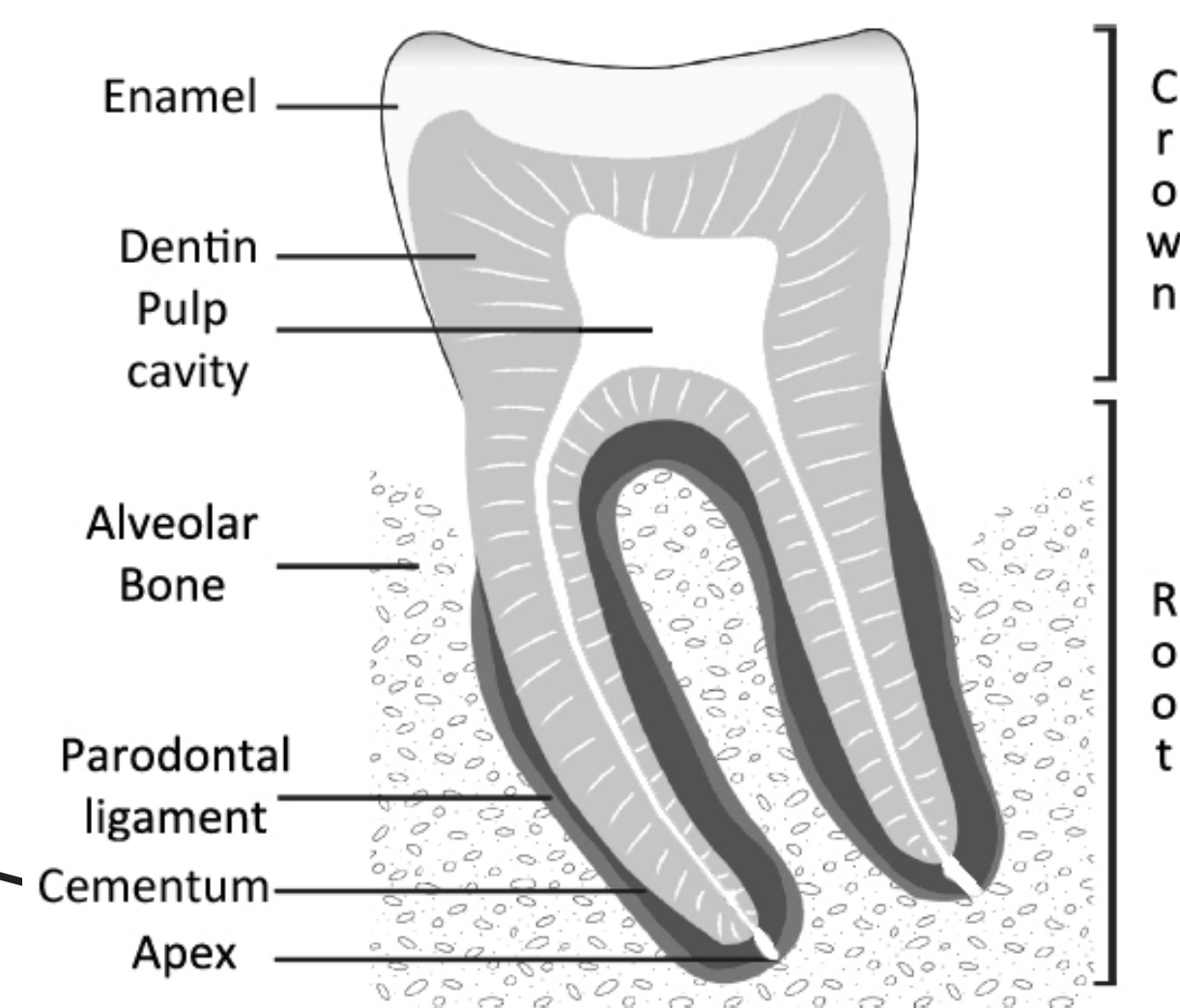
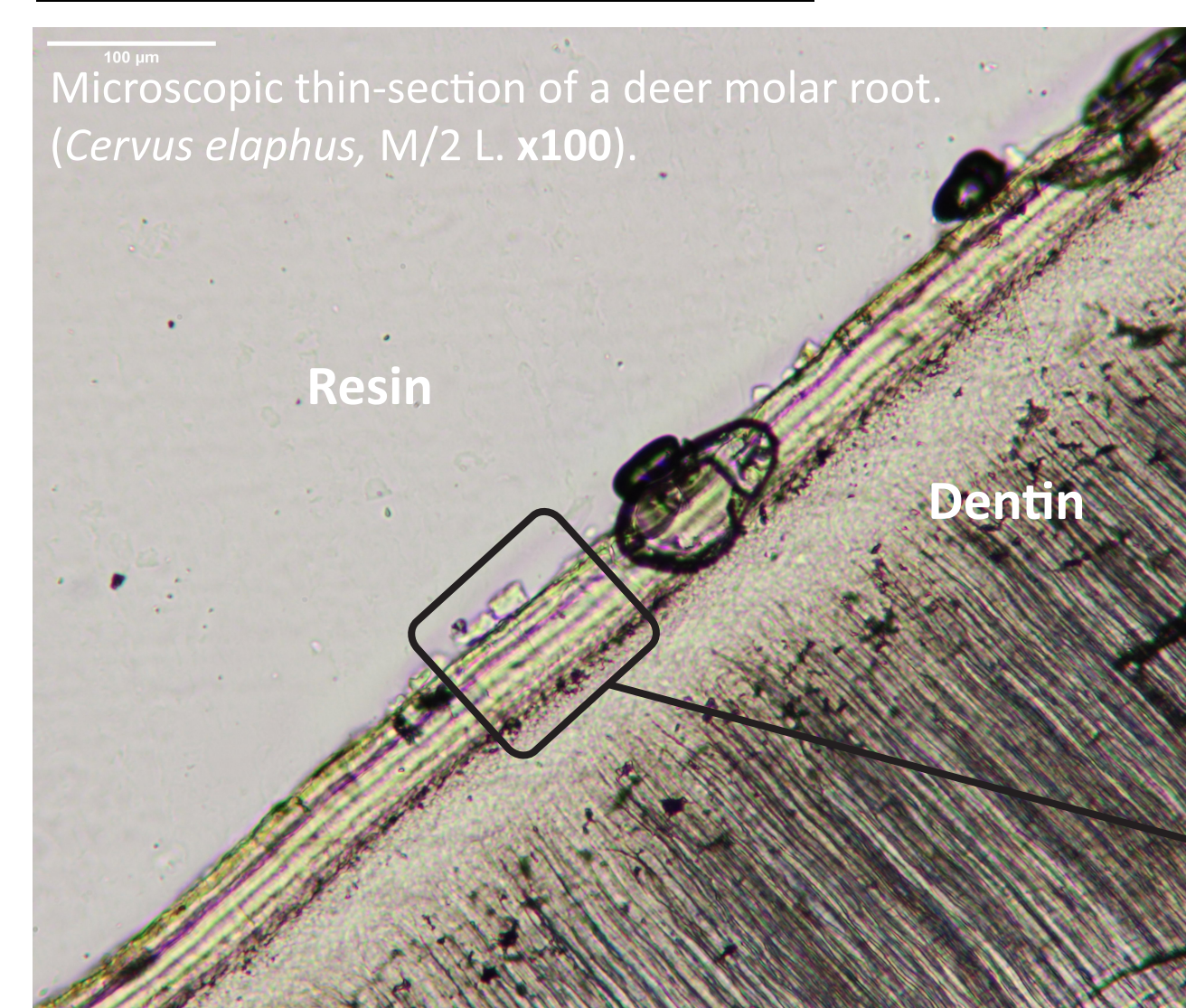


The analysis is based on **traditional methods of age and season at death estimation** (i.e. tooth eruption and wear) and **cementochronology** (biological age and season of death for adults) [2,3,6,10,12,13, 15,16].

Cementum is one of three mineralized tissues composing the tooth, with enamel and dentin.

It is deposited as alternating pairs of bands, according to the annual cycle and throughout the tooth's life :

- a fast growth deposit during the **warm season**;
- a low one in the **cold season**.



Material & Samples

The study of the material focused on **red deer**, **large bovines** and **ibex**.

Lazaret: 13 teeth of deer and 4 of ibex selected, i.e. 30 and 9 thin-sections respectively.

Canalettes: 33 teeth of deer, 1 of bovines, 1 ibex and 1 roe deer, i.e. 47 sections, including the samples made by previous studies (H. Martin [personal communication], M. Hassani [11]).

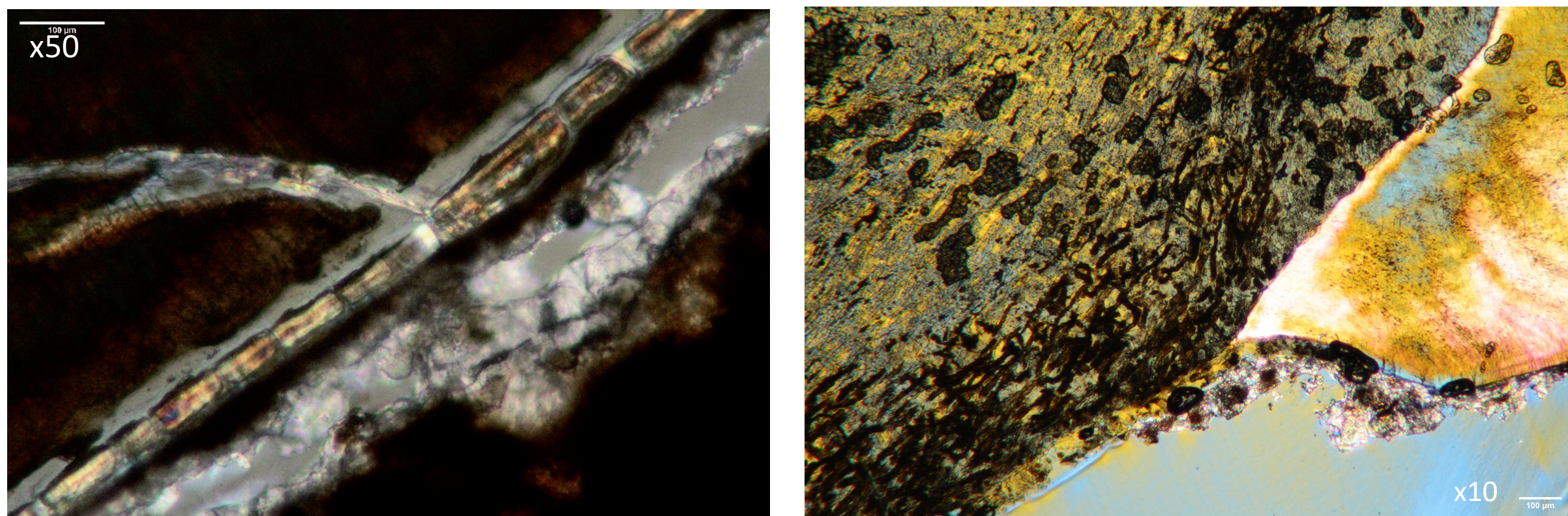
Levels	Lazaret UA29				Canalettes I.4			
	Cervus elaphus		Capra ibex		Cervus elaphus		Bos/Bison	
Cohorts	NISP teeth	MNIc	NISP teeth	MNIc	NISP teeth	MNIc	NISP teeth	MNIc
Juveniles	30	10	7	3	22	7	9	4
Prime adults	57	17	28	6	77	21	13	4
Old adults	18	5	6	2	9	3	0	0
Total	105	32	41	11	108	31	22	8
Total teeth	282	55			241		51	

Limitations

The success of the analysis in cementochronology depend on the preservation state of the inner structures and tissues of the teeth. Important **taphonomic damages** have been observed in the samples.

The most recurrent are:

- **Physical and chemical alterations** (cracks, peeling, leaching, staining), cf. below on the left ;
- **Microbial focal destructions** (bacterial or fungal attacks), cf. right image.



In the case of Lazaret Cave, most of the specimens show various alteration types but 95% allow the estimation of age and 67% the seasonality.

The Canalettes teeth are **heavily impacted by microbial destructions**. Indications of age were provided by 40% of teeth and the season of death by only 22% of them.

Preliminary results indicate that prehistoric groups exploited their **immediate environment**, targeting **female and juvenile herds**, but favoring **higher-yielding adults**. Residential mobility seems reduced, favoring a **logistical use of the territory** to procure specific resources not always available nearby. Lithic studies and data from spatial analyzes (fireplaces, dump areas) also suggest a long term occupation of the sites.

In a symmetrical ways, the sites seem to have had the **same fonction** but in distinct seasons and environments. Canalettes could be a **summer base camp** and the Lazaret a **winter camp-site**. In both cases, mobility patterns are similar, characterized by a long term occupation and the exploitation of main and secondary herd preys available in the surroundings.

Results

Demography

The deer mortality profiles are dominated by the **prime adults** and **young individuals**.

Ibex and large bovines are represented by few individuals but while the ibex group composition is similar to the deer, the bovines have the same proportion of youngs and adults.

Macroscopic vs microscopic

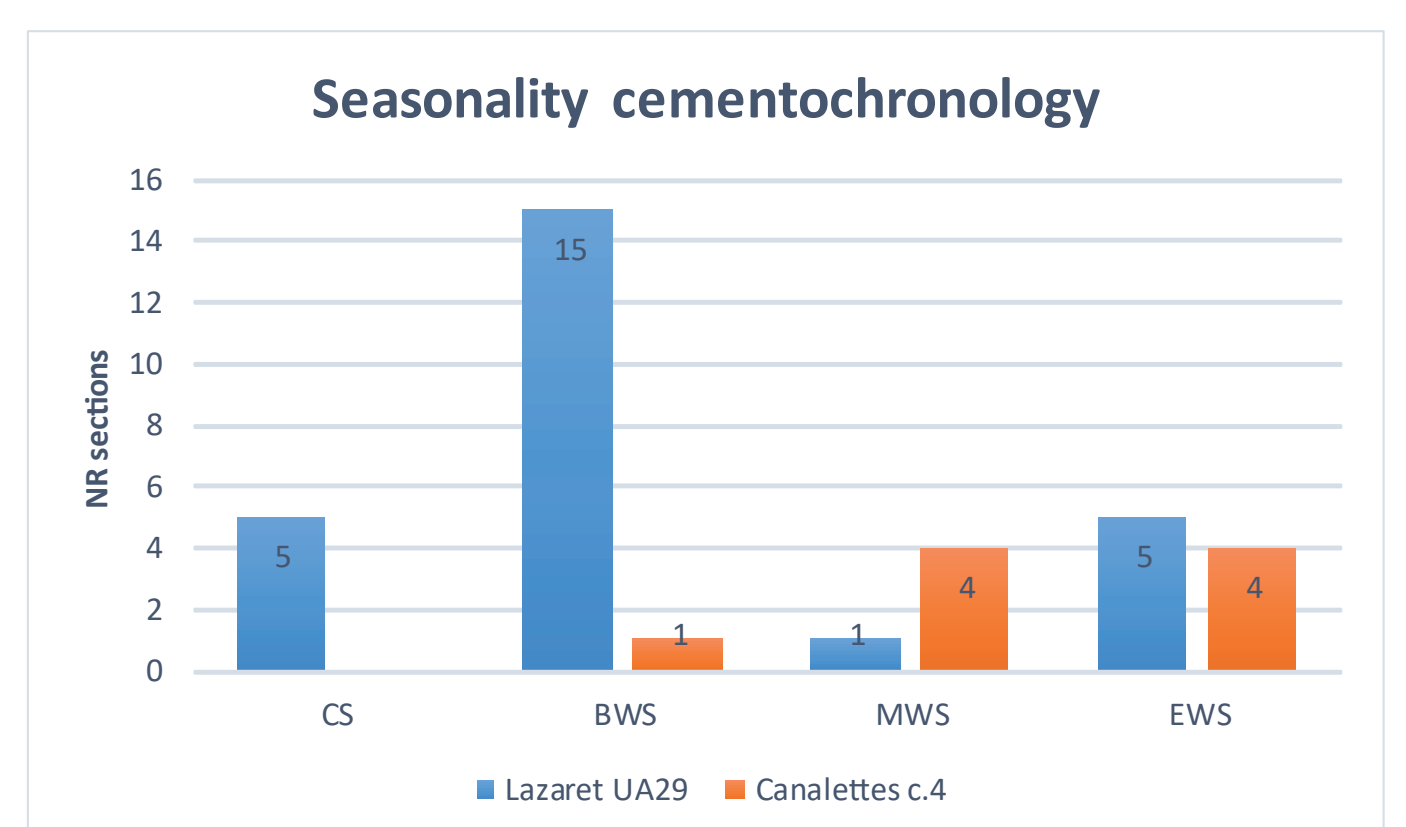
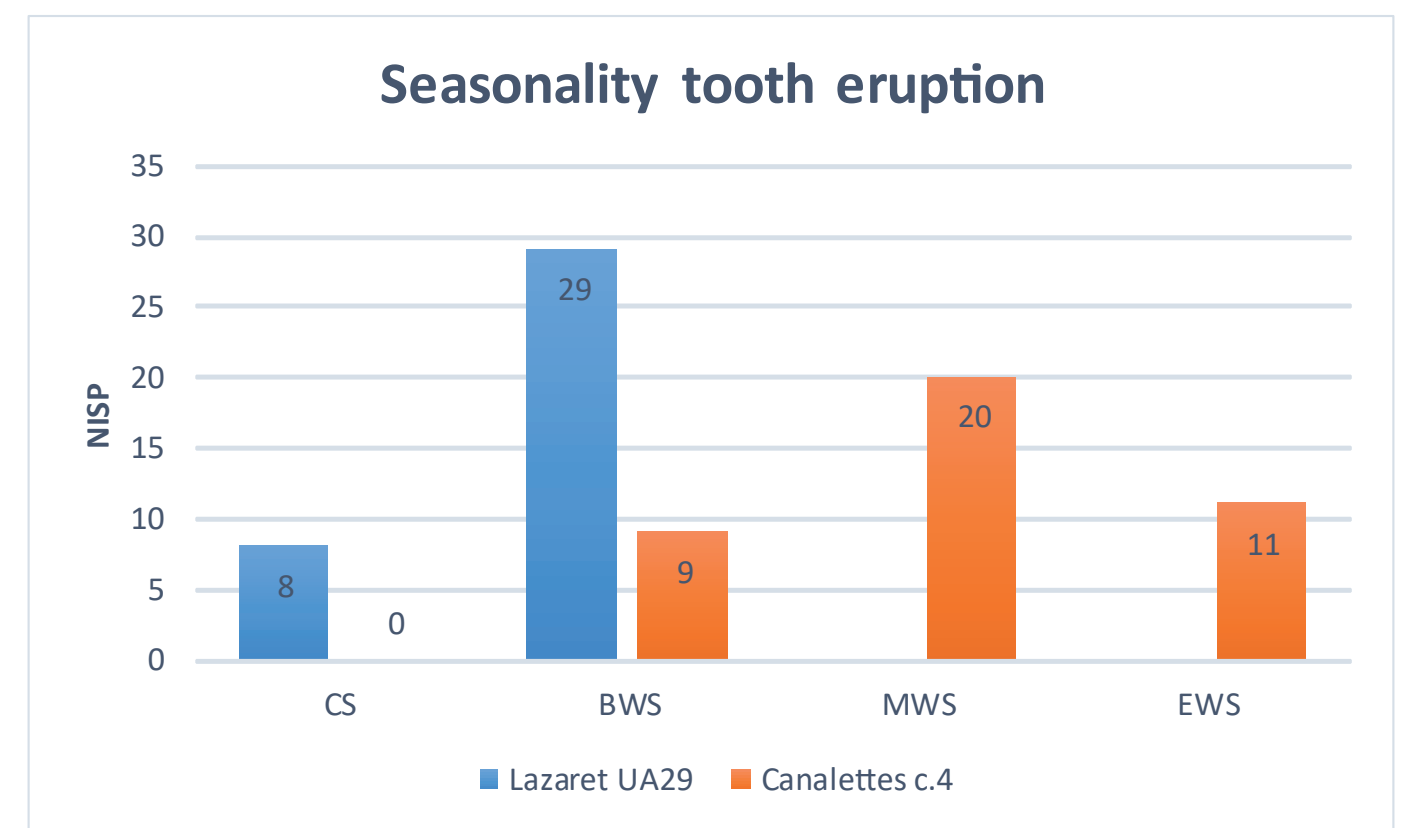
When samples give positive results, the comparison between the tooth wear and cementochronology observations shows 61% of agreement. The macroscopic methods over-estimated the age of death in 27% of the cases and only 8% are underestimated.

Age Cementum/wear	Lazaret	Canalettes
Agreement	9	8
Lower	7	
Upper	1	1
Total	17	9

Seasonality

At the Lazaret Cave, both methods show an acquisition of prey throughout the year, particularly in the **cold season (CS)**, during a large period which includes the **beginning of the warm season (BWS)** and the **end (EWS)** (cementochronology).

It is the opposite at Les Canalettes, with animals killed throughout all the **warm season**, especially during the **mid-warm season (MWS)**, i.e. in summer (dental eruption).



Analizis

The mortality profiles correspond to a **"catastrophic"** pattern in the ternary diagrams and represent a living population type **«Juvenile>Prime>Old»**.

The cementum data indicate a majority of ages **slightly younger** than those estimated with dental wear. Individuals initially placed in the oldest adult class (>12 years) were found to be heavily over-estimated for the deer. Taking this parameter into account, the composition of the deer groups seems to mainly focused on the **"prime adults"** range.

The composition of deer (young et prime adults) reflects structures of herds of females and fawns.

Represented by few individuals, results for ibex and large bovines could suggest punctual killings from **herds of femelles with calves**.

At both sites, prey acquisition seems to have occurred during a **long period** (several months) or recurrent visits, during the **cold season** at Lazaret Cave and **warm season** at Les Canalettes.

Prehistoric human groups seem to have performed a **regular predation** on small groups of ungulates available nearby the sites.

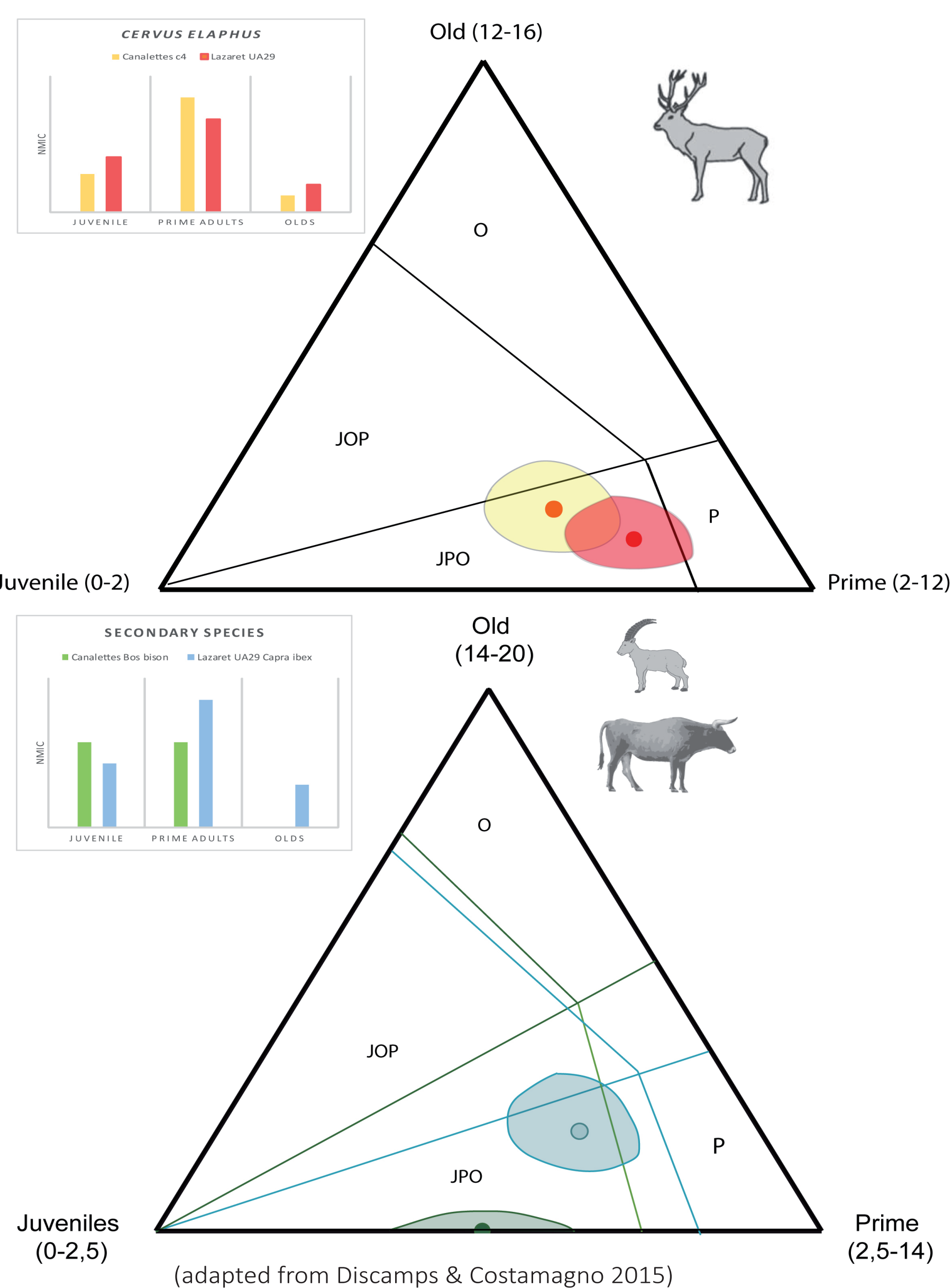
Discussion

The main differences are found on the seasonality of occupation. In the Canalettes rockshelter, a relative **temperate period** allows access to the medium mountain environment of the Causse and the **exploitation of the highlands**, not accessible in winter or glacial periods.

On the contrary, Lazaret Cave occupation occurs during the **cold season**. The site is located in a favorable climatic region which played a role of **climatic refuge** for animal populations during glacial periods [9,17].

Conclusion

Such a **combination of traditional and cutting-edge methods for studying dental remains** allows us to obtain reliable and relevant new data about **demography and seasonality** that shed light to the issue of animal resource **procurement and human mobility** during the **Middle Palaeolithic in Southern France**.



References

- [1] BINFIELD R.L. (1980) – Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site, *American Antiquity*, 45 (1) : 4–20.
- [2] BROWN W.A.B., CHAPMAN N.G. (1991) – Age assessment of red deer (*Cervus elaphus*): from a scoring scheme based on radiographs of developing permanent molariform teeth, *Journal of Zoology*, 225(1) : 85–97.
- [3] BROWN W.A.B., CHAPMAN N.G. (1991) – The dentition of red deer (*Cervus elaphus*): a scoring scheme to assess age from wear of the permanent molariform teeth, *Journal of Zoology* 224(4) : 519–536.
- [4] BRUGAL J.-P. (1995) – Archéologie et zoologie pour un nouveau concept, la paléozoologie humaine, *Préhistoire anthropologique méditerranéenne*, vol. 4, 17–26 p.
- [5] COSTAMAGNO S., et al. (2006) – Les Pradelles (Maurillac-le-Franc, France): A Mousterian reindeer hunting camp?, *Journal of Anthropological Archaeology*, 25(4) : 468–484.
- [6] COUILLIERE M.-A. (1962) – Le bouquetin des Alpes: *Capra aegagrus* des Alpes, Grenoble, Arthaud.
- [7] DAUJARD C., MONCEL M.-H. (2010) – On Neanderthal subsistence strategies and land use: a regional focus on the Rhone Valley area in southeastern France, *Journal of Anthropological Archaeology*, 29(3) : 368–391.
- [8] DE LUMLEY H., ET AL., (2014) – La Grotte du Lazaret (Nice, 06, Alpes-Maritimes), Nice, DRAC Région PACA.
- [9] DESCLAUX E. (2013) – Evolution des communautés de Mammifères dans les Alpes-Maritimes au cours du Pléistocène, *Bulletin du Muséum d'Anthropologie préhistorique*, n°19, suppl. (4) : 13020.
- [10] DISCAMPS E., COSTAMAGNO S. (2015) – Improving mortality profile analysis in zooarchaeology: a revised zoning for ternary diagrams, *Journal of Anthropological Science*, 38 : 62–76.

- [11] HASSANI M. (2016) – La Grande faune de la couche 4 de l'abri des Canalettes (Aveyron) Modalités d'acquisition du gibier à partir des restes dentaires, Master 2 Préhistoire à l'environnement & Archéosciences, Université de Nice Sophia-Antipolis, Nice, Vol. 1, 162 p., vol. 2 Annexes, 36 p.
- [12] KLEIN R. et al. (1983) – The calculation and interpretation of ungulate age profiles from dental crown heights, In: *Hunter-gatherer economy in prehistory: a European perspective*, Cambridge University Press, pp. 47–57.
- [13] KLEIN R.G., WOLF C., FREEMAN L.G. (1981) – The use of dental crown heights for constructing age profiles of red deer and similar species in archaeological samples, *Journal of Archaeological Science*, 8(1) : 1–31.
- [14] MIGNON L. (1995) – *Abri des Canalettes: un habitat mousterien sur les grands Causses (Aveyron)* / *Faunes 1980-1986*, Paris, Centre de recherches archéologiques (Valbonne, Alpes-Maritimes), Ed. du CNRS, 1993.
- [15] NANI S., GOURICHON L., RENDU W. (2015) – La cémentochronologie, In: *Messages d'os: Archéométrie du squelette animal et humain*, Paris, Archives contemporaines, pp. 217–240.
- [16] RIGLET P.-H. (1977) – Contribution à l'étude de l'âge de cerf élaphe (*Cervus elaphus* L.), Thèse d'exercice, Ecole nationale vétérinaire d'Alfort, 75 p.
- [17] VALENSI P. (2009) – Evolution des peuplements mammaliens en Europe méditerranéenne occidentale durant le Pléistocène moyen et supérieur. Un exemple régional: les Alpes du Sud françaises et italiennes, *Quaternaire. Revue de l'Association Française pour l'étude du Quaternaire* 20(4) : 553–567.
- [18] WĘGRZYŃ, M., SERWATKA, S., (1984) – Teeth eruption in the European bison, *Acta Theriologica*, vol. 29, p. 111–121.
- [19] <https://www.geoportail.gouv.fr/carte>

Acknowledgements

All thanks to Thibault Guiragossian, Pierre Magniez, Morgane Hassani and Hélène Martin who worked on this material. The authors are grateful to Prof. Henry de Lumley and Dr. Liliane Meignen, excavation directors of respectively Lazaret Cave and Les Canalettes, as well as to the Alpes-Maritimes and Provence-Alpes-Côte d'Azur regions, who helped and supported this study.