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Human adaptation to changing environments at Isturitz during the Aurignacian: stable prey choice and similar hunting landscapes

Emilie Berlioz* [1], Monica Fernández-García[2, 3], Marie-Cécile Soulier[4], Lucia Agudo-Perez[5], Gabriela Amorós Seller[6], Chistian Normand Orieux[7], Ana B. Marín-Arroyo[5]

1 - Palevoprim, CNRS & University, Poitiers, France ·
2 - Research Centre for Field Archaeology and Forensic Taphonomy, University of Lancashire, Preston, UK ·
3 - IPHES-CERCA, Tarragona, Spain 4 - TRACES, CNRS UMR 5608–TRACES, Toulouse, France ·
5 - EvoAdapta group, Historical Sciences Department, University of Cantabria, Santander, Spain ·
6 - Research group ECCE HOMO, Murcia, Spain · 7 - Association Eusko Arkeologia

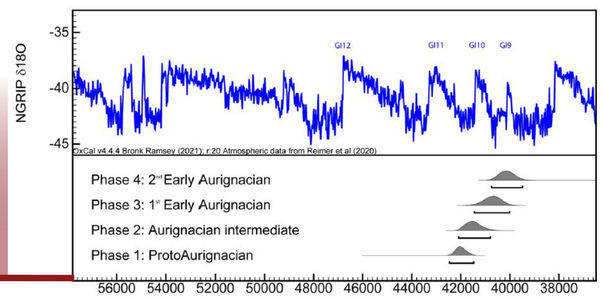
* Corresponding author :
emilie.berlioz@cnrs.fr



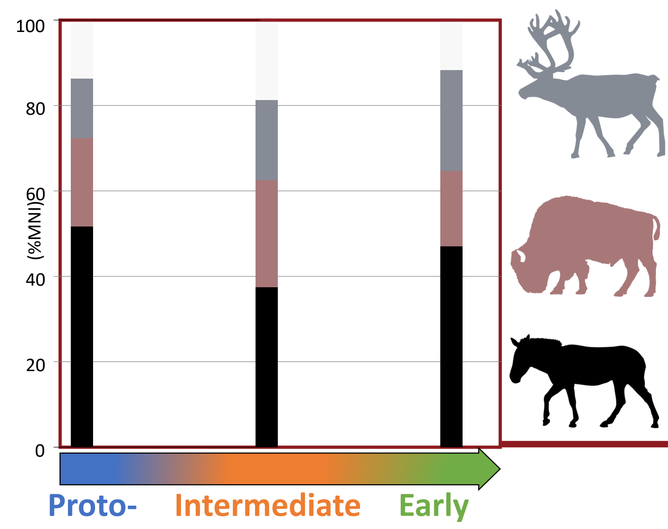
Question

How did climate-driven environmental changes at Isturitz alter the paleoecology of early *H. sapiens* prey and reshape their hunting behaviors?

We revised the previous chronology[1] of the Aurignacian phases: ~42,570 -39,480 cal BP[3]





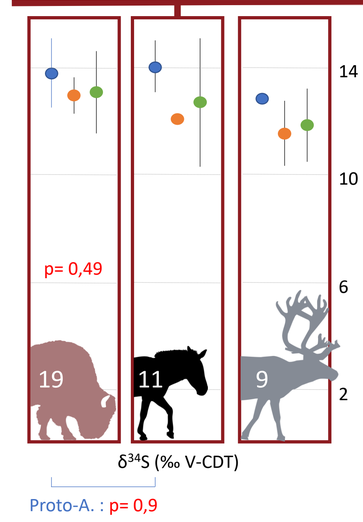


Horse is the primary prey across the sequence, followed by reindeer and large bovines [2]

Process

To obtain a comprehensive overview of human ecological conditions, we combined 3 proxies at complementary temporal scales providing information on the ecosystems and living conditions of prey from their earliest years to the last few weeks before death.

High $\delta^{34}S_{coll}$: proximity to the Atlantic coast.
Over the sequence, human's prey come from the same relatively local geographic area.

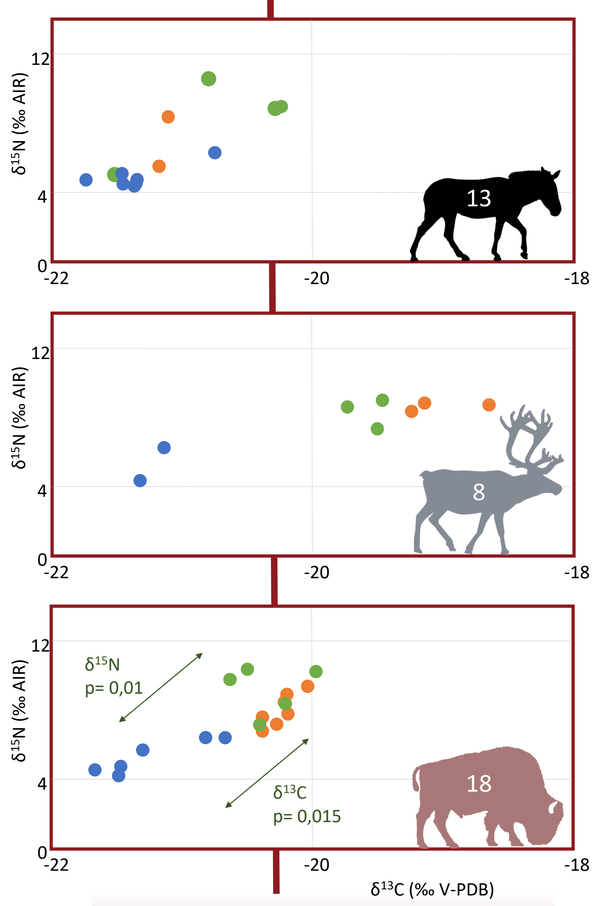


ISTURITZ : a rich fossil assemblage[2]

Bone collagen stable Isotopes



Last 10-15 years of the animal's life
$\delta^{13}C_{coll}$: average diet
$\delta^{15}N_{coll}$: aridity, trophic level
$\delta^{34}S_{coll}$: geographic origin

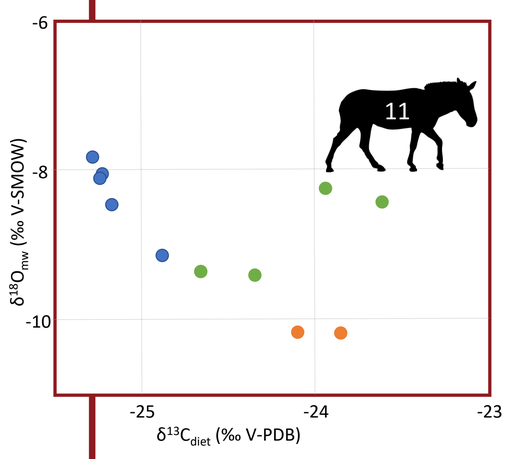


↑$\delta^{15}N$: ↑aridity and habitat opening.
$\delta^{13}C$: gradual shift towards drier, more open landscapes.

Enamel stable Isotopes

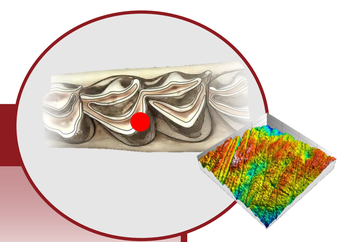


Early-life stages of an animal's life
$\delta^{13}C_{carb}$: diet, habitat use
$\delta^{18}O_{carb}$: water sources, T° changes

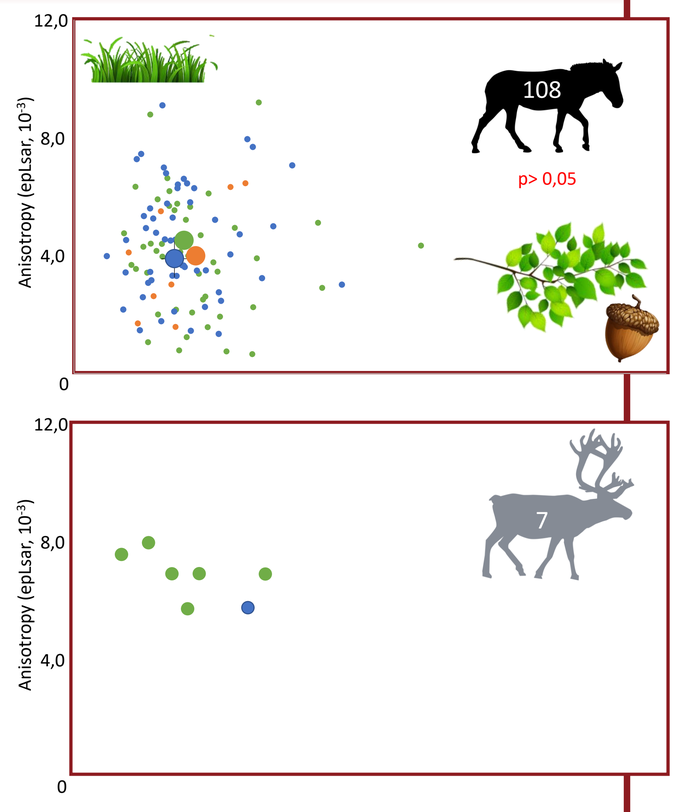


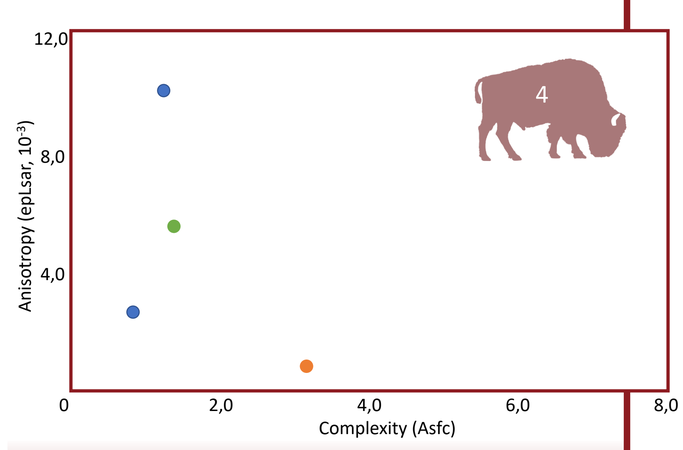
Clear Intermediate Aurignacian climatic deterioration:
↑$\delta^{13}C$: Grazing, ↑aridity & landscape opening through time.
↓$\delta^{18}O$: colder & drier conditions.

Dental Microwear Texture Analyses



Last weeks of an animal's life
Diet : Browser to Grazer



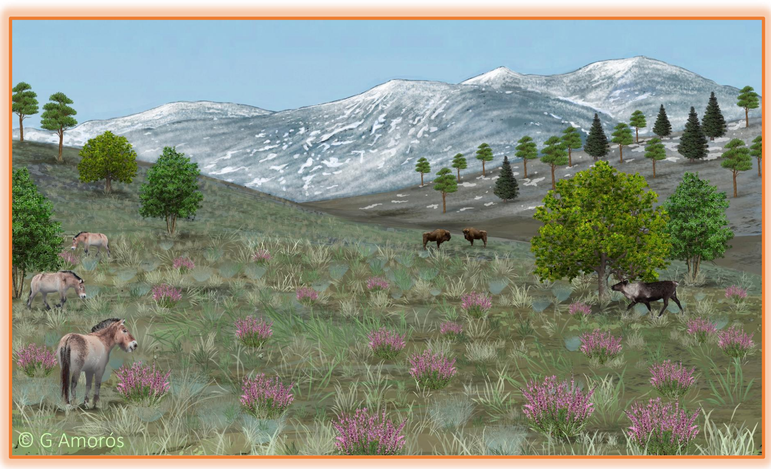


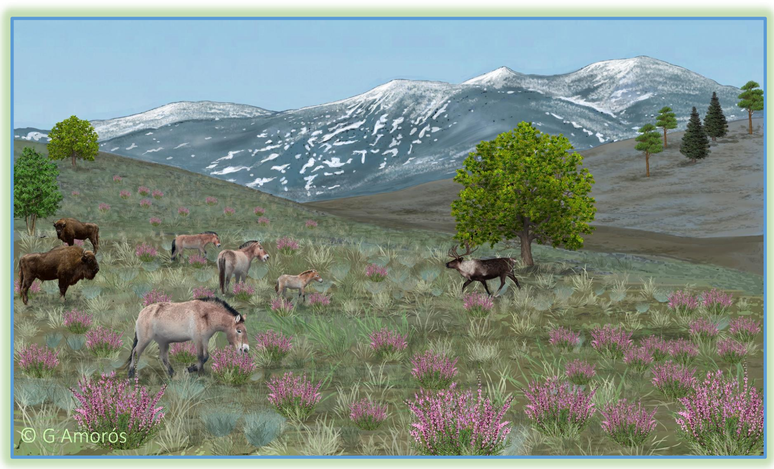
Environmental cooling & opening, but…
DMTA: grass-rich diet, stable.
Open environments remained available & likely served as hunting grounds.

Summarized Findings

Our multi-analytical approach has proved useful in identifying hunting grounds and strategies in the context of climate and environmental change. Despite increasing environmental stress (cooling, aridification, progressive habitat opening), Aurignacian groups maintained stable hunting strategies over nearly 3,000 years, illustrating their **resilience** : same preys[2], same type of environments[3], same geographic area[3]







References :

[1] Barshay-Szmidt *et al.,* 2018. Journal of Archaeological Science: Reports. 17, 809–838.
[2] Soulier, 2013. [PhD thesis]. Université Toulouse 2, Le Mirail.
[3] Berlioz, *et al.,* 2025. Journal of Human Evolution. 202, 103665.

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