

**Talk or Poster?** talk

**Which session?** 5. Hard animal material industries, archaeometry and ethics: new advances?

**Title: Contributions of paleoproteomics to the study of Middle Paleolithic bone tools: the Biache-Saint-Vaast “retouchers” (MIS 7, Pas-de-Calais)**

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## ABSTRACT

About 500 words or 2500 characters

Over the last decades, important discoveries have deeply reshaped our understanding of Neanderthal behaviors, and evidence of non-dietary uses of different kind of animals has notably increased. The use of bones for a variety of daily activities is frequently identified, with so-called bone “retouchers” being the best recognizable and the most numerous (*e.g.* Martin 1930; Patou-Mathis & Schwab (dir.), 2002; Daujeard *et al.* 2014; Hutson (dir.) 2018). In parallel, the use of paleoproteomics techniques in zooarchaeological studies of the Middle Paleolithic has increasingly developed in the last few years and is starting to be used on Middle Paleolithic bone tools (*e.g.* Martisius *et al.* 2020; Bray *et al.* 2022; Morin *et al.* 2023).

To study subsistence strategies as effectively as possible, the taxonomical identification of faunal remains can highlight some trends, with sites geared towards monospecific acquisition of game or more diversified acquisition, thereby reflecting varied behaviors. The high rates of bone fragmentation observed in many faunal assemblages, linked to human or other carnivore activities as well as to post-depositional phenomena, complicates these identifications. When it comes to bone tools, paleoproteomics techniques can be even more important in understanding the exploitation of animals, the key question being: was there any intentionality in the choice of the raw material used?

To address this question, we studied the faunal assemblages of Biache-Saint-Vaast (BSV, Pas-de-Calais), a site that yielded two levels rich in bones of large terrestrial mammals accumulated by Neanderthals. Faunal assemblages were studied using classical zooarchaeological methods (anatomical comparison) showing the predominance of *Bos primigenius*, *Ursus arctos* and *Stephanorhinus hemitoechus*, both within the consumed fauna and the bone tools. The number of tools classified as retouchers, more than 300 from levels IIa and IIb, MIS 7, contributes to the site's originality (Auguste 2002; Sévêque et Auguste, 2018). The fragmentation of the artefacts induced however a high rate of indeterminate taxonomical attributions that can partly blur the reality of the raw material diversity. To try to overcome this potential bias, a paleoproteomical analysis is undertaken using a minimally invasive ZooMS protocol (Bray *et al.* 2022).

We discuss the results of this minimally invasive method, with no or minimal impact on the fossil material, and demonstrate the interest of the joint application of different approaches and methods in view of an understanding of the choice of this type of bone tool and more generally of the management of large herbivore fauna by Neanderthal populations, in particular with regard to a possible selection and/or choice of specific raw material. We also elaborate on the possibilities and the limits of this type of analysis, mainly concerning the data available for the identification of extinct species, and more generally the rank of the species.

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