

## **Middle Paleolithic bone retouchers from Northern France: preliminary results of a multi-proxy analysis**

Marie-Pauline Vignes\*<sup>1</sup>, Fabrice Bray<sup>2</sup>, Veerle Rots<sup>3</sup>, Marie-Anne Julien<sup>4,5</sup> and Patrick Auguste<sup>1</sup>

<sup>1</sup> : Évolution, Écologie et Paléontologie (Evo-Eco-Paleo) - UMR 8198, Université de Lille, CNRS, France

<sup>2</sup> : Miniaturisation pour la Synthèse, l'Analyse et la Protéomique (MSAP) - UAR 3290, Université de Lille, CNRS, France

<sup>3</sup> : FNRS-F.R.S., TraceoLab/Prehistory - University of Liège, Belgique

<sup>4</sup> : GéoArchPal-GéoArchEon, Viéville-sous-les-Cotes, France

<sup>5</sup> : Histoire naturelle de l'Homme préhistorique (HNHP), UMR 7194, Dpt Homme & Environnement, Muséum national d'Histoire naturelle, CNRS, UPVD, Paris, France

Over the last decades, important discoveries have deeply reshaped our understanding of Neanderthal behaviors, and notably an increasing number of proofs of non-dietary uses of different kind of animals. The use of bones for a variety of daily activities is now frequently identified, with so-called bone “retouchers” being the most recognizable and the most numerous. But whether those remains were opportunistically or deliberately chosen remains unclear, highlighting two key questions: was there any intentionality in the choice of raw material? Was there any specific preparation of the bones prior their use as retouchers? Only a multi-proxy analysis can allow to answer those questions. We will present here our approach and preliminary results through the study of a collection from Northern France: Biache-Saint-Vaast (thereafter BSV).

The MIS 7 site of BSV yielded three main archaeological levels with Mousterian lithic industries associated with rich bones of large terrestrial mammals remains, with particularly good surface preservation for an open-air site. Over 300 bone remains with impression patches, similar to percussion stigmata on lithic material were identified, making BSV one of the largest known collections of Middle Paleolithic bone tools. We propose to perform a systematic non-invasive zooarchaeological, taphonomical and use-wear study to understand the acquisition and use of the remains. In addition, paleoproteomics analyses are applied to overcome the limitations of classical taxonomic attributions, through a minimally invasive technique.

Our first results indicate that the remains of the three main species identified at BSV were used as “retouchers”: aurochs (*Bos primigenius*), brown bear (*Ursus arctos*) and meadow rhinoceros (*Stephanorhinus hemitoechus*). The specimen observed so far were nearly exclusively used for percussion of flint, in order to retouch flakes or tools. These results highlight the importance of combining different approaches and methods for the knowledge of the use of such bone tools and more generally of the management of large fauna by Neanderthal populations. Further analyses will attempt to characterize the full bone tool collection of BSV. In addition, Middle Paleolithic sites from Northern France where bones are well preserved, will allow the application of such multi-proxy analysis at a large scale.

Such detailed studies, using multi-proxy approaches on bone tools, is still poorly developed among Middle Paleolithic researches and will undoubtedly become mandatory to improve our knowledge of past hunters exploitation of faunal material, and more generally of Neanderthal or other humanities behaviors.

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