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Change in raw material selection and subsistence behaviour through time at a Middle Palaeolithic site in southern France

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ABSTRACT

We apply a resource selection model to the lithic assemblages from 11 archaeological layers at a Middle Palaeolithic site in southern France, the Bau de l'Aubesier. The model calculates how to weight each of 10 variables in order to best match the proportions of raw materials from various potential sources in the lithic assemblages. We then combine the variables into two sets of five each, those related to the characteristics of the raw materials themselves, and those related to the sources and the terrain around them. Running the model with each subset shows that the terrain variables always provide a better match to raw material use than do the raw material variables taken by themselves, but the best model is always the overall (10-variable) model. This means that terrain is most important in every case, but raw material properties also matter. Comparing the percentage contributions of each subset within the overall model, however, shows a clear change in emphasis in the upper layers versus the lower layers of the site. In the lower six layers, the percent contribution of the terrain variables is always greater than that of the raw material variables, but in the upper five layers the reverse is true: terrain still matters, but raw material becomes more important. We also look at faunal and basic tool typological data, which show a progressive change through time, as smaller prey become more important (and large prey less so), and tools and cores proportionally less abundant in the assemblages in the upper layers. We suggest that these results reflect a change in subsistence strategies at the time of a particularly harsh climate near the end of the Middle Pleistocene, and that hominin groups using this site continued to use this new approach throughout the rest of the Pleistocene.

Introduction

Archaeologists have set themselves the challenging task of reconstructing and understanding the lives of past hominins, using the material remains the hominins left behind. Those material remains must somehow inform us not only of what the hominins did, but how they did it, and why. The task is particularly challenging when we are concerned with pre-modern hominins, since we have to assume that they did not have the same capabilities and evolved behavioural tendencies as modern humans. That is, in fact, both the challenge and the attraction of studying pre-modern humans: to find out what they were capable of, and how they changed as they became us. To do that, however, we need objective methods of analysis, free of a priori assumptions.

Since we know that all lives are influenced by a large variety of intersecting factors, both social and environmental, archaeologists look for ways of identifying those factors and determining their influence. Ultimately, though, we know that we have to take as many factors as possible into account, all at once, judge their relative weights and see how they influence each other, before we can approach any real understanding of past behaviours.

Prehistoric stone tools provide us with a variety of types of information. The tools themselves, what they are and what they were used for, help us understand past lifestyles, while the stages of the chaîne opératoire present in a lithic assemblage provide us with insight into how the prehistoric group divided its activities across the landscape, giving us clues to the group's strategies of resource procurement and use. The provenance of the raw materials gives us an idea of the extent of the territory within which the group lived and worked. In addition, the choice of which raw materials to use must have been constrained by many factors, including the requirements of the desired tool itself, the energy and time

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requirements of other activities, the characteristics and distribution of potential raw materials available within the territory, and the length of occupation of the site where we find the assemblage (Torrence, 1983, 1989; Geneste, 1988; Wilson, 1988, 1998, 2007a, b, c; Elston, 1992; Jeske, 1992; Kuhn, 1995, 2004).

One of the underlying paradigms of the study of lithic raw material economies is the perceived contrast between 'expedient' and 'curated' technology (Binford, 1977, 1980, 1989). In the case of curation, tools are kept and transported, potentially over long distances, whereas expedient procurement occurs when raw materials are acquired as and where they are needed. Curation, especially if combined with the production of 'better' tools, which would require 'better' raw materials for their fabrication, may be evidence of an increased appreciation of the quality of the raw materials. It may also be evidence of greater strategic organization of activities: more forethought, better planning. On the other hand, though, forethought and planning may well have led a group that was moving into an area where good quality raw materials were abundant to abandon any tools they already had, in order to (seemingly) expediently procure raw materials in the new area (and reduce the weight of kit they had to carry there) (Texier et al., 1996, 1998, 2003). Alternatively, forethought and planning may have led a group to stockpile materials at a site that they knew they would revisit: this is called "provisioning of place" by Kuhn (1995), and it would lead to less curation of tools. We therefore cannot understand lithic procurement strategies on the basis of any single criterion, not even the chaîne opératoire, divorced from the lithic landscape within which the activities occurred. We also need methods which will allow us to examine this issue from other angles.

This paper uses a previously-published model (Browne and Wilson, 2011) designed to evaluate the factors influencing raw material procurement, and applies it to a series of layers at a Middle Palaeolithic site, the Bau de l'Aubesier (hereinafter called 'the Bau') (Fig. 1), to trace changes through time in the relative weights of the factors. We also develop the method further, in order to make it possible to quantitatively compare the results for different assemblages. The results show a clear change in emphasis on some criteria versus others in the later layers versus the earlier layers of the site. We then present data assembled from Fernandez (2006) concerning the minimum number of individuals (MNI) of faunal species in the various layers, categorize the species into prey size classes (explained below), and find that prey size choice also varies through time. Finally, although detailed tool typology and technology data are not yet available, we compile and examine the preliminary typological data presented in Lebel (2000a) to further strengthen our interpretations. Combining all of these data gives us a better vision of prehistoric life in that region during the Middle Palaeolithic.

Materials and methods

The data set

The study area The Bau is a large rock shelter site in the Vaucluse department of southern France. The Vaucluse has a rich prehistory, from at least the Middle Palaeolithic up through the Neolithic and into Roman times, demonstrated through the presence of many important sites. Over 30 rock shelter sites are known from the Middle Palaeolithic alone (Buisson-Catil, 1994). The region is rich in outcrops of high quality flint of Cretaceous and of Oligocene age (Della Casa, 2005; Slimak et al., 2005; Wilson, 2007a, 2011), and its prehistoric importance is also demonstrated in the fact that flint from the Vaucluse has been identified in sites throughout southern France and as far away as Italy (Della Casa, 2005).

The Bau is located halfway down the approximately 100 m high south wall of the gorge of the Nesque river, opening to the north (see Supplementary Online Material [SOM] 1). Fig. 2 shows the site

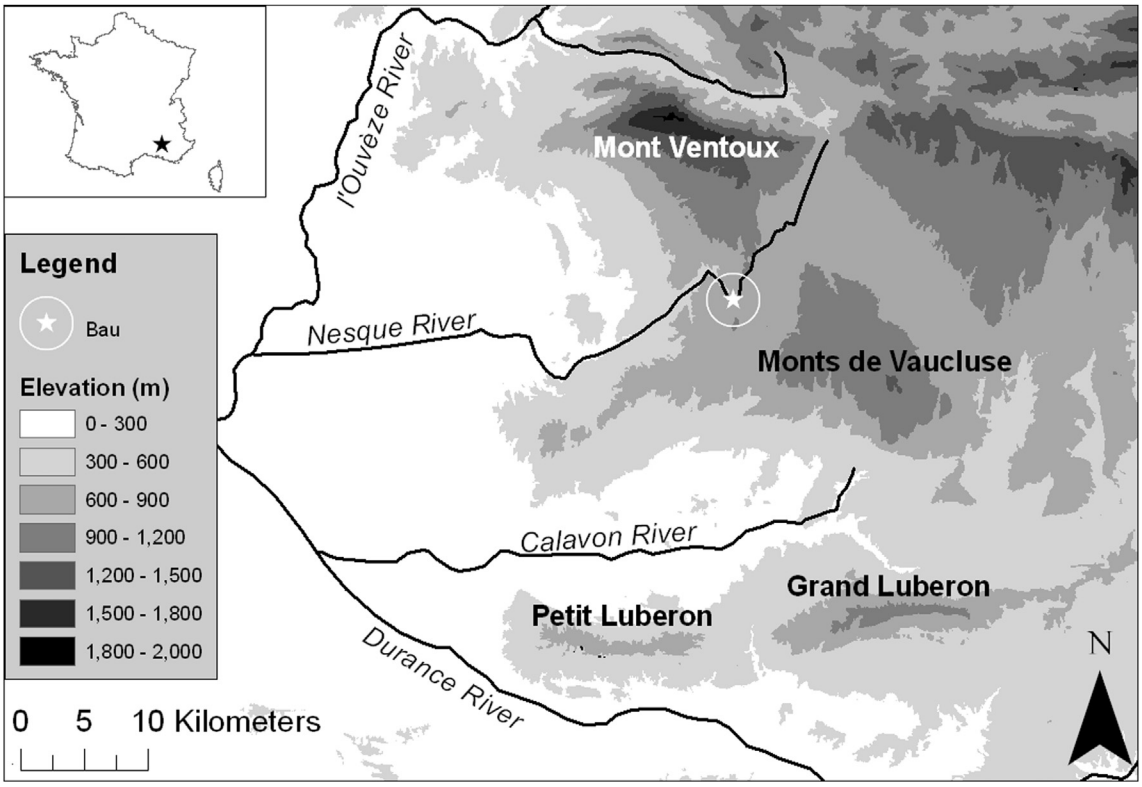

Figure 1. Map of the study area.