The exploitation of mammoth in the Swabian Jura (SW-Germany) during the Aurignacian and Gravettian period

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A B S T R A C T

Mammoth (Mammuthus primigenius) is one of the main game species during the Upper Palaeolithic in the Swabian Jura. Procurement and exploitation of this mega mammal shows quantitative differences and qualitative changes between the Aurignacian and the Gravettian periods. The raw material ivory in the Aurignacian became replaced by mammoth ribs in the Gravettian accompanied by technological changes concerning points as well as cultural changes concerning jewelry.

Although some signs of climatic deterioration from the Aurignacian to the Gravettian are evident and the ecological niche of mammoth is partly occupied by horses in both periods, the habitat of the mammoth populations does not seem to have been endangered.

From the point of view of the organic artefact industry, we argue for a clear cultural break, in contrast to a degree of continuity observed in the lithic industry.

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1. Introduction

Woolly mammoth (Mammuthus primigenius) was one of the most impressive mega fauna species in the steppe environment during glacial stage MIS 3 and apparently important for the subsistence of Palaeolithic hunter and gatherers. This is witnessed by countless mammoth remains in Palaeolithic sites associated with constructions and/or artifacts all over Eurasia (Gaudzinski et al., 2005). However, the procurement and exploitation of mammoth was quite diverse. Beside the debate of hunting versus scavenging of mammoth carcasses by humans, which is the most controversial topic, several authors describe bone collecting for tool manufacturing or for building shelters and other constructions (Münzel, 2001a, 2005; Fladeler, 2003; Gaudzinski et al., 2005; Svoboda et al., 2005; Brugère et al., 2006; Niven, 2006; Zenin et al., 2006; Germonpré et al., 2008; Salcher-Jedrasiak et al., 2010; Demay et al., 2012; Nikolski and Pitulko, 2014; Wojtal and Wilczyński et al., 2015). Direct human impact, such as projectiles in bones or shooting marks, are rare exceptions (Zenin et al., 2006; Nikolski and Pitulko, 2014; Pitulko et al., 2016). Moreover, another strange phenomenon is the general scarcity of butchering marks on mammoth bones compared to those on other game species. Here we have to consider that defleshing of a mammoth carcass is not a simple task and you rarely hit the bone during the butchering process. Our own experience with an Indian elephant from the zoo in Stuttgart, Baden-Württemberg, supports this (Münzel et al., 2015). Considering actualistic studies on naturally died elephant carcasses in Africa, Haynes and Klimowicz (2015) aim to collect multiple taphonomic arguments to improve the interpretation of Palaeolithic sites with mammoth remains.

The role of mammoth is often underestimated in Western-Central European sites, simply because its remains are less abundant than in Upper Paleolithic sites in Eastern-Central Europe and Russia. One reason for the underestimation of mammoth remains is their fragmentary condition and the difficulty in identifying those fragments. But the preferences of mammoth raw material for the organic tool production demonstrate the importance of this species in the Upper Danube area.

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Amongst the Palaeolithic woolly mammoth sites, a striking difference between Western and Eastern localities is obvious. In contrast to East-European sites with large accumulations of mammoth bones, such as Dolni Vestonice, Krakow-Spadzista, Pavlov I, Molodova I (Demay et al., 2012; Wilczynski et al., 2012, 2015a,b; Wojtal et al., 2012), archaeological sites in the western part of woolly mammoth distribution are less spectacular due to the lower abundance of their remains. Here large open air sites and accumulations of mammoth bones are missing. Cave sites do not have the potential of being a kill site for mammoth. Instead body parts or single mammoth elements must have been disarticulated elsewhere at a kill-site and people brought them into the caves, thus mammoth remains sustained a higher selection.

In this publication, we aim to give an overview about differences in the procurement and the exploitation of mammoth in the Ach and Lone Valleys (Swabian Jura, southwestern-Germany), tributaries of the Danube River (Fig. 1). Mammoth remains are present in all of the cave sites under consideration, but in very different quantities and qualities. The most remarkable difference is a chronological one. It concerns the element representation and the exploitation of mammoth remains as raw material during the Aurignacian (43–34 ka cal BP) compared to the Gravettian period (34–30 ka cal BP). Mammoth remains are biased towards ivory and ribs (Münzel, 2001b, 2005), which both were intensively used and preferred as raw materials. During the Aurignacian, ivory is much more abundant in the cultural layers than during the Gravettian period. Ivory was used for all kinds of everyday tools, such as chisels, retouchers, and projectile points, as well as for personal ornaments, figurative art, and flutes (Riek, 1924; Hahn, 1988; Schmid, 1989; Conard et al., 2004; Floss, 2007; Conard, 2009; Wolf, 2015). This stands in contrast to the Gravettian period, where rarely any ivory was used. It was mainly chosen to produce personal ornaments, but not in as large numbers as before (Riek, 1973; Scheer, 1995, 2000; Hiller, 2003). However, the decreasing number of ivory beads in the Gravettian is supplemented by an increasing number of tooth pendants, which are rare in the Aurignacian assemblages in the Swabian Jura. Furthermore during the Gravettian period projectile points and other tools have been exclusively made from bone, most often from mammoth ribs (Münzel, 2001b, 2005; Wolf et al., 2016).

The main question is what caused this change in raw material choice? Basically two main factors could have driven this:

- Environmental changes, e.g. a decreasing mammoth population either by climatic deterioration and/or by competition with other species, or
- Cultural and/or technological changes from the Aurignacian to the Gravettian.

This we would like to discuss on the background of environmental parameters including the ecology of mammoth through stable isotope tracking on one hand, and aspects of cultural change reflected by the use of mammoth remains as source of raw material on the other hand. We will compile newly generated with already published data to give reasonable suggestions for this major differences in mammoth procurement and exploitation.

2. Archaeological background

The cave sites under consideration in the Ach Valley are Hohle Fels near Schelklingen, Geißenklösterle and Brillenhöhle near Blaubeuren. In the Lone Valley, we deal with Vogelherd near Niederstotzingen, Hohlenstein-Stadel near Asselfingen, and Bockstein near Rammingen (Fig. 1: for details of the research history, see Table 1).
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