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Pre-Neandertal behaviour during isotopic stage 9 and the beginning of stage 8. New data concerning fauna and lithics in the different occupation levels of orgnac 3 (Ardèche, South-East France): occupation types

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Abstract

The morphology of the Orgnac 3 site has changed over time. This human settlement was once a cave, until it was transformed into a rock shelter and finally an open air site. The stratigraphical sequence has been dated to between isotopic stages 9 and 8. Human groups frequented the site in spite of its changing context, establishing living spaces close to cave walls or around hearths. The site thus provides an ideal opportunity to observe artefact spatial distribution and changing technological systems. The Levallois debitage method appears at the top of the sequence, around 300 000 B.P. Analysis of fauna and lithics from levels 6 and 2 reveals evidence of different human activities. Regardless of these activities, human groups lived and organized their settlement in the same way, whatever the length of the occupation (several short and one long occupation are represented). Their behaviour appears to have remained unchanged no matter what species was hunted or what lithic technology was practised.

Keywords: Isotopic stages 9 and 8; Spatial organization; Human behaviour; Acheulian; Early Middle Paleolithic; Large mammal remains; Artefacts; France

1. Introduction

Spatial analysis of artefacts in European Neandertal and Pre-Neandertal sites has revealed that inhabited spaces were specifically organized. Such patterns of organization are more or less recognizable, depending on elements related to conservation and to the degree of precision with which data were collected from the different habitation levels. A closed space seems to have largely influenced the disposition of different activity zones, as may be observed in caves, where hearths and artefact concentrations are disposed according to the position of cave walls and entrances (Abri Romani in Spain, Le Lazaret and Les Cannalettes, in France [26,44]). Natural trenches were sometimes used to build a hearth or an activity zone (Menez-Dregan in France [36]). However, open air sites excavated over a large surface area also reveal work space structuring, indicating, on the one hand, a separation between game treating and knapping activity zones (Soucy, Bettencourt in France [21,22]) or, on the other hand, a close

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association between these two activities, whether the carcasses in question be game or carrion (Schöningen and Lehringen in Germany, la Polledrara di Cecanibbio and Rebibbia-Casal de' Pazzi, in Italy [1,40,41]). Stone structures or post-holes may be observed, indicating transformation of the inhabited space (Soleilhac, Terra Amata and Combe Grenal, in France [4,23]).

Orgnac 3 presents several points of interest. Situated on a plateau near the Rhône Valley, on the righthand shore and to the south of the Ardèche river gorges, the site was excavated from 1959 to 1972 by Jean Combier [6]. The archeological sequence is dated to isotopic stage 9 and the beginning of stage 8 by ESR, U/Th, volcanic minerals and biostratigraphy (Table 1) [8,10,11,12,18,20,25,39]. Biostratigraphical studies (mammal remains, microfauna, fossil pollen) allow to situate the base of the sequence within a temperate context, contemporary with the human occupation and more or less humid according to the levels. Over time, the environmental framework gradually became cooler. The top of the infill would have been deposited during a cold, dry context. [3,7,13,16,17,37]. Humans initially occupied the cave, which was formed from the opening of an aven (Fig. 1). As the cave's roof slowly receded, humans sought shelter in a depression under the remaining rock escarpment (a sink hole measuring 600 m^2, oriented S/SW). The transformation of the site over time allows us to examine the ways in which humans adapted to their changing situation. Did their settlements follow the receding cave walls and roof? Was their living space structured in the same way in a cave and in an open air context? Did the same activities take place in spite of the changing topography of the site?

Ten occupation levels have been observed in the upper part of the sequence. The sequence consists of an accumulation of layers of stony red clays mixed with elements from the collapsed ceiling, a typical karstic phenomenon in the region (Fig. 2). Over time, exterior elements, wind transported sands, gradually increased, in relation with the collapsing of the ceiling and the opening up of the entrance of the cave. The effects of run off water are observable, resulting in the deposit of carbonates and the desilicification of flint tools [7,17,18,19]. The layer comprising level 6 (i2) is of heterometric, more or less weathered gravels, in an abundant brownish-red sandy-clay matrix which filled in the spaces between the fallen blocks, some of which 1 m^3. The cave floor is chaotic and its thickness (10–30 cm) increases towards the northeast near the cave's overhang [6]. The layer comprising level 2 (d2) corresponds with a level of the same thickness and aspect, very concretioned, indicating run off water and import of abundant exterior elements due to the cave's opening. Humans settled in an open air basin. The speed of the sedimentation is unknown for the two levels which present a slight slope towards the south. Vertical distribution profiles do not indicate well-defined beds of objects, but levels of maximal concentration, a typical dispersion for clay infills with high gravel content. No sorting or preferential orientation has been observed for the archeological material and refits generally concern pieces situated close to one another. The lithic material is patinated but relatively fresh and it is probable that if any displacement took place it would have happened within the sediment as it slowly slid towards the large surfaces. For these reasons, the spatial distribution study was carried out by zones of 1 m^2 for each archeological unit [30].

Table 1
Radiometric data of the sequence of Orgnac 3

Archaeological level 2 [9,18]	Archaeological levels 5 and 6 [11,25,39]
Volcanic minerals: green clinopyroxene from Mont-Dore-Sancy about 300 000 B.P.	Stalagmite, U/Th, ESR, 309 000 ± 34 000 B.P.
Ash: 298 000 ± 55 000 B.P.	U/Th 288 000–45 et +82 B.P. 374 000–94 et +165 B.P.

Faunal analysis underlines the relationship between the dominant species hunted and climatic change. Species most characteristic of dominant environmental conditions and available close to the cave were preferentially hunted. Lithic assemblages reflect a series of contemporary occupations and express technological coherence during each phase. In this stratigraphic sequence, as in other European sites, the appearance of the Levallois knapping method has been situated near the limit between isotopic stages 9 and 8, (emergence of "Middle Paleolithic").

This study concerns two levels: level 6, at the base, and level 2, at the top of the sequence. Level 6 was accumulated in a cave context whereas level 2 was deposited mainly in an open air context. The surface area excavated for both levels is of 39 m^2, located along the eastern edge of the cave wall, where some evidence of the cave's roof subsists (last covered sector of the cavity). Levallois knapping appears in level 4b, developing progressively towards the top of the sequence, in level 2.

Seven human teeth were discovered in lower levels 5a, 5b and 6 (isotopic stage 9). Two of four temporary molars (Homo 2 and 9), probably belonging to a nine-year-old child, and two incisors (Homo 7 and 8), belonging to a five-year-old child. Tooth crowns are large, showing dimensions superior to those of both a Neandertal and a present-day child's [24]. The prolonged form of the second milk tooth molar differs from modern teeth which are more square. The "Homo 2" tooth resembles two lower second molars belonging to an Ante-Neandertal child from the Caune de l'Arago (Arago I and Arago V).