Site formation processes of the Lower Palaeolithic layer 18 in Hummal (Syria)

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Abstract

Numerous well-preserved finds were excavated in an archaeological level within the Lower Palaeolithic part of the Sequence of Hummal, in El Kowm (Syria). The rich archaeological level shows a remarkable high find density, a lithic assemblage dominated by pebble tools, simple flake tools and handaxes. The faunal remains are numerous but fragmented due to post-depositional processes. This taphonomic study of the lithic and faunal assemblage proves the integrity of the assemblage and shows that it was deposited and covered in a short time episode.

Introduction

Numerous remains from the Lower Palaeolithic period are known in the El Kowm region in Syria. These include a large number of surface finds of bifaces (Jagher and Le Tensorer 2011, Jagher *et al.* 2015) and several stratified sites. The Upper Acheulean site of Nadaouiyeh Aïn Askar (Jagher 2000, Jagher 2011) and the Middle Acheulean site of El Meirah (Boëda *et al.* 2004) are both characterised by the presence of numerous bifaces. While El Meirah is dated around 700 ka (Boëda *et al.* 2004) the Acheulean layers of Nadaouiyeh were deposited between 350 ka and 550 ka before present. A completely different assemblage was excavated in Aïn al Fil, containing no bifaces or retouched tools but pebble tools, simple cores and flakes instead. This assemblage was dated back to 1.8 MA before present and is therefore one of the oldest sites outside the African continent (Le Tensorer *et al.* 2015). In Hummal layers 15 -23 (Unit G) were attributed to the Lower Palaeolithic. The assemblage from Unit G in Hummal shows many similarities with so called Oldowan assemblages. Pebble tools (Chopper, Hammerstones and Sphaeroids) are well represented. Additionally numerous notched and denticulated pieces have been described. Together with these archaic-looking artefacts four handaxes were discovered (Fig. 1) (Le Tensorer *et al.* 2011, Wegmüller, 2011, Wegmüller 2015). The chronological position of Unit G remains unclear. The analysis of the microfaunal remains suggests a position within the Middle Pleistocene (Maul *et al.* 2015) whereas preliminary palaeomagnetic results indicate a position within the Matuyama subchron thus older than 780 ka. (Villalain pers. comm.).

Figure 1: *Handaxe from layer 18 in original position of its discovery.*

Within the Lower Palaeolithic Unit G the archaeological horizon of layer 18 is by far the richest. 74% of the recorded finds from Unit G were found in this archaeological horizon. The archaeological level lies on the interface between layer 17 and layer 18. The remains were deposited on sandy, carbonated silt (layer 18B) and are covered by a finely laminated dark greyish to black clay about 10 to 15 cm thick (layer 17) (Fig. 2). Due to post-depositional processes, the layer is slightly deformed and inclined in the southern part of the excavation area (Fig. 3). Besides its high find-density, the undisturbed appearance of the archaeological level is remarkable. In this short case study we present some taphonomic and spatial observations made on the faunal and lithic material from layer 18.

Taphonomic study of the lithic and faunal material

From 2002 to 2010 a total of 593 lithic artefacts and 2304 bone fragments were excavated in layer 18 over an area of about 18.5 m^2. Due to some uncertainties of the layer attribution, created by the position of the archaeological level at the interface

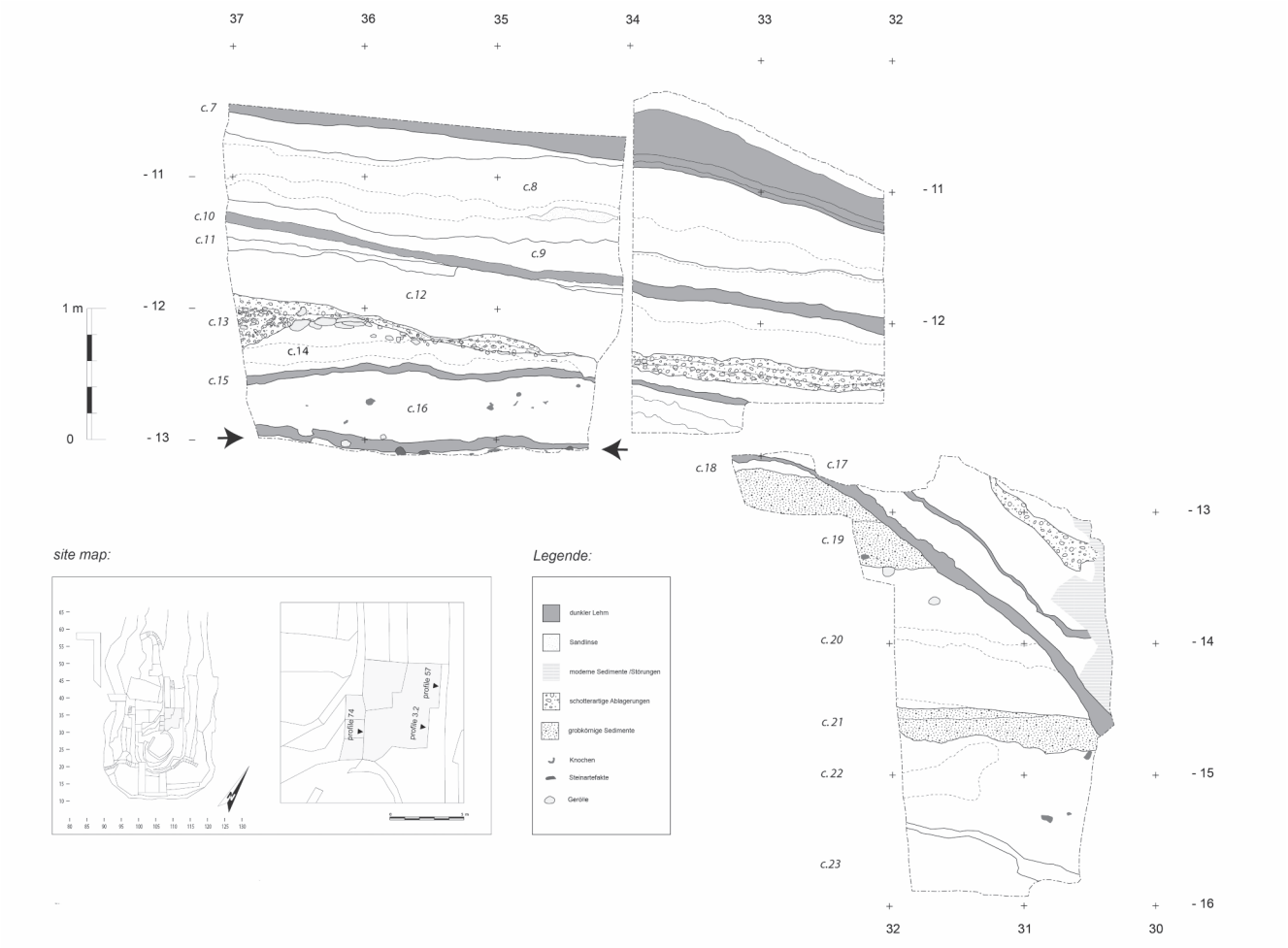

Figure 2: *Profile through the Lower Palaeolithic Sequence in Hummal. The archaeological level 18 is marked by arrows.*

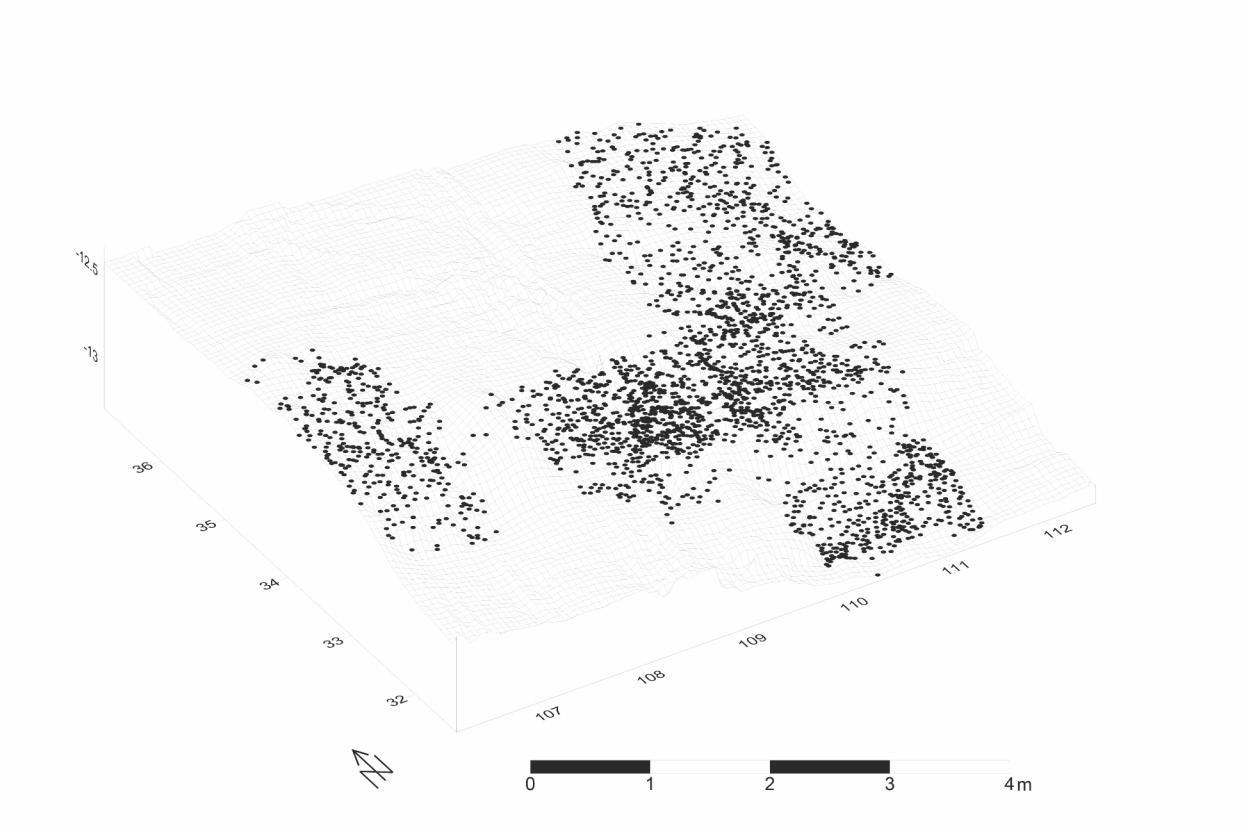

Figure 3: *Spatial distribution of the archaeological remains from layer 18.*

between two geological layers (17 and 18), some material from the first two years of excavation were not clearly attributed to layer 18. In the subsequent excavations only scarce finds were made in layer 17 and therefore all material from these two layers is assigned to the same archaeological level. (Wegmüller 2008). A spatial analysis of all registered finds shows that there is no substantial vertical dispersal of the remains.

Lithic artefacts and bones longer than 5 cm and with a clearly oriented axis were registered by two points during excavation. This information allows to define the horizontal of the object. The orientations of 257 bones and 73 lithic artefacts were determined in layer 18 by this method; a summary graph of the horizontal orientations is mapped in Fig. 4. The horizontal orientation of the elongated object follows no regularity and no alignment is recognisable.

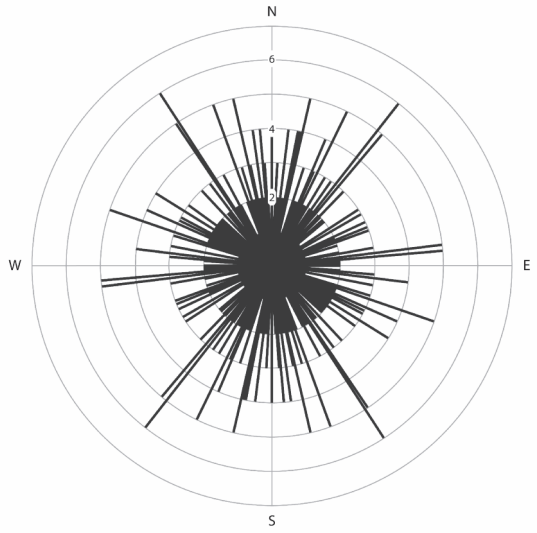

Figure 4: *Horizontal orientations of elongated objects.*

species	n	%
aurochs	24	4%
camelids	89	14%
equids	75	12%
gazella	51	8%
rhinoceros	29	5%
very large-sized herbivores	29	5%
large-sized herbivores	167	26%
middle-sized herbivores	5	1%
small-sized herbivores	15	2%
total herbivores	484	76%
lion	1	<1%
indet.	153	24%
collection in Basel	638	100%
indet. in El Kowm	672	
total	1310	

Figure 5: *the faunal assemblage from layer 18: Very large-sized herbivores = Rhinoceros & large camelids; large-sized herbivores = Bos, Camelus and Equus; middle-sized herbivores = size of Oryx and small equids; small-sized herbivores = size of gazelle and caprine.*

Lithic artefacts

593 lithic artefacts were excavated and registered in the archaeological level of layer 18. A total of 335 flakes and fragments, thereof 46 tools (13 notched pieces, 9 denticulated pieces and 24 flakes with irregular retouch), 12 cores, 53 pebble tools and 4 handaxes were studied in detail during the 2007 and 2009 field season in El Kowm. Only a few pieces show edge damage or other traces indicating trampling processes or re-deposition of the lithic artefacts. A preferential deposition either on the ventral or on the dorsal surface was not observed. For the majority of

Figure 6: *Stone tools and faunal remains in layer 18 (camelid bones partially in anatomic connection) (Photo Peter Schmid).*

the lithic material patination or other traces of chemical weathering are not recognisable. Only 18 pieces show a light-grey, 5 pieces a white and 8 pieces a reddish patination. Several pieces with a double patination prove the re-use or recycling of lithic material.

Faunal remains

The corpus of faunal remains excavated and registered from layer 18 comprises 2304 bone fragments. Only a part of them, mainly bones discovered in 2002 and 2003 could be transported to Basel and studied in detail. The remaining material stayed in El Kowm and was only studied in a preliminary manner. This study focuses on the collection in Basel which comprises 638 bone fragments from which 43% could be identified to at least genus level (Fig. 5). Two different species of camelids and one species of equid have been identified. The other species present in this layer are: the aurochs (*Bos cf. primigenius*), the goitered gazelle (*Gazella cf. subgutturosa*), the steppe rhinoceros (*Stephanorhinus hemitoechus*) and a mandible of lion (*Panthera leo*) (Elsuede in prep.). The relatively small number of unidentified objects can be explained by the selection of larger and determinable objects prior to the export from Syria. On the site 1310 faunal remains were excavated and registered in 2002 and 2003. It is likely that the remaining 672 faunal remains must be added predominantly to the undetermined bone fragments and, therefore, this category is highly underrepresented in the studied sample.

Most of the bones were crushed and compressed at the place of their deposition. This process is mainly caused due to the weight of the covering sediment as layer 18 is situated 12 m under the actual surface; nevertheless in most of the cases the original shape of the bones was still recognisable. The in-situ fragmentation and the compression of these bones could be observed on the whole excavation area. Additionally, chemical alteration led to a dark brown discolouration of the bones (Brugal 1994, Huisman 2009, O'Connor 2000). Although the bones show clear traces of chemical alteration no traces of weathering as a consequence of a longer exposition on the surface prior to the burial of the objects could be observed.

While in some cases cut marks were observed, traces of gnawing, are not present (Elsuede in prep.). Carnivore coprolites are missing as well. Some parts of the carcasses are preserved in anatomical connection or are only slightly disturbed (Fig. 6). Additionally isolated bones and broken bones are numerous. Although no distinct breakage pattern is observable, we assume a connection of these broken bones to hominid activities.

Discussion

Once discarded, the remains stemming from hominid activities (i.e. butchering, carcass processing, stone tool production etc.) are subject to different processes that can change and disturb the traces of the activities carried out. Both, natural and anthropogenic forces can influence the preservation of the remains. The analysis of the depositional context of the archaeological objects and their distribution within the excavated surface, helps to understand the nature of the deposit and the main factors, which influenced the preservation of the archaeological level.

In a first step the definition of the factors responsible for the deposition and accumulation of the archaeological material is needed. A natural accumulation of archaeological material driven by water flow can be excluded. A deposition in water, especially in flowing water, leads to an alignment and a preferential orientation of elongated objects in direction of the water flow. (Benito-Calvo and de la Torre 2011 and references therein). Furthermore lithic artefacts do not show any preferential deposition either on the dorsal or on the ventral face. These reasons led us to the conclusion, that the objects were not disturbed by the presence of water after their deposition and covering. Although the presence of water during the burial process by clayey sediment is probable and also suggested by the presence of chemical alteration of the bones, the original position of the archaeological objects apparently was not heavily affected by these processes.

The presence of large carnivore bones raises the question whether the accumulation of animal bones is not only related to hominids but also a result of large carnivores using the same places. The interaction of hominid activities and large carnivores within the same site is widely discussed and verified in several Lower Palaeolithic sites in Eastern Africa (e.g. Bunn *et al.* 2010, Barba and Dominguez-Rodrigo 2007). Either animal hunted by large carnivores were also exploited by hominids or vice versa. Some sites also show a subsequent use of the same locations by carnivores and hominids which don't take place at the same time, but forming a complex palimpsest where the finds can't be assigned to one or the other agent of accumulation. In the case of Hummal no gnawing traces were documented and carnivore coprolites are completely absent. Therefore the involvement of large carnivores in the accumulation of the excavated remains is unlikely.

The analysis of the faunal and lithic remains from layer 18 gives an idea of the time span in which the formation of the archaeological level took place.

Lithic artefacts generally show fresh edges and no sign of extensive trampling. Therefore, a longer exposition of the material on the surface and during repeated visits to the site can be excluded. Only a few pieces are patinated, the majority of the lithic assemblage does not show any patination. Formation of patina on lithic artefact exposed to weather and the sun doesn't require a long time. Experimental studies on different lithic materials show, that in a Mediterranean environment patination forms in a time span of less than a half a year (Wojtczak and Ismail-Meyer, this volume, Malinsky-Buller 2011).

The preservation of the bone surfaces shows no traces of heavy weathering which suggests that the bones were covered quickly and not exposed on the surface for a long time (Behrensmeyer 1978). All surface transformations of the bones result from post-burial alteration. Therefore the time represented in layer 18 can be limited to a span of months rather than years and the presence of multiple depositional episodes over a longer time period can be ruled out. The generally good preservation of the lithic artefacts stays in contrast to presence of altered and crushed bones. Both categories were undergoing the same post depositional processes, but the lithic artefacts were not affected in the same extent. Apparently the compression of the clayey layer covering level 18 did not lead to any damage of the lithic artefacts but to a fragmentation of the faunal remains.

Conclusion

After the discard of an object, different processes can influence the preservation of the archaeological remains. By analysing these processes we can reconstruct the different steps of site formation in order to define the nature and integrity of the archaeological deposit. This case study on the material from layer 18 in Hummal suggests that the deposit was formed exclusively by hominid activities and was not significantly disturbed and changed by other agents. The covering of the archaeological material took place a short time after presence of hominids at the site. In fact the archaeological material of layer 18 most likely represents a limited number of activities, carried out over a short episode of time. Due to the fast covering by sediment and limited chemical and physical alterations after the deposition, these remains were protected in the original situation, giving today a literal "snap shot" of past hominin life.

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