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Site formation processes and Late Natufian domestic spaces at Baaz Rockshelter, Syria: A micromorphological perspective

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ABSTRACT

Geoarchaeological research at Baaz Rockshelter focuses on reconstructing geogenic and anthropogenic formation processes at the site and examining post-depositional alterations of the archaeological record. Baaz is set in a rockshelter at the base of a limestone cliff and its archaeological sequence includes seven layers documenting the repeated use of the site during the Upper Paleolithic and Late Natufian, including a Late Natufian house, as well as several phases of Neolithic occupation. Based on lithic, faunal, and botanical analysis, Upper Paleolithic people used the site sporadically and centered their activities on hunting. During the Late Natufian and Neolithic, occupations were also short term, but more intense. Here, we present results of a geoarchaeological investigation of the deposits and the first systematic micromorphological study of a constructed, Late Natufian floor. Throughout the sequence, the main formation process is the weathering of limestone, in addition to minor but regular aeolian input of silt-sized quartz grains and mica. Post-depositional processes are rare and include minor secondary gypsum formation in all horizons and bioturbation that is most pronounced in the upper two layers. Anthropogenic processes vary in type and intensity. The Upper Paleolithic deposits contain mostly geogenic components with rare, microscopic anthropogenic components, supporting the argument for sporadic site use during this time. The Late Natufian deposits contain the remains of a house that exhibits some characteristics typical of structures from this time period, including an artificially lowered surface, a wall, the round shape of the house and a constructed floor. The floor is composed of silty clay and shows microscopic structural alterations resulting from intensive use. The house also shows unconventional features for the Late Natufian, such as a built-in mortar, built-in hearth, and a possible ash dump. The uppermost deposits with Late Natufian and Neolithic occupation have a mixed appearance and contain pits and lenses of herbivore dung.

1. Introduction

The Natufian is a crucial time period when people switched to a more sedentary lifestyle and began constructing more permanent dwellings. Research on this transition to a more sedentary way of life, and on Natufian houses and settlements in particular, is often restricted to the analysis of artifacts, faunal remains and to observations of architectural features. The latter include construction materials, pits, and hearths, which hold a wealth of information on Natufian craftsmanship, exploitation of the environment and use and abandonment of houses and settlements (Goring-Morris and Belfer-Cohen, 2003, 2008). Although field-based observations of these features is necessary and useful, microstratigraphic studies of deposits and features have also proven valuable in uncovering aspects of human behavior and practices not readily observed at a macroscopic scale (e.g. Friesem et al., 2011, 2014; Matthews et al., 1997; Sherwood and Kidder, 2011). Very few microstratigraphic studies have been conducted on sites and features dating to the Natufian (e.g. Garrard and Yazbeck, 2013; Kingery et al., 1988; Nadel et al., 2013) and none in Syria.

The present study investigates human behavior, paleoenvironmental indicators, and the integrity of the archaeological record at Baaz by employing field and micromorphological analysis in order to reconstruct the site's formation history. Baaz contains deposits ascribed to the Upper Paleolithic, Late Natufian and Neolithic. Of particular interest here are the remains of the Late Natufian house and its associated floor. We reconstruct the formation processes of the deposits that in turn provide a

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framework for the interpretation of other datasets. Further, this study explores paleoenvironmental indicators in the sediment and compares these with paleoenvironmental and geomorphological data from other studies. Most importantly, this study investigates human behavior by studying microscopic anthropogenic components in the sediments and by reconstructing the life history of features, e.g. the Late Natufian floor and associated combustion features. The geoarchaeological data are compared with other archaeological datasets from Baaz and similar contexts. Micromorphological studies of floors have provided important information on human behavior (Boivin, 2000; Gé et al., 1993; Karkanas, 2009; Matthews, 1996; Matthews et al., 1997; Tsatskin and Nadel, 2003). In Natufian research, however, micromorphological examinations of floors have been neglected, making this is the first systematic micromorphological study of a Natufian floor.

1.1. House structures in the Natufian

The Natufian is defined by its unique architecture, use of ornaments, graves, and characteristic bone and stone artifacts, e.g. lunates, which represent significant changes and innovation in subsistence economy, social organization and settlement systems (e.g. Bar-Yosef, 1998, 2002; Bar-Yosef and Valla, 1991, 2013; Garrod, 1957). These changes and innovations include more permanent settlements of which house structures are a critical units of analysis (see Goring-Morris and Belfer-Cohen (2008) for a detailed overview of Natufian architecture). Typical Natufian dwellings vary in size from 3 to 15 m in diameter (Goring-Morris and Belfer-Cohen, 2008). There is a shift in dwelling size and also in type from the Early to Late Natufian in the Mount Carmel, Galilee and the Upper Jordan Valley region in the Southern Levant. The Early Natufian here shows a differentiation into base camps as large as 100–150 m^2, as for example at Wadi Hammeh (Edwards, 1991), and into smaller, special-purpose camps, 2–4 m^2 in size, as for example the lime kiln at Hayonim Cave (Belfer-Cohen, 1988; Kingery et al., 1988) (see also Goring-Morris and Belfer-Cohen, 2003, 2008). Camp size in the Southern Levant drops during the Late Natufian where camps rarely exceed 10 m^2 (see for example the Late Natufian occupation at Eynan (Perrot, 1966)). In the Northern Levant, however, the picture is quite different. Early research suggested the presence of only a few, small Late Natufian sites here, in contrast to the rich record from the Southern Levant. Researchers interpreted this pattern as reflecting an origin for the Natufian in the Southern Levant or the forest-rich Mediterranean region, and subsequent spread into the inland Northern Levant (e.g. Bar-Yosef, 1998; Bar-Yosef and Belfer-Cohen, 1989, but see Goring-Morris and Belfer-Cohen, 2013). However, recent discoveries of a large Late Natufian settlement at Nahal Ein Gev II (Grosman et al., 2016) and of Early Natufian occupation at Jeftelik (Rodríguez Rodríguez et al., 2013), Dederiyeh (Nishiaki et al., 2011) and possibly Qarassa 3 (Terradas et al., 2013) in the Northern Levant challenge and enhance this model (see also Boyd, 2016).

In addition to size, Natufian dwellings share several other architectural characteristics. They are round to oval or D-shaped, semi-subterranean and commonly exhibit a wall composed of outer rings of stones, as at Jayroud 1 (Cauvin, 1991), Dederiyeh (Nishiaki et al., 2006), El Wad (Garrod and Bate, 1937), and Eynan (Valla, 1988). Observations of postholes in many cases indicate the construction of roofs, such as those at Wadi Hammeh (Edwards, 1991), and Eynan, (Haklay and Gopher, 2016). Hearths, and to a lesser degree constructed floors, are also present. However, to the best of our knowledge, floors - here specifically referring to constructed floors and excluding living/occupation floors/surfaces and stone paved floors - have been reported from only three sites: Hayonim, Tell Mureybet and Abu Hureyra. At Hayonim, Bar-Yosef (1991) describes the presence of a compacted earth floor at locus 2 from the Late Natufian occupation, in addition to paved floors in loci 4, 5, and 7. At Tell Mureybet, Cauvin (1991) and Stordeur and Ibàñez (2008) report the remains of a Late Natufian compacted clay or earth floor in layer 1A. At Abu Hureyra Moore et al. (1975) observed a rectangular clay floor in a subterranean house structure with post holes, which they assign to the Late Epipaleolithic and not the contemporary Late Natufian in the Southern Levant; however, others assign Abu Hureyra to the Late Natufian (see discussion in Moore et al., 2000; Boyd, 2016). Also at Moghr al Ahwal, Garrard and Yazbeck (2013) mention a constructed surface: a lime plaster layer at the base of a pit. This plaster layer is composed of several microscopic, thin layers possibly representing multiple episodes of replastering (pers. comm. R. Macphail and see also Neolithic examples in Matthews, 1996); however, the authors present no interpretation on the formation and function of this feature. According to the macroscopic field descriptions, the other three floors at Hayonim, Tell Mureybet and Abu Hureyra were made of naturally occurring material: clay or generic 'earthen material'.

1.2. Analysis of floors

Most commonly, reconstruction of human behavior in houses and settlements is facilitated by the analysis of artifact assemblages within the house or by macroscopic observations of the architectural features (see studies cited in 1.1. and Goring-Morris and Belfer-Cohen, 2003, 2008). Site formation studies of the actual deposits in the house and in-depth studies of the architectural features are often neglected (Cauvin, 1991; Moore et al., 1975; Stordeur and Ibàñez, 2008). Architectural remains such as constructed floors, roofs and walls represent their own artifact class, reflecting a range of human behaviors from their construction and craftsmanship, to the use and function of a room, house, camp or settlement, to their abandonment and end of settlement (Schiffer, 1983; Stein, 1987; Sherwood and Kidder, 2011; Friesem et al., 2011, 2014). Analysis is carried out by reconstructing the life cycle of the architectural features. For floors, the life cycle involves the following: 1) exploration of the landscape and raw material acquisition; 2) production of the necessary construction tools; 3) preparation and alteration of the raw material; 4) preparation of the surface; 5) construction of the floor; 6) use and maintenance; 7) abandonment; 8) reuse; and finally, 9) decay and destruction (Gé et al., 1993; Matthews et al., 1997). Gé et al. (1993) distinguish between anthropogenic formation processes - human activities - that result in accumulation, reduction, transformation, and translocation. They also emphasize that micromorphology is the optimal tool to reconstruct the formation and life history of a floor and other occupation surfaces.

This life history approach to studying floors has been successfully employed in a range of micromorphological and microcontextual studies, most prominently at Neolithic sites (e.g. Goren and Goldberg, 1991; Matthews, 1996; Matthews et al., 1997) but also in Epipaleolithic contexts that precede the Natufian (e.g. Tsatskin and Nadel, 2003). Matthews (1996) and Matthews et al. (1997) conducted micromorphological analysis at the Neolithic site complex of Çatalhöyük and were able to differentiate between outdoor and indoor areas and to identify room function, such as for food cooking, ritual purposes, and stabling. Similarly, at the early Epipaleolithic site of Ohalo II micromorphological analysis in concert with botanical, lithic, zooarchaeological, and spatial analyses were able to demonstrate the use of organic floor bedding in huts and to reveal differential use of space inside the huts for tool production, sleeping, and cooking (Nadel et al., 2004; Tsatskin and Nadel, 2003).

On more theoretical grounds, Gé et al. (1993) proposed a microstratigraphic model for occupation surfaces including constructed floors, which describes the formation of three distinctive microstratigraphic sublayers of the floor: the passive, reactive, and active zones (Fig. 2). The passive zone is the lower-most unit and presents an unaltered version of the floor as it was made. The overlying reactive zone is that part of the floor, which is transformed by trampling. The reactive zone consequently experiences changes in its fabric and components, which are introduced from the overlying active zone. The uppermost, active zone is the result of activities occurring on top of the floor. Furthermore, the contact between the