Establishing regional sequences: The Qalamunian Upper Paleolithic and its implications for the two-tradition model in the Levant.

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Abstract

This paper presents an analysis of the lithic artifacts of the Upper Paleolithic (UP) cultural sequence of Baaz Rockshelter in the Qalamun region of southwestern Syria. The site was discovered during a regional survey in Damascus Province conducted by a multidisciplinary team from the University of Tübingen and excavated between 1999 and 2004. We compare the UP of Baaz to the nearby site of Yabroud II. The archaeological record of the Qalamun region supports a discontinuity between the Middle Paleolithic (MP) and Early UP. The first phase of the Qalamunian UP is characterized by lithic assemblages with an emphasis on bidirectional reduction and the production of blades, as represented by layers KS 7 and 6 at Yabroud II, but not at Baaz. In contrast, the second phase of the Qalamunian UP is characterized by an emphasis on unidirectional reduction and the production of bladelets as seen in Baaz layers AH VII to IV and Yabroud II KS 5 to 1. We hypothesize that the Qalamunian UP record points to an early replacement of blade technologies with an increased emphasis on the production of bladelets around 38,000 cal BP. The orientation towards bladelet production as well as the related technological characteristics remains almost unchanged in the later UP phases for about 15,000 years (Baaz AHs V to IV, Yabroud II KS 4 to 1). Comparisons with other Levantine UP sites suggest that the Qalamunian UP sequence reflects a broader geographical phenomenon with regard to the occurrence of bladelet oriented technologies. Finally, we conclude that the Qalamunian UP record cannot easily be explained by the two-tradition model, which questions the pan-Levantine validity of the two-tradition model.

Introduction

The Eastern Mediterranean is a key region for studying the evolution of modern humans during the Late Pleistocene. Given the region's geographic position connecting Africa, Asia and Europe the record of human behavior in the Levant has implications for neighboring regions and beyond. A century of research in the Levant has succeeded in documenting a large number of well-stratified Middle (MP) and Upper Paleolithic (UP) sequences reflecting a high degree of cultural diversity (Garrod and Bate 1937; Ewing 1947; Rust 1950; Copeland 1975; Marks 1976; Bar-Yosef *et al.* 1992; Boëda and Muhesen 1993; Kuhn *et al.* 2003; Schyle and Richter 2015).

The first model explaining the diversity of the Upper Paleolithic in the Levant arranged observations into a unilinear developmental sequence (Neuville 1934). Researchers rejected this explanation after new data from large scale field projects of the 1970s became available and after re-evaluating material from older excavations. Prehistorians argued that the observed variability was better explained by two independent traditions, the Ahmarian and the Levantine Aurignacian (Gilead 1981; Marks 1981).

Research over the past two decades has revealed that an increasing number of assemblages do not easily fit into the two-tradition model. Attempts to consider variability in lithic assemblages beyond the Ahmarian-Levantine Aurignacian dichotomy (Kaufman 2003; Belfer-Cohen and Goring-Morris 2007) have so far not led to an explicit formulation of a competing model. Considering the size and geography of the Levant along with its mosaic of environmental conditions, it seems doubtful that pan-Levantine models provide valid foundation for explanations of the regional records. Moreover, by forcing assemblages into the taxonomy of the two-tradition model, we might mask significant regional variability.

In this paper we introduce a new UP lithic sequence from the Qalamun region in southwestern Syria and argue for establishing detailed regional sequences instead of focusing on simplified supra-regional models. This report includes data resulting from a decade of field work conducted by the Tübingen-Damascus Excavation and Survey Project (Conard 2006).

Background

From its onset in 1999, the Tübingen-Damascus Excavation and Survey Project, which we denote using its German acronym “TDASP” *(Tübinger-Damaskus Ausgrabungs- und Survey-Projekt)*, was conceived as a long-term, multidisciplinary research initiative to investigate the archaeology and paleoenvironment of Syria. After conducting preliminary reconnaissance of the Mediterranean coastal region and in the Damascus Province (Conard 2006), the TDASP team decided to focus its resources on southwestern Syria. More precisely, the TDASP study region is located in the Qalamun region, near the villages of Ma’aloula, Jaba’deen and Yabroud, located 50-70 km northwest of the old city of Damascus (Fig. 1).

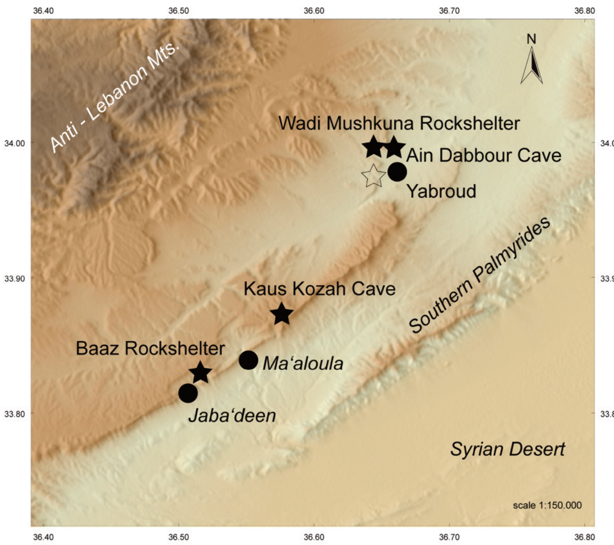

Figure 1: *Map of southwestern Syria showing the TDASP survey region in the Damascus Province. Large black stars denote the four sites excavated by the TDASP team; open star denotes location of Yabroud sites 1-4.*

We built upon the solid foundation of Rust’s (1950) work at Wadi Skifta in Yabroud. Additional research near this pivotal Levantine site included Suzuki and Kobori’s (1970) and Bakdach’s (2000) field surveys, as well as further excavation by Ralf and Rose Solecki (1987/1988). Between 1999 and 2010 our systematic surveys of the Qalamun documented 598 artifact bearing localities from the Lower, Middle, Upper and Epipaleolithic periods, and even the Neolithic, distributed over all parts of the study region (Conard *et al.* 2006b). During the surveys we identified four new stratified Paleolithic sites where we conducted archaeological excavations (Fig. 1): Baaz Rockshelter (1999-2004), Kaus Kozah Cave (2004-2006), Ain Dabbour Cave (2007-2008) and Wadi Mushkuna Rockshelter (2007-2010), as well as other potentially stratified sites that warranted further investigation.

The Qalamunian UP record

Baaz Rockshelter

Baaz was discovered during the first season of field work in May 1999. The TDASP team excavated Baaz in 1999, 2000 and 2004 and assembled a wealth of information on the UP, Epipaleolithic and Neolithic occupation of the rockshelter. This article presents results from our analysis of the UP occupations, while the two later periods were published in detail elsewhere (Barth 2006; Wahl-Gross 2006; Hillgruber 2010; Riethmüller 2010; Stahlschmidt *et al.* 2017; Conard *et al.* 2013; Napierala *et al.* in press).

Baaz (E 36.5161°, N 33.8203°) is located in the southernmost extent of the Palmyrides Mountains at an altitude of 1529 m above mean sea level. The site is situated at the base of a prominent Oligocene limestone cliff that is oriented in a northeast-southwest direction. The cliffline and its underlying cliff slope form a geographic barrier between the lowland hills and fans and the highland hills and plateau. In certain valleys where perennial springs flow today, the cliffline is incised, allowing fresh water to flow from the highlands. Baaz is located on a prominent ridge above such an incision that offers passage for humans and fauna between the lowlands and the highlands and a ready supply of fresh water from a major spring (Fig. 2).

Stratigraphy

We defined seven stratigraphic units on the basis of visible changes in color, texture and grain size, taking care not to excavate across stratigraphic units. We refer to the main stratigraphic units as geological

Figure. 2: *Baaz Rockshelter. A) Site location in the cliff line (arrow), B) Overview of the site, C) Overview of the excavation.*

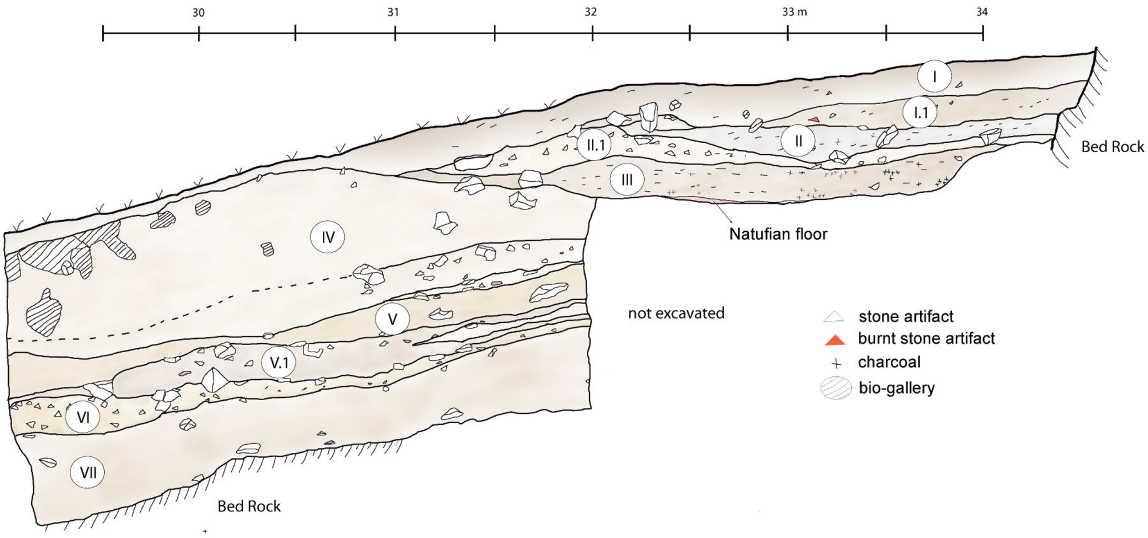

Figure 3: *Profile drawing showing the stratigraphic position of the archaeological horizons (Roman numerals) at Baaz Rockshelter.*

horizons (GH with Arabic numbers), while we defined the cultural units as archaeological horizons (AH with Roman numerals). We subdivided these units using letters or numbers to define sublayers and features within a horizon. At Baaz the seven GHs correspond directly to seven AHs (Fig. 3).

Compared to the overlying layers of mainly anthropogenic origin (AHs I - III), the stratigraphy of the underlying geogenic layers AH IV-VII is clear. These layers comprise about 1.2 m of compact, yellowish brown clayey silt with clasts of poorly sorted angular limestone debris. The concentration of finds varies with depth, suggesting that occupation of the site was punctuated. Finds include mainly lithic artifacts with some fauna, but little charcoal. Features such as hearths were not observed below AH III. Underlying AH VII we observed limestone bedrock.

Chronology

To better understand the cultural sequence at Baaz, we submitted nine charcoal samples for AMS radiocarbon dating to the Leibniz Laboratory in Kiel (Deckers *et al.* 2009). We calibrated the dates using OxCal version 4.2.3 (Bronk Ramsey *et al.* 2013) and IntCal 09 (Reimer *et al.* 2013). Based on the dating results, we recognize at least four phases of occupation at Baaz. The uppermost samples from AH I-II document Neolithic use of the rockshelter, while the next phase from AH II-III corresponds to an Epipaleolithic occupation that we attribute to the Khiamian and Late Natufian. The dated UP occupations are distinct: the occupation of AH V occurred between approximately 26-24,000 cal BP, placing it at the end of the UP, while the occupation of AH VII dates to 38-33,000 cal BP within the Early UP. Although direct dates were not obtained from AH IV, its age is constrained between the minimum age of AH V and the maximum age of AH III, or 24-13,000 cal BP. This places AH IV in the final UP or the early Epipaleolithic.

	Baaz IV		Baaz V		Baaz VII	
Debitage	N	%	n	%	n	%
Cores	11	0.3	69	0.9	8	0.4
Core trimming elements	7	0.2	21	0.3	3	0.1
Crested blades	2	0.1	30	0.4	1	0.0
Flakes	215	5.6	834	10.6	147	6.8
Blades	82	2.1	359	4.5	25	1.2
Bladelets	114	3.0	543	6.9	87	4.0
Debris	18	0.5	40	0.5	23	1.1
Small & microdebitage	3239	84.0	5408	68.7	1752	81.3
Unidentified flakes > 2 cm	169	4.4	565	7.2	110	5.1
Total	**3857**	**100**	**78 69**	**100**	**2156**	**100**

Table 1: *UP lithic assemblages from Baaz Rockshelter. Unidentified flakes are unretouched lithic artifacts counted during the sorting of the bucket finds but without classification as flake, blade or bladelet. Unidentified flakes >2 cm: see unidentified flakes.*

Archaeology

Data presented here reflects the state of our analysis in 2010. With the beginning of the civil war in Syria in 2011 we had to stop field work and analysis of the material. The majority of data on Baaz Rockshelter presented here was recorded in a database by the TDASP teams and by Felix Hillgruber for his PhD (Hillgruber 2010) during the field seasons. This database forms the basis for most of the basic description of the assemblages and the numerical data in this paper. In our last season in 2010 we had the chance to 3D scan 446 lithic artifacts from AHs III to VII. The 3D models allowed us continuing our

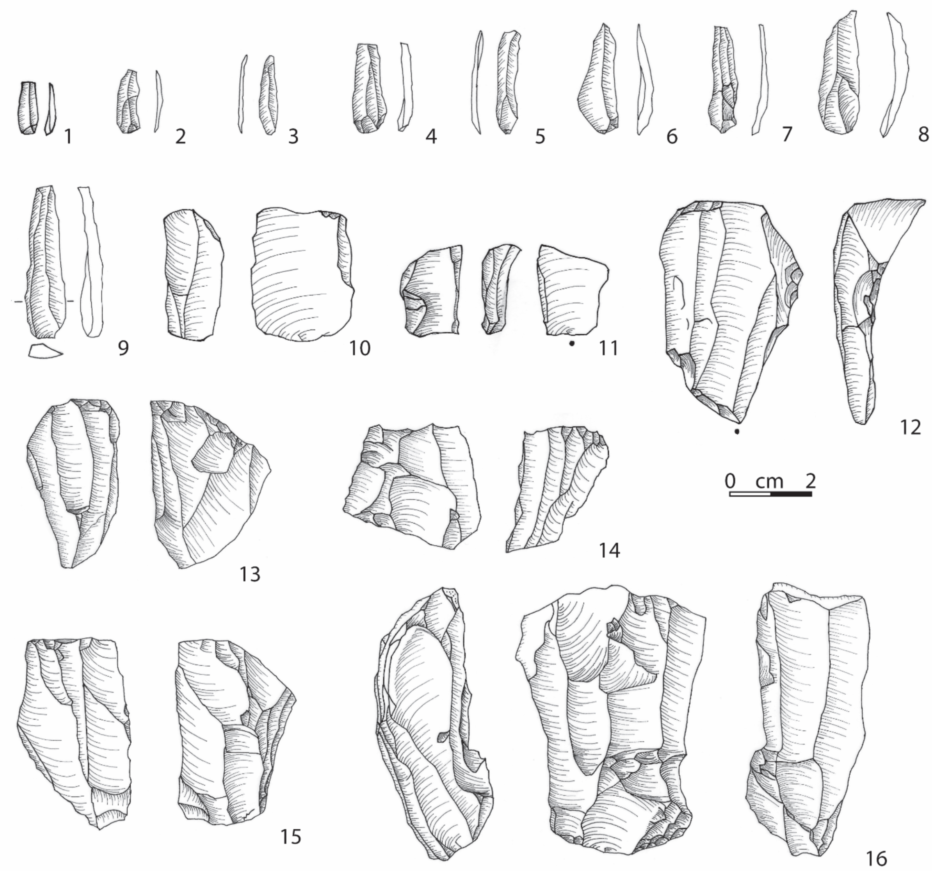

Figure 4: *Examples of lithic artifacts from Baaz Rockshelter AH VII. 1-9 bladelets, 10-12 burins, 13-16 cores.*

study for part of the assemblages in Germany and adding new data after 2010. Data from the 3D models is also included in this paper.

The paper will focus mainly on the lithic materials from AHs VII, V and IV of Baaz. While we recognize occupation in AH VI, the 62 stone artifacts and 11 faunal remains are too sparse to evaluate on their own. Since we cannot make conclusive statements about this assemblage, we exclude it from our analysis.

In his doctoral thesis Napierala (2011) describes the faunal remains of the UP layers at Baaz in detail. Thus we limit discussion here to a brief overview. Layers AH VII and VI did not provide a sufficient amount of data to draw conclusions about the composition of the fauna deposited during these occupations. However, faunal assemblages from AH V and IV indicate a dominance of wild caprines and gazelles, typical prey species of the Levantine UP. While AH V provides additional evidence for equids, AH IV lacks finds identified as equids. It is worth noting, that the faunal assemblage of AH IV also indicates a reliance on smaller game such as hare. In the absence of chronometric dating, prudence suggests that we not over-interpret this pattern. Nonetheless, the increased relative frequency of small mammals is a characteristic frequently observed at Epipaleolithic sites (Stiner *et al.* 1999; Munro 2003; Stutz *et al.* 2009).

The assemblages of lithic artifacts from AHs VII, V and IV are made predominantly on local, fine-grained chert ranging in color from dark brown to greyish brown (Hillgruber 2010). Chert is readily available from a variety of primary and secondary contexts throughout the region and can be considered as local. Pieces from primary context often feature white chalky cortex which distinguishes them from raw material extracted from secondary contexts, which have a thin, often scarred cortex and range in color from grey to brown (Hillgruber 2010). In fact, all assemblages below AH III are dominated by raw material from secondary contexts, with primary sources exploited to a far lesser degree.

AH VII

The lithic assemblage from the deepest layer AH VII (Fig. 4) consists of 2156 artifacts (Tab. 1). Small (20-10 mm) and microdebitage (<10 mm) comprise about 80% of the assemblage, and flakes outnumber blades (>12 mm width) and bladelets (<12 mm width). The tool assemblage from layer VII is small (n=16) and consists of six burins, six simple laterally

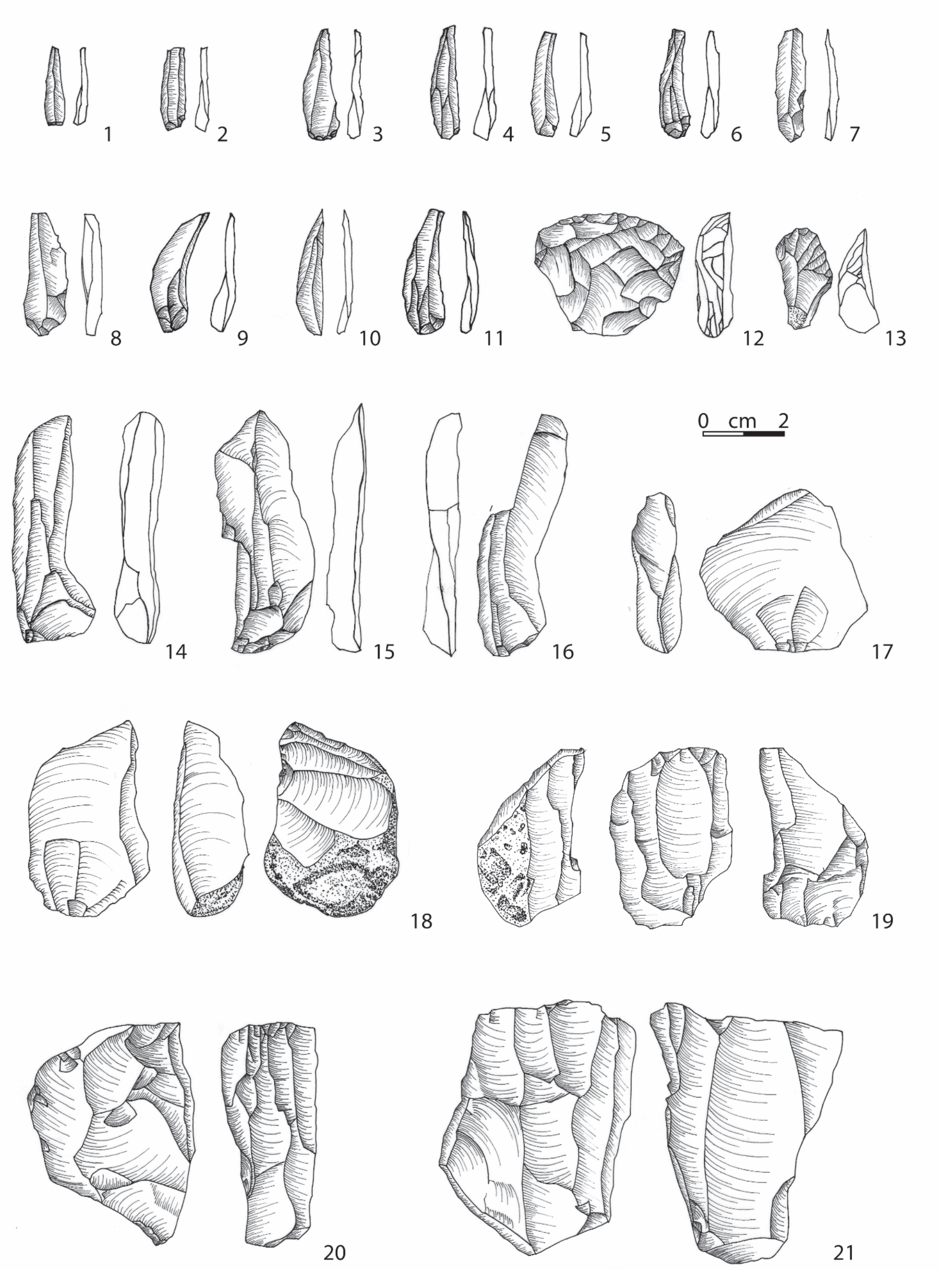

Figure 5: *Examples of lithic artifacts from Baaz Rockshelter AH V. 1-11 bladelets, 12 Ksar Akil scraper, 13 flat carinated scraper, 14-17 burins, 18 core on flake, 19-21 cores.*

retouched bladelets, one laterally retouched blade and three miscellaneous retouched tools (Tab. 2).

Lithic production in AH VII focused on laminar artifacts as indicated by the frequencies of bladelets and blades (Tab.1). A unidirectional logic of reduction is characteristic of both blade and bladelet production. However, the blade and bladelet cores feature significant differences in their technical configuration. While blade cores have two opposed platforms, which are oriented to exploit two independent reduction surfaces, the majority of the bladelet cores are single platform cores with a single removal surface.

Eleven percent of complete artifacts larger than 2 cm show more than 90% cortical cover, while the average cortex cover as defined by Dibble *et al.* (2005) is 37%. This value is relatively high and contrasts with the expectation that only a small number of cortical artifacts should be present in technological systems that are geared toward the serial production of blades. We interpret our observations on cortical cover as an indication of on-site initiation of the reduction process, in addition to managing convexity by expanding the reduction surface into the cortex covered flanks of the cores.

AH V

The lithic assemblage of AH V (Fig.5) consists of 7869 artifacts, a considerably larger assemblage than AH VII (Tab. 1). Here, small and microdebitage account for about 70% of the assemblage.

Flakes and laminar debitage are present in equal frequencies. The 108 tools are dominated by laterally retouched artifacts (n=62) and burins (n=36), with other tool types making up the difference (n=10). Of the 62 laterally retouched artifacts, most are bladelets (n=46) with partial dorsal retouch along one lateral edge. About a third of these retouched bladelets show ventral retouch (n=13). Ten of 36 burins feature two or more spalls detached in one direction. Finally, the remaining ten tools include two laterally carinated scrapers, one so-called flat carinated scraper (Fig. 5, #13), one Ksar Akil scraper (Tixier 1974) (Fig. 5, #12), two truncated pieces, one borer and three miscellaneous retouched pieces (Tab. 2).

Despite the frequency of flakes, laminar artifacts were the main goal of lithic production in AH V, given that blades and bladelets dominate the tool blanks (Tab. 1). Laminar production in AH V is characterized by multiple production sequences. Production is evident in blade and bladelet cores that have mainly one platform, indicating the preference for unidirectional reduction. While cores with two opposing platforms are present, they count among the minority. The geometry of the discarded blade and bladelet cores indicates that flat cobbles were often reduced along their narrow face.

	Baaz IV		Baaz V		Baaz VII	
Tools	N	%	N	%	N	%
Scraper	-	-	4	4	-	-
Burin	6	13	36	33	6	37
Truncation	1	2	2	2	-	-
Borer	1	2	1	1	-	-
lateral retouch	32	70	62	57	7	44
Unspecific retouch	2	4	3	3	3	19
Backed pieces	4	9	-	-	-	-
Total	**46**	**100**	**108**	**100**	**16**	**100**

Table 2: *UP tool assemblages from Baaz Rockshelter.*

Of the complete artifacts larger than 2 cm, 15% show more than 90% cortical cover, while the average cortex cover is 38%. As in AH VII, this value exceeds the expectations for laminar technology. Similar to AH VII, this might indicate that cortex covered nodules were imported onto the site. Reduction surfaces were then expanded into parts of the core covered with cortex during the on-site reduction process. The export of blanks and the mixture of laminar and flake technologies in AH V might be additional explanations for the relatively high average cortex cover.

AH IV

The lithic assemblage of layer IV consists of 3857 artifacts (Tab. 1). Small and microdebitage account for about 84% of the assemblage. Similar to AH V, flakes and laminar debitage are present in equal frequencies. The 46 tools (Tab. 2) are dominated by laterally retouched pieces (n=32) and burins (n=6), with eight other tool types present. About half of the laterally retouched pieces are bladelets (n=22) with partial direct retouch along one lateral edge. Only one laterally retouched piece shows ventral retouch. Of the six burins, three feature two or more spalls detached in one direction. In the category of other tools, four backed artifacts appear in the sequence for the first time. Additionally, one truncated piece, one borer and two miscellaneous retouched tools complement the tool assemblage of AH IV.

Similar to AHs VII and V, lithic production in AH IV is geared towards laminar artifacts. Blades and bladelets clearly dominate the blanks (Tab. 1). Scars on the majority of blade and bladelet cores indicate a preference for unidirectional reduction.

Of the complete artifacts larger than 2 cm, about 10% show more than 90% cortical cover, while the average cortex cover is 32%. Despite being slightly lower than AHs VII and V, this exceeds expectations for laminar technology and indicates the import of cortex covered nodules, the expansion of reduction surfaces into parts of the core covered with cortex during the on-site reduction process, and an export of blanks and tools.

Yabroud Shelter 2

Few stratified UP sites are known from the Qalamun region, and of these, the most important is Yabroud Shelter 2 (Yabroud II) in the Skifta valley 1 km west of the city of Yabroud (Fig. 1). Separated by 35 km as the crow flies, Baaz Rockshelter and Yabroud II form the basis for studying the UP in southwestern Syria.

Yabroud II was excavated by Alfred Rust between 1930 and 1933 (Rust 1950). According to Rust (1950) the site contains a sequence of three late MP (Kulturschicht (KS) 10-8) and seven UP assemblages (KS 7-1). All UP assemblages from Yabroud II show a strong emphasis on the production of blades and bladelets. One of us (KB) had the opportunity to study these assemblages at the University of Cologne.

After their description by Rust (1950) assemblages from Yabroud II have been subject to repeated re-analysis (Bakdach 1982; Schyle 1992;

Pastoors *et al.* 2009; Bretzke and Conard 2012). Their lithic technological characteristics can be summarized as follows. The lithic technology in KS 7 and 6 at Yabroud II is dominated by blade production from unidirectional and bidirectional cores, with blanks showing plain and facetted platforms. Bidirectional reduction occurs from two opposing platforms sharing one reduction surface, which indicates a bidirectional logic of reduction.

In KS 5, the technological spectrum includes unidirectional and bidirectional reduction on highly convex reduction surfaces, as well as the production of twisted blades (Bretzke and Conard 2012). In contrast to KS 7 and 6, bidirectional reduction in KS 5 involves cores with two opposed platforms serving two independent reduction surfaces. Still, reduction follows a unidirectional logic. An additional characteristic that distinguishes KS 5 from KS 7 and 6 is its significant shift towards bladelets in the production of laminar artifacts (see also Bakdach (1982), figs. 20 and 30). This shift is accompanied by an increased frequency of bladelet cores and multiple burins, demonstrating the implementation of two independent reduction systems for the production of bladelets in KS 5.

Assemblages from the overlying sequence of KS 4 to 2 are characterized by an increasing emphasis on unidirectional reduction of cores with a trend toward lithic production on flat reduction surfaces (Bretzke and Conard 2012). Despite this trend, the overall lithic technological behavior remains largely unchanged in KS 4 to 2 compared to the underlying KS 5.

In KS 1, we observe a lithic technology based on unidirectional reduction from cores with flat reduction surfaces. The production of blades and bladelets is geared towards straight forms. Compared to the underlying layers, the most significant change in lithic production is reflected in a noticeable increase in carinated scrapers, including nosed and shouldered variants. Many of these carinated scrapers have scars large enough to indicate their use as bladelet cores. The assemblage from KS 1 thus shows the appearance of an alternate approach in the production of bladelets, in this case, from blanks. Additionally, bladelet production from cores and multiple burins is present. This stands in contrast to KS 5 to 2 and provides evidence for a significant expansion of the technological repertoire of the inhabitants of Yabroud II during the deposition of KS 1.

The Qalamunian UP sequence

To interpret the Qalamunian UP sequence we compare the lithic assemblages from Baaz Rockshelter and Yabroud II. First we note that the techno-typological composition of the UP assemblages from Baaz does not correspond to KS 7 and 6 at Yabroud II. We see more affinities of Baaz AH VII with KS 5 to 2 at Yabroud II. Moving up the sequence at Baaz, the assemblages from AHs V and IV have typo-technological characteristics that are not represented in the Yabroud II assemblages. Thus we argue that Baaz AHs V and IV postdate the Yabroud II sequence. Nonetheless, the lack of chronometric data from Yabroud II does not allow us to confirm the proposed relationship of Yabroud II with Baaz.

Despite intensive field work in the Qalamun region, the archaeological record currently lacks evidence for the transition from MP to UP (Rust 1950; Suzuki and Kobori 1970; Bakdach 2000; Conard 2006). This period is often thought to be represented by lithic assemblages characterized by a mixture of MP technology and UP typology (Marks 2003). A distinctive feature of lithic assemblages from the transitional period in central Levantine contexts is the presence of chamfered pieces *(chanfreins)* (Newcomer 1970; Copeland 1975). Other characteristic tool types related to the MP - UP transition in the Levant include the Emireh point found in southern Levantine contexts and the Umm el Tlel point found at inland sites in the northern Levant (Boëda and Muhesen 1993). However, none of these characteristic tool types and related lithic technologies are known to occur in Qalamunian assemblages.

Rust (1950), as well as other researchers later (Besançon *et al.* 1975; Ziffer 1981; Bakdach 1982) argue that Yabroud II KS 7 and 6 represent UP lithic traditions. In contrast, Pastoors *et al.* (2009) conclude from their re-evaluation of Yabroud II KS 10 to 5 that KS 7 provides "…more signs for a Middle Paleolithic than a Upper Paleolithic industry." (Pastoors *et al.* 2009, p.60) and see with regard to KS 6 "…more affinities to the concept of an Initial Upper Paleolithic" (ibid, p. 61) Given the lack of characteristic tool types in addition to the relative small number of finds in KS 7 and 6, we see no strong evidence for an interpretation of these layers as MP or Initial UP. Moreover, a decade of TDASP field work in the region including systematic surveys that have identified 598 stone artifact bearing localities and excavation of the 4 m thick MP sequence at Wadi Mushkuna (Bretzke *et al.* in press), located 2 km north of the Yabroud sites, did not provide clear evidence for MP-UP transitional assemblages in the Qalamun region (Conard *et al.* 2010). Based on these observations we hypothesize a discontinuity in the lithic traditions between the MP and Early UP.

We argue that the first stratified evidence for an UP occupation in the Qalamun region is represented by KS 7 and 6 at Yabroud II and assume that it predates 38 ka BP. Clear technological differences distinguish these assemblages from assemblages of later UP occupations represented by Baaz AH VII to IV and Yabroud II KS 5 to 1. Based on these observations we argue that the Qalamunian UP record can be divided into two distinct UP phases. The older UP phase reflected in Yabroud II KS 7 and 6 is characterized by lithic assemblages featuring an emphasis on bidirectional reduction and the production of blades. In contrast, the second phase of the Qalamunian UP is characterized by a technological shift towards an emphasis of unidirectional reduction and the production of bladelets. Given the dating of Baaz AH VII, the occurrence of bladelet technologies in the region can be dated to about 38 ka BP. Strong similarities in the lithic technology of assemblages from the sequence of Baaz AH VII to IV suggest that the technological tradition remains relatively unchanged in our study region between about 38 ka BP and 23 ka BP. During the later UP occupations in the second Qalamunian UP phase technological innovations such as carinated scrapers in Yabroud II KS 1 and twisted ventrally retouched bladelets in Baaz AH V, indicate that novel technological elements were successively added in otherwise unchanged technological repertoires.

Discussion

The Qalamunian UP record points to an early replacement of blade technologies (Yabroud II KS 7 and 6) with technologies with an increased emphasis on the production of bladelets (Baaz AH VII, Yabroud KS 5). This orientation towards bladelet production remains almost unchanged in the following UP occupational phases (Baaz AHs V to IV, Yabroud II KS 4 to 1). Other sites from the central Levant provide sequences similarly featuring an early shift in the emphasis from blade to bladelet production. These include Kebara layers IV/III vs. II/I (Bar-Yosef *et al.* 1996; Rebollo *et al.* 2011) and Ksar Akil layers XIX-XV vs. XIII-IX (Bergman 1987; Williams and Bergman 2010), both of which may be analogous to the situation in the Qalamun region. This technological shift is also associated with a change from bidirectional to unidirectional logic of reduction, the occurrence of an independent reduction sequence for bladelets using carinated scrapers, and the dominance of retouched bladelets (Bergman 1987; Bar-Yosef *et al.* 1996; Tostevin 2012). At Kebara this shift is dated to about 42-36 ka cal BP (Bar-Yosef *et al.* 1996), while new data from Ksar Akil indicate that the shift there might have occurred between 40-37 ka cal BP (Douka *et al.* 2013). Both chronologies agree with our data and indicate that the Qalamunian UP sequence reflects a broader geographical phenomenon with regard to the occurrence of bladelet oriented technologies.

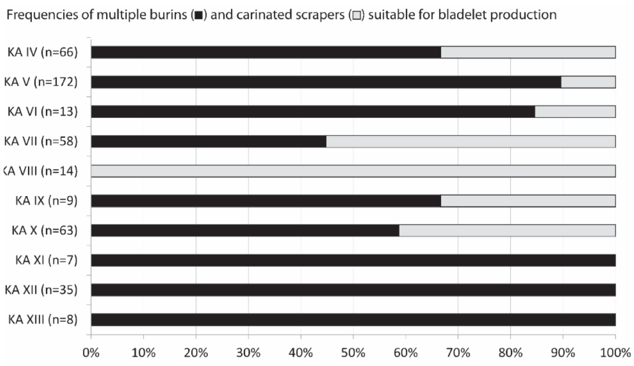

Figure 6: *The relative frequencies of carinated scraper and multiple burins in Ksar Akil layers XIII to V. Data from our own re-evaluation of material from squares F4 and E4 housed at the British Museum and Harvard University. We counted multiple burins and carinated scrapers only if we observed at least three laminar scars with lengths > 15 mm.*

We consider the continuous presence of similar bladelet technologies during the second phase of the Qalamunian UP between 38 ka BP and 23 ka BP as a marker for a stable population in the Qalamun region. Comparable evidence for technological continuity in the Levant is scarce, which might be largely due to the low number of stratified sites from the critical timeframe. However, the extensive UP sequence at Ksar Akil provides important data to assess the question of continuity vs. discontinuity in the timeframe roughly between 38 ka BP and 23 ka BP. One of us (KB) studied material from layers XIII to VI of the Boston College excavation because the second phase of the Qalamunian UP finds its best parallels in this part of the Ksar Akil sequence. Tixier and Inizan (1981) argue that the presence of *burins nucléiformes* as bladelet cores in layers XII to VI indicate continuity. It is of critical importance to note that Tixier and Inizan (1981) include layers VIII and VII in their model. These layers were often classified as classic Levantine Aurignacian (Marks 2003) and thought to be significantly different from both underlying and overlying assemblages (Williams and Bergman 2010). In our own re-evaluation of material from Ksar Akil layers XIII to V we found evidence to support claims of continuity. We argue that lithic technological differences between Ksar Akil layers X/IX and VIII/VII largely reflect a shift in bladelet production from cores to carinated scrapers. Our analysis clearly shows that bladelet production from carinated scrapers already occurs in layer X and continues afterwards in layers VI to

IV (Fig. 6). Potential reasons for such a shift may be related to changes in raw material economy and group mobility.

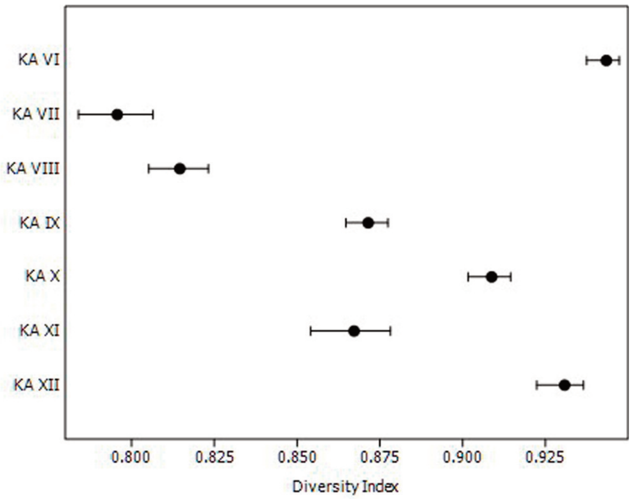

Figure 7: *Diversity indices for the Ksar Akil tool assemblages from layers XIII to V. Data from Bergman (1987). Greater values indicate greater diversity of tool types, while smaller values indicate more specialized assemblages with relatively few different tool types. Whiskers represent the confidence interval for the index computed with a bootstrap procedure using the Past software package (Hammer* et al. *2001).*

To test this, we analyzed tool diversity and used the result to estimate the duration of stay based on the assumption that, all else being equal, greater tool diversity reflects longer stays at the site (Richter 1990). Using data on the tool assemblages provided by Bergman (1987), we analyzed Ksar Akil layers XIII to VI and calculated the diversity index following Kandel *et al.* (2016). Significantly smaller diversity indices for layers VIII and VII at Ksar Akil reveal that these assemblages are more specialized than all other assemblages (Fig.7). Translating this into settlement behavior, the data suggest shorter stays and higher overall mobility during the deposition of layers VIII and VII compared to earlier and later periods. Hence the increase in frequency of carinated scrapers in these layers could indeed reflect an adaptation to changed settlement dynamics and support the hypothesis of technological continuity.

Conclusion

New data from the UP of the Qalamun region in southwestern Syria indicate an early shift from blade technologies to a focus on bladelets around 38 ka BP. Bladelet technologies remain largely unchanged and a dominant characteristic of the UP occupations in the region at least until about 23 ka BP. We argue that these observations stand in contrast to the two-tradition model, which is often considered to be of pan-Levantine validity. The two-tradition model proposes that an endemic culture, the Ahmarian, is continuously present in the Levant between ca. 45 and 28 ka cal BP (Belfer-Cohen and Goring-Morris 2007; Goring-Morris *et al.* 2009; Belfer-Cohen and Goring-Morris 2014) and is briefly confronted with the appearance of an independent culture, the Levantine Aurignacian, between ca. 37 and 32 ka cal BP (Belfer-Cohen and Goring-Morris 2014).

One critical question for the discussion of the two-tradition model is how to assess bladelet assemblages, including those of the Qalamun. Do bladelet industries form an independent entity in the Levantine UP, or are they a component of both Ahmarian and Levantine Aurignacian traditions? While we have no simple answer to this question, arguments for continuity presented above may point to the first option. The bladelet dominated UP assemblages from Umm el Tlel in the Syrian Desert also support claims for the introduction of an independent entity for bladelet assemblages. Ploux and Soriano (2003) classify these assemblages into the Ahmarian-Levantine Aurignacian dichotomy. However, with regard to the two-tradition model, many authors struggle when they consider the Umm el Tlel UP assemblages because of its strong bladelet component. In our view the dominance of bladelet production throughout the UP sequence at Umm el Tlel contradicts the two-tradition model.

Based on our observations in the Qalamun region and results from other parts of the Levant, we question the pan-Levantine validity of the two-tradition model, which seems to oversimplify the diverse record. Recent results from archaeological, paleoanthropological and paleogenetic research in the Levant and neighboring regions such as the early dates of modern humans in Asia (Liu *et al.* 2010), genetic evidence for admixture between Neanderthals and modern humans (Prüfer *et al.* 2014), new fossil evidence for the co-existence of modern humans and Neanderthals (Hershkovitz *et al.* 2015), and early bladelet industries in the Zagros Mountains (Conard and Ghasidian 2011) and the Caucasus (Adler *et al.* 2008; Kandel *et al.* 2014) support the view of a much more complex human history. Thus it seems to be a good time to re-examine our ideas about the UP period in the Levant. We argue for establishing regional sequences and critically examining pan-Levantine models. Based on the great geographic diversity of the Levant and its many marginal environments, we expect a high degree of regional variability in the archaeological record during the climatic oscillations of MIS 3.

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