EAST OF JAWA: CHALCOLITHIC / EARLY BRONZE AGE SETTLEMENT ACTIVITY IN AL-ḤARRA (NORTH-EAST JORDAN)

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Introduction

The first complex societies in south-west Asia emerged in Mesopotamia and the southern Levant in the Late Chalcolithic / Early Bronze Age (5th to early 3rd millennia BC). One of the characteristic features of these societies was their association with supra-regional, long distance communication (trade) networks.

The "Arid habitats in the 5th to early 3rd millennia BC: mobile subsistence, communication and key resource use in the northern *badia* (north-east Jordan)"[1] archaeological research project investigates the possible impact of these developments on the northern *badia*, a currently arid region in north-east Jordan, centrally located between Mesopotamia and the southern Levant (Müller-Neuhof 2012a).

Since the project started in 2010, six archaeological survey seasons have taken place in this region, focusing on different areas within the northern *badia*.

Investigations were carried out at the large flint mines and cortical tool blank production sites in the greater Wadi Ruwayshid region. These date to the Chalcolithic / Early Bronze Age (C/EBA) and are located in *al-Hamad*, the eastern limestone desert of the northern *badia*, on the western escarpment of al-Risha limestone plateau (Müller-Neuhof in press a – d; forthcoming a). Further investigations focused on evidence for C/EBA rainwater harvesting irrigation and terraced field agriculture close to Jawa (Müller-Neuhof 2012b; forthcoming b), as well as on an evaluation of the accessibility and traversability of the basalt desert of *al-Ḥarra*. A key element of this research was the identification and documentation of C/EBA economic activities and land-use patterns in *al-Ḥarra*.

It was initially hypothesised that *al-Ḥarra* may have played a central role in local communication networks, serving as a transit region for the trade in cortical tool blanks from the Wadi Ruwayshid mines to postulated 'consumer' regions in the west. The region is characterised by dense surface scatters of basalt boulders. These hamper easy movement and are, at first sight, a major obstacle for communication routes crossing this region. However, there are numerous *wadis* and *qi'an* (mudpans) in *al-Ḥarra*, which faciliate access to and easy movement within the basalt desert. Two transect surveys followed these features and crossed *al-Ḥarra*, aiming for Jawa, the hypothetical (midway) destination of C/EBA trading groups.

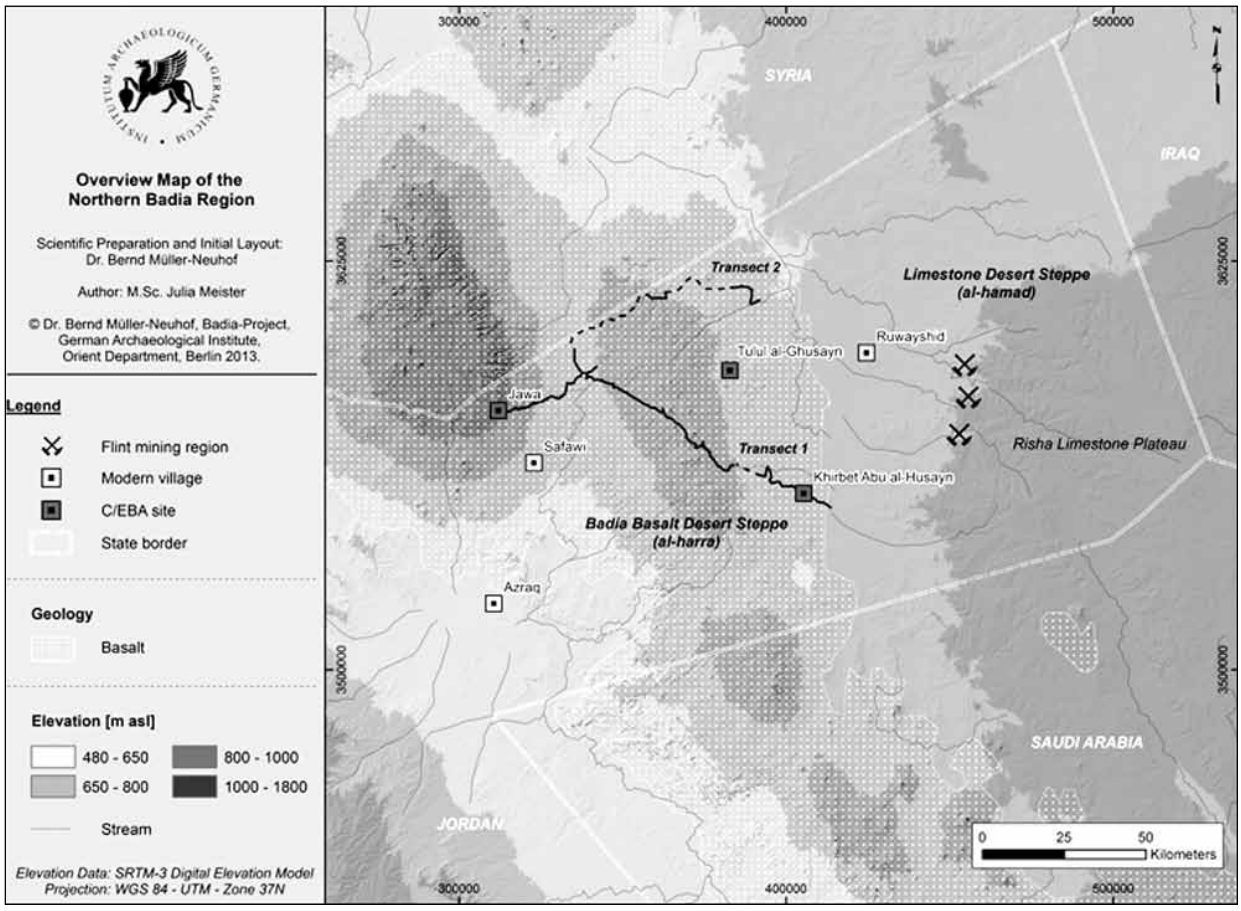
The first transect survey crossed the basalt desert from south-east to north-west and was carried out in autumn 2010. It was almost 100 km-long and started at Qa' Abu al-Husayn in the south-east. From this location, it followed the fissure eruption zone, characterised by a chain of long, narrow *qi'an* (such as Qa' Bakhita, Qa' al-Aza'im and some smaller adjacent *qi'an*) to the north-west. The route continued along Wadi Aza'im, where a *ca* 9 km-long leg was not surveyed because it was not accessible by car, although it could easily be reached on foot. The transect then passed through Wadi Ladhyim, Qa' Tell Ladhyim and Wadi She'ib via the easily accessible basalt gravel country around Jabal al-Ashaqif before crossing the Amman - Baghdad road and Qa' esh-Shahba. Still following the fissure eruption zone, the route passed

1. This project has been funded by the *Deutsche Forschungsgemeinschaft* (German Research Foundation) (MU 3075/1-2) since its start in 2010.

through Tulul ash-Shahba, following Wadi Zumeilat Umm el-Awaijl and crossing Qa‘ Umm el-Awajil. It continued in north-westerly direction along Wadi al-Abd, Qa‘ at-Ra’at and Qitar el-Abd towards Wadi Salma and Marrab Salma. From there the transect shifted to the south-west and west, crossing Qa‘ Shubayka and finally stopping at the outlet of Wadi Rajil on to Qa‘ Shubayka (**Fig**. **1**).

A second transect was also planned in a more east - westerly direction in the northern part of the basalt desert, orientated towards Wadi Rajil. It was initially planned to survey this transect in a westerly direction, via Wadi al-Khidari, the fissure eruption zone and Wadi Salma, moving towards Qa‘ Shubayka and then by means of Wadi Rajil to Jawa. However, when this survey was carried out in spring 2011 it was discovered that parts of the transect, between Wadi al-Khidari and Wadi Salma, were difficult to access. Therefore we changed its direction slightly and orientated the transect north towards the Syrian border. From Marrab al-Khidari in the east, the new transect extended north-west via Wadi Tal’ at-Zalat ash-Shamali, Qa‘ el-Misma, Tall el-Misma and Wadi Abyad. It also traversed parts of Wadi Shawiyya, Wadi Jathuri, Wadi Sara, Qa‘ es-Saul, Qa’el-Abd and Marrab Salma, before crossing Qa‘ Shubayka and following the entire Wadi Rajil from this point onwards towards Jawa.

For two reasons, we were only able to survey parts of this transect. First, because of the change to our plan, we had to apply for permission from the Jordanian authorities to visit the border region, which caused a few days’ delay. Second, during this survey we identified evidence for C/EBA terraced gardens and rainwater harvesting irrigation at Jawa, which necessitated preliminary documentation and required more time than initially planned. The parts of this transect which were eventually surveyed were Marrab al-Khidari, Wadi Tal’ at-Zalat ash-Shamali to the north-west, areas of Wadi Abyad



1. Map of the research region (©DAI-Orientabteilung, J. Meister and B. Müller-Neuhof).

and Wadi Shawiyya, parts of Qa‘ Shubayka and the entire Wadi Rajil from Qa‘ Shubayka towards Jawa (**Fig. 1**).

It should be stressed that, in most cases, we were able to reach all parts of the transects by vehicle, partly on natural surfaces (*wadi* beds, mudpans, basalt gravels) and partly on tracks within the *wadis*. In some cases there was no direct vehicle access to parts of the route, necessitating detours. However, in order to determine the likelihood of these routes having been used in prehistory, we always investigated the area prior to any detours in order to assess whether the direct route could have been accessed on foot.

Characterisation and Dating of the Habitation Sites

The main goal of the transect survey was to randomly sample, identify and date different types of human activity in the *al-Ḥarra* region. As such, this survey focused on archaeological sites located within the confines of the transects. Consequently, sites located beyond the transect boundaries were ignored, even when visible on the satellite imagery.

Along these transects *ca* 208 sites, mostly habitation sites, were identified; the majority could be characterised as campsites with animal pens. The structures are evidence that people stayed in the same location for longer periods of time, whilst the surface finds help to date the occupation and activity.

The surface finds, consisting mainly of pottery for the later periods and lithic artefacts for the earlier periods, are suggestive of occupation in the Late Neolithic, Chalcolithic / Early Bronze Age, Roman and Byzantine periods, as well as into the Umayyad, Abbasid, Mamluk, Ayyubid and late Islamic / Ottoman periods[2].

Interestingly, material remains from the Middle Bronze Age to the Roman / Byzantine period have not been detected in the archaeological record, suggesting that there was (almost) no human activity in the region during that time frame. This fits with regional climate models which describe a long, dry period, especially from the 3rd millennium BC onwards, which is thought to have lasted more or less until the beginning of the common era (e.g. Weninger 2009: 7, Fig. 2).

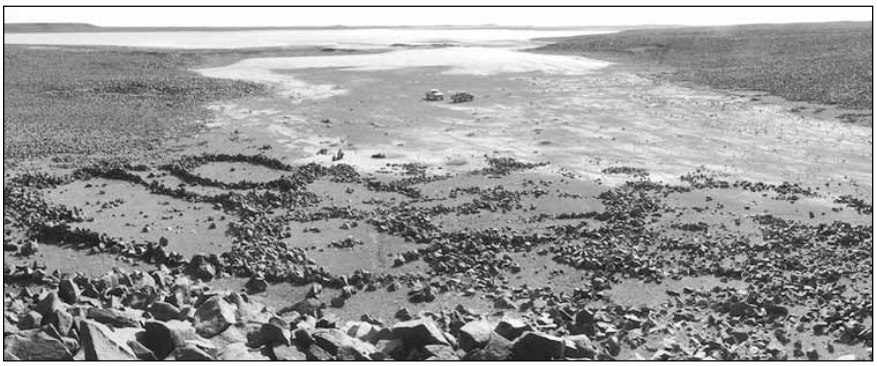
For the sake of completeness, it should be mentioned that the earliest period of human activity that we were able to identify, on the basis of archaeological artefacts is the Late Acheulean (Lower Palaeolithic), which is represented by one basalt cleaver and one basalt scraper, discovered in the vicinity of Jawa[3]. Additionally, the remains of human activities dating to the Epipalaeolithic and PPN were frequently observed and have already been recognized by Alison Betts (Betts 1998), especially in the Wadi Rajil region[4]. Furthermore, it should be emphasised that the Late Neolithic, which is found at many sites on the transects, seems to have been a period during which the region was intensively occupied. This period is also represented at the southern edge of the Jordanian basalt desert in the areas of Wisad and Maitland’s Mesa (Rowan *et al*. 2011; Rollefson *et al*. in prep.). However, most of the campsites encountered on the transect surveys can be attributed to the C/EBA on the basis of surface finds of lithic artefacts.

Late Roman / Byzantine and early Islamic pottery is frequently observed on these C/EBA sites. This implies that these campsites were reoccupied in later periods, perhaps because of their typically favourable location along the edges of mudpans. This is especially true for recent or sub-recent reoccupation of such sites, evidenced by (re)built animal pens, traces of modern *bedouin* encampments and truck tracks inside these camp areas. This is often the case at the edge of *wadi* confluences and mudpans, as well as along the edges of wide *wadis* which would, in the rainy season, have offered abundant grazing and opportunities for water-collection (**Fig. 2**).

Unfortunately, the multi-period occupation of several of these campsites with pen structures makes it difficult to distinguish the layout and building phases of the habitation structures on these sites without excavation.

Those campsites which can be dated to the C/EBA on the basis of surface finds and which

2. Ina Kehrberg has dated the pottery; her report will be published in the final survey report.
3. I have to thank Gary Rollefson, who visited us in spring 2011 and discovered a Palaeolithic basalt cleaver just after stepping out of the car.
4. For instance Mugharet al-Jawa, Khallat ʿAnaza and Khabrat Abu Hussein (Betts 1998: 11ff.)



2. C/EBA Campsite no. II-7 in the Qa‘ Bakhita (©DAI-Orientabteilung, B. Müller-Neuhof).

have not been affected by later occupations, or at least minimally so, typically consist of a cluster of different-sized enclosures, representing animal pens or camping areas. Just as today, these are typically constructed of the locally occurring small basalt boulders (**Fig. 3**)[5].

Permanent C/EBA Occupation East of Jawa

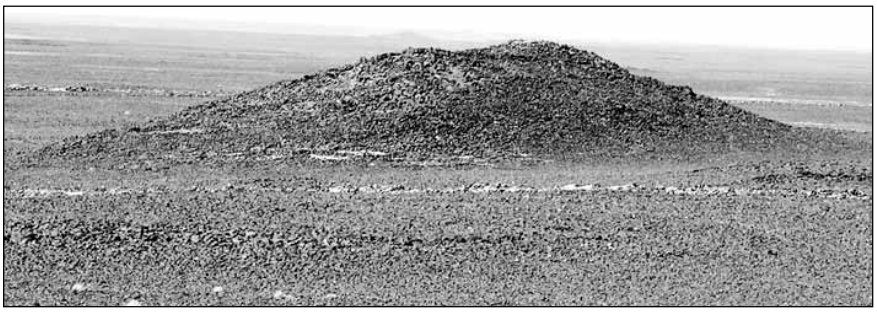
Although evidence from the campsites hints mostly at limited periods of seasonal occupation, most probably during winter and spring in these regions, evidence for permanent C/EBA occupation was discovered at two sites; Khirbat Abu al-Husayn (KAH) and Tulul al-Ghusayn (TaG), both located east of Jawa. KAH was surveyed in detail, whilst TaG only briefly in spring 2013.

Khirbat Abu al-Ḥusayn

During the first transect survey in autumn 2010 we identified the hillfort settlement of Khirbat Abu al-Husayn on the south-eastern edge of *al-Ḥarra*, close to the large mudpan of Qa‘ Abu al-Husayn, after which we named the site. A second half-day visit was made in spring 2012. In March 2013 we spent almost five days at KAH for a closer investigation of the site, which included a site survey, kite photography and a detailed architectural survey of the structural remains on the surface.

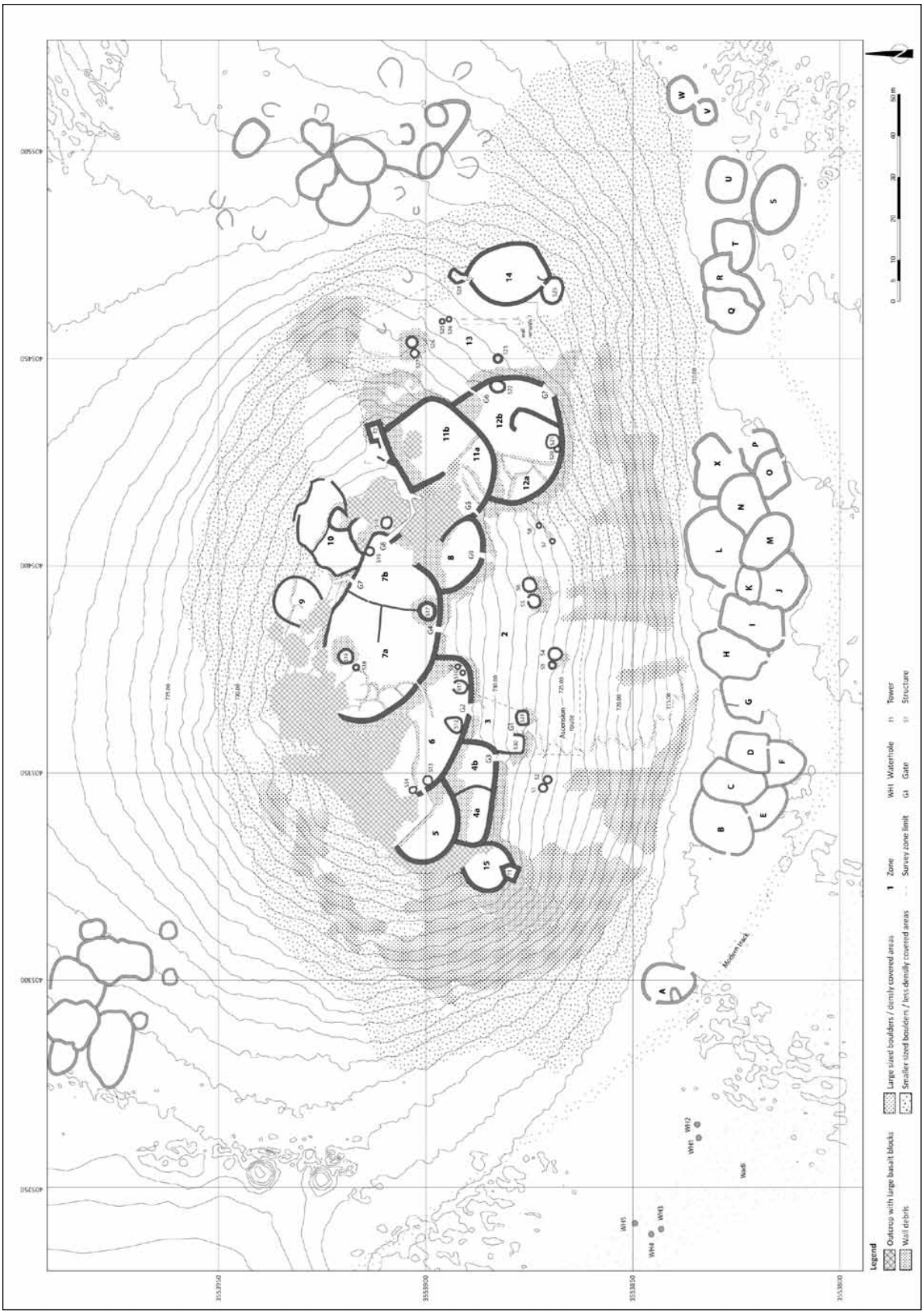
KAH is located on a small volcano (**Fig. 4**), one of the easternmost in the long chain of volcanoes that forms the fissure eruption zone crossing *al-Ḥarra* from south-east to north-

3. C/EBA Campsite no. VIII-48 in the Wadi Rajil (©DAI-Orientabteilung, B. Müller-Neuhof).



4. View of Khirbat Abu al-Husayn from Northeast (©DAI-Orientabteilung, B. Müller-Neuhof).

5. A detailed report on the campsites identified on both transect surveys will appear in the final publication of the project (Müller-Neuhof forthcoming c).



5. Plan of Khirbat Abu al-Husayn and its surrounding (©L. Abu-Azizeh).

west. This volcano chain is flanked to the south-west by a series of long mudpans which give relatively easy access deep into *al-Ḥarra* from the south-east, whilst simultaneously providing pasture for pastoralists and their herds during the grazing periods of winter and spring. This fissure eruption zone was probably a major route for accessing and crossing *al-Ḥarra* from east to west and *vice versa*. The motivation for establishing a fortified site in this location, in a region that currently receives an annual precipitation of 50 mm or less, may therefore have been strategic in nature, i.e. to control access to this route.

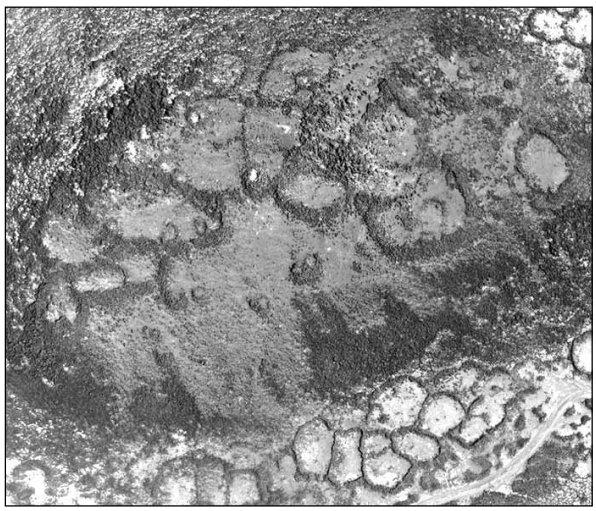
The volcano on which KAH is located has no visible crater. Instead, the summit consists of a series of flat areas at different levels. This is delimited to the west, north-west, north and north-east by basalt outcrops, characterised by very large and closely spaced blocks (**Figs. 5**, **6**). The south-western, southern, south-eastern and eastern edges of the summit are delimited by very thick walls, enclosing large terraced areas. These walls, which are mostly double faced (**Figs. 7** and **8**) with a width of 1.3 m and a visible height of at least 1 m, are founded on the outcropping basalt blocks. Gaps between the natural outcrops are blocked by additional walls which, when viewed as a whole, form a protective fortification around the entire summit.

Additional smaller walls inside the protected summit areas divide them into different units (**Fig. 9**).

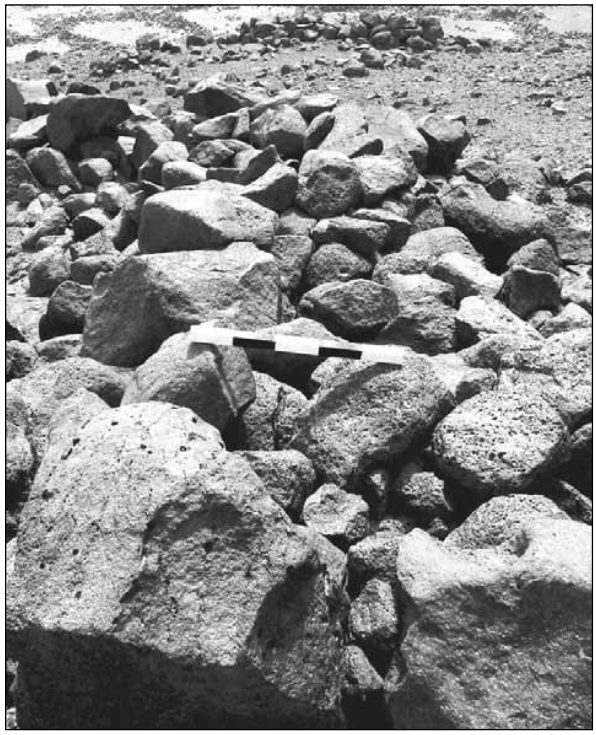
A distinctive feature of the site and its fortifications are the remains of two tower structures, which are located at strategic positions on the site (see **Fig. 7**). Together, these towers provide panoramic 360° views around the site and far into the surrounding landscape.

Tower T1 is a pentagonal structure embedded in the outer wall at the south-west corner of the site. The massive walls and abundant internal tumble hint at a much taller construction which subsequently collapsed.

More or less on the opposite, north-eastern, side of the site is Tower T2. This is rectangular and, again, the massive walls and abundant tumble of massive stones inside the structure indi-

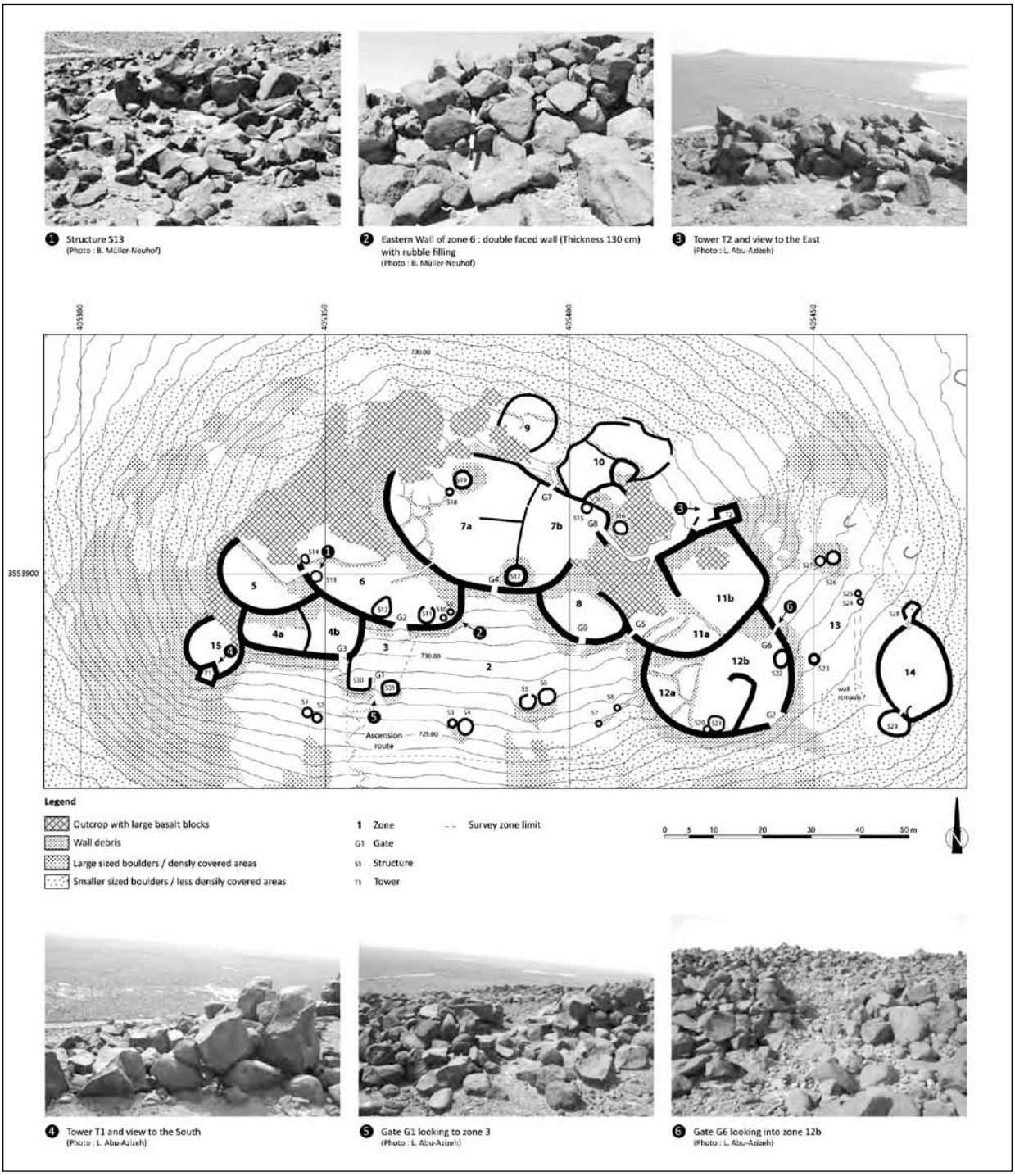


6. Aerial view on Khirbat Abū al-Husayn (©DAI-Orient-abteilung, W. Abu-Azizeh).



8. Section of a double faced wall at Khirbat Abu al-Husayn (©DAI-Orientabteilung, B. Müller-Neuhof).

9. Summit of Khirbat Abu al-Husayn with remains of partition walls in the centre (©DAI-Orientabteilung, B. Müller-Neuhof).



7. Plan of Khirbat Abu al-Husayn (©L. Abu-Azizeh).

cate that the structure was originally much taller.

There are at least nine points of access to the site, some of which have gate-like features (e.g. G1) (**Fig. 10**). Furthermore, gate G1 can be reached by a narrow path that winds up the southern flank of the volcano. Additional outer walls are anticipated, especially on the southern and eastern flanks of the volcano, which have probably collapsed and eroded.

Approximately 31 small enclosure-like structures (S1-31) have been identified on the site. In most cases these are circular and resemble

10. View on gate no. 1 from the site of Khirbat Abu al-Husayn, with pen structures in the background (©DAI-Orientabteilung, B. Müller-Neuhof).

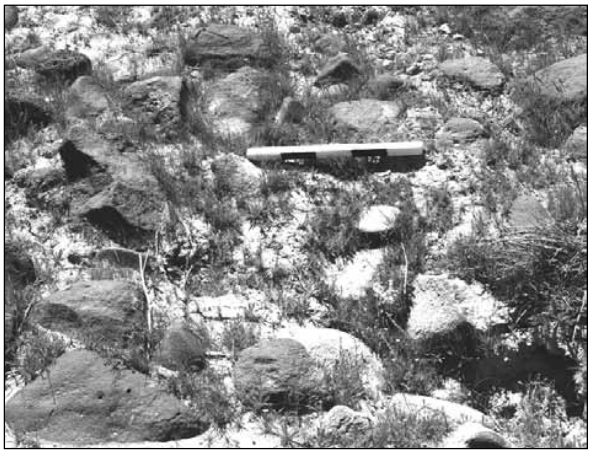
storage facilities, perhaps silos. Others, semi-circular and slightly larger, probably served as rooms.

A large area (S14) was discovered east of the summit on a terrace lower down the eastern slope. It seems to be an isolated structure, seemingly unconnected to the other settlement walls to the west. As a whole, this structure consists of a large, central roundish / rhomboid-shaped enclosure with two attached rooms, one to the north and a larger to the south. The entrance to the central enclosure is located close to the northern room, on the western side. The southern room is reached through a passageway close to the southern end of the enclosure.

This layout, with two attached rooms aligned on cardinal points (north and south), displays some parallels with Chalcolithic open sanctuary sites known from the Sinai, e.g. the Uvda valley (Avner 1984: 119ff.; 2002: Figs. 5: 77-79). Additionally, two campsite clusters have been identified at the foot of the volcano and on the lower parts of the slopes, one to the north-west and another to the east. There is also a long row of enclosures at the southern foot of the slope.

Further to the south, a small, shallow *wadi* runs from west to east into an adjacent small mudpan. Here possible water holes have been identified (see **Fig. 5**), which are both defined and reinforced by stone settings. These are characterised by the presence of shallow depressions, in which vegetation growth is much denser in comparison to the immediate surroundings (**Fig. 11**). These structures so far constitute the only possible evidence for a water supply at KAH. Unfortunately dating them is difficult, as no diagnostic material was encountered there.

Ascertaining the date of KAH itself is also no easy task; surface finds were extremely scarce. A few sherds were found in the pen structures

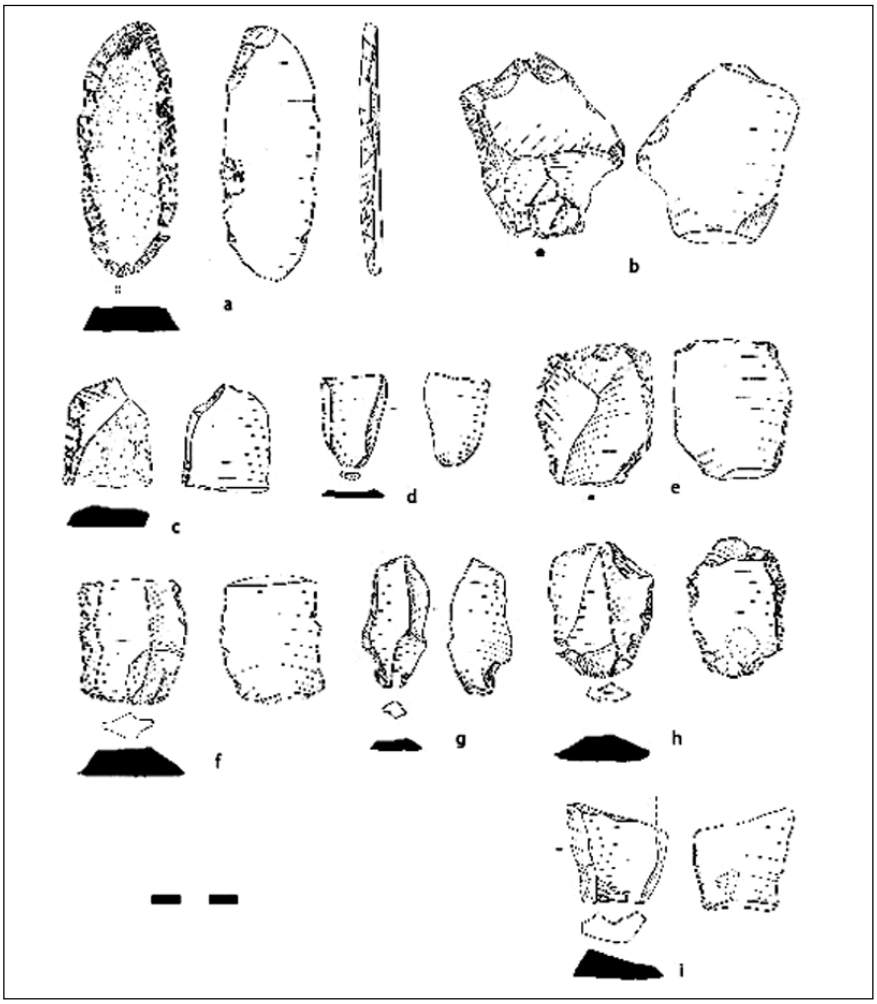


11. Remains of a water hole encircled by basalt stones in the small wadi adjacent to Khirbat Abu al-Husayn (©DAI-Orientabteilung, B. Müller-Neuhof).

at the southern foot of the hill. Some date to the Roman / Byzantine and early Islamic periods, and provide evidence for the reoccupation of these campsites. Others are body sherds of a dark coarse ware, probably of C/EBA date. On the site itself, just a single buff-orange coloured C/EBA sherd with the remains of a handle was found. Lithic artefacts were also relatively scarce on the site itself and were mostly undiagnostic. However, some remains of cortical tool blanks and large platform flakes and blades indicate a late prehistoric date. When the style of the architecture at the site is also taken into account, a C/EBA date for the structures seems likely (**Fig. 12**). Comparable lithic material was also found in the pen structures at the foot of the volcano, as was one complete cortical scraper (**Fig. 12a**). Further diagnostic lithic artefacts from the pen structures at the foot of the volcano date to the Late Neolithic.

In contrast to Jawa and Tulul al-Ghusayn, no evidence for agriculture, whether in the form of gardens or field structures, has so far been identified. Indeed, with the exception of the possibly contemporary water holes, the means by which the site was supplied with water is still not entirely clear.

Nevertheless, it can be assumed that agriculture was practiced on the mudpan close to KAH. Owing to the strategic nature and location of KAH and its fortifications, it seems likely that the site was permanently occupied, albeit perhaps with just a small number of people in the dry season. This would make KAH the eastern-



12. C/EBA lithic artefacts from Khirbat Abu al-Husayn (©DAI-Orientabteilung, B. Müller-Neuhof).

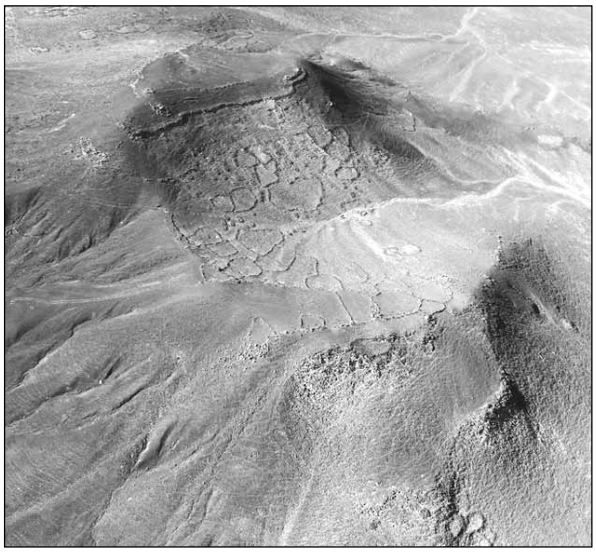
most permanently occupied C/EBA settlement in this region.

Tulul al-Ghusayn

Tulul al-Ghusayn (TaG) was discovered by D. Kennedy and R. Bewley of the APAAME aerial photography project in autumn 2011, during a helicopter flight over the region (**Fig.13**). In spring 2013 we were able to spend almost two days on the site for an initial archaeological surface investigation.

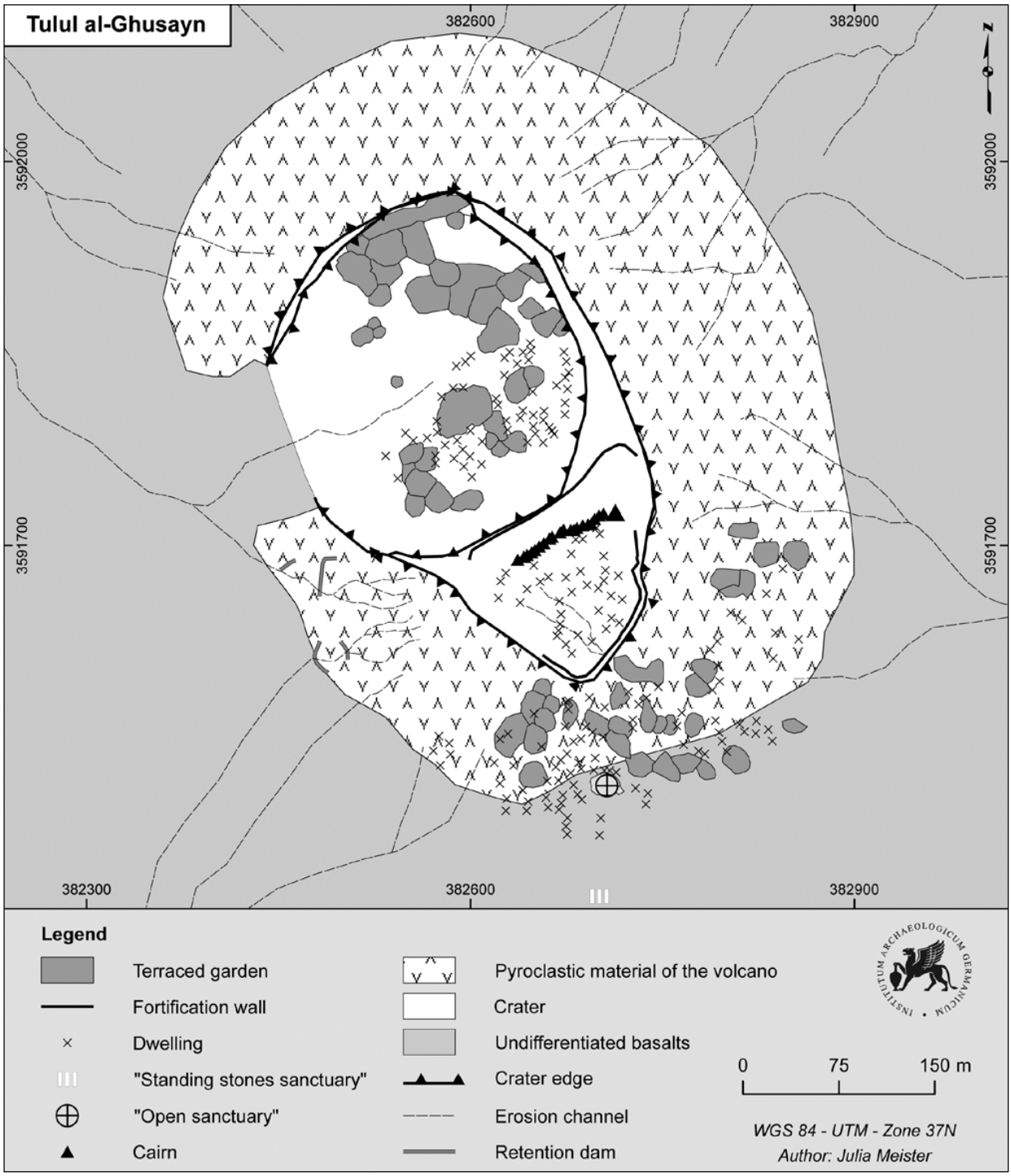
TaG is located on the eponymous volcano close to Wadi al-Ghusayn in the north-east part of *al-Ḥarra*. It lies *ca* 20 km west of the eastern edge of the basalt desert and 9 km north of the Baghdad highway.

The site comprises three separate habitation areas and two areas of terraced gardens (**Fig. 14**). The main (upper) habitation area is located on the south-eastern rim of the crater (**Fig. 15**),



13. Aerial view of Tulul al-Ghusayn from NW with terraced gardens in the crater of the vulcano and the upper part of the settlement on its southeastern rim (©DAI-Orientabteilung, B. Müller-Neuhof).

which opens towards the west. The *ca* 140m-wide rim at this part of the volcano slopes slightly towards the south-east. The edges of this area, which covers just over 1 ha, are characterised by steep slopes. In some places these form cliffs, which provide a degree of natural protection for the habitation area. However, the remains of an enclosing wall, which probably functioned as a genuine fortification, are still visible in many places and would have reinforced the natural protection. In particular, the edge closest to the crater is reinforced by a *ca* 1 m-wide, double-



14. Plan of the site Tulul al-Ghuasayn (©DAI-Orientabteilung, J. Meister and B. Müller-Neuhof).

15. Aerial view of the fortified dwelling area on the crater rim of Tulul al-Ghusayn (©DAI-Orientabteilung, B. Müller-Neuhof).

faced wall (**Fig. 16**).

Possible entrances were identified on two sides of the upper habitation area.

A large cairn, unfortunately looted, with an attached 'tail' of smaller cairns is the most prominent feature of this upper area.

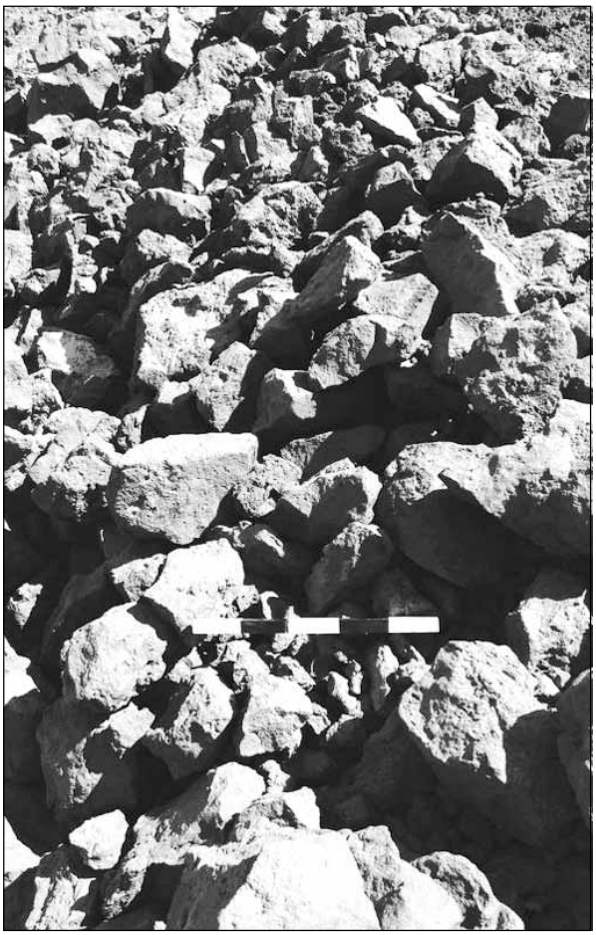
The dwelling structures themselves are scattered across almost the entire surface of the upper habitation area. During the survey we were able to identify at least 37 dwellings. These are very small structures, characterised by a double room or room and 'forecourt' feature. They are all similar in size, being *ca* 5.5 m long and 2.5 - 3 m wide. The buildings are typically constructed of double-faced walls, *ca* 0.5 m wide with rounded corners (**Fig. 17**). In parts, these are preserved to a height of 0.5 m. The entrance is always on the long side of the building, close to a corner, and leads into the smaller room or 'forecourt' from which the main room, generally measuring *ca* 2.25 by 1.5 m, is accessed. Comparable house structures have been discovered at Maitland's Mesa by G. Rollefson, Y. Rowan and A. Wasse, where they are referred to as '*ghura* huts' (Rowan *et al*. n.d.).

The distribution of houses in the upper habitation area seems not to follow any clear plan, e.g. one linked to a system of pathways. However, all buildings are aligned north-west – south-east, probably because of the orientation of the natural slope and possibly in relation to the prevailing wind.

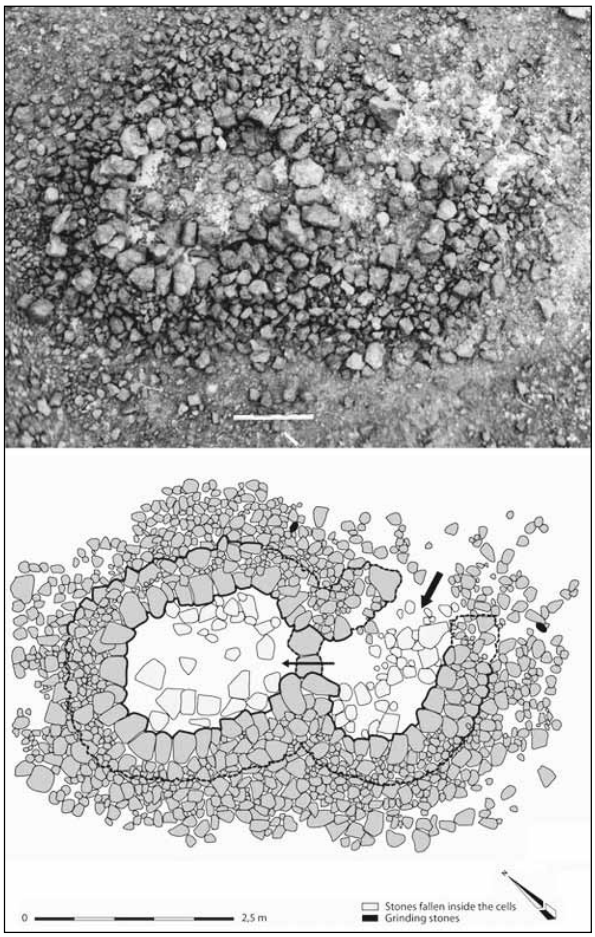
Additional dwellings were encountered on the southern and eastern slopes of the crater, where at least 54 dwellings have been identified. These resemble the houses of the upper habitation area in terms of structural features and size. In this area some terrace features were also encountered. These were probably constructed to level the area in order to facilitate the construction of dwellings and to afford easy access to them.

Comparable terrace features have been identified in the third habitation area, located at the foot of the southern and south-eastern slopes of the volcano. Here 89 dwelling structures have so far been recorded, but owing to a lack of time we were unable to examine all of the potential huts at the foot of the eastern slope.

Some metres to the south of this habitation area, a possible 'sanctuary' was discovered (**Fig. 18**). This feature is characterised by a row of flat, upright, standing stones with larger stones placed in the centre and smaller stones to both sides of these large ones. Located directly behind this front row are two other similarly orientated rows of flat, upright, standing stones. The rear of the central part of this feature is reinforced with stone packing. Taking the large central stone as an axis, the entire structure is orientated towards the east. Comparable standing stone sanctuaries have been identified in the Negev and Sinai,



16. Section of the double faced fortification wall of the upper settlement (©DAI-Orientabteilung, B. Müller-Neuhof).



17. Aerial view and drawing of one of the typical Tulul al-Ghusayn huts (©DAI-Orientabteilung, W. Abu Azizeh).

18. Row of standing stones ("standing stones sanctuary" at the eastern end of Tulul al-Ghusayn (©DAI-Orientabteilung, B. Müller-Neuhof).

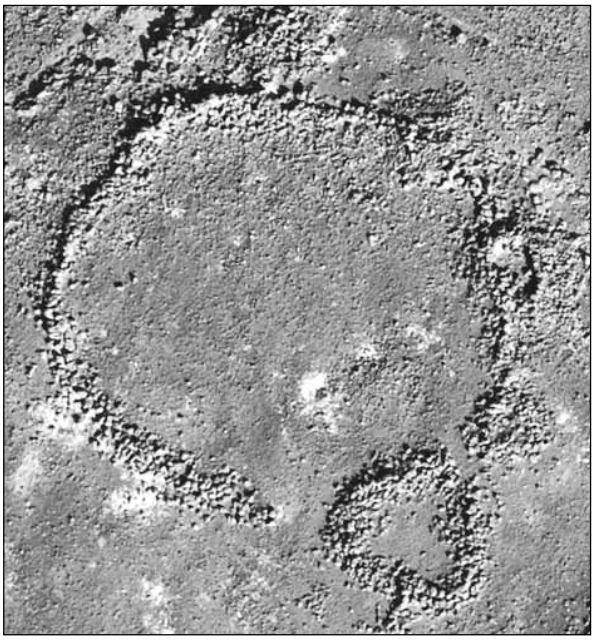
e.g. at Uvda 69 (Beith-Arieh 2003: Figs 4:40-44), Wadi Mara and Wadi Aradeh (Avner 2002: Figs. 4:30-31), and by W. Abu-Azizeh and M. Tarawneh in al-Thulaythuwat area of southern Jordan, along the escarpment of Tarat Kabd.

Whilst studying the aerial photos taken by the APAAME team (D. Kennedy, R. Bewley and M. Dalton) and the author after the survey, another possible sanctuary structure was identified several metres west of the aforementioned example. This again clearly resembles the open sanctuaries from the Negev / Sinai region, especially those known from the Uvda valley, and probably also that known from KAH (see

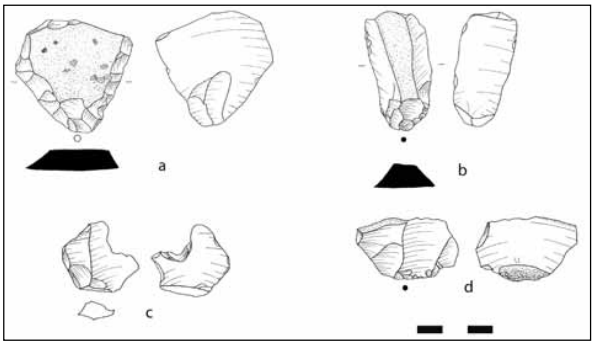
above). However, here the annexes are not orientated on clear cardinal points (**Fig. 19**).

Some lithic artefacts were found within the three habitation areas, mostly cortical tool blank fragments, along with large platform flakes and blade fragments (**Fig. 20**). These indicate a probable C/EBA date for the occupation and use of this site. Pottery was scarce and consisted solely of body sherds of a very coarse and dark ware. Additionally, many grinding stone fragments were found in or close to several of the dwellings.

The most interesting aspect of TaG is the remains of terraced gardens hinting at rain-fed agriculture. On almost all areas of the crater slopes and, additionally, on extensive areas of the southern and eastern outer slopes of the volcano, terrace wall structures have been identified from aerial photographs (**Fig. 21**) and satellite imagery. These terraced gardens extend over a total area of approximately 2.2 hectares. Our surface investigations revealed terrace walls (**Fig. 22**) preserved to a height of 50 - 60 cm which, at least at the lower end of the garden plots, still retain a similar depth of soil. During our brief investigation of these structures, the potential remains of a few hydrological features were encountered. However, the location of these gardens within the crater and on the outer slope of the volcano shows that the catchment area of the entire terraced garden system was very small and consisted of just the volcano itself. This is in marked contrast to the terraced garden system at Jawa, where the water catchment area is much larger (see Müller-Neuhof 2012; forthcoming b). It would appear that the



19. Aerial view of the "open sanctuary" close to the dwelling area on the southern and eastern slope of Tulul al-Ghusayn (Tulul Ghusayn (Ghusein Settlement 2 APAAME_20130409_RHB-0082). Photo: R. Bewley).



20. C/EBA lithic artefacts from Tulul al-Ghusayn (©DAI-Orientabteilung, B. Müller-Neuhof).

21. Aerial view of a part of the terraced gardens in the crater of Tulul al-Ghusayn (©DAI-Orientabteilung, B. Müller-Neuhof).

22. View of some terraced gardens in the crater of Tulul al-Ghusayn (©DAI-Orientabteilung, B. Müller-Neuhof).

terraced garden system worked fairly well during the occupation phase of TaG; this supposition is supported by the discovery of grinding stones in several of the huts.

A preliminary observation is that different surface features within the gardens may be related to the different crops that were planted there. Some areas are cleared of basalt blocks, whilst others are not. Within the garden areas we even encountered small terrace-like stone settings, which may have marked planting pits for trees or shrubs.

Sediment and phytolith analyses of soil samples from the cleared gardens are currently being carried out in an attempt to gain more information about agricultural activities at the site. It seems that TaG represents the easternmost evidence for rain-fed agriculture in the wider region, at least during the C/EBA, and that this could only be achieved by constructing terrace gardens to retain both soil and water during the rare and short, but supposedly intense, rainfall events.

Conclusion

All of the observations and interpretations presented above derive from different surveys and are preliminary in nature. During the transect surveys, we 'missed' many sites which were not located directly on the transect routes but close to them and which, on the basis of their appearance on the satellite imagery, seem to be very interesting camp site structures. Owing to the fact that the main objectives of the survey were to identify possible routes through *al-Ḥarra* and to gain a preliminary understanding about the economic utilisation of this region, more intensive survey in some of the transect legs was not possible. However, this is something for future research activities to focus on, with specific areas on the transect routes being identified for more detailed investigation. The same is true for KAH and TaG. At KAH we were able to map the structures on the site and carry out detailed investigations of some of the architectural features; the same is planned for TaG. However, a major – and as yet unresolved – problem is the dating of these structures. It will therefore be necessary to carry out excavations at these sites in the near future, at least on a small scale, in order to obtain C_{14} data. These data are also desperately needed for Jawa itself.

Despite these limitations, the transect surveys and investigations at KAH, TaG and in the vicinity of Jawa have generated new and important information on the occupation of this region in the C/EBA. It is now possible to hypothesise that there was an intensive economic utilisation of the region during the C/EBA, characterised by flint mining and cortical tool production, long distance trade of these items, animal husbandry and intensive pastoralism and agriculture. The extent to which the northern *badia* of Jordan was connected to the neighbouring early urban cultures in Mesopotamia and the southern Levant is an issue for ongoing and future research. However, the identification of possible cultic 'standing-stone structures' and 'open sanctuaries', which are also known from other arid regions in south-west Asia, hints at the existence of a desert culture which extended, at least in ideological terms, over wide areas of the region.

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