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A first note on the excavations at UAQ38, a new Neolithic site in the Emirate of Umm al-Quwain

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Abstract

At the end of 2018, the first season of excavation was carried out at the shell midden site of UAQ38. The site occupies the top of a sand dune not far from UAQ36 and UAQ2, two other recently investigated Neolithic shell middens. Several well-stratified anthropogenic levels were excavated at UAQ38, which can be dated mainly to the 5th millennium BC, although the recorded artefacts suggest a possible older date for the lowest levels. Food waste, post-holes, fireplaces, and burnt shell dumpings attest to human activities that took place at the site over a rather long period of time. Here the stratigraphic sequence will be presented, together with a first overview of the artefactual assemblage. The collected data will be concisely discussed in order to fit the site within the typology of Neolithic settlements that can be proposed for the area. UAQ38 is so far the only Neolithic site along the northeastern coast of the UAE for which stratified charcoal is available for dating.

KEYWORDS

Arabia, material culture, mobility, Neolithic, shell midden

1 | INTRODUCTION

In the Emirate of Umm al-Quwain, in the southeastern part of the Arabian Gulf, evidence of Neolithic human occupation was reported as soon as the first surveys were carried out in the early 1990s (e.g. Boucharlat et al., 1991a, 1991b; Phillips, 2002; Uerpmann & Uerpmann, 1996). However, a substantial investment in a multi-year programme of excavation was required, as it represents the only realistic means of documenting a detailed stratigraphic and cultural sequence and to establish a first typology of sites, from simple way stations to encampments and possibly more sedentary sites. For such a demanding task to be accomplished, extensive planimetric excavations were necessary instead of small trenches, combined with the study and accurate drawing of relevant sections.

This strategy was applied by the French Archaeological Mission in the UAE (FAMUAE) at Akab (Charpentier & Méry, 2008), UAQ36 (Méry et al., 2019), and more extensively at UAQ2, today the major Neolithic site known in the Umm al-Quwain Emirate (18 surveyed sections document 146 linear meters of stratigraphic sequences overall; see among others Méry, 2015; Méry et al., 2016) (Figure 1).

In late 2018, a new stratified site was excavated following the same methodology at UAQ38, a shell midden located 2 km from UAQ2, with the aim of collecting further data to compare and contrast with the results obtained from the UAQ2 (2011–2014, 2017) and UAQ36 (2017–2018) excavations. The excavation is part of the joint activities between the Department of Tourism and Archaeology in Umm al-Quwain and the French Archaeological Mission to the UAE.

UAQ38 sits atop one of a series of dunes located along the borders of an area of coastal *sabkha* facing the Umm al-Quwain lagoon (Figure 1). These rather mobile dunes, with a southeast–northwest orientation, represent the western edge of the

FIGURE 1 The location of the study area with the distribution of the Neolithic sites mentioned in the text (GIS: F. Borgi) [Colour figure can be viewed at wileyonlinelibrary.com]

inland desert and developed by windblown sand accumulation with an orientation that is set at 90° to that of the earlier, southwest–northeast elongated, Pleistocene fossil dunes which lie below them (Atkinson et al., 2012; Bernier et al., 1995; Preston et al., 2015). The current surface elevation at the highest point of UAQ38's dune is some 10 m higher that the adjacent, ancient *sabkha*. The surrounding environment, at the time of the Neolithic occupation discussed here, was dominated by a dunal shrubby vegetation inland, with mangrove concentrations in the coastal lagoons (Méry et al., 2019: 230–231; Tengberg, 2005).

Recent archaeological investigations have shown that the Neolithic occupation in the coastal area of the Umm al-Quwain Emirate can be dated back to the middle of the 6th millennium (Mashkour et al., 2016; Méry & Charpentier 2013).[1] The mentioned projects carried out at Akab in the 2000s, and more recently at UAQ2 and UAQ36 also started to shed some light on the nature of the 5th millennium human presence in the same area. While radiometric analyses of charcoal and shell samples are awaited, which will help to more solidly ground the absolute chronology of the site, the preliminary results of UAQ38's excavation will be presented here, as they add significant data for the discussion of Neolithic human occupation in the region.

2 | EXCAVATION RESULTS: STRATIGRAPHY AND FEATURES

Identified in 2012, UAQ38 was first sounded in 2013 with the excavation of a small test trench, 1.0 × 0.5 m wide, which provided a first overview of the stratigraphy. The shell-midden was then selected in 2018 as the place for a small-scale excavation given its proximity with UAQ2 and UAQ36, and considering the relatively rich surface collection made during previous surveys. The site is located 2 km northeast of UAQ2 and 1 km northeast of UAQ36.

A first test trench was excavated, measuring *c*.2.5 × 1.6 m at the top and then progressively stepped to allow reaching the deeper layers (Figure 2/a). The trench was placed in such a way that its northwestern side coincided with the limits of the 2013 test trench. The upper contexts, overall comprising loose or poorly compacted sand of varying colours, as well as small concentrations of charcoal and ash, generally have a low quantity of shells down to a depth of 85 cm. Richer shell beds and more frequent anthropogenic features are encountered below that level and down to 195 cm of depth, where only clean, sterile, aeolian sand was encountered. The excavation was stopped at the depth of 2.25 m from the current surface.

Random buckets of soil from the upper layers were dry-sieved (3 mm mesh) to test the presence of artefacts (i.e., objects). As the trench was deepened, all the sediment was entirely dry-sieved. In order to provide a rough provenance to the materials collected during the excavation of this first test trench, the soil was removed by arbitrary layers, the thickness of which depended on an estimate of the compactness of sand, shell inclusion percentage, and charcoal presence or absence. As a result, five cuts were distinguished: between 85 and 95 cm below the current surface; 95–115 cm; 115–135 cm; 135–175 cm; 175–195 cm.

The study of the sections led to the initial distinction of 25 stratigraphic units (SU). These are represented by shell-rich subhorizontal layers which are more or less regularly alternating

[1] All dates are indicated as cal BC.

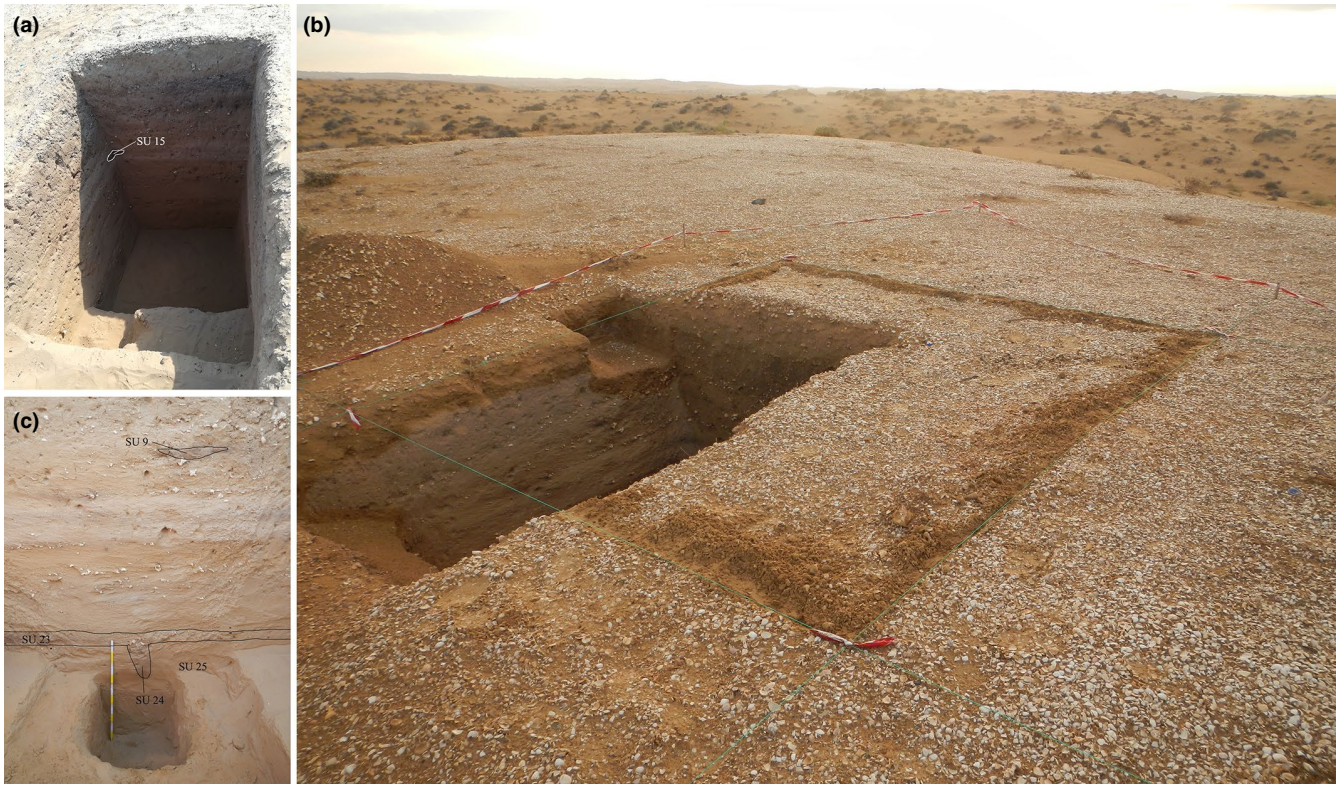

FIGURE 2 (a) the initial test trench at UAQ38 and (b) tracing of the excavation area in relation to it, seen from the west. (c) shows the final deep sounding which revealed 70 more centimeters of clean sand lying below the anthropic levels. Contexts mentioned in the text are indicated (photos M. Degli Esposti). [Colour figure can be viewed at wileyonlinelibrary.com]

with cleaner sand deposits (Figure 2/a, b). Two small fireplaces were located (SU9, SU15) and ecofacts (raw material or small charcoal fragments) were collected. A post-hole was recognised in section (SU24), which had been excavated from the base of the lowermost level of occupation (SU23) and through the underlying sterile sand (SU25). Dry-sieving allowed the collection of several significant finds, such as a painted Ubaid potsherd, a fragmented arrowhead, a flint bifacial piece, a few flint flakes, a medium size ground stone tool (used both as a grindstone and as a hammerstone), and several small shell-beads.

FIGURE 3 Isometric 3D view of UAQ38's excavation at the end of the works, looking south (3D: F. Borgi) [Colour figure can be viewed at wileyonlinelibrary.com]

Given the promising results, a 3 × 3 m trench was delimited, traced so as to enlarge the initial test-trench both southward and westward and keeping the northeastern exposed section (corresponding to the left part of section AB in Figure 4) as stratigraphic guidance (Figures 2/b and 3). A 1.0 × 1.0 m horizontal grid was established to record the provenance of the artefacts and the location of features and the single squares were distinguished by the combination of letters and numbers (A, B, C along the S–E axis; 1, 2, 3 along the S–W axis; see Figures 5 and 7). The deposits removed from this second trench were all entirely dry-sieved with a 3 mm mesh. Moreover, 20 litres from each layer (roughly two full buckets) were test-dry-sieved with a 1 mm mesh, providing the basis for the statistical evaluation of their content. A quick test excavated at the end of the works revealed that the thick sterile sand deposit is at least 90 cm thick (Figure 2/c).

The upper levels will not be described in detail here, as they are too superficial and were subject to strong reshuffling (SU1: superficial fragmented seashell scatter; SU2: fine aeolian sand accumulation; SU3: darker aeolian sand, due to the

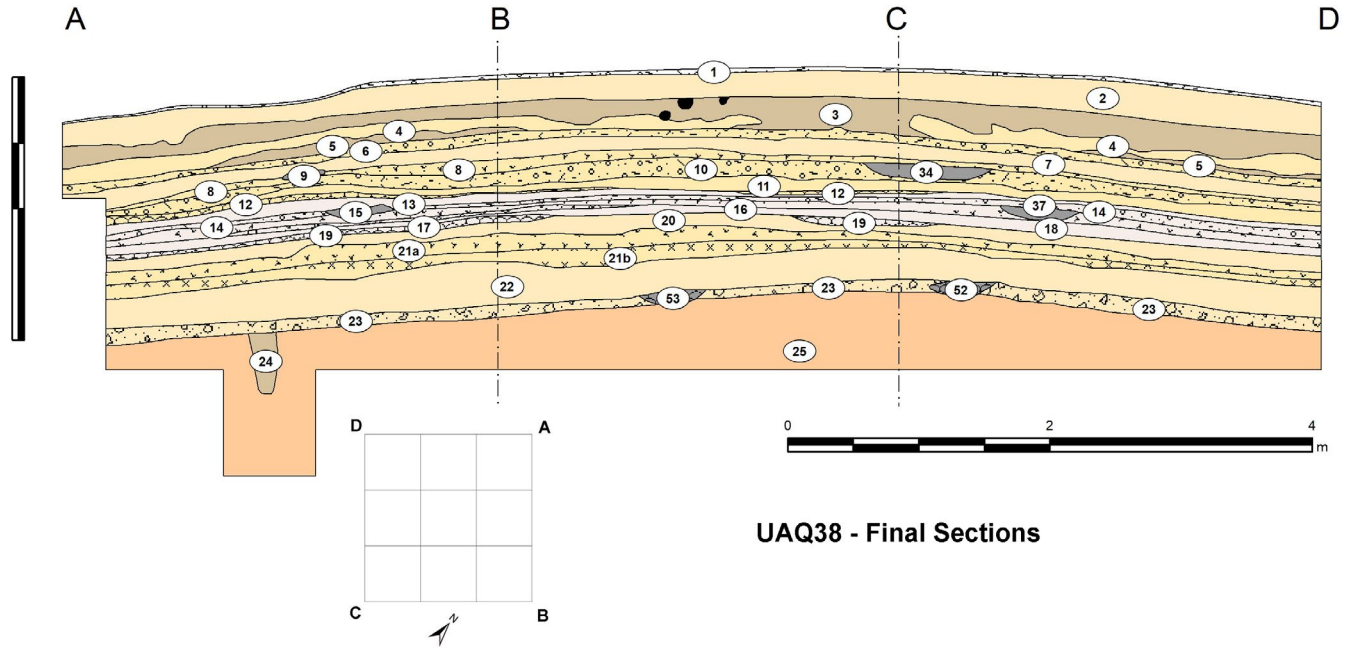

FIGURE 4 Stratigraphic sections along the northeastern, southeastern, and southwestern sides of the excavation trench at UAQ38 (drawing: M. Degli Esposti; CAD: F. Borgi) [Colour figure can be viewed at wileyonlinelibrary.com]

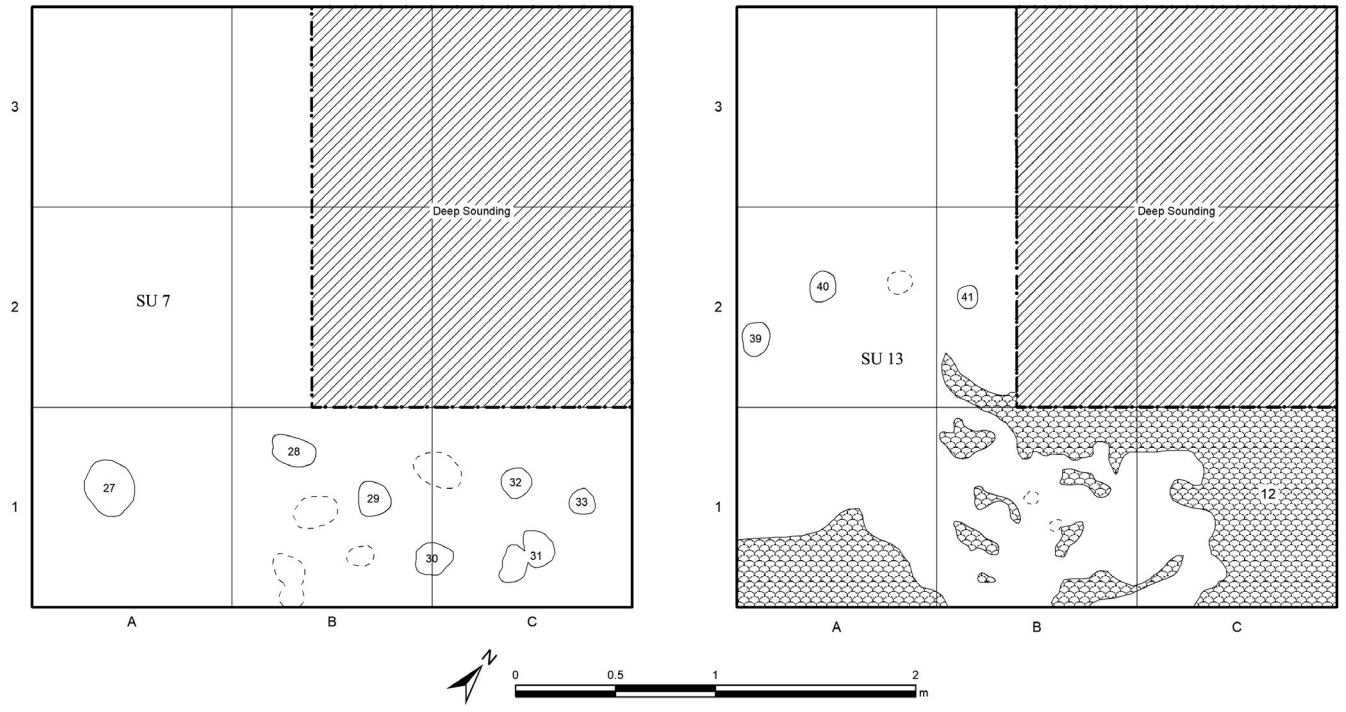

FIGURE 5 UAQ38, plans at the upper surface of SU7 (left) and of SU13 (right), showing the connected post-holes and seashell layers. Hatching indicates possible additional post-holes (CAD: F. Borgi)

presence of pulverised charcoal and ash; SU3, 4 and 5 largely intermingled due to intense root action).

The lower part of the stratigraphic sequence is described below (see the corresponding sections in Figure 4):

- SU6: 3–5 cm deep layer of seashells, with a medium density. Seven post-holes (SU27–33; the shape of SU31 suggests the presence of two paired posts, see Figure 5 left) and three additional possible ones were located in the

uppermost and flatter part of the investigated area (squares A1, B1, C1). They were cut through the underlying sand level of SU7. At the bottom of SU6, in square A1, stands a concentration of fragmented shells (SU26) comprising two complete shell scrapers (*Callista* sp.).

- SU7: clean aeolian fine sand.
- SU8: seashell layer similar to SU6, but less homogeneously spread in the south-eastern part of the new trench (line 1 of the grid). A small fireplace was located in the eastern section (SU9), while a fragmented net-sinker was found in situ. One sub-oval post-hole, (SU35), despite only distinguished on top of SU10, must be linked to the occupation which generated the debris of SU8.
- SU10: sand layer, with irregular seashell scatters and a large ashy lens (SU34).
- SU11: cleaner sand lens visible in section; it could not be distinguished from SU10 during excavation.
- SU12: sandy lens with fragmented seashells, including a number of crab and fish remains (some with anatomic articulations). Only occupies the southern part of the exposed surface (Figure 5 right).
- SU13: layer of clean aeolian fine sand with sparse seashell fragments and micro-fragments, with three post-holes cut from its top (SU39–41, Figure 5 right).
- SU14: thin and discontinuous layer of sparse seashells, better distinguishable thanks to the presence of two small fireplaces (SU15, SU36).

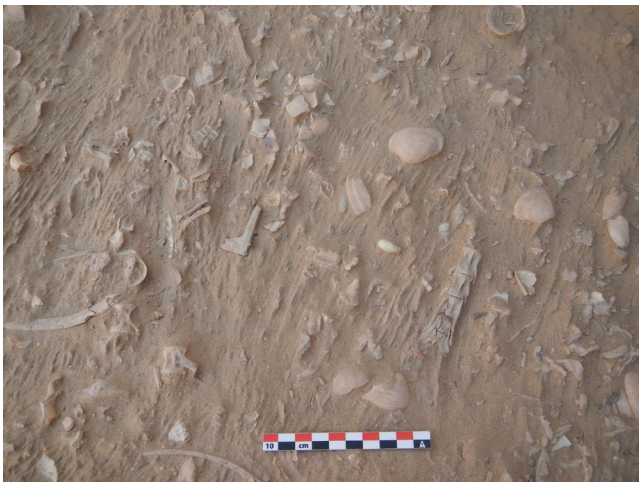

FIGURE 6 Detail of the fish-rich lens SU17 (UAQ38), showing specimens in anatomical articulation (photo: K. Lidour) [Colour figure can be viewed at wileyonlinelibrary.com]

- SU16: almost sterile sand deposit, marked at its top by the presence of a fireplace (SU37) and a post-hole (SU38).
- SU17: discontinuous lens of fragmented seashells containing a remarkable quantity of fish bones, several of which still showing anatomical articulations (Figure 6). A small concentration of *Marcia* sp. shells was found against the northern excavation limit, in square B3 (not named).
- SU18: deposit of clean aeolian sand. Sparse seashells, except two more distinct seashell lenses lying atop SU20

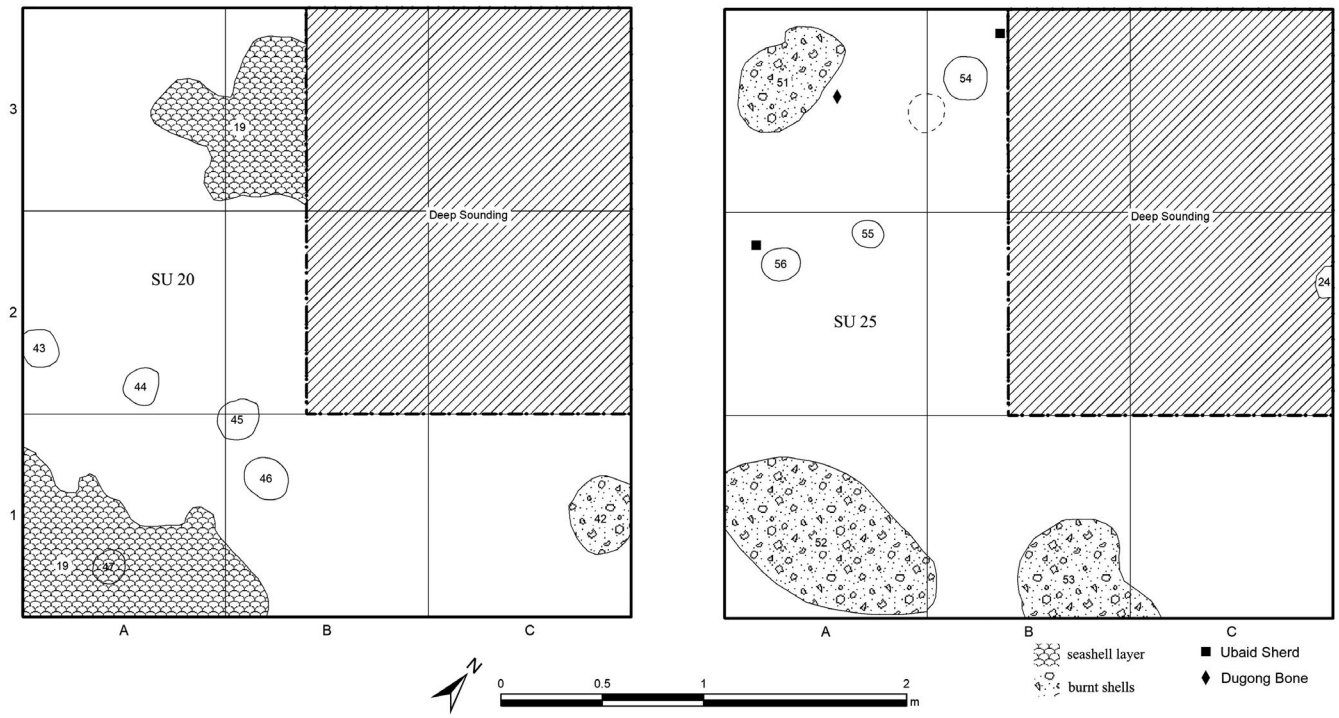

FIGURE 7 UAQ38, plans at the upper surface of SU20 (left) and of SU25 (right), showing the connected post-holes, seashell layers, and burnt shells concentrations. Hatching indicates possible additional post-holes (CAD: F. Borgi)

(overall labelled SU19, Figure 7 left). Between these two lenses, five small sub-circular post-holes were found, cut through SU20 (SU43–47, Figure 7 left). A small lens comprising a concentration of *Marcia* sp. shells, together with the two valves of a *Callista* sp. shell was found in square C1, against the eastern limit of the excavation (SU42).

- SU20 and SU21: the fine aeolian sand deposit SU20, with a yellowish brown colour, comprises sparse seashells and little clusters thereof. A series of small, sub-planar lenses lying below SU20 was named as SU21, but the transition between the two layers is blurred and both units seem to represent one and the same event: a relatively thick deposit of fine sand may have been heavily reworked by wind and other natural agents, possibly including human interference. The distinction between SU21a and 21b was kept for the sake of recording the finds but actually does not reflect the depositional history of the layer.
- SU22: thick clear aeolian sand deposit with a small fireplace/ashy lens (SU50) and two post-holes (SU48, SU49) visible at the top. Few scattered, isolated seashells. The majority of the fragmented shells can be interpreted as resulting from the reshuffling of material from the upper part of SU23.
- SU23: rather dense seashell scatter, mainly fragmented, with a high proportion of burnt specimens (in squares B1, C1). Two concentrations of burnt *Saccostrea cucullata* shells (SU51, SU53) and one of burnt *Marcia* sp. shells (SU52) were distinguished (Figure 7 right). These are better interpreted as meal waste rather than actual fireplaces. Three small postholes (SU54–56) were cut near the top of SU23, and can be mapped together with SU24, seen in the initial section. Below the uppermost, more regular seashell spread stand small shell "pockets" erratically distributed. The transition with the underlying clean sand (SU25) is not sharp, and faint traces might indicate an earlier generation of post-holes. SU23 is the earliest anthropogenic deposit at the site.
- SU25: Compact, sterile sand.

Overall, extended excavations at UAQ38 have provided evidence of a rather intense human activity at the site, comprising several occupational episodes, which are reflected in the numerous stratigraphic levels marked by seashell scatters, burnt seashell concentrations, post-holes, and fireplaces. Although the large majority of the postholes was observed in plan, the limited extension of the excavation does not allow reliable reconstructions of the dwelling morphology, and the identification of circular alignments must remain tentative at best (see Figure 5 right and Figure 7). Very important from the point of view of the paleoenvironmental and chronological reconstruction, small charcoal samples were collected from 12 stratigraphically controlled contexts (SU8, 10, 11, 14, 16, 18, 20, 21A+21B, 22, 23, 50, 51). A selection of these will be dated and compared with the chronometric results obtained from *Marcia* sp. shell samples, which were systematically collected from all the excavated layers.

Accurate sieving of the deposits led to the collection of rather abundant archaeological material. This comprises several significant items, such as a few Ubaid pottery sherds, numerous seashell beads, net-sinker fragments, stone tools of various types, and rarer kinds of personal ornaments which will be concisely illustrated below.

3 | MATERIAL CULTURE

Two hundred ($n = 200$) single finds were collected, marked, photographed, described, and registered. The database mainly comprises artefacts, possible shell and stone tools, and ecofacts. These were registered when they correspond to the raw material intended for manufacturing finished items (e.g. shell beads or flint tools). Other unworked stones found at the site were collected as their occurrence surely cannot be considered as accidental, although they were not individually registered. All of the finds could be assigned to the Neolithic period, with the exception of a few surface sherds dated to the pre-Islamic Period (Black Ware) and to the Islamic Period (turquoise faience and terracotta ware).

One of the most relevant discoveries also comes from surface collection but it can be dated to the second half of the 5th millennium BC or to the early 4th millennium BC. It is an incomplete, soft-stone tubular bead of the 'Akab' type (Figure 8 top). As the name reveals, although not exclusive to that site (see below), this type of bead is best known from the

FIGURE 8 The Akab type bead collected from the surface (top), and the stone sphere discovered in SU23 at UAQ38 (bottom) (photos: K. Lidour) [Colour figure can be viewed at wileyonlinelibrary.com]

Akab island, where overall more than 230 specimens were collected, including semi-finished ones, from the excavation of the ritual *Dugong Bone Mound* (Charpentier & Méry, 2008: 130–131 and fig. 9/1–3; Prieur & Guerin, 1991: 80 and figs 4 right, 5, and 6/8). The type includes two different models (Charpentier & Méry, 2008: 130). One has a double, angled distal perforation which comprises a part which follows the axis of the bead and connects almost at right angles with a second part that follows one of the cylinder's rays. This model is found both made of shell and made of stone. The second model is conversely only found made of shell and has one end fashioned in the way just described, while the other is bevelled and has a biconical, transversal perforation. A soft stone bead of the same type was previously found on the surface of UAQ36 (Méry et al., 2019: fig. 7/B). In the same western Emirates coastal area two examples are known from the site of RA2, south of the Umm al-Quwain lagoon (Uerpmann, 2003: fig. 3 left), and one from Jazirat al-Hamra site JH48 (Vogt, : fig. 9.5/6). Recently, another example was found at Qumayrah-Ayn QA2, in northern Oman, not far from the Emirati border (Białowarczuk & Szymczak, 2019: fig. 5/e). Further away, a similar item is illustrated from the site of Ras al-Hamra RH6 in the greater Muscat area (Biagi, 1999: fig. 15/3), and another one from Suwayh SWY-2 along the southern coast of the Arabian Peninsula, in Oman (Charpentier et al., 1998: fig. 9/5). Outside the Oman peninsula, only one example is known so far, coming from surface collection at Dukhan, in Qatar, and characterised by a quadrangular section (Madsen 1961: 195 and fig. 18). Other surface finds from UAQ38 cannot be more precisely dated than to the Neolithic period. These finds comprise two unpainted standard Ubaid Ware sherds, a gastropod bead (a perforated *Polinices* sp.), and a disc shell bead (cut, perforated, and polished fragment of *Spondylus* sp., i.e. a red to purple bivalve). Other finds may only tentatively be dated to the Neolithic period as well, such as a shell scraper (*Callista erycina*) and a 'cupula' stone that was used as a crushing stone (Figure 9). An unworked wadi pebble possibly used as a net-sinker was also found, as well as two valves of *Anadara* sp. that could have served as utilitarian tools (e.g., spoons).

Considering the stratigraphically provenanced objects, one can distinguish: personal ornaments (shell beads and pendants), tools (possible stone fishing sinkers, possible shell containers/utilitarian shells, and shell scrapers), and Mesopotamian Ubaid pottery. Ecofacts comprise fragments of ochre (from the upper layers) and abundant shells of

FIGURE 9 "Cupula" stone collected from the surface of UAQ38 (photo: K. Lidour) [Colour figure can be viewed at wileyonlinelibrary.com]

FIGURE 10 The two examples of mother-of-pearl pendants discovered at UAQ38 (photos: K. Lidour; editing: M. Degli Esposti) [Colour figure can be viewed at wileyonlinelibrary.com]

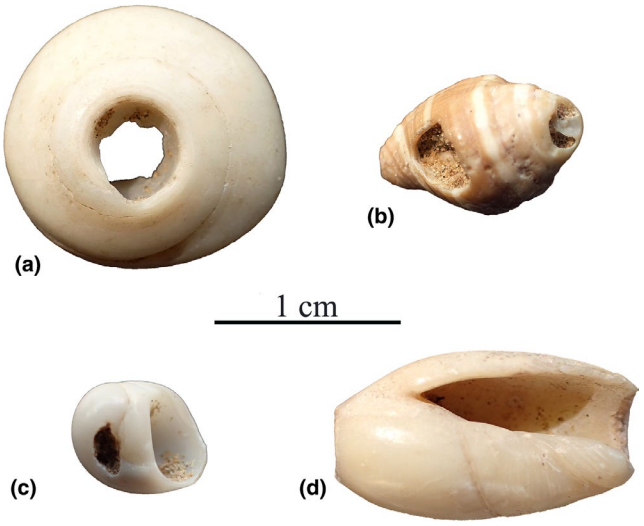

FIGURE 11 Different types of perforated shells used as beads were discovered in stratified contexts at UAQ38. (a) Annular bead in *Conomurex persicus* apex; (b) *Engina mendicaria* bead; (c) *Polinices* sp. bead; (d) *Ancilla* sp. bead (photos: K. Lidour; editing: M. Degli Esposti). [Colour figure can be viewed at wileyonlinelibrary.com]

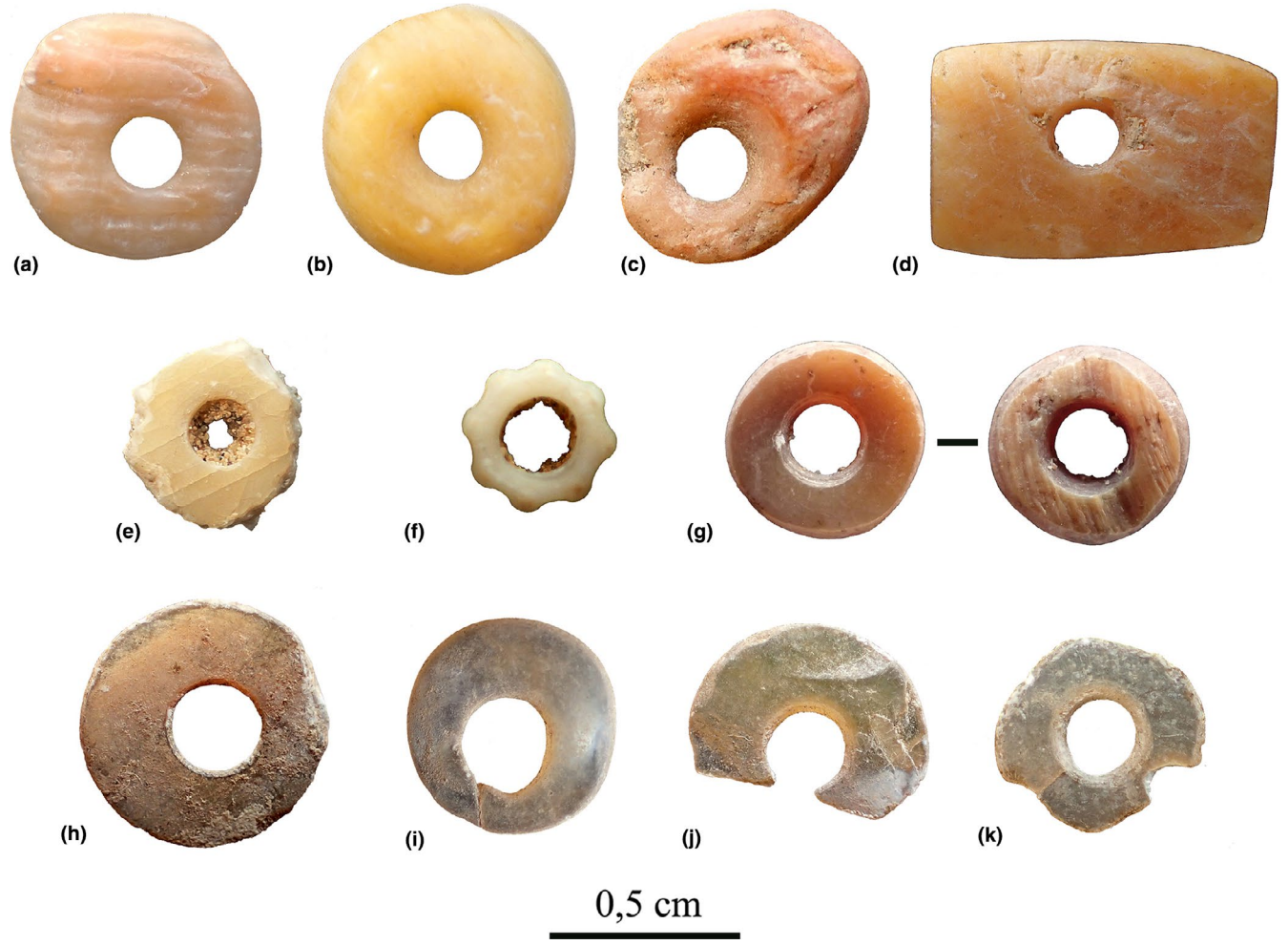

FIGURE 12 Complete, fragmented, and in fieri shell flat beads from UAQ38. They are mainly disc shaped, but one rectangular shaped example (d) was also discovered. (a–c) Disc beads in *Spondylus* sp. shell; (d) Rectangular bead in *Spondylus* sp. shell; (e) Unfinished bead in *Spondylus* sp. shell; (f) Segment of *Dentalium octangulatum* shell; (g–k) Disc beads in *Pteriidae* shell (photos: K. Lidour; editing: M. Degli Esposti) [Colour figure can be viewed at wileyonlinelibrary.com]

various species which had possibly been collected for the manufacturing of beads.

The most interesting piece for personal ornament is a semi-precious white-greenish stone sphere found in the earliest occupational layer, SU23 (Figure 8 bottom), which recalls the carnelian sphere discovered at UAQ2 (Méry & Charpentier, 2013: fig. 4). A few other specimens were discovered from stratified and radiocarbon dated contexts at UAQ2 (ibid.), but also from other sites such as as-Sabiyah (Carter & Crawford, 2010: fig. 4/10 bottom right), Jabal Buhais and the nearby site of Jabal Faya FAY-NE15 (Kiesewetter et al., 2000: fig. 2/16; Uerpmann et al., 2012: fig. 11 right), and further away at Ras al-Hamra RH6 (Biagi, 1999: fig. 15/6–10). They indicate that these spheres are chronologically representative of the regional Middle Neolithic, from about 5500 to 4500 BC. Two mother-of-pearl oval pendants (Figure 10) are comparable with Akab and UAQ2 finds (Méry & Charpentier, 2012: fig. 14; Méry, 2015: fig. 3/9), as well as with specimens from Jabal Buhais (Kiesewetter et al., 2000: fig. 2/12, 14–15), and as-Sabiyah (Carter & Crawford, 2010: 77; fig. 4.3/35–37). These pendants are conversely more characteristic of the Late Neolithic period, after c.4500 BC.

More than fifty shell beads were discovered in stratified contexts, including the earliest levels (SU23, 24) (Figures 11 and 12). They mainly comprise small perforated gastropods and worked bivalves (as *Ancilla* sp., *Bulla ampulla*, *Conus* sp., *Cyprea* sp., *Dentalium* sp., *Engina mendicaria*, *Nassarius* sp., *Polinices peselephanti*, Pteriidae, *Spondylus* sp).

As previously documented at UAQ2, the UAQ38 assemblage is characterised by the abundance of gastropod beads of the *Polinices* species (Figure 11/c), and their possible local manufacture seems to be indicated by the co-occurrence, in the same anthropic levels, of unperforated shells of the same type.

The discovery of *Engina mendicaria* perforated beads also from the lowest layer of occupation at UAQ38, SU23 bottom,

is of interest (Figure 11/b), as this species is not found along the coast of Umm al-Quwain. Its presence, which is also attested at Akab and UAQ2, must, therefore, find a different explanation from local collection, and several hypotheses can be put forward, such as exchange between Neolithic groups; collection during occasional trips to the northern coast of the UAE; or collection linked to more regular, seasonal movement of the whole group. No evidence allows for a more precise reconstruction.

The local manufacture of disc beads of *Spondylus* sp. is attested at UAQ38 by the presence of two rough shell discs (e.g. Figure 12/e, which comes from SU23), which correspond to the second step of the *chaîne opératoire*, i.e., the perforation of the roughly shaped disc. The presence of a complete valve of *Spondylus* sp. from SU26 further supports the local manufacture hypothesis. Among the flat shell beads, a rectangular specimen stands out (Figure 12/d), as it is the only one discovered at the site so far. The manufacture of disc beads of *Spondylus* sp. is common in the region, as witnessed at Akab (Charpentier & Méry, 2008: 129–130 and fig. 14) and UAQ36 (Méry et al., 2019).

Overall, the wide variety in the raw shell material collected by the Neolithic dwellers of UAQ38 is comparable with that witnessed at UAQ2, while at UAQ36 it appeared to be more limited.

3.1 | Tools

Callista sp. shell scrapers (8 complete specimens, 11 retouched fragments, and 18 valve fragments probably broken during manufacture, Figure 13) were found in 17 stratigraphic units throughout the sequence. However, none came from the lowest level of occupation. This type of tool is ubiquitous in Neolithic contexts of the Oman peninsula (Charpentier et al., 2004).

Other possible utilitarian tools (n = 11) include *Vesticardium* sp., *Anadara* sp., and *Chlamys* sp. valves. These three types of shell could be used as spoons, small containers, but some of them were possibly used as scrapers as well. A microscopic study of their use-wear is needed to confirm this hypothesis. A microscopic analysis is also necessary in order to confirm the presence of two whetstones in the upper layers (SU3, SU3-4-5), one made of fine sandstone and the other one made of limestone.

A net-sinker with one notch and four possible fishing sinkers were also found in the upper layers (SU7 and SU8). These are not worked, but the use of unworked pebbles as sinkers is common even today, and can be plausibly hypothesised for the past as well. A heavy, multi-purpose stone tool, surely used both as a grinder and as a hammer-stone (hard unspecified rock) was instead found in the lowest occupational layer (SU23). One part is polished by use, while other faces bear traces of percussion.

FIGURE 14 The painted Ubaid sherd discovered in SU23 (photo: K. Lidour) [Colour figure can be viewed at wileyonlinelibrary.com]

3.2 | Pottery

Few stratified Ubaid pottery sherds were discovered, all coming from SU23 except one sherd discovered in SU20. These Ubaid potsherds correspond to a minimum number of four vessels. The body sherd found in SU20 is identified as a standard Ubaid Ware sherd, with a 9-mm-thick wall. The other sherds correspond to (1) a gritty fabric (UAQ38.144.1); (2) a pink-red micaceous fabric (UAQ38.1433); and (3) a fine Ubaid fabric (UAQ38.52, UAQ38.142.1, UAQ38.142.2, UAQ38.144.2).

The fine Ubaid fabric sherds are painted with a thick glossy black paint; UAQ38.52 also bears red paint (Figure 14). Cases of

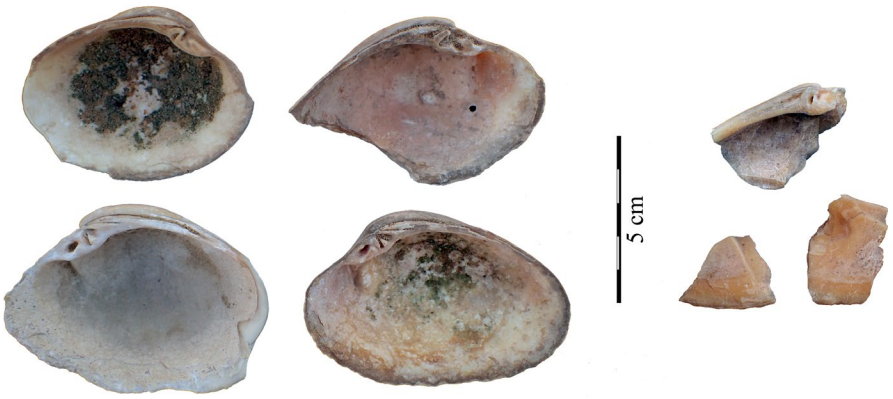

FIGURE 13 UAQ38, *Callista* sp. shell scrapers (left), a very fragmented piece of a scraper of the same type (bottom right), and part of a similar tool probably broken during manufacturing (photos: K. Lidour) [Colour figure can be viewed at wileyonlinelibrary.com]

bichromy are rare among Ubaid wares but well attested (Oates, 1960: 36). In such a case, the red paint is applied after the firing but is very adhesive to the surface of the pot (Courtois & Velde, 1987: 157, 161). However, for the UAQ38.52 example, it is not clear if the red paint is fired or not. The preserved motifs consist of four parallel horizontal black bands. They are partly covered by a red paint. This stylistic composition is not very specific but might correspond to Ubaid 2/3 phase according to Lebeau (1991: pl. II/7). However, such a simple pattern of multiple horizontal bands does not disappear in Ubaid 3 and 4 (Lebeau, 1983: pl. VIII/3; 1991: pl. IV/18). Two other small sherds found at the site are respectively decorated with one and two black bands.

3.3 | Lithic industry

A total of 361 lithic artefacts were collected during the stratigraphic excavation, while 24 other pieces came from surface collection. The lithic assemblage is distributed through 17 stratigraphic contexts (SU2–SU37). Overall, it comprises 13 cores, 86 flakes, 138 scars and chips, 17 waste products, 62 fragments, plus 9 fragmentary macro-tools and 36 tools.

Identified raw materials comprise radiolarite and chert, with a notable quantity of chalcedony. Minor differences have, however, been noticed in relation to the different occupational levels. Just like at UAQ2 and UAQ36, Jebel Ma'taradh, some 40 km from UAQ38, can be suggested as the likely place for raw material procurement (see Charpentier et al., 2017).

The large majority of the lithic items derives from different phases of lithic reduction: end products (flakes, bladelets); scars and chips; waste products. Cores mainly comprise simple types: longitudinal, unipolar or bipolar specimens, with little or no preparation of the core. However, the presence of two well-shaped chalcedony bladelets in the lower stratigraphic units (SU18, SU22+23 top) indicates standardised lithic reduction.

The co-occurrence of cores and abundant items belonging to different phases in the lithic reduction process bear witness to the fact that the latter was carried out at the site. Moreover, such local lithic industry is attested throughout the occupational sequence at the site, here including the earliest levels.

The most numerous items among the identified ones are "*pièces esquillées*" ($n = 16$). Other significant items comprise four drills borers, four end-scrapers, and three scrapers. The drills are of small size and could have been used to pierce both the seashells used as pendants and the mother-of-pearl pendants. Only a microscopic, traceological analysis could, however, confirm this hypothesis.

The lithic assemblage from UAQ38, almost in its entirety, displays a manufacturing quality which is comparable with that witnessed at the Neolithic sites of UAQ2 and Akab. The discovery of the broken tips of three lozenge-section arrowheads deserves a specific mention. These points were collected from the lower levels of the excavation (SU23, SU19–20, SU21–22), and resemble the points discovered in levels 8–14 at UAQ2 (Méry et al., 2016: fig. 2/d), although their fragmentary nature hampers a safe comparison. They are also comparable to the type published by Charpentier and Méry (2008: fig. 5), and one of them, which is made in chalcedony (Figure 15), is very similar to an almost complete example found in 2013 in the UAQ2 graveyard (Méry et al., 2016: fig. 8/A).

FIGURE 15 Broken tip of a lozenge-section flint arrowhead from UAQ38 (photo: K. Lidour) [Colour figure can be viewed at wileyonlinelibrary.com]

Their presence allows the lithic assemblage collected at UAQ38 to be assigned to two distinct levels of "technical behaviour". In fact, while the majority of the assemblage mirrors very simple techniques (unipolar and bipolar, with limited core preparation), the three arrowhead point fragments testify to a much greater degree of technical investment. This raises the question of the place of production, an answer for which is currently impossible to provide.

4 | FISHING AND SUBSISTENCE ECONOMY

4.1 | Shellfish

The subsistence economy of UAQ38 is dominated by marine shellfish consumption, as witnessed by the collection of thousands of shells. The most abundant taxa identified are clams (*Marcia* sp.) and murexes (*Hexaplex kuesterianus*), well represented throughout the stratigraphic sequence. Conversely, mangrove oysters (*Saccostrea cucullata*) seem to be more abundant in the earlier occupation layers. Other edible shellfish such as mangrove snails (*Terebralia palustris*) and strombs (*Conomurex persicus*) are only scarcely present. It is likely that *Terebralia* are more present in the latest levels.

The sea snail *Indothais lacera* is well represented at UAQ38, in particular in SU3, while almost absent at Akab, UAQ2, and UAQ36.

Several species of clams inhabit intertidal sands and could have been easily collected on the banks of the tidal channels situated inside the lagoon. Murexes could be easily found on the shallow subtidal rocky flats such as those located in front of the site. Although *Terebralia* snails can also be encountered in non-mangrove environments—like in the flood drainage system close to the Oceanic Hotel in Khor Fakkan (Feulner, 2000)—their presence at UAQ38 suggests the exploitation of mangrove swamps. In this sense, imprints of pneumatophores on many oyster valves (*Saccostrea cucullata*) confirm the ancient presence of white mangrove trees (*Avicennia marina*) on the nearby shore. The shell fragmentation appears to be highly correlated to the rate of burning. In fact, the most fragmented assemblages are from contexts which could be interpreted as fireplaces or discharge pits.

4.2 | Fish

Fish also played an important role in the diet of the inhabitants of UAQ38. The assemblage amounts to some hundreds of fish bones and is mainly composed of small seabreams (*Rhabdosargus haffara* and *Acanthopagrus* spp.), mullets (Mugilidae) and possibly mojarras (Gerreidae). Specimens were generally between 50 and 300 g, that is, about 10–30 cm in length. A few remains can be attributed to larger specimens such as longnose trevallies (*Carangoides chrysophrys*) estimated to be about 3 kg (c. 50 cm in length).

A premaxilla and a maxilla of a large trevally (*Caranx* sp.) were discovered in anatomical articulation in SU12. This specimen has been estimated to be about 15–20 kg (possibly 1 m in length). A remarkable cluster of large fish remains was observed in SU17 (see Figure 6). They mostly belong to bigeye trevallies (*Caranx sexfasciatus*)—identified thanks to species-diagnostic bones such as hyperostotic cleithra. They were between 3 and 8–10 kg (from c. 50 cm to 1 m in length). A few kawakawa[2] (*Euthynnus affinis*; 5–6 kg, c. 60–70 cm in length) remains were also found in SU17. Cartilaginous fish are not well represented at the site, possibly due to taphonomic bias. Shark and ray vertebrae are not completely calcified, while teeth and stings are made of vitrodentine, which is a stronger material. Hence, two unworked ray stings (Myliobatiformes) were found in SU7 and SU21. An unworked, lower tooth from a requiem shark (*Carcharhinus* sp.) was also found in SU23. This shark is estimated to be 1.5 m in length.

Small mullet and seabream could be caught in shallow waters, especially over soft bottom areas. The occurrence of small grunts (*Pomadasys stridens*) points to the exploitation of seagrass meadows as was also suggested at Marawah MR11 Area A, in the Emirate of Abu Dhabi (Lidour & Beech, 2020). A wide variety of coastal fish can be caught in the surrounding shallow waters using non-selective fishing devices such as beach seines and intertidal barrier traps. Beach seines could have been used on foot—the local *idfarah* technique according to Heard-Bey (1986: 175)—or from small boats. However, schools of trevallies and kawakawas only occur in open waters, although not necessarily far from the coast. The capture of such pelagic fish thus generally bears witness to the mastery of seafaring and of specific techniques such as angling and seine fishing from boats. However, it is important to note that, in Polynesia, large schools of big-eye trevallies are generally seen in the passes during the day, dispersing and entering lagoons during the night to feed (Bagnis et al., 1984). Further investigation is, therefore, necessary to determine whether open-water fishing outside of the lagoon was carried out by UAQ38 inhabitants, as was recently highlighted at the nearby site of Akab (Lidour et al., 2019).

4.3 | Other seafood

Unlike other Neolithic sites along Umm al-Quwain's coast such as Akab, UAQ2, and UAQ36, crab remains (claws and shell fragments) are only scarcely attested at UAQ38, although they nevertheless number a few hundreds. The vast majority can be attributed to the blue crab (*Portunus segnis*), while only a few mangrove crab (*Scylla serrata*) remains were recovered. Blue crabs could be easily speared on the shallow subtidal rocky flats at low tide. It has to be noted that a burrowing urchin (*Echinometra* sp.) spine was also found in SU23. Two fragments of dugong (*Dugong dugon*) ribs were found in SU6 and SU23.

4.4 | Terrestrial mammals

Only a few bones (around 30 fragments) can be attributed to terrestrial mammals. They mostly belong to domesticated taxa such as caprinids (goat or sheep, *Capra* sp. or *Ovis* sp.) and bovids (cattle, *Bos* sp.). Large bovid remains are concentrated in the earlier levels: SU22 and SU23 in particular. The anatomical parts recovered are essentially teeth and fragments of diaphyses (long bone shafts). Carpus and tarsus bones are also frequently found. However, no butchery marks were observed. A few bones could be attributed to gazelle (*Gazella* sp.) but further examination of the material is necessary.

5 | CONCLUDING REMARKS

As mentioned above, the results of radiocarbon dating on charcoal and shell samples are still pending, but the discovery of charcoal in most of the stratified layers at UAQ38 is one of the most relevant results of the fieldwork. Once their

[2]A small species of tuna found in the Indo-Pacific.

dating is achieved, it can be considered alongside the results from the seashells systematically collected from all the layers in the sequence, making UAQ38 a reference site for Gulf archaeology as UAQ2 already is. Moreover, these data will provide a significant contribution to the commendable efforts aimed at reaching an accurate estimate of the marine reservoir effect for coastal United Arabian Emirates and northern Sultanate of Oman.[3]

On the basis of the material culture, the earliest anthropic occupation of UAQ38 can be suggested to be older than at UAQ36, where the lowest layers in the sequence were dated to the mid-5th millennium (Méry et al., 2019: fig. 6). In fact, artefacts such as the gemstone sphere and the arrowhead reflect a high technological investment, which appears to be comparable with that mostly documented in the oldest levels at UAQ2. One may, therefore, suggest a date for the earliest occupational level—SU23 and associated features—in the second part of the 6th millennium BC or at the beginning of the 5th millennium BC.

A first discussion of the different types of Neolithic settlements in the area, and of the related ways of human occupation, has recently been published by the authors (Méry et al., 2019), and will not be replicated here. The results of the excavation at UAQ38 quite easily fit in the general picture proposed there, that of a coexistence of different types of sites, which range from occasional resting places (possibly only connected to just one episode of food consumption) to more stable dwelling sites, such as Akab and UAQ2 most likely were. Within this sequence, UAQ38 stands somewhere between the complexity and density of UAQ2 and the more discontinuous and less dense occupation of UAQ36, a site that in any case provided evidence of repeated occupations.

However, it must be borne in mind that during the first half of the 5th millennium BC, a shift towards a less dense occupation seems to be recognisable in the whole area, and is well represented by the change between the early (14–9) and later (8–1) levels at UAQ2. This change has been associated with an aridification of the climate, possibly related to a reduced availability of natural resources (or a more difficult access to distant ones) which is mirrored in the evidence of a more utilitarian exploitation of the raw materials (Méry et al., 2019). At UAQ38, a similar trend seems to be recognisable between the earliest anthropic levels (specifically, SU23) and the later ones. It is thus clear that the aforementioned awaited radiometric data will hopefully provide further support to this picture, or conversely indicate that a more blurred reconstruction has to be envisaged.

The anthracological analysis of the charcoal samples, carried out prior to radiocarbon dating, led to the identification of 34 samples collected throughout the stratigraphic sequence (see above), all belonging to one and the same taxon, that is, *Avicennia marina*.[4] While they are significant from the point of view of the environmental exploitation of the Neolithic dwellers of UAQ38, it is clear that these data alone are of little help in further highlighting possible climatic changes.

The rich archaeological record of UAQ38, as presented here, already contributes significantly to the reconstruction of the earliest human communities which occupied the coastal area of the United Arab Emirates; at the same time, such wealth of data calls for future, more extensive excavation, with a specific target in the earliest layers, the ones that provided a most varied set of artefacts and evidence of in situ lithic debitage, as well as shell bead manufacturing.

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[3]The results from UAQ38 should be available by early 2020, thanks to the collaboration with Ms. S. Lindauer, who is preparing her doctoral research at Mannheim University, focused on this unsolved question. The cooperation project that has been developed for several years among researchers working in Umm al Quwain within the 'Neoarabia' ANR research project—S. Lindauer, S. Méry, Prof. A.G. Parker and Dr. G. Preston from Oxford Brookes University (UK), and Dr. N. Mercier from CNRS IRAMAT in Bordeaux (France)—is essential for the accurate dating of UAE's archaeological sites and, therefore, for establishing significant comparisons within the whole Gulf region and the Sultanate of Oman.

[4]The study was carried out by V. Dabrowski (UMR7209—Archéozoologie, archéobotanique: Sociétés, pratiques et environnements, CNRS-Muséum National d'Histoire Naturelle de Paris), which we gratefully thank for providing the preliminary data.

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