Challenging the Late Neolithic cultural horizon of Southern Arabia: The case of Sharbithat 10 (Dhofar, Sultanate of Oman)

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Abstract
The Neolithic in Southern Arabia has always shown unique traits that followed an autonomous path, different from the Northern Arabian region and the Levant. Its chronological framework is still under construction, but the systematic research occurring in Oman unveils a complex picture of moving populations developing specific solutions to various environmental conditions. This paper shows the results of an intensive survey carried out on the coastal trait around the village of Sharbithat (Sharbithāt), which refines the cultural chronology of the vastly unexplored area at the turn of Al-Wusta/Dhofar Governorate in southern Oman. Characterised by 14 km of shoreline enclosed in a limestone massif, Sharbithat is dotted by vast mesas surrounded by wadi deltaic branches and abundant flint sources. Most terraces are inhabited today and covered up with flint scatters, dwellings, and cairns. A sequence of preliminary test trenches to assess the stratigraphy of Sharbithat SHA-10B indicated a precise chronological frame. Indeed, the sites on this mesa show a single period stratification sequence, a rich marine faunal composition and intense flintknapping activity. A peculiar lithic industry consisting of lunates, backed pieces, and tanged points characterise this Late Neolithic site (4th mill. BCE), in contrast with the Middle Neolithic sites (as SHA-4, 6th mill. BCE), which are fully dedicated to the production of bifacial foliates and trihedral projectile points. Based on the study of the technological processes that led to the manufacture of such artefacts, new hypotheses on coastal subsistence strategies and chronological issues have risen. With the present article, we introduce the first study of this area, the chrono-typological implications, and their relevance in the framework of South Arabian prehistory.

Keywords: Southeastern Arabia, Oman, Neolithic, projectile points, backed bladelets, fisherfolks

1. Introduction

The "Archaeology of the Arabian Seashores" project aims to study the Omani coastline's evolution, from hunter-gatherers' at the end of the Pleistocene to the rise of metal ages societies (Charpentier, 2021). The land extending from the eastern head of Arabia (Ra's al-Jinz) to the last villages of the Dhofar region facing the Yemeni border and the islands of Masirah and Hallanyat has been systematically surveyed and tested (Figure 1). During the past four years (2017-2019), the fieldwork activities focused on Sharbithat bay (Figure 1, 2). Located at the entrance of the Dhofar Region, between the villages of Ra's Madrakah and Shuwaymyiah, P. Biagi first visited the area in 1985 (Biagi, 1988). However, it has just recently been surveyed systematically.

The Sharbithat bay is characterised by an imposing limestone massif which surrounds the shore that is dotted with numerous wide marine terraces (Maiorano et al., 2018). The surveys were conducted on foot, drawing transects of 1–2 km across the terraces. The visibility was excellent due to the almost complete lack of vegetation. All of the remnant and visible dwellings have been recorded, but a systematic collection of the surface material and a collection of diagnostic pieces was carried out at selected archaeological areas, and the artefacts' location was recorded using a hand-held GPS (Topcon GMS-2 Pro GPS Receiver). Thirty-six sites were recorded and labelled SHA–1 to SHA–36 (Figure 2). Post–depositional and erosive phenomena have affected the encountered surface scatters and only a few sites on the Sharbithat marine terraces featured a legible stratigraphy.

The intense fieldwork activities at Sharbithat were primarily based on the study and examination of regional geological and geomorphological settings. In a previous publication (Maiorano et al., 2018) the authors described the general landscape and its archaeological composition, presenting the main sites (Sharbithat SHA-2, SHA-4, SHA-9 and SHA-10) and the related features. The Sharbithat plain is characterised by deltaic fans and conglomerates related to the Late Miocene-Pliocene phase, in contrast with the Tertiary's oldest calcareous formation that characterises the system of marine terraces (also referred to as mesas) scattered all over the coast. It is in this area that most Neolithic settlements and occasional encampments were situated. Indeed, the high plateau in the hinterland appears to be composed of a tertiary bioclastic carbonated deposit belonging to the known Dhofar group, which developed a tabular morphology due to the exposition to the coastline. Deep canyons created by wadi branches cut this massive plateau. Detailed geomorphological studies are still in course (Maiorano et al., 2018).
In this venue, the results of the SHA-10B test excavation, the technological study of the collected artefacts, and the first radiocarbon dating will be discussed.

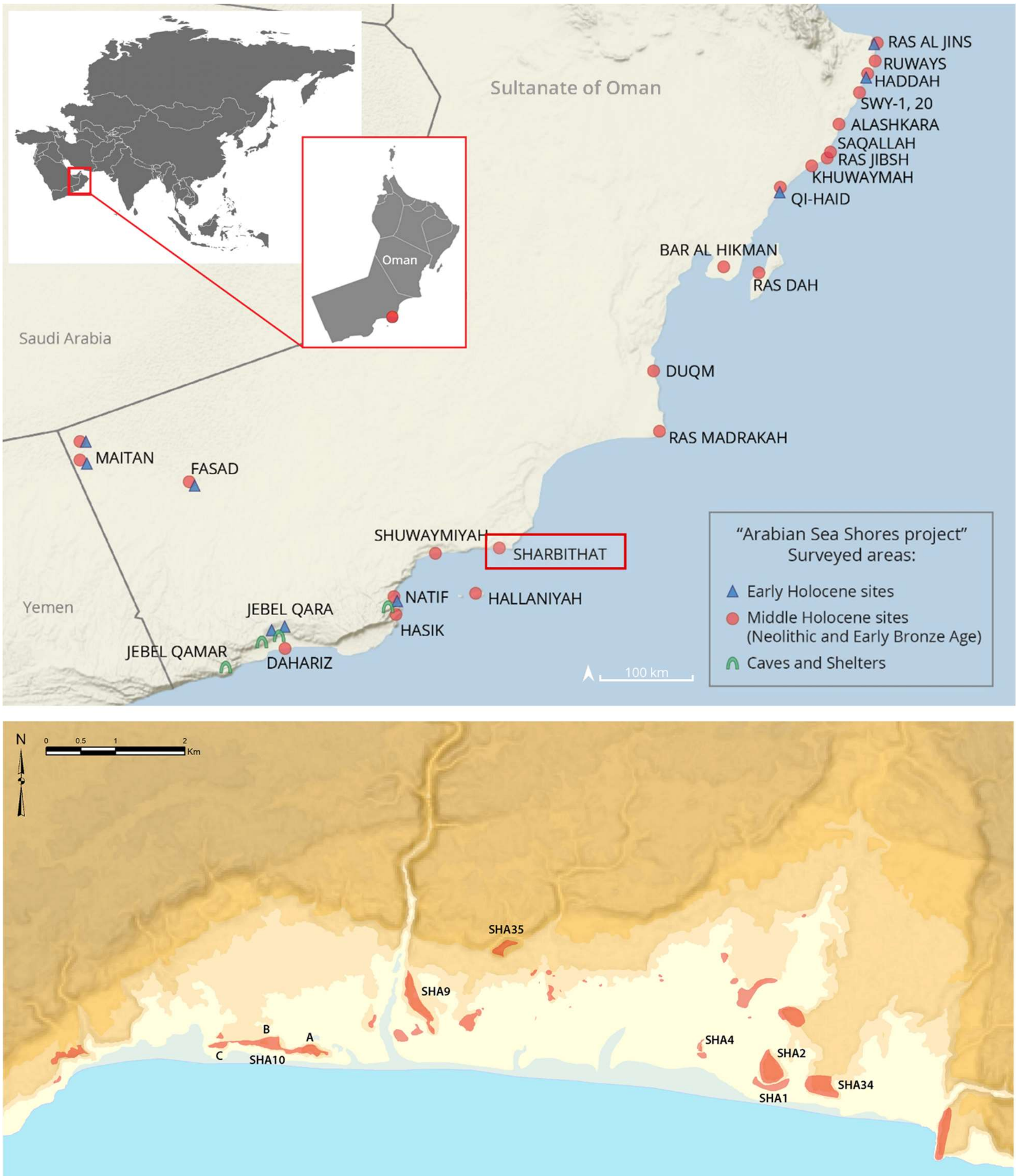

Figure 1. "Arabian Sea Shores" project: general map of the surveyed areas from 2010 to 2021 (top). Map of the Sharbithat bay with the location of main sites (bottom). Graphics: M. P. Maiorano and F. Borgi.

2. Investigation of the Late Neolithic site of SHA-10B

SHA-10 extends on the most expansive marine terrace (more than 1.5 km), and it is home to three main concentrations (A, B, C, Figure 2) that yielded consistent scatters of lithic and shell artefacts. Concentrations of circular stone structures characterise SHA-10A, and 10B made with standing or horizontal sandstones (Figure 2) where different lithic artefacts, such as micro-drills, worked shell ornaments, scrapers and net sinkers, have been found. Nevertheless, the most notable discovery was the high amount of backed bladelets, ranging in size and shape, associated with tanged points shaped on a thick laminar flake (Maiorano et al., 2018). These points were defined later as the Fasad points (characteristics of the Final Palaeolithic hunter-gatherers' communities; Charpentier, 2008; Charpentier and Crassard, 2013; Charpentier et al., 2016) because of their association with an assemblage typical of the 4th mill. BCE sites (Méry and Charpentier, 2013) but also because of their morphological structure and different production techniques (Maiorano et al., 2018, 2020a). In this paper, two methods for a more precise comparison between these assemblages are proposed and partly sustained by the radiocarbon dating results.

2.1 Test-trenches excavation

At Sharbithat SHA-10B, two test trenches (T1 and T2; Figure 3) measuring 2 m^2 and 4 m^2 respectively were excavated and fully documented, the soil sieved, and all the materials collected and analysed. To not affect the core of the site in the framework of a preliminary investigation, we avoided the excavation of the structure, preferring a test excavation of the peripheral areas. The site core will be excavated in the framework of next seasons.

At T1 the preserved sediment is only 7 cm thick. Beneath a 1 cm thick layer of sand (SU0) lies a 5 cm thick dark level rich in shell remains, lithics and fish bones (SU1). Below this rich level, SU2 is basically archaeologically sterile reef sand, which interfaces with the bedrock.

The second trench (T2, later extended to the north T2N) measured a maximum of 20 cm in depth. After removing a superficial level of limestone rubble (SU0), an ashy, dark layer rich in artefacts, shells and fish bones was uncovered (SU1). In this stratigraphic unit, several fire-spots have been identified and sieved separately. Cut in SU1, SU5 is a large pit containing two long mammal bones (*Equus* sp. cfr *E. africanus*), a net sinker and various lithic tools (Figure 3, detail). Together with the fish bones, some rests of *Sepia* sp. and crabs (*Leucosiidae* sp.) were discovered. All the fish remains are under study at the Natural History Museum of Paris (under the expertise of Philippe Bearez). Below a thin layer of loose sand (SU2), a dark-orange ashy layer rich in fish bones, shells and lithics covers the bedrock (SU3). In this last layer, as well as in the SU2 and 1, tanged points made on thick laminar blank have been found, in clear overlap with a rectilinear blade-oriented industry and a significant production of backed pieces.

Figure 2. Location of SHA-10A and SHA-10B (top). Main features characterising the archaeological landscape at Sharbithat SHA-10: (a) circular stone structure made with horizontal and vertical standing stones at SHA-10B; (b) circular cairns and stone structures. Drone photos by A. Al-Mashani, 2017.

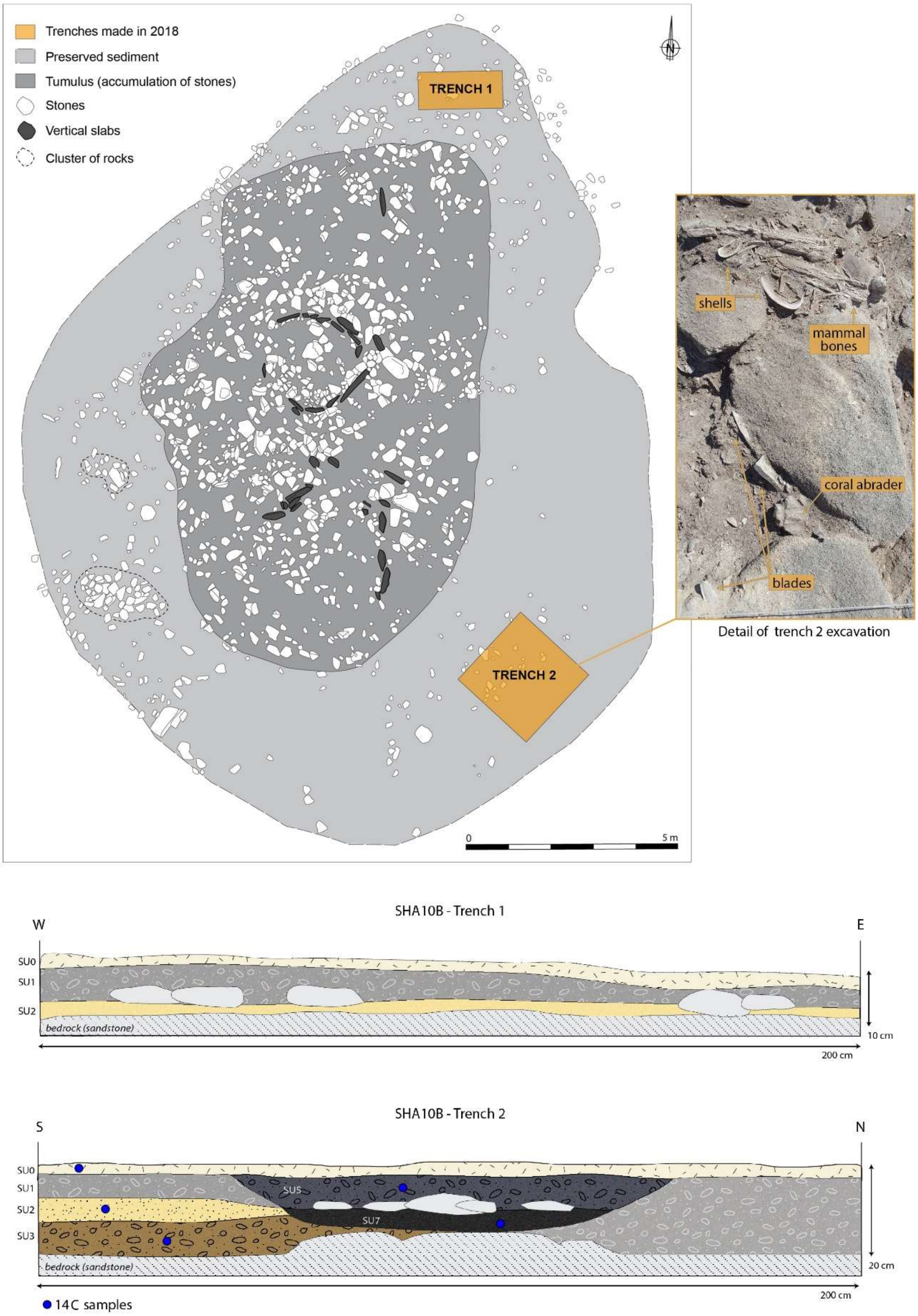

Figure 3. (Half-up) Orthographic map of the site SHA-10B with the trenches location. (Half-down) Test-trenches sections. Trench 1: limestone rubble (SU0); level rich in shells, lithics and fish bones (SU1); sterile reef sand lying over the bedrock (SU2). Trench 2: limestone rubble (SU0); ashy layer rich in shells, lithics and fish bones (SU1); large pit containing artefacts and animal bones (SU5); loose sand (SU2); ashy layer with fish bones, shells and lithics covering the bedrock (SU3). Drawings by G. Marchand, M. P. Maiorano.

Trench	SU	Plaquette	Chips	Flakes - decortication	Blades - bladelets	Flakes first intention	Cores	Chunks	Tools	Backed pieces	Total
1	0	5	27	53	10	10	1	77	0	10	193
1	1	0	2	52	22	8	0	38	0	8	130
1	2	0	0	15	2	0	0	2	1	0	20
2S	Surface	0	15	73	21	25	0	57	3	25	220
2S	1	4	389	275	65	116	2	206	16	113	1187
2S	2	1	430	191	27	60	4	181	8	61	963
2S	3	0	56	67	13	17	0	29	5	17	204
2N	Surface	3	5	27	6	5	1	15	0	5	67
2N	0	5	50	75	18	14	0	66	6	14	248
2N	1	3	179	252	37	53	1	92	16	56	689
2N	2	0	57	41	12	21	1	34	4	21	192
2N	3	0	28	42	8	13	0	19	2	13	126
2N	4	0	41	26	18	12	0	15	4	12	128
2N	5	2	21	49	21	14	0	16	4	13	140
2N	6	0	0	6	2	0	0	2	1	1	12
2N	7	3	70	127	12	25	1	63	0	25	326
2N	7	0	24	44	12	10	0	19	3	10	122
2N	8	0	2	10	2	1	0	10	2	1	28
2N	Pit B	0	2	0	2	1	0	0	0	1	6
Total Trench 1		*5*	*29*	*120*	*34*	*18*	*1*	*117*	*1*	*18*	*343 (7%)*
Total Trench 2		*21*	*1369*	*1305*	*276*	*387*	*10*	*824*	*74*	*388*	*4658 (93%)*
Total		**26**	**1398**	**1425**	**310**	**405**	**11**	**941**	**75**	**406**	**5001**

Table 1. Counts of lithic remains from SHA-10B Trench 1 and 2 (north 2N, south 2S).

2.2 Raw material sources

The first identified two flint outcrops are located at the eastern side of the bay, in the immediate surroundings of the sites SHA-1 and SHA-4, but six others were mapped and sampled all over the central and western ridges (SHA-7, SHA-8, SHA-12 and SHA-13A/B, SHA-31, SHA-32, Figure 4). The outcrops emerge from the tertiary formations (Fars Formation or Dhofar Group) where erosive phenomena have exposed the surface. Despite their vicinity to the archaeological sites, these outcrops do not represent actual flintknapping workshops while the most recently discovered at SHA-31 and SHA-32 are two flint hills in the middle of a sandy depression, covered by partly worked plaquettes and rough blades and bifaces preforms abandoned at the first phase of reduction. The raw material occurs in the shape of thin plaquettes or small blocks and nodules, 5 to 20 cm in length while at SHA-7 and SHA-10 the plaquettes are generally larger (about 40 cm). The flint is grey or black with a thick limestone cortex (5 to 10 mm), but the texture is homogeneous with occasional hard chalcedony inclusions. These features make it an excellent exploitable material despite the limited possibilities given by the shape of the flat blocks, which do not allow full volumetric exploitation.

Figure 4. SHA-32, the widest raw material outcrop. Photo by J. Vosges, 2017.

2.3 Assemblage and Debitage

The blade production is uncommon in the known Middle Neolithic industries of Southern Arabia (6500-4500 BCE), while several sites dated to the last phase of the Late Neolithic (3700-3100 BCE) (Charpentier, 2004; Charpentier, 2008; Crassard, 2008; Borgi et al., 2012; Maiorano et al., 2020a) yielded numerous artefacts made on laminar blanks. Fisherfolks at Sharbithat oriented their manufacture to producing blades and bladelets. These are frequently thick and partly cortical. The core-volume organization adapted to the raw material found in the shape of plaquettes and blocks: the active surface of the core, from which the removals are detached, extends along the two thin delimited surfaces (Figure 5).

The core reduction, unidirectional or bidirectional, rarely involves the preparation of the surface through a crested blade. These cores are minimally prepared, and the volume is not thoroughly shaped out before starting the extraction of blades. The blades were detached with a soft stone hammer. Consequently, their shape and size are significantly variable (Figure 6, 7).

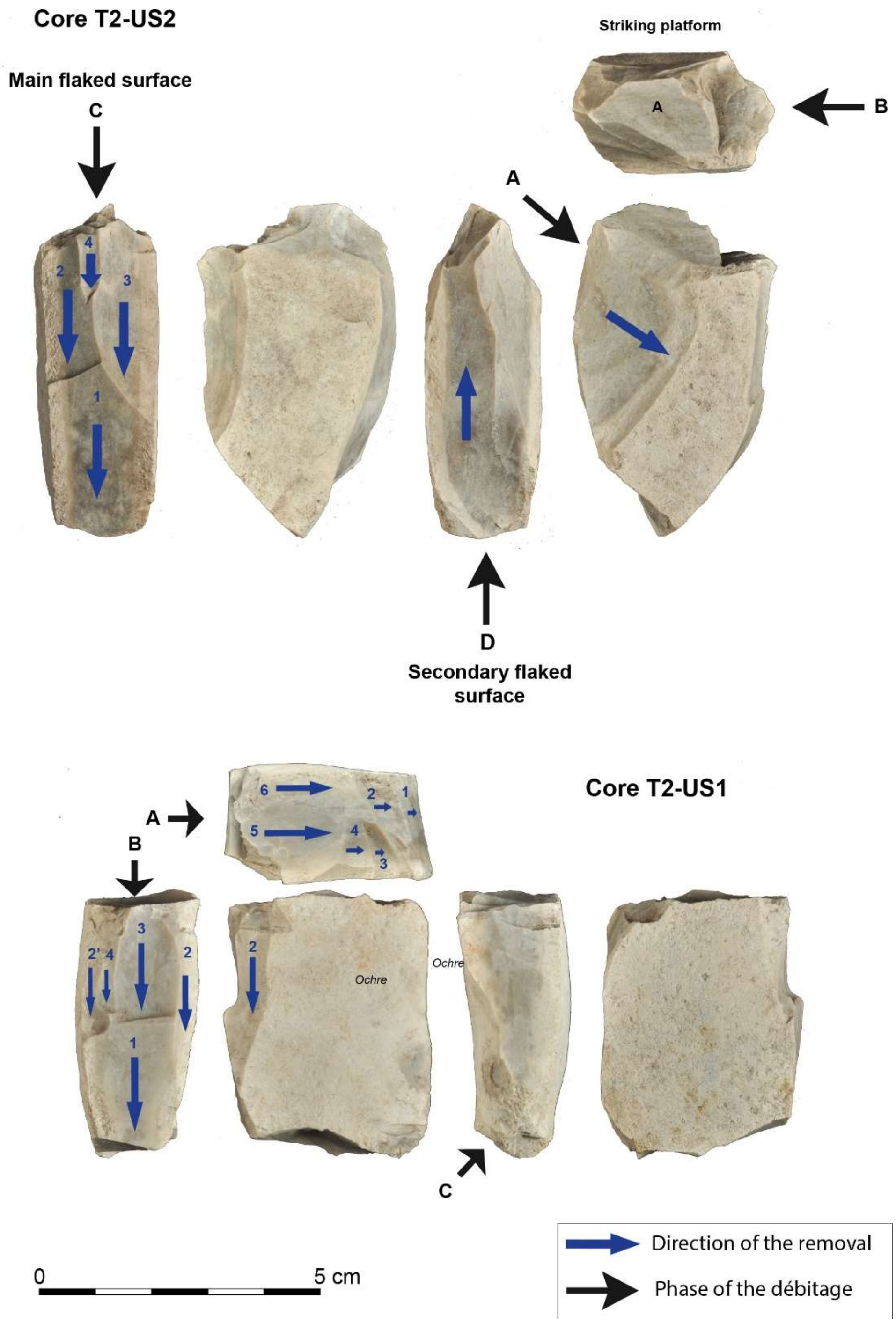

Figure 5. Two cores from Trench 2 with indication of the debitage phase and the detachments direction (photos by J. Vosges and G. Marchand).

Retouched blades are modified through marginal and semi-abrupt retouch by direct percussion with a stone hammer. The retouch usually covers just one edge, leaving the cortex on the opposite side (Figure 6), resembling the backed knife production. Of particular interest was the unexpected discovery of a blade retouched on one side, covered by ochre (Figure 6: 6).
The collected large side-scrapers (transverse, convex or double) found in the trench were produced by exploiting large, thick flakes, frequently covered by a small portion of the natural cortex, most likely left to handle the smooth back edge of the tool (Figure 6) comfortably.

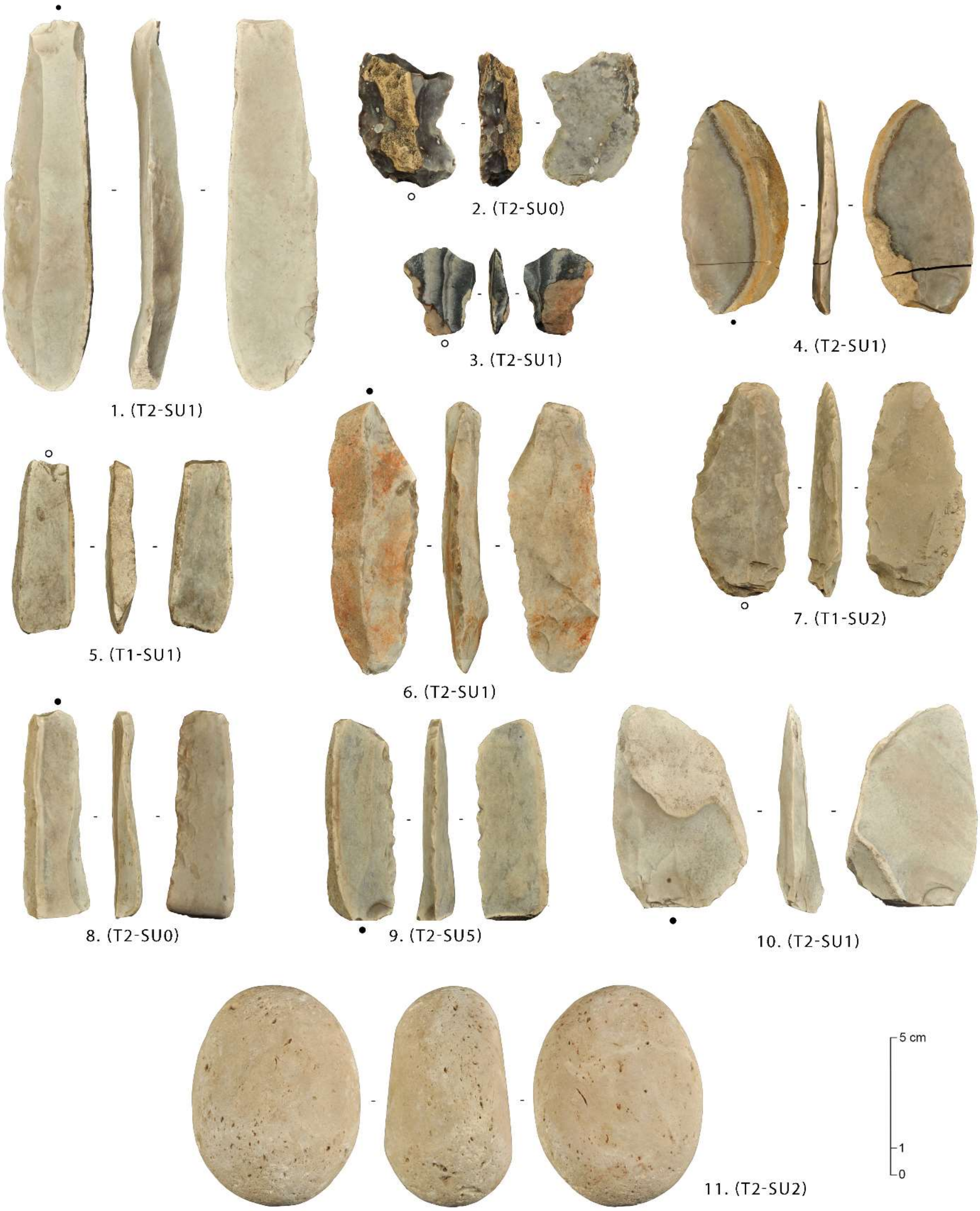

Figure 6. Blade (5), retouched blades (1, 6, 8, 9), notch (2, 3), and scrapers (4, 7, 10), and stone hammer (11) from Trench 2 (photos by J. Vosges).

2.4 SHA–10B: backed bladelets

The main peculiar classes of remnants were, however, the backed bladelets. More than 300 backed bladelets were collected during the excavation. These items have been found frequently broken at

both extremities and modified by direct and abrupt retouching. The blanks are usually blades and bladelets with a rectilinear longitudinal profile retouched by bipolar percussion. Despite the frequent fractures that affect the most substantial part of these artefacts, it is possible to recognize two main categories: elongated lunates and rectilinear backed bladelets (Figure 7). Some recognizable knapping accidents caused by hard hammers or imprecise shots are the gibbous back and the "Krukowski" fracture (Duches et al., 2018). Unlike the typical microburin process, which intentionally aims to break blanks obliquely, the "Krukowski" microburin is accidentally produced during backing, often in relation to the management of the blank's thickness. These breakages happen when the retouching blow is released too far onto the blank, causing the removal of a small part of it that forms a trihedral point (De Bie and Caspar, 2000; De Wilde and De Bie, 2011). At SHA-10B, their number is 149 "Krukowski" against 157 orthogonal fractures. During the experiments carried out by a team member (J. Vosges), their recurrence was explained by the bipolar percussion made with a hard hammer on an anvil, without any adaptation of the process to find alternative solutions, as the pressure retouch. By default, this large amount of "Krukowski" fractures can be considered part of the technical mark of the SHA-10B lithic industry. Micro-drills were shaped on flakes or bladelets by abrupt, direct, or alternate retouch on both edges. Their tips are blunt, and they were most likely hafted (Figure 7: 14-16).
Backed bladelets are rarely mentioned in the literature of Arabian prehistory, but a few specimens are reported in UAE 5th millennium sites, such as Marawah Island, Sharjah Tower and Abu Dhabi Airport (Millet, 1988; Beech, et al., 2004; Charpentier, 2004; Kallweit, 2004). A few backed bladelets have also been reported at Suwayh SWY-1 (Charpentier, 2004), and Ras al–Hamra RH-6 in Oman (Biagi 1999 Fig:12-14). In Southern Oman, the first documented microliths belong to the Upper Palaeolithic, to the MIS3 layer in Matafah AH III (Rose et al. 2019; see Rose, 2022: Fig. 10.11), supporting the hypothesis that projectile technology enabled populations to persevere in isolated territories outside of Africa. They are extremely thin and standardized. Subsequently, they almost disappeared during the first phases of the Neolithic to be re-introduced in the Late Neolithic period in Sharbithat. In the last two years, two other sites of backed pieces and geometrics related to the Bronze Age were reported. At Hili-8 (dated to the Early Bronze Age, Buchinger et al. 2020) and Saruq al Hadid (Late Bronze Age, Moore et al., 2020), geometrics and lunates were found to be associated with large blanks industry as well. Lastly, the microliths from Inqitat were dated to the Early Iron Age (Hilbert and Lischi, 2020) or the Pre-Islamic Era, when similar finds are known from Yemen (although commonly made in obsidian, Crassard 2008).
In all these cases, microlithic artefacts represent only one aspect of chipped stone assemblages where they occur in conjunction with larger tools and seem integrated into an already defined technological system. They can be regarded as an element of technological adaptation to major innovations in subsistence and economy taking place from the Late Neolithic remaining, however, embedded in resilient production strategies. To date, there is no evidence of the adoption of lunates in the long-lasting excavated sites with apparent cultural-economic ties to the Oman peninsula, such as Baluchistan, or the Indus valley, suggesting the conceptual idea behind the production of lunates evolved locally. The idea of a lunate's morphology and function was introduced, but its production was integrated into the prevailing technological system.

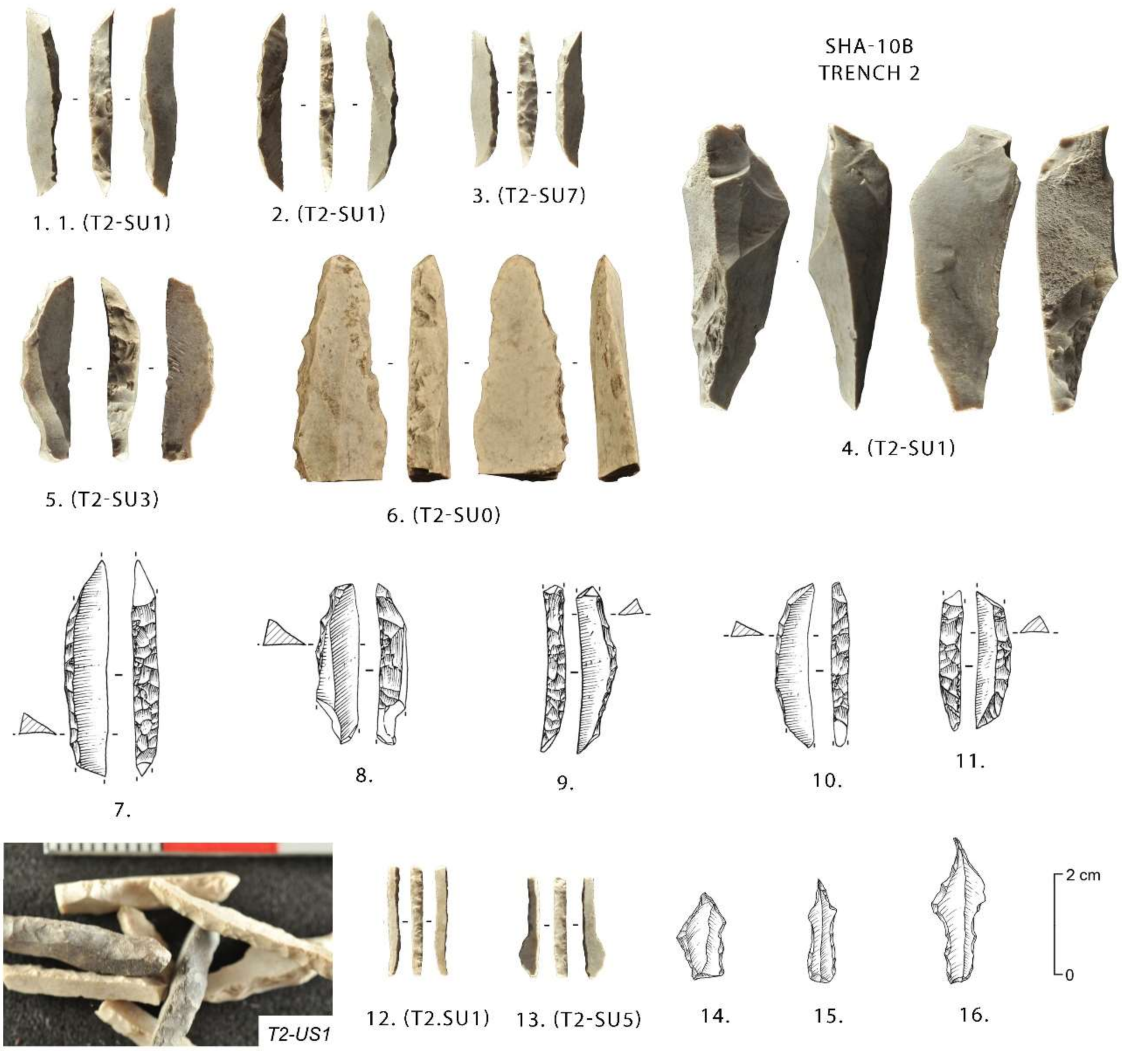

Figure 7. Backed bladelets and lunates from SHA-10B. Where not specified in brackets, the pieces come from the surface (drawings by G. Devilder and M. P. Maiorano; photos by J. Vosges).

2.5 Tanged points

Tanged points were produced using thick flakes and blades. The tang was shaped by direct hard hammer percussion on anvil. Their size is generally variable, and the length ranges between 70 and 43 mm while the width is more homogeneous (15–25 mm) (Figure 8). The apical part is barely corrected by partial removals and, occasionally, by continuous retouch. The tanged points and the backed bladelets were produced exploiting the same local raw material, and the applied knapping methods and techniques are also virtually identical.

Chronologically, this assemblage was hard to define. The technical investment in manufacturing the artefacts is low, and this characteristic might recall the ancient Fasad points (Charpentier, 2008; Charpentier and Crassard, 2013), but also the rough laminar blanks diffused in central Oman, as the Al Haddah points (Charpentier et al., 1997; Maiorano et al., 2020a).

The SHA–10 points look, indeed, similar to other artefacts discovered in Ḥaḍramawt (Type 3A, Crassard, 2008) and to a few specimens reported in the Wahiba Sands (Edens, 1988), Ramlat Fasad

(Pullar, 1974) and Nedj Plateau (sites 92.14–15, 92.19, 92.36 in Zarins, 2001). However, most of these points have been discovered during surface surveys and need secure dating. In Yemen, Rémy Crassard (2008) tentatively dated them to earlier periods but, given the recent results of ^{14}C dating at Sharbithat (Table 2), the chronological framework for their production and diffusion in Oman is later, fitting entirely in the 4th millennium BCE.

To further explore the techno-morphological variability among points defined as "Fasad" (coming from different sites all over Oman), a Principal Component Analysis (PCA) was run based on the attribute's analysis of 154 entire points[1]. For the analysis, only sites with more than five elements were selected. We included all entire points collected by the team in the last twelve years of missions at Natif 2, Fasad, Haddah (BJD-1), Maitan (SQJ-8 and SQS-2), SHA-10A, SHA-10B, SHA-2,[2] and some samples reported in the literature as Site 92.14 and Site 92.19 (Zarins, 2001). The PCA was run on the presence/absence of each attribute's mode (listed in Figure 9) using the function prcomp in R (R Core Team, 2020) and aimed at exploring the possible presence of population structure. These attributes were selected after verifying their strength in analysing the whole sample of points from Southeastern Arabia (for a detailed description of the methods, see Maiorano et al. 2020a). In the previously mentioned analysis, it emerged that the retouch position along the edge (I_R_pos, III_R_pos, V_R_pos, VII_R_pos), the shape of the medial section (the unretouched blank's shape or retouched irregular cross-section) and the thickness at the mid-point were the main driver of variation in the laminar points group. As visible in the graph, a neat distinction emerges between these points (Figure 9). PCA effectively separates the specimens into three main sets, all of which match with the technological and morphological differentiation identified between Fasad (yellow ellipse), al-Haddah (green) and Sharbithat (light blue; Figure 9). The outliers are irregular points that do not fit perfectly in one of the sets. In addition to the techno-morphological distinction between the Sharbithat and the Fasad group, the discovery of four Sharbithat points in the different layers of the SHA-10B trench made safer their attribution to the 4th millennium Late Neolithic horizon.

[1] For additional references, see Maiorano et al., 2020a; O'Brien and Lyman, 2003; O'Brien et al., 2010.

[2] Here we report the full list of references: Natif 2 (Charpentier et al., 2016), Fasad (Charpentier et al., 1996, Charpentier and Crassard, 2013), Haddah BJD-1 (Charpentier et al., 1997, Charpentier and Crassard, 2013), Maitan SQJ-8, SQS-2 (Maiorano et al., 2020b, Al Kindi et al., 2021).

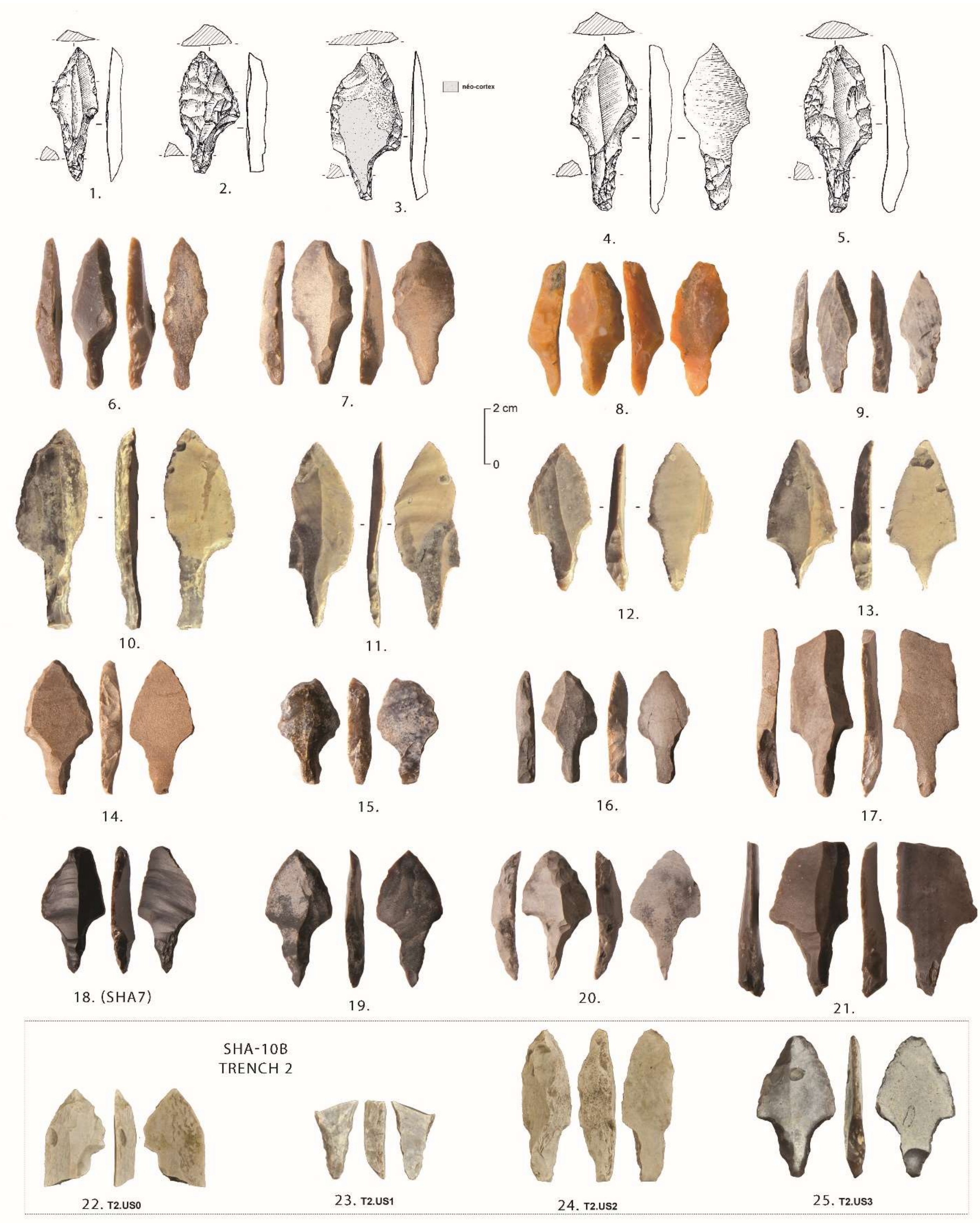

Figure 8. Selection of points from the surface (1 – 17, 19 – 21), and from Trench 2 (22 – 25) at SHA-10B. Sample of the same point type from SHA-7 (18) (drawings by G. Devilder; photos by J. Vosges and M. P. Maiorano).

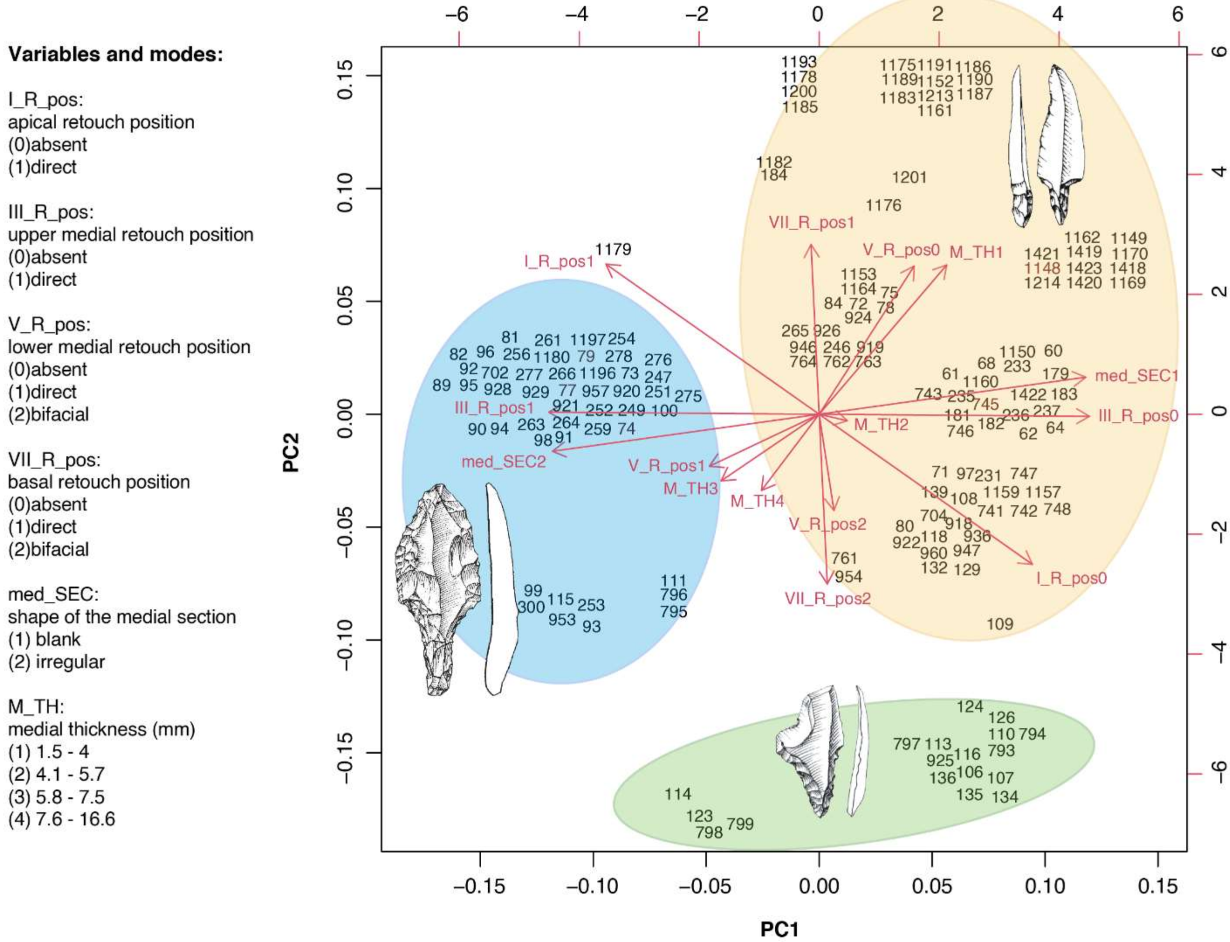

Figure 9. The biplot shows the PCA results aimed at identifying the traits that explain most of the variability in the entire sample of points. The black labels represent the specimens, while the reds are the variables and modes listed on the left (complete tables are available as supplemental files). The plot graphically summarises the variability in non-bifacial points (made on flake, bladelets or laminar-flake blanks), dividing the 154 analysed points into three groups where the Fasad cluster occupies the upper-right side, the Al-Haddah the lower part and the Sharbithat the left area. A detailed description of the used method and the attributes' selection is fully reported in Maiorano et al., 2020a.

2.6 Beads and bead-making process

Since the excavations carried out at Sabbyiah (Kuwait), Akab (UAE), Ra's al-Hamra, Suwayh and Masirah Island (Méry and Charpentier, 2013), the discovery of many beads at different stages of production indicates the importance and recurrence — and in some cases, even the specialization — of this manufacturing activity at several coastal sites along the Arabian Sea.
At SHA-10B, more than 100 beads were collected in test trench 2, made both in shell and soft stone. The shell beads assemblage presents a remarkable dimensional variety. Only a single preform made in Spondylus sp. has been found. In the test trench 2 worked Conus shell fragments were also retrieved, together with cylindrical beads made by exploiting the columella of big shell specimens like *Fasciolaria trapezium*, thicker bivalve, and gastropods (Figure 10). Some gastropods, particularly the *Bullia* sp., *Cypraea* sp. and *Conus* sp., have unique perforations made by sawing, a technique never identified in Omani Neolithic (see Fig. 11: 4-6).
Usually, the last steps in beads production are polishing and regulating the shape using a calibrator. In Sharbithat SHA-10B, two bead calibrators made of coral were found during the excavation

(Figure 10). This kind of tool is quite rare, and it finds comparisons only in two Neolithic sites: the 4th millennium settlement of Ra’s al-Khabbah KHB-1 (Ash Sharqiyah Region) and Sur Masirah SM-5 (Masirah Island), although in these sites a soft-stone anvil was used to break the shells, perforate the Spondylus discs and polish the edges (Charpentier et al., 2013).

Figure 10. Shell and stone beads from Trench 2 (1); shell beads (4 – 7) and preforms (2, 3, 8, 9, 10); two bead abraders made in coral (11, 12; photos by J. Vosges).

2.7 The fishing equipment: net sinkers and fishhooks

At SHA-10, net sinkers are made from flat and oval pebbles. The diameters range between 4-8 cm and the side engravings are generally formed by long segments. This type of net sinkers with transverse grooves is very common throughout the southern Arabian coast, especially after the 5th millennium BCE. Uniformity in shape and size is often recognizable for this class of tools. However, the typical shell fish-hooks, usually made in *Pinctada margaritifera* sp. (Borgi et al., 2012; Méry and Charpentier, 2013) and known as one of the most widespread tools linked to encampments where the human subsistence was mainly based on fishing activities, here are completely absent and the only retrieved fish-hook is made with a large double-pointed bone (Figure 11). Similar specimens are reported from RH5 (Biagi and Starnini, 2020: Fig. 4) and the neolithic layers of Natif-2 (unpublished report).

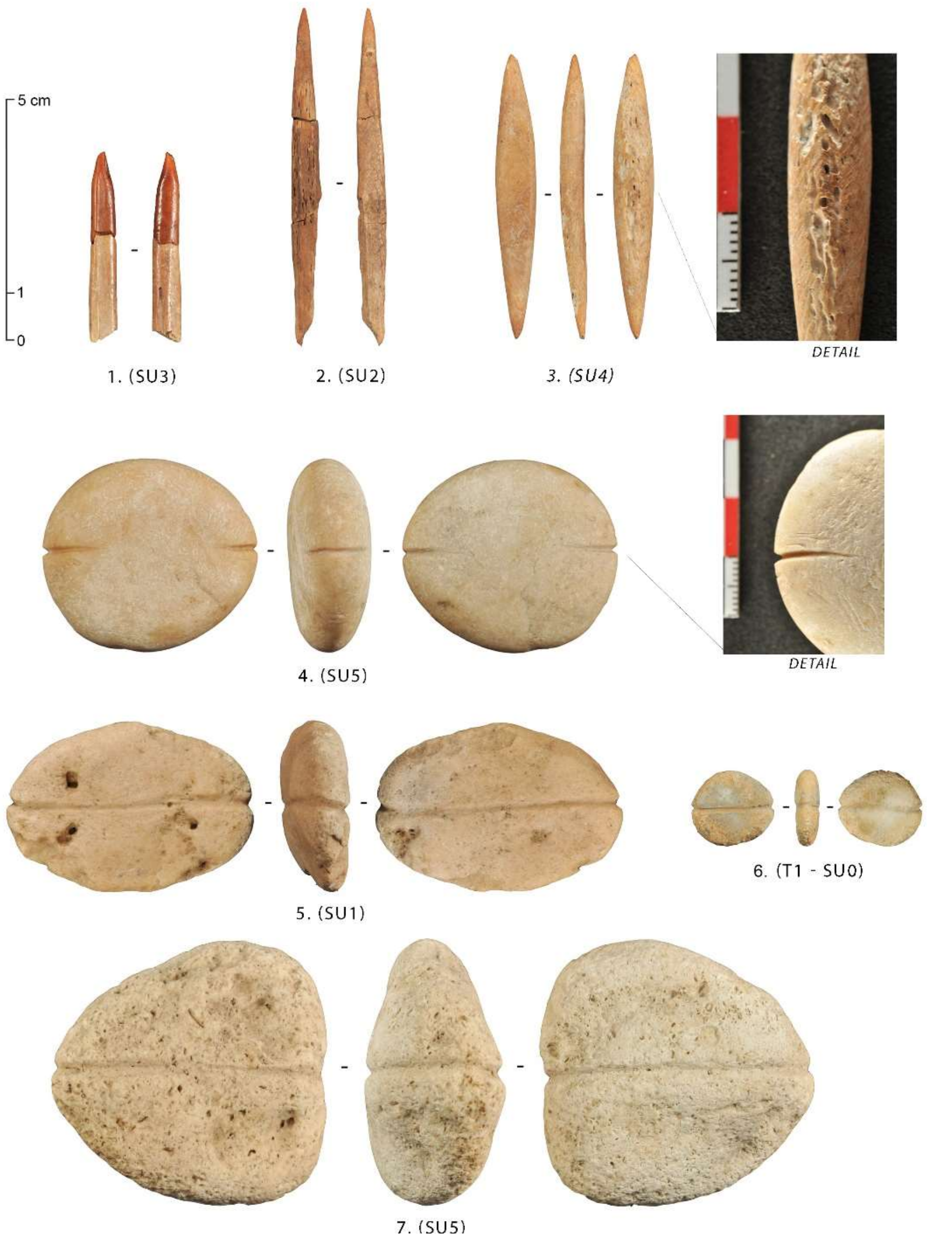

Figure 11. Bone fishhooks (1 – 3) and netsinkers (4 – 6) from Trenches 1 and 2 (photos by J. Vosges).

3. Discussion: assessing the chronological and cultural issues

The excavation of the test trenches at SHA-10B yielded five ^{14}C charcoal dates, reported in Table 2, that range between 3949-3712 BCE and 3339-3026 BCE. All the levels from SU2 to SU7 yielded radiocarbon dates that place the anthropic occupation of the site to the 4th millennium BCE. The radiocarbon dating results were calibrated using the OxCal v 4.2.3 software and IntCal13 atmospheric calibration curve (Reimer et al., 2013). The older levels, including SU6 and SU7, date to the second half of the 4th millennium BCE (SU6: 4500±30 BP, 3347-3097 BCE cal. BCE and layer SU7 in the direct vicinity of the fire spot in SU6: 4525±30 BP, 3358-3103 BCE). The youngest date (975±30 BP) comes from the superficial layer (SU0), and reflects the possible disturbance caused by later charcoals.

Site	Layer	Material	Lab.	^{14}C Age BP	Calibrated Age 2σ BCE
SHA-10B	SU0	charcoal	SacA-54938	975±30	1013-1155 AD
SHA-10B	SU2	charcoal	SacA-54939	5035±30	3949-3712 BCE
SHA-10B	SU3	charcoal	SacA-54940	4470±30	3339-3026 BCE
SHA-10B	SU5	charcoal	SacA-54941	4500±30	3347-3097 BCE
SHA-10B	SU7	charcoal	SacA-54942	4525±30	3358-3103 BCE

Table 2. ^{14}C results from Sharbithat SHA-10B Trench 2.

These new radiocarbon dating results challenge the indiscriminate use of points made on blade/flake blanks as a "guide fossil" for the Final Palaeolithic periods. The Fasad points, their cultural affiliation, and their chronology have always been explained through two opposed approaches: one stressing their Levantine origin (Uerpmann et al. 2009, 2013), the other proposing an autochthonous model where the Early Holocene hunters-gatherers groups who produced such points rooted in the local Final Palaeolithic (e.g., Charpentier and Crassard 2013; Charpentier et al., 2016). The scarcity of dated sites and the morphological variety in the different Fasad assemblages always gave this lithic complex an ambiguous role. However, the recent discovery of Al-Hatab and Khamseen shelters in Dhofar (Hilbert, 2014; Hilbert et al., 2015a, 2015b), Jebel Qara (Cremaschi et al., 2015), Natif-2 coastal cave (Charpentier et al., 2016), and a re-organization of this cultural frame in more consistent classes (Charpentier and Crassard, 2013), added new light on the Fasad controversy. In this framework, the discovery and chronological definition of SHA-10 points led to the formulation of additional hypotheses on the several aspects connected to separate cultural entities. The chronological spectrum in which SHA-10 falls might indicate that several of the previously collected Fasad points, especially in interior Dhofar (Zarins, 2001), might be attributed to the Late Neolithic (4th millennium BCE). In this perspective, re-evaluating the previously collected points might be necessary. The association of these points with backed bladelets produced by the same techniques and raw material, combined with the presence of other artefacts widely diffused in 4th millennium BCE (thick laminar products, net sinkers with horizontal incision, specialized bead production, etc.), opened new interpretative lines. Moreover, at Sharbithat, we assessed a neat association of points with fishing toolkits and backed pieces for the first time. Indeed, points are absent from the contemporaneous sites scattered throughout the Southern Arabia coast (Crassard, 2008; Charpentier, 2008; Maiorano et al., 2020a).

Considering the last results, we can affirm that the lithic complex diffused at Sharbithat SHA-10 marks a different expression of the Late Neolithic cultural horizon. When the pressure technique was abandoned (at the beginning of the 4th millennium BCE; Charpentier, 2021), the manufacturing of points became less sophisticated. However, the processes leading to the technical impoverishment that characterises the transition from the Middle Neolithic to the Late Period in Oman Peninsula remain largely unexplained. Between the end of the 5th and the beginning of the 4th millennium BCE, the Intertropical Convergence Zone (ITCZ) moved

southwards, decreasing its influence on Southeastern Arabia (Preston et al., 2012, 2015; Lézine et al., 2017). These changing climatic constraints most likely forced human groups to move to the coastal and more suitable areas characterised by water sources (Crassard and Drechsler, 2013). Sites dating to the 4th millennium BCE, indeed, show increased development of local specificities generated by the intensive and probably seasonal exploitation of environments, especially wadi deltas, lagoons, and mangroves, as suggested by the coeval expansion of shell middens (Cleuziou and Tosi, 1998).
The survey and test excavations provided new empirical evidence of a different Late Neolithic facies, which increased our knowledge about the region's lithic technological and typological variability. The overview on SHA-10B shows a considerable amount of surface evidence scattered all over the marine terraces behind the white bay, where most Middle and Late Neolithic sites are concentrated. Interestingly, no traces of later occupation have been recognized, except for the two concentrations of stone houses in the immediate surroundings of the current downtown and the abandoned village of Manji. However, it seems unconvincing that the whole area was unpopulated during the Bronze and the Iron Ages. The absence of metal and pottery fragments in the surveyed areas could be linked to the physical isolation of this bay, making it challenging to import copper and export local resources. The presence of vast flint outcrops, the excellent quality of the raw material, and the abundance of marine resources may have led to self-sustaining communities. Indeed, the future out-coming results of the geomorphological and geophysical investigation, together with the increasing of new dating made on charcoal remains collected during the excavations, will help to clarify these chronological and cultural questions. The uniqueness of Sharbithat bay makes it one of the most relevant contexts in which further data collection and soundings can be performed to understand landscape use through time better.

4. Conclusion

The abundant lithic artefacts collected in the test trenches at SHA-10B seem homogeneous regarding raw material, applied knapping techniques, and manufactured tools. The high amount of debitage products associated with cores and final products identifies this site as a multi-functional space adopted for both the artefact's production and use. Of course, the function of backed pieces and points still needs to be assessed. However, use-wear analysis is in the course, and an extensive excavation is planned for the following years to help identify the stone structure, which is still unknown. Despite extensive research will be necessary to accurately reconstruct a chronological framework for Dhofar comparable to that developed for north-eastern Oman, this study contributed to developing an (aceramic) Late Neolithic chronology based on the stratified lithic assemblages from Sharbithat 10.
In the paper, we demonstrate how the evolution of projectile points followed a different path than previously thought, experiencing a return to the blade blanks production, even though different in terms of technique and, likely, artefact's function. Consequently, the points industry previously assigned to the "Fasad" group should be better analysed and divided into a Fasad industry belonging to the 9th – 7th millennium BCE and a "Sharbithat" facies with a chronological boundary around 3900/3000 BCE.
The implications of this new interpretation are not limited to a – subregional – diversification of the Late Neolithic period with lithic evidence but should be evaluated in the larger framework of the Dhofar region in the perspective of a re-evaluation of some surface lithic assemblages coming from this area, previously assigned to the Fasad facies.
Lastly, the Sharbithat assemblage from SHA-10 show significant changes in raw material exploitation, technological development, dwelling construction, and regional cultural interaction/isolation patterns. The identification of a backed industry on laminar blanks may help to identify the emergence of a fishery economy partly different from the ones in Northern-Central Oman, where more detailed subsistence records and radiocarbon dates are available so far.

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