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New insights on Bronze Age funerary monuments in the Ḥajar foothills: surveys and excavations at Bisya (Ad-Dākhilīyyah, Sultanate of Oman)

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Summary

The Bisya region is rich in archaeological heritage, with thousands of protohistoric funerary monuments (fourth–first millennium BC), making it an ideal place to study the diversity of burials in the region. This article presents the results of two survey and excavation seasons in the Bisya region.

Remote sensing identified over 5500 tombs in a vast area, and ground surveys made it possible to document their variability and spatial distribution. The article discusses the architectural diversity, topographical location, and chronological assignment of these tombs and sheds light on the transition from the Hafit to the Umm an-Nar period as well as on further possible reuses.

The excavation of three tombs (Tomb F4170, Tomb F2276, and Tomb F4169), revealed their architectural features and deposits and shed light on their possible dating. The imported pottery found in Tomb F4169 indicates connections with Mesopotamia, Iran, and Baluchistan. Beads, small objects, and copper alloy artefacts were recovered, providing further insight into the burial practices and trade networks of the time.

This research in the Bisya region contributes with new data to our understanding of the burial landscape and socio-cultural development during the Early Bronze Age in the Arabian Peninsula, illuminating the architectural evolution and the trade and cultural networks in which the population was involved.

Keywords: Hafit, Umm an-Nar, south-east Arabia, tombs, trade networks.

Introduction

In the south-eastern Arabian Peninsula, the development of the funerary landscape and practices related to funerary monuments characteristic of the Early Bronze Age (EBA, 3200–2000 BC) have attracted the interest of scholars since the beginning of research in the region (e.g. Böhme 2011; Bortolini & Munoz 2015; de Cardi, Bell & Starling 1979; Cleuziou 2002; Gentelle & Frifelt 1989; Giraud & Cleuziou 2009; Williams & Gregoricka 2020; Yule & Weisgerber 1998). These tombs are indeed important indicators of the socio-cultural development of populations in relation to the exploitation of their territories. Two main types of funerary monuments are known for the third millennium BC, which have led to the distinction between the Hafit (3200–2700 BC) and Umm an-Nar (2700–2000 BC) periods (Bortolini & Munoz 2015). In addition to their architectural style and the degree of elaboration of their construction, it is also their location in the landscape that changes over time (al-Jahwari 2013; Giraud 2009), in conjunction with a use of the monuments that becomes collective, probably even communal (Cleuziou & Munoz 2007; Munoz 2019). Deposits associated with the deceased also bear witness to an intensification of regional and

long-distance exchanges (e.g. Cleuziou, Méry & Vogt 2011; Méry 2000; Méry et al. 2012).

Since this initial investigation, several studies have shown that this evolution was in fact more complex and that there was not only regional diversity but also transitional forms (e.g. Bortolini 2019; Potts 2012; Vogt 1985; Williams & Gregoricka 2019; 2020).

The Bisya region has a rich archaeological heritage, including thousands of protohistoric funerary monuments, many of which have so far been spared urbanization. It is therefore an ideal place to study this burial diversity on a regional scale and diachronically.

This article presents the results of two seasons of survey and excavations conducted on funerary monuments in the Bisya region as part of the ARABIANCAIRNS project, hosted by the French Archaeological Mission in Central Oman (FAMCO) in partnership with the Ministry of Heritage and Tourism (MHT) of the Sultanate of Oman.

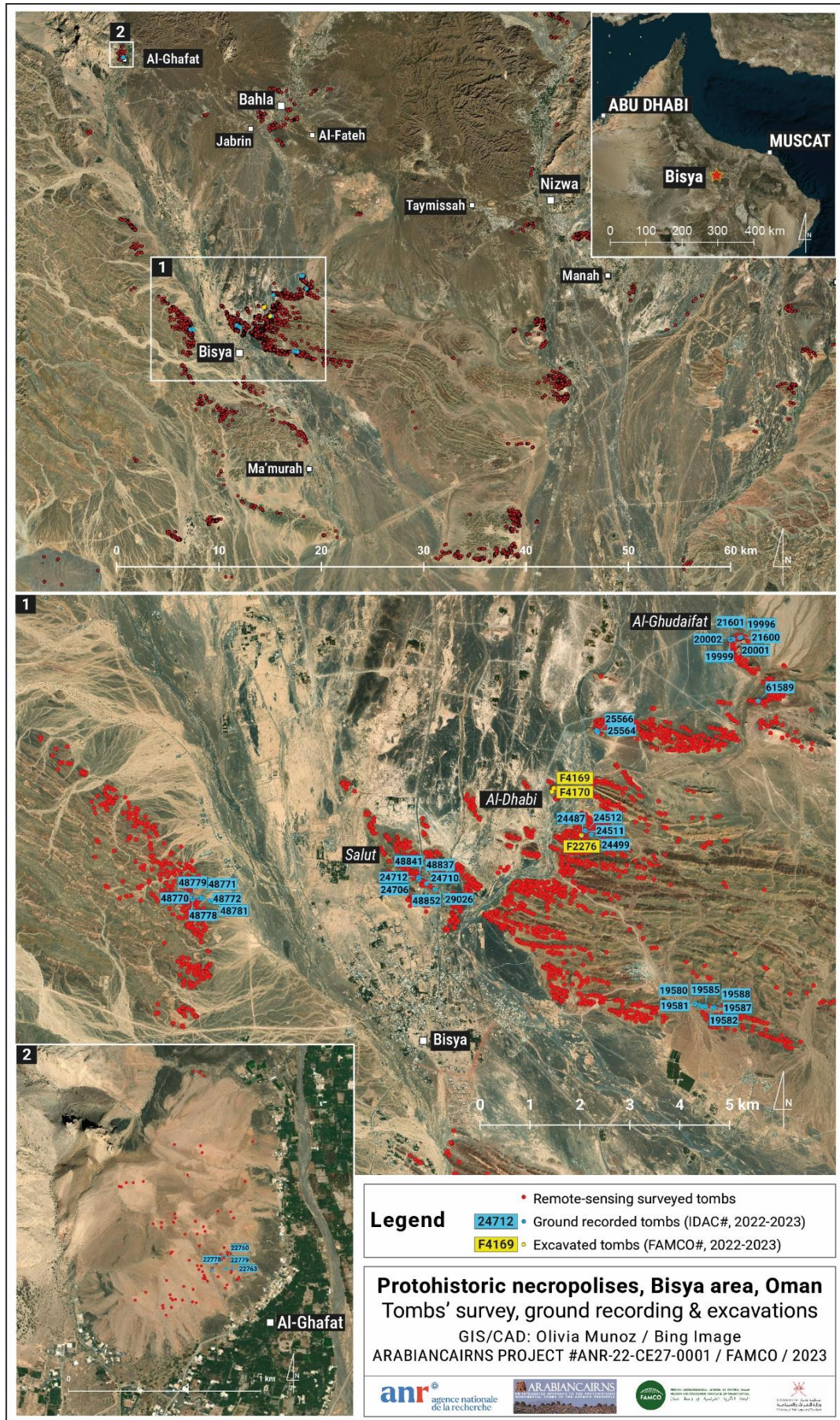


FIGURE 1. A map of protohistoric necropolises in the Bisya region and the location of surveyed/excavated tombs.

The ARABIANCAIRNS project

The ARABIANCAIRNS project ¹ is a multidisciplinary project which aims to carry out a large-scale analysis of the phenomenon of cairns or tower tombs, characteristic of protohistoric Arabia

(c.5500–300 BC), to assess their chronological diffusion and characterize the lifestyles and cultural identities of the tomb builders, as well as their exchange and circulation networks. A partnership with FAMCO ² was initiated in 2021 in order to understand the evolution of the funerary landscape in

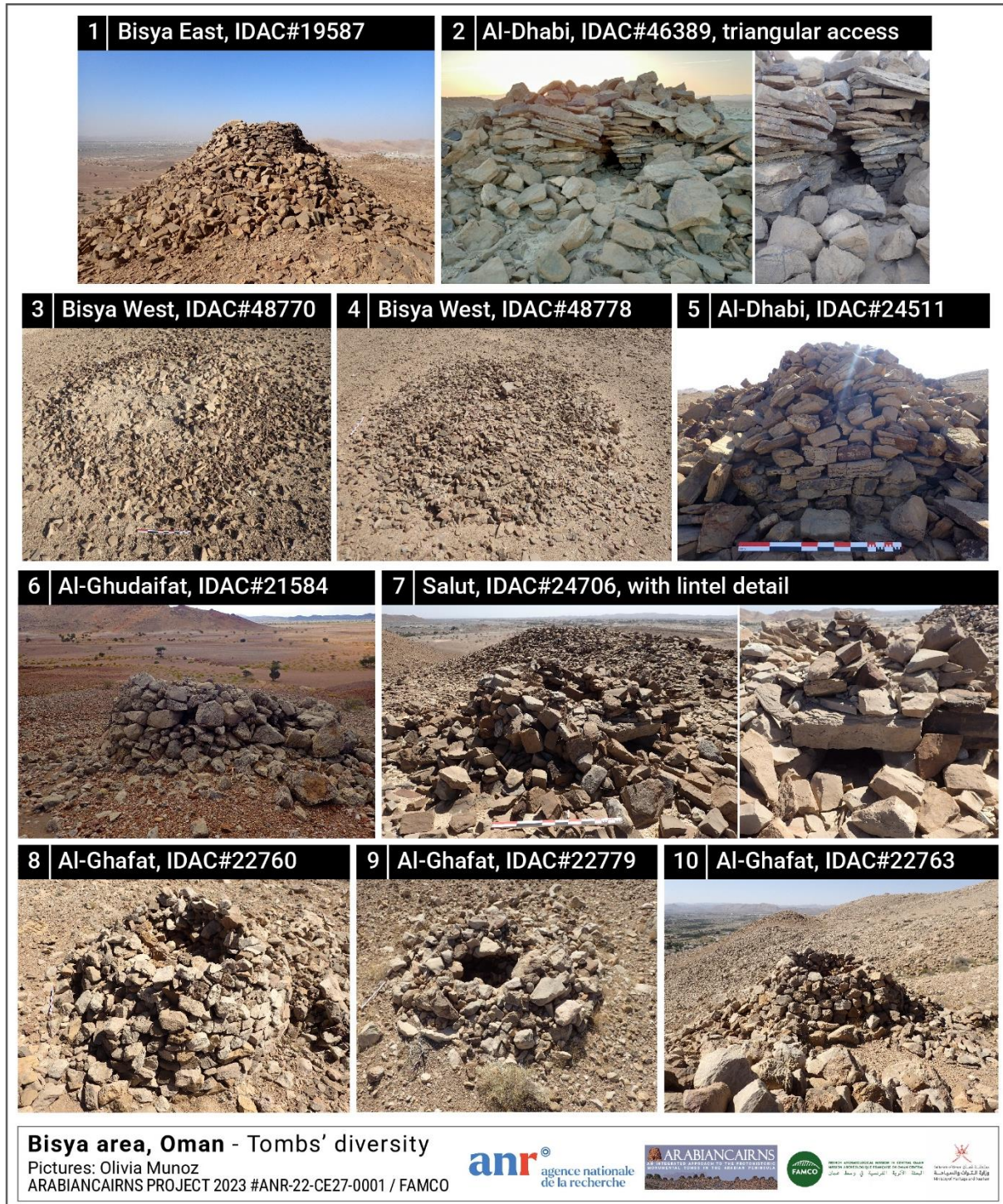


FIGURE 2. Examples of the diversity of tombs in the Bisya area.

¹ The ARABIANCAIRNS project is directed by Olivia Munoz and brings together researchers from various disciplines specializing in Arabia.

² FAMCO is directed by Martin Sauvage and Mathilde Jean. the FAMCO began surveying and excavating some EBA sites.

this foothill area and characterize living conditions and subsistence patterns during the EBA.

Previous searches in Bisya/Salūt and current Programme

For several years, the Bisya area has been the subject of much archaeological and anthropological research. In the 1980s–2010s, the British team led by Jocelyn and Jeffrey Orchard carried out surveys and excavations at what they called the ‘Hajar Oasis Towns’ and their associated protohistoric tombs and settlements (Orchard & Orchard 2007). More recently, the Italian Mission to Oman (IMTO), led by Alessandra Avanzini, has conducted research on the fortress of Salūt and its surroundings. These studies, mainly focusing on occupation from the Middle Bronze Age to the Iron Age, have unearthed towers, settlement sites, and tombs (Avanzini & Degli Esposti 2018). The research, together with the restoration of several monuments, has contributed to the creation of a local museum on the site, which is now open to the public. In parallel, the FAMCO began surveying and excavating some EBA sites.

From 2022 onwards, the field programme was taken over by Martin Sauvage and Mathilde Jean, including a palaeoenvironmental study of the area, an archaeological survey and mapping, the study of monumental towers, and excavations of EBA settlements and tombs in al-Dhabi 2 (Sauvage *et al.* 2022; Jean *et al.* 2023).

Survey

A foot survey of the area was carried out by the Orchard team, which published maps of the archaeological remains identified as it went along; one of the latest maps, by Henry Buglass³, lists these remains but has not been published. Another survey carried out by Bortolini within the frame of the Wadi Halfayin Archaeological Survey, identified a large quantity of tombs east of Shāfa but have not been published in detail (see Bortolini 2014; 2020). Subsequently, a survey was carried out by the FAMCO team⁴ using satellite imagery and foot surveys over an area of 3500 km², where *c.*2900 tombs were identified. The satellite survey was then extended and completed in 2022,⁵ over 4700 km²

towards Bahlā’ and Manah, covering around 5500 tombs (Fig. 1).

During the 2022 and 2023 seasons,⁶ thirty-six tombs were ground-surveyed in several areas around Bisya and Al-Ghāfāt, to document their characteristics in a variety of environments and topographic locations and collect samples for ¹⁴C dating (see Fig. 1). Over the next few years, we hope to extend the ground record to around 5% of the tombs, in order to obtain a more representative sample of observations.

Each ground-surveyed tomb was georeferenced, measured, photographed, and recorded according to its location, main dimensions, degree of preservation, construction materials, block dimensions, and architectural features. A description as well as a plan and section sketches completed the recording of these structures, associated with photographs and a 3D model. When present, artefacts observed on the surface were collected and inventoried for further analysis, and human bones were sampled for further radiocarbon dating.

The tombs’ architectural variability

During the ground surveys, we identified a degree of architectural variability in the tombs recorded. This heterogeneity can be seen through differences in the tombs’ dimensions, the existence of one or more concentric walls sometimes separated by a rubble block, the presence or absence of an entrance to the burial chamber, its shape and orientation, the material used, the degree of elaborateness of the external wall facing, the width of the walls, and/or the extent of collapse, as well as the shape and size of the burial chamber (Fig. 2).

While a more extensive study and systematic description of cairn tombs is needed in order better to characterize this architectural variability and provide quantitative data that will enable intra- and interregional comparisons, the ¹⁴C dating of the collected samples will offer a chronological frame better to comprehend this diversity.

³ Map ‘the Hajar Project, Bisya Area Sites’. Surveyors: Alan Roberts, Alasdair Foden, and Kevin Arnold (Birmingham University).

⁴ The survey was carried out in 2015–2017 by Jessica Giraud and Tara Beuzen-Waller (Beuzen-Waller *et al.* 2018), and then extended in 2021 by Richard Vanel for his MA thesis (Vanel 2021) at Sorbonne University, supervised by Tara Beuzen-Waller. The survey carried out by the FAMCO was mainly focused on Central Oman and ID numbers are tagged with the F# identifier.

⁵ The survey was completed by Olivia Munoz, in the frame of the ARABIANCAIRNS project, which covers the entire Arabian Peninsula. The ID numbers for this project are tagged with the IDAC# identifier.

⁶ In 2022, A. al-Tamimi (MHT, Bisya) guided us to the necropolis of Al-Ghudaifat, north of Bisya, which he had identified. In 2023, foot survey was carried out around Al-Ghāfāt, al-Dhabi, Salūt, and on either side of the town of Bisya.

The tombs' topographical location and chronological attribution

We have also noted a diversity in the topographical location of the tombs which may be on plains, terraces, or hill crests. In literature, it is generally assumed that Hafit tombs were preferentially built on high points, while the more recent tombs are located further down in slopes or on the plain (Giraud 2009; Giraud & Cleuziou 2009; al-Jawhari 2013; Deadman 2017), although Williams and Gregoricka (2020) noted a different situation at Dank, with cairns in lower areas dated to the Neolithic period. Initial observations seem to confirm that the tombs located on the plains belong to periods later than the Hafit period (in terms of architectural style, size, and any surface material present). However, some cairn tombs located in high places, whose architecture is not very distinctive, present material from the Wādī Sūq and Iron Age periods on the surface (see survey pottery), attesting to the possible reuse of Hafit tombs in these periods. Late Iron Age reuse of tombs is indeed attested elsewhere in the Oman peninsula, by stratigraphic observations and further radiocarbon dating (Munoz *et al.* 2017: 189; Munoz 2017a: 20) or more frequently by the presence of Iron Age furniture in reused tombs (Schreiber & Häser 2004; Döpfer 2014; Condoluci & Degli Esposti 2015: 33; al-Jahwari 2016; Madsen 2018: 233). Proper construction of tombs in high places in later periods is also attested at Al-Dhabi 2 (see tomb F4169, below).

Therefore, while during surveys the tendency is systematically to attribute tombs located on ridges to the Hafit period, it seems to us that location is not a sufficient criterion. Indeed, it is difficult to distinguish, without clear architectural structure, stratigraphic context, and material or absolute dating, provided by a proper excavation, what is possible reuse or later construction (Munoz 2022; see also al-Jahwari 2016). In the absence of excavations, however, a probabilistic chronological attribution can be made on the basis of combined criteria (typology, location, artefacts found), which can be updated and undermined by absolute chronologies when and where they are available.

Pottery and other artefacts

During the survey, fifty-four pottery sherds were collected on the tombs' surface. This material was found scattered around eight protohistoric tombs located on the plain, north-west of Bisya (IDAC#48770, 48778, 48779), on mountain ridges east of al-Dhabi (IDAC#24499, 25564), and on the

mountain ridges overlooking Salut (IDAC#48841, 24712, 48837) (see Fig. 1).

All the assemblage can be dated to the Early Iron Age (*c.*1300–600 BC; Phillips 2010), except for two fragments which can be associated with the 'semi-fine orange wares' (Méry 2000) attributed to the Wādī Sūq period (2000–1600 BC; Velde 2003). Typological analysis shows that the most frequent shape is the carinated cup (14 fragments), followed by medium or small bowls, one small closed vessel, and one open-spouted vessel. These shapes are well known at numerous Early Iron Age ritual/ cultural sites in the Oman peninsula, both in the Emirates and Oman (Benoist 2000; 2007; Benoist *et al.* 2012; Magee 1996; 2014; Condoluci, Degli Esposti & Phillips 2018). Interestingly, in the Khubayb and Abu Silah necropolises, small cups and spouted vessels/pouring vessels were also attested, placed on top of the EBA and Neolithic monumental tombs (Williams & Gregoricka 2020), attesting to their reuse or re-appropriation during the Iron Age. Moreover, the discovery of copper-alloy artefacts, stone beads, and shells containers suggested that some of these tombs were at least reused during the Early Iron Age or Wādī Sūq period, a practice already observed in this area and discussed by the IMTO (Condoluci & Degli Esposti 2015; Degli Esposti *et al.* 2018; Avanzini & Degli Esposti 2018). Further excavations and dating will provide a better understanding of the observed variability, both in terms of architecture and topography.

Excavations

Tomb F4170 (IDAC#21598)

Tomb F4170 was excavated in 2022 (Jean *et al.* 2023). It is located on a small hill, close to the al-Dhabi AD-2 site and near a two-walled structure.

The tomb is roughly circular and measures 3 m in diameter (Jean *et al.* 2023: fig. 8/A, C). The wall appears as an accumulation of irregular and unworked stones without a clear structure. The blocks' dimensions are heterogeneous (from 20 x 20 cm to 50 x 80 cm) with the largest blocks located on the external facing. An oval-shaped chamber, oriented east–west, includes a few flat slabs that may have formed a pavement, but disturbance attributed to looting prevents this from being confirmed.

Despite systematic sieving, no bone fragments were found inside the chamber, perhaps as a result of the plundering. However, a few bone fragments (probably human) and a 3rd upper molar tooth germ — from a 10–14-year-old individual — were found on the surface near the tomb, and could have belonged to the funerary deposit. A single shell bead

was found within the chamber (Jean et al. 2023: fig. 8/B). Given the lack of datable organic material,⁷ no absolute dating was considered for this tomb, but its architecture, location, and bead are compatible with the Hafit period.

Tomb F2276 (IDAC#24488)

Tomb F2276 was excavated during the 2023 campaign. It is located 1 km south-east of the al-Dhabi-2 site, on top of a rocky ridge, along with hundreds of other tombs (Fig. 3/1).

The grave is roughly circular in shape and preserved over a height of 0.9 m. The collapsed stones extend over a diameter of 5.7 m. Due to lack of time, the outer wall was not completely cleared but the tomb appears to have several concentric walls, filled with rubble stones (Figs 3/2, 3/3). The roughly

rectangular chamber (1.2 x 0.7 m) is oriented east–west and delimited by an inner wall built of dry stone, similar to the local geological substrate. The well-preserved inner wall, between 0.3 and 0.4 m wide, is made of nine courses (0.9 m high), and features a *contre-fruit*⁸ indicative of a corbelled roof. Interestingly, this wall shows no interruption, suggesting that access could have been via the top of the tomb or that it has been carefully resealed (Fig. 3/4), as was observed at Shanah (ST-2, al-Belushi & elMahi 2009:34) and at Shiyā (Munoz 2023: 31).

Despite systematic sieving and meticulous research, no bone fragments were found inside the burial chamber. Once again, the lack of anthropological data could be due to taphonomic processes or looting.

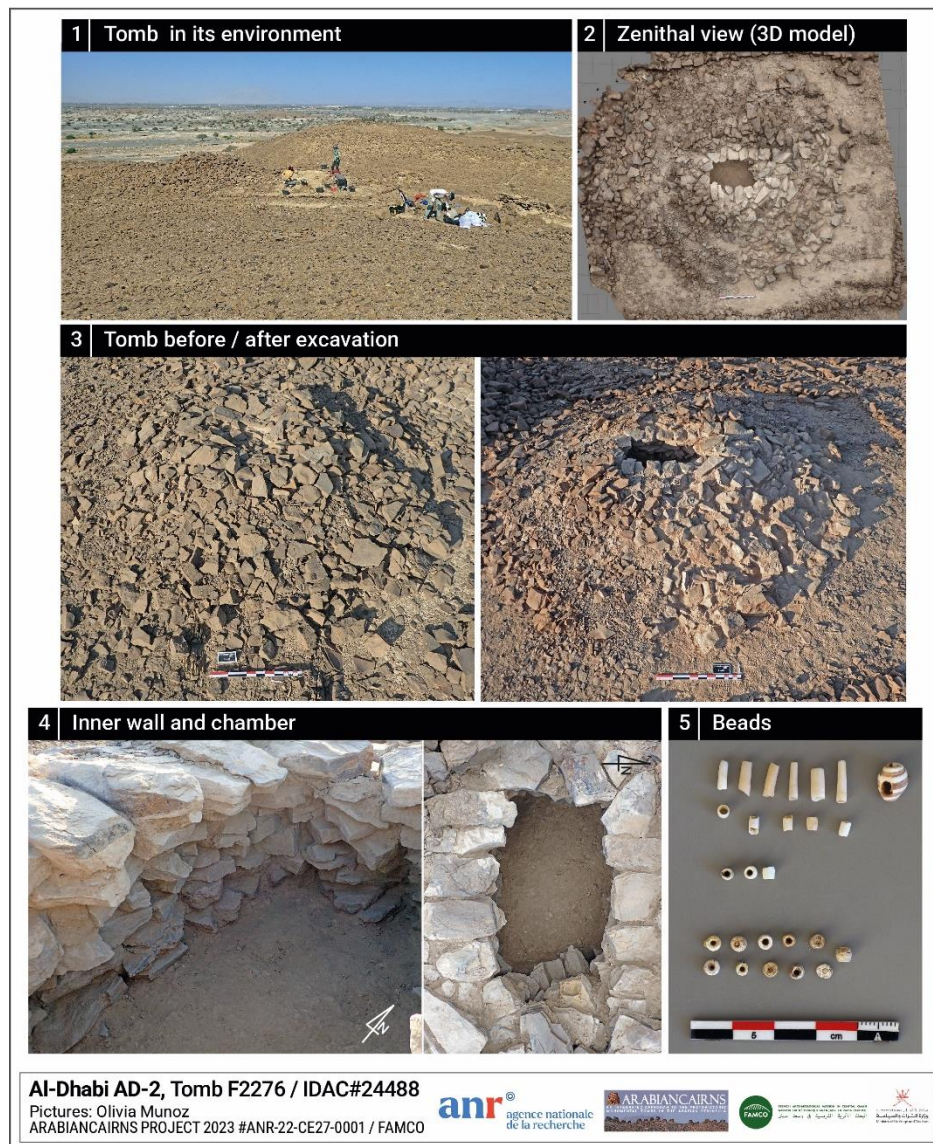


FIGURE 3. Tomb F2276 (IDAC#24488): architecture and grave-goods.

⁷ The shell bead is subject to the marine reservoir effect that is difficult to estimate, and the human tooth was not found in a clear, funerary context.

⁸ A gradual decrease in the thickness of a wall from bottom to top on its internal face.

Grave-goods

However, the discovery of several beads, made of shells (*Dentaliidae*, *Engina mendicaria*) and artificial material, suggests that there was a mortuary deposit (Fig. 3/5). Due to the absence of organic remains inside the tomb, we cannot provide absolute dates, although both architecture and furniture found inside the chamber suggest a construction and use during the first half of the third millennium BC.

Tomb F4169 (IDAC#21635)

Location

Tomb F4169 is located on the al-Dhabi 2 site (AD-2). It is situated on a rocky ridge, some 20 m west of a monumental tower and a few dozen metres north-west of the settlement site, currently being excavated by the FAMCO (Sauvage et al. 2022; Jean et al. 2023).

Architecture

Tomb F4169 is circular and measures 5.8 m in diameter. It consists of a circular dry-stone wall, 0.90–0.95 m thick, made up of two linings — inner and outer — filled with irregular rubble blocks 0.25 m wide (Figs 4 & 5). The inner facing, 0.45 m thick and preserved in four layers up to a height of 0.90 m, consists of large blocks (40–60 x 10–30 cm, 15–30 cm high) of local stone, triangular or trapezoidal in shape. The blocks are laid in headers and roughly squared on the inside of the chamber to give it a perfectly round shape (Fig. 4).

The outer facing is 0.25 m thick and has been preserved up to a height of 0.20 m, which corresponds to a maximum of two courses (Fig. 4). However, since the base was not completely exposed — in order not to destabilize the structure while waiting for the planned restoration of the tomb — it is possible that lower courses have survived beneath. This outer facing is made of local white stones, which differ from those of the inner facing. Their shape is trapezoidal, with the outer face larger than the inner one. They are of approximately uniform size and format (c.40 x 28 x 10 cm) (Figs 4, 5/4). Moreover, the stone masonry is more meticulous than that of the inner facing. Although the stones of the outer facing are not comparable to the ‘sugar lump’ of the classical Umm an-Nar type tombs, they show a regularity and degree of elaboration as they appear to have been trimmed to a smooth, uniform surface, which distinguishes them from the Hafit tombs in the area. Thus, if the degree of elaboration can be considered as a chronological marker, as several scholars point out (Böhme & al-Sabri 2011; Gagnaison et al. 2004; Kennet, in preparation; Yule

& Weisgerber 1998), the lining of tomb F4169 would tend to assign the structure to the beginning of the Umm an-Nar period.

The burial chamber is circular, and measures 4.4 m (north–south) by 4.35 m (east–west). The chamber is paved with small irregular flat stones lying side by side in the centre on a diameter of 2.5 m, surrounded by three concentric radii of larger stones lying flat (47 x 35 x 12 cm) (Figs 4, 5/6). Between the slabs we observed numerous small multi-coloured pebbles (1–3 cm long), which are also found elsewhere on the site between the rocky outcrops, suggesting that they were not deliberately introduced to prepare the ground for the tomb.

Access to the chamber is via an east/south-east entrance (55 cm wide), where the wall is disrupted (Figs 4, 5/2). A large trapezoidal slab (53 x 56 x 18 cm), located some 30 cm above the pavement, forms the threshold (Fig. 5). On either side (north-east and southwest) of this threshold, the inner facing of the wall is preserved over three courses. To the south-east of the threshold, the outer facing is interrupted, although it is not clear whether the absence of stone is intentional or due to subsequent alteration of the wall.

Despite the attention given during the excavation, no potential internal partitioning, wall ties, or breaks in the paving of the chamber were observed. The lack of an internal partition also leads us to question the arrangement of the cover, as it calls into question the hypothesis of a flat roof, as is usually assumed for Umm an-Nar-type tombs. Large collapsed slabs were found inside the chamber, which could indicate a corbelled roof. However, the preserved foundations did not show any counter crop, suggesting that it was built higher. As for the original height of the tomb, we can assume from the amount of collapsed stones that it was at least 2 to 3 m high, but further research is needed in order to obtain a more precise estimate. Taken together, these structural components — single chamber, lack of internal partition, large diameter of the chamber, unique external wall, stone masonry, carefully worked outer facing — could correspond to an intermediate architectural form between the late Hafit and early Umm an-Nar periods. Several examples of comparable tombs sharing one or more common features with F4169 are known, both inland and on the coast. Tomb As-21 from Asimah (Vogt 1994: 62, fig. 29) consists of a unique wall made up of two linings and contains a single burial chamber accessed via an entrance to the west of the structure. At Tawi Silaim, Cairns 2 and 3

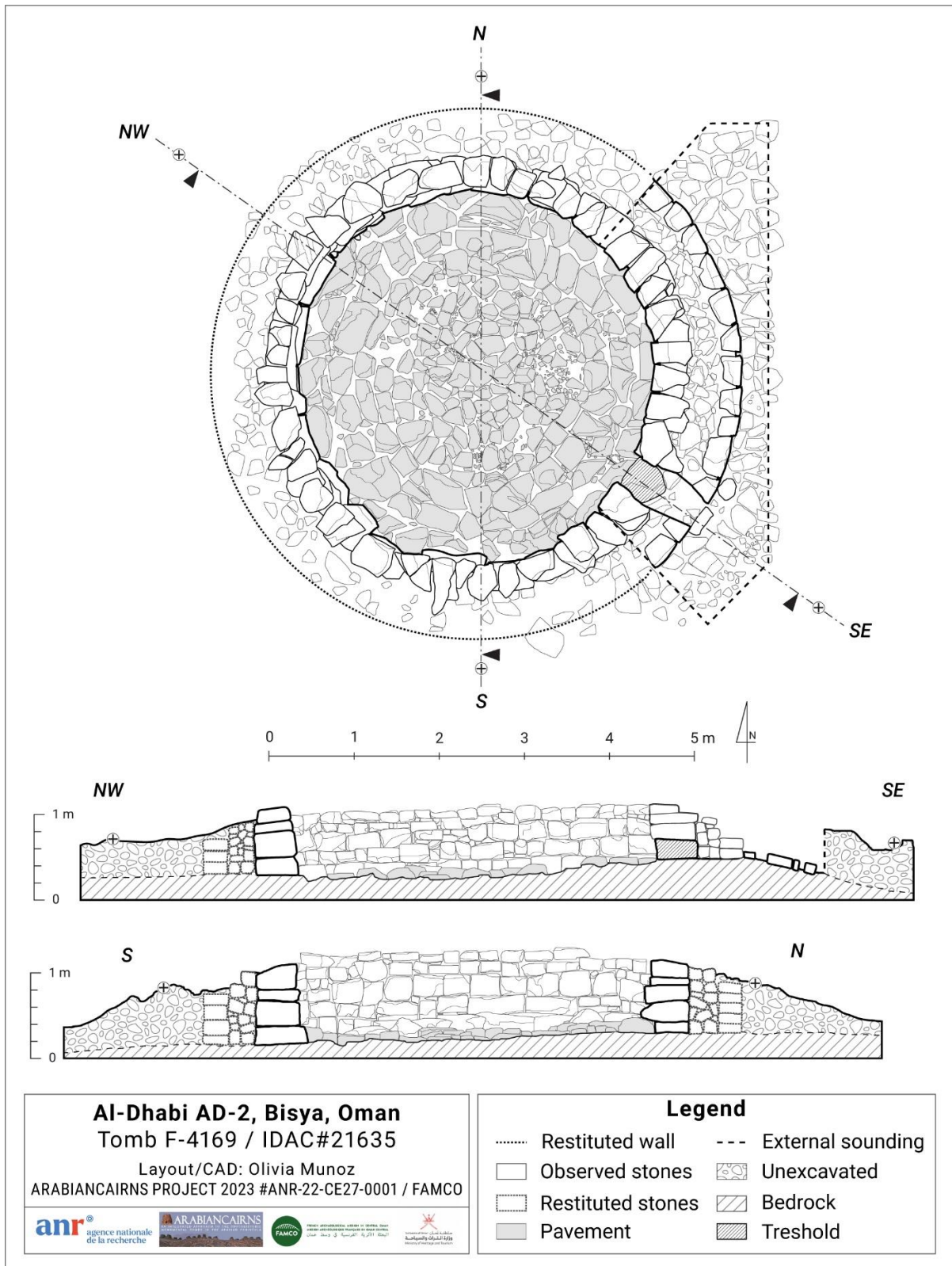


FIGURE 4. Plan and sections of Tomb F4169 (IDAC#21635) from al-Dhabi AD-2 (Bisya).

(Vogt 1985: taf. 22; de Cardi, Bell & Starling 1979: 67, pl. 32b) are built with a single wall interrupted by an eastern entrance leading to the paved burial chamber. In al-Maysar, tomb M-402 shows a single burial chamber without internal subdivision, identical to F4169, but the structure of the wall is

quite different. While F4169 seems to consist of a single wall with two sides separated by a rubble block filling, M-402 consists of three rows of blocks of similar size (Yule & Weisberger 1998: 193, fig. 11).

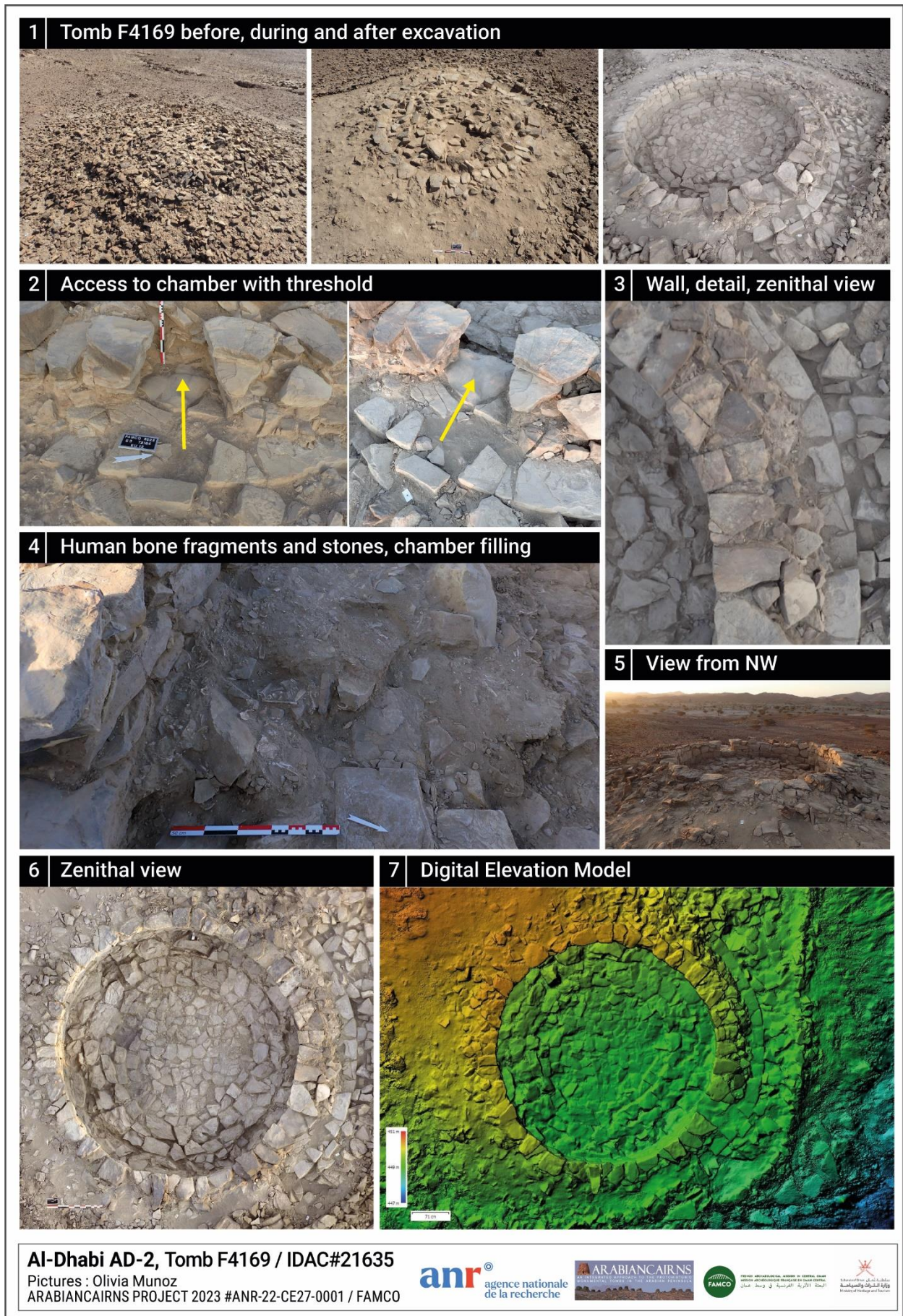


FIGURE 5. F4169 (IDAC#21635) architecture: general view and detailed insights.

Human remains

Human remains were found at various levels of the fill, in a disorganized pattern with no preserved articulation and mixed with collapsed stones (Fig. 5/4). The human remains were located throughout the chamber: in the middle and near the walls and in the entrance passage.

However, no bone fragments were found outside the tomb or inside the collapse of the outer wall in the excavated area. Although this was only one small excavation and may not be representative of the entire area surrounding the structure, it suggests that the tomb has not undergone any significant alterations (natural or anthropogenic) following its abandonment and destruction.

However, the bone fragments in the lowest 40 cm are denser and somewhat better preserved, although they are mixed and covered by large boulders. A preliminary inventory shows that all age groups seem to be represented, from infants to adults. A provisional MNI based on tarsal bones (right and left talus) and skull (petrous parts), which will be refined during the forthcoming study, indicates that at least seventy individuals are represented in this tomb. Furthermore, we observed some carious lesions suggesting a diet rich in carbohydrates, which has been considered as a marker of an agricultural lifestyle (Munoz 2017b), and would be consistent with the discovery of date-palm remains in the nearby residential area. However, this finding needs to be clarified by the ongoing study of the oral health status of the whole group buried in this tomb.

Pottery

As the pottery study from Tomb F4169 is still in progress, the results presented below are preliminary. This section describes five well-preserved, reconstructed imported vessels to assess trade networks around al-Dhabi 2 and a chronological range (Fig. 6). Most of the remaining pottery is Umm an-Nar funerary ware, including jars with red slip, painted chevron patterns, and suspension vessels, which are under study and will be published in a separate article. Fabric analysis (macroscopy, thin section petrography, geochemistry) is also being carried out.

The five imported vessels were found as fragmented potsherds scattered among the tomb filling, with no particular order, mixed with sediment, human remains, and ornaments from the top of the tomb filling to the pavement. It indicates a disturbed filling, with no visible organization of the pottery funerary deposits. After reconstruction, these vessels present complete to subcomplete profiles. However, despite careful excavation and systematic sieving of the tomb's sediment, sherds are missing

on every vessel, supporting the hypothesis of highly disturbed funerary deposits.

The first vessel is a small plain jar with a globular body, high shoulder, cylindrical neck, and triangular ledge rim, 9 cm high with an opening 5 cm wide (Fig. 6/1). The beige-greenish fabric is fine, medium porous with white to yellowish inclusions, probably calcareous. This type of jar and fabric could indicate a southern Mesopotamian origin, although the shape is considered chronologically of little diagnostic use. A broad third-millennium date is proposed based on a comparison with the typo-chronology from al-Hiba/Lagash, type HL-3 (Renette 2021: 90–91, pls 149–150; Renette, personal communication 2023). This shape differs from the carinated jars usually found in Hafit type tombs and is related to the Mesopotamian Jemdet Nasr tradition (Potts 1986). Mesopotamian pottery is almost absent in the tombs at Hili and disappear in the Hili-8 settlement after 2600 BC (Méry & Schneider 1996; 2001), while they are more frequent in funerary contexts at Umm an-Nar (Frifelt 1991).

Three vessels highlight important connections with Iran and Baluchistan. One deep bowl with a simple rim and flat discoid base bears painted decoration: two horizontal lines on the outside, below the rim, and geometric scale-like patterns on the inside (Fig. 6/2). This type is known in Makran at the end of period IIIa, c.3000–2800 BC (Didier & Mutin 2013: fig. 4; personal communication, 2023).

One example of incised grey ware has been reconstructed, with a cylindrical shape and flared thinned rim, 10 cm high and 13 cm wide at the opening (Fig. 6/3). This vessel type is known to imitate the Iranian soft-stone productions, with incised architectural patterns, and is made of a very fine grey-blue fabric. Incised grey pottery is almost exclusively found in funerary contexts in eastern Arabia from the mid-third millennium onwards, in Umm an-Nar period tombs, for instance at Hili (Cleuziou, Méry & Vogt 2011: 164–167) and Bat (Böhme & Al-Sabri 2011: fig. 12). Analysis of such vessels found in funerary contexts in the Oman peninsula demonstrated the importation of incised grey ware from the Dasht plain in Makran, Balochistan (Méry *et al.* 2012). Incised grey ware from Makran is usually dated from period IIIc, 2600–2500 BC (Didier 2013: 206–208; Didier & Mutin 2013: 474–476).

The tomb also yielded several examples of painted grey ware, also called Emir ware, such as the canister jar with geometric and caprid patterns (Fig. 6/4). This type is commonly found in Umm an-Nar tombs in the Oman peninsula, on large EBA sites such as Hili (Cleuziou, Méry & Vogt 2011: fig. 204) and Bat (Böhme & Al-Sabri 2011: figs 11–12) and

peripheral sites such as the necropolis of Adam south (Gernez & Giraud 2017: fig. 6.11,13). As for the incised ware, the Emir ware is known to be imported from Makran (Méry et al. 2012). The typological comparison indicates Makran period IIIc, c.2600–2500 BC (Didier 2013: fig. 165).

The fifth vessel is a jar with a flat base, rounded body, high neck, and simple everted rim, 9 cm high and 7 cm wide at the opening (Fig. 6/5). The fabric is light red with frequent vegetal and mineral temper; the outer surface is slightly burnished. This vessel is more enigmatic as it bears no resemblance to the usual imported productions in Umm an-Nar tombs. A comparison could suggest a possible origin in the EBA southern Levant or north-west Arabia but further analysis will be carried out to confirm this (S.

Shabo and M. Luciani, personal communication, 2023).

The preliminary pottery study highlights important trade networks around Bisya from the early to midthird millennium BC. Maritime connections through the Oman Sea and the Gulf are attested by the presence of grey wares from south-east Iran/Makran and a Mesopotamian vessel. Interestingly, another vessel raises the hypothesis of possible networks via terrestrial routes across the Arabian Peninsula to north-west Arabia or the southern Levant, which is very little documented so far for the first half of the third millennium BC.

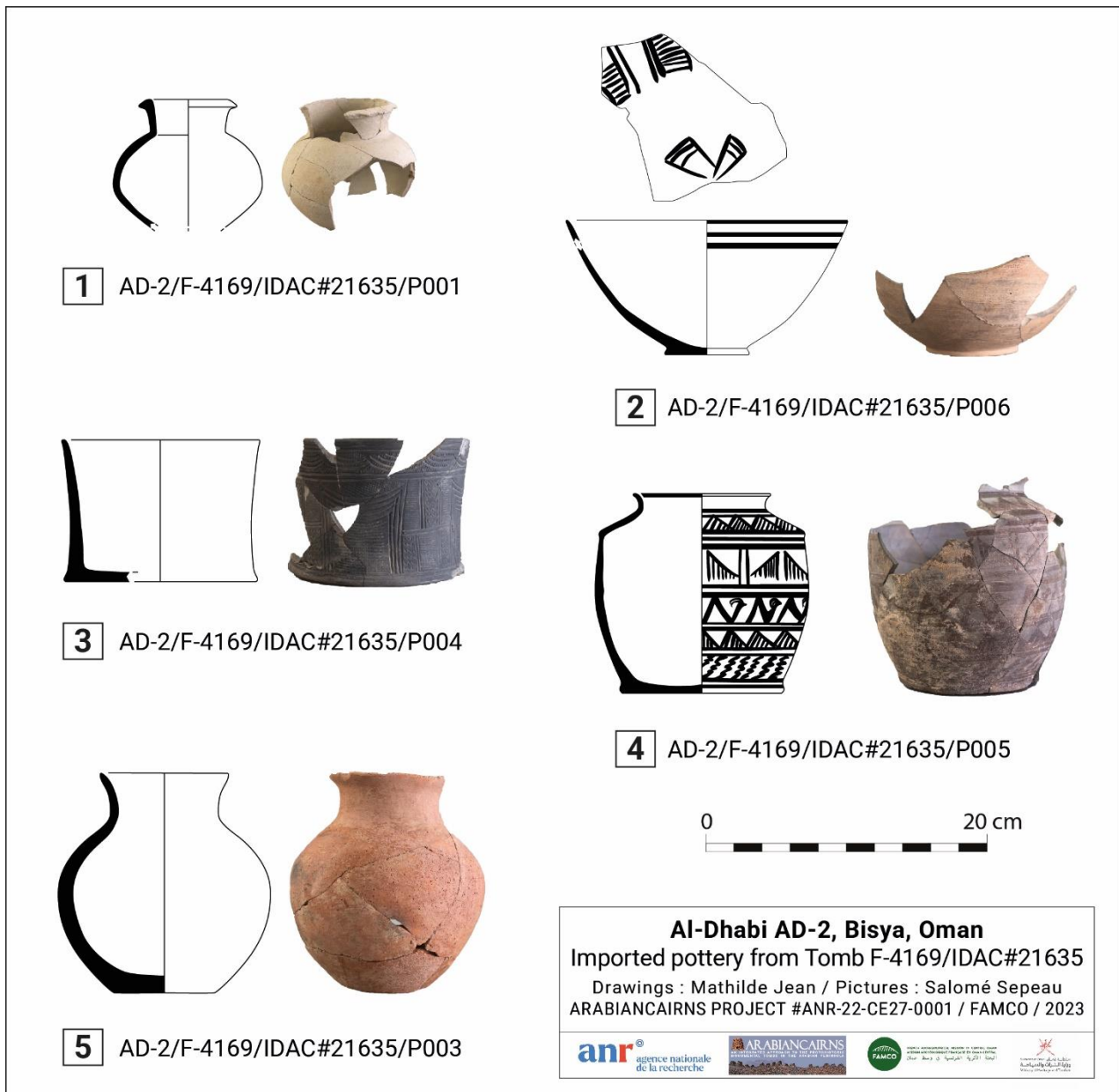


FIGURE 6. Imported pottery assemblage from Tomb F4169 (IDAC#21635).

Beads (F4169/B001–B014)

Exhaustive sieving of the fill with a fine mesh (1 mm) during excavation yielded 1450 beads made of stone, artificial material, and shell (Fig. 7). The majority came from the very base of the tomb, close to or in contact with the paving, often in the gaps between two slabs. Although no articulation was observed, a set of tubular enstatite beads were found

grouped together, suggesting that they belonged to the same ornament that had fallen into the interstices of the paving.

Within the assemblage, small biconical/barrel artificial enstatite⁹ beads (n=404) and short cylindrical chlorite beads (n=491) prevail. They are followed by tubular artificial enstatite beads (n=198) and discoid shell beads (n=187). Short cylindrical

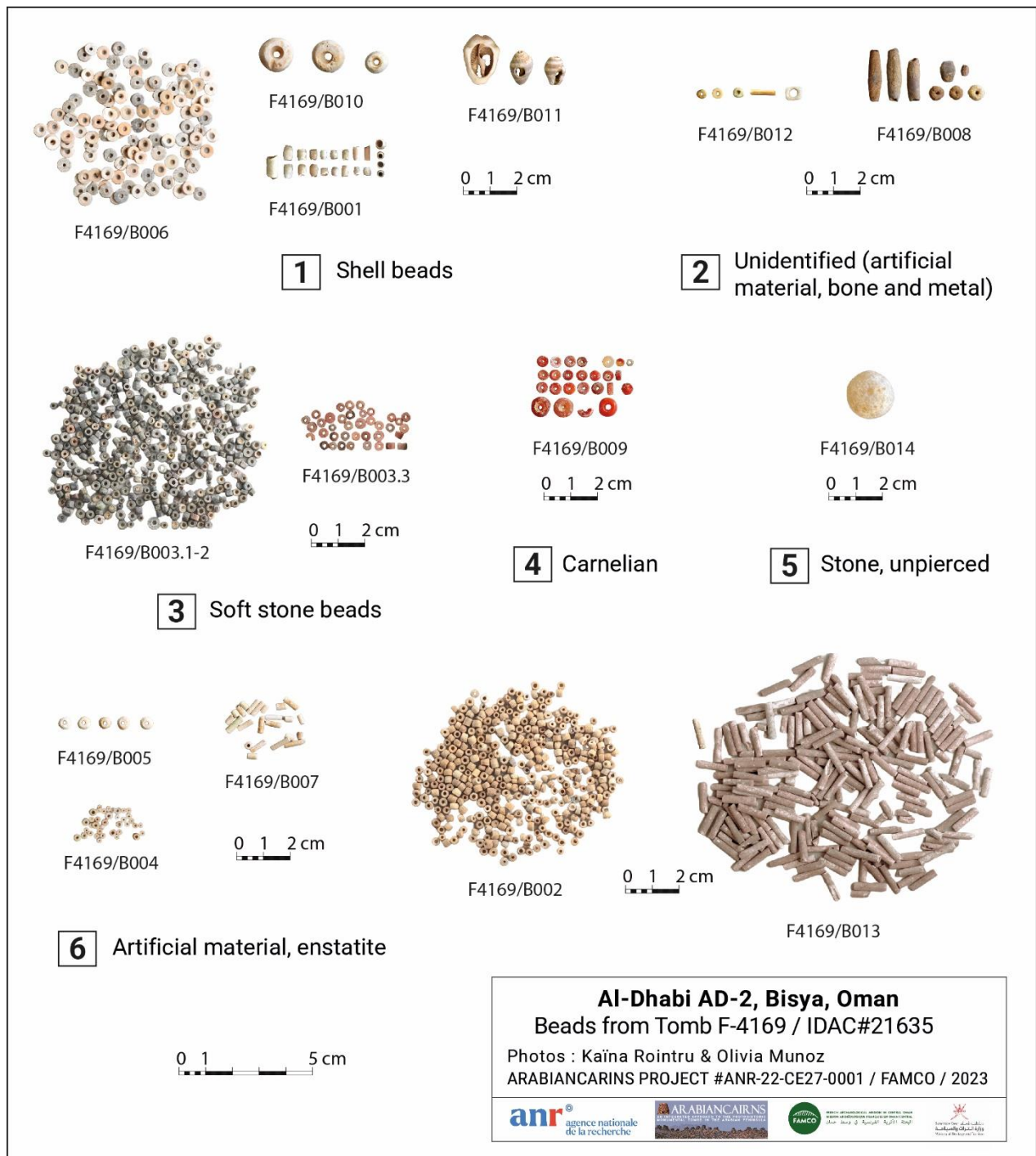


FIGURE 7. Beads from Tomb F4169 (IDAC#21635).

⁹ Artificial enstatite is the result of heating steatite (for further details on this process, see Law 2018).

artificial enstatite microbeads (n=67) and carnelian beads (n=24) are also represented. Such ornaments have parallels in Hafit and Umm an-Nar tombs at several sites across the Oman peninsula, in inland contexts such as Bat (Schmidt 2020), al-Khashbah (Schmidt & Döpfer 2019), Hili (Cleuziou, Méry & Vogt 2011), Jabal Hafit (Madsen 2018), Jabal el-Emalah (Benton & Potts 1994); or in coastal contexts from the Gulf and the Sea of Oman such as Umm an-Nar (Frifelt 1991), Al-Sufouh (Benton 1996), Ra's al-Jinz (Munoz 2014), Ra's al-Hadd (Munoz 2014), or Shiyā (Munoz et al. 2017; Munoz 2023). Manufacture of enstatite beads is documented in the Hafit period village at Ra's al-Hadd HD-6 (Azzara & Cattani 2018; Law 2018). The beads assemblage will be subject to further studies.

Other artefacts

Several artefacts were recovered within the chamber (Fig. 8):

A perforated disc made of shell (F4169/S004, diam.: 3.5–3.7 cm; thickness: 0.4 cm; perf.: 1.8 cm),

probably *Conus* sp., was found in the chamber. Its shape is pseudocircular and it has a 1 cm alteration on part of the edge (Fig. 8/1). Parallels are known at Ra's al-Hadd HD-60 and Ra's al-Jinz RJ-2 (Marcucci 2004: figs 375–386), but they seem to be elements in the process of being worked on for the production of rings, whereas our example is polished and probably served as an ornamental accessory.

A fragmented ring made of mother-of-pearl (F4169/S001), a complete *Conus* sp. ring (F4169/S002, diam. 2.2 cm), and a fragmented *Conus* sp. ring (F4169/S003) were found in the burial chamber (Fig. 8/2). *Conus* sp. ring production workshops are known at Ra's al-Hadd and Ra's al-Jinz (Marcucci 2004), whose production chain has also been described by Charpentier (1994). Their distribution extends throughout the Oman peninsula (e.g. al-Khashbah; Schmidt & Döpfer 2019), and as far as Egypt, Mesopotamia, Iran, and Pakistan (see references in Marcucci 2004).

A few rivets and a small plate made of copper alloy (F4169/M001) were found in the fill, mainly



FIGURE 8. Artefacts from Tomb F4169 (IDAC#21635).

near the pavement of the tomb. Rivets vary in size from 1 to 2 cm in length and measure *c.*3 mm in diameter (Fig. 8/3). Rivets are commonly found in EBA tombs, for instance at Jabal al-Emalah (Benton & Potts 1994: 56–57), Jabal Hafit (Madsen 2018: fig. 286), and Umm an-Nar Island (Frifelt 1991: 114, 217, 219). The plate, which is very thin (less than 1 mm), measures *c.*2.5 cm long and 1 cm wide.

A copper-alloy pin (F4169/M002, L: 14 cm, middle section = 0.5 cm) with pointed ends and curved deformation was found in the chamber (Fig. 8/4). Such pins are commonly found in Early Bronze Age tombs from the Oman peninsula for instance at Jabal Hafit (T1305, 1316, 1317, 1319; Madsen 2018: figs 286, 322, 333, 350), Ra's al-Jinz RJ-1 (Tomb 1 DA 15485, 15592, 15595; Munoz 2014: fig. A6.23–24), and Ra's al-Hadd HD-7 (Tomb 5: DA 22587, 22585, 22595; Munoz 2014: fig. A5.74, A5.85–86).

A fragmented worked bone object (F4169/F001) was found inside the burial chamber. It measures 2 cm long and 0.5 cm wide, and features seven equidistant perforations (Fig. 8/5). It is possibly a wire loop or grommet used to arrange several rows of beads in a necklace.

An interesting find was the discovery of a shark's tooth (F4169/F002) in the collapsed stones at the top of the chamber. It bears no perforation and measures *c.*1 cm long and 0.7 cm wide (Fig. 8/6). To our knowledge, this is a unique inland find in a mortuary context, at such a long distance from the coast, attesting to the existence of trade networks with the coast and already amply attested by the presence of shell artefacts and by ceramics imported from overseas regions.

Conclusion and future prospects

The work on the tombs in the Bisya region shows that Bronze Age tombs vary both morphologically and in terms of the location of the monuments in the landscape. The difficulty of assigning the tombs to a specific period was highlighted during the surveys, as there are no excavations or absolute dating, especially as the monuments may have been reused or remodelled in later periods. Two of the excavated tombs (F4170 and F2276) can be structurally associated with the Hafit period and are located in two different topographical areas, one on a low terrace, the other on a ridge. On the other hand, tomb F4169 has certain features generally attributed to Hafit tombs (high location, single chamber, no internal partition), as well as features associating it with the cultural sphere of the Umm an-Nar period (stone masonry, collective character of human deposits, and material culture).

Absolute dating, material studies, and bioanthropological analyses will provide further information on the lifestyles, biological and cultural identities, and exchange relationships of the Bisya population over time. One especially important question is the integration of the communities into an agricultural way of life, which we will examine by studying the dental pathologies of the numerous individuals from tomb F4169 and combine with the study of the palaeobotanical remains found in the residential areas and palaeo-environment. Continued research will also enable us better to assess the diversity of tombs and their spatial distribution. Our research already shows that the Bisya population belonged to the Umm an-Nar cultural area and participated in regional exchange networks with links to the coastal zone as well as to south-east Iran/Makran, Mesopotamia, and north-west Arabia and the Levant. The role of Bisya in this exchange network will be further clarified by future studies of the pottery from the tombs in comparison with that from the surrounding environments and the neighbouring foothills sites.

Author contributions

OM as head of the ARABIANCAIRNS project planned the research, carried out survey and excavation, analysed data, and wrote the paper; KR carried out survey and excavation, analysed data, and wrote the paper; MJ co-heads the FAMCO, carried out the pottery study from tomb F4169 and wrote the tomb F4169 pottery section; MPP carried out the pottery study from survey and wrote the survey pottery section; CR, ML, PGS, MC carried out survey and excavation; all authors reviewed and edited the paper.

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