REFINING MOTYA'S URBAN HISTORY WITH LANDSCAPE-SCALE INVESTIGATIONS

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With a contribution of P. Toti

Abstract: Motya was a major Phoenician centre of western Sicily during the 6th and 5th centuries BCE, yet compared to its Greek neighbours, relatively little is known about how the island city developed over time or how its urban spaces were organised at its height. Scientific archaeological investigations, which have been semi-continuous since the 1960s, have mainly focused on its monumental features, burial spaces, and industrial installations, providing only a partial picture of the city's history and development. New results of intensive survey and excavation of the eastern half of the island help to close the gaps between the site's most prominent features and show that a significant section of Motya was orthogonally planned as early as the mid-6th century BCE, an act that all but erased possible traces of earlier occupation, if the islet was ever intensely occupied. Despite this, at least one part of the investigated area was spared reorganisation of space and exhibited a distinct layout that suggests a separate function. This research demonstrates the potential for intensive surveys on settlements to contribute to site histories and correct possible bias for continuity that would arise in chronologies created from data from temples, monuments, or other persistent places in urban sites.

Keywords: Motya, Punic, urban planning, archaeological survey, geophysical survey, memory.

1. Introduction[1]

The history of settlement at Motya has been chronicled through decades of excavation, tracking the establishment and elaboration of monumental structures, including fortification walls and major gates, monumental and religious structures, ritual and burial spaces, commercial and port districts, production areas, and buildings decorated with mosaics, all with the purpose to understand the broad cultural trends, international connections, and the roots of settlement that extend back in time before the arrival of Phoenician colonists. One longstanding but secondary product of these investigations was clues and models for how the Phoenician settlement and later Punic city were organised spatially.[2]

Here we report landscape-scale investigations that seek to reveal the urban layout(s) of Motya[3], an island site set in a shallow lagoon off the coast of West Sicily, near modern Marsala (Fig. 1). Its advantageous position on a small, defensible islet in a protected natural harbour, with good anchorage facilities and access to the Sicilian hinterland, made it an important waypoint for Phoenician expansion when it was founded

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1 The authors share the full responsibility of the content of the present contribution, §§ 1-2, 4-6 were conceptualized and written by P. Sconzo and J. Herrmann; §3.1 and 3.3 by J. Herrmann; 3.2 by P. Sconzo with a contribution on pottery by P. Toti; 3.3.3 was written by L. Fazio. The Trapani Soprintendenza BBCC has granted all the relevant permissions for the work presented here (permit n. 13764 of the 24/11/23).

2 Isserlin – DuPlat-Taylor 1974; Famà 2008; Nigro 2022.

3 Here we use *Motya* to refer to the ancient settlement and city and *Isola San Pantaleo* to refer to the landform itself.

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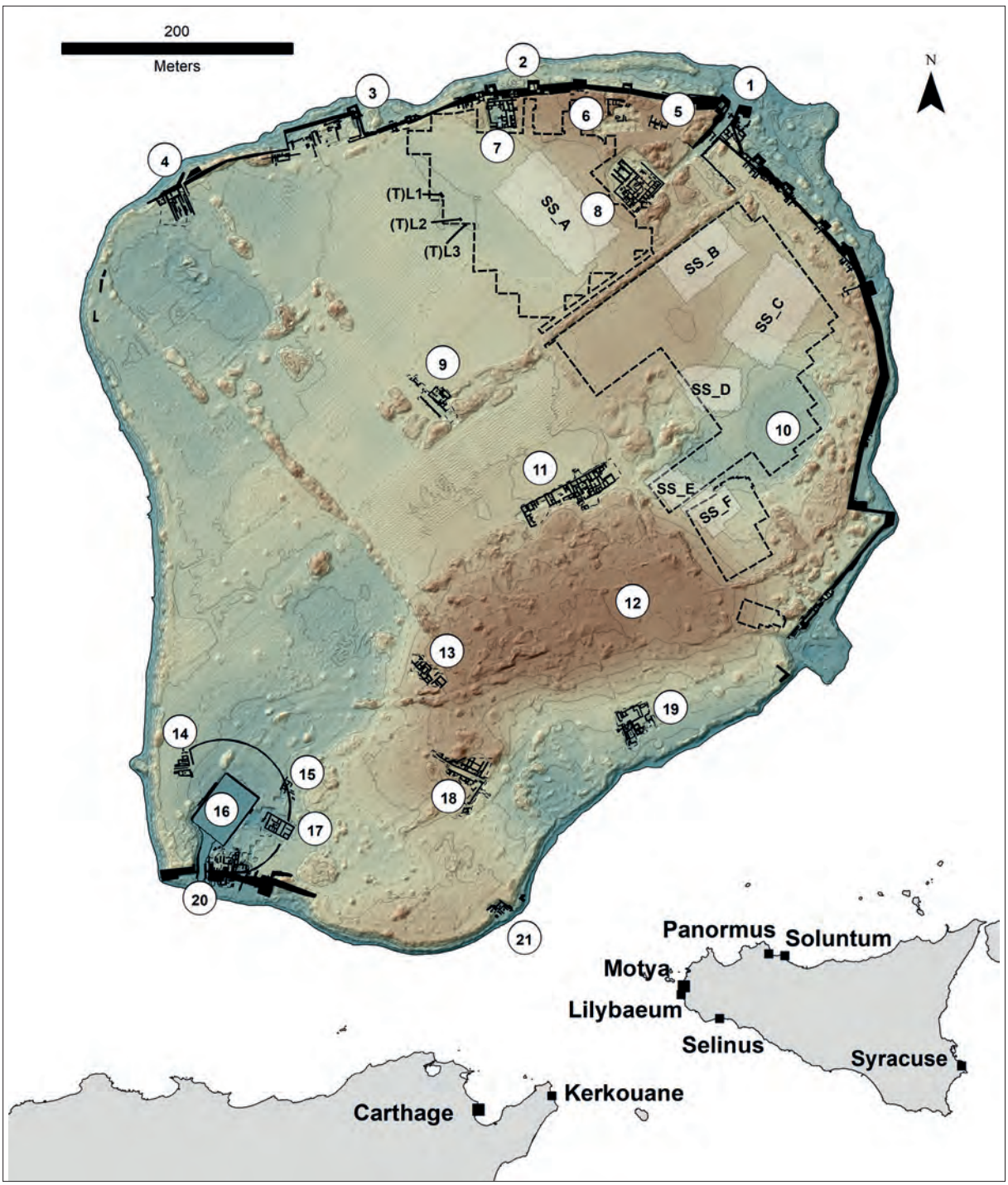

Fig. 1. Isola di San Pantaleo and key points on the site of Motya. Locations of test excavations (T)L1-3, survey units (SS_A-F, shaded white), and geophysical survey areas (dotted lines). Key points indicated include: 1) North Gate; 2) Archaic Necropolis; 3) Tophet; 4) 'Zona F'/Northwest Gate; 5) 'Zona J'; 6) 'Zona K'; 7) 'Zona T' (ex Luogo d'Arsione); 8) Cappiddazzu; 9) Abitato Centrale; 10) depression/pond; 11) 'Zona A'; 12) Acropolis & Whitaker hamlet; 13); 'Zona D'/Casa del Sacello Domestico; 14) Anchor Sanctuary; 15) Temple of Astarte; 16) Kothon; 17) Temple of Ba'al; 18) 'Zona B'; 19) House of Mosaics; 20) South Gate; 21) Casermetta. At the bottom: Motya's position in the central Mediterranean and other sites mentioned in the text.

in the 8th century BCE, and contributed to its florescence as a strategic stronghold of Carthaginian maritime power. The early colonial settlement was probably an unfortified trading post rather than a true urban establishment associated with ritual and mortuary contexts that signalled the specific identity of the new inhabitants.[4] Over time, Motya grew to cover the entire 44 hectares of the small island and featured a robust local economy as a trading hub and production centre, and similarly, a strong political presence owing to its position in the heart of the Mediterranean. Motya was destroyed during the final siege by the Greeks of Syracuse in 397 BCE (Diodorus: XIV). Parts of the island site were reoccupied immediately after that, although the settlement never achieved the status and intensity of occupation that it had previously enjoyed.

In 2017, we initiated an integrated landscape-scale investigation program that coordinates aerial, geophysical surveys with intensive surface collection of the island's interior and test excavations to define the layout of the Motya's urban plan. While it is a less common application compared to rural or regional-scale investigations, intensive surface surveys on complex urban sites are not uncommon.[5] The results of pedestrian survey are nearly always augmented by data from parallel satellite, aerial, and or terrestrial remote sensing surveys (which, as defined here, includes near-surface geophysical prospection).[6] The integration of these methods permits a fine-grained picture of the urban layout, site extents, and use space with some control for a chronology that comes from surface materials and targeted excavation.

However, the interpretative potential of the results of urban surveys can extend beyond the generation of a map for planning and management to understand how the people who occupied these ancient settlements viewed themselves and their place in the world. For example, the order and form of cities and the buildings within them can reflect broad ideologies or the relationship between the earth and the cosmos. Or the emplacement of coordinated urban layouts or construction of monumental installations can be a material manifestation of authority and the capacity for centralized planning. Apart from this, variation in the forms of structures in a plan could alternatively reflect bottom-up processes or co-creations. Moreover, transformations in patterns of organization and the use of space can help to understand the structures and histories of urban centres but the development of the communities who occupied them, and their experience within the built environment.[7]

The idea that the shape and timing of buildings and urban plans play a key role in understanding Phoenician and Punic identity has recently come to the fore,[8] but in the Mediterranean, this approach has been slow to develop outside of Magna Grecia or the context of Roman expansion, in part owing to the obliteration or destruction of Phoenician and Punic contexts by later phases of occupation. Fortunately, Motya was almost completely abandoned by the 3rd century BCE, and because of this, the current landscape offers a relatively uncontaminated space for archaeological investigations.

The broader objectives of our investigations are to provide an updated account of the temporal and spatial organization of life on the island, to understand trends of population aggregation and the process of urban intensification at the site, and how Motya fits within Mediterranean traditions of urbanism.[9] In doing so, we have identified that there is the need at Motya for the recovery of spatio-temporal data that augment a chronology that has thus far been primarily informed by investigations at major points of sig-

4 Quinn 2018, pp. 91-95.

5 Bintliff 2013; Cowgill 2015; Martens 2005

6 Attema *et al.* 2020; Knodell *et al.* 2022; Sevara *et al.* 2020; Vermeulen 2016.

7 Smith 2010; Johnson 2013; Attema *et al.* 2020; Knodell *et al.* 2022.

8 Fumadó Ortega 2013; Huemer 2021.

9 This project began in 2017 as a cooperation between the Universities of Palermo and Tübingen. Since 2020 it has become a joint enterprise between Palermo and the University of Pennsylvania. In 2017, work concentrated on the NE quadrant of the island. In 2020 permission was extended to the SE quadrant.

nificance on the site. We assert that a landscape approach that emphasizes non-monumental contexts can help to refine the history and chronology of urban sites like Motya by capturing fine-grained spatial and temporal variations.

2. Urban reconstructions of Motya

The work presented here is part of a long tradition of research that has focused on reconstructing the urban layout of Motya. Isserlin and DuPlat Taylor were the first to formalise this line of inquiry. Their investigations in 1963, 1964, and 1966 partially addressed the existence of a site's central axis road that linked a causeway, which provided access to the mainland via a gate in the north (North Gate), to the Kothon, once considered a port and dry dock.[10] As part of this, an examination of surface features was augmented with an electrical resistance survey on select areas of the island's interior. Although the application of geophysical methods at this time placed Motya at the vanguard of archaeological remote sensing, it yielded mixed and slightly contradictory results that were not resolved by excavation.[11] Nonetheless, Isserlin's examination of exposed surface features, including the dimensions of the North Gate road, led him to hypothesize that the city was divided into a grid of regular dimensions.

Spatially extensive, scientific excavations at Motya took place between the 1970s and 1990s, including some locales that were key in the formation of a concept for Motya's urban form.[12] These include excavations at Zona A, at the Abitato Settore Centrale, Zona B, Zona E[13] – all in the island's interior. There was also an expansion of work at the Cappiddazzu,[14] key anchor for the central axis road. In the last two decades, investigations have changed orientation to religious, administrative, and industrial aspects of Motyan society but have done little to enhance the picture of urbanism apart from a small segment of the residential area in the heart of the island, namely the Casa del Sacello Domestico (Fig. 1).[15]

Viewed as a whole, the locations and orientations of architecture exposed during these investigations of relatively prominent features did not reinforce the idea of a regular grid or standards for house construction but rather inspired an alternative to Isserlin's proposal. And so, the idea of a city where key points were connected by sinuous roads was proposed for the life of the site, a model for site organization that could be interpreted as the perpetuation of an urban plan hypothesized for the earliest days of intense settlement on the island.[16] For the most part, this model of the site's organization has persisted until today.

Geophysical investigations at Motya were renewed in the 2000s, including a limited ground-penetrating radar survey,[17] and a magnetic survey area on the northern end of the island,[18] which purported to document "neighbourhoods" that, in reality, reflect the extent of modern field boundaries. These results offered a tantalising glimpse of the organisation of structures and architecture that strongly suggested a gridded site in the latest layers. Still, proper interpretation of these data was hindered by the limitations of their instrumentation and sampling strategy.

10 Isserlin 1971; 1974.

11 Tagg 1965; Isserlin – Du Plat-Taylor 1974. Also, Herrmann – Sconzo 2020, p. 984.

12 For a comprehensive account of the housing structures of Motya discovered in those years, cfr. Famà 2008; 2009.

13 Zona A: Famà 2002a. Abitato Centrale: Tusa 1970. 'Zona B' excavations remain unpublished; a short note by Famà 2002b, p. 28. Zona E: Famà – Toti 1997; 2000.

14 Tusa 2000; Nigro 2012, with further literature.

15 Nigro 2007.

16 Famà 2008, p. 286; Nigro 2022, p. 341.

17 Sciotti *et al.* 2004.

18 Di Mauro *et al.* 2011; 2014.

Our first round of geophysical survey began in the open fields of the northeastern quadrant of the island and included magnetic gradiometry and ground-penetrating radar (GPR).[19] Located immediately west and north of the Cappiddazzu sanctuary, this area is second only to the 'acropolis' in elevation and was one of two primary points of access to the island settlement. This survey was intended to document subsurface structures in the presumed residential areas between open excavation zones, thus providing a starting point for relating Motya's urban plan.

Results show a coordinated plan of segmented buildings fronting the central axis road and parallel to the main architecture of Cappiddazzu to the west (Fig. 2).[20] Such evidence confirmed observations already formalised by Isserlin and DuPlat-Taylor in the 1960s that at least one part of the Punic settlement was organised according to an orthogonal urban pattern.

The segmented buildings structures echo the dimensions and orientation of the Cappiddazzu itself, they did not resemble monumental architecture, but rather residential structures seen elsewhere on Motya (Area A)[21] and in the Punic sphere and Magna Grecia.[22] These house-blocks are each approximately 21 x 100 (~1:5 ratio) metres and divided into five segments that, based on variation in internal divisions and slight misalignments along the outer walls, appear to have been constructed independently of each other (Fig. 2). Strong circular magnetic features are found within these structures, which are likely ovens or kilns.[23]

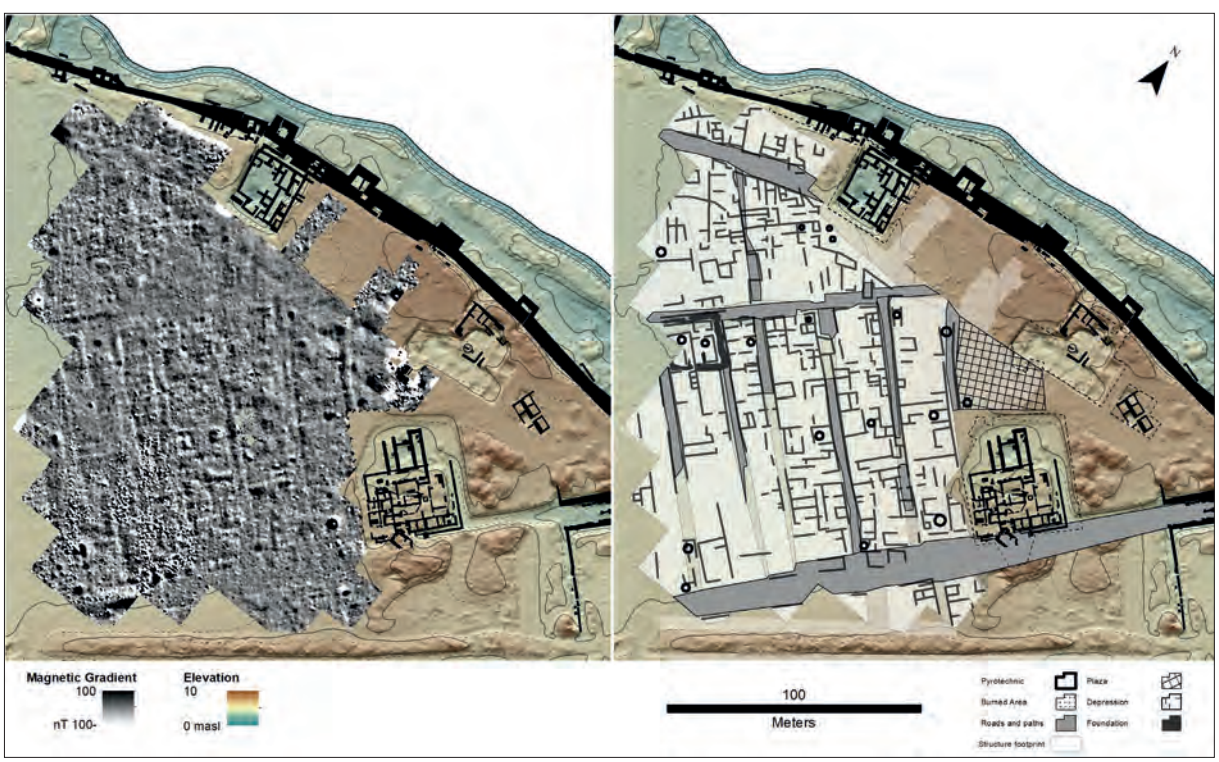

Fig. 2. Results of 2017 magnetic gradiometry survey.

19 As for the methodology applied, cfr. Herrmann – Sconzo 2020, pp. 986-991.

20 Herrmann – Sconzo 2020, pp. 991-994, Fig. 6.

21 Famà 2002a.

22 Herrmann – Sconzo 2020, Fig. 8.

23 One of these features was lately excavated and is discussed in section 3.2.1, below.

Despite the contrast between the apparent modest construction methods of these buildings and the Cappiddazzu, the space between the monumental phases (Phases III-V)[24] of the latter and the first block of houses to the west is not appreciably wider than the space between one block and the next, approximately four metres. However, an open space is found between the Cappiddazzu and the Zona K excavations where no built structures have been documented and a small plaza can be inferred. The ring road, approximately 8 metres wide, visible in both the magnetic and GPR survey results, connects this space with parts farther south following the contour of the fortification wall.[25]

One final feature of note revealed by the 2017 survey is a north-oriented square/quadrangular structure that measures in full 18 metres on its shortest side and greater than 22 metres on its largest side. The structure overlays and is oriented to the orthogonal urban layout (Fig. 2).[26]

3. Methods

3.1. *Geophysical Survey*

Inspired by the results described above, geophysical survey was expanded in 2021. Magnetic gradiometry survey covered the southeast quadrant of the island to generate a relatively clear plan of the latest architectural and landscape features (Fig. 3).[27] Survey with GPR and soil resistance sensors covered only selected areas to aid interpretation of specific features identified in the magnetic gradiometry results.

While all the areas surveyed with magnetic gradiometry are under grape cultivation now, the northernmost field was surveyed before the plants were set. This is significant for explaining the difference in quality between the two survey areas. Magnetic gradiometry survey results in grape cultivation areas exhibit a noticeable drop in the quality compared to areas outside of the vineyards (or prior to planting), owing largely to the increased sensor height and decreased sensor stability as the surveyor avoided the grape vines. The quality of the magnetic gradiometry results was further compromised where survey direction was limited by the orientation of the rows of vines. Ideally, survey direction for geophysical instruments that require in-line processes for contrast enhancement would not be aligned with the direction of expected linear features, e.g., walls or roads. This is so that straight features that are aligned with survey transects are not removed by linear filters during processing. Unfortunately, the orientation of the vine rows is roughly orthogonal to the ordered grid observed in the eastern half of the island, and we believe that the magnetic signature of some of the (northeast-southwest oriented) interior walls that were mapped in the areas of grape cultivation are, in many cases, suppressed by the gradiometer itself during data collection and by in-line filters applied during processing. This is, however, not the case in the northeast quadrant, where we were able to survey before the establishment of the vineyard and set the survey orientation at roughly a 45° angle to the expected architecture. Despite these shortcomings, magnetic gradiometry data are interpretable and quite informative across all areas, particularly when examined on a broad scale.

In the new survey area, structures to the southeast of the central axis road match the dimensions of their analogues north of the causeway and extend roughly 60 metres south of the vineyard boundary (Fig. 3). Features in this area are more subtle because of the increased distance of the sensor from the ground surface, but the general plan of these segmented buildings is still apparent, largely owing to the robust signal

24 Nigro 2009.

25 The presence of a plaza and of the ring road had already been proposed by G. Falsone (1988a; 1989).

26 Excavation of this feature is discussed in section 3.2.1, below.

27 The 2021 geophysical survey was assisted by Jackson Clark, Lisa Doro, and Marco Cangemi.

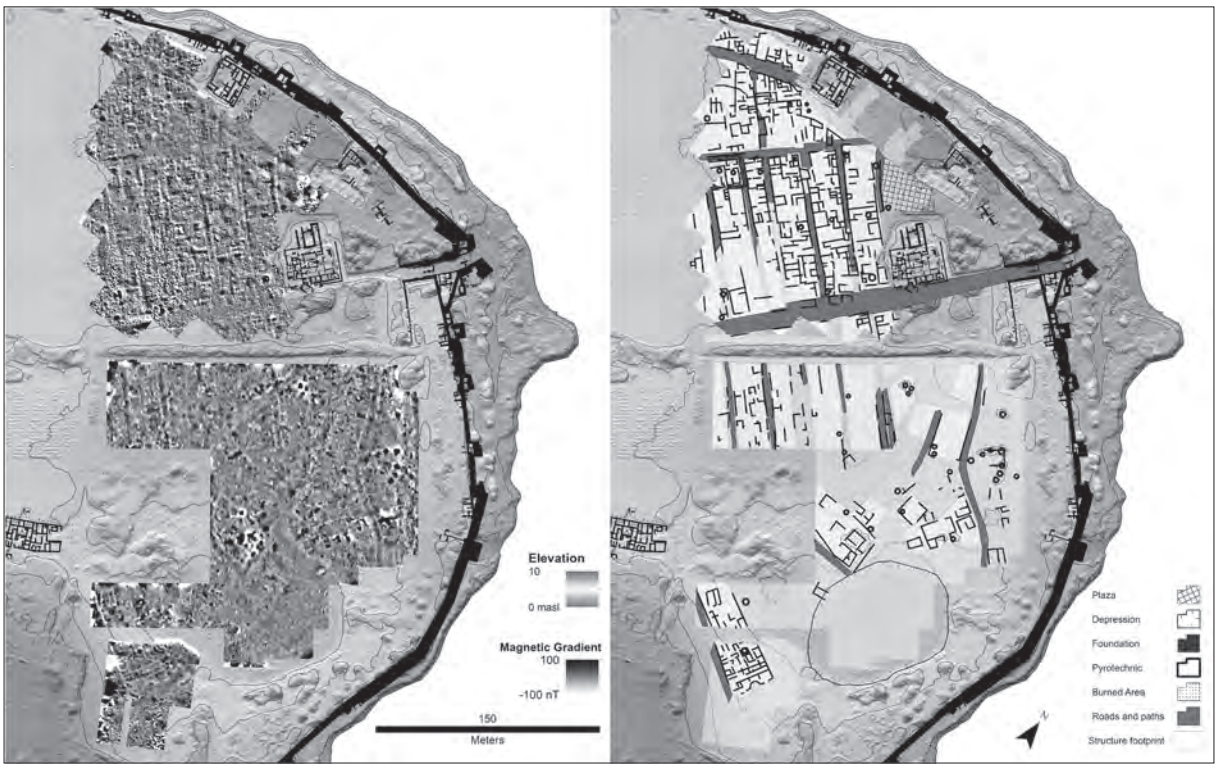

Fig. 3. Overall magnetic gradiometry map with interpretation.

of the alleyways that divide them. These orthogonal structures cover approximately 3.5 hectares across both survey areas.

Moving farther south, we see a variety in the forms, orientations, and spatial relationships between apparent structures in the magnetic gradiometry data that we do not see in the north. A cluster of buildings lay on a rise to the east, closest to the fortification wall. While their exact extents and boundaries are sometimes difficult to discern, there are at least three distinct structures here (Fig. 4, SS_B). Closest to the central axis road, is what appears to be a long, segmented building of the type featured in the orthogonal section but positioned at an angle to the rest. The eastern boundary of this structure follows a path with a signal like the alleys of the gridded area, but the age of this path is in question. While the ancient building foundations seem to align to this path, and it is not visible in early 20th century aerial photos, the course of the path extends outside of the survey area as a single line of olive trees extends north.

Smaller buildings are found along both sides of this path that follows the edge of a ridge on the eastern side of the survey area that do not conform to the dimensions of the segmented structures described above. These buildings are under 20 metres in length and width and are notable for their strong magnetic features that suggest that the buildings or elements within them were subjected to high temperatures. Unlike some of the pyrotechnic features seen in the magnetic gradiometry in the north, which appear as circular features located near the centre of a structure or a room, these features occur along the walls and at corners, making it difficult to discern if they are pyrotechnic installations along a wall or, more likely, architectural features that were magnetically enhanced by a burning event.[28]

28 e.g., Gaffney – Gater 2003; Linford 2006; Gaffney *et al.* 2000.

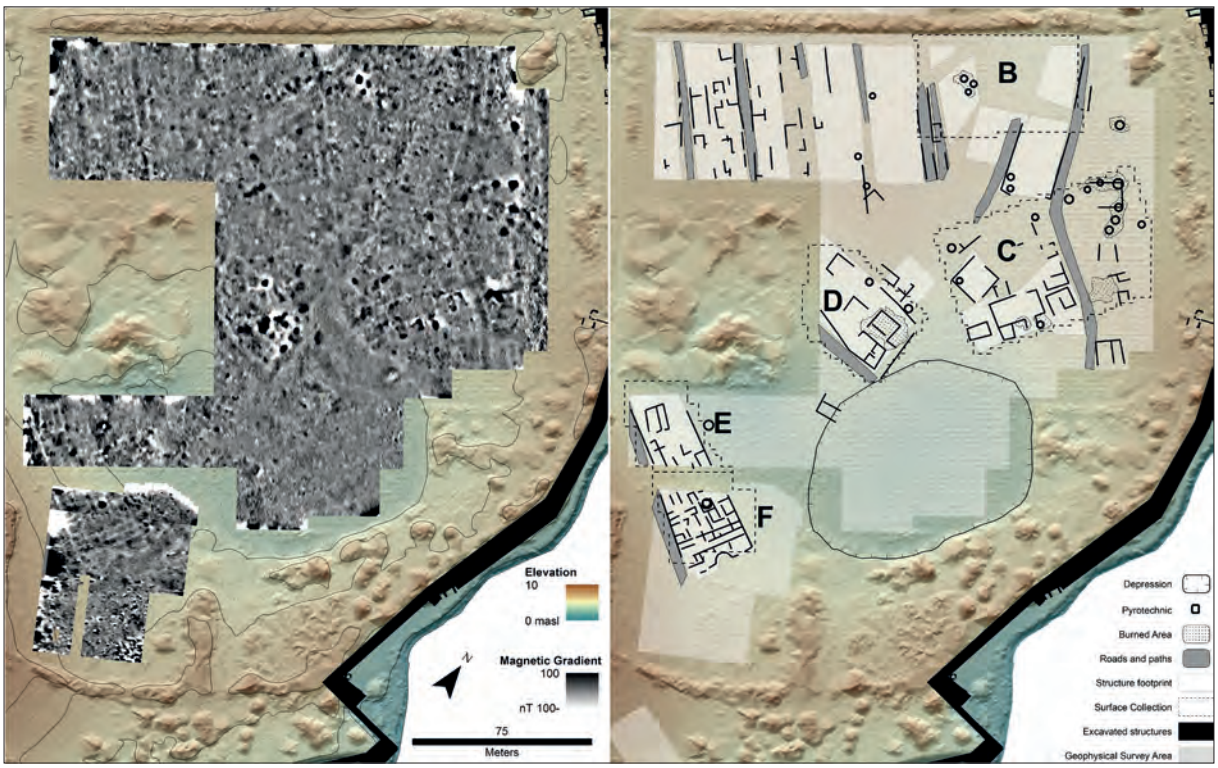

Fig. 4. Detail of the southern magnetic gradiometry sector with survey units (SS_B-F) collected in 2022. Extent of Figure 5 is indicated on magnetic gradiometry map.

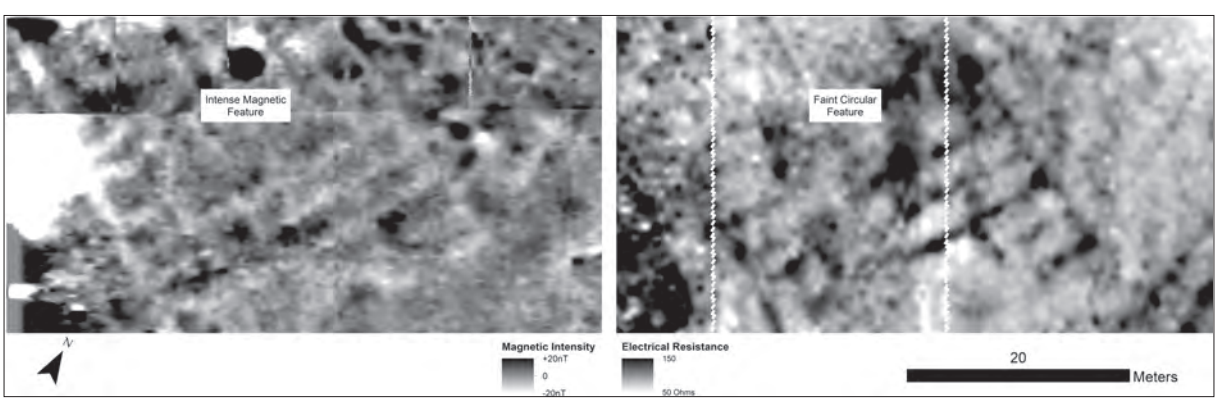

Fig. 5. Magnetic gradiometry (left) and electrical resistance (right) image of a long building in SS_E and SS_F that features a pyrotechnic installation and a semi-circular feature at the centre of the eastern façade.

A structure opposite these buildings, downslope and on the west side of the survey area, also exhibits evidence of burning, which emphasizes the magnetic signature of a quadrilateral room within the larger structure (Fig. 4, SS_C). This building is flanked on the south by evidence of an alley that separates it from the signature of a possible parallel structure that was not clear enough to discern for interpretation.

Moving southwest, a long building of the style found in the area with the gridded plan, or perhaps better compared with its neighbour in Zona A, is found spanning two modern fields that are separated by a fence that was erected to protect the vineyard (Fig. 4, SS_E). This building seems to taper slightly as one

travels north and has a prepared alleyway on its south side. The southern façade of the building may feature a concave semi-circular entrance, which, if verified, would be unique for this sort of structure. A discrete, strong magnetic feature also indicates here the presence of a pyrotechnic installation, and its circular form was corroborated by data from an electrical resistance survey (Fig. 5).

This long building and the one immediately to the north both face an oval-shaped depression of an unknown genesis where weak magnetic features seem to fade out. This depression may correspond to what Ciasca identified as a pond or second 'Kothon' by observing the site's contour lines, but never excavated (Fig. 1, 10).[29] Unfortunately, the magnetic gradiometry results are not clear enough to definitively confirm or deny this hypothesis.

3.2. *Test Excavations*

In the summer of 2021 and 2022 three small test trenches were opened in the westernmost limit of the studied area, longitudinally aligned along the tractor path that leads from the interior to the Tophet and the Necropolis to verify the observations from the 2017 geophysical survey in the NE sector of the island and to collect dating material for a chrono-functional interpretation of the whole North Gate residential district (Fig. 6).[30] The test trenches, called (T)L1-3each measured approximately 2 x 3 metres.

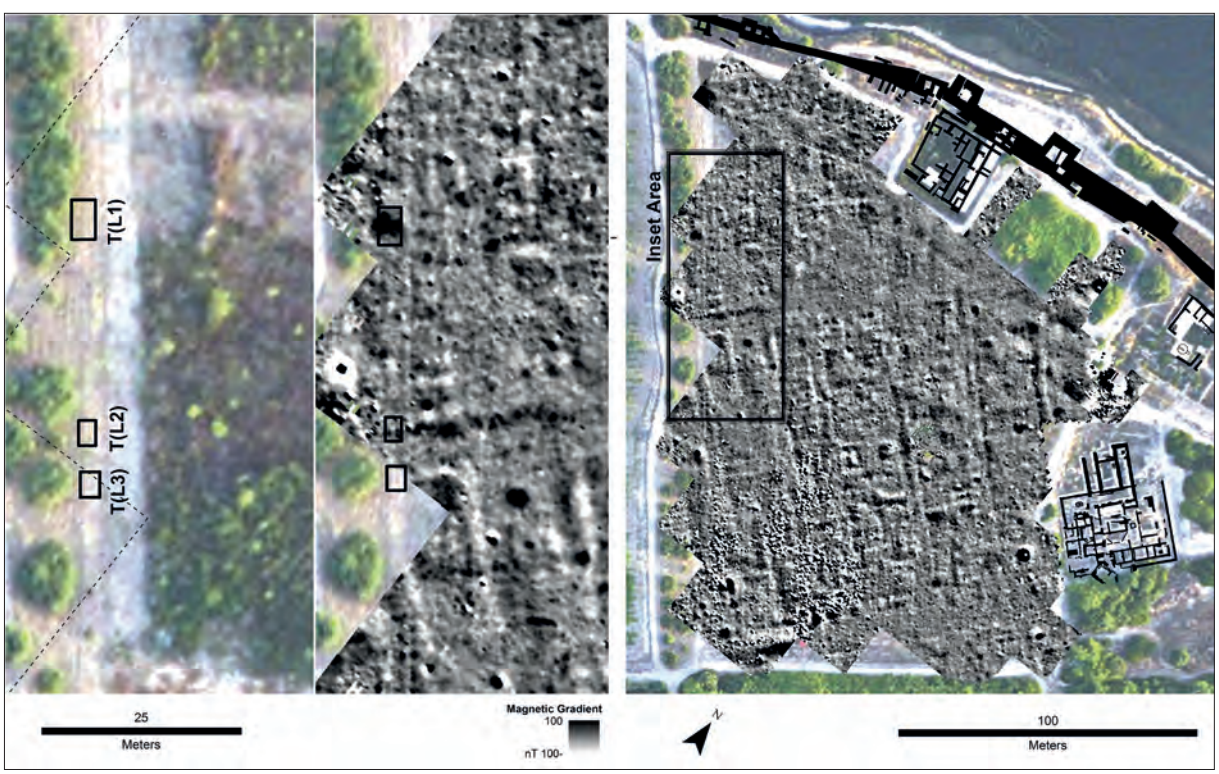

Fig. 6. Location of the three test trenches with magnetic gradiometry, (left) an aerial orthophoto, (center) on the magnetic gradiometry, and (right) in the broader survey area.

29 Ciasca 1995, pp. 273, 275. Also, Famà 2009, p. 52.

30 These trenches have been located outside the vineyard, which covered most of the residential quarter mapped with magnetic gradiometry. Originally planned to measure 2 x 3 metres, two of the three trenches were then slightly enlarged to capture features of interest.

Fig. 7. Beaten-earth floor of Level (T)L1_3, from north.

Test trench (T)L1, the northernmost of the three, targeted a large magnetic signature of considerable size that was interpreted as a pyrotechnic feature. Trenches (T)L2 and L3, arranged 7 metres from the latter, aimed at investigating the westernmost recorded street of the North Gate residential district and capturing one wall of the adjacent segmented structure.

3.2.1. Test Trench (T)L1

Excavation of (T)L1 [31] revealed a stratigraphic sequence divided into three levels; the two upper ones (Levels L1_1-2) belonged to the modern phases of use of the area, first as part of a vineyard and later as a pathway. Level L1_3, was characterised by an installation cut out into the bedrock on at least one side and filled by four overlapping layers characterised by an increasing presence of combustion-related material (concoctions, ash, charcoal and other elements that may cause magnetic alterations) and other artefacts notably linked to pottery production, such as flat-convex mudbricks.[32]

Unfortunately, the encountered structure could not be thoroughly investigated as its limits fall almost entirely outside the extent of excavation. Because of time constraints, the excavation was interrupted at the level of a relatively compact beaten-earth surface (Fig. 7), on which rested a pseudo-circular concentration of fragmentary large transport amphorae (belonging to 2-3 initially complete specimens).[33]

Sherds recovered in all L1_3 layers contained mostly locally produced Punic common and cooking-pot wares (Fig. 8, 1-8; 21-23), primarily transport amphorae of Toti's types 18-19 (Fig. 8, 9-20).[34] These forms are widely attested at Motya from the end of the 5th and the full 4th century BCE, in a phase following the destruction of the Punic city by Dionysius of Syracuse.[35] Greek and other imported pottery were extremely rare in these contexts.

Excavation of (T)L1 confirms our interpretation that the magnetic feature detected during the 2017 geomagnetic survey is a pyrotechnic installation and adds confidence to our interpretation that similar magnetic features mapped across the orthogonal area are signals from furnaces or kilns. We have tentatively

31 Operations lasted 3 weeks and were supervised by F. Leprai.

32 Similar bricks were used in several kilns retrieved in the two main pottery workshops of the island, namely the 'Ceramico' of Zona K and in Zona T (former 'Luogo d'Arsione) multifunctional compound (Falsone 1981).

33 At the behest of the Superintendence BBCCAA and the Whitaker Foundation, the test trenches were refilled at the end of the excavation season.

34 These two types correspond respectively to Ramon 4.2.2.1, 4.2.2.2 (Toti 2002, p. 19, pp. 290-295).

35 The end of the 5th/beginning of the 4th century BCE date is likewise suggested by bowls and jars, which find numerous parallels from nearby Zona A (Vecchio 2002, pp. 203-273).

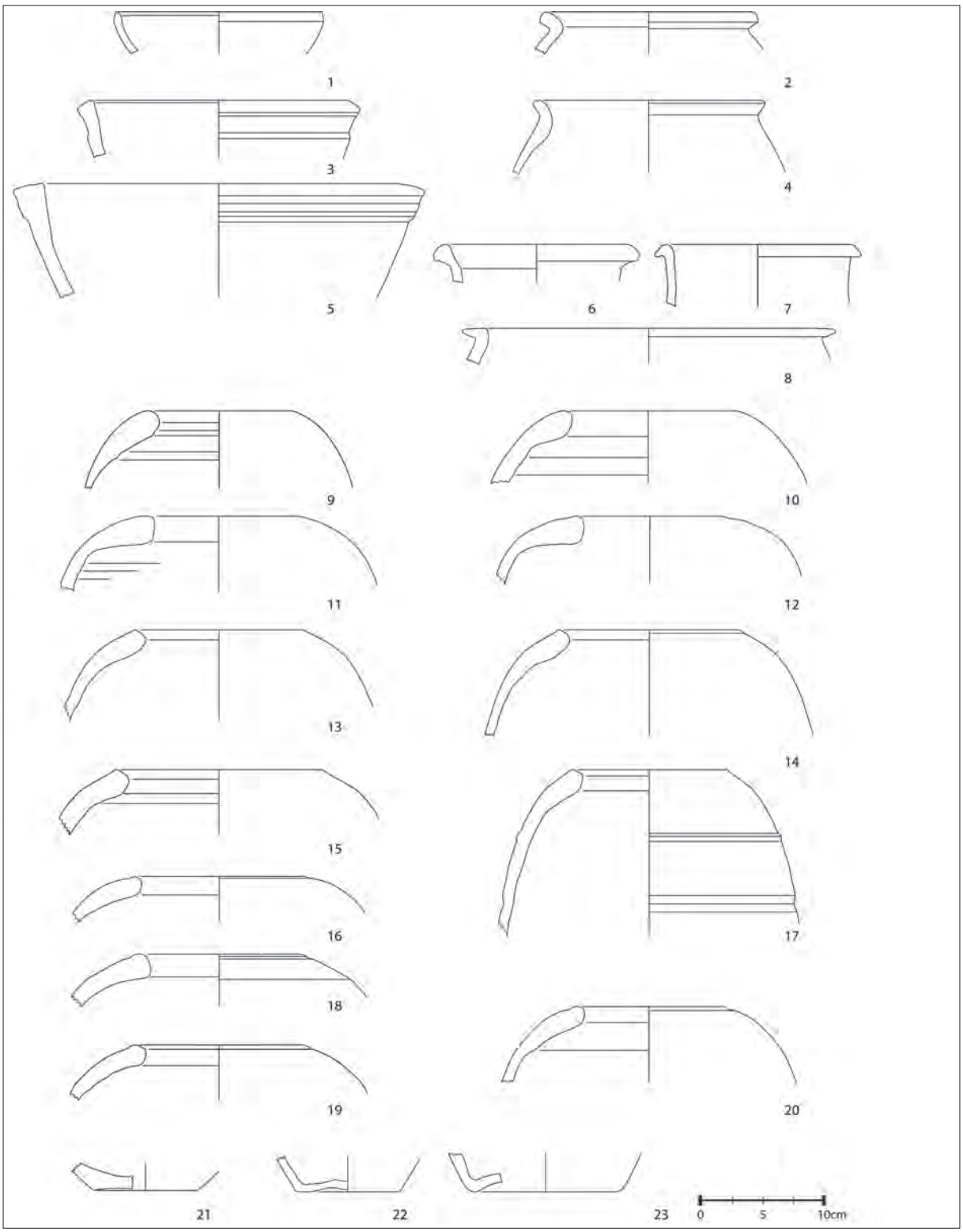

Fig. 8. Pottery from Sounding (T)L1-Level L1_3.

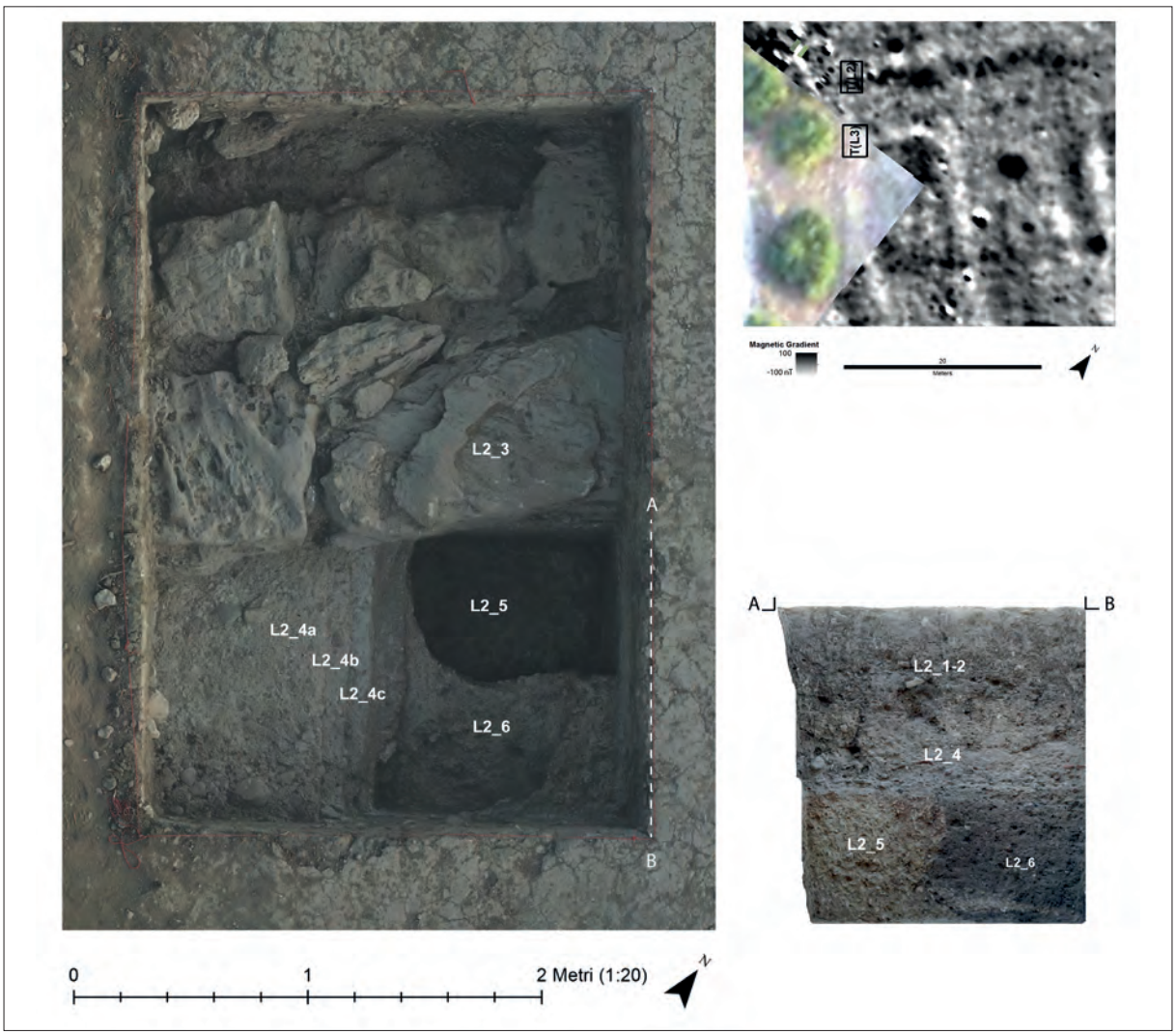

Fig. 9. Sounding (T)L2: a) orthophoto; b) close-up magnetometry; c) section.

interpreted this feature's last level of use as a part of a large pit used to dispose of kiln residues or as a structure related to pottery production.

3.2.2. TEST TRENCH (T)L2

Excavation of trench (T)L2[36] revealed that archaeological deposits in this section of the island are approximately 80 cm thick. Here we found a more complex stratigraphic sequence, articulated in five phases, the first two of which (Level L2_1) – as in (T)L1 – were represented by the modern road and an old vineyard. Level L2_3, immediately below the latter, included the megalithic structure that was observed in the magnetic gradiometry survey, with an east-west orientation (Fig. 9), occupying the northern portion of the

36 The operations of Soundings (T)L2 and (T)L3 were supervised by S. Mancuso and had lasted 5 weeks.

sounding and continuing below its east and west limits. The installation was made of huge unhewn limestone slabs, has a thickness of c. 1.50 metres, and preserved for a single course.[37]

A shallow and wide foundation trench was detected on the south side of this wall, containing a small deposit of equid bones and a small bronze sheet but no sherds. No diagnostic artifacts were associated with this structure in our small exposure, and thus the age and interpretation for this building remains open. The large slabs were not removed during excavation, limiting our access to deeper levels.

Outside of this massive foundation, we exposed a sequence of three floors (Level L2_4), each approximately 5 cm thick, made up of a local *cocciopesto* of coarse workmanship. The three floors have a compact matrix, rich in crushed stones, marly lumps, shells, and many pottery sherds, which were pivotal for the dating of the overall urban system of the NE sector of the island. It is possible that the high concentrations of sherds in these pavements contributed to the enhanced magnetic signature of the alleyways seen in the magnetic gradiometry results. The three surfaces, very similar to each other, were built over a short time and represent renovation episodes of the alleyways that divided the closely packed segmented structures. The oldest floor rested on a thin sandy layer which we interpret as a preparation layer. They match those discovered in L3 located to the south.

Level L2_5, archaeologically the oldest, was reached in a small sounding of approximately 1 x 1 metres, carried out in the SE quadrant. It features two pits or silos, one irregular, and another semi-circular, of presumed anthropogenic nature, cut into the virgin marl, found at a relatively shallow depth in this part of the island. The filling consisted of a shred of marl and almost sterile loose earth. L2_6 was represented by the marl rock.

3.2.3. Test Trench (T)L3

The southernmost trench, (T)L3, occupied an area of 3.20 x 2.50 metres and was located 3.2 metres south of L2. Six phases were identified in this excavation, all of which correspond to levels in the neighbouring soundings. Level L3_1, the most recent, was represented by the modern tractor path, and Level L3_2 corresponded to five vine pits from planting that were arranged in rows at a regular distance.

Level L3_3 included the NW angle of a room/building with a stone plinth and a sequence of four floor levels (road) in the local *cocciopesto*, corresponding to those recorded to the N in of (T) L2, abutting against it. The walls feature medium and large unhewn stones, have a visible extension of 2 metres north-south x 1.5 east-west and a thickness of c. 1.5 metres (Fig. 10, a-b). Were preserved for two rows, the lower one projecting, perhaps a sort of sidewalk or stone to protect the foundation from a roof dripline. The inner corner (visible in the SE corner of the sounding) showed no traces of a floor. Based on the construction technique and size, it can be suggested that the walls belonged to a medium-sized building, confirming what was noted in the geomagnetic survey.

The road surfaces observed in this trench have a thickness of approx. 5-10 cm and seem to have direct relationships observed in (T)L2. The most recent floor is poorer than the ones below, which are more compact and characterized by a dense texture of pebbles, marly lumps, animal bone fragments and a rich corpus of fragmented and perfectly arranged ceramic sherds. This rich body of ceramic includes both Punic (common and cooking-pot wares) and Greek (especially black-glazed) vessels; it allows us to attribute the establishment of the oldest road level (L3_3c, Fig. 8, 24-41)[38] to the end of the sixth century BCE and allowed the identification of two later renovations (L3_3b-a, Fig. 1-24) during the next 80-100 years (to the end of

37 The massive blocks resemble those used to pave the central axis road leading in from the North Gate.

38 Level 3_3c includes, among others, black-glazed attic cup of type C, amphorae of Toti's types 7/Ramon 1.4.2.1 and 8/Ramon 1.4.3.1 (Fig. 8: 31-33), datable between the end of the 6th and the 5th century BCE (Toti 2002, p. 282, pls. 5-6:1).

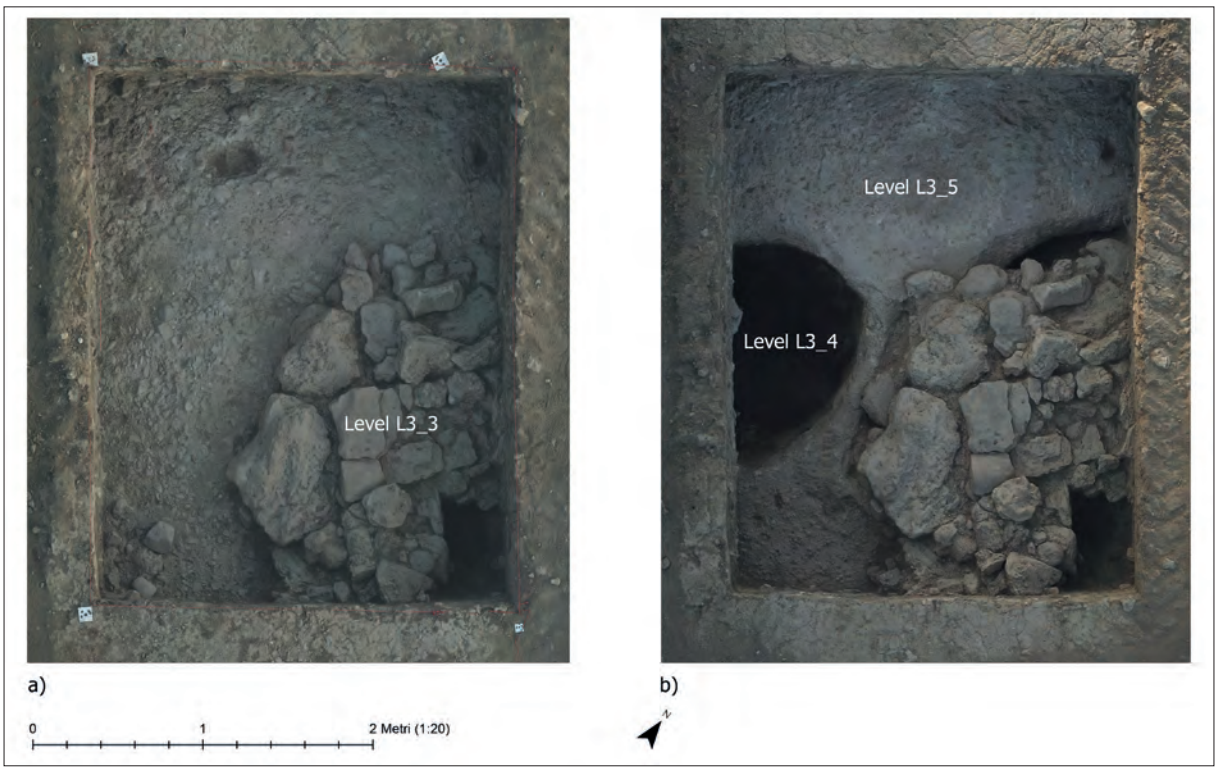

Fig. 10. Sounding (T)L3, a) Level L3_3; b) Level L3_4.

the 5th century BCE).[39] The oldest floor rests on a thin sandy layer which can be interpreted as a preparation layer that is just above bedrock.

Level L3_4 is the oldest and is represented by a circular pit with a diameter of 1.35 metres that falls half below the west section and cuts the bedrock. The fill consists of animal bones, ash, and a good number of tableware sherds, mainly plates (Fig. 9, 1); shallow carinated bowls (Fig. 9, 2); hammer-head bowls (Fig. 19, 3-6); chalices (Fig. 9, 9-10); small jars (Fig. 9, 7-8); and cooking-pots (Fig. 9, 11-13). These forms find close comparisons in 7th-6th centuries BCE levels of Motya and Carthage.[40] No amphorae nor Greek imports were retrieved here. The excavation terminates on bedrock, level L3_5.

39 Level 3_3b includes amphorae (Fig. 8: 13-14) of Toti's type 13 (also Ramon 1.4.5.1/4.2.2.6), datable to the 5th century BCE (Toti 2002, pp. 285-287, pls. 9-11); while in Level 3_3a occur amphorae (Fig. 8:5) of Toti's type 16, datable to the end of the 5th century BCE (Toti 2002, pp. 288-290, Pl. 29:11).

40 Selected parallels. Fig. 9:1: Motya: Spagnoli 2017, pl. 1: MC.11.2491/16 (period IVB of Nigro's periodization, c.750-675 BCE); Carthage: Vegas 1999, Pl. 34, 2; Fig. 9, 2: Motya: Spagnoli 2017, pl. 1: MC.08.2409/199 (period IVB of Nigro's periodization, c.750-675 BCE); Fig. 9, 4 Carthage: Vegas 1990, Pl. 5:59; Fig. 9, 6: Motya: Spagnoli 2017, pl. 3: MC.07.1685/137 (period IVB of Nigro's periodization, c.750-675 BCE); Fig. 9:9 Motya: Spagnoli 2017, pl. 4: MD.09.2219/19 (period IVB), the same piece is however attributed to period VA, in Spagnoli 2019, pl. 3; Carthage: Vegas 1990, Pl. 5, 6. The cooking-pots at Fig. 9: 11-13 have close parallels in the bulk of material found at Motya in the favissa F.2950: Spagnoli 2012, Pl. II: MC.11.4510/61; MC.2951/43; and at Carthage below Kardo XIII and attributed to the first half of the 7th century BCE: Vegas 1999, type 60.1, Pl. 20, 184-191.

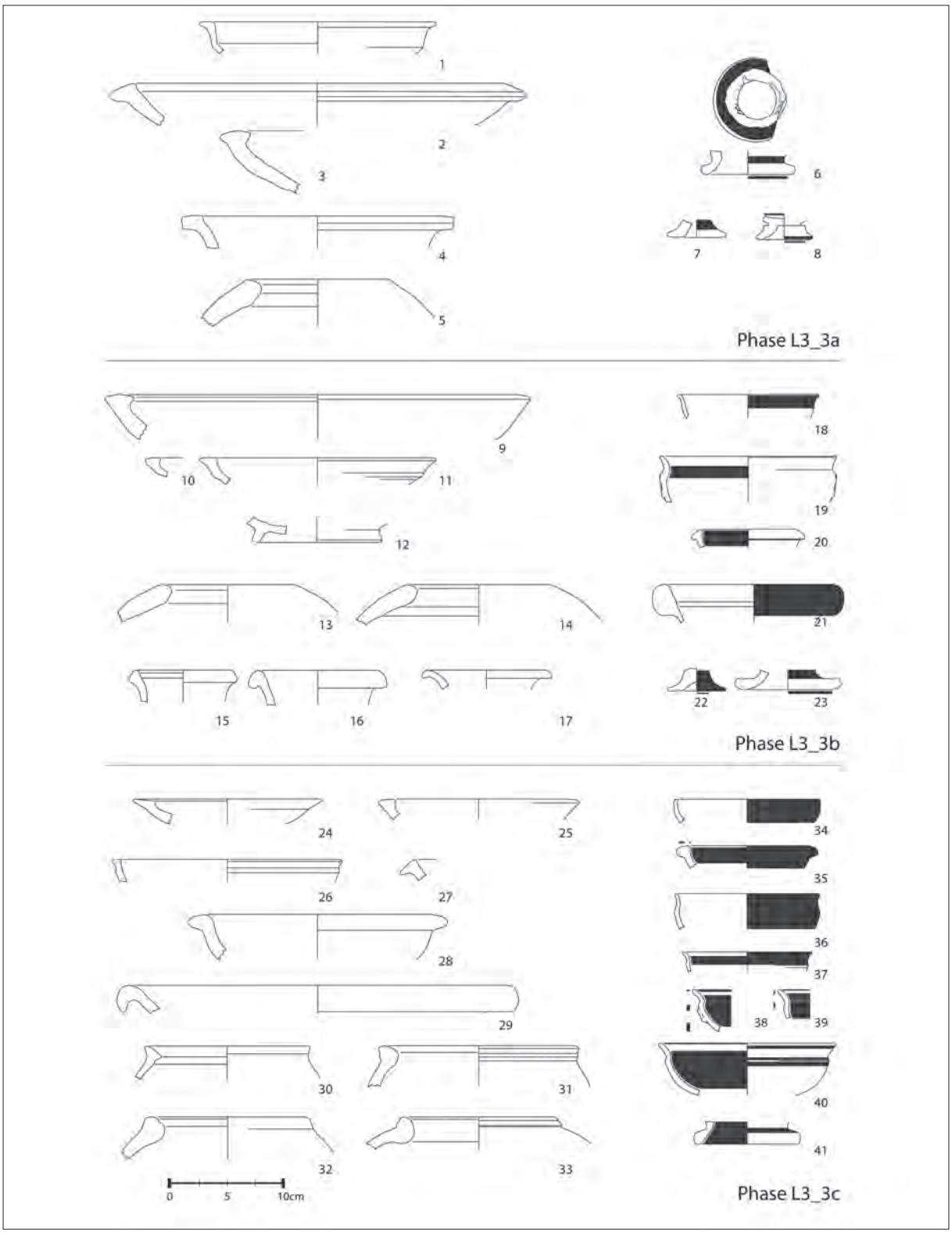

Fig. 11. Pottery from Sounding (T)L3-Level L3_3.

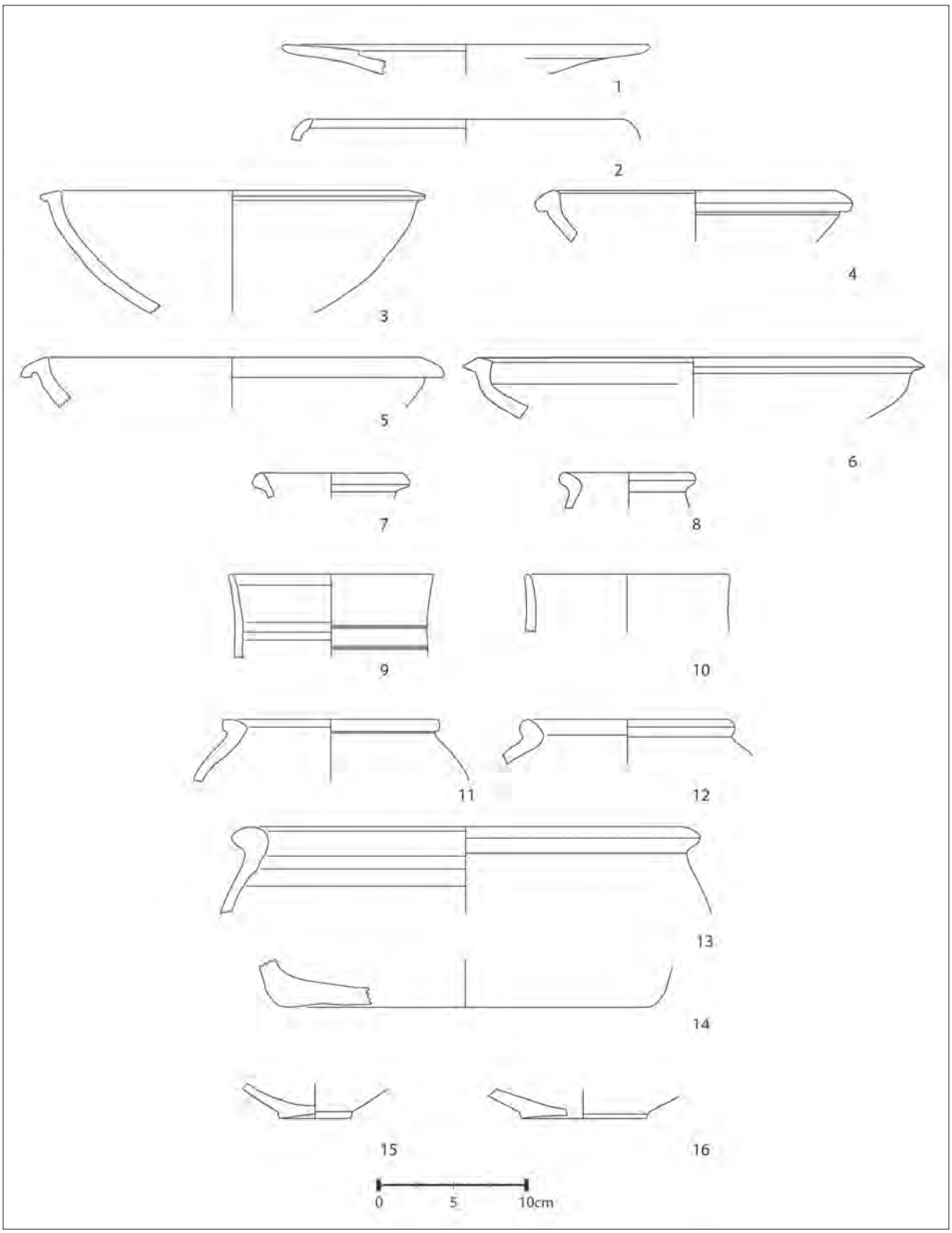

Fig. 12. Pottery from Sounding (T)L3-Level L3_4.

3.2.4. RÉSUMÉ

From the comparative analysis of the data collected in the three soundings we can draw the broad contours of the development of settlement in this sector of the island (Tab. 1).

Phase	(T)L1	(T)L2	(T)L3	Features	SU	Dating
I	L1_1	L2_1	L3_1	Modern pathway	1001-1002-1003; 2001-2002-2004; 3001-3002	modern
II	L1_2	L2_2	L3_2	Modern Vineyard	1006/1005, 1018/1019; 1016/1015; 2006-2007; 3005-3010-3012-3018-3021	Pre-modern
III		L2_3	-	Megalithic wall	W2003; 2008, 2009	?
IV	L1_3	-	-	Remains of a kiln (?)	1009-1014-1017-1023_1024	4th-3rd century BCE
V	?	L2_4	L3_3	Floor levels belonging to a possible road.	W3009	
		4a	3a		2005/10=3014	5th century BCE
		4b	3b		2011=3017	late 6th century BCE
		4c	3c		2012=3024	6th century BCE
		4d	3d		2013=3025	
VI		L2_5	L3_4	Pits/Silos	2014-2016; 3029-3031	7th-6th century BCE
VII		L2_6	L3_5	Virgin soil/bedrock	2016; 3026	-

Tab. 1. Compared stratigraphy of Soundings (T)L1-L3.

Phase VI (L2_5, L3_4, Fig. 10c) marks the most ancient use of the area and consists of two pits/silos of variable size and shape cut directly into the bedrock of Phase VII. The silos, found in each sounding, have similar characteristics and recall those retrieved by our mission below and outside the southern wing of Area J building[41] and those recognised by Famà below the residential block of Area A.[42]

The circular pit/silos 3030 contained at least two different filling layers full of material datable to the 7th and the 6th century BCE. The co-presence of sherds of different periods in the same context suggests that the silo's obliteration may have resulted from an intentional landfill, a large garbage disposal, composed of heterogeneous materials.

Phase V (L2_4; L3_3, Fig. 10b) collects the vestiges of the North Gate district, which were previously detected by geophysical survey. Identified in the two southern soundings, L2 and L3, it includes the angle of a building belonging to the westernmost identified block of the orthogonal district and, west of this, a nort-south road with various remakes consisting of an overlap of several floor levels laid presumably at a short interval of time. These floors, made of local *cocciopesto*, formed one of the alleyways that divided the closely packed segmented structures of the North Gate district. The embedded material allows us to date the first arrangement of the new orthogonal urban layout in the 6th century BCE and frames its development and use in the 100 years that followed. The latter would, therefore, follow the trend of orthogonal refoundation of the main Phoenician-Punic sites of the western Mediterranean around the same or slightly later period. It would also coincide with the construction of the monumental works in Motya, including the fortification wall and the first monumental phase of the Cappiddazzu.

Phase IV (L1_3) is represented by what was originally to be a large pit used for the disposal of processing residues or represents a fraction of a structure related to the production of ceramics. It has been identified exclusively in the northernmost sounding L1, in a peripheral area located outside the proper orthogonal district, between this and the ring road that ran parallel to the fortification wall. Here the

41 Building J is under study.

42 Famà 2002b, 41-43, figs. 33-34.

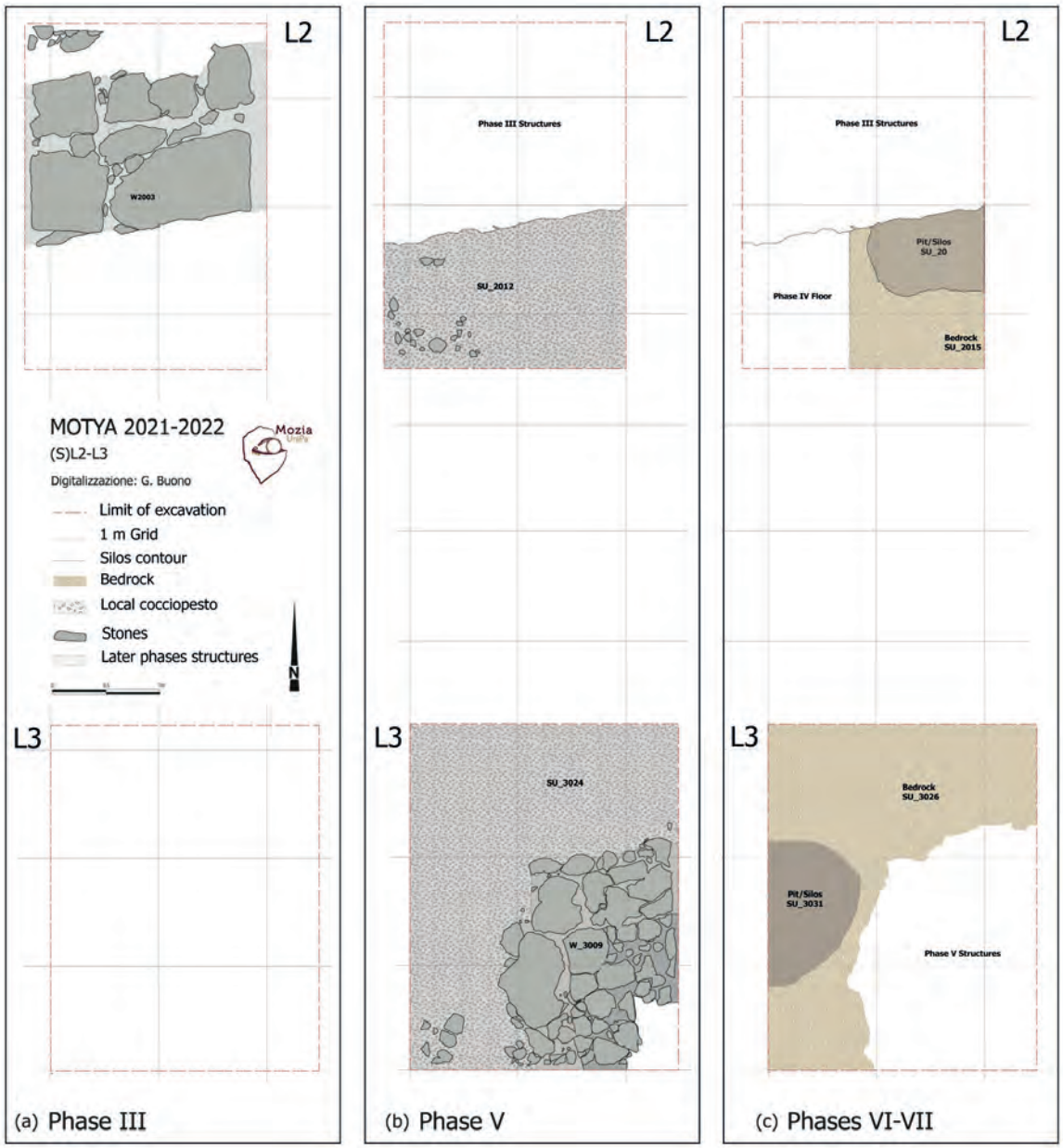

Fig. 13. (T)L2 am (T)L3: general plan, by phase.

magnetic survey did not provide precise results, highlighting the presence of masonry structures and small rooms that did not follow a regular trend, as well as some significant anomalies, of which the pit is the archaeological manifestation. The ceramic material found *in situ* inside the structure can be dated to the very end of the 5th-full 4th century BCE and therefore – most probably – to a phase following the defeat of the Punic city by Dionysius.

Pyrotechnic structures similar and contemporary have been identified in other locations along the fortification and immediately inside it and could testify to a later use of part of the North Gate district as an extended ceramic workshop in a phase in which much of the population had already settled on the mainland at Lilibeo (see below).

Phase III (L2_3) includes a megalithic structure of quadrangular shape, oriented N-S, that overlays the urban orthogonal district, maintaining its basic orientation. Precise dating is not possible for this feature since this structure is preserved only at the foundation level and no layers or floors directly connected to it have been found.

Phases II-I include the modern pathway (L1_1; L2_1; L3_1) and the vineyard (L1_2; L2_2) and belong to recent times. The final phase of the area is traced from the planting of the vineyard in modern times and later used as a road.

3.3. Controlled Surface Collection

An intensive gridded surface collection was carried out over areas that had been surveyed in 2017 and 2021 with the magnetic gradiometer to link distributions of exposed cultural material with the architectural features that were identified in the geophysical survey.[43] Surface collection prioritized five distinct complexes evident in the magnetic gradiometry, which were of architectural and spatial interest, selected with the expectation that they would verify prior interpretations, help identify a date range for newly found structures, and provide a sample with some breadth of function and style (Figs. 1, 4). Two of these were in the northeastern sector in correspondence with the orthogonal structure district: SS_A covered a pair of segmented structures located in the core of the field surveyed in 2017; SS_B was the location of similar ordered segmented structures but located on the south side of the main causeway leading from Porta North towards the interior.

Three more complexes were set in the SE sector with SS_C placed at a large structure with possible pyrotechnic installations, located on a promontory overlooking the island's eastern shore and interior; SS_D at a square structure with strong magnetic anomalies, also suspected pyrotechnic installations; and SS_E and SS_ F cover a long building that resembles the segmented buildings in A and B but featuring a semi-circular installation at its southern end. This area is divided into two areas (E & F), each representing a different preservation environment on either side of a modern field boundary that bisects this feature.

3.3.1. Preservation Environment

Most of the area under investigation reported here is under dry famed bush vine cultivation and the maintenance of these fields can influence the position of artifacts at and below the surface in two ways. These first impact near-surface deposits when the vines are planted, as rounded conical excavations at diametres greater than 50 centimetres and extending more than 80 cm below the surface, displacing approximately 0.3m^3 of soil vertically (Fig. 14). These plantings are established approximately every 2.4 metres, as new vineyard row widths are optimized to permit passage by tractor widths and distances between rows at Motya as they have been for the last 50 years as observed in aerial images and surface inspection during the 2017 geophysical survey. This results in a systematic mixing of artifacts from contexts that are less than one meter in depth,

43 Surface collection was assisted by Emilia Bebic, Callie Chen, Sarah Laporte and Vaughn Ortner.

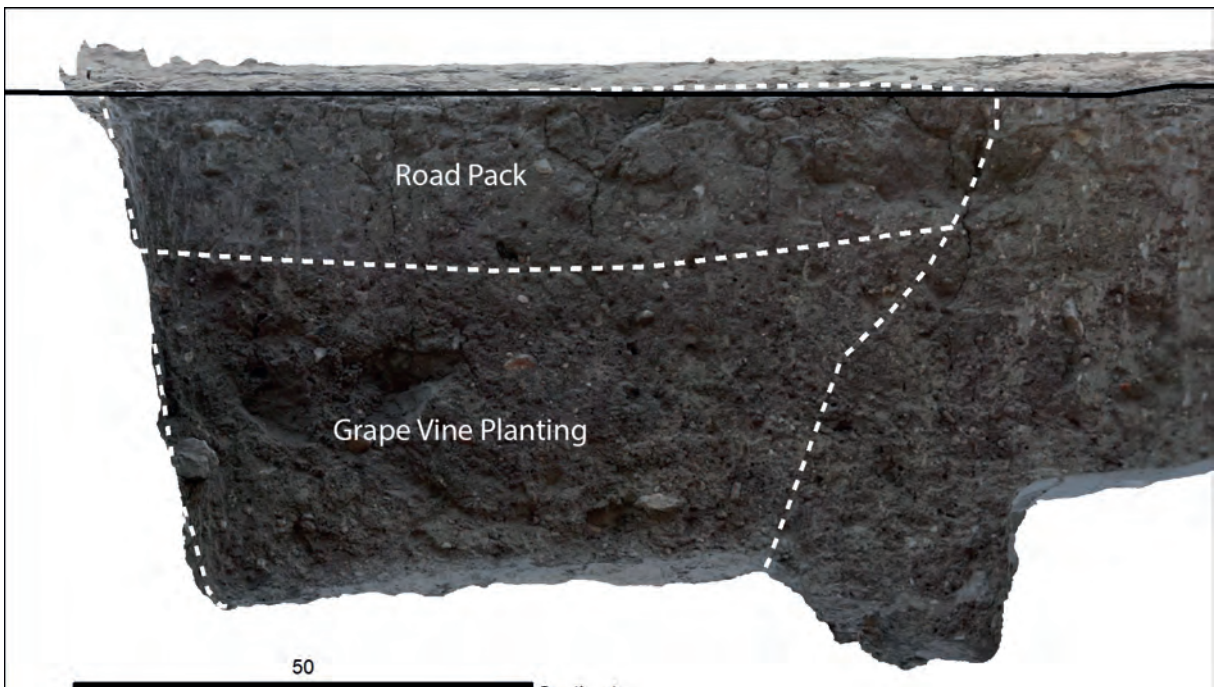

Fig. 14. Orthomosaic of the east section of test trench (T)L2 showing the extent of the pit from grapevine planting.

indicating that approximately 6% the volume of vineyard sediments within one meter below the surface has been churned through planting.

This results in systematic exposure of some deeper contexts across cultivated surfaces. In terms of mixing stratigraphic contexts, this is more significant in some parts of the island site than others. For example, we expect that some untouched deposits may exist near the locations of the ancient fortification walls, possibly because of mud brick or earthen melt from large architectural installations that have now accentuated the topography along the edges of the island and buried in-tact archaeological deposits. However, in the interior of the island, the depths of archaeological deposits can be limited by bedrock elevation where it is sometimes found just 50 centimetres below the modern ground surface. The effects of these plantings here mean that older levels in stratified contexts are likely to have been disturbed and exposed in antiquity as well as through agricultural work in the past two centuries, presenting both an opportunity for older deposits to be observed through surface survey, as well as an indication that archaeological contexts have been disturbed at some depth.

Second, regular, mechanical inter-row tilling distributes surface sediments and exposed artifacts laterally, a factor that has been recognized for some time[44] and verified through repeat survey of sites and landscapes.[45] Inter-row tilling reduces the need for chemical intervention in viticulture as it eliminates competing vegetation and integrates fertilizer with topsoil. This is performed with more regularity as producers prioritize cultivation methods that use limited chemical weed control. At Motya and in vineyards in similar environments, mechanical tilling introduces three different types of mechanical interventions into surface

44 Ammerman 1985; Terrenato – Ammerman 1996.

45 Lloyd – Barker 1981.

sediments, first through the tilling mechanism or disks, second from a weighted bar that is towed behind the tiller to smooth the sediment. Finally, via the tires or tread from the vehicle. Tilling is conducted on a regular basis during the growing season and certainly plays a role in the exposure and movement of surface artifacts. For some sediments, tilling in Sicilian vineyards is documented to displace surface sediments 0.3 metres horizontally on average.[46] We must consider the cumulative effects of regular tilling on surface artifacts, with different influences for surface artifacts located near the centre of the rows as opposed to exposed artifacts sheltered by the grape vines. Consequently, the horizontal provenience of surface artifacts in areas of cultivation must be considered a general rather than a precise location.

3.3.2. Collection Strategy

The regular rows from grape cultivation informed the grid size and orientation for controlled surface collection, as they did with geophysical data collection. In these vineyards, regularly tilled soils are completely exposed between rows of vines spaced at approximately 2.4 metres. During geophysical survey we observed that there was excellent artifact exposure and some correspondence with the features we were able to map. Collection units, spaced on the planting pattern, were laid with RTK GPS at an interval that represented every second row (~4.8 metres).

All artifacts were collected within a 1.2m radius of a point between rows, representing the full span of the soil between vine plantings and covering an area of approximately 4.3m^2.[47] Midway through survey, the density of surface collection units was cut by half so that all the areas could be sampled within the time allotted. In this case, surveyors visited every fourth row as opposed to every second row but maintained the ~2.4-meter unit spacing along rows. Overall, our surface survey represented a 32% sample of the landscapes we visited and covered 654 collection units (Tab. 2).

	SS Dimension in m²	collected area in m²	No. of collection units	No. of sherds	Sherds/ collected area m2	Weight in kg
SS_A	5770.98	1049.2	244	8908	8.49	197,72
SS_B	2830.28	309.6	72	12618	40.76	50,31
SS_C	4608.49	645	150	10881	16.87	97,23
SS_D	1909.72	348.3	81	10211	29.32	44,89
SS_E	1166.42	215	50	5495	25.56	28,92
SS_F	1326.51	245.1	57	11476	46.82	32,95
Total	17612.4	5624.4	654	27766	9.87	452,02

Tab. 2. Sampling statistics for each surface collection area.

3.3.3. Material Culture (LF)

As part of the controlled surface collection in the 654 collection units, a total of 38 stone tools (among which grinding stones, pestles and obsidian blades), 22 terracotta artefacts (mostly loom weights, but also a small plaque with a Gorgon head), 4 metal tools and weapons, 5 mosaic tesserae, 3 fragmentary glass artefacts, some ceramic or metal slags, several roof tiles and 27,766 (c. 500 kg) pottery sherds were collected and processed. Individual sherds (both diagnostic and not) were recorded in relation to their provenance (collection unit) and counted according to ware classes (Tab. 3).

46 Novara *et al.* 2022.

47 In terms of artifact sampling, we chose to collect everything. This sampling method, we feel, has certain analytical advantages over other collection strategies that limit recovery to diagnostics, or chronotypes, and risk missing potentially valuable data.

Survey Area (SS)	Prehistoric	Impasto Ware	PU common Ware	PU Red Slip	PU Painted	P Cooking -pot Ware	G Proto-Corinthian	G Corinthian	G Common Ware	G Black Glaze	G Red Glaze	G Black Figure	G. Red Figure	Ionian	Colonial Gr Common Ware	Colonial Sel Gr Common Ware	Colonial Gr Black Glaze	Indigenous incised	Indigenous Painted	Roman	Modern	Unclear
A	0	9	8038	3	5	3	1	33	109	73	2	0	1	6	420	71	27	0	1	30	15	110
B	0	0	3395	0	2	3	0	3	109	42	3	1	0	1	97	34	19	0	1	3	11	26
C	0	1	6449	1	0	2	0	0	20	43	2	1	1	1	416	61	71	7	0	0	27	29
D	0	0	2692	0	0	11	0	0	99	88	0	0	0	1	94	52	0	0	0	0	10	56
E	0	0	1969	0	0	11	0	0	256	61	1	0	0	0	0	0	0	0	0	0	16	113
F	0	2	1869	0	0	29	1	0	174	45	0	0	0	1	0	3	0	0	0	0	12	260
	0	**12**	**24412**	**4**	**7**	**57**	**2**	**36**	**767**	**362**	**8**	**2**	**2**	**10**	**1027**	**221**	**117**	**7**	**2**	**33**	**91**	**594**

Tab. 3. Sherd counts according to survey unit.

Diagnostic sherds (defined here as all decorated sherds and any rim, handle, or base), 1,718 in total, were additionally fully coded and, when possible, assigned into half-century bins to help visualise the chronological sequence of each survey area. [48] Most of the diagnostics belong to the two main groups of the Phoenician-Punic and Greek pottery, each in turn including several wares.[49] Clearly dominant is the body of material of Phoenician tradition (around 90%) compared to the Greek one, which however remains a constant presence over time until to the end of 5th century BCE, when Italic and regional fine wares gradually replaced Attic productions. Moreover, Roman pottery needed to be added to the two major macro-classes during investigations to accommodate African Red Slip Ware and amphorae of the Late Roman period found during the survey.

In each survey sector, the collected material could be chronologically framed between the 7th century and the 4th century BCE, showing a climax between the 5th and the first half of the 4th century BCE, corresponding to the time of settlement peak of the Punic city and its immediate aftermath (Fig. 15).

No signs of pre-Phoenician presence, as reported immediately to the west, in the area of the so-called acropolis,[50] and along the northern and eastern shorelines,[51] were recorded; while the Late Roman finds (pottery and mosaic tesserae) were detected exclusively in SS_A-B, specifically in the survey units located closer to the Cappiddazzu precinct, where already the existence of a Roman structure was acknowledged (see below).

48 In the final qualitative analysis, only 330 sherds could be traced back to well-known ceramic types that offered a good degree of chronological reliability.

49 Among Phoenician-Punic pottery, we could distinguish between common, Red Slip, Painted and Kitchen Wares. Greek ceramics included Proto-Corinthian and Corinthian, Ionic and Attic Black Glazed Wares. Greek colonial productions were also identified, distinguishing a common 'selinuntina' and a colonial Black Glazed Ware.

50 On the prehistoric settlement at Motya see: Falsone 1988a; Spatafora 1980-1981, pp. 894-904; 2000; Caltabiano 2007; Nigro 2016, with further references.

51 Remains of a circular megalithic structure with *in situ* material have been also recently identified during the Palermo excavation of the archaic necropolis, in one of the two rooms of Tower B4; prehistoric 'grotticelle' tombs are attested on the east coast, below the western chamber of Tower B1 (Nigro 2020, p. 16, with further references).

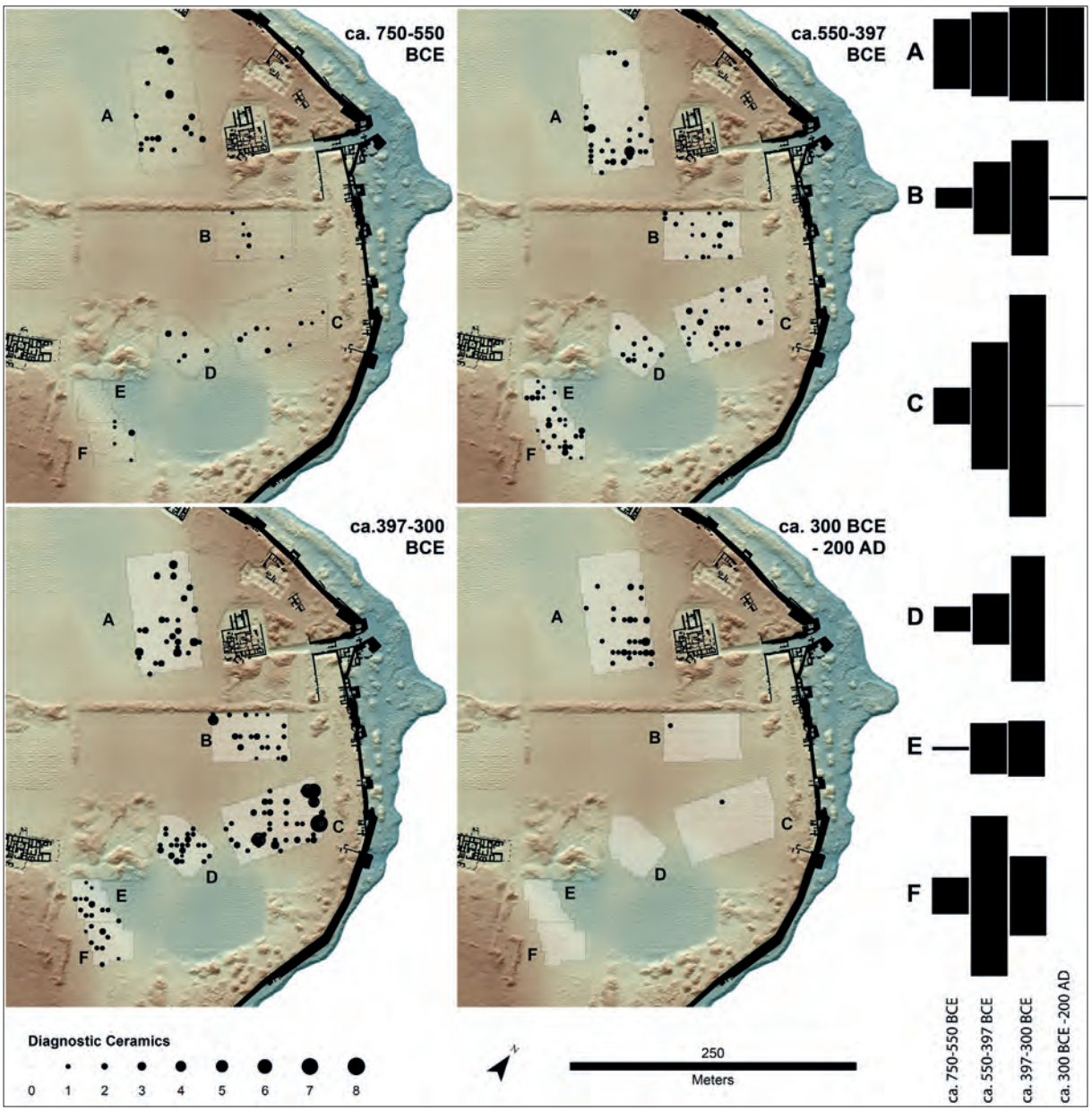

Fig. 15. Diagnostic ceramics from the 2021 surface survey, by period with frequency seriation diagrams for survey area.

The colonial phase (Late 8th-mid-6th century BCE) is sparsely attested on the surface, being more evident in SS_A, and in SS_D. Among ceramics of Phoenician tradition, we recorded a few Red Slip Ware fragments, some cooking pot rims belonging to types 13-15 of Vecchio classification,[52] and several transport amphorae of local production, belonging to Toti's types 1 (Fig. 16, 1), 4 (Fig. 16, 2), 5 (Fig. 16, 3), 7-8 (Fig. 16, 4-5).[53] Imported Greek material include protocorinthian *aryballoi* and *kotylai* (Fig. 16, 6), several

52 Vecchio 2002, p. 210, pl. 8.

53 Toti 2002, pp. 278-282, Pls. 1-6.

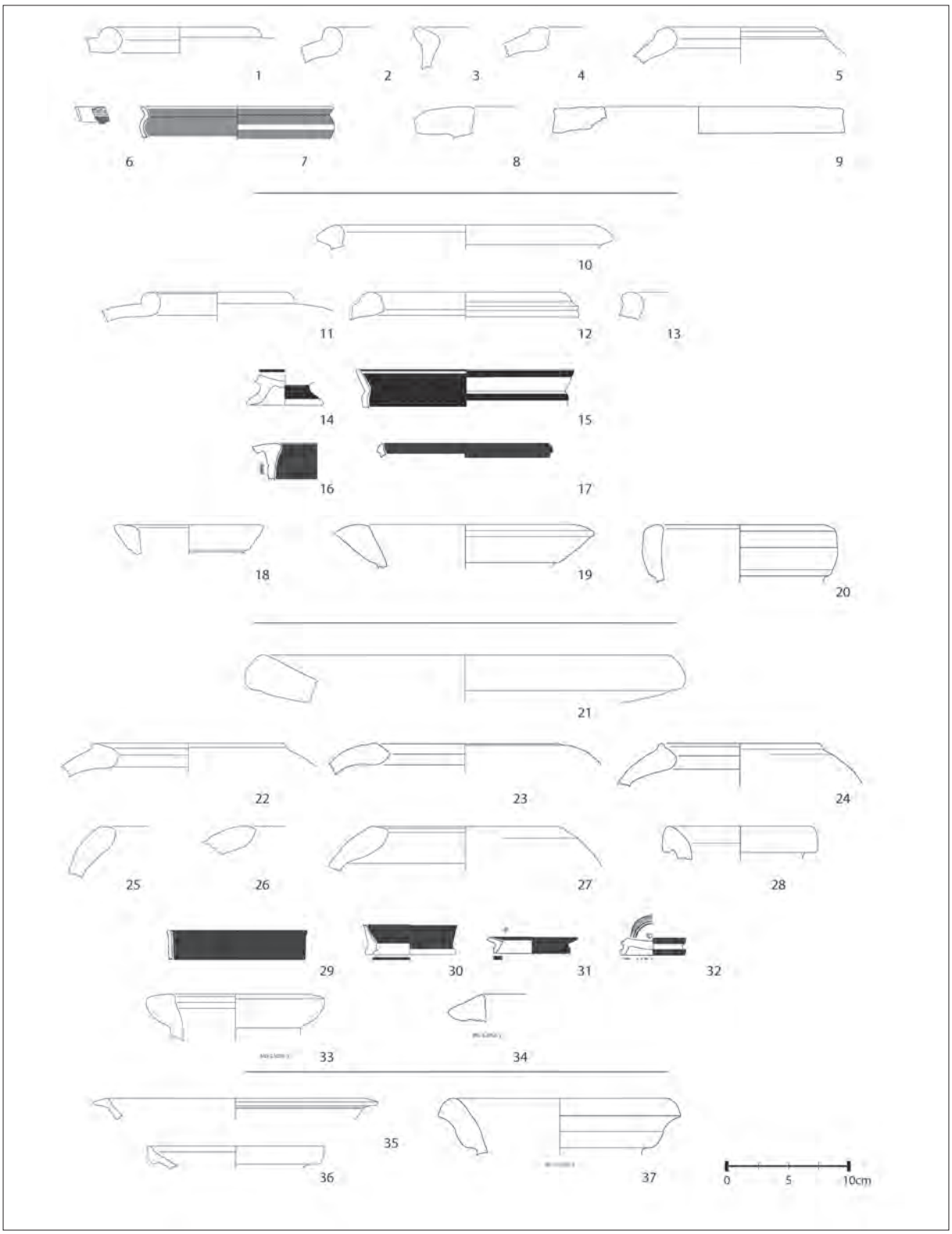

Fig. 16. Pottery from surface collection.

B1 Ionic cups (Fig. 16, 7) and Type A Corinthian Amphorae (Fig. 16, 8-9). A dozen 'impasto ware' (IW) body sherds can also be tentatively attributed to this period.[54]

The body of datable material increases exponentially for the 6th-5th century BCE, when Punic material is mainly represented by cooking-pot and common wares (Fig. 16,10), including several transport amphorae of types 6 (Fig. 16, 11), 9 (Fig. 16,12), 13 (Fig. 16,13) and 14 of Toti's,[55] mostly locally produced.[56] Greek imports of the 6th century BCE occur in the form of B2 ionic cups (Fig. 16, 14-15) and, in limited number, Laconian craters. Attic craters (Fig. 16,16), type C *kylikes*, type A *skyphoi*, stemless cups (Fig. 16,17), and black-glazed lamps begin to appear at the end of the 6th century BCE. Black-figured and red-figured productions are also documented with several type B Corinthian (Fig. 16,18-19), and western Greek MGS II (Fig. 16, 20) amphorae. This phase predominates in SS_F, with over 70% of diagnostics allotted.

There is also a significant amount of material from the Late 5th-4th century BCE, in the years that immediately preceded and followed the Syracusan siege. Apart from a few common ware mortars (Fig. 16, 21), most of the Punic material here is represented by transport amphorae, among which predominate Toti's types 18 (over 70 examples (Fig. 16, 22-24) and 19 (17 examples, Fig. 16, 25-26). As stated before, this production begins already in the late 5th century BCE to become widespread in the period following the destruction by Dionysius of 397 BCE.[57] Also attested are amphorae types Ramon 4.2.2.6[58] and Toti's types 16 (Fig. 16, 27),[59] and 20 (Fig. 16, 28).[60]

Among non-Punic material, black glazed cups of Sicilian or Italic production (Fig. 16, 29-30), several s*kyphoi* and stamped cups (Fig. 16, 31-32) datable to the 4th–early III centuries BCE were also collected. Western Greek amphorae type MGS III (Fig. 16, 33-3,4) already known in Motya until the end of 5th century BCE occurs as well.

There is a lack of clear evidence for Hellenistic and early Roman occupation.[61] This period of abandonment lasts until the 4th – 5th century BCE, when a limited sector of survey SS_A, the closest one to the Cappiddazzu precinct, provided a respectable number of African Red Slip cups, plates and lamp sherds. The production belongs to group D, of which Hayes 58 plate (Fig. 16, 35) and Hayes 99A cup (Fig. 16, 36) have been recognized. Also, a Tripolitanian amphora of the 4th century BCE has been recorded (Fig. 16, 37).

54 In the absence of diagnostic attributes (rims, lugs, decoration, etc..) a closer dating for these body sherds is difficult to achieve. They share fabric attributes with the oldest hand-made cooking-pots or 'pignatte' of the contemporary indigenous productions. On the Motya Impasto Ware (IW), cfr. Orsingher 2013; Guastella 2020.

55 Toti 2002, pp. 278-287, pls. 4, 6, 9-12.

56 Common ware productions feature porous and quite coarse red fabrics (sometimes with gray or sandwich cores), rich in white carbonate inclusions, and a yellow or pinkish slip coating. Archaeometric characteristics of the local fabrics have been as first outlined by R. Alaimo and team (Alaimo *et alii* 1997). For an analysis of the local Motyan production which integrates morphological and archaeometric data, cfr. Bechtold 2015, pp. 58-71; Bechtold – Schmidt 2015.

57 This has been evidenced in 'Zona A' excavations (Famà 2002a, p. 48) and in various other sectors of the island: Orsingher 2011, p. 112-113.

58 Ramon Torres 1995, pp. 194, 405, figs. 56, 163. Cfr. also, Bechtold 2015, p. 51.

59 Toti 2002, p. 288, Pl. 14: 2-3.

60 Toti 2002, p. 295-298, Pls. 20-25.

61 What was recovered was a fusiform Hellenistic unguentarium, familiar to burials of the 3rd and 2nd century BCE in the necropolis of *Lilybaeum* and Motya itself (Sconzo 2016, Fig.13), an amphora of Toti's type 22, a Ramón T-7.4.3.1. and a Ramón 9.2.1.2. from the 3rd - 2nd century BCE.

4. Discussion

The results described above permit a reconsideration of the topography of Motya, expose nuances in its ordered layout, and provide new information about how spaces in the eastern half of the island site were created, used, and transformed through time. In the following sections, we synthesize our results to approach a model for the urban organization of the eastern sector of the island for the four broad phases of occupation with special emphasis on Motya's political and economic peak in the period from the late 6th to the 4th century BCE.

4.1. *The Phoenician Colony (8th-mid 6th century BCE)*[62]

The picture of the pre-Phoenician occupation for our study area remains unchanged from what was built from prior investigations in the 'acropolis' and along the northern and eastern shoreline.[63] Likewise, this research adds little in the way of evidence for intense occupation on this side of the site during the Phoenician colonial phase. Instead, we can support that early Phoenician settlement may have been limited to the south sector of Isola San Pantaleo.[64]

Definitive evidence for pre-6th century BCE built structures was not found in our test trenches set above the westernmost block of the North Gate district, nor is there any indication of a palimpsest evident in the geophysical survey results. This does not preclude that this part of the island was used in some form, but the character of this occupation remains elusive so far. The retrieval of 7th - 6th century BCE Phoenician tableware inside pits carved into the bedrock in two of our three test excavations, (T)L2-3, suggests that there was activity in this area. These pits are similar to those recorded immediately below the southern wings of the monumental building of Area J,[65] and below the private building of Area A, Phase Ia-b (dated to late 8th-7th century BCE).[66] They could indicate that at least part of the island's northeast quadrant was devoid of solid constructions, and the area was used as a peripheral garbage dump. Alternatively, the possibility remains that these scattered pits may be all that is left of a pre-6th century occupation, which was deliberately erased when the new urban plan was established in the mid-late 6th century BCE (see below).

While tantalizing, this last point is not supported by the surface finds. Diagnostic materials from before the mid-6th century BCE are scarce in all the five surface survey sectors (SS), offering no clues into the organization of space in this part of the island that would build on adjacent documented funerary deposits along the northern shoreline,[67] or sacred spaces such as the Cappiddazzu.[68] There is a clear dearth of surface finds that are associated with periods pre-6th century phases and considering the effects on exposure that intensive construction in antiquity and long history of deep plantings and mechanized agriculture that has had on the soils in more recent times, little to suggest that there are significant undisturbed strata that hold them.

There are surely some exceptions to this across the island, most notably the renovation of monumental structures. One such exception exists on a promontory overlooking the island's eastern shore, where a square structure with strong magnetic anomalies in Area SS_D is associated with most of the pottery key types typical of the colonial phase.

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62 Roughly corresponding to Motya phases IV-V of La Sapienza's periodization (Nigro 2018, tab. 1).

63 V. note 50.

64 Famà – Toti 1997; Nigro – Spagnoli 2017.

65 Unpublished.

66 Famà 2002b, p. 41.

67 On the chronology of the archaic necropolis, cfr. Sconzo 2016; 2020, with further references.

68 On the chronology of the Cappiddazzu area, cfr. Tusa 2000; Nigro 2009. On the early colonial settlement of the island, cfr. also, Nigro – Spagnoli 2017, with further bibliography.

4.2. *The Fortified Island (Mid 6th-5th century BCE)*[69]

An ambitious top-down building program was initiated in the mid-late 6th century BCE that coincides with the establishment of a Punic identity for settlements aligned with Carthage in the central and western Mediterranean.[70] At Motya this included the construction of the fortification line, the realization of new temples and public buildings (as the monumental building of Area J),[71] of several workshops,[72] the installation of a paved road connecting the burial spaces and monuments of Motya to the mainland at Birgi, and the establishment of new and extensive residential sections that cover at least a quarter of the island, visible in the geophysical survey data (Figs. 3-4).

The quarters that we have been able to map thus far cover more than 3 hectares and are oriented to a central axis road[73] that anchored the twin sacred poles of the island, the Cappiddazzu to the south and the temple of Baal near the Kothon to the south.[74] Domestic structures begin at the north end immediately adjacent to the Cappiddazzu sanctuary, minimizing open space that may have surrounded earlier foundations. The only clear evidence for an open area is at the back of the cella of the Cappiddazzu sanctuary, where no clear structures were detected by magnetometry, and Palermo University excavations of Area K/K-East demonstrated the presence of a space of at least 23 x 15-meter plaza the sanctuary and the 'Ceramico' workshop.[75]

While similar open spaces of this type have not yet been definitively identified, this plaza is likely one of several small plazas that were distributed throughout Motya's ordered plan. This triangular or semi-circular court is reminiscent of public spaces documented at Kerkouane,[76] Selinus (although later), or even those from Byrsa Hill or Monte Sirai, in line with a pattern of dispersed open spaces in ordered plans proposed for Punic settlements.[77] An 8-meter-wide ring road that follows the contours of the fortification wall likely intersects this open the plaza behind the Cappiddazzu, and such a ring road is similarly recognized as a standard part of Punic city planning.[78]

The most salient feature of this part of the island is the residential area, which is evidence for ordered space, the mobilization of a large labour force, and the deliberate settlement of large numbers of people all of which were likely organized by a central authority. This expansion occurs at the expense of open space available for agriculture and grazing which was presumed to have covered most of the island up to this point,[79] indicating a shift of priority toward accommodating a larger population and demonstrating how closely the island city must have been tied to mainland Sicily following this change. This neighbourhood is currently understood to have lasted a century after its founding in the mid-late 6th century BCE, based on ceramics recovered from paving episodes of the *cocciopesto* alley floors retrieved in our test trenches. This chronology is further reinforced by the dense concentrations of surface artifacts in this area, indicating homogeneous

69 Roughly corresponding Motya phase VI of Nigro's periodization (Nigro 2018, Tab. 1).

70 Bondì 2014, p. 64, with further literature.

71 Falsone – Sconzo 2017.

72 Falsone 1981; 1989.

73 We have decided here to avoid the use of terms such as *plateia* and s*tenopos* for defining respectively the central axis road and its perpendicular streets, as these terms are strictly tied to Greek urban concepts.

74 Nigro 2012, p. 2.

75 Falsone *et al.* 1980-81, p. 880; Falsone 1988b, pp. 13-16, 19-20; 1989, p. 61.

76 The contemporary North African city seems to share with Motya also the general urban scheme, which associates a ring road with an orthogonal structure of the inner zones.

77 Huemer 2021, pp. 145-148.

78 On the ring road, cfr. Falsone *et al.* 1980-81, p. 880, n. 11.

79 Nigro 2017; Moricca *et al.* 2021.

and continuous occupation of all the available space. The situation is the same for the classical period as 5th century BCE materials have an even distribution over all the investigated zones. These phenomena are testament to a nucleation phenomenon which drew people from elsewhere, most probably involving indigenous and Greek immigrants as well.

The establishment of this orthogonal plan and other island infrastructure in the mid-late 6th century is an assertion of top-down authority and a reflection of leaders' organization. The results of the mid-6th century crisis have not gone unrecognized at Motya but have been largely seen through the lens of the development of monumental construction in the vicinity of the Kothon and with the raising of the fortification walls.[80] What has yet to be understood, however, is the extent of the reorganization of space across the island. Conversely, we see some evidence of bottom-up agency in the construction of the individual segments of the houses, as observed elsewhere on Motya[81] and in other settlements the ordered plans.[82] This opportunity for co-creation by new residents, not just with neighbours in adjacent plots, but in a sense with the organizing authority, fostered the development of a civic or neighbourhood identity that is encoded into the built environment.[83]

When we look southward, the situation changes as documented structures are no longer oriented to a grid.[84] Instead, long, segmented buildings face a winding road, and there is the appearance of more open areas perhaps used as gardens, orchards or workspaces dotted with pyrotechnic installations. The homogeneous distribution of both local and Greek, black-glazed pottery on the surface suggests that the entire southern survey area was occupied and presents several possible scenarios. One possibility is that the large multicellular buildings with irregular plans recorded in this part of the island pre-date the construction of the gridded residential to the west but were occupied simultaneously. This is supported by the results of SS_D, which returned a significant number of diagnostic ceramics from the previous phase. If this is true, then we must assume that this sector of the island was not substantially modified and maintained its old layout. Alternatively, these buildings could have been built at the same time and served a different function as indicated by their distinct layout. A third possibility is that these structures are from a later phase, but this seems unlikely since we would assume that this area, if unoccupied, would not have been left open during the intense construction seen immediately nearby.

One interesting feature in this area is the presence of a depression that A. Ciasca hypothesized to be a pond or second Kothon, which was connected to the lagoon until the end of the 5th century BCE when the channel was closed with the construction of a section of the fortification wall (Figs. 1, 10, 4).[85] Surface soils in this area feature fewer artefacts and are remarkably more pale in colour, suggesting that they formed in an anaerobic environment. It is not known if these soils are *in situ* or were placed here intentionally, but the hint of architectural signals and the sharp southern boundary of this depression suggest a more recent origin for this depression.

The process of monumentalization and construction at Motya during this period coincides with or even preceded by some decades the construction of the city walls and should be framed in the wider phe-

80 Nigro 2016; 2020.

81 Famà 2002b.

82 Cahill 2008, p. 202.

83 Smith 2010; also, for Motya specifically, cfr. Bondì 2014 after Tusa 1972, pp. 34-55.

84 There is no evidence for any coordinated plan other than the one we associated with the mid-late 6th century BCE intensification of the island. Note that there would be a strong likelihood that a palimpsest would have appeared in the magnetic gradiometry or perhaps in areas where the coordinated grid did not cover the lower levels.

85 This segment is the only stepped section of the fortification wall, which was thought to have been built with this technique to serve as an artificial embankment for impounded water (Ciasca 1995, pp. 273, 275. Also, Famà 2007, p. 52).

nomenon of refoundation and restructuring seen elsewhere indicated by the establishment of orthogonal patterns involving some of the main Phoenician-Punic sites (Kerkouane and Carthage in the central Mediterranean).

4.3. *Resettlement (4th-3rd century BCE)*

One year after the siege, Motya was reclaimed by Imilcone (Diod. XIV, 55) and apparently continued to be occupied for about two centuries, although it never regained the strategic and economic role it once held. In this phase a second wide-ranging restructuring process occurred, through which the community that remained in Motya showed its resilience and the ability to reorganize, albeit in a more modest form. The island was deprived of fortifications, or at least fortifications were not contiguous. In some places, industrial workshops including kilns were installed in the collapse of the defensive walls.[86]

Evidence for a significant post-Dionysian phase has been widely archaeologically documented within public, sacred areas as well as private buildings.[87] In the eastern sector of the island, the Cappiddazzu sanctuary was rebuilt, with several of its square blocks, heaps of rubble and mud bricks (probably resulting from the clearance of its previously destroyed parts) piled up in a line at the outskirts of the open space located at its back,[88] just in front of the already abandoned pottery workshop of Area K.[89] Likewise, the house block of 'Zona A' (Period IVB-C) was resettled with limited changes in the internal architecture.[90]

Our results substantiate this picture in some respects. The general resettlement of this area is confirmed by the pervasive (30% of collected sherds) and homogeneous distribution of 4th century BCE surface material in all 5 investigated survey units (SS_A-E). Moreover, the magnetic gradiometry results do not show evidence other than the orthogonal plan, which means that if some of these structures were reoccupied, they were not heavily modified or damaged.

The 397 BCE conquest created the conditions for the restructuring and repurposing of formerly domestic and urban spaces. We tentatively frame this phase within the 4th century BCE. It is possible that the numerous circular or irregular magnetic features highlighted by geophysics also belong to this period, as they postdate the original occupation of the structures in which they are situated. This is supported by the large numbers of 4th cent BCE amphorae fragments that we documented in test trench (T)L1 where we verified our interpretation of one of these magnetic features, and it is reasonable that some number of similar magnetic features mapped in this quarter correspond to kilns used for pottery production (in other cases there were certainly furnaces and tannours).[91] Kilns of this type have been documented elsewhere on the

86 Toti 2002a, p. 555.

87 For a review of the post-Dionysian occupation on the island, cfr. Orsingher 2011, with further bibliography. Main areas involved: Zona E (Period IV); Zona A (Period III); Zona F; Cappiddazzu, Phase V; Tophet. Level I.

88 Such earth and stone embankment was also hiding the 'Motya youth' (Falsone 1988b). Palermo University excavations in 'Zona K and K-Est' have allowed dating it (Falsone 1988b, Pl. XVII: 1-3; Falsone *et alii* 1980-1981, pp. 878, 880; also, Spanò Giammellaro 1989, p. 40; 2000, p. 1378, Fig. 2) to the first quarter of the 4th century BCE, thanks to the presence on its top of two surfaces/floors associated with mid-4th century BCE materials (Falsone 1988b, p. 16, Pl. XVIII: 1-2). It is therefore highly questionable L. Nigro's recent statement that this debris had been dumped in front of the Cappiddazzu sanctuary as late as the 2nd century BCE as part of a lime factory (Nigro 2023).

89 Likewise in a state of disrepair was the monumental Building J, which – after the initial structural collapse during the Dionysian siege – had undergone a slower process of demise.

90 Famà 2002b, 48; Famà – Toti 1997, p. 113.

91 SS_A features the largest quantity of 4th century BCE amphora fragments, most of which seem to be produced locally. This figure indicates, as Famà (2008, p. 54) already pointed out, a sharp decline in imports of wine and oil and a shift toward the export of local products.

island and date to the time between the second half of the 4th and the beginning of the 3rd century BCE,[92] suggesting a remarkable economic and productive recovery of the city after the destruction.

4.4. *Revival (4th and 5th centuries BCE)*

We close here with a short comment on the Roman and Byzantine occupation and the re-use of the ruins of the Sanctuary of "Cappiddazzu" during the Roman Period. The near complete absence of materials from the Hellenistic and early Roman ages, apart from the recovery of a handful of examples, is a significant yet unsurprising pattern. This sector of the island was apparently abandoned until the 4th-5th century BCE, when the area of the Cappiddazzu precinct was reoccupied, as confirmed by the presence of Late Roman surface material in east side of SS_A.

4.5. *Summary*

Our limited soundings combined with the distribution of ceramic material on the surface show that, at least on the east half of the island, the pre-6th century landscape was either relatively undeveloped or largely erased when an orthogonal plan was established at Motya. This orthogonal plan was the foundation for dense ordered spaces that are thought to have been primarily domestic in use, and there is positive and ample evidence in the surface finds and in test excavations for the intense occupation of Motya during the 5th century BCE. Evidence for settlement following the 397 BCE conquest is found near the centre of the island ('Zona A') northward (North Gate district). After this phase, there is a distinct lack of material evidence between the 3rd century BCE and the 4th century BCE, suggesting that there was a hiatus, at least on this side of the island. The latest evidence for settlement in antiquity includes the Late Roman settlement in the vicinity of the Cappiddazzu.

5. Continuity, Change, and Urban (re)Construction

As described above, intensive urban survey supported by targeted excavation has produced a more refined history of spatial and temporal changes in the urban fabric of Motya. Furthermore, these results push us toward broader reflections on how we reconstruct the histories of complex urban sites. In the case of Motya and similar urban environments, we suggest that continuity has been emphasised in reconstructions of Motya's history, with a focus on monuments and ceremonial spaces. Phoenician identity and tradition was encoded in the architecture and acted as a structuring influence on the Punic city centuries after the founding of the settlement. Specifically, at Motya, we see a connection to the past in the progression of the development of temple buildings in the south of the island and in the Cappiddazzu.[93]

Continuity can be observed not only in these structures themselves, but in the temporal development of the site as key landmarks at Motya were deliberately preserved through time and anchored in new developments. The foundational position of the twin poles of the Kothon precinct and Cappiddazzu in Motya's urban planning show that they were central to the identity of the community and suggest that the ideology that they represented was valued, and perhaps used to legitimise the political authority who reorganized Motya in the 6th century BCE.[94] Whereas an urban grid was still not totally understood to have been such an influence on the island's appearance, we now know that the city's transformation in the mid-late 6th

92 Kiln M58, located along the northeastern coast of the island, within the wall near the North Gate was active in production of type T-4.2.1.4/1.7 amphorae: Toti 2002b, pp. 565.

93 Nigro 2009; 2012; 2015; Tusa 2000.

94 Alcock 2002; Van Dyke 2003; Johnson 2013, p. 15.

century was not limited to the expansion of isolated monuments but rather included a massive rewriting of the landscape for significant parts Isola San Pantaleo. Based on our results here, this coordinated plan was accompanied by a massive increase in population, that persisted for approximately one century.

Our intensive investigations, including geophysical survey, surface collection, and targeted test excavations, reveal fine temporal changes in the demography, economy, and appearance of Motya that were heretofore not known. Investigations at the scale of households, gardens, and fields have the capacity to capture changes in a population and land use where continuity is found at the highest levels of social organization.[95] This can be important to define a Punic identity, if one existed at all, since changes at the scale of individual buildings and overall urban environment could be one aspect. Indeed, for some, features like the ring road, distributed small plazas, and a coordinated plan suggest a distinctly Punic, rather than a Phoenician ideal for urban organization.[96]

Moreover, in the fields and houses, the rhythms of change and transformation can be more rapid and must be responsive to more immediate needs and can capture the agency of people who live below or outside institutions of order. The approach we have taken here can help to mitigate bias toward temporal and cultural continuity that may spring from an emphasis on monumental structures as a source of data in understanding archaeological cityscapes and landscapes.[97] This research was able to record a heretofore unrecognized restructuring of urban space that reflects both top-down and bottom-up decision-making at a spatial and temporal scale that was not captured in the chronologies of persistent monuments on the island.

This should not be taken as a criticism of the hard work required for the development of the current chronology for Motya or other complex urban sites, but recognition that the time is ripe for an intensive look at changes in landscape and households in Punic urban environments. In other words, this is an example of the tension between archaeologies of continuity and archaeologies of change and the types of data that might influence these interpretations. The interaction between the slow tempo of change for monuments and rhythms of urban and domestic change is critical to understanding the process of hybridisation at all scales, which are the material evidence for the interactions between the inhabitants of a multicultural population within the framework of a Punic urban environment.

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95 e.g., Herrmann 2011; Marom – Herrmann 2014; Wynne-Jones *et al.* 2021.

96 Citations that highlight the incorporation of Hellenistic elements, C9 sanctuary for example also see Spagnoli 2019, p. 65. For 'Punicity' in urban plans see: Fumadó Ortega 2013; Bondì 2014; Huemer 2021.

97 This emphasis on monumental urban installations can be considered a parallel to the broader urban bias in Phoenician-Punic archaeology e.g., Spanò Giammellaro *et al.* 2008.

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