7. The Magoula Makrychori 3: Pottery and small finds from the Neolithic and early Chalcolithic periods

Lea Hüntemann

7.1. Introduction

The following study will be concerned with the creation of a model of the relative chronological sequence at Makrychori 3, a magoula situated at the north-eastern outskirt of Thessaly, in a basin encompassing several magoules and flat sites. The aim of this study is to present the surveyed material, implement the magoula in the general working area defined by the basin east of Mt. Ossa, and to determine possible relationships with neighbouring sites and regions. To achieve this, Makrychori 3 will first be contextualised with the natural environment of Thessaly and its chronology, to set the framework for this study. A short account of the relevant previous research in this field will also be given. As this research is part of a bigger project, *Das prähistorische Thessalien: mobile und sesshafte Gemeinschaften südlich des Olymp* by Dr. Agathe Reingruber, funded by the German Research Foundation and in cooperation with the Greek Archaeological Service in Larissa, Dr. Giorgos Toufexis in particular, the methods used for this are in accordance with the methods applied to the project in general. To determine the relative chronology of this site, the pottery and small finds were studied intensively, determining the different styles, technical aspects (as far as possible) and particularities of the individual finds. The results will then be implemented into the existing relative chronology through comparisons with published material from the region and will also be corroborated with the absolute chronological findings from recent years.

The analysis of the material will show that Magoula Makrychori 3 was likely settled from the early Middle Neolithic (MN), probably even from the late Early Neolithic (EN), until the Early Chalcolithic (ECh). Some uncertainties regarding the beginning and end of the settlement will remain, as the limited material does not permit more concrete results. However, this study shows that reliable, if preliminary, results can be obtained through the systematic collection of surface material and detailed analysis. The results will also show that the magoula forms a link between its neighbouring sites as well as the two regions on which it borders. In a more general reflection, this study will furthermore attest to the applicability of the Thessalian relative chronology, as the results from this analysis generally fit the model developed through countless bigger and smaller studies concerning the materiality of the prehistory in Thessaly.

7.2. Geography and Chronology

Makrychori 3 lies in the northeastern part of Thessaly, at the foothills of Mount Ossa. During surveys for this project, it became evident that this landscape encompasses two separate basins with independent catchment systems[1]. Both basins cover a landmass of roughly 85km^2, spanning between the modern towns of Makrychori in the northwest and Cheimadion in the southeast, and they are separated by an elevation of 104 masl (Fig. 7.1). Within this landscape, the northern basin of Elateia is part of the modern catchment area of the river Pinios, separated by its southern tributary, the river Kalamitsa, and the hill Douramani into the subbasin of Makrychori (west of it) and Elateia (east of it) – compare Chapter 3, Figure 3.18. Interestingly, the prehistoric sites in this basin all lie above 60 masl and towards its southern end, alluding to the hypothesis that in its northern part, a standing body of water might have covered the area at 60 masl[2]. Reconstruction of the rivers or lakes within the basin was a core question in the project, since nowadays most waterways besides the river Pinios have dried up and are only visible in some places (cf. Ch. 3 and 4). One of the main rivers in the basin of Elateia would be Kalamitsa, which formerly collected the water from both sides of the basin, springing from rivulets and tributaries

[1] Reingruber et al. 2024, 44.

[2] Grundmann 1937, 53, Taf. 37; Reingruber et al. 2024, 49.

Publiziert in: Reingruber, Agathe; Toufexis, Giorgos (Hg.): Siedlungsdynamik in den Becken von Sykourio und Elateia, Nordost-Thessalien, in prähistorischer Zeit. Ergebnisse der archäologischen, geomorphologischen und geophysikalischen Untersuchungen, Heidelberg, Propylaeum, 2025 (Prähistorische Archäologie in Südosteuropa, Bd. 34). DOI https://doi.org/10.11588/propylaeum.1583

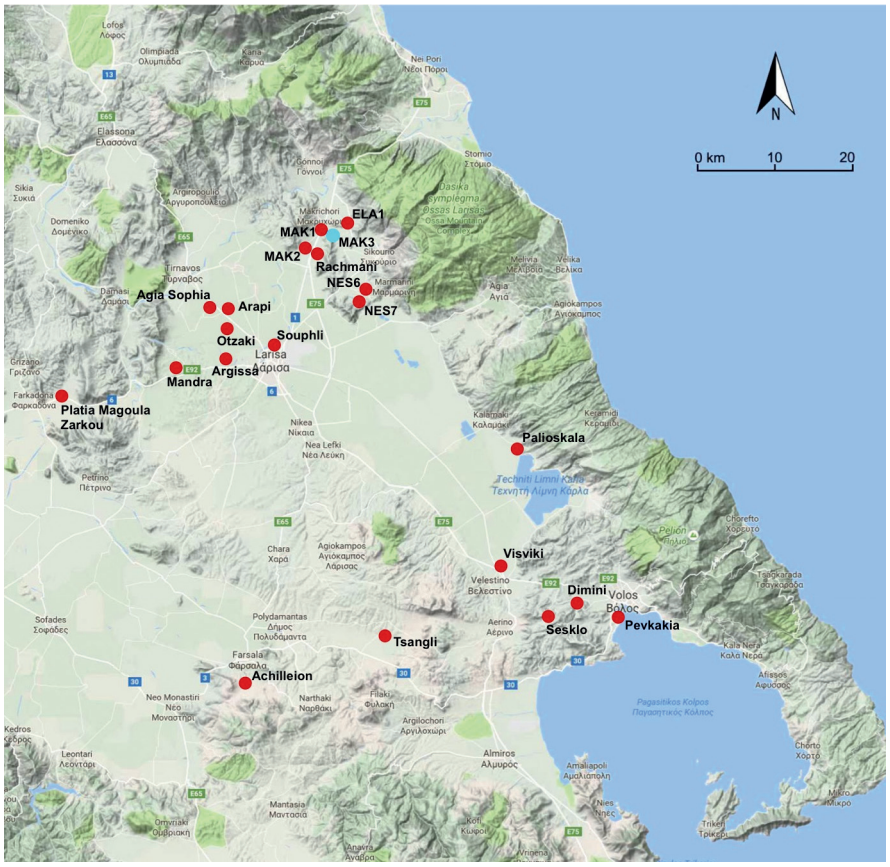


Fig. 7.1. Map of Thessaly, focused on eastern Thessaly and the basins of Elateia and Sykourio including all Thessalian sites mentioned in the text. Marychori 3 is highlighted in light blue.

in the hills, and emptied into the Pinios, but this stream has since dried up[3].

In total, the basin of Elateia measures roughly 43,2 km^2, 9 km north to south and 4,8 km east to west[4]. A total of fifteen sites on which Neolithic and Chalcolithic material was evidenced were localised in both basins, two more sit on the western edge of the hills forming the border between the basin and the plain (Fig. 7.1). These are the magoules Makrychori 3 at the foot of the hill Sigourotopi and Makrychori 1[5] at the foot of the Douramani hill. Their distance is of merely 1 km and together they mark the western entrance to the basin. Five other sites, Elateia 1–5, all of them flat, are located roughly 3,5 km east, and based on the materials collected from Elateia 1 and 2, they were probably coeval with Makrychori 3. The relative chronological examination of Makrychori 3 will therefore clarify the link between these and neighbouring sites and determine the position this magoula might have had in the prehistoric landscape.

The reconstruction of this prehistoric landscape is directly connected to the development of the chronology since the natural environment ultimately influences the conditions of the social environment. Therefore, the exact chronological sequence of the sites will mirror the conditions they existed in, creating an individual sphere for every single site. The factors affecting this sphere will be visible in the material recovered from the site. The chronology of the Neolithic and Chalcolithic in Thessaly has been researched since the early 20th century, starting with the first relative chronological observations by Christos Tsountas (1908) and Wace and Thompson (1912), which were refined in the ensuing years and eventually

3 Reingruber et al. 2021, 4.
4 Reingruber et al. 2021, 3.
5 The edge of this magoula was excavated by Giorgos Toufexis – comp. Chapter 6.4 and Toufexis 2017, 125–193.

Absolute Dates	Periodisation
6500/6400–6000/5900 calBC	Early Neolithic (EN)
6000/5900–5600/5500 calBC	Middle Neolithic (MN)
5600/5500–5000/4900 calBC	Late Neolithic I (LN I)
5000/4900–4600/4500 calBC	Late Neolithic II (LN II)
4600/4500–4300/4200 calBC	Early Chalcolithic (ECh)
4300/4200–3700/3600 calBC	Middle Chalcolithic (MCh)
3700/3600–3300/3200 calBC	Late Chalcolithic (LCh)

Tab. 7.1. Absolute chronological dates and archaeological phases for Thessaly (modelled after Tsirtsoni 2016, 454, Tab. 1; Reingruber et al. 2017, 50, Tab. 5; Reingruber this volume, Tab. 6.30).

reinforced by absolute chronological findings (see Ch. 8.3) (Tab. 7.1). Following the widespread acceptance of C^{14}-dating and the development of more reliant technological means which needed less material for concrete results, the detailed system of relative chronology was substantiated in some parts, but also contested in others[6]. This has led to new discussions and considerations in an attempt to bring both findings together. Yet, the chronological sequence in Thessaly is still heavily reliant on the accuracy of relative chronology, as there is not enough absolute chronological data to adhere to C^{14}-dates alone[7]. The same phenomenon can be observed in other parts of the Aegean and the Balkans[8]. The present study will primarily be concerned with the Thessalian Neolithic, the relative chronology of which is comparatively certain, and the ECh, which is still heavily contested. The developed model for the relative chronology of the site Makrychori 3 will then be implemented into the absolute chronological system devised by Reingruber (Ch. 6.4.).

The pottery categories of the Thessalian Neolithic have been studied intensively and the numerous analyses have shown that the pottery sequences themselves as well as their development can be considered both spatially and temporally consistent[9]. The EN is defined by early painted pottery, mostly red paint on a buff ground, and bichrome burnt black-topped pottery[10]. Impressed pottery occurs since the late EN (EN III). Following a long discussion about the beginning the of Neolithic itself and the conditions under which it began – mainly the existence of an autochthone Neolithic development – the beginning of the Neolithic in Thessaly was determined to be 6500 calBC[11]. The MN can be characterised by a general continuation of styles from the EN, but also the introduction of new defining styles for this period[12]. In terms of absolute chronology, the transitional phase between the EN and MN was determined to be between 6000 and 5900 calBC based on absolute chronological dates from Otzaki and Achilleion[13]. Nonetheless, this transition can as of now not be sufficiently explained in neither absolute nor relative chronological terms. The current duration of the MN is thought to be around 400 years (6000 to 5600 calBC)[14].

The Late Neolithic (LN) is divided into an earlier and a later phase[15]. The terminology used to denote this division differs, this study will adhere to the more commonly used Aegean terminology which denotes the earlier phase as LN I and the later phase as LN II[16]. The LN I phase is more commonly named after three distinct eponymous sites used to describe pottery styles: Tsangli, Larissa, and Arapi. The sequence of these styles was debated for a long time before stratigraphical information on this was obtained from Platia Magoula Zarkou[17] (see Ch. 6.1.1.1). The transition from earlier to later LN is poorly attested due to a lack of organic material from the excavations in the mid-20th

6 Tsirtsoni 2016, 14.
7 Toufexis 2016; Reingruber et al. 2017, 49.
8 Tsirtsoni 2016, 14–15.
9 Pentedeka 2017a, 134; Pentedeka 2017b, 340.
10 Alram-Stern 1996, 121.
11 Reingruber et al. 2017, 39, Tab. 5.
12 Alram-Stern 1996, 135.
13 Reingruber et al. 2017, 43.
14 Reingruber this volume, Ch. 6, Tab. 6.30.
15 i.e., Bonga 2016; Tsirtsoni 2016, 21.
16 cf. Tsirtsoni 2016, 19, Tab. 1.
17 Gallis 1987.

century[18], but was absolute dated to the beginning of the fifth millennium (5000 to 4900 calBC) based on dates from Mandra[19]. The LN II is generally regarded as the peak of Greek Neolithic pottery by many[20]. Its pottery is divided into three styles first identified at Otzaki Magoula[21]. Despite the clear distinction between the three different styles, an actual chronological distinction based on C^{14}-dates or stratigraphy was not possible, neither at Otzaki nor Dimini[22]. Only following the excavations at Mandra in 1996–1998, the absolute chronology of this phase was refined when data collected from this site was evaluated[23]. The radiocarbon dates allude to an end date between 4900 and 4700 calBC for these phases[24]. Compared with recent radiocarbon dates from other sites, the LN II is currently expected to have lasted from 5000 to 4600 BC[25].

An even more contested period is the Chalcolithic. This period has been regarded as a plethora of things throughout the history of archaeological study in Greece, as part of a Final Neolithic (FN), as a transitional period between the LN and Early Bronze Age (EBA) or, more recently, as a standalone period. Due to limited published material, this phase is characterised to a lesser extent than the Neolithic phases, although a few distinctions can be made. The painted pottery of the ECh follows the LN in terms of patterns, yet the colour and painting technique changes[26]. The Chalcolithic is also characterised by a noticeably coarser ware than in earlier periods, which will be described in more detail in the following sections[27]. The absolute chronology of the entire Chalcolithic, also referred to as "the 4th millennium problem" in the Aegean and the Balkans, is still unresolved[28]. In terms of material culture, the transition from Neolithic to Chalcolithic is considered quite smooth. This was observed for example at Pevkakia and Otzaki Magoula, where LN pottery styles continue into the ECh and consecutive pottery sequences have been identified[29]. Yet, the transition is hard to grasp[30]. Missing C^{14}-dates are also a problem in this period, and since only a few inventories are available, the perception of this phase is vague. Following sequence of the Chalcolithic has been suggested: the transitional phase from the LN to Chalcolithic begins in 4600/4500 BC and the ECh lasts until 4250/4000 BC[31]. The Middle (MCh) and Late Chalcolithic (LCh) probably ran from ca. 4250/4000 to 3700 calBC and 3700 to 3300 calBC, before transitioning to the EBA[32]. The site of Makrychori 3 will subsequently be analysed according to these parameters and integrated into these existing models as best as possible, to embed the findings from this study into the general landscape of Thessalian archaeology.

7.3. Research history

Despite the large amount of research in Thessaly in comparison to other regions[33], Makrychori 3 has only been mentioned passingly in other studies and until this project has only been prospected once in the 1960s, when David H. French was cataloguing the Thessalian archaeological sites for his dissertation. Unfortunately, French's dissertation has never been published, but it was integrated into Paul Halstead's dissertation from 1984, where he catalogues Makrychori 3 as number 283 of 682 Neolithic and Bronze Age sites in Thessaly[34]. Interestingly, Halstead catalogues the site as "Makrychori 2", although this site can be found further west, across the modern E75 highway. He dates it from the EN to the LN – probably based on the pottery collected by French. The next mention of the site, this time as "Makrychori 3" can be found in Gallis' Atlas from 1992, a compilation of all prehistoric settlements in eastern Thessaly. Regardless of the change in number, both Halstead

[18] Reingruber et al. 2017, 45
[19] Tsirtsoni 2016, 19, Tab. 1; Reingruber et al. 2017, 45–46.
[20] i.e., Bonga 2016, 52
[21] Hauptmann 1981, 7–8
[22] Reingruber et al. 2017, 45–46.
[23] Toufexis 2017, 44–45.
[24] Reingruber et al. 2017, 45–46.
[25] Tsirtsoni 2016, 454, Tab. 1; Reingruber et al. 2017, 50, Tab. 5.
[26] Schachermeyr 1991, 49.
[27] Hauptmann 1981, 131; Weißhaar 1989, 21.
[28] Tsirtsoni 2016, 14.
[29] Furholt 2017, 112.b
[30] Tsirtsoni 2016, 26.
[31] Tsirtsoni 2016, 454, Tab. 1; Reingruber this volume, Chapter 6, Tab. 6.30.
[32] Tsirtsoni 2016, 454, Tab. 1; Reingruber this volume, Chapter 6, Tab. 6.30.
[33] Furholt 2017, 114.
[34] Halstead 1984, Tab. 6.1, No. 283.

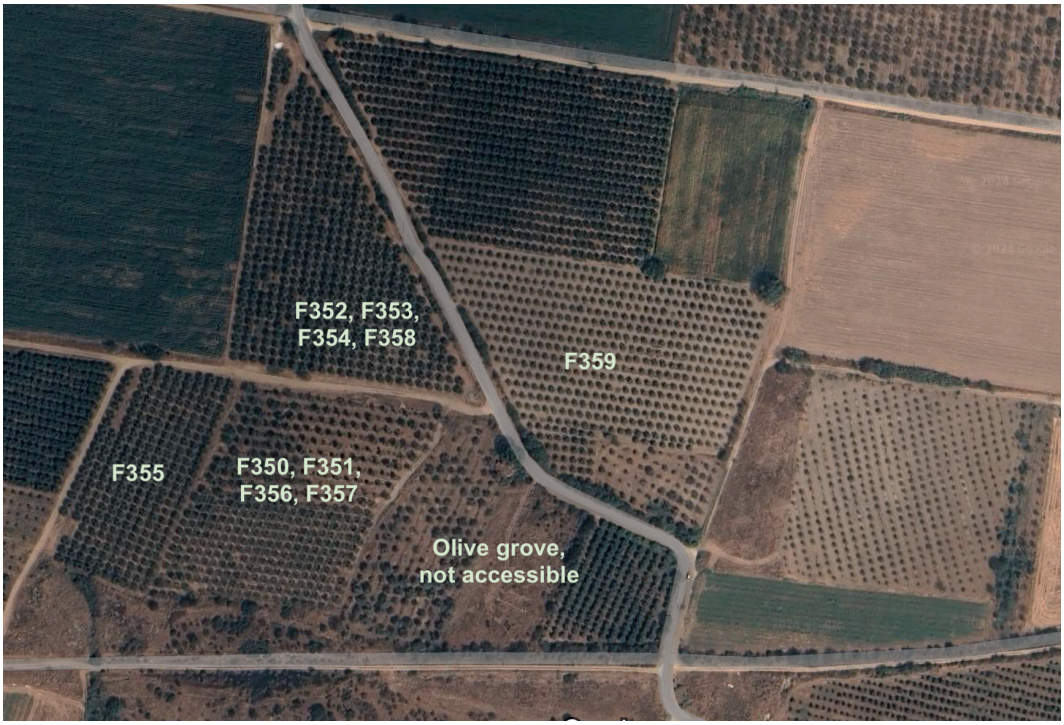


Fig. 7.2. Satellite image of Makrychori 3, the position of the surveyed fields is indicated. (© Google Maps 2023).

and Gallis mean the same site; this becomes clear as Gallis specifically mentions both the coordinates and the number Halstead has used (Nr. 283). Gallis also mentions its Greek name, Μάγουλα Σιγουροτόπι (Magoula Sigourotopi, meaning "safe place"), which refers to the eponymous mountain at which foot Makrychori 3 lies[35]. In the Atlas, the site is described as very flat, standing only one meter above the ground and being 150 m in diameter. Both Halstead (1984) and Gallis (1992) claim to have observed pottery dating from the EN to the Bronze Age. The site was not mentioned again, until now.

7.4. Methods

This study will primarily focus on the construction of a model to outline the probable relative chronology of Makrychori 3, based on the pottery and small finds collected during the campaign in 2018. A small number of sherds collected during D. H. French's survey in the 1960s will also be considered.

The magoula was surveyed in 2018, for which it was categorised into ten units (F350 to F359) of approximately the same size, all 16 m wide and up to 60 m long, with 4 m distance to each other.[36] Any decorated sherds and small finds were bagged separately for further analyses. The measurements of the field units and exact positions of the finds were recorded using handheld GPS devices. Following the survey, Amelie Mohrs (M.A.) combined the coordinates in GIS and created several maps denoting the different positions and quantities of sherds and small finds (compare Figs. 7.3–7.5.

The team prospected the area on the 2nd and 5th of November 2018[37], during which the visibility on the fields varied starkly, depending on their last date of ploughing. Most of Makrychori 3 nowadays serves as a field for almond trees (Fig. 7.2), which are ploughed at different intervals, depending on

[35] Gallis 1992, 144.

[36] The orientation of the fields followed the direction of the planted rows of almond trees and the division of the area by dirt roads, the survey being thus adjusted to the surface conditions and not the other way around.

[37] The weather conditions were favourable on both days, sunny on the 2nd of November and a little cloudy in the 5th.

Form (Description)	Form (Type)		Form Description)	Form (Type)
Simple bowl (closed)	T11–T12	vs.	Simple bowl (open)	T21–T23
Structured dish (closed)	T14–T15	vs.	Structured dish (open)	T24–T25
Jar (with neck)	T13, T16	vs.	Hole-mouthed jar	T17
Simple ring base	T41	vs.	Simple flat base	T42
Pierced lugs	T62–T63	vs.	Handles	T64–T65

Tab. 7.2. Illustration of the system used to differentiate technological differences in pottery (modelled after Reingruber et al. 2021, Taf. 2).

their age. Therefore, during the survey some of the fields had good visibility. Although the frequent agricultural activity potentially harms the finds underneath, so far there has been almost no deep ploughing used in Thessaly and therefore the sites are relatively safe.

The finds collected during these two days were brought to the Diachronic Museum of Larissa, where they are still stored today. The pottery was reviewed field by field, starting with F350. First, the bags of pottery were weighed, to determine the total weight of all sherds and weight of sherds by field. Afterwards, the pottery was sorted into categories: undiagnostic sherds, diagnostic sherds, and decorated sherds. All sherds were recorded statistically, according to the colour of their outside surface, position on the vessel, and possible decoration. Specific categories such as "Worn/Rolled" were also considered for sherds which had obviously undergone various depositional processes and could not be characterised otherwise. Only hand-formed pottery was recorded and later analysed; wheel-thrown pottery was sorted out. For body sherds, only the colour of their outside surface was recorded as well as possible slips. Diagnostic sherds were categorised into rims, bases, lugs, and handles, with an unspecified category added for possible outliers which could fit into neither category. The diagnostic sherds were then further classified based on the system created by Reingruber (cf. Tab. 6.1–6.5), to ensure Makrychori 3 would be analysed in the same way as the other sites reviewed in the overall study. Only few adjustments were implemented, related to surface colours and specific shapes found at this but not the other sites.

This classification system broadly defines the different vessel shapes (Tab. 7.2). Rims have been categorised into closed (T10–T18) or open vessels (T20–T28), bases have been categorised as ring bases (T41), flat bases (T42) and massive bases (T48), and jointed features were divided between lugs (T61), knobs (T62–T63), handles (T64–T65, T68), and handle grips (T66–T67). As lugs and knobs are also regarded as decorative features, they will be analysed as decorative pottery. To ensure the differentiation of all potentially relevant chronological information, they system was expanded to describe the shapes, sizes, and the type of the lips (cf. Tab. 6.4).

The decorated sherds, whether diagnostic or not, were then processed further. Due to the condition of the sherds upon discovery, not all decorations were recognised before washing and did not receive an individual coordinate. Once all decorated sherds from a respective field were identified, they were individually numbered based on their field and given a consecutive number (i.e., F350-K1). To catalogue all individual decorations and types, the pottery was drawn, recording the profiles and outlines. The analysis of the sherds included surface colours both in- and outside, surface treatments, and any visible changes due to secondary taphonomic processes. Three kinds of decorative styles were noted: negative decorations, such as impressions or incisions, colour applications, and positive decorations, such as lugs or knobs[38]. Following the drawing process, the best-preserved sherds were selected for professional photographing, although all chronological categories were regarded with at least one specimen.

After the formal analysis of all sherds, the small finds were recorded in a similar manner. Due to their noticeable form, all but one small find was already recognised in the field and are featured in the GIS. The small finds were characterised into groups of figurines, jewellery, and stone artefacts,

[38] Reingruber et al. 2021, 8.

based on the materials used. The stone artefacts were further split into polished and chipped tools. In this study, only the polished tools will be presented. The chipped tools were analysed by Dr. Petranka Nedelcheva (cf. Ch. 10.2). All finds were photographed professionally by Giorgos Dallas, photographer at the Ephorate and Diachronic Museum of Larissa. The drawings were sent to Angeliki Chalkia (M.A.), who digitised the profiles and outlines of all sherds, and reconstructed those sherds where more than 5% were preserved[39]. The sherds and small finds were grouped according to their chronological position and combined in ten plates, included at the end of this study. The relative chronology was determined through comparisons with published works, to ensure a precise integration into the existing framework for the Thessalian Neolithic and Chalcolithic.

7.5. The site

7.5.1. Size and location

Makrychori 3 is located 1.8 km from the national road from Larissa to Thessaloniki and is surrounded by an asphalt road leading to Sykourio. Several footpaths cut through it (Fig. 7.2). In its direct proximity lie two more Neolithic sites, a magoula, Makrychori 1, and a flat site, Elateia 1. Rachmani magoula is located a bit further to the south on the national road on its eastern side (Fig. 7.1). Due to its central position at the western entrance to the basin, Makrychori 3 can be regarded as a link between the basin and the plain. Although the magoula has been surveyed before in the 1960s, these first reports and the condition of the magoula in 2018 differ vastly. Gallis[40] describes it as measuring 150 m in diameter and 1 m in height, with finds ranging from the EN (Proto-Sesklo and Pre-Sesklo) and LN (Arapi) to the Bronze Age. In his observation, the site is almost "invisible"[41]. Halstead[42] describes the size of the mound as 0,8 ha and 5 m in height, showing that the observations vary significantly.

During the survey in 2018, the height of the magoula was observed to be 3.7 m and clearly visible in the landscape. Prehistoric finds appeared between 77 and 80.7 masl in an area of *ca.* 100 x 100 m (Fig. 7.3). Finds in general covered a larger area of roughly 150 m in diameter (Ch. 2, Tab. 2.3). Unfortunately, the easternmost part of the magoula could not be surveyed because of a fenced-off grove of olive trees, rendering a little less than one third of the magoula inaccessible (Fig. 7.2). Adding this section to the map of the site it may add to almost 3 ha.

The soil is sandy-loamy, fine-grained, with many different sized rocks. Only F359 differs from the other fields as it is of much lower elevation and darker in soil colour. Three fields, F355, F357, and F359 served as control fields to determine the limits of the magoula. Despite the excellent visibility due to recent ploughing, almost no finds were collected from F359. During a brief visit in 2021, the differences in vegetation cover became quite clear: the fields were not ploughed and there was much less visibility than in 2018.

7.5.2. The materials from Makrychori 3

The sherds and artefacts analysed for this study are those collected during the survey in 2018, of which some were collected before the final designation of the fields—these are labelled "stray finds"— and those collected during French's survey in the 1960s, which were labelled ATAE134-MAK3, according to the number Gallis assigned to the magoula[43]. There were a total of 1814 sherds collected in the two days of survey, amounting to 41.91 kg (Tab. 7.3). A relatively small amount of these sherds was sorted out in the analysis, 4% (n=74) in total. 88% of those sherds (n=65) belong to F355 and they were sorted out because they were deemed younger than the Chalcolithic. Subsequently, only six prehistorc sherds from F355 were included in the evaluation, the others were considered as part of Transect 8 (TRA8), which was surveyed

[39] The decision was made to reconstruct sherds with at least 5% preservation due to the large fragmentation of survey material. Reconstructed sherds with less than 7% preservation are recognisable through their dashed line.
[40] Gallis 1992, 144.
[41] Gallis 1992, 144.
[42] Halstead 1984, Tab. 6.1, No. 283.
[43] Gallis 1992, 144.

Fig. 7.3. Fields and finds plotted together with the contour lines. The most probable settlement area is highlighted in yellow.

Field Number	Weight of all sherds	Total number of sherds	Number of decorated sherds
F350	10,25 kg	479	29
F351	2,72 kg	129	5
F352	12,60 kg	508	25
F353	10,20 kg	411	30
F354	0,90 kg	29	1
F355	0,12 kg	6	0
F356	0,80 kg	40	0
F357	0,09 kg	9	0
F358	1,55 kg	78	1
F359	0,02 kg	19	0
Stray finds	0,33 kg	19	0
ATAE134	/	13	3

Tab. 7.3. Total weight and number of sherds and decorated sherds per field.

to study the surrounding area (Ch. 2). This leaves 1740 sherds (39.8 kg) for further analysis.

The overall condition of most of the sherds is considered good; there are some rolled or otherwise worn sherds, but they feature much more distinctly at other sites, such as Elateia 1[44]. The condition of the decorated sherds varies, especially among painted sherds; some decorations are almost vibrant, while others can barely be reconstructed. Interestingly, there were many sherds covered by a thick layer of sinter. Unfortunately, the bulk of thickly sintered sherds was only discovered once the analysis had already progressed, and sinter could therefore not be recorded systematically. This phenomenon will still be discussed briefly.

By comparing both weight and number of sherds with their respective affiliation to a field, a probable main settlement area was easily identified. The bulk of sherds was found in F352 (12.6 kg), F350 (10.3 kg), and F353 (10.2 kg) — neighbouring fields on the north-eastern side of the magoula, right next to the sectioned off olive grove (Fig. 7.4). These fields account for 77% of the total weight of all sherds. The total number of sherds per field shows the same pattern: in F352, 508 sherds were collected, 479 sherds in F350 and in F353 there were 411 sherds (Tab. 7.3). F351 still held many sherds (n=129; 2.7 kg), but the remaining fields yielded much less material. F358, F354 and F356 contained a total of 147 sherds (3.2 kg), while in F359 and F357 only 28 sherds (0.3 kg) were found. The stray finds are comprised of 19 sherds (also 0.3 kg).

The same picture emerges based on the distribution of decorated sherds (Fig. 7.5). Most of them were again found in F353 (n=30) and F350 (n=29). Further examination, however, shows that in F350, most decorated sherds were found in the eastern part of the field, towards the olive grove. In F352, 23 sherds were found. This means that, out of 94 decorated sherds, 82 (89%) were found in these three fields. Much fewer decorated sherds were found in F351 (8%, n=7), and the amount of finds from the remaining fields is negligible (3%; n=3). The distribution of small finds substantiates these findings (Fig. 7.3).

Based on these observations, the main settlement area is most probably situated on the fields F350 to F353, with F351 already on the margins of the densely inhabited section. F358 and F354 form another margin in the northwest, while F359 and F356 are on the northern and southern outskirts of the magoula. Most of F355 has already been sorted out, but F357 may not have been part of the magoula as well, since only nine sherds (0.1 kg; 1%) were found there and none of them were decorated. As the abundance of finds were found in F352 and F350, it would be interesting to survey the olive grove adjacent to it as well, to see the potential eastern extension of the site.

[44] Reingruber et al. 2021, 4.

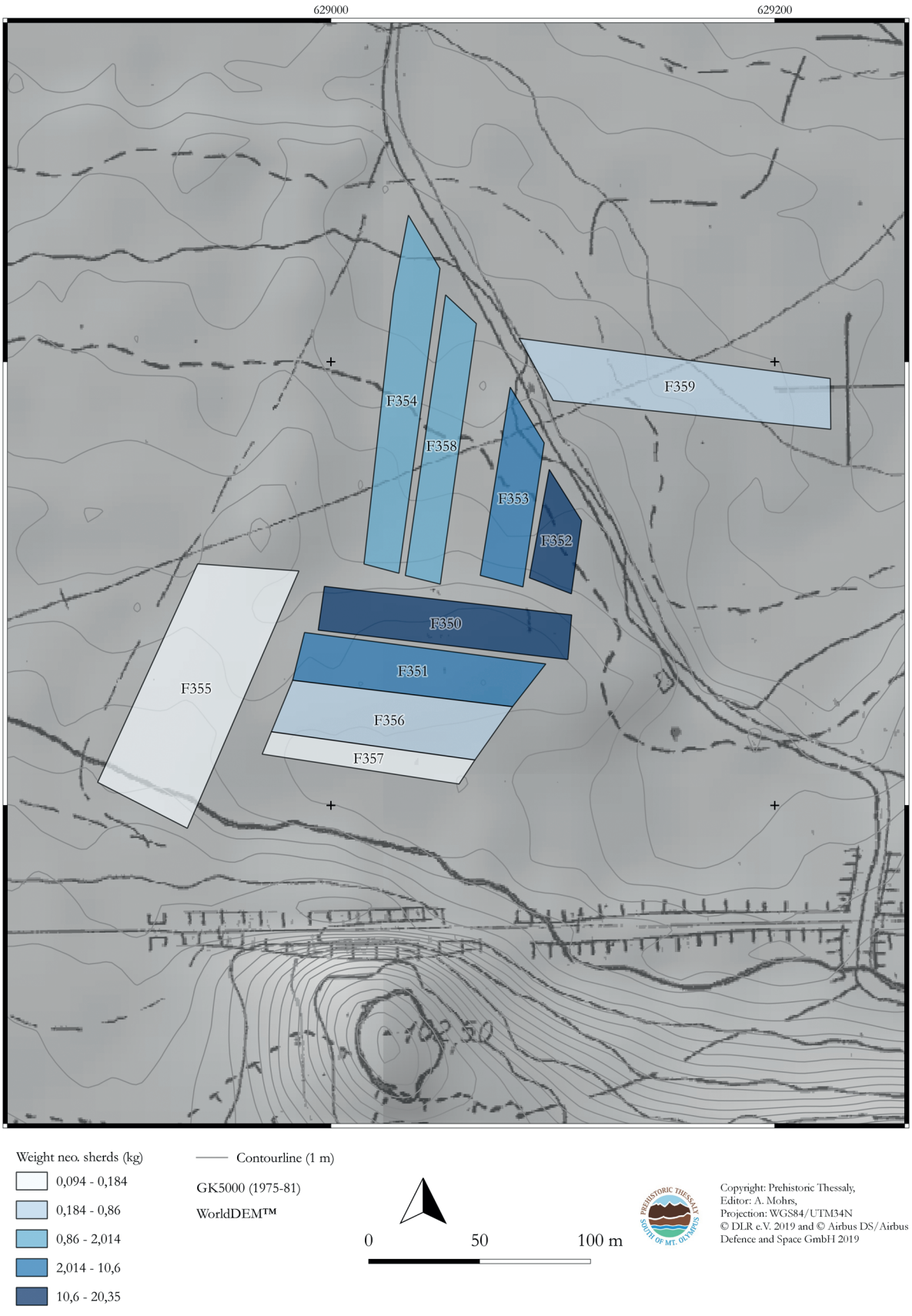


Fig. 7.4. Distribution of pottery based on the total weight per field.

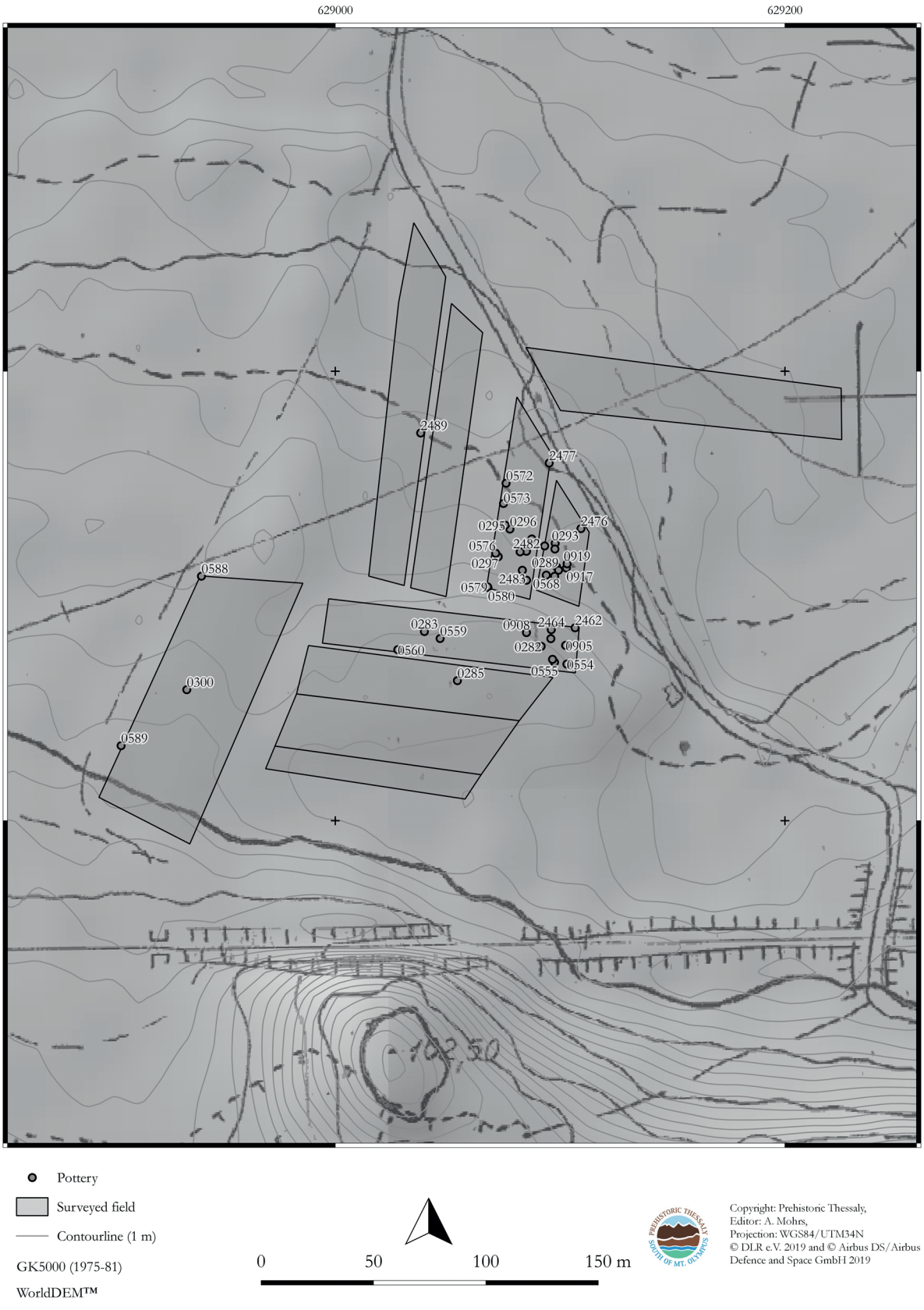


Fig. 7.5. Distribution of decorated pottery on the surveyed fields.

Colour and quality of the pottery	Number of sherds
red burnt	550 (33%)
brown (light)	441 (26%)
red slip	350 (21%)
brown (dark)	94 (6%)
light slip	66 (4%)
rolled or worn	66 (4%)
bichrome burnt (red-black)	47 (3%)
dark burnt	31 (2%)
violet slip	19 (1%)
bichrome burnt (black-red)	15 (1%)
violet burnt	11 (1%)
black polished	5 (<1%)

Tab. 7.4. Distribution of the twelve identified categories in the inventory of Makrychori 3.

7.6. The pottery

Roughly 40 kg of pottery (n=1740) were recovered at Makrychori 3. Missing stratigraphical information and the impact of post-depositional processes on some sherds forbade the definitive relative chronological dating for some of the pottery, but fortunately the greater portion of the sherds were able to be dated.

All 1740 sherds were analysed according to different technological aspects, including clay composition, surface treatments, and aesthetic aspects such as colour and decoration. Twelve different categories were identified to properly represent the different types of pottery found at Makrychori 3 (Tab. 7.4) Nine of the categories represent monochrome burnt types of pottery (n=1551; 89%), two depict bichrome burnt surfaces (n=62; 4%) and one category is reserved for worn or rolled sherds (n=66; 4%) that do not allow any further analysis.[45] The nine monochrome burnt pottery categories consist of differently coloured types of clay and surface treatments. The term "monochrome" is used in this study to refer to sherds featuring a single colour both on the inner and outer surfaces, and not to refer to unpainted or otherwise undecorated sherds[46]. The majority of sherds belong to the red burnt pottery without a slip (n=546, 31%); the colour originates in an oxidising firing process in which air enters the kiln[47]. The surface of these sherds can be rough, smoothed, burnished or polished. The addition of a red slip to pottery sherds was observed 356 times (21%) at Makrychori 3. Therefore, most of the pottery found at the magoula belongs to a monochrome red category (n=902, 54%). The second most common category is a light brown surface colour (n=422; 25%), which indicates a mixed firing process with different amounts of air allowed in the kiln. These sherds likewise either have a rough, smoothed, burnished or polished surface. There might also be slip application, but as it is less common, this not been recorded separately. Dark brown pottery seldomly exists at Makrychori 3 (n=100; 6%). Neither red nor brown monochrome pottery can be defined as inherently chronologically sensitive without any further considerations, such as vessel shapes or decorations, despite efforts to do so in the 20th century[48].

Characteristic for Greek Neolithic pottery is the use of very light surface colours (Munsell: 7.5YR 7/6). Rarely, this colour is achieved using Kaolin, a naturally occurring mineral used to whiten

[45] 4% are missing from the overall number of sherds (n=61), they represent thick- and thin-walled sherds in F350, which were not categorised according to their surface colour. This was modified for the following fields, but the count for F350 could not be revised due to time constraints.

[46] Reingruber et al 2021, 6.

[47] Alram-Stern and Dousougli-Zachos 2015, 102.

[48] i.e., Wace and Thompson 1912; Gallis 1992.

Ware	Components	Make	Distribution	Date
W1	Quartz + Mica	fine	100 (53%)	EN to MN
W2	Quartz + Mica + Limestone	fine	6 (3%)	MN
W3	Limestone (+ Sand)	fine	40 (21%)	MN to SN
W4	Quartz + Mica + Sand	coarse	20 (10%)	SN to CH
W0	no particles identifiable	/	24 (13%)	/

Tab. 7.5. Different wares from Makrychori 3 and their components and make as well as the number of times they were identified in the inventory of Makrychori 3(modelled after Reingruber this volume).

clay[49]. At Makrychori 3, the light colour is mostly achieved through the application of a slip, which is why Kaolin sherds and those with a light slip have been grouped together (4%; Tab. 7.4). Interestingly, this category features the largest percentage of decorated pottery: out of 94 decorated sherds found at Makrychori 3, 22 fragments have a light slipped surface (23%). Dark grey or black surfaces are achieved through reductive firing processes[50]. 2% of sherds have a black or dark grey surface (n=31), of these 87% have a dark burnt surface (n=27). The remaining 13% feature a dark polished surface (n=4), meaning the surface has been smoothed to the point where it appears to be glossy[51]. Unlike their red or brown counterparts, black polished ware usually has chronological value, meaning although those five sherds must be considered statistically irrelevant, they still signify the likely existence of LN I pottery at Makrychori 3 as this category can often be dated to this phase[52]. Sherds with a distinct violet colour (with or without a slip) were recognised in the fields F350 to F353, which is why it was added as a category. A total of 30 such sherds (2%) could be identified at Makrychori 3. All of them are thick-walled and made from coarse clay. So far, no clear comparisons with other Neolithic sites in Thessaly could be found. To more than half (67%; n=20) of these sherds a slip was added and the remaining 37% (n=11) exhibit varying degrees of smoothing.

The bichrome burnt pottery forms a distinct category made up of sherds that have two different colours on their exterior and interior side[53]. Four percent of the total pottery in Makrychori 3 belongs to this category (n=62), and 76% of these sherds (n=47) are red on the outside and black on the inside. The remaining 24% sherds (n=15) display a black exterior and red interior. Like black polished pottery, bichrome burnt pottery is also considered chronologically relevant. Because a stylistic parallel can be found in the LN I Tsangli, Larissa and Arapi phases[54], these 62 sherds can be relatively dated accordingly. Two decorated sherds of this group will be analysed in detail at a later point in this study.

In another step, the decorated sherds in each surface category were counted to determine which surfaces are usually decorated (Tab. 7.4). In total, only half of the pottery categories feature in the decorated inventory of Makrychori 3. Most decorations added onto red slipped pottery (34%; n=32), closely followed by light brown surfaces (n=30; 31%). There is a similar number of red burnt decorated sherds (17%, n=16) and those with a light slip (16%; n=15); 2% of decorated sherds display a bichrome burnt surface. Besides the surface treatment, the identification of different wares was attempted for the decorated sherds found at Makrychori 3. Due to time constraints and for conservational reasons, no petrographic analyses could be arranged, and no fresh breaks were available. Similarly, not all 1740 sherds could be considered, therefore this analysis is limited to a selection of sherds. The determination of these wares is based on identification of Neolithic wares in Thessaly, especially in the basins of Elateia and Sykourio by Reingruber[55] (Tab. 7.5). The wares of all 94 decorated sherds and 97 preselected diagnostic sherds were examined using

[49] Park and Allaby 2017.
[50] Bonga 2016, 35.
[51] Alram-Stern and Dousougli-Zachos 2015, 133.
[52] i.e., Hauptmann 1969, 10–24.
[53] Reingruber et al. 2021, 6.
[54] Hauptmann 1969, 21; Alram-Stern and Dousougli-Zachos 2015, 133.
[55] Reingruber this volume.

a 10x magnifying glass. The selection is based on the preservation of the individual sherds and on the equal representation of all different types identified at Makrychori 3. Despite this, different circumstances such as the reoccurring sinter coats prevented any identification of tempering particles to determine a specific ware in some cases. These sherds are registered as W0, meaning their ware could not be identified. At Makrychori 3, 24 sherds (12,5%) could not be classified (Tab. 7.5). W1 was determined to be typically EN or MN ware, tempered with a mixture of quartz and mica, which creates a typically fine to mid-fine clay. Notably, the addition of mica does not have to be intentional, as it naturally occurs in the contact zone of rocks. Most sherds (n=100; 53%) belong to this category. Ware 2 (W2) is mixed with both quartz and limestone, as well as golden or silver mica. This group features the fewest sherds (n= 6). It was identified to be mostly present in the early MN.

The second largest group of sherds can be attributed to W3 (n=40). It encompasses tempers mixed with limestone and mica. This ware is attested for MN and LN pottery. Other particles such as grog mixed into this ware might be an indicator for LN I pottery, but there was no grog in the material presented in this study. A small group of sherds belong to W4, which features quartz like W1 but with much larger particles, thus creating a coarse and usually quite thick-walled clay. 20 sherds (9%) can be attributed to this ware. They are most often found in Chalcolithic pottery, although they can occasionally be found in LN II pottery. Like the identification of the different surface treatments and colours, the examination of different wares of Makrychori 3 has revealed some chronologically relevant information, especially about LN and ECh pottery. For the most part, the wares alone are not sufficient to conclusively date a sherd. Nonetheless, the information from this analysis also shows the presumed usage of different clay deposits for the different wares. The existence or lack of golden mica, for example, indicates the usage of varied clay deposits.

7.6.1. Undecorated diagnostic pottery

Bodysherds are difficult to analyse without stratigraphic information, which is why the focus is put on diagnostic sherds. 22% of all sherds in this study exhibit diagnostic characteristics (n=383). 9% of those (n=33) are decorated and will therefore be discussed later. The catalogue of undecorated diagnostic pottery at Makrychori 3 consists of 49% rims (n=172), 40% bases (n=140), and 11% jointed features (n=38) (Fig. 7.6). Since for the most part, the shape of an undecorated vessel alone cannot be dated conclusively, the sherds discussed in this chapter are categorised by surface colour; and the few chronologically sensitive types are highlighted. As not all diagnostic sherds were analysed in greater depth, a preliminary selection of 97 sherds was made based on availability of the different types and conservation status, to ensure the most numerous types were analysed to the full extent. The remaining diagnostic sherds were described and serve as illustrative material to the analysis.

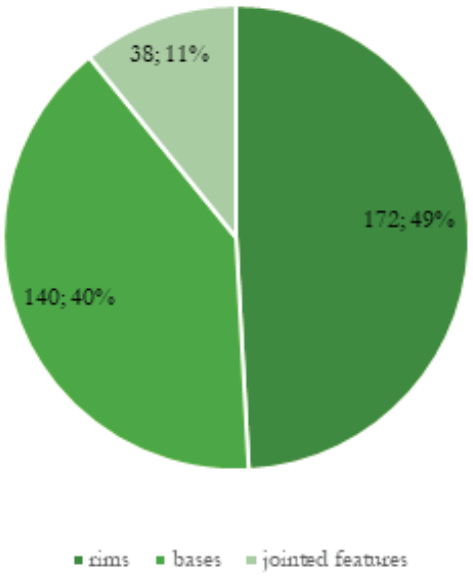


Fig. 7.6. Different types of diagnostic pottery in the inventory of Makrychori 3.

Red monochrome burnt pottery

Red monochrome burnt pottery is by far the largest category of diagnostic pottery. It combines any diagnostic sherd with a red surface, both with and without an additional slip. Red monochrome burnt pottery at Makrychori 3 constitutes 74% of all diagnostic pottery (n=186). Of this composition, 44% are rims (n=82), 39% are bases (n=73) and 17% are jointed features (n=31).

There are roughly the same number of closed (56%: n=46) and open vessels (42%; n=34). Three sherds could not be determined further, leaving 80 sherds for analysis. As part of the onsite analysis, twelve sherds were studied in more detail. The examination of tempers in this category substantiates the observation that red monochrome burnt pottery does not necessarily only date to the EN: while 50% of the sherds (n=6) do feature the W1 ware, identified in mainly the EN and MN by Reingruber (Ch. 6.3.1.3.1), about 8,3% (n=1) have large particles of quartz in their break matrix, identifying it as W4, typically dated to the Chalcolithic. The temper of the remaining two could not be determined (W0). In two cases, the shape of the lip held possible chronological information. One sherd has a bead-shaped lip (T11b) (Pl. 7.2-1), this shape has also been found in several MN layers (i.e., Otzaki magoula[56]). The other has a pointed lip (T11d). The shape is widely known, for example from Visviki Magoula, where it is characterised as EN and MN[57], but also from the Rachmani layer at Otzaki Magoula[58]. There are three sherds from vessels with a simple, outward curved neck, one with a short and round lip (T14a) (Pl. 7.1-7), the other with a short and sharply structured lip (T14c) (Pl. 7.1-8). Based on form and ware (W1), the first sherd can be sorted into the MN as bowls with a funnel-shaped rim[59]. However, the third sherd should be dated to the LN based on their ware (W3). In the LN I (Arapi phase), red monochrome smoothed pottery is predominant[60], although no comparable vessel types could be found in the published material. One rim-fragment of a pithos with a closed rim (T18a) was identified at Makrychori 3, which can be conclusively dated to the LN or ECh[61]. Of the sherds belonging to open vessels, two highly fragmented ones with a simple convex shape with a round lip (T21a) might be dated to the EN or MN based on their tempers (W1 and W2, respectively) (Pl. 7.1-5). Incidentally, this shape is widespread in the MN[62]. Two fragments from structured bowls (T24a, b) might be dated to the EN or MN based on their W1 temper and shape, which are also attested in the MN layers at Otzaki Magoula[63] (Pl. 7.2-5, 10).

Out of 73 bases in total, 68 could be sorted into three different categories. They encompass 74% ring bases (n=54), 15% flat bases (n=11), and 3% massive bases (n=2). Half the ring bases (n=27) are simple ring bases (T41a) (Pl. 7.3-1–2, 5, 7–9). The shape of these bases is known in both the Neolithic[64] and Chalcolithic[65]. Two of the high ring bases (T41b; from 1,5 cm onwards) were analysed further; both are categorised as W1 and likely date to the late EN or MN (Pl. 7.3-12). This assumption is based on comparisons from Otzaki Magoula[66]. 9% of ring bases (n=5) are considered very high (T41c; from 2,5 cm onwards) (Pl. 7.3-13). Similar sherds are known from the painted Sesklo ware[67], perhaps a correspondent date might be inferred for this T41c base. Two fragments exhibit a flat ring base, which describes a short foot rim that can be slim (T41e) (Pl. 7.2-5) or broad (T41g) (Pl. 7.3-3), and W1 tempering. Flat ring bases are quite common in the EN and MN[68] but also in the LN I[69]. Red monochrome flat bases are less numerous. One simple flat bases (T42a) with W1 ware has been analysed further (Pl. 7.3-14). Flat bases are known from the LN[70] and the Chalcolithic[71]. However, they are also known as the bases of bowls in the MN where they are also primarily on red monochrome burnt pottery and decorated vessels[72].

In the category of red monochrome burnt pottery, there are 31 jointed features – more than in any other category. Most of them (87%) are simple handles with different profiles (T64; n=27), followed by 6% of handle lugs (T69; n=2), and 3% broad handles (T65), and lugs (T66), respectively (n=1).

56 Mottier 1981, 22; Typentafel A.
57 Alram-Stern and Dousougli-Zachos 2015, 109, II.B.2, 111.
58 Hauptmann 1981, Beilage 10, 22.
59 Mottier 1981, 22, Typentafel B.
60 Alram-Stern and Dousougli-Zachos 2015, 128.
61 Hauptmann 1969, 75; Hauptmann 1981, 133.
62 Mottier 1981, Typentafel B, 33–34; Hauptmann 1981, Beilage 7, 31, 53; 10, 18.
63 Mottier 1981, Typentafel B.
64 for EN/MN ring bases i.e., Alram-Stern and Dousougli-Zachos 2015, Taf. 81, AXI-001; Taf. 85, AX-059-AX-065; for LN ring bases i.e., Alram-Stern and Dousougli-Zachos 2015, BIII-010.
65 i.e., Hauptmann 1981, Beilage 10, 16.
66 Mottier 1981, Typentafel C, 52.
67 Mottier 1981, Typentafel E, 151.
68 Mottier 1981, Typentafel A26; C29.
69 Hauptmann 1981, Beilage 7, 32, 39.
70 Hauptmann 1981, Beilage 1.
71 Weißhaar 1989, Taf. 129, Typ 171.
72 Alram-Stern and Dousougli-Zachos 2015, 112.

Brown monochrome burnt pottery

As the second largest category, brown monochrome burnt pottery encompasses 35% of all diagnostic pottery (n=124). It includes all diagnostic sherds classified as light brown or dark brown. This category is almost congruent with the spectrum identified for red monochrome burnt pottery, thus some results are duplicated. Of those 124 diagnostic sherds, 56% are rims (n=70), 40% are bases (n=49), and 4% are jointed features (n=5).

53% of the sherds belong to closed vessels (n=37) of two different categories, 65% are simple shapes (n=24) and 35% are structured shapes (n=13). Slightly curved outward lips (T11e) (Pl. 7.1-8) sometimes resemble bead shaped lips (T11b) but they are two separate widespread categories that appear in many different phases[73]. Since these four sherds are tempered with quartz and mica, a relative chronological date in the EN or MN might be suggested. Bead shaped lips are less common and also primarily occur in the EN and MN, for example at Otzaki and Visviki Magoula (Pl. 7.2-4)[74]. The analysis of two straight-walled fragments (T12) also suggests an EN or MN date, as these fragments with slightly outward curved lips (T12e) were categorised as W1, which is typical for the EN and MN (Pl. 7.1-6; Pl. 7.2-2). One fragment from a structured vessel with a short, but sharp neck (T14d) and W1 temper was studied further (Pl. 7.1-2). Since the overall shape of this type is well-attested in the MN[75], F353-K39 is also regarded as such. There are two sherds with a thickened outward bent neck: one has a round lip longer than 2,5cm and W1 (T15b) (Pl. 7.1-1), the other a sharp-edged rim longer than 2,5cm and W3 (T15d) (Pl. 7.1-3). The T15b fragment might therefore be compared to funnel-shaped rims as known from the late EN or MN[76]. The temper and shape of the T15d fragment are perplexing, as the ware suggests a LN date, but the shape is primarily MN[77]. Although sharply structured forms are widespread in the LN I, the exact shape of this fragment could not be found in the published material apart from a similarly shaped vessel was identified at Otzaki Magoula[78].

The different categories of open vessels are less numerous, most of them belong to simple convex dishes with a round lip (T21a; n=11). Two of them were studied further, both were determined to belong to W1. Round lipped simple dishes are very common in all phases and can for example be found in the MN inventory at Visviki Magoula[79], in the LN I layer at Arapi Magoula[80], and in the middle Rachmani layer at Pevkakia Magoula[81]. One fragment of a simple convex vessel with a slightly outward curved lip (T21e) and W1 (Pl. 7.2-7) can be compared to a similar dish from Otzaki Magoula[82]. The vessel from Otzaki has impressed decorations on the lower part of the vessel, which cannot be reconstructed for this sherd. Two other simple convex dishes have pointed lips (T11d), one with the earlier W1 ware, the other belonging to the later W3 ware. This correlates to the published record, where these vessel shapes are also found in both the EN and MN[83] as well as the LN[84]. One fragment neither fully resembles a bead-shaped (b) nor a slightly outward curved (e) lip, but rather a hybrid between both. This sherd was categorised as T21c, which translates to a strongly defined lip (Pl. 7.2-8).

Four different types of bases can be differentiated for Makrychori 3 brown monochrome burnt pottery. There are 52 bases in total, of which 10% were too fragmented for further determination (T40x; n=5). The remaining 47 bases consist of 60% ring bases (T41; n=28), 31% flat bases (T42; n=15); 6% massive bases (T48; n=3), and 2% thin-walled bases (T47; n=1). As mentioned, ring bases which are lower than 1.5 cm are known in the entire Neolithic and in the Chalcolithic[85]. The material from Makrychori 3 corroborates this, as

[73] cf. Mottier 1981, Typentafel A for EN/MN.
[74] Mottier 1981, Typentafel A26, 39; Alram-Stern and Dousougli-Zachos 2015, Taf. 81, AX-001 – AX-003.
[75] Mottier 1981, Typentafel B.
[76] Mottier 1981, Typentafel B.
[77] Mottier 1981, 22.
[78] Hauptmann 1981, Taf. 4, 3.
[79] Alram-Stern and Dousougli-Zachos 2015, Taf. 89, AVI-II-008 – AVIII-011.
[80] Hauptmann 1969, Beilage 4, 31.
[81] Weißhaar 1989, Taf. 108, Typ 58.
[82] Mottier 1981, Taf. 11, 20.
[83] Alram-Stern and Dousougli-Zachos 2015, Taf. 82, AX-022.
[84] Hauptmann 1981, Beilage 7, 53.
[85] Alram-Stern and Dousougli-Zachos 2015, Taf. 85, AX-059 – AX-065, Taf. 102, AIV-047; Weißhaar 1989, Taf. 129, Typ 178.

the analysis revealed that all wares can be attested for this type (Pl. 7.3-4, 6, 10–11). One of the flat bases was reinforced with a platform (T42c) (Pl. 7.3-15). The ware was identified as W4, the closest comparison shape-wise might be the Chalcolithic Omphalos-like bases at Pevkakia Magoula[86], although it is unclear whether such massive versions are known.

A small number of brown monochrome burnt jointed features were identified (n=5), a total of 40% simple handles (T64; n=2); and 20% broad handles (T65; n=1), another 20% lugs (T66; n=1), and 20% handle lugs (T69; n=1). Among those jointed deatures, there is not much diversity in types. Most handles are either slim and oval or almost oval in diameter (T64b, d) (Pl. 7.2-11). Such handles are common for example in the coarse ware of the ECh[87]. One broad handle in the inventory is additionally also flat (T65a) (Fig. 7.2-13)[88], while the single lug (T66b) is attached horizontally to the bodysherd on Pl. 7.2-12[89].

Dark monochrome burnt pottery

There are few dark burnt sherds in total at Makrychori 3, they make up 3% of the inventory (n=11). 91% of this category are rims (n=10) and 9% are bases (n=1). Among the rims, 60% are considered closed shapes (n=6) and 30% open shapes (n=3). The remaining 10% could not be differentiated (n=1; T10/T20x). There are only two dark polished fragments in the entire inventory, one belonging to a simple closed vessel with a round lip (T11a) with W3, and the other belonging to a simple closed vessel with a pointed lip (T11d; Pl. 7.2-3). Both were characterised as LN I since this is characteristic for Larissa pottery[90]. One sherd from an open vessel features a peculiar flat lip, which has a circumferential dent in the middle and the ware was determined to be W1 (Pl. 7.2-6). So far, no comparable shapes or vessels were identified in the published material. The single base from this category is a simple ring base (T41a).

Light Slipped Monochrome Burnt Pottery

Most light slipped pottery sherds at Makrychori 3 are also decorated, and thus will be analysed in the following passages on decorated pottery. The remaining sherds make up 5% of the diagnostic inventory (n=17). Of those, 24% are rims (n=4) and 76% are bases (n=13). No jointed features could be identified, although they are quite common for light slipped painted pottery, as will be shown with the decorated pottery. There are more open (75%, n=3) than closed (25%, n=1) shapes. The open vessels are all simple convex shapes, one with a simple round lip (T21a) and the other two featuring a slightly outward curved lip (T21e). Both those shapes are attested in the MN[91] and the LN[92]. Out of 13 bases, 92% could be identified as ring bases (n=12), while for 8% no shape could be determined (n=1).

Bichrome burnt pottery

In general, bichrome burnt pottery such as the one found at Makrychori 3 may be dated to the LN[93]. Aside from black-topped ware, which is a special form of bichrome burnt pottery[94], this pottery style is only known from LN layers in Thessaly[95]. Yet, no black-topped ware was identified in this inventory, consequently all sherds presented here are considered LN. In this case, both red-black and black-red bichrome burnt pottery are grouped together. A total of 2% of the diagnostic pottery at Makrychori 3 is considered bichrome burnt pottery (n=7). 43% are bases (n=3), 28% are rims (n=2), and the other 28% are jointed features (n=2).

In summary, the analysis of the diagnostic but undecorated pottery has shown that finding exact chronological markers for unstratified pottery based on shape and surface colour in the published inventory for both the Neolithic and the Chalcolithic is difficult and in most cases impossible. Out of 97 closely studied pottery fragments, only 33% (n=32)

---

86 Weißhaar 1989, Taf. 129, Typ 175.
87 Toufexis 2017, 145
88 They are not to be confused with the MN I Strap handles..
89 Such lugs are common in Otzaki: Hauptmann 1981, Beilage 1.
90 i.e., Hauptmann 1969, 20, 26, Beilage 1, Taf. 10.9; Alram-Stern 1996, 135.
91 i.e., Mottier 1981, Typentafel A, 8.
92 i.e., Bonga 2016, Fig. 98, 1.
93 Alram-Stern 1996, 136.
94 Black-topped pottery describes a distinct pottery category consisting of vessels with an ivory-brown colour and a distinct black rim on the outside and black coloured inside. This colouring is considered intentional, probably achieved by stacking the vessels inverted in the kiln (cf. Milojčić-v. Zumbusch 1976, 64–66; Reingruber 2008, 192–193).
95 Hauptmann 1969, 21.

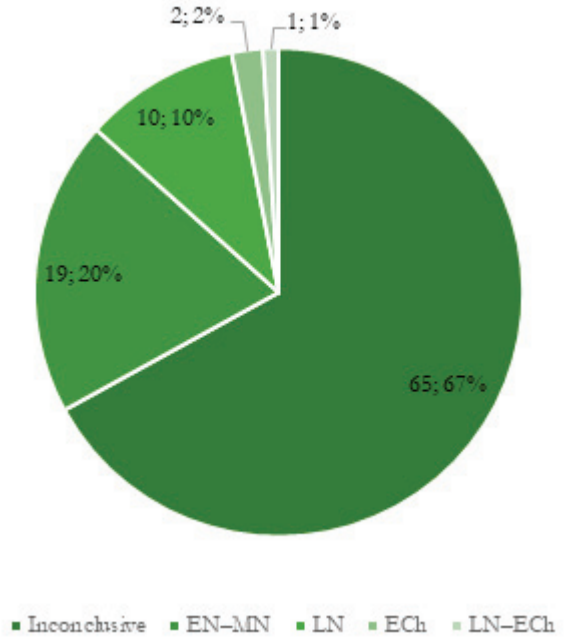


Fig. 7.7. Results from the analysis of diagnostic pottery from Makrychori 3.

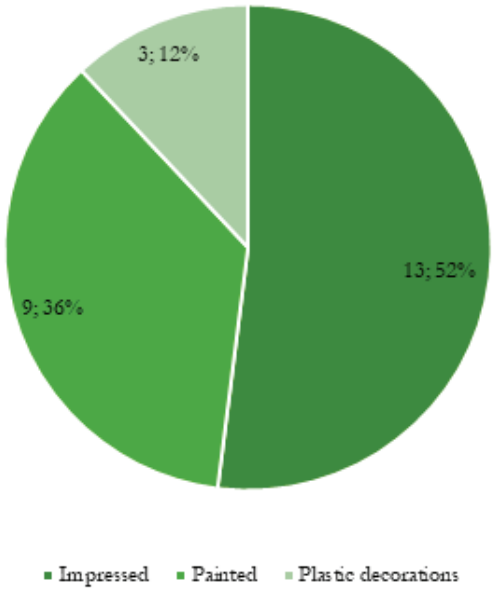


Fig. 7.8. Different decoration styles on MN pottery from Makrychori 3.

could be plausibly dated based on their shape and ware (Fig. 7.7). However, in most of those cases it can be argued that these are chronologically very important shapes that clearly denote a certain date, such as in the case of MN high ring bases. Ultimately, out of these 32 dates fragments, 59% (n=19) are considered MN, 31% (n=10) belong to the LN, 6% are ECh (n=2), and 3% (n=1) might be either LN or ECh (Fig. 7.7).

7.6.2. Decorated pottery

7.6.2.1. Early and Middle Neolithic pottery

Out of 94 decorated sherds found at Makrychori 3, 26 (28%) should be considered MN. The pottery of the MN is classified by several styles and characteristics. Some are defining for the period, but a lot of traditions from the EN are continued, although differences between the two phases are visible[96]. The characteristic decorations of the MN are classic Sesklo painted pottery, identified as red-on-white pottery and first recorded at the eponymous site near Volos[97], impressed pottery, and scraped ware. At Makrychori 3, no scraped decoration was found, but impressed decorations and red-on-white paint are present, as well as red monochrome pottery with plastic decorations (Fig. 7.8). A variety of surface colours and treatments occur in the group of MN sherds. Most are of a light (32%, n=8) or light brown colour with or without a slip (32%, n=8), followed by red burnt sherds (25%; n=6). Only a few, very specific sherds were found with a bright red slip (13%, n=3), they will be considered separately. The majority of tempers (71%, n=18) are W1, which is to be expected in EN and MN pottery. In the clay of two sherds (8%), there were particles of limestone next to those of quartz and mica (W2); this ware is regarded as specifically MN (compare Ch. 6.3.1.3.1). The clay of the rest of the sherds (25%, n=6) is unidentifiable (W0). There are no specific vessel shapes identifiable in the MN material of Makrychori 3, such as conical or funnel-shaped bowls and dishes[98], spherical vessels, either with cylindrical necks or

[96] Schachermeyr 1991, 31.

[97] Tsountas 1908, 174.
[98] Mottier 1981, 22.

funnel-shaped necks[99]. The main diagnostic traits for this study therefore are the decorations.

Decorated monochrome burnt pottery

Three bright red monochrome burnt sherds (Munsell: 2.5 YR 4/8) were identified featuring plastic decorations and a thick red slip on both sides and W2 temper (Pl. 7.4-17–19). This style is known from other sites from the MN[100]. Wace and Thompson describe it as "well-polished and carefully finished"[101], and it appears to be found often together with the earliest painted pottery. The elongated lugs have a distinct bean shape and are found on the very convex walls of the vessels. The same shade and decoration were found in MN layers at Tsangli, Agia Sophia, and Visviki Magoula[102]. Unfortunately, no diagnostic sherds of this category were found, but the distinct convex shape of the wall and comparisons with other sites point towards bowl-shaped vessels, probably on a raised foot[103].

Impressed pottery

17 out of the 26 decorated MN sherds (67%) have impressed decoration (Fig. 7.8). For much of the 20th century, these were considered a marker for the EN, supposedly only appearing in the early phases of the Neolithic[104]. However, following the detailed study of previous excavations, impressions on pottery were also identified in the later stages of the Neolithic and even beginnings of the Chalcolithic, although their design transforms markedly[105]. Interestingly, in the LN I, no impressed designs have been identified and following the MN, the overall amount of impressed pottery decreases drastically[106]. The EN designs are characterised by a distinct fingernail shape; this tradition continues during the MN, during which other impressed design also appear[107]. The decorations are pressed directly into the wet clay, using differently shaped instruments, possibly made from wood or bone[108]. Johanna Milojčić-v. Zumbusch[109] identifies several different impressed styles, although she considers all of them to be EN. She defined the special 'Cardium Ware', a design characterised by linear rows of dots. The term derives from the impressed pottery in the Mediterranean Neolithic, where actual Cardium shells were used to press designs into the clay[110]. In Thessaly, a different instrument was used since the decorations are notably different from those in the Mediterranean. Despite this, the term Cardium ware persists in Thessaly, but will not be used in this study. Instead, the term comb impression is preferred. Additionally, more subsequent studies show that impressed decorations hold no chronological value when analysed by style alone[111]. Milojčić-v. Zumbusch's classification has since been refined to include a wider variety of impressions, such as comb-impressions (still called "Cardium-Ware by Mottier), other instrument-made decorations, and a fusion style combining both impressed and painted designs[112]. At Makrychori 3, there are no painted impressed sherds, but the other styles can be identified among the sherds.

Of the 13 sherds with impressions, none were coated with a slip of any kind, they were smoothed in ten cases, and kept rough in two; one surface appears almost burnished (Pl. 7.4-1). Seven sherds are made from light brown clay, the clay of the other five sherds is red. The wares of most sherds (85%; n=11) were identified as W1; the temper of two (15%) sherds could not be properly identified because no particles could be observed (W0).

The largest group of sherds is decorated with some form of fingernail impressions, two of them with a classic fingernail-shape and four of them using a narrow short instrument[113] (Pl. 7.4-1, 5). Comb-impressions, characterised by two (or possibly more) parallel rows of punctures[114] were identified on a

[99] Mottier 1981, 23.
[100] Reingruber this volume, Ch. 6, Taf. 4.
[101] Wace and Thompson 1912, 13.
[102] Milojčić-v. Zumbusch 1976, 58, Taf. 27, 44; Alram-Stern and Dousougli-Zachos 2015, 103, Taf. 84, AX-050, AX.053.
[103] Mottier 1981, 22–23.
[104] Milojčić-v. Zumbusch 1971, 146–148.
[105] Schachermeyr 1991, 30–31; Alram-Stern 1996, 89, 126.
[106] Schachermeyr 1991, 30.
[107] Schachermeyr 1991, 30, Alram-Stern 1996, 126.
[108] Schachermeyr 1991, 30.
[109] Milojčić-v. Zumbusch 1971, 77–78.
[110] Bonga 2019, 160; Reingruber et al. 2023, 21.
[111] i.e., Mottier 1981.
[112] Mottier 1981, 26–27; Reingruber et al. 2023, 23, 25.
[113] Mottier 1981, 26, Tab. 2, 15–16; 3, 1–2; Milojčić-v. Zumbusch 1971, 75–76, Taf. N
[114] Milojčić-v. Zumbusch 1976, 78; Mottier 1981, 26.

single sherd (Pl. 7.4-9). Comparable pottery was identified in the MN layers of Otzaki Magoula[115] or Agia Sophia Magoula[116]. Two very interesting sherds display a peculiar kind of decoration: they appear to have been made by pushing the still-wet clay aside, thus creating a specific pattern (Pl. 7.4-12–13). Similar decorations were found at Otzaki Magoula[117]. Impressions of different kinds can also be found on two sherds: one with triangular and the other with shallow round impressions. At Otzaki, similar sherds were in MN layers[118]. Lastly, one sherd exhibits two different decorative styles, impressed in parallel lines: the top line consists of roundish stitches, while the other appears to have been created using a fingernail-shaped instrument. Due to the fragmentation of the sherds, no real patterns were discernible on most sherds. A linear pattern could be identified in four out of twelve sherds, for another four such a style can probably be assumed based on comparisons with similar fragments from other Neolithic sites[119]. It is unclear whether the impressions covered the entire vessels or were arranged parallel in a band around it[120]. Naturally, the fragmentation and lack of stratigraphic contexts greatly hinders a clear dating of the sherds, but the comparison with other sites and style supports the classification of these impressed sherds as either late EN (EN III) or MN.

Painted pottery

Red-on-white painted pottery, usually also called "Sesklo style", is described as one of the defining decorations of the MN[121]. White-on-red painted pottery is rare[122] and was not identified at Makrychori 3. The surface of the sherds is coated with a light slip, which ranges from almost white to light yellow. The red is usually vibrant. Out of 26 MN decorated pottery fragments, nine can be attributed to red-on-white painted pottery (38%). Seven of the fragments are tempered with quartz and mica (W1), in two cases the ware cannot be determined (W0). Eight pieces have a light slip applied to the surface; in one case the coating appears to be brown. Six out of nine times (67%), just the outside of the sherd is painted. In terms of patterns, three distinct styles can be distinguished in this category: a solid-style defined by square designs; a zigzag or flame style defined through complex geometrical designs placed along parallel zigzag or rhombus fields; and a linear style comprised of intertwined triangles, zigzagged lines, and squares[123]. Stratigraphical analyses determined that in general stiff, linear patterns are found in the older MN layers, while geometric and more freely drawn pattern tend to be found in younger layers[124]. The linear patterns can be arranged in parallel lines or zigzag motifs combined with larger fields in triangular or rectangular shapes. The geometrically complex patterns are built around a central tooth- or flame-shaped band at the fringe of thicker linear and zig-zag patterns[125]. Decorations on the inside are usually parallel lines that run from the rim to the bottom.

Unfortunately, the surface of most sherds (56%) is too damaged to clearly distinguish the patterns. In three cases (33%), parallel lines could be identified on the inside (cf. Pl. 7.4-14), and in one case, a complex geometric pattern, probably stemming from a band with triangular shapes attached to it (Pl. 7.4-15). Similar designs were found at Otzaki Magoula[126]. Slightly curved lines, which probably hint towards more geometrically complex patterns, are attested in two body sherds.

There are two vessel shapes commonly associated with red-on-white pottery: bowls with a flat base and open bowls with a high funnel-shaped base[127]. Closed vessels with rounded shoulder and cylindrical necks are also found frequently[128]. Just one sherd from Makrychori 3 bears any identifiable diagnostic traits: a rim from an open vessel with a pointed lip (Pl. 7.4-14,). Since there are only a limited number of vessels associated with the red-on-white style, it might be suggested that F350-K8

[115] i.e., Mottier 1981, Taf. 3, 7–8.
[116] Milojčić-v. Zumbusch 1976, Kat. VIIIe.
[117] Milojčić-v. Zumbusch 1971, 74, Taf. L, 7.
[118] Mottier 1981, 26.
[119] i.e., Milojčić-v. Zumbusch 1976; Mottier 1981.
[120] Reingruber et al. 2023, 23, 36.
[121] i.e., Tsountas 1908, 74–77; Mottier 1981, 28; Alram-Stern 1996, 89.
[122] Schachermeyr 1991, 32.
[123] Schachermeyr 1991, 32.
[124] Mottier, 1981, 30–31.
[125] Mottier 1981, 30; Alram-Stern 1996, 126–127.
[126] Mottier 1981, i.e., Taf. 1; Taf. XXII, 1.
[127] Mottier 1981, 28–29.
[128] Schachermeyr 1991, 32.

belongs to either an open bowl or a very high ring base[129]. The pattern on this fragment might also suggest a later period of the MN since it appears to differ from the usual flame ornamentation.

Despite the high degree of fragmentation and few diagnostic sherds, the consistent tempering and decorative style identify these nine sherds as clearly belonging to the MN period. The lack of larger, more informative sherds is unfortunate, but the simple existence of these sherds confirms that Makrychori 3 must have been occupied in the MN, although no assertion can be made regarding the settlement length or size. The impressed sherds and group of monochrome red pottery with a lug contribute to this deduction. Although both can also be found in the EN, the lack of any other typically EN pottery, such as early red designs painted onto buff surfaces, highly suggests that these sherds are more likely to date to the MN.

To assume EN occupation of this site therefore seems rash and further analyses would be needed to support such a claim. Until then, the existence of ambiguous sherds can be explained as belonging to either the MN or the transitional period between EN and MN.

7.6.2.2. Late Neolithic pottery

LN pottery forms the bulk (56%) of pottery collected at Makrychori 3, with 53 sherds identified from this period. Contrary to the Neolithic development in other parts of Greece, the LN is a direct continuation of the MN in Thessaly[130]. This period is characterised by a multitude of different, yet distinct styles, which allows easier relative chronological dating than perhaps in the MN. However, the differentiation of styles within the subphases of the LN can be more challenging. In the entire LN, pottery is still hand-made, and most vessels are coated with a slip or at least smoothed very well[131]. Petrographic analyses have shown that potters exploited and further processed local clay for their ceramics[132], yet the mobility of the pottery itself increases with possible production centers in both the west and east of Thessaly[133]. A widespread trend observable between LN I and LN II represents the change in composition and patterns, from geometric elements usually arranged around a spiral to curvilinear elements organised into panel-like compositions[134]. The different styles are usually named after the sites where they were first discovered, as it is the case with many other pottery styles[135]. In this study, a more neutral description of the different styles is preferred, but for comprehension, both designations will be used.

At Makrychori 3, different kinds of decorated pottery are considered LN: paint, plastic decorations, and a combination of both. Painted decorations vastly outnumber plastic decorations (43 to 3), both styles combined on a single sherd were identified seven times (13%). The most common surface colours range between red and a light brown, as with the MN pottery. Red surfaces are usually achieved through the application of a slip (47%; n=25), light brown surfaces might have a slip, but not in all cases (36%; n=19). A light slip was identified in 13% of the cases (n=7), and in two special instances a bichrome form of pottery was recorded. Concerning different wares found at the site, as expected, most of the sherds (n=21, 39%) are tempered with limestone and in some cases mica (W3), a combination of which was identified at the sites Nessonis 5 and 6 as belonging to the LN (Ch. 6.2.5.2. and 6.2.6.2). The wares of a comparatively large number of sherds could not be identified (n=12; 23%). This might be connected to the previously mentioned sinter found on several sherds, many of them found among the LN pottery of Makrychori 3. This observation will be discussed later. Only two sherds belong to W2, which was identified primarily for the MN (Ch. 6.3.1.3). In total, 17 sherds were recognised as belonging to LN I, while the remaining 36 sherds were perceived as dating to LN II.

LN I pottery

The LN I dates to the second half of the 6th millennium BC[136]. The pottery is characterised by

[129] cf. Mottier 1981, Taf. IIb; Schachermeyr 1991, Taf. 13.
[130] Alram-Stern 1996, 90.
[131] Bonga 2016, 33.
[132] Bonga 2016, 32.
[133] Pentedeka 2017a, 145; Pentedeka 2017b, 342.
[134] Bonga 2016, 37.
[135] Schachermeyr 1991, 33.
[136] Reingruber et al. 2017, 45.

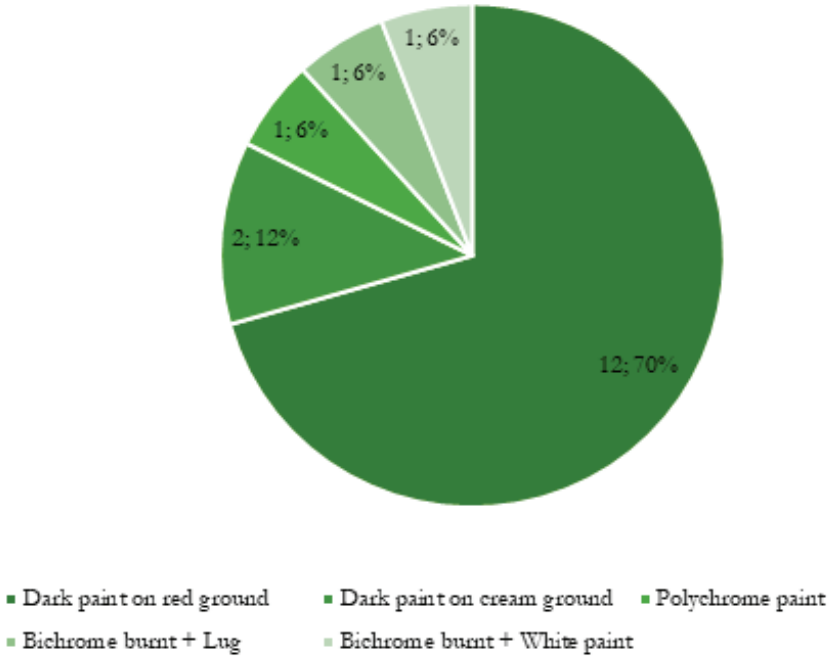


Fig. 7.9. Different types of LN I pottery from Makrychori 3.

linear patterns, such as lines, zigzags, or ladder motifs in different variations, and filled in areas, i.e., triangles or rhomboids[137]. The pottery of this phase was first identified at the sites of Tsangli, Larissa, and Arapi[138], although the problems resolving around the chronological position of the Larissa pottery was not resolved until the 1980s[139] and this still affects the current archaeological research (Ch. 7.3).

Several typically LN I styles are only attested once in the inventory of Makrychori 3. Particularly interesting is a polychrome painted sherd (Pl. 7.5-4), most certainly dating to the Tsangli or Arapi phase (Fig. 7.9). Polychrome painted pottery features in entire LN; the distinction between both can be difficult, especially with sherds as small as this one. In this case, what is preserved in style and shape of the decoration, seems to point towards LN I. F350-K9 features red and black paint on a white background, this style is usually achieved using manganese and iron oxide-based pigments, the use of which replaces three-stage-firing[140]. On bigger fragments, LN I and LN II styles can be easily distinguished: the former features highly burnished vessels with an almost orange-red colour[141] which are arranged in straight or curved lines on buff clay and outlined in black[142]. The latter style is described as similar, but the white ground is described as close to Classical Dimini black-on-cream pottery, as are the patterns[143]. Based on these descriptions, F350-K9 rather resembles LN I polychrome pottery and is therefore classified as such.

A few sherds cannot be dated into either phase of the LN I and are therefore defined broadly. One such sherd was identified as dark-on-cream pottery, either Tsangli- or Arapi-style (Fig. 7.9). This fragment was found during the survey in the 1960s; it is a handle fragment with a peculiar asymmetrical pattern (Pl. 7.5-2), which may have potentially formed due to fragmentation. A similar handle fragment was found in Nessonis 7, exhibiting a wavelike patten (compare this volume, Tafel 22.4), which could also explain the apparent asymmetry. Based on its shape, the fragment from Nessonis is dated to the Arapi Phase, as such fragments are known from the Tsangli layer at Arapi Magoula[144]. Another bodysherd can be defined as black-on-cream pottery, but beside thin parallel

[137] Bonga 2016, 37.
[138] Hauptmann 1969, 19.
[139] Gallis 1987.
[140] Bonga 2016, 107.
[141] Wace and Thompson 1912, 16.
[142] Hauptmann 1969, 65.
[143] Bonga 2016, 127.
[144] Hauptmann 1969, 23, Taf. 8, 6, 11.

lines no diagnostic criteria can be examined; the matrix revealed no particles (W0). However, the colouring suggests this sherd dates to the Arapi phase[145].

Two sherds in this category belong to the bichrome pottery described earlier in this study (see Ch. 7.6; Fig. 7.9). The outside of F350-K24 is black, while the inside is red; for F351-K2, the opposite was recorded (Pl. 7.5-3). The former is characterised by a large lug positioned directly under the rim or on the profiling of the vessel. There are several similar sherds. Hauptmann[146] has identified this shape of lug as belonging to the Arapi Phase, while Bonga[147] describes them as LN I or even LN II pottery. The second fragment features tiny residue of white paint – the only white paint discovered at Makrychori 3. An exact pattern cannot be determined, but the colour of both paint and surface suggest Tsangli pottery[148]. Even though no definite attribution to either category is possible in these five cases, they have been identified to older than LN II, meaning they most probably are older than 5000 BC.

One group of sherds found at Makrychori 3 can be conclusively dated to the LN I: black-on-red pottery sherds clearly belonging to the Arapi Phase. Twelve such sherds were collected, and as with polychrome pottery, there are two very similar styles in both the LN I and LN II[149]. Hauptmann describes the older LN I black-on-red pottery as "relatively thick-walled" and featuring vibrant colours[150]. He concludes that in most cases, just the outside is decorated, meaning that these were possibly primarily closed shapes. This is substantiated by Reingruber (Ch. 6.4.3.2.). The patterns are arranged in a tectonic style, underlining the clearly structured shape of the vessels, which are constructed like Tsangli Phase vessels[151]. The main elements are linear designs, such as zigzag lines, rhomboids, and triangles. This is the main difference between LN I and LN II black-on-red pottery, although spirals might occasionally occur on this pottery already[152]. Using this knowledge, 59% of sherds (n=10) were identified as belonging to the Arapi red-on-black painted pottery. All of them feature a red slip, while 60% of them (n=6) were identified as W3, another 30% belong to W1 (n=3). One ware could not be determined (W0). As with other decorations described in this study, this group was also affected by the heavy fragmentation and sinter, leaving 50% of sherds with a pattern too fragmented for identification and the other 50% with a pattern broadly identified as linear. A single sherd features both painted designs and a small lug. Their vessel shapes could not be determined, but all rims belong to closed vessels, which is an additional indicator for an LN I date because most LN II vessels with decorations are open shapes[153]. One rim features a repair hole (Pl. 7.5-1).

Thus, a total of 32% (n=17) could be assigned to LN I phases Tsangli, Larissa and Arapi, covering four characteristic styles of these phases.

LN II pottery

The LN II is characterised by pottery commonly known as Otzaki- and Dimini-style, named after the eponymous sites. It dates to the first half of the fifth millennium (5000–4600 calBC)[154]. In contrast to the previous LN I, the forms and patterns change noticeably, although the basic shapes remain the same. This style of pottery was identified early on by Wace and Thompson[155], who designated this pottery as B3α, divisible into three different styles. However, aside from this aesthetic differentiation, no indisputable stratigraphy can attest the actual differentiation of those three styles, generally known today as Otzaki A to C, but the pottery sequence is attested at different sites (Agia Sophia, Sesklo, Argissa and Dimini)[156]. Generally, this pottery is characterised by a few things. For the most part, handles are replaced by lugs and knobs, and the sides of vessels are no longer structured as sharply as before[157]. Almost always, both sides

[145] Schachermeyr 1991, 42, Taf. V; Toufexis 2017, 170.
[146] Hauptmann 1969, Beilage 4, 50–51.
[147] Bonga 2016, Fig. 97, 4–6.
[148] Hauptmann 1969, 25–26; Toufexis 2017, 125.
[149] i.e., Alram-Stern 1996, 136; Bonga 2016, 83.
[150] Hauptmann 1969, 68.
[151] Hauptmann 1969, 65.
[152] Hauptmann 1969, 65.
[153] Bonga 2016, 85.
[154] Reingruber et al. 2017, 45–46.
[155] Wace and Thompson 1912, 16
[156] Hauptmann 1981, 7; Alram-Stern 1996, 138.
[157] Schachermeyr 1991, 93.

of the mostly open vessels are decorated, with a variety of geometric and spiral elements organised into panels[158]. Those decorations usually appear infinite on the outside and are situated around a central motif on the inside[159]. The motifs range from already known linear and filled-in elements, to spirals, checkerboards, and meander-patterns. Outside of Thessaly, this style is rare in Greece[160]. Not all three typical styles identified for this phase could be determined at Makrychori 3. Otzaki A, also known as the Agia Sophia phase, features primarily white painted designs on a red background[161], and no such sherds were identified at Makrychori 3. In rare cases, Otzaki A pottery can be decorated with black designs painted on a red background, like the pottery attributed to Otzaki B[162]. Consequently, any red-on-black pottery identified as LN II will be ascribed to both Otzaki A and B.

In total, 36 decorated sherds can be conclusively attested to LN II, five of these exhibit a black-on-red design (14%). In contrast to the Arapi black-on-red pottery of LN I, this style is characterised by large-scale spirals, surrounded by accompanying motifs and fields filled with a hatched pattern[163]. The high degree of fragmentation at Makrychori 3 also prevents the proper examination of patterns for this category, which is why the same system of identification has been applied as for the Arapi red-on-black pottery. All sherds exhibit quartz particles in their breaks, which identifies the wares as W1, and in all instances, the patterns are painted onto a red slip. A basic linear decoration could be identified for three sherds (60%), but the remaining designs were far too fragmented for identification.

The shapes of the diagnostic pottery sherds reflect the most characteristic vessel shapes found in this phase. The entire LN II is characterised by open bowls with flat bases – known as Dimini-type bowls[164]; those vessels can also be found in typical Otzaki B inventories (cf. Pl. 7.5-9). Small amphora jars and fruit-stands are also widespread. Due to the large fragmentation of the other sherds, only F352-K16 can be conclusively identified as a piece of a 'Dimini-bowl', two of the remaining belonged to an unspecified open vessel, while F350-K30 probably belonged to a closed vessel, such as an amphora, which are characteristic in Otzaki B pottery[165].

The greater portion (68%; n=31) of LN II pottery can be attributed to black-on-cream painted pottery, commonly known as Otzaki C or Classical Dimini style (Fig. 7.10). This style is frequently referred to as diagnostic style of LN II[166]. It is comprised of light brown to red surface colours decorated with black designs mirroring those found in Otzaki A and B. The fact that 86% of the entire LN II assemblage found at Makrychori 3 chronologically belongs to the Classical Dimini phase resembles the findings of Stella Souvatzi[167] on a small scale. Upon her examination of the Dimini-assemblage, she concurred that virtually all LN II painted pottery can be classified as Classical Dimini style[168]. In her analysis, she identified a fine, yellowish clay as preferred by the potters in this phase[169], another finding that can be replicated for Makrychori 3. More than half of the sherds examined (n=17) feature limestone and sometimes mica in their clay (W3), yet the breaks were observed to be of a noticeable yellow colour. A further 26% (n=8) could not be identified (W0), followed by a small percentage of W1 (n=5) and W2 (n=1). As expected with Otzaki C, the surface colours ranged from light brown (68%) to red (32%). The light brown colour was achieved either through a slip or the firing of the clay (n=16), if an even lighter colour was preferred, the vessel was coated in a light slip before painting (n=5). 31% (n=10) exhibit a red slip. This complicates the differentiation between Otzaki A/B and Otzaki C sometimes; in the case of Makrychori 3, this decision was based on surface colour as well as painted styles and other decorations.

Otzaki C decorations have been called the "Neolithic palace-style" due to their perceived high

[158] Wace and Thompson 1912, 16; Hauptmann 1981, 7–8.
[159] Schachermeyr 1991, 93; Toufexis 2017, 85.
[160] Schachermeyr 1991, 93.
[161] Hauptmann 1981, 10; Alram-Stern 1996, 136.
[162] Hauptmann 1981, 9, 46; Toufexis 2017, 85-86.
[163] Hauptmann 1981, 47; Bonga 2016, 85.
[164] i.e., Souvatzi 2008, 120.
[165] Hauptmann 1981, 48.
[166] Bonga 2016, 52.
[167] Souvatzi 2008, 119–122.
[168] Souvatzi 2008, 119.
[169] Souvatzi 2008, 121.

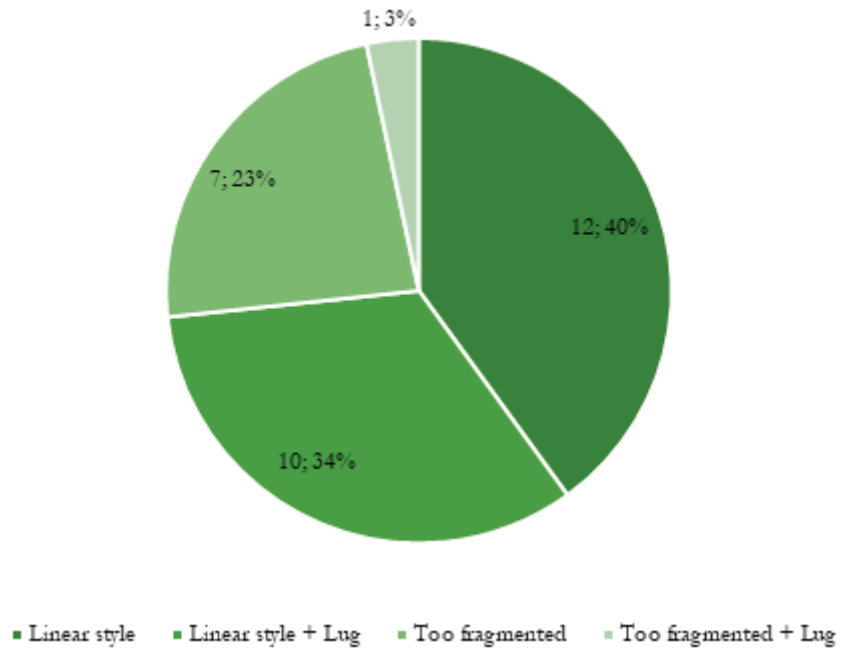


Fig. 7.10. Different black-on-cream styles in the inventory of Makrychori 3.

aesthetic value and refined craftsmanship[170]. The patterns resemble those found in LN I, yet the pottery demonstrably differs. While the preferred spirals of LN I are replaced by meanders as main element, their tectonic arrangement on the vessel has an almost metope-like character[171]. Thus, self-contained panels are created which feature different patterns on one vessel; this organisation is the distinctive feature of this style[172]. Another distinguishing feature for this phase is that both sides of the vessel are always painted, especially in the case of sherds belonging to the classic bowl shape, known as 'Dimini-bowl'[173]. Plastic decorations, such as lugs and eyelets are also characteristic for this style, they usually sit on the upper part of the vessel, close to the rim or just above the widest part of the bowl[174].

At Makrychori 3, all 31 sherds are painted on both the interior and exterior. A greater number of sherds are simply painted (71%, n=22), while the other 26% feature both paint and plastic decoration (n=8) (Fig. 7.10). Most of the painted patterns (57%, n=13) were identified as linear elements, they include ladder patterns (Pl. 7.7-1), chequered patterns (Pl. 7.7-2), and hatch patterns (Pl. 7.6-5). All these are considered primary elements of Otzaki C pottery[175]. The remaining 35% (n=11) of the painted pottery are once more too fragmented for further specification. In some cases, (cf. Pl. 7.6-2) just specks of both colour and slip are preserved. The plastic decorations, which make up 26% of the painted inventory (Fig. 7.10), consist of lugs (n=7) and knobs (n=1) situated directly underneath the rim. 29% of the time (n=5), the lug was pierced vertically (i.e., Pl. 7.6-5). F352-K4 features two fully preserved double-knobs (Pl. 7.5-6); this style has been described as typical for Otzaki C[176] and was for example also identified in the LN layers at Visviki Magoula[177].

There is a surprisingly restricted stock of vessel shapes for LN II black-on-cream pottery, further reinforcing the illustration of this being a highly

[170] i.e., Hauptmann 1981, 50; Alram-Stern 1996, 139.
[171] Alram-Stern 1996, 139; Toufexis 2017, 85, Abb. 117.
[172] Theocharis 1973, 102.
[173] Bonga 2016, 54.
[174] Schachermeyr 1991, 48; Toufexis 2017, 86.
[175] Schachermeyr 1991, 43, Taf. VI; Bonga 2016, Fig. 15.
[176] Pl. 4; i.e., Souvatzi 2008, 255; Bonga 2016, 53–54.
[177] Alram-Stern et al. 2015, 165, 194, 203, Taf. 182, I,4-279, I,Gr-1-020.

specialised pottery style. Most commonly associated with this phase is the "Dimini bowl", a distinct simple bowl shape first recorded by Tsountas[178]. All rims at Makrychori 3 featuring plastic decoration can be attributed to those "Dimini-bowls", and there are countless examples found at other Neolithic sites, such as Otzaki Magoula or Pevkakia Magoula[179]. A second widely distributed shape are "fruit-stands", the only structured vessel shape in this phase[180]. The remaining four rims might have theoretically belonged to either bowls or fruit-stands, their exact shape cannot be determined. A typical flat base of this phase is also attested, one of the only decorated bases in this inventory (Pl. 7.6-9), as well as a fragment of a handle (Pl. 7.6-8). This handle type is exceptionally rare in the inventory of Otzaki C, it might have belonged to an amphora featuring two handles[181].

Two sherds stand out from the catalogue because they cannot be dated beyond the general LN. Both feature dark paint on cream background, which was achieved through a slip, but the high degree of fragmentation on one sherd and a thick layer of sinter on the other prevent any conclusive analysis of the motifs displayed on both sherds. A linear pattern can be reconstructed for both, but they would fit into either LN I or LN II.

Consequently, 53 decorated sherds have been identified as belonging to the LN, the bulk of all sherds found at Makrychori 3. An additional three sherds can be categorised into either LN II or Chalcolithic pottery. The first of these sherds is a small fragment of a rim exhibiting a small lug directly under the lip (Pl. 7.7-5). Remains of a slip and possibly paint might be suspected on the surface, but it is too fragmented to be sure and the sherd is also covered in flecks of sinter. Several comparisons were found for this sherd: there are a few vessels featuring a vertical line of small lugs along their wall, these decorations are also positioned right underneath the lip and are dated to the early Dimini phase[182]. Paint is attested for some, but this can also not be excluded for F350-K25. A similar style can be found on Chalcolithic pottery from Otzaki Magoula[183]. This pottery is dated to the Rachmani phase coarse pottery, it is unclear whether the sherd at Makrychori 3 can or should be regarded as such. A similar fragment is F353-K26, a light brown fragment of an eyelet without any other visible painted or impressed decoration (Pl. 7.7-4). The shape of the eyelet is mirrored in both MN and LN, as well as Chalcolithic pottery. Due to the W3 ware, a MN date can probably be excluded for this sherd. At Visviki Magoula, comparable fragments were found in both the LN and Chalcolithic layers[184], and at Agia Sophia, those sherds belong to the Rachmani layers[185]. The third sherd differs from the first two: this is a red burnt handle fragment, possibly once coated in a red slip, with a circular knob attached to it (Pl. 7.7-7). The vertical position of the lug on the handle seems unusual. Similar fragments are found at Otzaki Magoula[186], where they can also be dated to both the LN and Chalcolithic. Reingruber has also identified one such handle in her inventory[187], as has Weißhaar at Pevkakia Magoula[188]. As a result, all three sherds collected at Makrychori 3 are only roughly dated to the 5th millennium BC.

7.6.2.3. Chalcolithic pottery

The Chalcolithic pottery from this site appears very distinct from the MN and LN pottery. Although there is painted pottery from the Chalcolithic period, no painted decorations have been discovered in the inventory of Makrychori 3. The published material from Chalcolithic sites in Thessaly originates from Otzaki, Rachmani, Pevkakia, and Visviki Magoula, which were all excavated in the 20th century, when the Chalcolithic Period was considered to be a transitional phase between the LN and EBA[189]. Newer findings are expected from more

[178] Tsountas 1908, Πίν. 24.
[179] i.e., Weißhaar 1989, Taf. 3, 5a–6b; Hauptmann 1981, Taf. 19, 1–2.
[180] Hauptmann 1981, 51.
[181] Hauptmann 1981, 59, Taf. 29.2, Typentafel 1 C12.
[182] Milojčić-v. Zumbusch 1976, Taf. 7, 7–8.
[183] Hauptmann 1981, 132–133, Taf. 40, 1–2, Taf. 44, 1, 3, 7, 5.
[184] Alram-Stern et.al. 2015, 143, Taf. 163, I,4-068, Taf. 198, I,OF-008.
[185] Milojčić 1976, Taf. 8, 12, 17.
[186] Hauptmann 1981, 291, Taf. 95. 1, Beilage 10.45.
[187] Reingruber this volume, Tafel 16.12, ATAE288-NES5-K22.
[188] Weißhaar 1989, Taf. 5, 15, Taf. 135 Typ 227.
[189] Alram-Stern 1996, 140; Toufexis 2017, 127-146.

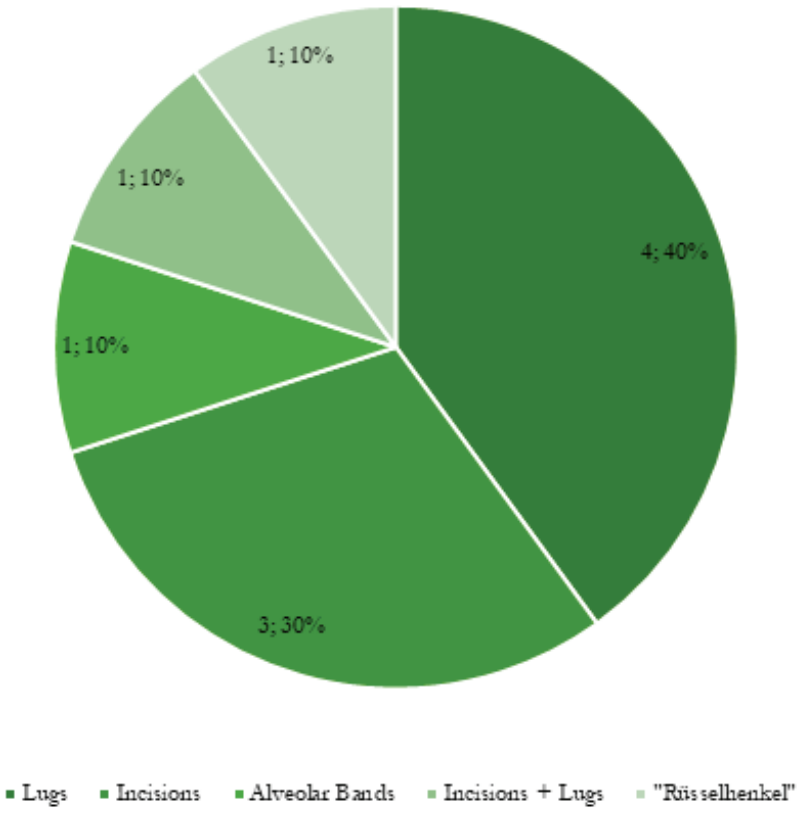


Fig. 7.11. Different decorations on the ECh pottery from Makrychori 3.

recent excavations (i.e., Palioskala), but until this material is fully published, no detailed distinction between earlier and later Chalcolithic material can be made for the surface material of Makrychori 3. As mentioned before, Rachmani pottery will be described as ECh pottery in this study. The pottery from the Rachmani period is both similar to and different from the preceding Neolithic period. The painted pottery closely resembles the form spectrum found in the LN, as it shows a continuation of Otzaki C motifs[190]. However, the technique changes, as the colour is pasty, meaning it is applied after the firing process[191]. The preferred paint colours are a pinkish red and white. This painted ware has been described as relatively rare[192], and incidentally, no painted Rachmani pottery was identified at Makrychori 3.

The ECh period also features negative and positive decorations, in the form of incised and impressed decorations, as well as plastic decorations[193]. There are ten such decorated sherds, all of them featuring a red burnt surface and noticeably large quartz particles in their break matrix (W4). The red surface colour ranges from light brownish red (Munsell: 5YR 6/6) to a very deep dark red (Munsell: 2.5YR 4/6; 3/6). At least seven sherds (70%) should be considered thick-walled. Two types of decorations were identified on these sherds: negative decorations in the form of deep incisions or impressed patterns, and positive decorations in the form of lugs (Fig. 7.11). Half the decorated sherds (n=4) exhibit lugs in different positions. Two were attached directly under the rim of a vessel, while the other two were placed directly under the base of the handle. 30% of the sherds are decorated with incised patterns (n=3), while the last sherd features a distinct impressed pattern. Another handle is decorated with both styles: a knob directly under-

[190] Schachermeyr 1991, 49.
[191] Alram-Stern 1996, 140.
[192] Weißhaar 1989, 16.
[193] i.e., Alram-Stern 1996, 141; Weißhaar 1989, 20.

neath its lower end and a fine incision on the fragment of the sherd still attached to it.

Among the plastic decorations, lugs are typical for the Rachmani period, and they are commonly found on coarse rather than fine pottery[194]. Lugs attached directly underneath the rim were also recognised at Pevkakia Magoula[195]. Two such fragments were identified in the material from Makrychori 3. Lugs attached to the base of a handle are also known from the lower Rachmani layer at Pevkakia Magoula[196]. They can appear as single decorations, or in pairs of two, three or even more lugs on the shoulder of a vessel or on handles[197]. Handle fragments with singular lugs at their base feature twice in the inventory of Makrychori 3.

Two types of incisions can be found in the Rachmani pottery inventory. One is made up of fine and organised lines and dots, which are sometimes even arranged into a style reminiscent of Furchenstich pottery[198]. These incisions can also be encrusted with white paint. The handle fragment with both a plastic decoration and an incision (Pl. 7.7-10) appears asymmetrical, but this fragment might have belonged to a handle featuring pairs of lugs, which were also found at Otzaki Magoula[199], or this observation could be due to fragmentation. The second style is vastly different; those sherds are decorated with deep and sometimes very coarse incisions. They are often found on handles of so-called scoops[200]. Similar incisions are found on both a rim and a handle from Makrychori 3. The incisions on the handle are comparable to incisions found on the incised handles from Pevkakia Magoula[201] (Pl. 7.7-12). The very flat, thick-walled rim resembles other large coarse vessels identified in both Pevkakia and Otzaki Magoula[202] (Pl. 7.7-6). Two fragments exhibit different forms of impressions or indentations. One fragment is adorned with an impressed decoration in the form of alveols (Pl. 7.7-11 and Fig. 7.11)[203]. At Pevkakia Magoula, such decoration could be dated very precisely, and this finding suggests that these decorations date between 4300 and 4200 BC, into the transitional phase between the ECh and MCh. The other is a fragment of a very flat handle with a central groove on top (Pl. 7.7-8). There is a similar fragment in the catalogue of Otzaki Magoula[204] and this type of decoration seems to be commonly found on the outside of scoops[205]. Lastly, one fragment consists of a triangular plastic shape that has been added to a sherd (Pl. 7.7-9), and it looks like the tip of a "Rüsselhenkel", which has been identified by Weißhaar[206] in the lower Rachmani stratum at Pevkakia Magoula.

The large degree of fragmentation prohibits any detailed distinctions of Chalcolithic vessel shapes at Makrychori 3. The thick-walled character of at least seven of them suggests larger vessels such as pithoi or cauldrons, which are often found in Chalcolithic inventories[207]. The large number of handles, compared to the other material found at this site, supports this observation, as most of these large vessels are equipped with thick handles[208]. In summary, there are ten sherds in the inventory of Makrychori 3 that cannot be compared to Neolithic pottery found in Thessaly. Their identification as Rachmani style pottery in connection to the findings that this pottery belongs to the ECh rather than the entire Chalcolithic allows for its identification as presumably ECh in the context of Makrychori 3.

7.6.2.4. Unidentifiable pottery

Despite the numerous possibilities to analyse and date unstratified pottery, some sherds cannot be identified without stratigraphic information. At Makrychori 3, two sherds fit into neither category described in the previous subsections and so far, no comparable pottery was found in the published material about Thessalian Neolithic and Chalcolithic pottery or in museums.

The first of those is a body sherd with a red slip, W1 temper, and a peculiar linear pattern

[194] Hauptmann 1981, 133.
[195] Weißhaar 1989, Taf. 31,6; 33, 1.
[196] Weißhaar 1989, Taf. 31, 9.
[197] Hauptmann 1981, 133, Taf. 22. 14, 20.
[198] Weißhaar 1989, 20.
[199] Hauptmann 1981, 133, Taf. 46, 3, 5–6.
[200] Weißhaar 1989, 20.
[201] Weißhaar 1989, Taf. 30, 1–4.
[202] Hauptmann 1981, 132, Taf. 44,6; Weißhaar 1989, 20, Taf. 30, 12.
[203] Weißhaar 1989, 23; Taf. 33, 12, 15–16; 34, 13–16.
[204] Hauptmann 1981, Taf. 22, 12.
[205] Weißhaar 1989, Taf. 47, 1.
[206] Weißhaar 1979, 44, Typ 209, Taf. 21, 3.
[207] Hauptmann 1981, 131–132, Beilage 10.
[208] Hauptmann 1981, 132–133.

Field	Total	Rolled/Worn	Percentage	Total Dec.	Sinter	Percentage
F354	29	11	37,93%	1	/	/
F359	19	4	21,05%	0	/	/
F358	78	11	14,10%	1	/	/
F353	411	19	4,62%	30	11	36,67%
F356	40	1	2,5%	0	/	/
F351	129	3	2,33%	5	1	20%
F352	508	7	1,38%	25	15	60%
F350	479	6	1,25%	29	13	44,83%
F355	6	4	not relevant	0	/	/

Tab. 7.6. Number of rolled/worn and sintered sherds in the respective fields.

(Pl. 7.7-13). At first glance, the technique on the sherd resembles MN scraped ware since the pattern looks faded, but the colours would be unusual – scraped ware is known to exhibit dark scraped patterns on a lighter ground[209]. This decoration can either be created by using a wet cloth to wipe out the patterns on the still-wet slip, or by painting the decoration onto polished pottery while it is still wet[210]. None of these techniques were applied here, and attributing this pattern to a kind of polishing style was also ruled out. Upon further inspection, it could be determined that the almost opaque light lines on the sherd are remnants of white paint on red ground. The pattern and exact technique, or which post-depositional processes might be responsible for this kind of damage remains unknown. Parallels might be drawn to Tsangli-phase red polished pottery[211], which is known to feature white paint, but aside from a single sherd with a similar colour scheme but different pattern[212] no successful comparisons have been made yet.

The second specimen is even more peculiar. This rim features a red slip, although not much of it is still left on the surface, and W4 temper with large pieces of quartz easily identifiable. It is decorated with a strip that probably enclosed the entire vessel (Pl. 7.7-14). The orientation of this sherd could not be fully determined, but it seems not much is missing from the lip. Due to this fragmentation, just the inner diameter was measured, which amounts to 7 cm. Despite an intensive search and discussions with both Reingruber and Toufexis in October 2021, no definite relative chronological date could be determined. Since the sherd is handmade, a classification as Neolithic or Chalcolithic seems reasonable, but no similar shapes could be identified within the published material.

7.6.2.5. Post-depositional processes

As last part of the pottery analysis, the sherds were checked for indications for post-depositional processes. Two such conditions were discerned during the recording of the pottery: severely rolled or worn sherds, and sherds covered in sinter.

The rolled or worn sherds were categorised systematically, as this was a condition which had already recorded at other sites in the basin of Elateia[213]. They were excluded from the detailed analysis since they could not provide clear results – after all, their surface colour or decoration could not be determined. At Makrychori 3, 4% of all sherds are rolled or worn (n=66). Compared to results from other sites[214], this is a relatively small number of sherds and any reasoning for this condition must remain hypothetical. Yet, it must be mentioned that rolled or worn sherds similarly were found in specific fields (Tab. 7.6). While almost all fields contain rolled or worn sherds, the largest quantities were found in F353 (n=19), F354 (n=11), and F358 (n=11). F352 and F350 both also hold a relatively high number of those sherds (n =7; n=6, respectively). For the three fields F350, F352, and F353, this is not a large amount compared to their total of sherds, the

[209] Mottier 1981, 33, Taf. IIIb.
[210] Alram-Stern 1996, 127–128.
[211] Hauptmann 1969, 25; Schachermeyr 1991, 38.
[212] Schachermeyr 1991, Taf. IVb.
[213] Reingruber et al. 2021, 5.
[214] i.e., Reingruber et al. 2021, 5, 16.

Phase	Total Number	Percentage of sherds affected in this phase
LN	30	57%
MN	5	19%
CH	3	30%
Transition LN to CH	2	67%

Tab. 7.7. Number of sherds affected by sinter sorted by their determined relative chronological age.

percentage lies between 1% and 5%. However, as F354 and F358 only encompassed a small number of sherds to begin with (n= 29 and 78, respectively), yet the number of rolled or worn sherds in this field amount to 38% and 14% of their respective total number. Furthermore, 21% of F359 (n=4) are affected, since only 19 sherds were collected in total. Therefore, there might be a pattern to these findings. For Elateia 1, Reingruber et al.[215] queried, whether the distribution of rolled/worn sherds might indicate running water in certain areas of the settlement – hypothetically even leading to the abandonment of the settlement. Similarly, in Makrychori 3, the heavier affected fields are situated lower than 78 masl. Nonetheless, no explicit findings can be inferred from this. With further investigation, through more attention paid to such conditions or through systematic drilling, the hypothesis of temporary flooding within the settlements might be tested – for Makrychori 3 and beyond.

The exact frequency of sinter covering sherds could not be analysed as systematically as the rolled/worn sherds because the occurrence of this phenomenon was not observed from the beginning of the pottery analysis and upon its discovery could not be repeated due to time restrictions. In general, existence of many sintered sherds in both F352 and F353 was noted, but none were found in F354. This is interesting since F354 yielded so many rolled/worn sherds. Due to these observations, special attention was paid to sinter during the analysis of the decorated pottery, in which both spots and thick layers of sinter were recorded. The analysis of sintered sherd revealed that a total of 43% of all decorated sherds are affected to some extent (n=40). The larger number is only covered in spots of sinter (67%; n=27). However, the remaining 33% are coated in a thick layer of sinter (n=13), which in some cases even prevented the analysis of the sherd (i.e., Pl. 7.5-7 or Pl. 7.7-2). Among the decorated sherds, the largest number of affected sherds can be found in F352 (60%; n=15), F350 (44,83%; n=13), and F353 (36,67%; n=11) (Tab. 7.6). Considering the large total number of sherds collected in each of these fields, this number only amounts to about 3% for all fields.

Albeit, when the sintered sherds are sorted by their assessed relative chronological age, a clear pattern emerges (Tab. 7.7). 75% of the sintered sherds belong to the LN (n =30), while the other periods feature much less sinter, 12% in the MN (n=5), 8% from the ECh (n=3) and 5% from the transitional phase between LN and ECh (n=2). Overall, this amounts to a quite large number of sintered sherds in each period. Projected onto the total number from each category, this means 57% of all LN sherds are coated in at least a little sinter, as are 30% of ECh sherds, 19% of MN sherds, and 67% of LN-ECh sherds. Although this result should be handled carefully, as there are only three sherds in this category in total. This certainly is no reliable model – a more thorough analysis is needed – but the implications of this observation are worth-while. Compared with the elevation in the area, it was determined that both F352 and F353 lie below 78 masl, while F350 lies at 80 masl. Conspicuously, most of the impressed and therefore likely oldest decorated pottery was found in F350 and without signs of sintering, contributing to the idea that settlement activity might have been influenced by climate factors. The inference of possible flooding events in prehistoric times might explain the irregular affection of different pottery categories, but without more data, this cannot be more than a loose hypothesis to explain the observed phenomena. More research on the development of sinter on pottery in general, but also on more regional factors such as the amount of calcium in the groundwater in the basin of Elateia needs to be conducted before there can be conclusive results.

[215] Reingruber et al. 2021, 16.

7.7. The small finds

In addition to the pottery, a total of 45 small finds were collected; of these, 26 will be presented here. A single small find was identified as modern, and subsequently sorted out of the inventory. The remaining 25 small finds were categorised into stones, clay objects, and pieces of jewellery. The study of these objects remains largely descriptive, followed by a comparison with published material to determine possible relative chronological ages.

7.7.1. Stone tools

Of all 45 small finds, 32 were characterised as stone tools. In this chapter, twelve polished stone tools are presented[216]. One group of stone tools are pounders (n=4; Pl. 7.8-1–3, 5). Depending on the stones' natural shape, a pounder is usually either round or oval, so they can be gripped firmly[217]. They are classified through the damage to their work surface, which results from continued punching onto different surfaces[218]. The pounders from Makrychori 3 are probably meant to be gripped at their slightly ovate neck, which in the case of F353-01 is slightly discoloured, perhaps from continued use. The dorsal side is noticeably damaged with tears and breaks littering the surface. Most tools are made from pebble-stone. They can be characterised as two smaller (F350-02, F358-01; up to 120 g) and two bigger pounders (F353-01, F358-02; up to 320 g). The smaller pounders are round and flat with a straight dorsal side, while the ventral side is slightly convex. The work surface is visibly flattened, with both scratch marks and bulbar scars. There are flecks of sinter on all surfaces of F350-02. Half the dorsal surface of F358-01 has broken off, possibly from too much usage as a pestle. The heavier pounders are shaped differently. The overall shape of F353-01 is more oval and broader, although the structure is the same as the smaller ones. The working surface is severely damaged, full of scratch marks and bulbar scars, and some fragments have broken off. Additionally, the entire neck and ventral side are covered in a thick layer of sinter. F358-02 retains a predominantly oval and long shape, suggesting a use as either pounder or mortar[219]. Great damage to the ventral side of this objects suggests the same: almost two-thirds of the surface have broken off, creating a hatchet-shaped surface. This damage could be both due to hammering or grating on hard material[220]. Pounders such as these have been used since the Palaeolithic[221]. In Thessaly, they are documented at several sites, for example at Visviki Magoula[222] or in the Rachmani layers at Pevkakia Magoula[223]. Without stratigraphical information, statements regarding the relative chronological age of these tools are problematic, as pounders are attested in both the Neolithic and Chalcolithic.

Two fragmented tools were identified as possible muller (Pl. 7.8-4, 6). A muller was used in connection to grind- or whetstones; they display at least one work surface, but might have been used on both sides[224]. Muller are usually made from coarse materials, to enhance the work process[225] Their shape can be spherical or flat, depending on their service life. The work surface of ATAE134-01 is not fully preserved, and the length and neck of the tool are missing completely. Since the work surface is covered in scratch marks and because of the grainy material used, it was probably rather used as a muller than a hatchet[226]. F350-03 could be potentially identified as very thin grindstone or muller. It features the same wear marks as ATAE134-01, but the preserved work surface is also severely rounded, suggesting this tool might have been used for multiple tasks, possibly relating to food production. Furrows, for example from grinding tools, were not identified[227]. Muller occur since the Mesolithic but are more common since the Neolithic[228]. ATAE134-01 shows traces of sinter, but cannot be conclusively positioned on the

[216] A thirteenth polished stone tool, F350-03, which was identified as a sort of pestle, was not analysed further due to time constraints and the large degree of fragmentation.
[217] Bergner 2015, 412.
[218] Hahn 1991, 237.
[219] cf. Bergner 2015, 412, Taf. 255, VSt121.
[220] Bergner 2015, 412.
[221] Hahn 1991, 238.
[222] Bergner 2015, Taf. 254–259.
[223] Weißhaar 1989, Taf. 65, 14, 17.
[224] Bergner 2015, 413.
[225] Hahn 1991, 242.
[226] Hahn 1991, 239.
[227] Bergner 2015, 414.
[228] Hahn 1991, 244.

magoula, meaning this information cannot be processed further. Muller are also known from Visviki Magoula[229].

The catalogue of polished tools also includes the fragment of a mace-head (Pl. 7.9-1) and a multi-use tool (Pl. 7.9-6). The mace-head is made from gabbro and weighs 151.7 g. Almost half of it is preserved, the shape and diameter of the object can therefore be conclusively reconstructed. The surface is cracked and dented in some parts; clear bulbous scars are visible on the surface. The drill-hole is polished from the inside and almost round. Mace-heads are featured in the Neolithic inventory of Greece but are relatively rare on the mainland[230]. At Pevkakia Magoula and other sites, these mace-heads are known from the middle and upper Rachmani layer[231]. The multi-use tool (comp. Ch. 10.3) is made from quartz with small Goethite inlays, and it weighs c. 550 g. The dorsal side of the object is coated in a thick layer of sinter, while the ventral side remains completely free. The neck is flattened, possibly on purpose, and when held with a right hand, the thumb can be settled on a ledge on the dorsal side, for a better grip. The work surface is covered in bulbous scars.

The remaining four stone tools were identified as adzes and celts. The difference between both tools lies within their symmetry: an asymmetrical blade suggests it was mounted diagonally to the hilt– typical for an adze[232]. Yet, the characteristic traits for both tools overlap, which is why they are usually categorised together[233]. Adzes and celts are characterised based on the length and width of the tool. In this study, the largest of them is a celt weighing 26 g, the blade is 4,5 cm wide (Pl. 7.9-3). The full length cannot be reconstructed, as the distal part of the tool has broken off. The dorsal surface is well-polished, revealing the texture of the stone. The original surface of the ventral side has also broken off, revealing the rough inner texture. F350-01 and MAK3-Str.02 are also celts, although much smaller (Pl. 7.9-4; Pl. 7.9-5). Both are no wider than 2,5 cm and probably not much longer than 4 cm – although the exact shape cannot be reconstructed due to fragmentation. MAK3-Str.02 is probably made from Serpentinite and weighs 11,4 g. It is polished on all sides, but the proximal dorsal side appears especially smooth, which might be due to continued use. However, the surface of the distal dorsal side is almost rough. Therefore, this celt could have been used for cutting different materials, possibly as a skinning tool, and the polished surface might be resultant from the angle in which it was used[234]. The upper half has sustained considerable damage, the break matrix and some parts of the surface are also covered in sinter. The smaller celt (F350-01) is no larger than 2x2 cm and weighs only 4,2 g. Both sides are well polished, and there are barely any signs of usage. The edge is notably pointed, the ventral side is slightly sloped, perhaps from continued resharpening. Celts such as these are also known from Pevkakia Magoula[235], or Visviki Magoula[236]. The fourth stone tool is an adze, roughly 2,5x4 cm in size and weighing 33,2 g (Pl. 7.9-2). The material could be serpentinite, which was probably sourced locally[237] (Fig. 5.2). F351-04 is well-polished but is also damaged on both sides and covered in various amounts of sinter on the edges and in the break. Similarly, there are different signs of usage: bulbous scars and grooves, which would indicate it was used with force.

Celts and adzes are a characteristic stone tool in the European Neolithic, although in Central Europe, early finds date to the Mesolithic[238]. In Thessaly, they are known from Neolithic and Chalcolithic layers[239]. Although the twelve stone tools analysed at Makrychori 3 cannot be securely dated to a certain phase, they support the findings from the pottery analysis, as they can be dated to the MN and LN as well as the ECh.

[229] Bergner 2015, 413, Taf. 261.
[230] Bergner 2015, 412, Taf. 253, VSt110, VSt111.
[231] Weißhaar 1989, 48, Taf. 65, 21–22; 82, 5; Tsountas 1908, Abb. 246.
[232] Hahn 1991, 230.
[233] cf. Hahn 1991, Bergner 2015.
[234] pers. comm. with Reingruber, 02nd Nov. 2021.
[235] Weißhaar 1989, 47–48, Taf. 65, 11.
[236] i.e., Bergner 2015, Taf. 251.
[237] pers. comm. with Reingruber, 01st Nov. 2021.
[238] Hahn 1991, 234.
[239] Weißhaar 1989, 48, Taf. 70.10.

7.7.2. Clay objects

7.7.2.1. Figurines

Figurines are a well-known find category in the Greek Neolithic and Chalcolithic, most of them were found at sites in Thessaly[240]. Thessalian figurines are mainly found in settlements, in both the broader settlement area and in house contexts[241]. Seven figurines or parts of figurines were collected at Makrychori 3. Six of them depict anthropomorphic bodies or body parts, while one depicts an animal head.

Anthropomorphic figurines

All six anthropomorphic figurines depict various body parts; five of them were made from clay, one fragment is made from marble. The most complete fragment of a figurine (Pl. 7.10-1) depicts a torso and lower body, neck, and rudiments for arms and legs. Most of the frontal surface is damaged, with clear broken edges. The upper half of the chest is still intact, although the surface of the stomach and possible depictions of genitalia have broken off as well. The remnants of the neck are also still visible, the head itself seems to have broken off unclean. Viewed from the side, it becomes apparent the figurine is portrayed to have slight hyperlordosis, with the upper and lower back sightly curved outward. The back of the figurine is very interesting: while the front is badly damaged, the smoothed surface of the back is completely intact. Additionally, there are five incisions on the back: two on the shoulder, two asymmetrical incisions on the hips, and one to denote the buttocks. The bottom of the figurine is flat, suggesting a seated position. The asymmetrical position of the hip incisions might suggest that this figurine was depicted as sitting on the ground, one leg angled to the side and one leg bent. Such a figurine is for example known from Sesklo, it is almost intact and was dated to the MN[242]. Asymmetrically constructed seated figurines were also described by Hansen[243], and similar fragments to F351-02 were found at Achilleion[244] and Sesklo[245]. Although undated, the corpulent body of this figurine more closely resembles the structure of MN figurines than the more schematic depictions in the LN[246]. For this reason, F351-02 should be regarded as MN.

A similar fragment shows the stomach area of a figurine (Pl. 7.10-4), which unfortunately does not fit the torso found in F351. The front of the fragment, which weighs 28,3 g, appears to have originally been coated in a brown slip. The brown clay underneath is smoothed crudely and the whole surface partly covered with thick sinter. It shows multiple incisions, which can be interpreted as depictions of body parts. The front is clearly rounded, indicating a protruding stomach. Incised into the surface are an umbilicus and a vulva, identifying this fragment as part of a female figurine. The incision from the vulva is continued on the bottom of the fragment. From the sides, the curve of the stomach is clearly visible. The back of the fragment allows a better observation of the clay used, revealing pieces of quartz and limestone (W2). Usually, standing figurines are depicted with visible genitalia[247]. Another fragment depicts the left leg of another standing figurine (Pl. 7.10-6). It is made from brown clay with W2 tempering as well. The surface is well smoothed on all sides, but there is a thin layer of sinter on especially the left side. The foot is very worn and positioned slightly outward, so that the figurine appears to be tiptoeing. Interestingly, on the inside of the thigh, the remains of a vulva and buttocks can be seen in form of an incision at the bottom of what would be the torso. This area appears to be of a darker colour. The top of the fragment is shaped like a joint, to connect the leg to the lower body at the hips. It does not appear broken off and the rounded shape has been smoothed. The inside of the leg is very flat, hinting at the former connection to a right leg in its original state. There is a second fragment of a leg, although just the lower part of the object is preserved (Pl. 7.10-3). It weighs 4,4 g and the ware was categorised as W1. The overall shape suggests this is probably the foot of a left leg because it is bent slightly to the left and

[240] Orphanidi 1996, 153; Hansen 2007, 112, 114.
[241] Hansen 2007, 113.
[242] Papathanassopoulos 1996, 302, Nr. 209.
[243] Hansen 2007, 119.
[244] Hansen 2007, Taf. 91, 6.
[245] Hansen 2007, Taf. 99, 8.
[246] Hansen 2007, 122.
[247] cf. Hansen 2007, Taf. 99.

the right edge is flattened, where it probably sat against the right leg. A thin layer of sinter covers all sides of the fragment. Like F351-02, F353-04 and F353-05 can also be considered EN or MN, as they also adhere to the naturalistic, corpulent style inherent to stratified figurines of the same date[248]. In theory, such naturalistic forms are also attested in the Chalcolithic[249], but the ware of all three fragments suggests an older date.

The fourth fragment of a figurine (Pl. 7.10-2) is made from a red slipped brown clay tempered with limestone (W3). At first glance, the fragment seems to resemble part of an arm or a leg. Viewed from the front, the upper and lower part are curved downward, creating a stump-like shape. However, viewed from the back, the edges of the find are suspiciously straight. Compared with F351-02, the object was identified to be the shoulder of a figurine[250]. Yet, the straight edges of the fragment are almost at a 90° angle toward each other, one side even features grinding marks, suggesting this object was used after its fragmentation. The ware was identified to be W3, suggesting a LN date, but the shape is reminiscent of EN and MN figurines.

The sixth fragment (Pl. 7.10-5) is made from marble, and possibly represents an acrolith in form of a removable head, or a schematic depiction of a head. The object weighs 4,1 g and no definite orientation or defining marks could be identified. The general shape is roughly rectangular, although the uneven, broken edge at the bottom suggests this piece was longer at some point. All sides of the fragment are highly polished, although the right side is completely covered in sinter. Stone figurines are known since the LN, where stone gradually replaced clay as material[251]. The shift from MN to LN further transforms the tradition of figurine production: naturalistic depictions are replaced by schematic forms in the LN II[252]. Schematic heads such as MAK3-Str.01 are known from Pevkakia Magoula[253] and Sesklo[254], where they unfortunately could not be dated properly[255]. Acroliths are important indicators for the Chalcolithic but can also be dated to the LN[256].

Zoomorphic figurine

Most zoomorphic figurines in Neolithic Greece depict ruminants and while they are generally considered rare, most are from Thessaly[257]. A fragment of such a figurine was found at Makrychori 3, likely depicting an unspecified ruminant head (Pl. 7.10-8). The specimen is made from red burnt clay and W1 tempering. The head was probably attached to a vessel since the back of the head is a sherd fragment, meaning F351-03 is probably a protome[258]. It weighs 30,2 g and has a solid structure. The whole surface is polished, with occasional flecks of sinter. The face is a bit asymmetrical and faces forward. From the side, an elongated snout becomes visible. There is a small hole towards the bottom of the profile, probably some form of damage. Interestingly, the bottom of the figurine features another small hole, probably used for stabilisation of the head[259]. Zoomorphic depictions, primarily cattle, are mainly known from LN sites, such as Platia Magoula Zarkou but there are also some MN finds[260].

7.7.2.2. Unidentifiable clay object

Among the small finds, there was also an unidentifiable clay object with a unique shape, which is yet to be explained fully. It is made from a very coarse red clay (W4), tempered with large pieces of quartz and mica, and weighs 126,8 g. From the inside, the object is poorly smoothed, the outside is very finely burnished (Object not illustrated). It is made from two pieces of clay connected at an almost 90° angle. Two possible comparisons were found: it might be part of a house model or part of a spit support. House models are rare but known in Thessaly, for example from Chaironeia or Platia Magoula Zarkou[261]. There is a difference between

[248] Hansen 2007, 118, i.e., Taf. 92, 1.
[249] Weißhaar 1989, Taf. 66, 13.
[250] for similar shoulder-depictions in figurines see e.g. Hansen 2007, 118, 122.
[251] Hansen 2007, 122.
[252] Hansen 2007, 122.
[253] Hansen 2007, Taf. 104, 13, 105, 5.
[254] Hansen 2007, Taf. 100, 4–6.
[255] Weißhaar 1989, 69–70.
[256] Hansen 2007, 124; Milojčić 1976, 11, Taf. 19, 4.
[257] Toufexis 1996b, 159; Hansen 2007, 116.
[258] Toufexis 1996b, 160.
[259] Toufexis 1996b, 159.
[260] Toufexis 1996b, 159.
[261] Toufexis 1996a, 161.

house models with and without the roof, which marks a chronological difference, as roofed house models are primarily known from the MN and house models without a roof mainly from the LN[262]. Since the object from Makrychori 3 is fragmented, such a distinction cannot be made. Spit-supports are objects shaped like the frustum of a pyramid; they become wider towards the bottom[263]. According to corresponding stratified finds in Thessaly and Macedonia, spit supports date to LN I or LN II[264]. Nonetheless, a classification as part of a house model (or maybe a different model[265]) seems more likely due to the colour of the object and the rectangular fit of both clay plates.

7.7.3. Jewellery

Three pieces of jewellery were found at Makrychori 3, two beads and a piece of worked *Spondylus*. In general beads are the most common form of jewellery in Thessaly[266]. The two beads are very small, only weighing between 0,01 and 0,02 g. One is made from serpentinite and the other from a hard, whiteish material (Pl. 7.10-9–10). The colouring and material structure of F353-02 suggest that it is made from *Spondylus*, rather than marble. This bead is highly polished, although the surface is damaged in some places and with smaller flecks of sinter. Both ends are cut, giving it a discoid shape[267]. In Thessaly, *Spondylus* beads are also attested at Sesklo, Dimini, and Rachmani Magoula[268], the material seems to be preferred to other shell materials also available in both MN and LN[269]. An almost identical bead was also found in Dikili Tash, also dating to the MN or LN[270]. Such beads from stratified contexts were dated between 5200 and 5000 BC[271]. Discoid *Spondylus* beads are the most common type of *Spondylus* object in southeastern Europe, although they are less common in Greece and considered rare outside of Thessaly or Macedonia[272]. MAK3-Str.04 was found along the path that cuts through the top of the magoula as a stray find. The green and black surface of the bead looks rough and unpolished, the structure of the material is clearly visible. Some surface damage is visible with a magnifier, but otherwise this bead appears to be complete. The flat shape of the bead resembles Type VII of Neolithic beads in Thessaly[273], which was also recorded by Tsountas[274] and in the lower Rachmani stratum at Pevkakia Magoula[275].

The other *Spondylus* fragment from Makrychori 3 is a fragmented arm ring, which has broken in half (Pl. 7.10-7). *Spondylus* as a resource is known in the Aegean since the Palaeolithic and Aegean *Spondylus* can be found all over the European continent[276]. This fragment weighs 12,3 g and the surface is well polished. One half is completely covered in a thick layer of sinter, while the other half is completely free of any deposits but shows signs of damage. The inside is matte, suggesting the animal was dead before it was collected[277]. Both sides thin out at the ends, and the lower end of the fragment looks like it has been perforated. What appears to be a gouge with eight impressions in a row is visible on the inside. The small width of the material (1 cm) and simultaneously large diameter (probably 7 cm) of the object suggests this was a bracelet, which might have been also used after breaking, perhaps as an amulet[278]. Fragmented arm rings are quite common in south-eastern Europe between 5500 and 5000 BC, and especially common in LN Greece[279]. Their secondary usage as amulets has also been attested for numerous *Spondylus* fragments, although they are mostly distributed in Central Europe[280]. In Thessaly, similar objects were found at Visviki Magoula[281] and Agia Sophia Magoula[282]. It is unlikely that the fragment is younger than LN or Chalcolithic, as *Spondylus* objects disappear after the EBA.[283]

---

[262] Toufexis 1996a, 161.
[263] Alram-Stern and Dousougli-Zachos 2015, 447.
[264] Alram-Stern and Dousougli-Zachos 2015, 447–448.
[265] cf. Papathanassopoulos 1996, Fig. 268, No. 269.
[266] Kyparissi-Apostolika 2001, 213.
[267] Windler 2018, 99, Abb. 6.30.
[268] Karali 2005, 96, Fig. 4.
[269] Karali 2005, 95.
[270] Papathanassopoulos 1996, 335, No. 285.
[271] Windler 2018, 96.
[272] Windler 2018, 98–99.
[273] Kyparissi-Apostolika 2001, 96, Πίνακας II.
[274] Tsountas 1908, Taf. 43, 26–28.
[275] Weißhaar 1989, 49, Taf. 38, 17.
[276] Windler 2018, 76.
[277] Galik 2015, 460.
[278] Windler 2018, 94.
[279] Kyparissi-Apostolika 2001, 209, 213; Karali 2005, 95.
[280] Windler 2018, 94.
[281] Galik 2015, 460–461, Taf. 280.
[282] Milojčić 1976, Taf. 21.
[283] Karali 2005, 96.

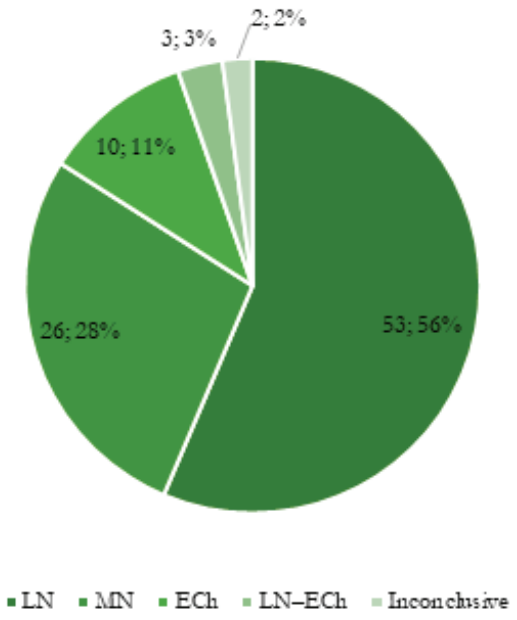


Fig. 7.12. Results from the analysis of the decorated pottery. As neither the undecorated diagnostic pottery nor the small finds can be dated as conclusively as the decorated pottery, they are excluded from this graph.

7.8. Results and Conclusion

The aim of this study was to create a coherent model for the relative chronology of the site Makrychori 3, based on the material collected in the surveys in 2018 and the 1960s. Through the analysis of the pottery and the presentation of the small finds in correlation with the geographical data collected in 2018, an overview over the extent and possible period of occupation of this site was given.

The analysis of the distribution of all finds has shown that the extent of the site encompasses the central fields of F350, F351, F352 and F353 (Fig. 7.3). However, the northernmost field F359, should be regarded as outskirt of the magoula, or maybe just area of influence, as only a few sherds were collected there and the spatial segregation from the main area is considerable. To determine whether any settlement activity occurred there, more centralised survey work would be needed. In the south, F356 might still be regarded as southern limit, but the little number of finds from F357 designates it as an area of influence, rather than a part of the magoula. Following the evaluation of tne pottery, the western field F355 with a large number of Hellenistic finds is now part of TRA8. F358 and F354 in the northwest should be regarded as part of the habitation zone of the magoula, since a considerable number of sherds were collected there, including a few decorated ones, as well as small finds. In total, more survey work or geophysical exploration would be needed to accentuate these limits and to more sharply define the extent of the site. Another interesting prospect would be to access the previously restricted area next to F350, to see how the magoula is limited in the south-east. Nonetheless, the evaluation of the differently distributed finds illuminates the most probable area (Fig. 7.3).

This study for the most part showed that the detailed analysis of decorated sherds yields the most tangible results when examining surveyed material. The diversity of the Neolithic and Chalcolithic material as well as the fact that many small find and pottery categories, whether they be based on shape or material, are too widespread to be dated without accompanying information, i.e., from stratigraphies or well-known decoration styles. Hence, the analyses of undecorated pottery and the small finds remain mostly descriptive and were used toreinforce and accentuate the conclusions from the analysis of the decorated pottery when possible, rather than providing reliable results independently.

In general, the analysis of the sherds and small finds has revealed that the magoula was inhabited from

the MN to the ECh, although the data concerning the beginning and end of the settlement is somewhat ambiguous (Fig. 7.12). There are clear indications for a MN habitation, especially on account of the white-on-red painted sherds, the determined wares (W1 and W2), and as well as some of the identified vessel shapes, such as funnel-shaped rims. Nonetheless, as mentioned before, many traditions from the EN are continued into the MN, most importantly impressed pottery sherds and bright red slips, but also specific vessel shapes such as the prominent "Sesklo bowls"[284]. In general, the analysis of undecorated diagnostic pottery has revealed that only a few such sherds from Makrychori 3 held specific chronologically relevant information. Despite these findings, it might be argued that without the exact stratigraphic position, there cannot be a clear distinction between these potentially EN or MN sherds, and they can only be dated according to the published material from other sites. However, since any unambiguous indicators for an EN occupation of Makrychori 3 are missing, such as black-topped or red-on-buff painted pottery, the preliminary identification of an EN layer would be precipitous. Therefore, based on the existence of conclusively MN material as well as potentially ambiguous findings, such as the naturalistic figurines and the impressed pottery, the beginning of the magoula might be dated to the transitional phase between the late EN (EN III) and the early MN (MN I). The total number of presumably MN sherds make up 28% of the entire inventory at Makrychori 3 (n=26) (Fig. 7.12).

Furthermore, the LN is attested exceptionally well, with more than half the total sherds (56%) identified as either LN I or LN II (n=53) (Fig. 7.12). The study has shown that the LN I phase is less prevalent in the inventory (n=13), and some of the categories from this period are represented by just a few sherds, for example black polished pottery or polychrome painted LN I pottery. The bulk of the sherds is dated to the LN II (n=37), most of them are from the Otzaki C pottery spectrum (n=31), just a few sherds were identified as either Otzaki A or B (n=6). The typical vessels shapes, mainly open and unstructured bowls, are as prevalent in the inventory as the dark-on-cream, sometimes dark-on-red pottery of this phase. The results from the analysis indicate that the densest habitation would have been in the LN II period. Furthermore, a few sherds (n=3), possibly belonging to either the LN or ECh period (Fig. 7.12), imply that Makrychori 3 was settled in the transitional phase between both periods. The ECh is represented by ten sherds, 11% of the entire inventory (Fig. 7.12). The length of the Chalcolithic occupation cannot be inferred, and at this stage only the ECh can be attested. The acrolith or schematic head of a figurine also supports this. In summary, the findings suggest the site was inhabited from the transitional phase between EN and MN (EN III–MN I) to the ECh, which in absolute dates translates to an occupation from 6100/6000 to 4300 calBC[285].

These findings enable the comparison of Makrychori 3 with neighbouring sites in the area. As mentioned before, two other sites are in close vicinity to this site: Elateia 1 and Makrychori 1. Due to the relative chronological classification of Makrychori 3, it is now possible to infer contact between Makrychori 3 and Makrychori 1, as both sites have existed simultaneously for most of their occupancy[286]. Since both sites are situated within one kilometre of each other, it seems only logical that there was contact. The reason for two concurrent settlements within such proximity to each other can only be hypothesised and without further research, no concrete results can be obtained from the surveyed archaeological record alone. Geophysical examinations and more extensive archaeological methods would be needed to ascertain solid arguments for this. Likewise, contact with Elateia 1 might be cautiously inferred, since this site was only inhabited during the beginnings of Makrychori 3, in the MN I. Preliminary results about the relationship with the natural environment can also be implied, although also in this aspect much more research in general would be needed for conclusive results. The largest extent of the magoula on the fields at c. 78 to 80 masl was confirmed, as was the existence of many sintered sherds in fields below 78 masl, most of them from the LN, in contrast to fewer

[284] Alram-Stern and Dousougli-Zachos 2015, 126.

[285] Tsirtsoni 2016, 454, Tab. 1; Reingruber this volume Tab. 6.30; Reingruber et al. 2017, 50, Tab. 5.

[286] Toufexis 2017, 125-193; Reingruber this volume Tab. 6.30.

sintered sherds from the MN and almost no sinter on impressed pottery, which was largely found at 80 masl. This might indicate they were covered by a standing body of water for a considerable amount of time, while the sherds were still on the surface and not covered by soil[287]. Following the reconstruction of a prehistoric lake in the basin of Sykourio, based on both detailed survey work and geophysical examinations[288], it has become apparent once more that interdisciplinary methods greatly improve our understanding of prehistoric environments. Therefore, even small-scale studies such as this one should include record and analyse conspicuous findings such as sinter or other fragmentations on pottery to ensure this data can be analysed in a bigger context.

In summary, the methods used in this study successfully established a model for the relative chronology of the site through in-depth observation and analysis of the different categories and comparison with published material. Therefore, preliminary results about the extent of the site and length of the occupation were inferred through surface material. This shows that the detailed survey of a site can already lead to meaningful results, which might form the basis for further research and additionally helps understanding the prehistoric environment of a centralised area better, even without large-scale excavations.

[287] pers. comm. Reingruber, 15th August 2022.
[288] i.e., Reingruber et al. 2021; Reingruber et al. 2024.

Bibliography

Alram-Stern 1996: E. Alram-Stern. Die Ägäische Frühzeit 2. Serie, Forschungsbericht 1975-1993. 1. Band: Das Neolithikum in Griechenland mit Ausnahme von Kreta und Zypern (Wien 1996).

Alram-Stern and Dousougli-Zachos 2015: E. Alram-Stern und A. Dousougli-Zachos (eds.), Die deutschen Ausgrabungen 1941 auf der Visviki-Magoula/Velestino. Die neolithischen Befunde. Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraumes 36 (Bonn 2015).

Alram-Stern et al. 2017: E. Alram-Stern, A. Sarris, K. Vouzaxakis, K. Almatzi, P. Arachoviti, V. Rondiri, D. Efstathiou, E. Stamelou, C. C. García, T. Kalayci, F.-X. Simon, G. Cantoro, J. Donati, and M. Manataki, Visviki Magoula Revisited: Comparing Past Excavations' Data to Recent Geophysical Research. In: A. Sarris, E. Kalogiropoulou, T. Kalayci, L. Karimali (eds.). Communities, Landscapes, and Interaction in Neolithic Greece. Proceedings of the International Conference, Rethymno 29–30 May 2015, 2017, 137–148. https://www.academia.edu/67907466/Magoula_Visviki_revisited_comparing_past_excavations_data_to_recent_geophysical_research (last accessed 09.07.2024).

Bergner 2015: M. Bergner, Geschliffene Steingeräte. In: E. Alram-Stern, A. Dousougli-Zachos (eds). Die deutschen Ausgrabungen 1941 auf der Visviki-Magoula/Velestino. Die neolithischen Befunde. Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraumes 36 (Bonn 2015) 408–419.

Bonga 2016: L. Bonga, Late Neolithic Pottery from Mainland Greece, ca. 5.300–4300 B.C. (Pennsylvania 2016). http://dx.doi.org/10.34944/dspace/813 (last accessed 09/07/24).

Bonga 2019: L. Bonga, Early ceramic styles and technologies in the Aegean and the Balkans: retrospect and prospects. Documenta Praehistorica XLVI. 2019. https://doi.org/10.4312/dp.46.10 (last accessed 09/07/2024).

Coleman 2011: J. E. Coleman, The Petromagoula-Doliana Group and the Beginning of the Aegean Early Bronze Age. In: D. Katsanopoulou (ed.), Ancient Helike and Aigialeia. Protohelladika: The Southern and Central Greek Mainland. Helike IV, 2011, 13–44.

Furholt 2017: M. Furholt, Das ägäische Neolithikum und Chalkolithikum. Transformationen sozialer Handlungsmuster in Anatolien und Griechenland zwischen 6500 und 4000 v. Chr. Universitätsforschungen zur prähistorischen Archäologie 304 (Bonn 2017).

Galik 2015: A. Galik, Geräte aus Schmuck, Geweih und Knochen. In: E. Alram-Stern, A. Dousougli-Zachos. (eds.) Die deutschen Ausgrabungen 1941 auf der Visviki-Magula/Velestino. Die neolithischen Befunde. Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraumes 36 (Bonn 2015) 455–460.

Gallis 1987: K. Gallis, Die stratigraphische Einordnung der Larisa-Kultur: eine Richtigstellung. Praehistorische Zeitschrift 62, 1987, 147–163.

Gallis 1992: K. Gallis, Ατλας προϊστορικών οικισμών της ανατολικής θεσσαλονίκης έδεσσας (Larissa 1992).

Gallis 1996: K. Gallis, Ausgrabungen der neolithischen Siedlungen und Friedhöfe von Platia Magoula Zarkou, Souphli Magoula und Makrychori 2 in Thessalien. In: E. Alram-Stern (ed.). Die Ägäische Frühzeit 2. Serie, Forschungsbericht 1975-1993. 1. Band: Das Neolithikum in Griechenland mit Ausnahme von Kreta und Zypern (Wien 1996) 521–563.

Grundmann 1937: K. Grundmann, Magula Hadzimissiotiki. Eine steinzeitliche Siedlung im Karla-See. Athener Mitteilungen 62, 1937, 56–62.

Hahn 1991: J. Hahn, Erkennen und Bestimmen von Stein- und Knochenartefakten. Einführung in die Artefaktmorphologie. Archaeologica Venatoria 10 (Tübingen 1991).

Halstead 1984: P. Halstead, Strategies for Survival: An Ecological Approach to Social and Economic Change in the Early Farming Communities of Thessaly, N. Greece (Cambridge Dissertation 1984).

Hansen 2007: S. Hansen, Bilder vom Menschen der Steinzeit. Untersuchungen zur anthropomorphen Plastik der Jungsteinzeit und Kupferzeit in Südosteuropa. 2 Bände. Archäologie in Eurasien 20 (Berlin 2007).

Hauptmann, 1969: H. Hauptmann, Die Funde der frühen Dimini-Zeit aus der Arapi-Magula, Thessalien. Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraums 9 (Bonn 1969).

Hauptmann 1981: H. Hauptmann, Die deutschen Ausgrabungen auf der Otzaki-Magula in Thessalien III: Das Späte Neolithikum und das Chalkolithikum Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraums 21 (Bonn 1981).

Karali 2005: L. Karali, Shells from Prehistoric Sites in Northern Greece. In: D.E. Bar-Yosef Mayer (ed.). Archaeomalacology. Molluscs in former environments of human behavious. Proceedings of the 9th Conference of the International Council of Archaeozoology (Durham 2005) 91–98.

Kyparissi-Apostolika 2001: N. Kyparissi-Apostolika, Τα Προϊστορικά Κοσμήματα της Θεσσαλίας (Αθήνα 2001).

Maran 1998: J. Maran, Kulturwandel auf dem griechischen Festland und den Kykladen im späten 3. Jahrtausend v. Chr. Studien zu den kulturellen Verhältnissen in Südosteuropa und dem zentralen sowie östlichen Mittelmeerraum in der späten Kupfer- und frühen Bronzezeit. Universitätsforschungen zur prähistorischen Archäologie 53 (Bonn 1998).

Milojčić 1958: V. Milojčić, Zur Anwendbarkeit der C 14-Datierung in der Vorgeschichtsforschung. Germania 36, 1958, 409–417. https://doi.org/10.11588/ger.1957.44114 (last accessed 07/09/2024).

Milojčić 1976: V. Milojčić, Agia Sofia-Magula. In: V. Milojčić (ed.). Die deutschen Ausgrabungen auf Magulen um Larisa in Thessalien 1966: Agia Sofia-Magula, Karagyös-Magula, Bunar Baschi. Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraums 15 (Bonn 1976).

Milojčić-v. Zumbusch 1971: J. Milojčić-v. Zumbusch, Die deutschen Ausgrabungen auf der Otzaki-Magula in Thessalien. I, Das frühe Neolithikum. Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraums 22 (Bonn 1971).

Milojčić-v. Zumbusch 1976: J. Milojčić-v. Zumbusch, Karagyös-Magula. In: V. Milojčić (ed.), Die deutschen Ausgrabungen auf Magulen um Larisa in Thessalien 1966: Agia Sofia-Magula, Karagyös-Magula, Bunar Baschi. Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraums 15 (Bonn 1976).

Mottier 1981: Y. Mottier, Die deutschen Ausgrabungen auf der Otzaki-Magula in Thessalien II: Das Mittlere Neolithikum. Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraums 22 (Bonn 1981).

Orphanidi 1996: L. Orphanidi, Anthropomorphic Figurines. Thessaly – The Northern Sporades – Central Greece. In: G. A. Papathanassopulus (ed.). Neolithic Culture in Greece (Athens 1996) 153–154.

Papathanassopulus 1996: G. A. Papathanassopulus (ed.), Neolithic Culture in Greece (Athens 1996).

Park and Allaby 2017: C. Park and M. Allaby, China Clay. A Dictionary of Environment and Conservation (3rd ed.) (Oxford 2017). https://www.oxfordreference.com/view/10.1093/acref/9780191826320.001.0001/acref-9780191826320-e-1274 (last accessed 09/07/2024)

Pentedeka 2017a: A. Pentedeka, Negotiating Identities and Exchanging Values: Neolithic Pottery Production and Circulation in Thessaly. In: M. Gori, M. Ivanova (eds.), Balkan Dialogues. Negotiating Identities between Prehistory and the Present (Oxon, New York 2017) 131–155.

Pentedeka 2017b: A. Pentedeka, Pottery Exchange Networks under the Microscope: The Case of Neolithic Thessaly. In: A. Sarris, E. Kalogiropoulou, T. Kalayci, L. Karimali (eds.), Communities, Landscapes, and Interaction in Neolithic Greece. Proceedings of the International Conference, Rethymno 2015 (Ann Arbor, Michigan 2017) 339–352..

Reingruber 2008: A. Reingruber, Die Argissa-Magula: das frühe und das beginnende mittlere Neolithikum im Lichte transägäischer Beziehungen. Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraums 35 (Bonn 2008).

Reingruber et al. 2017: A. Reingruber, G. Toufexis, N. Kyparissi-Apostolika, M. Anetakis and Y. Maniatis, Y. Facorellis. Neolithic Thessaly: radiocarbon dated periods and phases. Documenta Praehistorica XLIV, 2017, 34–53. https://doi.org/10.4312/dp.44.3 (last accessed 04/05/2024).

Reingruber et al. 2021: A. Reingruber, G. Toufexis and Y. Maniatis, Elateia 1 in Northeastern Thessaly 8000 Years Ago. Relative and Absolute Chronology of a Flat Extended

Settlement. Documenta Praehistorica XLVIII, 2021, 184–201. https://doi.org/10.4312/dp.48.22 (last accessed 09/07/2024).

Reingruber et al. 2023: A. Reingruber, L. Bonga, L. Thissens, The impressed pottery of the Aegean Neolithic. In: M. Marić, J. Bulatović, N. Marković (eds.), Relatively Absolute. Relative and Absolute Chronologies in the Neolithic of Southeast Europe (Belgrade 2023) 19–40.

Reingruber et al. 2024: A. Reingruber, G. Toufexis, S. Valkaniotis and A. Manakos, The basins of Sykourio and Elateia in northeastern Thessaly: an attempt at reconstructing the (pre)historic landscape. In: AEThSE, Archaiologiko Ergo Thessalias kai Sterea Elladas 6, Volos 2018 (Athen 2024) 59–70.

Schachermeyr 1991: F. Schachermeyr, Sammlung Fritz Schachermeyr: Die neolithische Keramik Thessaliens. Aus dem Nachlass bearbeitet von Eva Alram-Stern. Veröffentlichungen der Mykenischen Kommission 13 (Wien 1991).

Souvatzi 2008: S. Souvatzi. A Social Archaeology of Households in Neolithic Greece: An Anthropological Approach (Cambridge 2008).

Theocharis 1973: D. Theocharis, Neolithic Greece, ed. Stelios A. Papadopoulos (Athens 1973).

Toufexis 1996a: G. Toufexis, Zoomorphic Figurines. In: G. A. Papathanassopulus (ed.). Neolithic Culture in Greece (Athens 1996) 159–160.

Toufexis 1996b: G. Toufexis, House Models. In: G. A. Papathanassopulus (ed.). Neolithic Culture in Greece (Athens 1996) 160–162.

Toufexis 2016: G. Toufexis, Palioskala. A Late Neolithic, Final Neolithic and Early Bronze Age settlement in the Eastern Thessalian plain, Central Greece. In: Z. Tsirtsoni (ed.). The Human Face of Radiocarbon. Reassessing chronology in prehistoric Greece and Bulgaria, 5000–3000 cal BC (Lyon 2016) 361–380.

Toufexis 2017: G. Toufexis, Oikistiki drastiriotita kai organositou horou stous oikismous tis Neoteris Neolithikis sti Thessalia: Paradeigmata apo tous oikismous ston Profiti Ilia Mandras, Makrychori, Galini kai Rachmani (PhD Diss., University of Thessaly, Volos 2017). (griech.: Γ. Τουφεξής, Οικιστική δραστηριότητα και οργάνωση του χώρου στους οικισμούς της Νεότερης Νεολιθικής στη Θεσσαλία. Παραδείγματα από τους οικισμούς στον Προφήτη Ηλία Μάνδρας, Μακρυχώρι, Γαλήνη και Ραχμάνι). Open access: https://hdl.handle.net/10442/hedi/41426

Tsirtsoni 2016: Z. Tsirtsoni (ed.), The Human Face of Radiocarbon. Reassessing chronology in prehistoric Greece and Bulgaria, 5000–3000 cal BC (Lyon 2016).

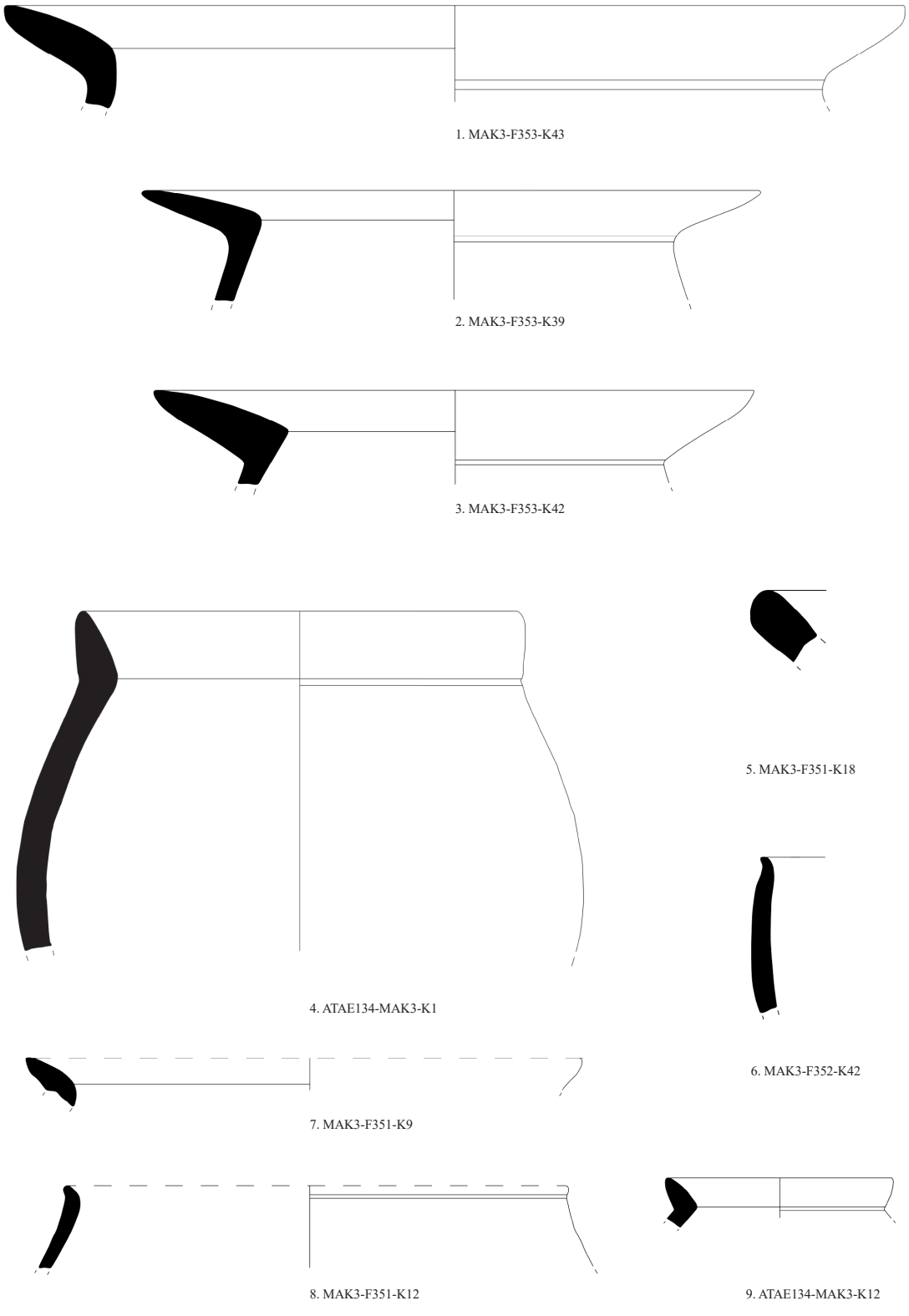
Tsountas 1908: C. Tsountas, Αι προϊστορικαί ακροπόλεις Διμηνιό και Σέσκλο. Βιβλιοθήκη της εν Αθηναις Αρχαιολογικές Χεταιρείας (Αθήναι 1908).

Wace and Thompson 1912: A. J. B. Wace and M. S. Thompson, Prehistoric Thessaly (Cambridge 1912).

Weißhaar 1989: H.-J. Weißhaar, Die deutschen Ausgrabungen auf der Pevkakia-Magoula 1. Das späte Neolithikum und Chalkolithikum. Beiträge zur ur- und frühgeschichtlichen Archäologie des Mittelmeer-Kulturraums 28 (Bonn 1989).

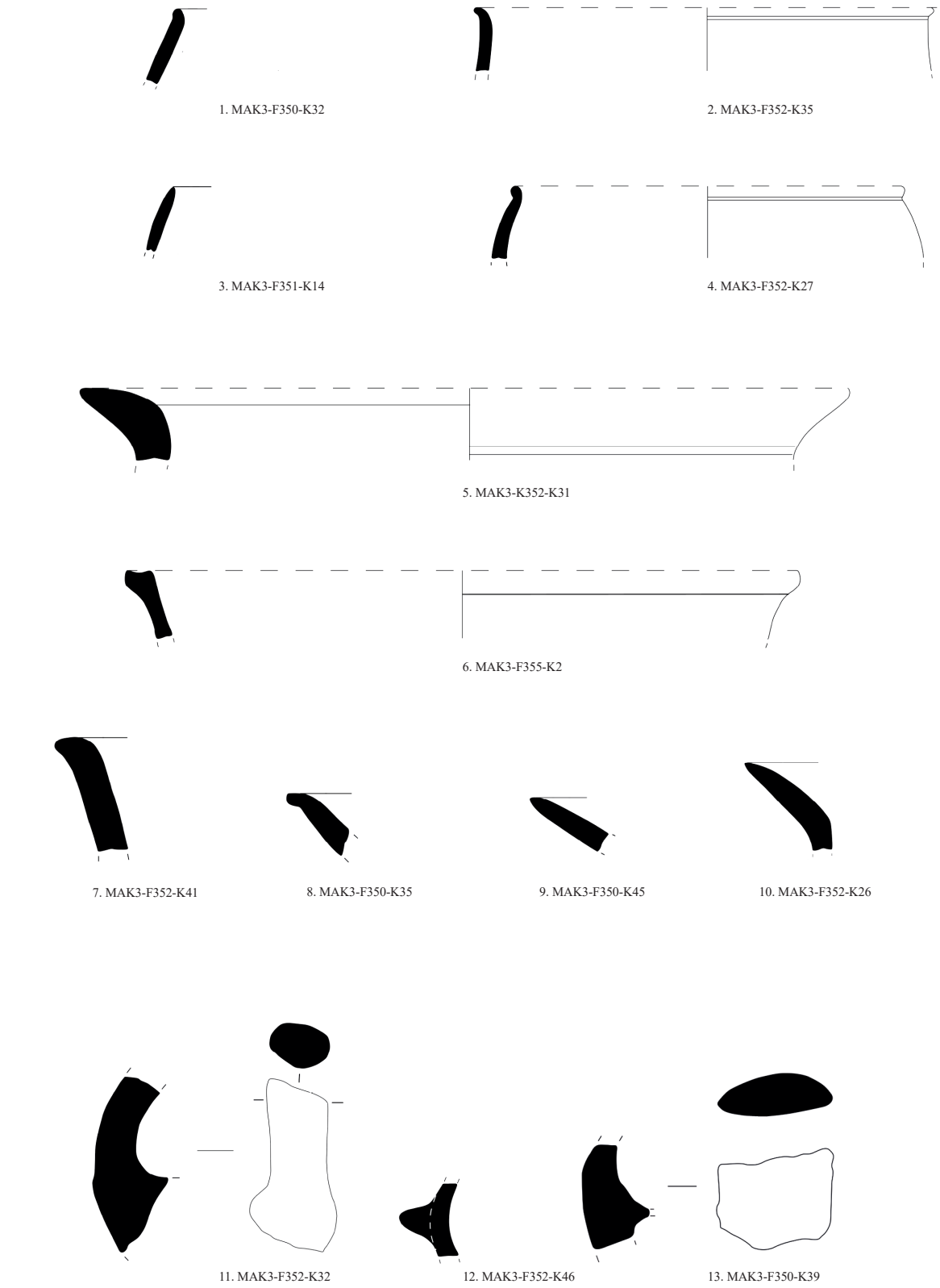
Windler 2018: A. Windler, Der Austausch von *spondylus gaederopus* in Europa zwischen 5500 und 5000 v. Chr. Eine ökonomische Analyse. RITaK 6 (Bochum 2018).

Plate 7.1



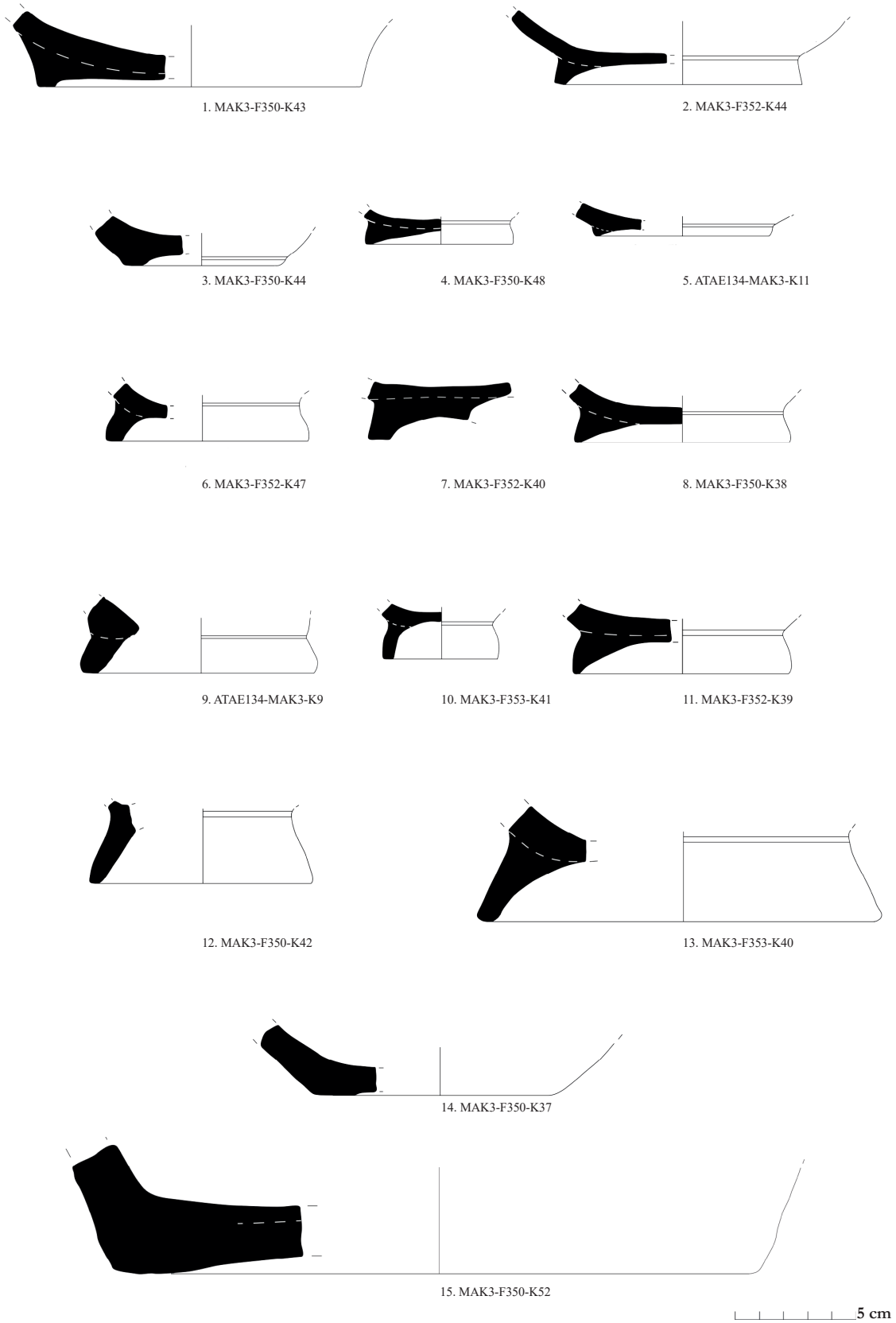
Diagnostic pottery: Different types of closed vessel shapes, T10–T19 (1–9).

Plate 7.2



Diagnostic pottery: Different types of closed vessel shapes, T10–T19 (1–4), different types of open vessel shapes, T20–T29 (5–10), different types of jointed features T60–T65 (11–13).

Plate 7.3

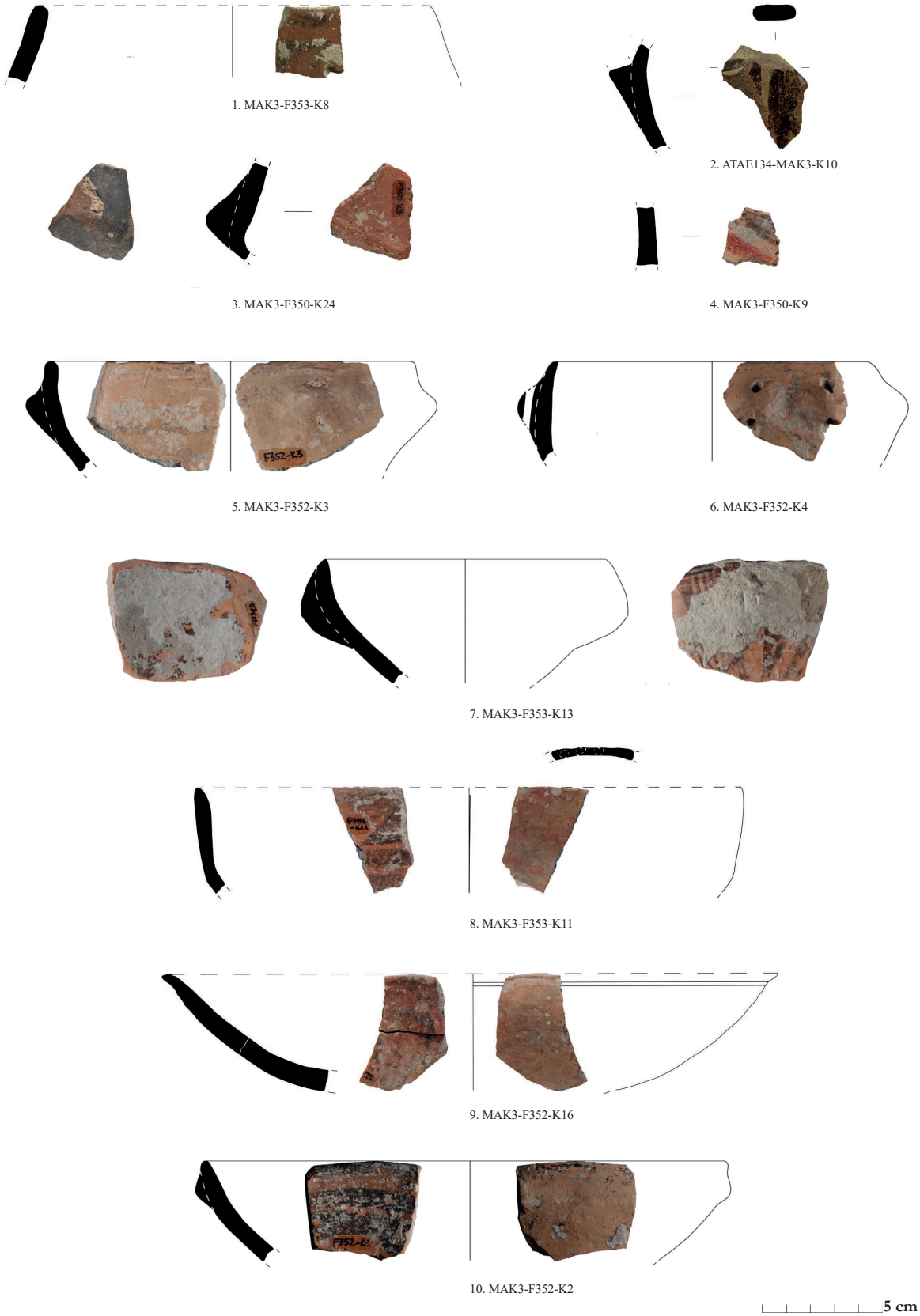


Diagnostic pottery: Different types of ring bases, T41 (1–13), different types of flat bases, T42 (14–15).

Plate 7.4

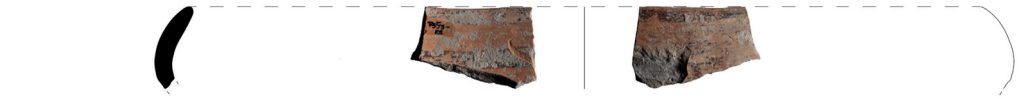
MN pottery: Impressed decorations (1–13), red-on-white painted pottery (14–16), plastic decorations (17–19).

Plate 7.5



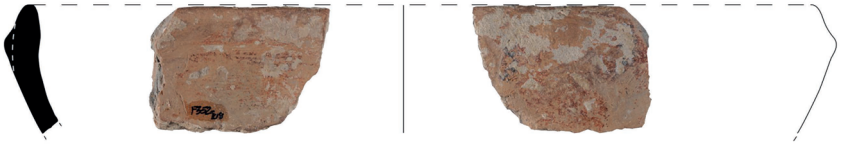
LN I pottery: Black-on-red painted pottery (1), dark-on-cream painted pottery (2), bichrome burnt pottery (3), polychrome painted pottery (4); LN II pottery: Dark-on-cream painted pottery (5–7), black-on-red painted pottery (8–10).

Plate 7.6



1. MAK3-F353-K9

5 cm

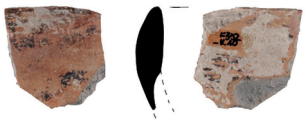


2. MAK3-F352-K18

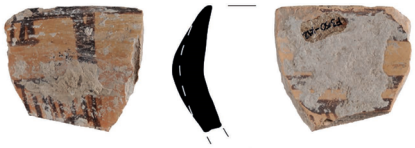
3. MAK3-F353-K10

4. MAK3-F352-K1

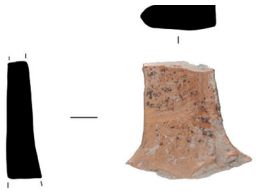
5. MAK3-F350-K11



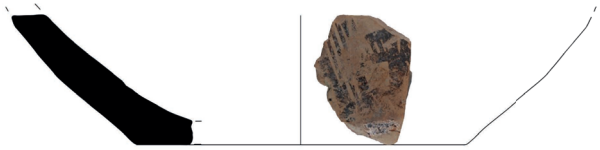
6. MAK3-F352-K10



7. MAK3-F350-K12



8. MAK3-F353-K14



9. MAK3-F353-K22

5 cm

LN II pottery: Dark-on-cream painted pottery (1–9).

Plate 7.7

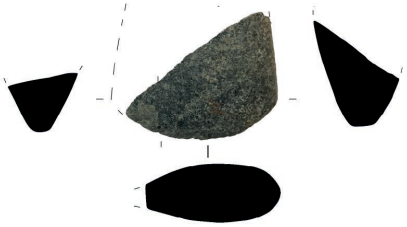
LN II pottery: Dark-on-cream painted pottery (1–3); LN–ECh pottery: Plastic decorations (4–5); ECh pottery: Plastic decorations (7–10), incised decorations (6, 12), impressed decorations (11); Unidentifiable pottery (13–14).

Plate 7.8

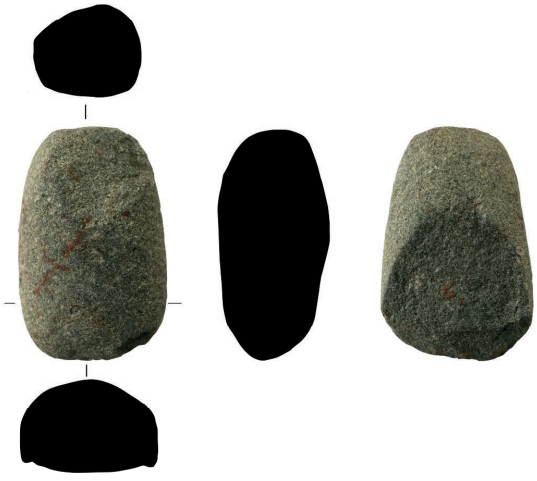
1. MAK3-F350-02

2. MAK3-F358-01

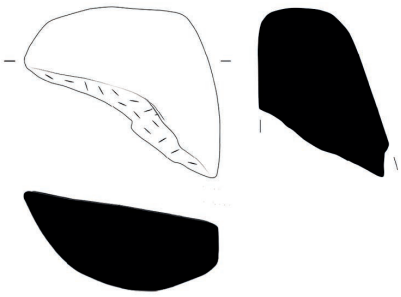
3. MAK3-F353-01



4. ATAE134-MAK3-01



5. MAK3-F358-02

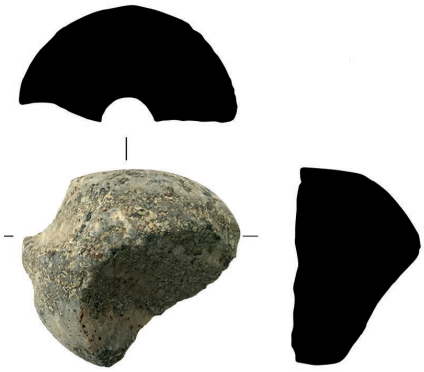


6. MAK3-F350-03

5 cm

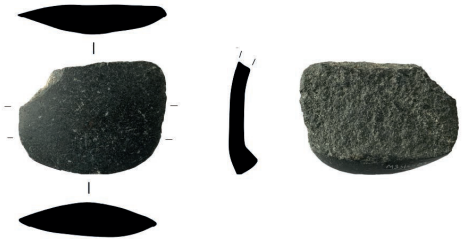
Lithics: Hammer Stones (1–3, 5), fragments of stone tools, probably muller (4, 6).

Plate 7.9

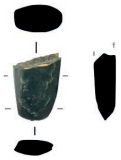


1. MAK3-F352-01

2. MAK3-F351-04



3. MAK3-Str.03



4. MAK3-F350-01

5. MAK3-Str.02

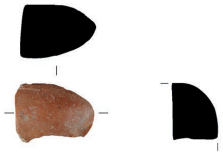
6. MAK3-Str.05

5 cm

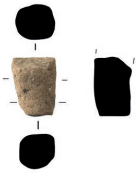
Lithics: Fragment of a macehead (1), adzes and celts (2–5), multi-use tool (6).

Plate 7.10

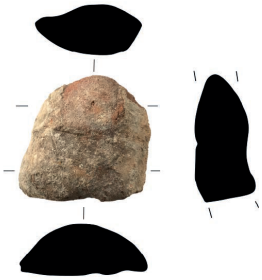
1. MAK3-F351-02



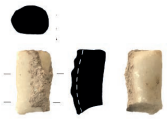
2. MAK3-F352-04



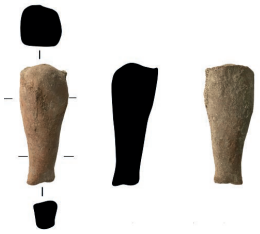
3. MAK3-F353-04



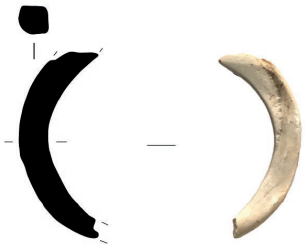
4. MAK3-F352-02



5. MAK3-Str.01



6. MAK3-F353-05



7. MAK3-F353-03

8. MAK3-F351-03

9. MAK3-Str.04

10. MAK3-F353-02

5 cm

5 cm

Figurines and Jewellery: Fragments of anthropomorphic figurines (1–6), fragment of an animal figurine (8), fragment of a *Spondylus* armring (7), beads (9–10).