

The Late-Final Neolithic and Early Helladic I Pottery from Midea in the Argolid: Continuity and Change

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Introduction

Midea, a well-known Mycenaean citadel, situated at the eastern border of the Argive Plain (Figure 1.1), was excavated from 1983 to 2009 through a joint Greek-Swedish excavation programme, under the direction of Dr Katie Demakopoulou (Demakopoulou 2012). The material on which this article concentrates comes from two adjacent trenches, A and Aa, located on the Northwest Terrace of the Upper Acropolis (Demakopoulou *et al.* 2005; 2006/2007; 2008; Demakopoulou and Alram-Stern, in preparation).

Although the site is perhaps better known for its later remains, excavation recovered Late and Final Neolithic (LN and FN) pottery, as well as Early Helladic I and II (EH I and EH II) types, from a variety of stratified, undisturbed deposits, and as residual material in later contexts. This rich assemblage provides a valuable opportunity to examine both the first phases of occupation at the settlement, and its wider relationships and connections.

This paper summarises the Neolithic-EH I pottery from Midea, and offers comment on aspects of its morphology, surface modification, fabric, and production technology. These data are used to examine the potential use and the distribution of pottery during the Neolithic and EH I periods. Although only a small proportion of the material comes from closed contexts,

all diagnostic sherds have been recorded to show the range of shapes and macroscopic fabrics present at the site. This has been complemented by further analysis of selected sherds using thin section petrography and scanning electron microscopy (SEM).

Archaeological features and chronology

An important discovery for our understanding of Neolithic and Early Helladic activity at the site was a space defined by two walls, probably a room, located in Trench A, with one portion of wall being attached to a massive double-faced megalithic wall that may have formed part of a fortification system. Within this possible room an assemblage of large pottery fragments and intact vessels was recovered, primarily consisting of EH II types (Alram-Stern 2018; Burke *et al.* 2018; Demakopoulou *et al.* 2006/2007: 23–24). Next to this wall there was a rock-cut tomb (Grave 1) and a FN pit grave (Grave 2, Figure 1.2), accompanied by a sealed deposit in the area of Grave 2 containing abundant LN pottery. This positioning, and the find types recovered, suggest that the FN Grave 2 cut through an earlier LN layer ('LN Deposit') (Demakopoulou *et al.* 2006/2007: 21–23). To the east of these features, in Trench Aa, excavation revealed a layer in which EH I pottery was abundant (Demakopoulou *et al.* 2008: 7–13) (Figure 1.2).

Grave 2 represents the only closed FN context identified at the site and contained the skeleton of a woman, aged 40–50 years old, buried in a contracted position (M. Schultz, personal communication). 14C analysis indicates a date for this burial during the earliest FN (MAMS 27718: 4357–4274 cal. BC (1 σ), 4442–4261 cal. BC (2 σ)), synchronous with the start of the FN period at Franchthi Cave, which is dated to c. 4310 cal. BC (Vitelli 1999: 138, table 9). It predates significantly the Attica-Kephala culture, which current data places in the early 4th millennium BC (Tsirtsoni 2016: 454, table 1; 459–460). Of particular note were two red burnished sherds recovered from the floor of the grave, one belonging to the body of a pithoid jar with plastic decoration, the other the base of a jar; both are dated to the FN and were sampled for petrographic analysis (Figure 1.4d; Figure 1.5b: sample MID 13/12).

In terms of pottery proportions, from a total of c. 3100 diagnostic LN-EH II sherds, around 2000 belong to EH II type vessels, whilst the remaining 1100 can be divided as nearly two thirds corresponding to LN and FN pottery and one third belonging to EH I (Table 1).

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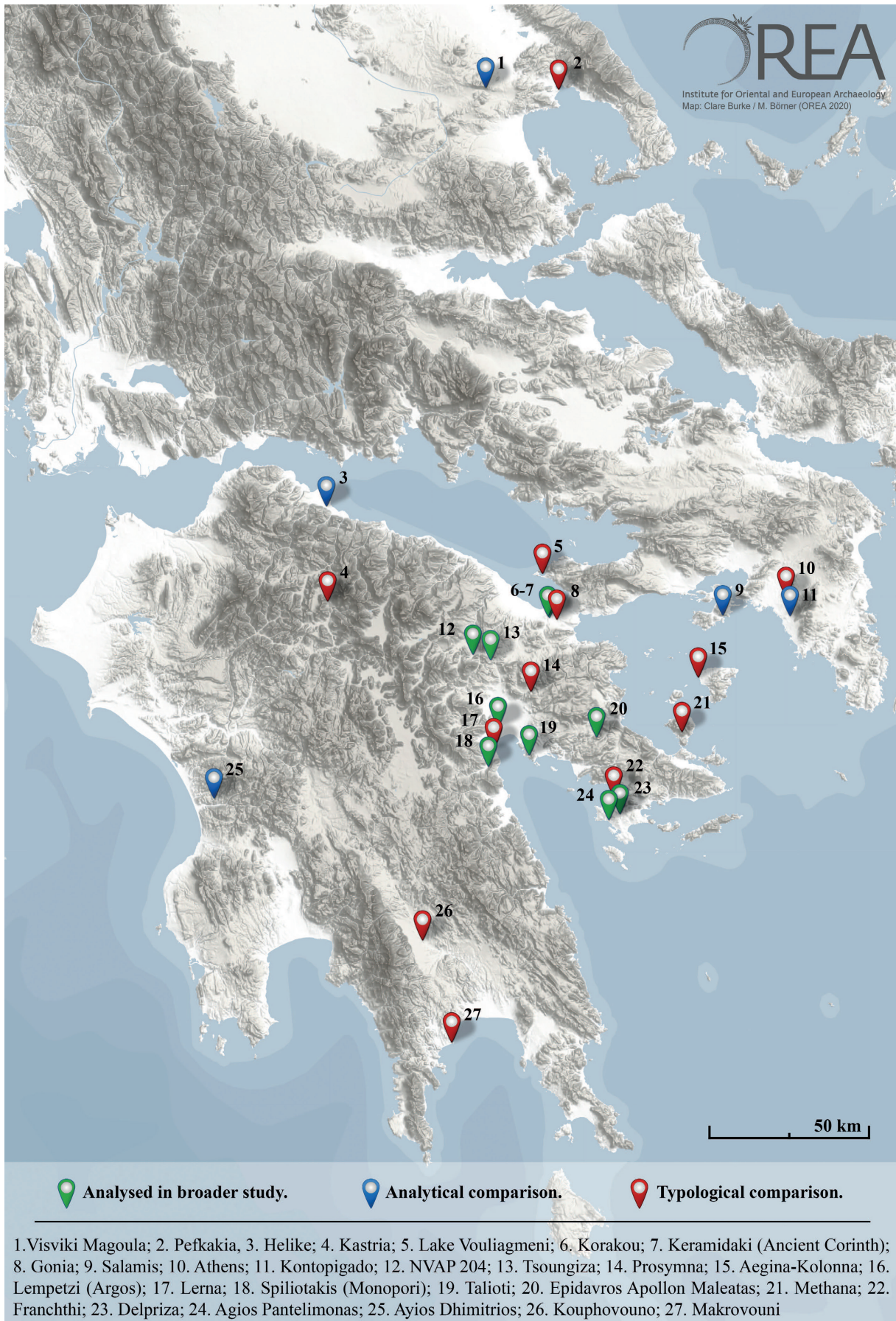


Figure 1.1. Map of the northeastern Peloponnese, with comparative sites and sites mentioned in the text (© Clare Burke).

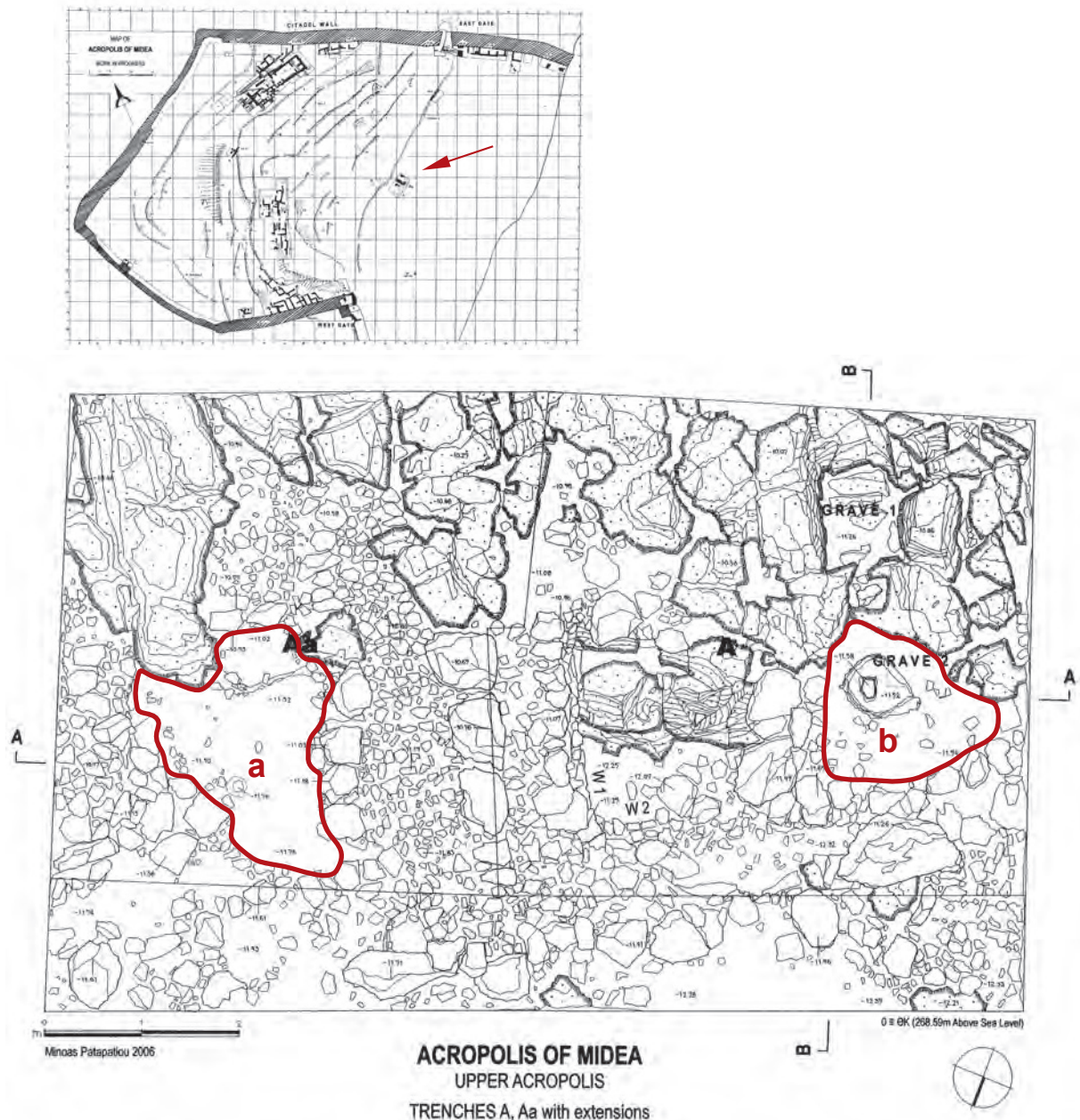


Figure 1.2. Midea, Upper Acropolis, Trenches A and AA, areas of graves and closed contexts are indicated: (a) area with Early Helladic I destruction layer; (b) Late Neolithic fill (after Demakopoulou . 2006. Drawing: M. Patapatiou).

The Late and Final Neolithic period pottery wares and forms

The Late Neolithic period

The LN pottery from Midea is best represented in the 'LN Deposit'. With the exception of a single FN sherd, the deposit contained exclusively LN type pottery and, like the LN material at Midea generally, contained a good proportion of fine wares (34%), a trend comparable to other sites including Kouphovouno (Mee 2007: 210-215). These fine wares are dominated by deep bowls, a common LN vessel shape. In terms of surface finish, a total of 70 fragments from the

'LN Deposit' belong to pattern-painted pottery, of which 14 fragments are polychrome ware, and seven fragments are bichrome ware.

Comparable polychrome and bichrome pattern-painted wares are most common in the later phase of the LN period (Dousougli 1998: 110-124; Katsipanou-Margeli 2018: 62-64; Phelps 2004: 96-102; Vitelli 1999: 40-42, 51-52). The class is characterized by the presence of red painted surface decoration typically surrounded by a dark brown on a buff or orange surface (Figure 1.3). At Midea, characteristic motifs comprise vertical and diagonal lines, often bordered by wavy lines, as well as triangles and maeandroid designs. These patterns

Table 1.1. Chronological chart of the periods mentioned in the text.

Absolute Chronology BC (Manning 1995, Pullen 2011, Tsirtsoni 2016)	Periodization Greek mainland Peloponnese	Argolid	Korinthia	Attica Boiotia Euboia
2200 2450/2350	EH IIB	Lerna IIIC–D		Lefkandi I
2750/2650	EH IIA	Lerna IIIA–C early	Tsougiza EH II Developed Tsougiza EH II Initial	
3100	EH I	Talioi	Tsougiza EH I Perachora X–Z	Eutresis III–IV Tsepi
4000	Younger Final Neolithic = Chalcolithic	Halieis Franchthi 5b FN Lerna II	Tsougiza FN	Athens N. Slope Tharrounia IIb
4500	Final Neolithic = Chalcolithic	Franchthi 5a Prosymna		Attica-Kephala Tharrounia II
4900	Late Neolithic II („late“)	LN Lerna II Franchthi 4	Gonia	Tharrounia Ib
5500	Late Neolithic I („early“)	Franchthi 3		Tharrounia Ia

are well known in the northeastern Peloponnese and suggest that Midea was part of a network of interaction, which include Gonia and Lerna, within which similarly decorated pottery was produced in different locations, some of which may have circulated, (for Gonia, see Figure 1.3b: cf. Phelps 2004: fig. 44:21; for Lerna, Figure 1.3c: cf. Vitelli 2007: 334 fig. 75d).

At Midea, the polychrome and bichrome wares are dominated by hemispherical bowls most likely associated with the consumption of food. The similar style and size of these bowls may reflect a desire for standardisation considered meaningful when used in commensal acts (Figure 1.3a) (Halstead 2012: 40–42). In addition, the LN deposit around Grave 2 also produced

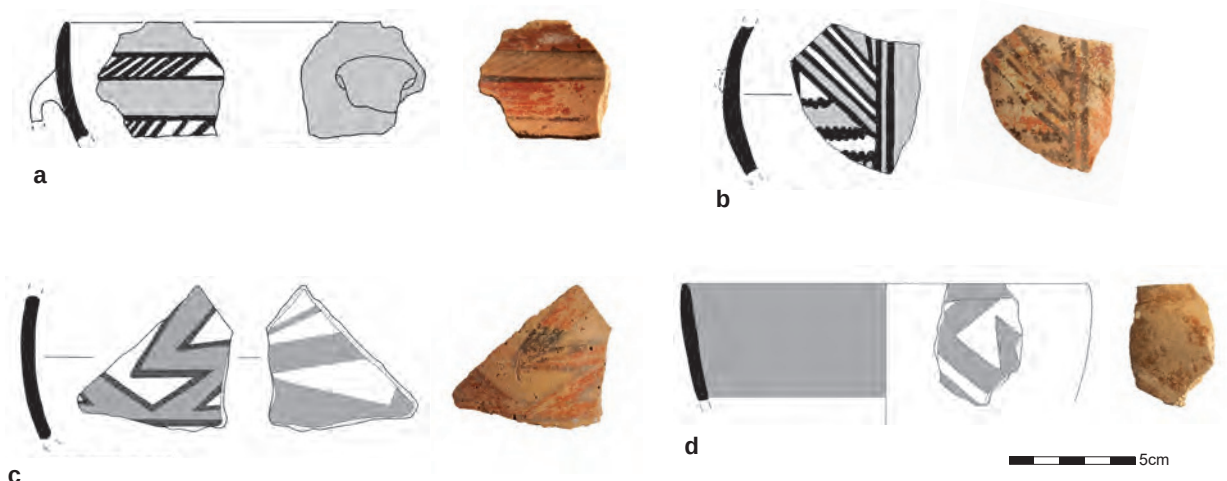


Figure 1.3. Late Neolithic pottery from Midea: (a–d) polychrome pottery (photos: Kostas Xenikakis; drawings: Constanze Moser; © OREA).

88 fragments of burnished pottery and five of pattern-burnished pottery, one grey ware fragment and one sherd with fine incised decoration, most again deriving from bowls. There are good parallels for this assemblage within the material from Franchthi Ceramic Phase (FCP) 4 (Vitelli 1999: 38–63), whilst the general dominance of bowls clearly indicates the importance of dining at Midea during the LN period.

The macroscopic fabric of the fine ware vessels is mostly red (2.5YR 4/6), sometimes pink (7.5YR 8/4), with many moderately sorted, small to fine white inclusions, small grey, and small red rounded to angular inclusions and pores (Macroscopic Group 2). However, the polychrome and bichrome wares are characterized by two more distinct macroscopic fabrics. The first is very fine grey (7.5YR 5/0 – 10YR 4/1) or pink (7.5YR 6/4 – 10YR 6/3) with only rare inclusions visible to the naked eye; the second is also grey or pink, but with small red inclusions (Macroscopic Group 1. Figure 1.5a: MID 13/10; for

petrography, see Figure 1.9A). There are very strong similarities between the macroscopic fabrics of the polychrome ceramics and the probably synchronous, burnished and pattern-burnished wares. In contrast, there is a clear difference between the macroscopic fabrics of the LN fine wares and those of coarser vessels. It is particularly notable that the coarse, most often pithoid, vessels from the LN deposit around Grave 2 were macroscopically comparable to the typical FN fabrics from Midea, implying a degree of technological continuity in the manufacture of coarse pottery between the LN and FN periods. This will be discussed in more detail in the technology section below.

The Final Neolithic period

FN pottery is frequent in nearly all contexts and has been identified with the help of comparable material from other sites. The presence of earlier FN activity, synchronous with the construction of the grave, is

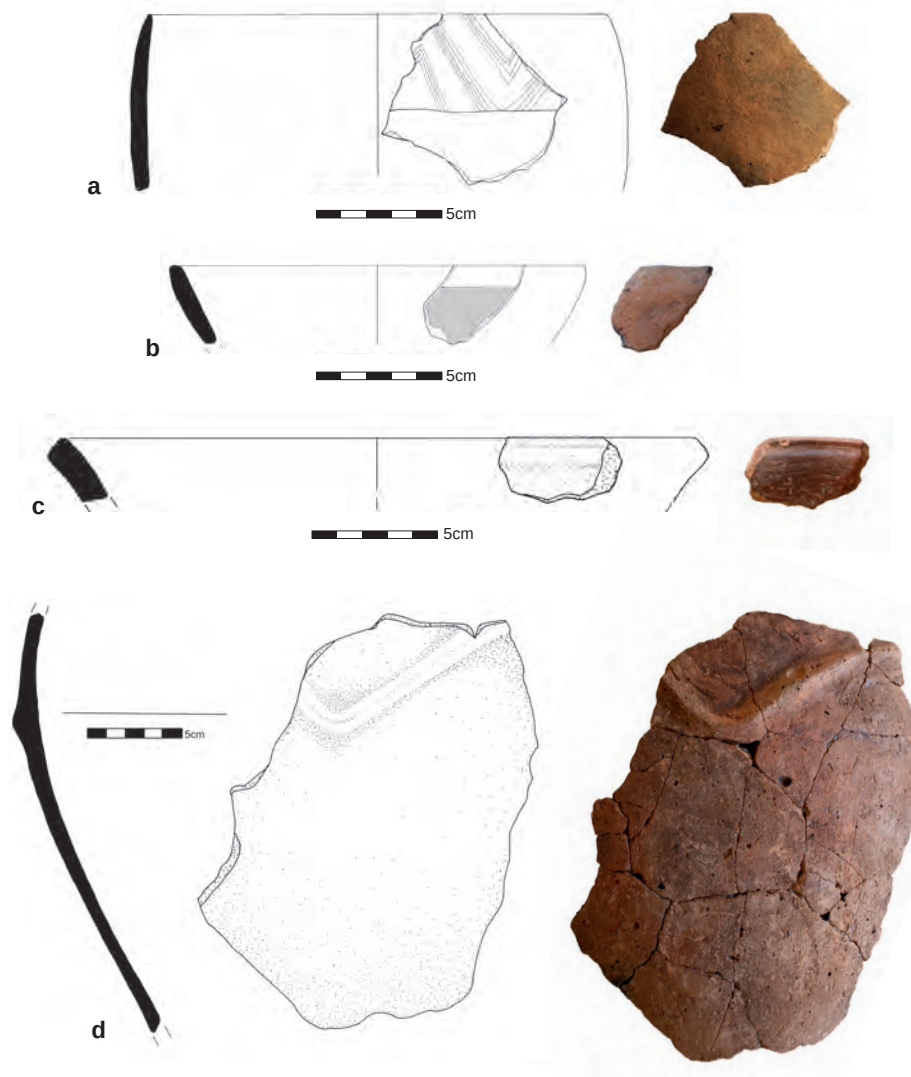


Figure 1.4. Final Neolithic pottery from Midea: (a) fine incised ware; (b) crusted ware; (c) rolled rim bowl (d) jar with plastic decoration (photos: Kostas Xenikakis, Clare Burke; drawings: Constanze Moser, © OREA).

suggested by the recovery of fine incised ware (Figure 1.4a) (Vitelli 1999: 70, 252, fig. 53h) and crusted ware (Vitelli 1999: 68-70, 248 fig. 51) (Figure 1.4b) paralleled in the earlier FN of Franchthi Cave.

A small number of fine incised ware sherds were recorded at Midea, belonging to deep bowls, displaying fine linear zigzag or triangular incisions under the rim or on the upper part of the body, on a smoothed or burnished surface. Incised wares are characterised by local variation (e.g., at Kastria: Katsarou and Sampson 1997: 232-256), with the shape and decoration of those from Midea being comparable to 'Prosymna Incised Ware' well-known from the nearby site (Phelps 2004: 105-106; Figure 1.4a). The similarity in form and decoration evident in examples from Midea and from nearby sites in the Argolid suggests that these bowls conformed to a regional style, circulating among groups of people who shared similar consumption practices.

Crusted ware represents another distinctive component of the FN ceramic record at Midea, fragments of which are characterised by the addition of broad bands of white crusted paint below the rim on an otherwise wiped or slightly burnished surface. Crusted wares have a wide distribution over the Peloponnese and the Greek mainland generally, making the identification of close parallels more difficult (Phelps 2004: 108-111; Pefkakia: Weisshaar 1989: 21-22; Franchthi: Vitelli 1999: 68-70, 73-74; Lerna: Vitelli 2007: 354-355, fig. 85; Ayios Dimitrios: Zachos 2008: 17). All examples from Midea belong to hemispherical or deep bowls (Figure 1.4b), and three are again, macroscopically comparable to the LN macroscopic fine fabrics (Macroscopic Groups 1 and 2) described above.

Although a variety of FN fine wares are attested at Midea, the assemblage is dominated by burnished and unburnished coarse wares, sometimes bearing plastic decoration in the form of single and multiple bands (Figure 1.4d, sample 12) with a similar dominance of coarse wares having been recognised in the FN ceramic profiles of other Peloponnesian sites (Mee 2007: 215-216). The most common forms at Midea are bowls and jars, although low numbers of pithoid vessels, pans and scoops are also present. The characteristic macroscopic fabric for this pottery is low fired with red or black fracture with many (7.5-15%) small to fine white inclusions, small grey inclusions and red inclusions, pores that are not readily visible in dark fabrics (Macroscopic Group 3. Figure 1.5b-c: MID 13/12, MID 13/22). However, five sherds are of the fine grey and pink macroscopic fabric with red inclusions characterised as LN Macroscopic Group 1, suggesting some continuity in fabric technology between the LN and FN.

The presence at Midea of so-called heavy burnished ware, including some belonging to rolled rim bowls, may indicate settlement also during the later phases

of the Final Neolithic period (Alram-Stern 2014: 312-313, 314 fig. 6; Katsipanou-Margeli 2018: 81-82). One example of a heavy burnished ware rolled rim bowl was particularly striking within the assemblage due to its unusual red macroscopic fabric and brownish red, highly burnished surface, and may well represent an import to the site (Figure 1.4c, sample MID 13/3: for petrography, see Figure 1.10).

A characteristic form related to Macroscopic Group 3 is the so-called 'cheese-pot', of which 39 fragments have been identified (Figure 1.6). These bowls are characterised by a row of perforations under the rim. They appear around the start of the 5th millennium BC and are most frequent throughout the Aegean during the 4th millennium BC (Alram-Stern 2014: 313-315 fig. 7; Katsipanou-Margeli 2018: 78-81), surviving in EH I as pans with perforated rims of the type reported at Kontopigado (K. Kaza-Papageorgiou and V. Hachtmann, personal communication).

These 'cheese-pots' appear in a variety of forms at Midea, as is common at other FN sites. They include deep, hemispherical bowls (Figure 1.6b-d) (Vitelli 1999: 242 fig. 48b), large coarse bowls (Vitelli 2007: 362 fig. 89a-b, 368 fig. 92a), deep bucket-like vessels (Alram-Stern 2006: 56 no. 74), storage jars (Papathanassopoulos 2011: 159, no. 106), pans (Figure 1.6a) (Alram-Stern 2006: 56 nos. 82-83; Pantelidou Gofa 2013; 2016: 227-232, pl. 106-109) and large, asymmetrical vessels (Vitelli 1999: 292 fig. 73b; 2007: 370 fig. 93, 372 fig. 94). Some are decorated with incision (Figure 1.6c) and have a lug handle (Figure 1.6b) or a rolled rim. The pans are commonly produced in a coarse macroscopic fabric with frequent white inclusions (Figure 1.6a; see also samples MID 13/20 (Figure 1.5c) and MID 13/11 (Figure 1.9D)) with an unfinished exterior and a smoothed interior. In contrast, bowls with perforations are often of a medium fine to medium coarse fabric and may be burnished on both interior and exterior.

The characteristic feature of these pots, a row of holes below the rim, appears on a variety of vessel forms, from shallow coarse ware pans to semi-fine bowls. If these holes are to be interpreted as a functional feature common to a variety of vessel types, they may have been used for fixing a cover of cloth or animal hide which was tightened over the mouth of the vessel. Such an interpretation has been already suggested by Elizabeth Banks (Vitelli 2007: 123), who interpreted these vessels either as drums (Vitelli 2007: 123) or as containers of warm coals and ashes (Banks 2015: 84). However, such covers may have a less specialised function, serving simply to protect the vessel contents during storage or transportation. This interpretation has ethnographic analogies from modern Greece and Lena Cavanagh (personal communication) recalls seeing cloth covers



Figure 1.5. Images of macroscopic fabrics. A: Sample MID 13/10 Late Neolithic polychrome bowl. B: Sample MID 13/12 Final Neolithic jar with plastic decoration. C: Sample MID 13/22 Final Neolithic burnished jar with plastic decoration. D: Sample MID 13/20 Final Neolithic cheese-pot (© C. Burke).



Figure 1.6. Final Neolithic pottery from Midea: (a-d) Cheese-pots (photos: Kostas Xenikakis; drawings: Constanze Moser, © OREA).

being tied to baskets in order to protect food during transport as a child in mid-20th century Central and Southern Greece.

The Early Helladic I wares and forms

A second closed context, a level excavated in 2006, besides much LN and FN material, contained a considerable number of pottery fragments dated to EH I. The stratigraphy, as well as the lesser degree of fragmentation of the EH I material, indicates that this pottery forms part of a destruction horizon.

In total, 186 diagnostic EH I sherds have been recorded at Midea. No complete EH I vessels were recovered and so vessel profiles have been reconstructed with reference to parallels from other sites. The most common forms are bowls (Figure 1.7), including examples of types known from Tsoungiza such as deep to medium bowls (Figure 1.7a), hemispherical bowls (Figure 1.7b), flaring rim bowls with flattened lip (Figure 1.7c), and bowls with inturned rims (Pullen 2011: 72-74, form 5-8). Their surface is usually red slipped and burnished, however, rare unburnished and, very rarely, unslipped, examples are also present. Other characteristic shapes are fruitstands, large shallow bowls/fruitstands, askoi and jars. A single example of a frying pan is also noted. Parallels for these shapes come from Tsoungiza (Pullen 2011: 56-87), Talioti (Weisshaar 1990) and Lake Vouliagmeni in Corinthia (Fossey 1969).

In contrast to the previous period, with very few exceptions, the EH I macroscopic fabrics were fired from pink to red (2.5YR 5/8 – 5YR 7/6 – 7.5YR 6/4) with

a grey core, and contained visible white and sparkling white inclusions, and less commonly, red clasts (Figure 1.7a; MID 13/35; for micrograph, see Figure 1.13B). They were grouped according to their texture, being fine (Macroscopic Group 4), medium fine (Macroscopic Group 5) and medium coarse (Macroscopic Group 6). Equal numbers of bowls, askoi and jars were produced in Macroscopic Group 4, Macroscopic Group 5, and Macroscopic Group 6. However, it was particularly notable that the fruitstand assemblage was dominated by the fine Macroscopic Group 4 (Figure 1.12), providing an early indication of a possible shared origin (discussed in more detail in the technology section, below). The fabric of the frying pan was characterised by a higher proportion of red inclusions, and was assigned to Macroscopic Group 7. In addition to these macroscopic fabrics, it was possible to identify a distinctive fragment of a large bowl with out-turned rim, characterised by gold mica inclusions (Figure 1.7d; MID 13/29; for micrograph see Figure 1.14A), otherwise unknown in the local material, which petrography confirmed as an import from Aegina.

The most characteristic EH I shapes at Midea are the fruitstand and the large shallow bowl (many of which may be the bowls of fruitstands which have become detached). These vessels display a limited repertoire of types, but differ quite considerably in their diameter (0.22-0.64m, Figure 8). They are characterised by either a downward or an outward turned rim, with incised decoration on the interior (for parallels from Talioti, see Weisshaar 1990: pls. 2-6; also at Tsoungiza, Pullen 2011: 65-72, Form 1) (Figure 1.8a-b). In addition to these two rim types, there are also shallow bowls

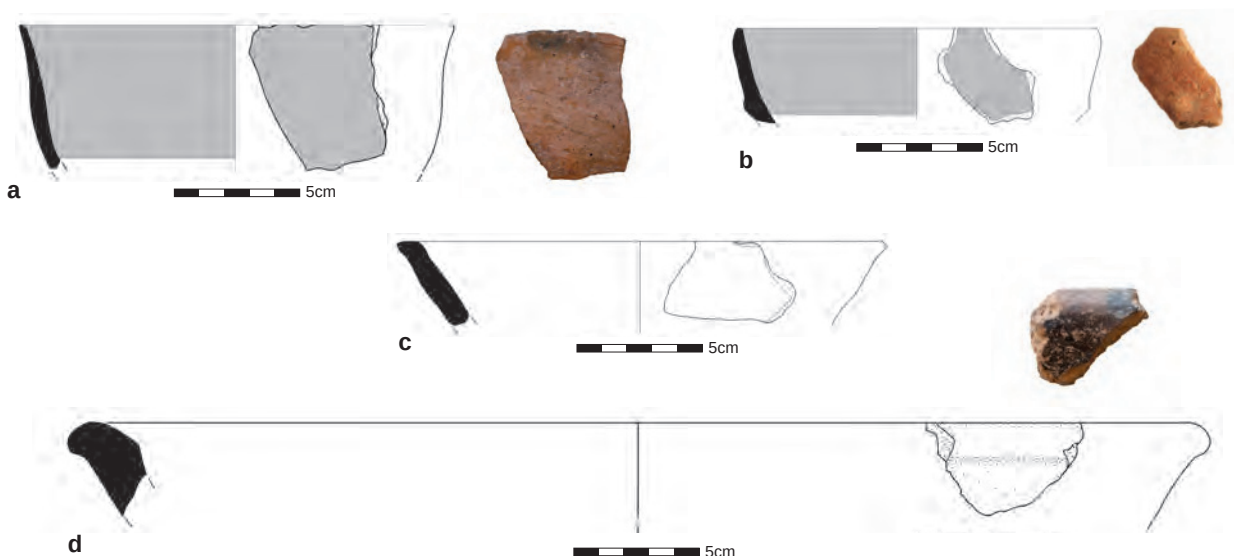


Figure 1.7. Early Helladic I pottery from Midea: (a-c) bowls; (d) bowl with everted rim (photos: Kostas Xenikakis; drawings: Constanze Moser, © OREA).

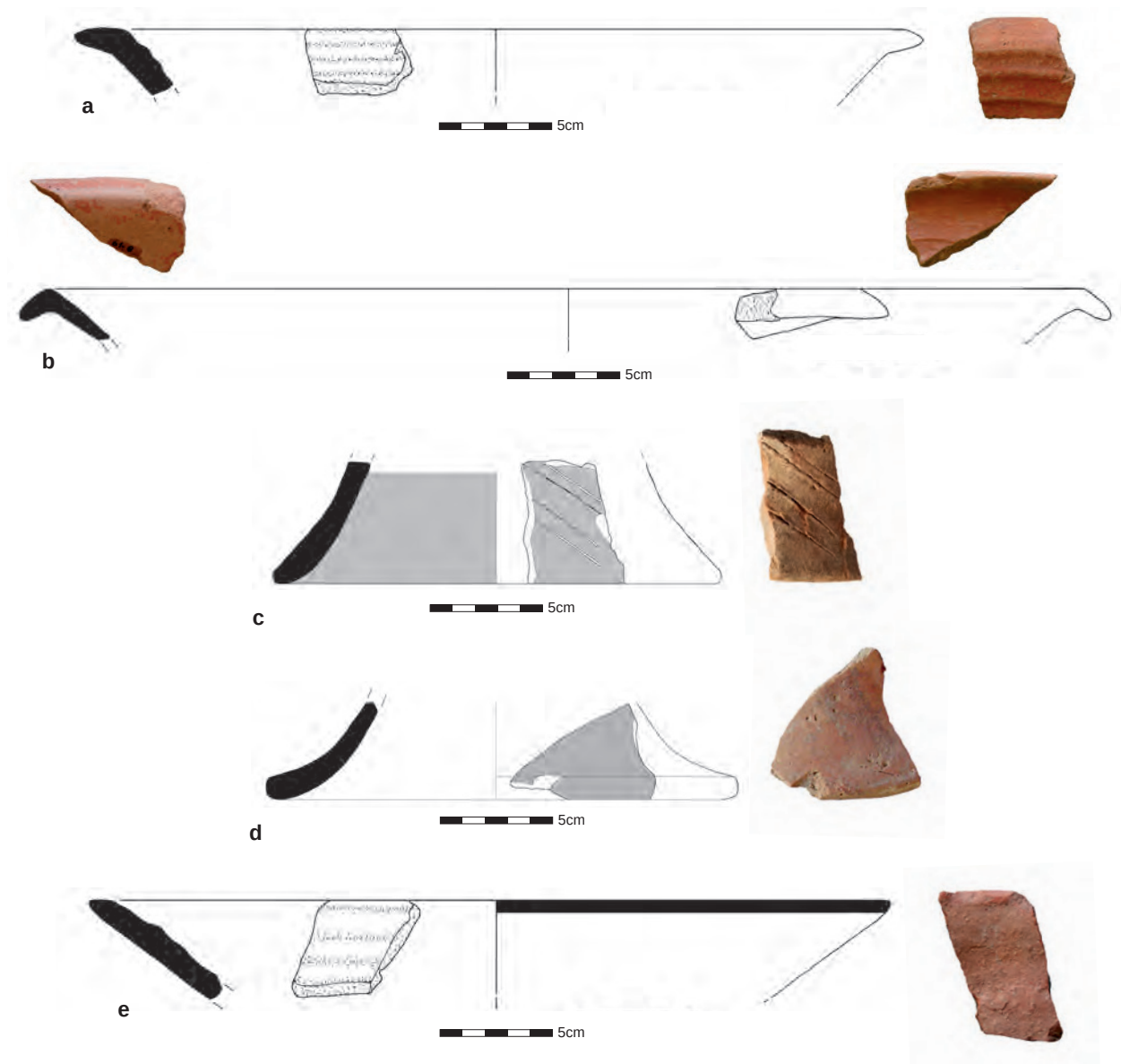


Figure 1.8. Early Helladic I pottery from Midea: (a-d) fruitstands; (e-f) large shallow bowls (photos: Kostas Xenikakis, Clare Burke; drawings: Constanze Moser, © OREA).

with flattened or simple spreading rims known from Talioti (Weisshaar 1990: 28 pl. 4:9,11) and Makrovouni Magoula in the Argolid (Dousougli 1987: 183, 184 fig. 12:46-47) (Figure 8e-f). Most have a red painted, usually unburnished, interior and often an untreated exterior.

As noted above, the shallow bowls and fruitstands belonged predominantly to the fine-grained Macroscopic Group 4 (MID 13/35: for petrography, see Figure 1.13A) and only rarely appear in the medium fine Macroscopic Group 5 and coarse Macroscopic Fabric 6. Furthermore, the presence of fruitstands and shallow bowls, and in a comparatively high number (45 examples) at Midea suggests the participation of the community in particular dining practices requiring these vessels (discussed by Burke *et al.* 2020), which has analogies in Attica, the Cyclades and Crete during Early Bronze I (Burke *et al.* 2020; Day and Wilson 2004;

Pantelidou Gofa 2016: 110-119, pl. 44-51; Rambach 2000: 193-196; Wilson and Day 2000).

Potting technology of the Midea assemblage

Methodology

To complement the typological and macroscopic study, petrographic analysis was undertaken at the University of Sheffield, Department of Archaeology on a total of 126 samples, of which 29 belonged to the Neolithic period (including two samples which could only be assigned as FN-EH I), and 19 samples belonging to EH I type pottery. The aim of this analysis was to provide insights into the diachronic trends of pottery production and consumption represented within the ceramic assemblage at Midea, and to position these results in relation to wider patterns of behaviour

indicated by a recent larger study of EH pottery in the northeastern Peloponnese (Burke 2017, Burke *et al.* 2016, Burke *et al.* 2018, Burke *et al.* 2020. For a map of comparative sites within the larger analytical study, see Figure 1.1). Petrographic fabrics were defined based on four primary criteria: the identification of aplastic inclusion types, the frequency, size and shape of aplastic inclusions, the appearance of the micromass (including optical activity and colour), and the character of any visible voids.

Firing conditions were estimated based on macroscopic observations of vessel colour, the presence or absence of visible firing cores, the presence of primary calcite, the degree of optical activity of the micromass under the polarising light microscope, and through microstructural analysis using Scanning Electron Microscopy (SEM). SEM was undertaken at the Technological Educational Institute, University of Western Attica and the National Centre for Scientific Research (NCSR) 'Demokritos' Athens, to examine the vitrification of the ceramic microstructure and to estimate relative equivalent firing temperature ranges. These were estimated based upon standards established by Maniatis and Tite (1981) and Kilikoglou (Day and Kilikoglou 2001). These results were compared to similar material previously analysed from other sites in the northeastern Peloponnese (Burke 2017).

Representative samples were selected from across the visible range of technological, chronological and typological variability present in the assemblage, relating to macroscopic fabrics, surface modification types, and vessels forms, to allow investigation of diachronic change in technological choice. Although not all periods were represented evenly (especially in relation to LN type pottery), it was possible to sample a range of vessel types and wares (including FN cheese-pots, globular and deep bowls and jars and EH I fruitstands, bowls and jars), with a range of surface modifications (primarily burnishing, but also incision, slipping and appliqué).

Geological Overview

The geology of the Argolid region is characterised by the interaction of the Tripolis and Pindos geological zones. The area around Midea is dominated by the sedimentary geology of Lower and Middle Cretaceous argillaceous shales, cherts, sandstones and coarser clastic sediments. These are accompanied by Upper Cretaceous limestones which form the mountains around the Argive Plain, occasionally interspersed with red clays and chert. The hill of Midea itself consists of Lower Cretaceous to Paleocene limestones, hornstones, and marls, bordered to the south by Upper Pliocene to Pleistocene undivided flysch containing shales, calcite,

marls, sandstones and ophiolitic bodies. To the east lies Upper Triassic to Middle Jurassic carbonate rocks of chert, limestone and dolomites (Papastamatiou *et al.* 1970; Papavassiliou *et al.* 1984; Zangger 1993: 8; Zaronikos *et al.* 1970).

Neolithic fabrics

The Neolithic fabrics are dominantly characterised by the practice of tempering clay pastes with mudstones, siltstones and grog (crushed pottery added to the clay paste, see Figure 1.9).

Grog was identified in both LN and FN type pottery and although, as expected, there is not a 1:1 macro-micro correlation, the grog inclusions broadly corresponded to the red inclusions noted in Macroscopic Groups 1, 2 and 3. Variation in the type and abundance of different rock inclusions across the samples, suggests the use of different raw material sources in their manufacture. Some of these inclusion types appear to be naturally present in the base clay, whilst others appear to have been added as temper, alongside the grog. In addition to grog and argillaceous rock fragments (ARFs), the most common inclusion types are calcite, sandstone, siltstone and/or chert. All are compatible with the sedimentary geology within a 4km radius of Midea, and suggest local production of these vessels. Importantly, these fabrics also display a degree of variability in their coarseness, degree of optical activity, and the nature of the grog within the paste which indicates a lack of standardisation and likely reflects the contribution of multiple potters who shared the grog tempering tradition.

The most characteristic difference between the grog-based petrographic fabrics is in relation to their coarseness, with several LN and FN vessels manufactured in a particularly fine fabric with well sorted grog, mudstone and siltstone. These finer fabrics occur alongside more common coarse grog fabrics, which although sharing grog temper have less well sorted inclusions, and a broader range of inclusion types that include sandstone and quartzite compatible with the local geology. Although present in small numbers, the strong similarity between grog tempered LN and FN samples is striking (see Figure 1.9), and lends support to those macroscopic fabric observations outlined above suggesting a degree of continuity between LN and FN ceramic production practices.

It is particularly interesting to note that different samples sometimes contain grog fragments that look the same, suggesting either that the grog temper originated from a single vessel and was added to the paste of a variety of new pots, or that the grog temper came from different vessels that were made with the same paste recipe. Additionally, some fragments of grog

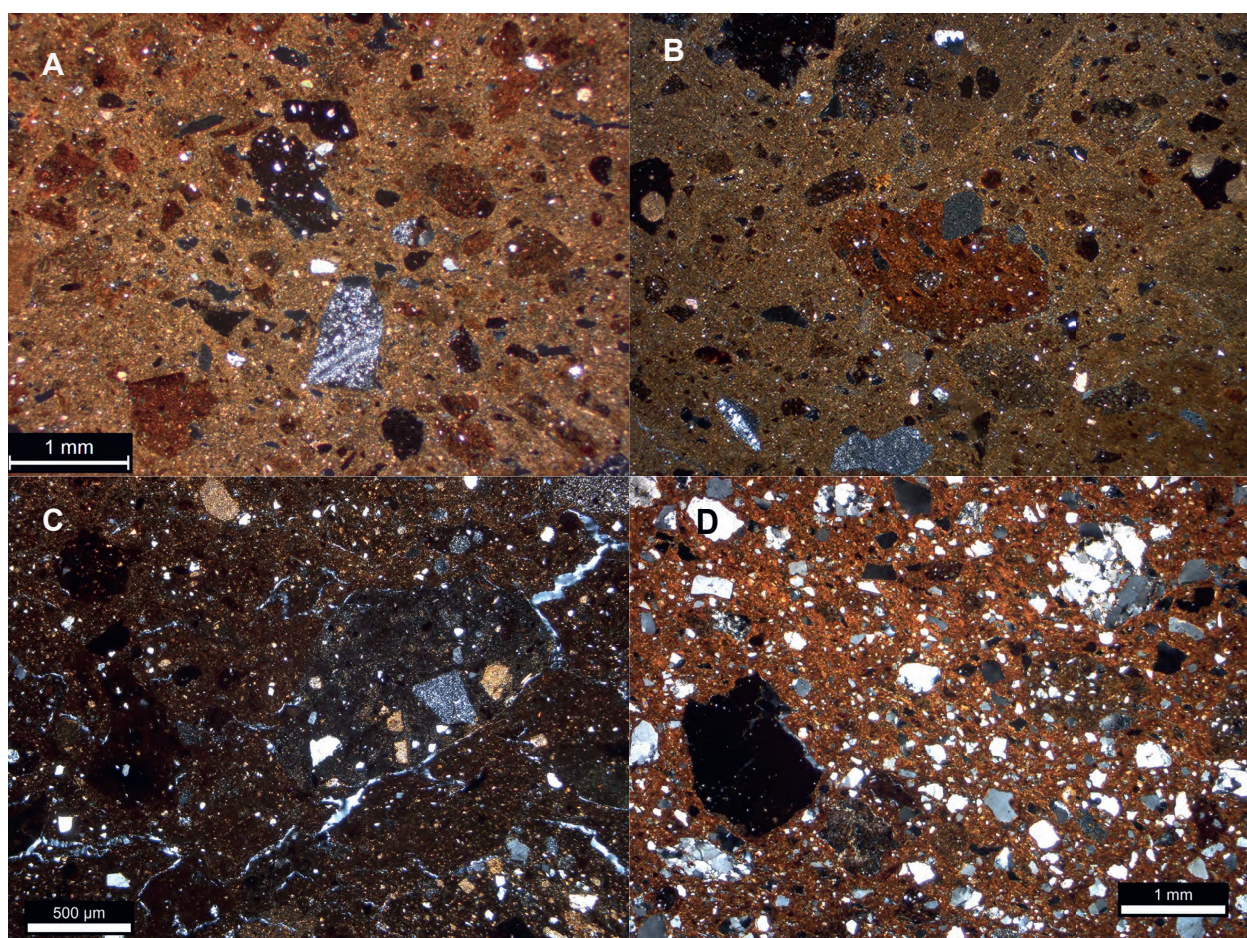


Figure 1.9. Micrograph images of grog fabric. A: MID 13/10 Late Neolithic polychrome bowl, B: MID 13/21 Final Neolithic burnished hole mouthed jar, C: MID 13/23 burnished globular bowl, D: MID 13/11 Final Neolithic cheese-pot (© C. Burke).

have a similar appearance to the surrounding matrix of the sample in which they sit, suggesting the recycling of pottery produced by the same potter or more likely the recycling of pottery made in the same pottery paste recipe tradition. The variability noted in these fabrics supports the idea that there was no standardised or consistent approach to the choice of raw materials in terms of geological resources for pottery production around Midea, and that instead it was the use of grog that formed a fundamental aspect of potting practice. Indeed, there are also examples of secondary grog (grog within grog), testifying to the continuous recycling of vessels used by the community during the Neolithic at Midea.

A non-standardised approach is also indicated by the absence of evidence for particular fabrics being chosen for the manufacture of particular wares or vessel types, confirming the macroscopic and typological observations outlined above. This suggests that the choice of raw materials was unrelated to the intended function of the vessel and that particular paste recipes were not used for particular wares. Although the addition of temper may reflect a rather more practical desire to control the plasticity and workability of the clay, and to prevent significant cracking during

drying and firing that might lead to vessel failure, this is not an entirely satisfactory explanation for its use. There is considerable ethnographic evidence to show that the choice of raw materials in pottery making is rarely related to functional considerations, but instead embedded within the learnt practice and broader traditions of the potters themselves (Day 2004; Gosselain 1998). The use of grog, in particular, may have also had social or symbolic motivations. This is especially evident when we see that it was often added with other materials, such as mudstone, which would have performed in a similar way and were theoretically as readily available to Neolithic potters considering their abundance in the landscape and the pottery fabrics. Alongside its more functional properties, the use of grog may reflect an attempt to link the past to the present, and there is, for example, ethnographic evidence for the recycling of pottery sherds by potters attempting to link the successful production of older vessels with the production of new ones, imbuing the new vessels with the success of the old (Gosselain and Livingstone Smith 2005: 41).

These results from Midea are consistent with trends across the wider Aegean, with the use of grog being

primarily considered as a FN technology with limited evidence for continuation into the Early Bronze Age, attested at sites across the Greek mainland and Crete, including Salamis (Whitbread and Mari 2014), Visviki Magoula (Pentedeika 2015), Alepotrypa (Pentedeika 2018), Youra (Quinn *et al.* 2010), Tsoungiza (Burke 2017), Helike (Iliopoulos *et al.* 2011); Kavousi (Day *et al.* 2005), Phaistos (Mentesana 2016) and Knossos (Tomkins 2002). The wide distribution of this practice clearly testifies not only to a shared potting tradition across different production locations, but also to the transfer of knowledge between different communities during the Neolithic and into the Early Bronze Age periods. Certainly, there is extensive ethnographic research into crafting (e.g., Gosselain and Livingstone Smith 2005; Lemonnier 2002; 2012; Stark *et al.* 2008) that has demonstrated the socially embedded nature of crafting activity, and the way in which ‘technological’ knowledge is related to wider worldviews and specific cultural understandings about the ‘correct’ or ‘best’ way to undertake a craft. Certainly, psychological and anthropological studies repeatedly demonstrate that human cognition and behaviour is derived from a combination of subconsciously and consciously learnt behaviour which form shared ways of doing and thinking, or what Mauss termed *habitus* (2009 [1934]), later developed into practice theory by Bourdieu (1972) and considered further through Wenger’s communities of practice (Lave and Wenger 1991; Wenger 1998). As such, technological practice is based on repeated, embodied actions on the material world and cannot be isolated from its social context (Lemonnier 2002; 2012). The motivations and ideas behind the crafting and use of pottery are culturally contingent (Burke and Spencer-Wood 2018; Lemonnier 2002; 2012; van der Leeuw 2002) and the fundamental role of social norms and values in framing crafting behaviour help to explain why there is such wide variation in how

pottery is made and its nature across time and space as it reflects and, indeed, contributes to the wide variety of cultural contexts in which learning and craft take place. As such, the wide acceptance of grog tempering in the Neolithic Aegean suggests that it was embedded within concepts that were recognised and shared by large numbers of potters, irrespective of their location or of the other raw materials with which they made their vessels.

In addition to grog-based pastes, it has been possible to identify two other distinct fabrics within the Neolithic material sampled from Midea. The first is a sandstone to low grade metamorphic fabric which we will address more fully in the discussion of the EH I type pottery, but which appears to have a long history and relates to an important community of practice in the Argolid region. The second is a serpentinite fabric represented by the high quality burnished rolled rim bowl discussed above (Sample MID 13/3; see Figure 1.4c and Figure 1.10).

This bowl is macroscopically distinctive, possessing an even red burnished surface and an unusual red fabric which lacks the firing core so often present in other Neolithic vessels from Midea. Petrographic analysis has revealed this bowl belongs to a serpentinite fabric and, unlike the other fabrics containing serpentinite at Midea such as the Sandstone to Low Grade Metamorphic Fabric discussed below, and a mudstone breccia fabric associated with EH II type pottery (Burke *et al.* 2018), this sample contains no other rock fragments that could aid in identifying its provenance. Serpentinite fabrics have been identified at a number of comparative sites in the northeastern Peloponnese (Burke 2017), however, none of these appear to be a match for the sample from Midea. The provenance of this sample is currently unknown, but it does appear inconsistent with the geology immediately in the area of Midea suggesting it is likely imported.

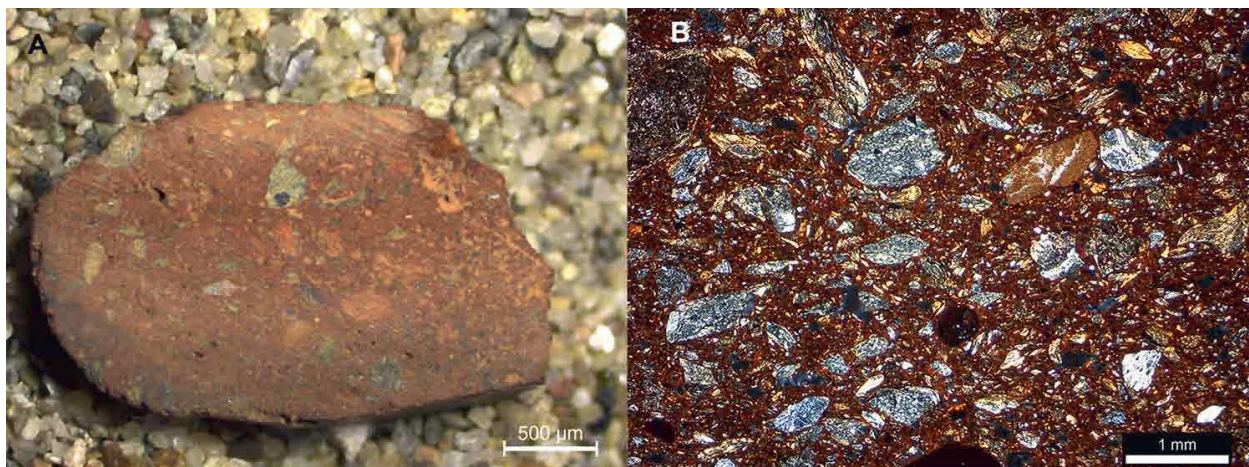


Figure 1.10. Sample MID 13/3 A: image of macroscopic fabric; B: micrograph of serpentinite inclusions (© C. Burke).



Figure 1.11. Sample MID 13/2 A: SEM image showing an unvitrified microstructure (x4000 magnification); B: image of the dark grey-black fracture of the ceramic (© C. Burke).

Final Neolithic firing

All of the FN grog-tempered samples examined using SEM belong to burnished vessels with mottled light to dark surfaces, indicative of exposure to mixed firing atmospheres. The samples also have a dark core or are black across the whole break (Figure 1.11), suggesting incomplete oxidation and/or incomplete combustion of any organic material within the ceramic, consistent with a short firing duration. These features were observed more generally within the FN material.

SEM-EDS analysis revealed low calcareous microstructures consistent with initial to extensive vitrification, suggestive of equivalent firing temperature ranges up to 900°C, and microstructures with no vitrification consistent with equivalent firing temperatures below 750–800°C (Figure 1.11). Low firing temperature ranges at around or below 800°C were also indicated within samples by the high degree of optical activity within the micromass and the presence of primary calcite which begins to degrade at around and above this temperature threshold.

Whilst it is difficult to establish with certainty whether low firing temperature ranges reflect purposeful practice or poorly controlled firing, the mottled colours and incomplete oxidation of the ceramics would seem to suggest the latter. It is worth noting that low firing temperature ranges would have been needed to ensure preservation of the burnished surfaces of these vessels, as vitrification resulting from high firing temperatures would destroy the burnished sheen.

Early Bronze Age fabrics

The EH I pottery sampled from Midea is characterised by a narrow range of fabrics. However, the fragmentary nature of the assemblage and some mixed contexts made recognition of definitively EH I material difficult at times. The sampled material is dominated by fruitstands, as an accepted characteristic shape of this date, but other bowl types and jars are included, benefiting from comparison with contemporary material published in the region.

As already noted, the EH I type material is dominated by the presence of a distinctive macroscopic fabric (Macroscopic Group 4; see Figure 1.12). This correlates to a distinct petrographic fabric, first recognised in the Neolithic samples, containing sandstone grading into low-grade metamorphic rock fragments, accompanied by rare serpentinite and degraded basic igneous inclusions (Figure 1.12). These inclusions can be sourced to those Upper Pliocene-Pleistocene flysch outcrops which contain sandstones and ophiolitic bodies located in the area south of Midea and in the Talioti Valley.

As discussed in detail elsewhere (Burke *et al.* 2018; Burke *et al.* 2020), this fabric has a number of key features relating to the types of raw materials, firing practices, typology and its distribution patterns (also discussed by Weisshaar 1990; Dousougli 1987) that link it to an important centre of production in the Argolid. It appears in a category of red firing and/or red slipped pottery, and was commonly used for the production of fruitstands in particular. Importantly, it becomes the most abundant fabric group for a wide

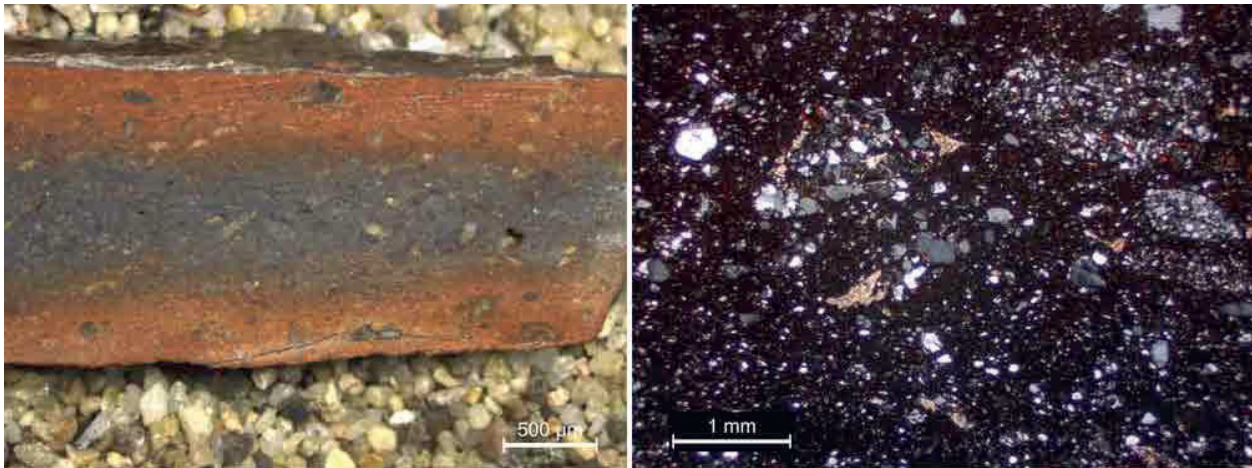


Figure 1.12. Sample MID 13/35. The macroscopic fabric and related petrographic sandstone to low-grade metamorphic fabric at Midea (© C. Burke).

range of EH II pottery types at many of the Argive sites we have examined, including Midea, suggesting that its associated potting centre became the dominant supplier in the area.

The second significant fabric associated with EH I type pottery is characterised by the presence of intermediate volcanic rock fragments (predominantly andesite) and matches Gauss and Kiriati's FG1 (2011) from the island of Aegina, c. 75km east of Midea. As noted above, these imports are clearly identified in the hand specimen by the presence of gold mica (Figure 1.13).

Andesite fabrics have also been identified in comparable EH I and EH II material at Tsoungiza (Burke *et al.* 2016) and Delpriza (Burke 2017), and EH II material at Korakou (Burke 2017), as well as in Attica associated with EH I-II and II pottery from Kontopigado-Alimos (Tsai and Day work in progress) and EH II Koropi (Douni and Day work in progress), highlighting the wide distribution of vessels from the island during this time. At Midea, and comparative sites, andesite fabrics are commonly found in bowl shapes which are characterised both by

the presence of gold mica and their thick red-brown slipped and highly burnished surface treatment. It is interesting to note that analysis at Midea and elsewhere shows that similar bowl forms were made locally at all of the sites studied (Burke 2017), which serves to highlight the effort of importation from Aegina, and it may have been that the quality of the finish of the Aeginetan examples was a contributing factor in their clear desirability for consumers. As andesite grinding stones were also circulated during this time it is likely that the two products may have travelled together from the island to the mainland.

Early Bronze Age firing

The sandstone to low-grade metamorphic MG4 fabric displays a range of characteristics related to firing. The vessels commonly have a red surface which is sometimes slipped also in a red colour, suggesting firing in a predominantly oxidising atmosphere. However, there are examples with mottled surface colours suggestive of exposure to mixed atmospheric conditions during firing, and others exhibiting a thick

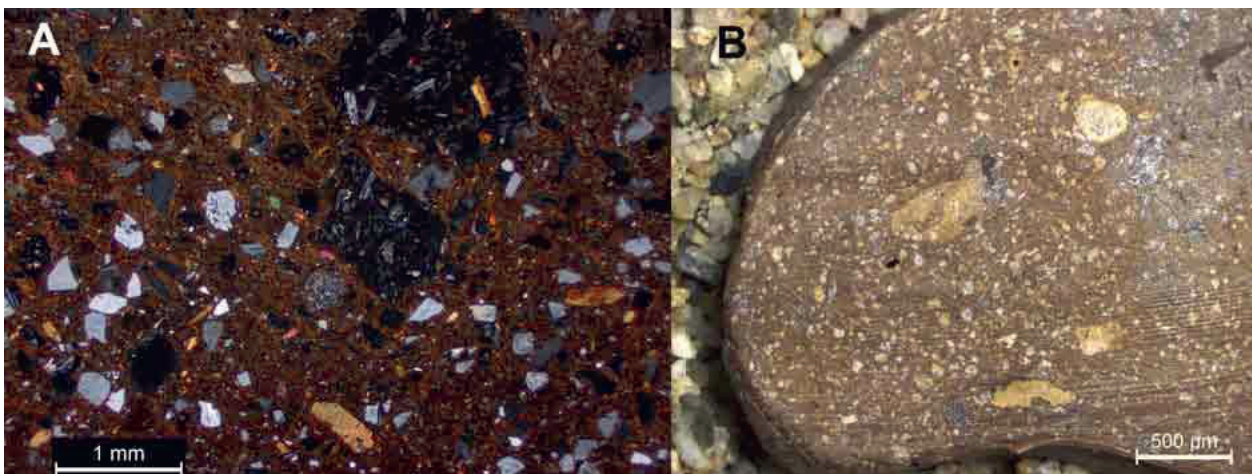


Figure 1.13. Sample MID 13/29 A: photomicrograph of the andesite fabric; B: image of macroscopic fabric (© C. Burke).

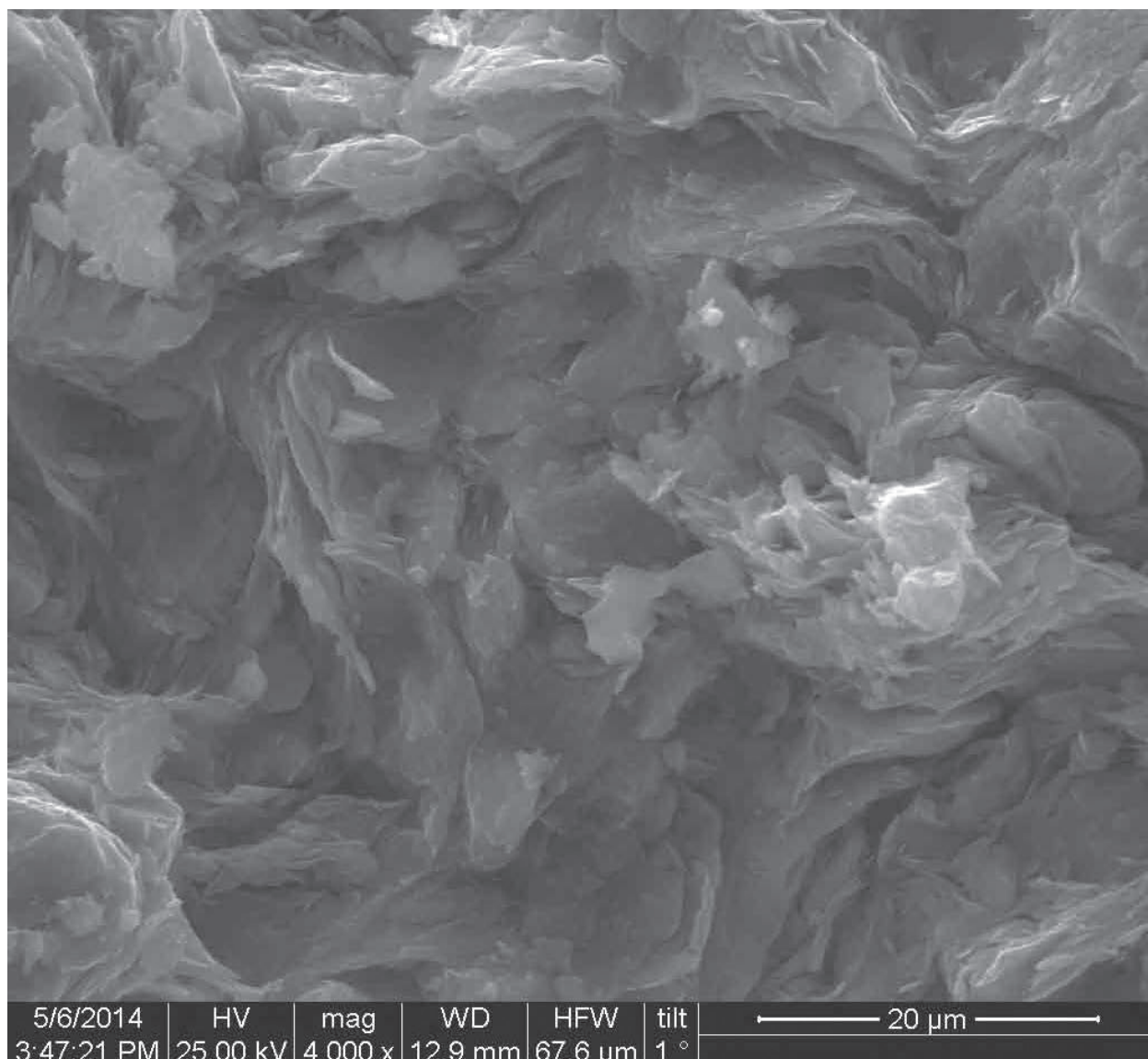


Figure 1.14. SEM image of MID 13/31 (x4000 magnification) displaying an unvitified microstructure suggestive of firing below 750°C (© C. Burke).

grey core with sharp borders indicative of incomplete oxidation of the vessel due to fast firing (Figure 1.12).

SEM analysis has revealed samples with predominantly non-vitrified microstructures (Figure 1.14). However, comparative samples of the same fabric from other sites testify to equivalent firing temperature ranges up to 950°C (Burke 2017; Burke *et al.* 2018).

The presence of uneven surface colours, thick firing cores, and evidence for a range of firing temperatures may indicate the use of open or fast firing techniques (Burke 2017; Burke *et al.* 2018). The analysis of the same fabrics from a number of sites and phases demonstrates the existence of a long-practiced firing tradition that continued into EB II, contrasting with the centres of production and technological practices responsible for the characteristic high quality dark slipped pottery

of EH II (Burke *et al.* 2016; Burke *et al.* 2018; Burke *et al.* 2020).

Finally, turning to the Aeginetan import, the optical activity of the micromass and the presence of a burnished surface provided an early indication that this vessel was fired at low firing temperature ranges. This was confirmed by SEM analysis which identified the presence of non-vitrified microstructures consistent with equivalent temperature ranges below 750°C (see Figure 1.15).

This result corroborates SEM analysis of the same fabric at Kolonna on Aegina (Gauss and Kiriati 2011: 271) and other sites in the northeastern Peloponnese (Burke 2017). As already discussed in relation to the Neolithic, low firing temperatures allow the preservation of the burnished finishes of these vessels.

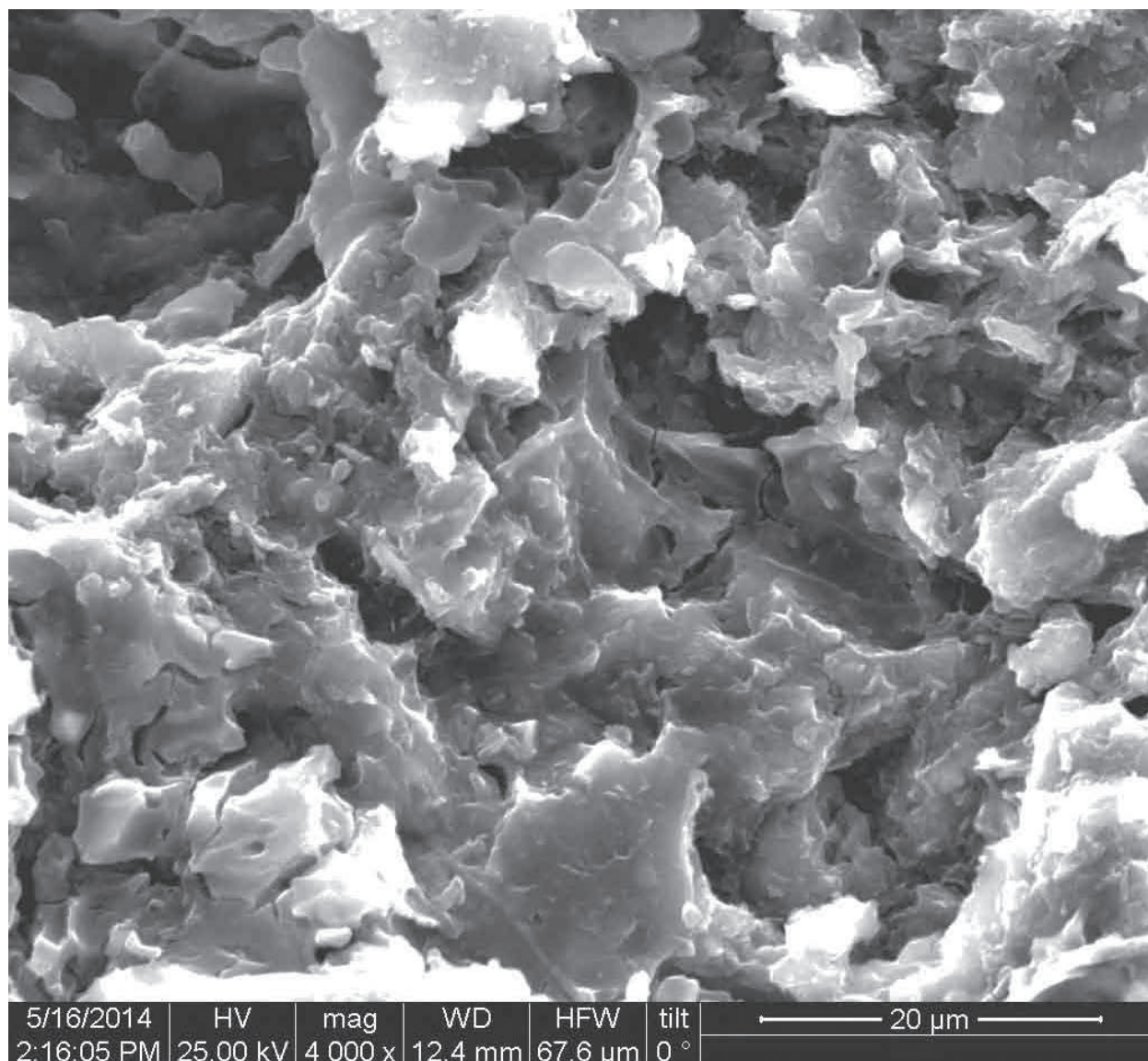


Figure 1.15. SEM image of MID 13/29 (x4000 magnification) displaying an unvitified microstructure (© C. Burke).

Conclusion

This new ceramic evidence suggests that the Upper Acropolis of Midea saw activity from at least the later part of the LN period, i.e. early 5th millennium BC. According to both 14C dating and pottery typology, the FN use of the site begins in the earliest part of the FN period (4300 BC) and continues later into the 4th millennium BC.

The LN pottery is characterised by a high proportion of fine ware, while that of the FN period is dominated by coarse ware. The style of decoration visible in the LN and FN patterned painted and incised fine wares indicates the involvement of Midea in local northeastern Peloponnesian networks of interaction, which perhaps found expression in dining activity at the site. A comparatively common special form in the material of Midea is the cheese-pot with a row

of perforations under the rim. It has been suggested that these perforations had a functional purpose for fixing a cover over the vessel which was most probably used during food production. In early EH I, we see the appearance of the fruitstand and the large shallow bowl at Midea and at other sites in the Argolid, such as Makrovouni and Talioti, these widespread changes most likely reflect a shared change in consumption and potentially dining practices across the northeastern Peloponnese and further afield.

Macroscopic fabric analysis has identified similarities within the coarse and fine ware assemblages at Midea indicative of continuity between LN and FN production traditions. It has also indicated a major shift in practice between the FN and the start of the EBA, represented by the introduction of new shapes and new macroscopic fabrics.

The petrographic results support these macroscopic observations, adding detail about raw materials and technological practices used in the production of pottery consumed by the community at Midea. The analyses have demonstrated that potters local to Midea took part in the pan-Aegean wide technological practice of grog tempering during the Neolithic and confirmed a change between the FN and EBA, represented by the decline of the grog tempering tradition alongside the rise of an important community of practice in the Argolid region, most likely in the area of the Talioti Valley. Although as a characteristic shape, fruitstands are potentially over-represented in the sampled material from Midea, it is worth noting that the Talioti potting community appears to have been particularly focused on the production of fruitstands, with over 90% of the fruitstands sampled within the broader EBA study belonging to this fabric group, their broad consumption possibly related to specific dining practices (Burke *et al.* 2020). The Argive centre of production rose to prominence over the course of the EBA to become the predominant source of pottery for surrounding settlements (Burke *et al.* 2020; also discussed from a macroscopic perspective by Weisshaar 1990). Importantly, the identification of a potential FN import (albeit from an as yet unknown location) and the presence of EH I type pottery from Aegina demonstrates the early access that Midea had to wide reaching networks of contact and exchange.

Analysis has also shown that much of the Neolithic pottery from Midea was fired in variable conditions at low temperature ranges, a choice possibly related to the preferential use of burnishing as a method of surface modification. A similar choice may account for the likely low firing temperature of the Aeginetan sample, given that on Aegina, too, burnishing constituted a common finishing method for early exports (Burke 2017; Burke *et al.* 2018). In contrast, the sandstone to low grade metamorphic fabric exhibits variable firing temperature ranges and features consistent with the technological tradition of fast firing, prevalent at this Argive centre of production irrespective of surface finish (Burke 2017; Burke *et al.* 2018). These results make clear that firing practices were a product of specific understandings and practices tied into the wider *chaîne opératoire* and traditions of pottery production.

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Kouphovouno and the Cyclades: A Note

Robin Barber

A recent survey of the radiocarbon chronology of mainland Greece, based on analyses of samples from excavations at Kouphovouno conducted by Bill Cavanagh, Chris Mee and Josette Renard (Cavanagh *et al.* 2016), has implications for the Cyclades. These lie in the suggested priority of the beginning of the Middle Cycladic (MC) period over the Middle Helladic (MH) and are particularly relevant to a proposal by Robert Buck (1964: 290), in the only full study of MH matt-painted pottery so far published, that Cycladic ‘Geometric’ pottery (as defined by Edgar 1904: 93–102) was of earlier origin and its likely source of inspiration.

The close similarity of the early ‘Geometric’ pottery of Phylakopi, and other Cycladic islands, to the matt-painted pottery of the Saronic island of Aegina and many Middle Helladic sites on mainland Greece is undeniable — the distribution of the barrel jar shape¹ (Buck 1964: 247–248, shape C1), with characteristic Geometric decoration, provides a striking example — but it is noteworthy that obvious differences in styles of painting and, in some instances, the results of clay analysis, suggest multiple production centres, even though many of the mainland pieces are thought to come from Aegina (Philippa-Touchais 2002: 37).

The Cyclades enter the Kouphovouno-based framework via three samples from Phase A of recent excavations at Akrotiri, dated to c. 2280–2130 BC (2σ) (c. 2205–2140 BC (1σ)).² Although the integrity of Akrotiri Phase A is questionable (Sotirakopoulou 2016: 355–356), and its wholesale assignation to a Middle Cycladic phase highly improbable given the apparently secondary nature of the deposits, and the fact that it contains elements which must be EC III in date (Knappett and Nikolakopoulou 2008: 3, table I; Nikolakopoulou *et al.* 2008: 313; Nikolakopoulou 2019b: 149–150, for reference to finds of DFI (Dark-faced Incised), which are diagnostic of early EC IIIB; for EC III, cf. also Renfrew

and Evans 2007: 176). It also appears to lack some classic MC features.

Nevertheless, even if Akrotiri Phase A were an integrated group, with the samples from the early end of the spectrum represented by the pottery, the dates could be applied to contexts no later (and quite possibly earlier) than early EC IIIB (= Phylakopi I-ii), the first point at which ‘Geometric’ pottery is found at Phylakopi. If they were associated with the later end, they would probably relate to the early phase of the Second City there (Phylakopi II-i), with the suggested absolute dates (Cavanagh *et al.* 2016: 46, table 5) pointing to an origin of the Geometric style some 200 years earlier (presumably, still in early EC IIIB).

As regards the later pottery spectrum in Akrotiri Phase A, again as viewed from Melos, it is coming to seem increasingly likely that we have been wrong to dismiss Mackenzie’s phase II-i of the Second City at Phylakopi (Barber 1983: 77–78) and that a number of elements can be identified as probably belonging to it (Barber 2017: 75).³ The most probable explanation⁴ of this is that there was a long phase, best termed for the moment ‘transitional’ (end of City I / early City II at Phylakopi), between classic EC III and classic MC. Phase A at Akrotiri certainly includes, as well as the earlier material, a considerable number of elements which, at Phylakopi, would be assigned to such a transitional stage.

A, perhaps somewhat risky, historical speculation is prompted by the presence, for instance, of Combination Ware (one of the main features of the transition) in I-iii levels at Phylakopi. This indicates that the transition had begun before the end of the First City there and that, at Akrotiri, the clearance represented by backfilling of the rock-cut chambers might have been the result of an episode contemporary with the destruction of Phylakopi I.

Returning to the relationship between Cycladic ‘Geometric’ and mainland matt-painted pottery, which was the primary stimulus for this note, we should not forget the indications (MacGillivray 1984), independent of the radiocarbon chronology, which point to

¹ Illustrations of Cycladic ‘Geometric’, Aeginetan and mainland matt-painted barrel jars: Phylakopi: Atkinson *et al.* (1904: pl. viii, no. 4); Paros: Rubensohn (1917: 58, fig. 62; 61, fig. 67, etc.); Thera: Nikolakopoulou (2019a: 215, table 3.1 (3/4), shape G1; 2019b: 64, no. 339, pl. 24); Orchomenos: Sarri (2010: pl. 77, nos. 1, 2 (= col.pl. 5, nos. 5, 6)); Eutresis: Goldman (1931: 147 fig. 201; 149, fig. 205); Aegina, Kolonna: Siedentopf (1991: pl. 16f); Argos: Philippa-Touchais (2002: 27, fig. 23, no. 71); Lerna: Caskey (1955: pl. 12b).

² The samples in question, derived from a compressed seed block from Pillar Pit 67N, are discussed in Nikolakopoulou (2019a: 37–38), and appear in Cavanagh *et al.* (2016: 46, table 5). I am most grateful to Professor Christos Doumas who invited me to Akrotiri several years ago to look at the material, and to Dr Irene Nikolakopoulou who showed me some of the pottery from these excavations.

³ To the Combination Ware and Thick Linear style pottery mentioned there should be added the ‘Geometric pottery with designs in matt black’ discussed by Edgar (1904: 102–106), now known as Soft Matt-Painted (SMP).

⁴ I hope shortly to address this matter further.

associations of Cycladic ‘Geometric’ pottery with mainland contexts earlier than MH. This position has received some further tentative support in discussion of recent finds from Kolonna on Aegina (Gauss and Smetana 2008: 338). Thus, even without the Akrotiri dates, there is a good case for continuing to uphold Buck’s view.

Finally, one may enquire the reasons for the mainlanders’ enthusiasm for contact with the Cyclades (perhaps particularly Melos) as demonstrated by the pottery. It may have lain partly in the trading activities of the islanders, bringing to the mainland products whose nature and sources we cannot identify. But the most obvious tangible commodity of value which the Cyclades possessed was Melian obsidian, of great importance to mainland communities where the use of metals was not yet highly developed.⁵

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⁵ The extensive mineral wealth of Melos (comprising aluminium silicates (clays), sulphur and sulphates (alum)), have a variety of possible applications, including as pigments (white Melian Earth), mordants (substances that fix dyes) for the textile industry (alum), fumigants (sulphur), or medicines/therapeutic products (alum/sulphur) (Photos-Jones and Hall 2014). These may also have contributed to the island’s importance in prehistoric times. Dr Photos-Jones (personal communication) has pointed out that the intensive working of Melian obsidian (a glass of volcanic origin) by the island’s inhabitants, in the Neolithic and Early Bronze Age, would have inevitably resulted in minor cuts and bleeding. Alum is a group of minerals (not a single mineral) of which Melos has a substantial number. These were extracted extensively in the Roman period, in the southeast of the island. Alum group minerals are astringent and, as such, can act as haemostatics (substances capable of stopping haemorrhage). It seems not unlikely that the obsidian workers of Melos may have discovered this and made commercial, as well as personal, use of their discovery. Although not yet demonstrated archaeologically, this suggestion gains credence from references to alum in the Linear B tablets (Photos-Jones and Hall 2014: 54–55).

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