Things that Travelled

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Glass production and consumption in Cyprus in Late Antiquity (fourth–seventh century CE)

Peter Cosyns and Andrea Ceglia

Abstract

At the economic crossroad of the eastern Mediterranean, Cyprus provides an ideal case study for the investigation of changing trade networks in the eastern Mediterranean during Late Antiquity. This chapter presents the preliminary results from ongoing research on Late Antique glass vessels from Cypriot early Christian basilicas. A combination of archaeological data with chemical and optical spectroscopic measurements allows the characterisation of specific vessel production groups that can be associated with either imported or locally produced glassware.

The ongoing research focuses on the glass vessels from ecclesiastical contexts from the fourth to seventh century CE, which formed a significant component within the church design as lighting devices. A uniform distribution pattern of specific glass vessels within ecclesiastical buildings not only enables a comparison of ecclesiastical contexts within Cyprus during Late Antiquity in the first place but allows also a wider investigation on the material from similar contexts throughout the entire eastern Mediterranean.

Introduction

Defining specific groups of vessel production related to imported or locally produced glassware falls within material culture studies, which increasingly focus on the better understanding of economic and cultural
networks (Wellman 1983; Rutherford 2007; Riedel 2013). The application of network theory to material culture has already proven to be useful for the understanding of diachronic socio-cultural processes that occurred within a large-scale area (Brughmans 2010). However, for the Mediterranean world these models have hitherto been based solely on pottery studies, which could lead to biased conclusions. Moreover, the current insights concerning the eastern Mediterranean in Antiquity are predominantly based on pottery evidence from Hellenistic and early Roman times (Peacock 1982; Peacock and Williams 1986; Lund 1999, 2006; Lund et al. 2006; Fenn and Römer-Strehl 2013), and, generally, the resulting model(s) of regional idiosyncrasies and inter-regional trade relations are extrapolated from these earlier periods to the Late Antique period. However, since the socio-economic and political situation in the late Roman empire differed significantly from the previous period, it is unlikely that these extrapolations fully reflect the socio-economic situation in Late Antiquity. Therefore, it is essential to examine different types of consumer goods from Late Antiquity itself in order to test the validity of the prevailing models. As a result, a more complete and balanced overview of the connectivity patterns and interrelated diversity in the eastern Mediterranean during Late Antiquity can be acquired.

Although Bonifay’s study (2004) has already shown that pottery is a good medium for the study of inter-regional networks in the western Mediterranean during Late Antiquity, it appears that for the eastern Mediterranean world, glass would also be a most appropriate medium with which to evaluate economical models of connectivity. Indeed, glass appears abundantly in the archaeological record of the late Roman period. In particular, ecclesiastical contexts of the fourth to mid-seventh century CE are relevant in examining evidence for commercial activity during Late Antiquity, because glass vessels were a significant component within the church design, as lighting devices: after all, from the Constantinian period onwards the erection of a monolithic church building programme resulted in intensive building activities based on a common design plan including the lighting, i.e. lamps and window sheets (Theis 2001; James 2006).

In previous research we discovered that in eastern Mediterranean ecclesiastical contexts specific lamp types were intended for the same specific spots within the building (Cosyns and Ceglia forthcoming). The fact that they are always found at precise locations within the early Christian basilicas and in association with other specific material emphasises the specific use of particular types of Late Antique glass vessels. This
uniform distribution pattern of similar glass vessels within ecclesiastical buildings enables the comparison of ecclesiastical contexts within the entire eastern Mediterranean, and, consequently, the investigation of patterns of local versus a so-called ‘globalised’ empire wide production and consumption.

Cyprus is an appropriate case study because the island was an important player on the east to west and south to north trade routes in Late Antiquity (Mitchell 2007; Lawall and Lund 2013). It was, for instance, the main hub for food supply from Egypt to Constantinople. Driven by a continuous economic growth, this prosperous Roman province displayed an increasing building programme of Christian basilicas between the fourth and mid-seventh century CE. Due to its central geographical position in the eastern Mediterranean and the prevailing sea currents, Cyprus acted as the crossroad of the three major economic actors in the eastern Mediterranean during Late Antiquity: Constantinople, Antioch and Alexandria. The Levant and Egypt were major glass production centres and Cyprus not only consumed raw glass from both centres (Freestone et al. 2002) but also imported finished glass objects from both. However, the exact diachronic distribution patterns have yet to be investigated, although these data for Late Antique Cyprus could be valuable for the exploration of the complexity of the glass consumption in the eastern Mediterranean during Late Antiquity. Therefore the intrinsic advantages of studying Cypriot Late Antique glass material have not yet been exploited and research on Cypriot Late Antique glass has remained restricted to the material study of glass in site excavation reports (Manning 2002; McClellan 2003), or to chemical analyses of a very restricted amount of samples from a single site (Freestone et al. 2002). Finally, the study of Late Antique glass from Cyprus would represent a significant addition to the ongoing research on production, distribution and consumption of late Roman and early Byzantine glass (e.g., Laflı 2009; Drauschke and Keller 2010; Fünfschilling and Laflı 2013; Keller et al. 2014).

The present chapter provides an introductory typological overview of the archaeological glass finds from the early Christian basilica of Yeroskipou-Ayioi Pente, and the archaeometric study of the glass from this site as well as from two other sites on the Cypriot south coast: Maroni-Petrera and Kalavasos-Kopetra (Ceglia et al. 2015, 2016). This research will be extended to a number of other sites, e.g. Alassa-Ayia Mavri, Katalymmata ton Plakoton and Ayios Kononas (Figure 4.1) in order to verify the possible regional differences between the Cypriot
coastline and the more inland sites, and to refine our general knowledge of glass distribution in Late Antique Cyprus.

**Impact of sea currents and wind-driven circulations on the distribution of glass in (Late) Antiquity**

The distribution of consumer goods such as glass vessels, is in some way a reflection of the economic evolution of the various regions, resulting from the connectivity between the different regions. It is clear from the sea currents and wind-driven circulations within the eastern Mediterranean that Cyprus acted as a perfect hub within the trade network between the metropolitan cities Constantinople, Antioch and Alexandria (Morton 2001). An additional but key concern to this issue is the island’s adjacency to both major centres of raw glass production and consequently Cyprus cannot simply be considered a consumer of the ubiquitous glass commodities but also a dispatcher of both Levantine and Egyptian raw glasses towards the West, though large amounts of glass were recycled. The early Christian basilicas in Cyprus provide ample but very consistent material, as vessel glass is almost limited to lamps. It would be very useful to extend the research with a comparative study on the lighting devices in glass from contemporaneous ecclesiastical buildings in Anatolia, Cyrene, Egypt, Greece and the Levant so to define regional idiosyncrasies as well as widespread commodities. The distribution of glass resulted from a
long-distance sea trade on a large scale (e.g. Nenna 2008), and it is essential to take into consideration the wind-driven and sea currents to better understand the distribution pattern of the Levantine and Egyptian raw glass and finished products. Until now, the circulation arrows on the maps have represented practical visualisations of the trade routes between the supplier and receiver of raw materials or consumer goods to make clear the interaction between two overseas areas. However, Knappett et al. (2008, 1009–10) have pointed out that commonly, site interactions ‘are simply drawn as lines, without weight or direction’, while the main interest of examining inter-site networks is to define the impact of each site within the interchange and how this could have taken place. Outlining the character of the mutual connectivity between two settlements advances understanding of those aspects that are under-represented in historical sources, such as the interregional economical organisation. The investigation of settlement patterning in Antiquity has always been strongly influenced by an oversimplified theoretical approach based on the actual distance between sites. It is not enough to calculate travel distances that people can afford over land by walking or by using a chariot or over water by boat via rivers, along the coastline by cabotage or through the open sea. Such assessment needs to be verified in view of natural influences like, for instance, the prevailing natural navigation conditions. For example, the location of the Milesian settlement of Sinope, halfway along the northern Anatolian coastline, was not coincidental as from there they could easily make use of the prevailing surface sea current heading north to the Crimea where Miletus again founded various colonies at the northern Black Sea coast, e.g. Panticapaeum (Kerch) at the eastern side of the Crimean Peninsula along the Kerch Strait (Gates 2011, 304–5) (Figure 4.2). From there, ships could take advantage of a current heading west towards Romania and back to the Bosporus to return to the Mediterranean Sea, or heading eastward to the Caucasus. As there were no power-driven ships in Antiquity, seafarers were at the mercy of currents and winds, so that it would have been frequently necessary to take a detour to reach a desired destination.

The Strait of Gibraltar was important as the source of all surface currents and tides (Morton 2001; Bergamasco and Malanotte-Rizzoli 2010). Dividing at the western coast of Sicily, the surface currents, on the one hand, head south towards the North African Gulf of Sirte or directing further eastwards towards the Levantine Sea and, on the other hand, turn north to head along the Italian coast. From there they either curl counter clockwise back southwards along the Sardinian east coast
within the Tyrrhenian Sea, or head further north into the Ligurian Sea along the French coastline and back south along the Spanish coast in the Balearic Sea (Figure 4.2). The sea currents in the Levantine Sea head north along the Levantine coast and turn counter clockwise around Cyprus towards Rhodes and Crete, making both islands logical passage stops or final destinations. In particular, Rhodes has been demonstrated to have played an important strategic role in trade as pivot for the Aegean to (re)distribute raw materials and finished products north to the Black Sea along the Anatolian west coast or towards Crete and the southern Greek mainland (Gabrielsen 1997; Coullié and Filimonos-Tsopotou 2014; Deligiannakis 2016).

In addition to sea currents and tides it is important to have help from the winds in order to increase speed and ease navigation when sailing or sail upstream. The knowledge of seasonal variations in strength and directions of the prevalent winds indicates that trade experienced cyclical undertakings concentrated from April to October as the summer winds (i.e. the Etesians) are more steady than the winter winds (i.e. Bora and Sirocco) (Morton 2001). Another factor to be considered is that ancient seafarers were not restricted to secure coastline routes, i.e. cabotage. Merchant ships also appreciated short cuts through the deep open sea when heading towards specific destinations (Morton 2001).
Considering Cyprus, two routes from Egypt turn alongside the Sinai. A first route heads towards the Levantine coast and up to Anatolia supplying the island at Salamis and Kition via a minor sea current that links east Cyprus with the Syrian coast. A second route goes into the open sea towards the west end of Cyprus where Nea Paphos is situated. Technological innovations in shipbuilding and sailing conditions possibly influenced the relocation of the former capital of Palaepaphos in the late Classical period, which until then must have been supplied through cabotage coming from the northern Levant. This element requires a detailed evaluation as it tackles the issue of the impact of a single destination trade between Egypt and Cyprus importing exclusively Egyptian material, as opposed to itinerant merchant ships sailing along the Levantine coast to enter Cyprus from the East, then sailing clockwise around the island with an assortment of Egyptian and Levantine commodities.

Objectives

The main objective of the research is to better understand Cyprus’ economic role in the eastern Mediterranean during Late Antiquity by means of research into glass from archaeological contexts. A first concern in the assessment of the glass production and consumption in Cyprus is to determine the impact of the two major glass-producing regions, i.e. the Levant and Egypt. Despite the fact that this allows the calculation of the ratio of imported glass of both production centres, it does not show whether the glass was imported as raw glass chunks or as finished artefacts or whether Cyprus was supplied with both categories of material. To detect a possible local production of finished artefacts in secondary glass workshops, a techno-typological study is required, because technological, formal and decorative idiosyncrasies can be markers of specific workshops. In order to differentiate local Cypriot production from imported artefacts, it is necessary to compare vessel types found in Cyprus with those from published sites in the Levant and Egypt. The resulting typology will enable a distribution pattern of imported and locally produced glass vessels. In this way, possible intra-regional differences will be recognised.

In addition, Late Antique Cypriot glass will be evaluated on (1) an intra-site level to better understand its use and function within early Christian basilicas and on (2) an inter-site level to identify the Cypriot consumption pattern. Finally, the Cypriot production and consumption
patterns will be compared to those of the surrounding areas in the eastern Mediterranean. In this way, the project can add valuable information to the study of the trans-regional trade and connectivity during Late Antiquity.

The research questions fall under two headings – glass production and glass consumption. The aims concerning glass production are:

• to identify the compositional groups of raw glass in order to define the provenance of the imported glasses, and thus the origin of the glass types present in ecclesiastical contexts in Cyprus – i.e., Egypt and Levant;
• to establish the ratio of imported glass from the two main primary glass production centres so as to elucidate the varying impact of both glass-supplying centres per ecclesiastical context;
• to distinguish possible Cypriot vessel types (shapes, decoration, technological features, and glass colours) from published Late Antique glass vessels from fourth- to seventh-century CE ecclesiastical contexts and secondary workshops in other eastern Mediterranean regions;
• to determine which glass types were used to produce the Cypriot vessel types (matching glass types and Cypriot vessel types);
• to assess in which glass types the imported finished products were produced (matching glass types and imported vessel types).

The research goals regarding the glass consumption are:

• to characterise the glass vessel distribution pattern on Cyprus to identify possible regional differences;
• to consider whether different regions on Cyprus had privileged trade connections with either the Levant or Egypt (by inter-site evaluation);
• to assess the specific use in the ecclesiastical contexts of the identified glass vessels (by intra-site evaluation);
• to evaluate the prevailing economic model based on historical research and on pottery studies and propose an alternative one with the glass data integrated;
• to assess the interaction and connectivity between the various regions in the eastern Mediterranean during the Late Antique period.
First results from study of the material

The glass from the early Christian basilicas Ayioi Pente at Yeroskipou (Cosyns and Ceglia forthcoming), Maroni-Petrera (Manning 2002) and Kalavasos-Kopetra (Rautman 2003) shows very clearly that the vessels form the largest part of the material retrieved. Despite the fact that windowpanes, tesserae and jewellery made in glass are also frequently attested, these categories remain rather minor groups within the glass assemblages (Figure 4.3). Although the results of the glass research of the more remote early Christian basilica of Katalymmata ton Plakoton on the Akrotiri peninsula remains very preliminary and cannot be included in detail, we noticed an unexpected large quantity of windowpanes there. Further investigation will indicate whether the glass tesserae are also still present in abundance. The first idea is that the sites of Yeroskipou, Maroni and Kalavasos were quarried soon after their destruction in the mid-seventh century CE whereas the quite isolated early Christian basilica of Katalymmata must have remained concealed and protected from looting. This Akrotiri site will form a major section in the analysis and assessment of the glass assemblages from the early Christian basilicas in Cyprus.

A great number of the fragments remain non-diagnostic and are consequently not attributable to a specific vessel type; however, lamps and goblets form the largest proportions of determined vessel shapes (Figure 4.4; Table 4.1). So far no beakers, cups, dishes, plates or jars have been identified in the early Christian basilica of Yeroskipou and with the exception of the lamps and stemmed goblets (most likely also used as

![Figure 4.3](image-url) The different functional types of glass material from the early Christian basilica of Yeroskipou-Ayioi Pente.
lamps) all other catalogued vessel shapes – i.e. flasks, bowls, bottles and jugs – remain minor categories.

The glass lamps form the largest part of the glass vessels. When also considering the stemmed goblets or so-called wine-cups as lamps, lighting vessels covers 85 per cent of all identified vessels (Figure 4.4). This assessment is likely to be a consequence of lamps and goblets being the easier forms to define, and in particular because only very few types occur. More than a quarter of the material remains indefinite, but most likely these undiagnostic fragments were derived from very thin-walled vessel shapes.

The high numbers of lamp fragments retrieved from the basilica Yeroskipou-Ayioi Pente are limited to five specific shapes – the hemispherical bowl-lamp (Figure 4.5a); the shallow conical bowl-lamp with handles (Figure 4.5b-c); the hollow-stemmed lamp (Figure 4.5d); the knobbed-base tall conical lamp (Figure 4.5e); and the stemmed goblets (Figure 4.5f). Despite the fact that three types – hemispherical and conical bowl-lamps and stemmed goblets – can stand on their bases, all five were almost certainly used as hanging oil lamps with a burning internal wick.

Most of the 297 lamps defined so far are stemmed goblets and hollow-stemmed hanging lamps (Figure 4.4). It is significant that undecorated hollow-stemmed lamps with rounded end account for almost all the fragments recorded at the sites of Yeroskipou-Ayioi Pente,
### Table 4.1 Lamp shapes from the early Christian basilica of Yeroskipou

<table>
<thead>
<tr>
<th>Hemispherical bowl-lamp</th>
<th>Shallow conical bowl-lamp</th>
<th>Stemmed lamp for polykandela</th>
<th>Knobbled-base conical lamp</th>
<th>Stemmed goblets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Features</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- decorated and undecorated</td>
<td>- undecorated</td>
<td>- undecorated</td>
<td>- undecorated</td>
<td>- undecorated</td>
</tr>
<tr>
<td>- everted rim with cut edge</td>
<td>- rounded or vertically folded rim</td>
<td>- rounded rim</td>
<td>- everted rim with cut edge</td>
<td>- rounded rim</td>
</tr>
<tr>
<td>- no handles</td>
<td>- three vertical handles</td>
<td>- hemispherical body</td>
<td>- tall conical shaped body</td>
<td>- cylindrical body</td>
</tr>
<tr>
<td>- mould-blown honeycomb</td>
<td>- kicked-in base</td>
<td>- funnel-shaped bottom</td>
<td>- large globular hollow knobbled base</td>
<td></td>
</tr>
<tr>
<td>pattern or plain free-blown</td>
<td>- no foot</td>
<td>- hollow stem</td>
<td>- hollow or solid stem</td>
<td>- hollow or solid stem</td>
</tr>
<tr>
<td>- normally without foot but can also occur with a stemmed foot</td>
<td>- sometimes with a cylindrical tube inside</td>
<td>- no foot</td>
<td>- discoid foot can be flat, slightly conical and strongly conical; rim tubular or rounded</td>
<td></td>
</tr>
<tr>
<td><strong>Correlations</strong></td>
<td>The honeycomb decorated bowls described as a ritual/liturgic objects (Stern 1985, 39); Considered a Syro-Palestinian product. Shape reminiscent of Sassanian facetted bowls in rock-crystal and in thick decolourised glass</td>
<td>Crowfoot and Harden 1931 type C (4th–7th c. CE); Isings 1957 form 134 (4th–5th c. CE); Uboldi 1995 type I.1 (4th–8th c. CE); Hadad 1998 type 1; Gill 2002 type 1–5 A variant of the so-called handled bowl-lamps includes a glass tube at the centre of the inner base that functioned as a wick holder² (see Hadad 1998 type 7)</td>
<td>Crowfoot and Harden 1931 type B2b; Uboldi 1995 type IV.2; Hadad 1998 type 4 (5th–early 8th c. CE); Gill 2002 type 6</td>
<td>Comparisons are known from Jerusalem, dated 7th–9th century CE, and Corinth (Davidson 1952, 121, pl. 60: 802) but the example from Thessaloniki is dated late 4th–5th century CE (Crowfoot and Harden 1931, 202, pls. xxviii, 11–12)</td>
</tr>
<tr>
<td>Illustrations</td>
<td>Hemispherical bowl-lamp</td>
<td>Shallow conical bowl-lamp</td>
<td>Stemmed lamp for polykandela&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Knobbed-base conical lamp</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------</td>
<td>---------------------------</td>
<td>------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>quantity</td>
<td>2 ex.</td>
<td>11 ex.</td>
<td>81 ex.</td>
<td>2 ex.</td>
</tr>
<tr>
<td>percentage</td>
<td>1.2%</td>
<td>6.7%</td>
<td>49.0%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

1 A good example of a Byzantine *polykandelon* for the suspension of 7 stemmed lamps – 6 in a circle and 1 central in the Maltese cross – has been excavated in Corinth, Greece (Davidson 1952, 128, pl. 63: 859).

2 Due to the degree of fragmentation it cannot excluded that the preserved rim and handle fragments of type 1 are of the variant with wick-tube. Only base fragments allow this identification, which may result in a much lower number of the handled bowl-lamps with wick-tube.
Maroni-Petrera and Kalavasos-Kopetra. Lamps with solid stem – plain or knobbed – and hollow-stemmed lamps with pointed end are represented only by single pieces. Sometimes sets of the hollow-stemmed hanging lamp were found together, making the use of polykandela almost certain in specific areas of the basilica. The large quantities of hollow-stemmed hanging lamps in transparent pale blue-green, pale blue, pale yellow-green or green glass from the early Christian basilica at Yeroskipou demonstrate that different glasses were contemporaneously in use. The very few hemispherical and conical bowl-lamps (Figure 4.5a–c) and the conical lamps with knobbed base (Figure 4.5e) are to be seen as special lamps, which were used individually on specific places in the basilica. For instance the mould-blown hemispherical bowl-lamp with honeycomb pattern (Figure 4.5a) is said to have functioned as a lamp hanging on a prominent place reminiscent of the piece in deep blue glass from Anemurium, Turkey (Stern 1985, 39).

Figure 4.5  (a) honeycomb decorated hemispherical bowl (ID no. 1); (b) handled bowl-lamp (ID no. 65); (c) handled bowl-lamp with wick-tube (ID no. 634); (d) undecorated hollow-stemmed lamp with rounded end (ID no. 103); (e) conical lamp with knobbed base (ID no. 569); (f) stemmed goblet or so-called wineglass (ID no. 16).
First results through archaeometric study

In a recent paper we discussed the glass consumption patterns from Yeroskipou-Ayioi Pente, Kalavasos-Kopetra and Maroni-Petrera from a material sciences perspective (Ceglia et al. 2016). Large sets of samples were chemically and optically analysed. Chemical analysis was used as standard approach to study ancient glass because it is a good method to categorise glass fragments. With the development of a methodological approach with optical spectroscopy we were able to increase significantly the quantity of examined material on their composition by discussing the relations between colour and chemical composition.

First we have carried out an in situ campaign with UV–vis–NIR spectroscopy. This method allowed us to obtain the transmission spectra on 416 ‘naturally’ coloured glass fragments, 206 from the early Christian basilica of Yeroskipou-Ayioi Pente, 144 from the site of Maroni-Petrera and 67 from Kalavasos-Kopetra (Ceglia et al. 2016).

In addition, we have analysed a selected set of 179 glass fragments from those three sites by using wavelength dispersive electron probe microanalysis (EPMA) to characterise their composition in terms of major and minor elements. A part of these samples were selected on the basis of the results from the in situ optical analysis, while the remaining glasses were selected among the material that could not be analysed optically due to the specific shape, e.g. tubular stems of the hollow-stemmed lamps (Figure 4.5d)(Ceglia et al. 2015).

On the basis of the archaeometric work we have distinguished six glass types on the basis of the chemical composition: Levantine 1, HLIMT, two types of HIMT (named HIMTa and HIMTb), Egypt 1 and HIT. Apart from Levantine 1 glass, which certainly has a Syro-Palestinian origin, all the other recognised glass types are most likely to have been produced in Egypt. The analysis of the chemical composition of the Late Antique glass samples from Cypriot settlements contributes to an improved interpretation of the HIMT families. We have, for instance, proposed that HLIMT glass is almost certainly a separate Egyptian primary production that started to be manufactured during the sixth century CE onwards (Ceglia et al. 2015; Cholakova et al. 2015).

At the current stage of our research we can state that the island was supplied with raw glass and/or finished objects by both Egyptian and Syro-Palestinian primary producers. The majority of glasses
belong to three groups: Levantine, HIMT and HLIMT. Two other types, HIT and Egypt 1 are represented in minor quantities, suggesting that objects made of this type of glass very likely have been imported as finished objects – either as consumer goods or as gifts (Ceglia et al. 2015).

In Yeroskipou-Ayioi Pente there are similar quantities of Levantine and Egyptian materials, while Egyptian glass is limited in Maroni-Petrera and nearly absent in Kalavasos-Kopetra. Such glass consumption pattern leads to two possible interpretations. On the one hand, it may reflect the trade networks as determined by the prevailing sea currents, indicating that east Cyprus is connected to the Syro-Palestinian coast, while west Cyprus is more oriented towards the Aegean areas and Egypt.

Alternatively, data may reflect a chronological evolution of glass imports, as the production of HIMT dominated the market during the fifth century CE, declined by the end of that century and definitely stopped by the mid-sixth century CE. The consequence of such a chronological interpretation of the HIMT-presence in the three basilicas implies that: (1) Ayioi Pente in Yeroskipou must have received large quantities of glass vessels during the fifth century CE that were discarded after the destruction of the first basilica phase, and accordingly should be linked to the pre-Justinian building phase (Cosyns and Ceglia forthcoming); (2) that the glass assemblage of the early Christian basilica of Maroni-Petrera is to be dated at the end of the fifth century CE; and (3) that the excavated structures of the different early Christian buildings at Kalavasos-Kopetra do not precede the mid-sixth century CE. In this case, the HLIMT glass should then be linked to the Justinian building phase of the considered sites because HLIMT glass was a new Egyptian production of the sixth century CE, that briefly took a large share of the market from the eastern Mediterranean to the western provinces. No tangible chronological implication can be ascribed to the Levantine material because this glass type was regularly produced and supplied to Cyprus through the period under consideration with no major changes in chemical composition.

The latter hypothesis concurs with recent research on the Late Antique glass from three Bulgarian sites (Cholakova et al. 2015). Based on very well-dated material they noticed a similar evolution showing the use of HIMT, HIT and Levantine glass during the fifth century CE, whereas the dominant glass type from their sixth-century CE contexts corresponds with our HLIMT glass.
Single melting event

Among the material from Maroni-Petrera, some objects had an analytically identical composition, meaning that they belong to the same melting event. The most striking example consists of five samples coming from the same batch (Figure 4.6, Table 4.2). Four samples were from the stems of hollow-stemmed lamps and an additional one was from a wall fragment. The minimum number of individual objects (MNI) is four objects and they are of a Levantine 1 composition.

The benefit of assessing archaeological glass assemblages with recognised batches is the possibility to connect specific typological features of the objects with the manufacturing process of a distinct workshop in a single moment and perhaps even by the same artisan. Moreover, from an historical point of view, it can be an indication that objects were commissioned by the church on a particular moment (Freestone et al., 2009).

Figure 4.6 Hollow-stemmed lamps of a single batch from the early Christian basilica of Maroni-Petrera.
This chapter highlights the benefits of an integrated approach to the study of glass consumption in Cyprus in Late Antiquity and its contribution to a better understanding of intra-regional and the interregional circulation and trade.

Besides a regional differentiation in the glass distribution there seems from the three sites considered that there is a strong chronological influence on the distribution of glass types.

The study has also made an important contribution in terms of analytical methodology. In situ optical spectroscopy can be applied on large numbers of glass pieces, allowing a better screening of the entire glass assemblage resulting in a valuable selection for sampling targeted glass groups. An important ongoing step of the research is the addition of a trace element study, which will provide the chemical fingerprint of the glass fragments. With this extra information we may be able to refine our understanding of the provenance of the glass groups identified up to now on the island.

At this stage, it is premature to ponder conclusions on the use of glass at an intra-site level as well as on an inter-site level. In order to

### Table 4.2 Chemical composition by EPMA of the five hollow-stemmed lamps from the early Christian basilica of Maroni-Petrera demonstrating they are from a single batch event (Ceglia et al. 2015)

<table>
<thead>
<tr>
<th></th>
<th>SF41</th>
<th>SF83</th>
<th>SF84</th>
<th>SF77</th>
<th>SF36</th>
</tr>
</thead>
<tbody>
<tr>
<td>SiO₂</td>
<td>67.4</td>
<td>67.7</td>
<td>67.9</td>
<td>67.9</td>
<td>67.1</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>3.18</td>
<td>3.18</td>
<td>3.20</td>
<td>3.13</td>
<td>3.19</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>0.61</td>
<td>0.61</td>
<td>0.61</td>
<td>0.62</td>
<td>0.63</td>
</tr>
<tr>
<td>TiO₂</td>
<td>0.09</td>
<td>0.09</td>
<td>0.09</td>
<td>0.09</td>
<td>0.09</td>
</tr>
<tr>
<td>MnO</td>
<td>0.06</td>
<td>0.06</td>
<td>0.05</td>
<td>0.06</td>
<td>0.07</td>
</tr>
<tr>
<td>Na₂O</td>
<td>16.3</td>
<td>16.4</td>
<td>16.2</td>
<td>16.2</td>
<td>16.1</td>
</tr>
<tr>
<td>K₂O</td>
<td>0.61</td>
<td>0.62</td>
<td>0.62</td>
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refine these conclusions more material from (well-)dated contexts needs to be studied. At some point it is planned to undertake a more in-depth contextual analysis, along with more optical and chemical analysis from other Cypriot sites in order to cover the whole accessible coastline.

At the time of writing we have received the possibility of working on the material from the basilicas of Ayios Kononas, on the Akamas peninsula, Katalymmata ton Plakoton on the Akrotiri peninsula and Ayia Mavri at Alassa.

References


