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FUNCTIONAL ANALYSIS OF EARLY BYZANTINE CONTEXTS AT SAGALASSOS

Introduction

Using the archaeological record to identify human activities and their social and economic implications is one of the most difficult but at the same time one of the most interesting aspects of archaeology. Reconstructing the fabric of daily life is difficult because it requires a comprehensive study of all available evidence including structures, site formation processes, artifacts, food- and plant remains¹. A full integration of the diverse data of the archaeological record is necessary as assumptions based on one particular material category can be contradicted by the presence of certain other objects. On the other hand, identifying human activities is fascinating because it can give us an idea of what daily life in ancient societies looked like. Contextual analysis, as it has been developed in Sagalassos, intends to provide a synthesis of the

results of all disciplines participating in the archaeological research. The overall aim is to detect patterns within the find assemblages in order to classify differences in modes of human habitation. The town of Sagalassos (**fig. 1**), located in southwestern Turkey, is very promising for this kind of studies as it has been the object of systematic interdisciplinary research for more than fifteen years, resulting in a good

¹ Concerning functional analysis and the role of pottery studies in determining the use of space see B. A. AULT/L. C. NEVETT, *Digging Houses: Archaeologies of Classical and Hellenistic Greek Domestic assemblages*. In: P. M. ALLISON, *The Archaeology of Household Activities* (London, New York 1999) 43–56. — A. S. JAMIESON, *Identifying room use and vessel function. A case-study of Iron Age pottery from building C2 at Tell Ahmar, North Syria*. In: G. BUNNENS, *Essays on Syria in the Iron Age. Ancient Near Eastern Studies Supplement 7* (Leuven 2000) 259–303.

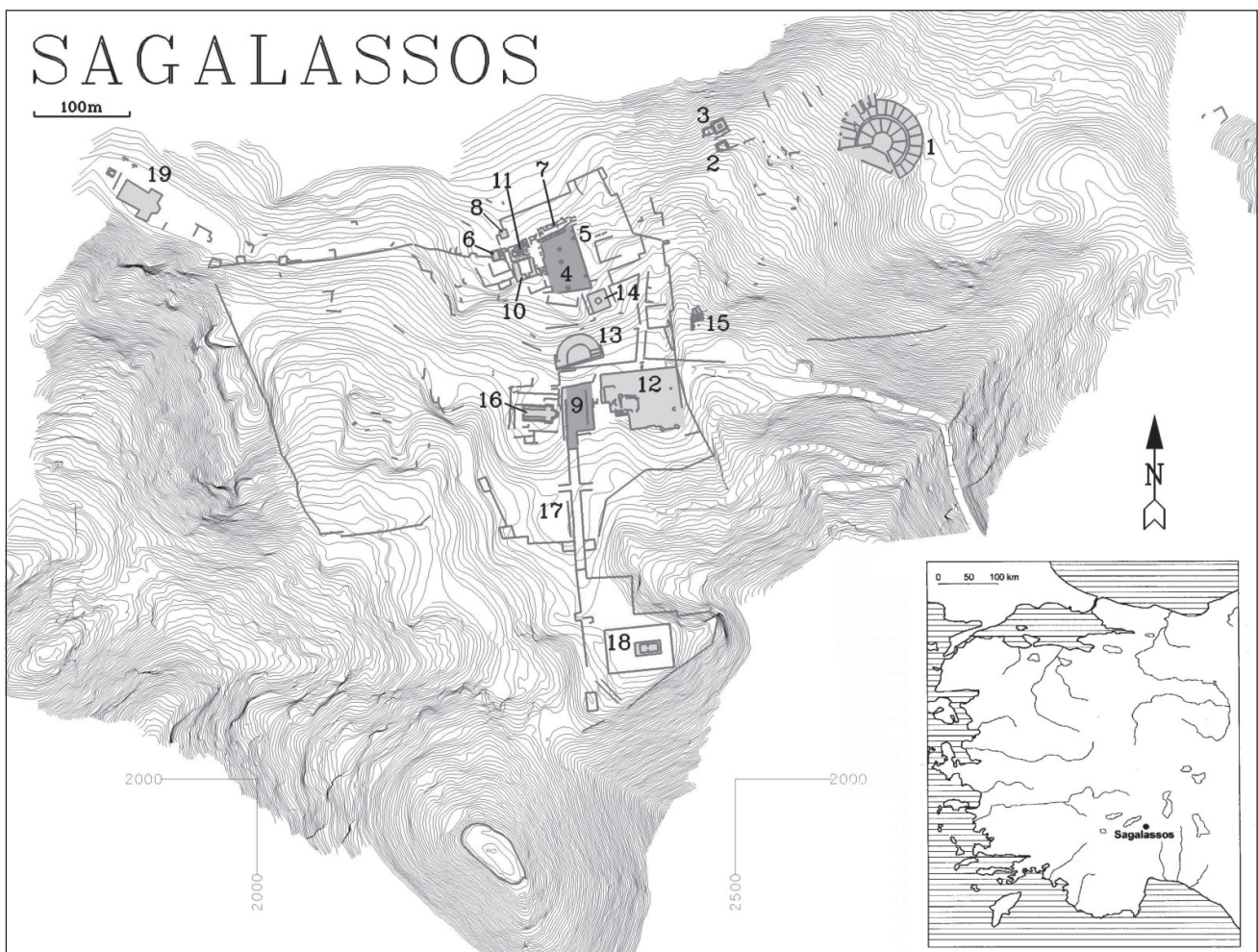


Fig. 1: Map of Sagalassos. — 1 Theatre. — 2 Doric Fountain. — 3 Neon Library. — 4 Upper Agora. — 5 Northeast Building. — 6 Doric Temple. — 7 Antonine Nymphaeum. — 8 Northwest Heroon. — 9 Lower Agora. — 10 Bouleuterion. — 11 Early Byzantine Cathedral. — 12 Roman Baths. — 13 Odeion. — 14 Macellum. — 15 Domestic Area. — 16 Temple of Apollo Klarios. — 17 Colonnaded street. — 18 Temple of Hadrian and Antoninus Pius. — 19 Basilica E1 within the former stadion.

understanding of both its history and its environment. The excavations provided specialists in such varied disciplines as pottery, metallurgy, glass, archaeozoology and palaeobotany with the opportunity to collect the data necessary to carry out a contextual study. This paper will focus on how the proportions of functional groups within the assemblages, specifically the ceramic assemblages, can be examined in order to gain additional information on the use of space.

Methodology

A contextual approach to the archaeological record requires standardized procedures to study the material within its architectural and stratigraphical context². First, the architectural setting and its diachronic change should be described. Second, the degree to which the assemblages are representative of the original content of a room should be assessed by examining the formation processes of the archaeological record. Third, the presence or absence of certain functional categories within the archaeological record should be investigated in order to reveal patterns in the distribution of the material. Detecting differences in functionality between assemblages, in this case ceramic assemblages, requires the quantification of the material according to relevant functional groups and an evaluation of the proportions between these functional groups. If different activities were conducted within certain areas, these must be reflected in the proportions of functional vessel groups present in their respective ceramic assemblages³.

The pottery used in this paper was quantified by counting and weighing diagnostic sherds (rim, handles and bases). The specific conditions at Sagalassos and the enormous quantities of pottery to be processed determined the methodological framework and the fact that more sophisticated quantification techniques could not be applied⁴. The combination of both counting and weighing made it possible to infer the extent of fragmentation within each deposit, which in turn provided indications about the formation processes of the context. Sherd weight, however, is not appropriate for comparing the proportions of functional groups, as these comprise various vessels types with very divergent morphology and size. To compare the composition of different assemblages the use of sherd counts is better applied, even though it relies upon the assumption that the relative breakage rates for different vessel types are similar within each assemblage⁵. This means that if twice as many sherds of a vessel type A as of vessel type B are present in a deposit, this ratio should hold in all assemblages in which both types A and B are present, regardless of the processes that played a role in the formation of the deposits. Although this assumption does not always hold true, a systematic quantification of sherds nevertheless will result in comparable sets indicating the proportions of vessel types present in the original population of the contexts⁶. Additionally, it was attested for the dataset used that the breakage rate was more or less the same for all assemblages.

Once the ceramics were quantified, the vessel types were lumped into larger groups with specific functions. Relating morphological features of ceramics to their use or content,

however, was a difficult task. Vessels served varied purposes depending on the necessities of the moment, as has been observed in ethnographic studies⁷, which makes it impossible unambiguously to link form to function. The overall shape of a vessel nevertheless limits its potential uses. Moreover, both archaeological and literary evidence indicate that (late) Roman society, as far as ceramics is concerned, was a consumer society with an elaborate range of vessel types designed for specific needs of daily life. Pottery was produced on an industrial scale and was designed for intended, specific functions. At Sagalassos the identification of a potter's quarter has shown the semi-industrial character of local vessel production⁸, while analyses of organic residues absorbed in the pores of ceramics showed that several vessel forms held specific contents⁹.

A system for classifying vessels into functional groups was developed by Jeroen Poblome for the Tanagra Field Survey Project, forming a part of the Interuniversity Poles of Attraction network¹⁰. The system was originally intended to make a meaningful comparison between different sites of the network possible, but it can also be used for intra-site analysis. On the basis of their morphological characteristics, the vessel types were divided into five main functional groups.

1. *Consumption*: The first group consisted of open tableware vessels such as cups, bowls and dishes. Although it is difficult to associate such vessels unambiguously with particular functions, it is assumed that they were used for consuming food and drinks¹¹.
2. *Serving*: A second group considered pottery used for serving food or drinks such as jugs and *lékaneis*.

² PUTZEYS ET AL. 2004, 32–34. — PUTZEYS ET AL. in press.

³ C. R. ORTON/P. A. TYERS, Counting broken objects: the statistics of ceramic assemblages. In: A. M. POLLARD, *New Developments in Archaeological Science. Proceedings of the British Academy* 77 (London 1991) 165.

⁴ When the paper was first presented at the XXIVth congress of the RCRF the counts of all rims, bases, handles and body sherds were incorporated into the analyses. After a re-evaluation of the material, it was decided not to take into account the body sherds as their high number in most contexts to a large extent determined the outcome of the statistical analyses. — For further discussion on the quantification of ceramics by counting and weighing see K. WARNER SLANE, *Corinth's Roman Pottery. Quantification and Meaning*. In: C. K. WILLIAMS/N. BOOKIDIS, *Corinth: the centenary, 1896–1996. Corinth XX* (Athens 2003) 321–335. — For the methods applied to the ceramics of Sagalassos see POBLOME 1999, 182–183.

⁵ C. ORTON, How many pots make five? An historical review of pottery quantification. *Archaeometry* 35, 1993, 179.

⁶ M. J. SHOTT, Quantification of Broken Objects. In: D. R. BROTHWELL/A. M. POLLARD, *Handbook of Archaeological Sciences* (Chichester 2001) 711–721.

⁷ P. M. RICE, *Pottery Analysis: A Sourcebook* (Chicago 1987) 293–301.

⁸ J. POBLOME/O. BOUNEGRU/P. DEGRYSE, The sigillata manufactories of Pergamon and Sagalassos. *JRA* 14, 2001, 143–166.

⁹ K. KIMPE/C. DRYBOOMS/E. SCHREVEN/P. A. JACOBS/R. DEGEEST/M. WAELEKENS, Assessing the relationship between form and use of different kinds of pottery from the archaeological site Sagalassos (southwest Turkey) with lipid analysis. *Journal of Archaeological Science* 31, 2004, 1503–1510.

¹⁰ More on the IPA network and its research themes can be found by following URL: <http://www.arts.kuleuven.ac.be/IPA-V-09/index.html>

¹¹ POBLOME 1999, 27.

3. *Preparation*: A third group comprised vessels used to process food, such as *mortaria*, or to move or temporarily store small amounts of substances, such as coarse ware jars.
4. *Cooking*: A fourth group contained cooking pots and frying pans.
5. *Storage*: The last group consisted of large vessels for the storage and transport of agricultural products. It considered *dolia*, local and imported amphorae. Depending on the questions asked it might be preferable to classify imported amphorae in a separate group. When looking for functional patterns, however, opposing imported to locally produced amphorae might cause an artificial division between rooms with essentially the same use.

After assigning every sherd to one of the five classes based on function, the data could be analyzed to examine the association between the contexts and their assemblages. Further analyses, which incorporated data on fabric, weathering pattern, specific functions and other particular ceramological data, are beyond the scope of our present intentions. To investigate the relationship between variables (the vessel categories) and cases (the ceramic assemblages), the statistical technique of correspondence analysis¹² was used. This technique, which is similar to principal component analysis, converts the value of each cell into a percentage of the total value for row and column and calculates the correlation between variables and cases, expressed in the form of linear combinations of which the first two account for most of the total variance. The values for these first two linear combinations, or components, can be plotted for each context and for each vessel category against orthogonal axes. This results in a scatter plot on which ceramic assemblages with similar proportions of certain functional vessel groups will be situated in the same area, together with the groups within which they best fit. In this way, the relationships between vessel functions and the contexts containing the ceramic assemblages are made visible.

The material

A correspondence analysis of the ceramic assemblages from several early Byzantine contexts at Sagalassos resulted in the scatterplot shown in **figure 2a**. Chronologically the material was dated between the second half of the 5th and the first half of 7th century AD, coinciding with phases 8 and 9 of Sagalassos Red Slip Ware¹³. The contexts were selected from both residential and commercial quarters of the town. Most of them originated from a large residential unit (the so-called domestic area) in the eastern part of the city (**fig. 1, 15**). Additionally, several contexts from four sites situated alongside the two main squares of the city were incorporated. The contexts from the upper agora (**fig. 1, 4**) originated from its western portico and from a large building, possibly with shops, at its eastern side (**fig. 1, 5**). From the lower agora (**fig. 1, 9**) contexts were selected from the northern rooms encroaching upon its western portico and from an early Byzantine complex situated at its eastern side. The chi-square test of the table with sherd counts resulted in a p-value almost equal to zero ($p < 0.0001$), indicating that there is very strong

evidence for an association between functional groups and contexts. The proportion of vessels belonging to each functional group thus depends on the context in which they were found. The scatter plot of the current correspondence analysis (**fig. 2a**) is a rather good illustration of the variation within the data (65,02% of the total variation comprised within the data is represented). Depending on its location in the scatterplot, the ceramic assemblage of each context can be associated with one of the functional groups situated in the different quadrants of the plot (**fig. 2b**). A first group, situated in the upper left side of the graph, is characterized by a higher number of vessels for serving food. Contexts with a ceramic assemblage containing a larger proportion of vessels for beverage and food consumption are situated in the lower left side of the plot. The contexts on the right side of the plot are characterized by coarse ware pottery. These can be subdivided into a group with more vessels for preparing and temporary storing small amounts of food and into a group dominated by vessels for storing and transporting agricultural products and by cooking vessels.

When the contexts of the different areas in the town were separated from each other, differences in function became visible. **Figure 2c–f** shows the same plot for each excavation area separately. Contexts from the urban villa (**fig. 2c**) are situated in the center of the plot having a mixed assemblage, although some of them have higher proportions of coarse ware jars and are scattered in the upper right part of the plot. Most contexts of the western portico of the lower agora, indicated with dots on **figure 2d**, are situated in the right side of the plot and seem to have larger proportions of vessels for storing, cooking and food preparation. The contexts of the early Byzantine complex at the eastern side of the lower agora, indicated with crosses on the same graph (**fig. 2d**), are situated in the upper part of the plot and mainly seem to contain vessels for serving and preparing food and drinks. Contexts from the western portico of the upper agora (**fig. 2e**) are situated in the left side of the plot indicating that they have a higher proportion of tableware, while the assemblages of the northeast building (**fig. 2f**) are mainly situated in the lower right side of the plot and primarily contain cooking ware and storage vessels. In the following part some contexts of the urban villa and of the lower agora are described in more detail.

The urban villa

Most of the assemblages of the urban villa (**fig. 1, 15**) are determined by vessels for food and beverage consumption, jugs and containers. There seems to be a concentration of coarse ware jars and small containers in the southwestern

¹² J. M. GREENACRE, *Theory and Applications of Correspondence Analysis* (London 1984). — For some applications of correspondence analysis to archaeological data see M. J. BAXTER, *Statistics in Archaeology* (London 2003) 136–143.

¹³ See POBLOME/BES/DEGRYSE in this volume.

¹⁴ M. WAELEKENS ET AL., *The 1994 and 1995 excavation seasons at Sagalassos*. In: M. WAELEKENS/J. POBLOME, *Sagalassos IV. Report on the Survey and Excavation Campaigns of 1994 and 1995*. *Acta Archaeologica Lovaniensia Monographiae* 9 (Leuven 1997) 193–199.

part of the villa, originally identified as the artisanal quarter of the house¹⁴. The relationship between the pottery assemblages and this quarter of the mansion, however, still needs to be studied in detail. The five contexts of the urban villa, which are situated in the lower right part of the graph (**fig. 2c**), require further attention¹⁵. It considers material from four small rooms, located immediately south of a large hall, which was identified as the main reception hall of the complex by reason of its imposing architecture. One of the spaces contained an abandonment deposit mixed with destruction material, while the contents of another room and of a layer covering a staircase leading to a small cellar were secondary refuse deposits. All deposits from this area unmistakably belong to phase 9 of the Sagalassos Red Slip Ware, dated between the second half of the 6th and the first half of the 7th century AD. This date was further confirmed by the presence of a hoard of coins dated to AD 575/6 which was found among the waste on top of the stairs¹⁶. The cellar itself still contained an ‘*in situ* deposit’ consisting of several local amphora types and restorable tableware. The assemblage might reflect the original use of the area as a storage/service area for the main reception hall. Towards the end of 6th century AD, however, the stairs leading to the cellar and the adjoining room were filled with rubbish. These secondary refuse deposits, which post-date the content of the cellar, contained a high proportion of sherds from unrestorable cooking vessels with traces of heavy use. The deposits also included dumped metal (fragmented ornaments and household implements, sheet and scrap metal) and macro botanical and faunal remains of kitchen and table refuse (mainly, ovicaprine, chicken and fish, the latter two cleaned and processed on the spot). The presence of these dumps suggests that by the end of the 6th century AD the reception hall had lost its ostentatious character and acquired a different function. As no direct evidence for cooking activity was found within the rooms themselves, it was suggested that the former reception room might have served as a food preparation area¹⁷. The room could have provided adequate space for cooking and eating for the people still living in the structures. Despite the fact that the inhabitants still had access to imported goods (in addition to imported ceramics, some bones of Nilotic fish were found) their standard of living seems to have dropped compared to that of the occupants of the preceding periods. While the splendid architecture indicates that the rooms once had formed the main reception area of the mansion, the material evidence shows that they were used more pragmatically by the end of the 6th century AD and contained one or more cooking areas and two waste disposal units.

The lower agora

The assemblages of the northern rooms encroaching upon the western portico of the lower agora are situated in the right part of the graph and are rather characterized by vessels for food preparation, for cooking and for storing agricultural products (the dots on **fig. 2d**). The material of these rooms was either left behind upon abandonment or thrown in shortly afterwards and can be attributed to phase 9 of Sagalassos

Red Slip Ware. The assemblages contained vessels belonging to the occupation of the room and discarded ceramics. Some complete *dolia*, locally produced amphorae, jars and jugs were retrieved, but most vessels were fragmented. One of the rooms contained a high proportion of sherds from imported amphorae mainly Late Roman 4 types with wine (?) from Gaza, while another one contained more cooking vessels. The archaeozoological material consisted of table- and kitchen refuse, most of it retrieved from a concentration of bones against the back wall of the northern room. Domestic species (cattle, sheep/goat, pig and chicken) and fresh water fish formed the majority. These bones indicate the processing and consumption of food either within the rooms or nearby if they were thrown in after the abandonment of the spaces. The plant remains from the floors and from the *dolia* consisted almost exclusively of cereals (especially wheat), while normally various species can be identified. The presence of cereals in these contexts strongly suggests that the rooms were at least temporarily used for the storage of grain and possibly even for its processing. Few other artifacts were found in the rooms and among these architectural and structural fittings were best represented. Portable tools seem to have been recovered, while doors and shutters were left in place with their locks and hinges. Overall, the material linked to the last period of occupation seems to indicate that the northern rooms of the western portico were used for the storage, processing and retailing of food. The refuse deposits in the rooms are either associated with the same period or might indicate that similar activities continued to take place nearby after the abandonment of the rooms.

The ceramic assemblages of the early Byzantine complex at the eastern side of the lower agora are plotted in the upper part of the graph and are typically defined by vessels for serving and preparing food (the crosses on **fig. 2d**). The ceramic material could be dated to the transition between phases 8 and 9 of Sagalassos Red Slip Ware in the second half of the 6th century AD. Some rooms in the complex contained enough features linked to the last occupation phase of the structures to get an idea of their function¹⁸. One room could be identified as the kitchen of the complex. It contained a fireplace situated against its back wall. On top of the beaten earth floor, close to the hearth, there was a concentration of cooking ware. Nearby, the base of a bowl was found, containing a human fetus. This “burial” is a clear proof that the material was left at the time or shortly after the final abandonment of the structure. In addition to the cooking pots, the room contained utensils used for food processing such as a pestle and an iron kitchen knife. The study of the archaeozoological material revealed that this room had a high proportion of bones from commensal vertebrates such as the black rat. Their presence shows that the structures were still accessible after

¹⁵ For a detailed description of the contexts and their content see PUTZEYS ET AL. 2004, 38–48. — PUTZEYS ET AL., in press.

¹⁶ S. SCHEERS, The coins found in 1998, 1999, 2000 and 2001. In: M. WAELKENS/J. POBLOME, Sagalassos VI: Report on the Survey and Excavation Campaigns of 1998, 1999, 2000 and 2001. *Acta Archaeologica Lovaniensia Monographiae* 14 (Leuven in press).

¹⁷ PUTZEYS ET AL. 2004, 53.

¹⁸ For a detailed description of the contexts and their content see PUTZEYS ET AL. forthcoming.

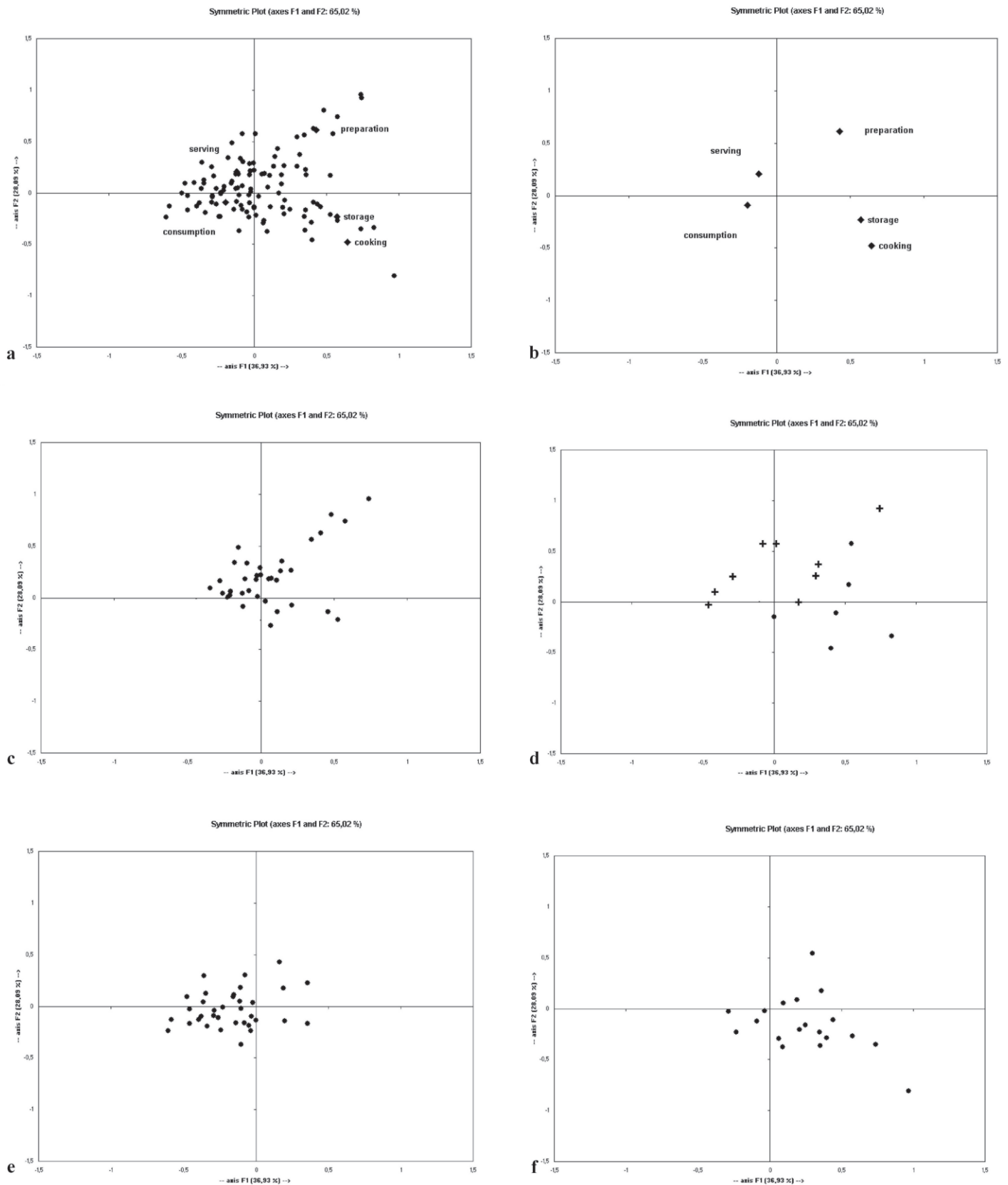


Fig. 2: Correspondence analysis scatterplot representing the correlation between functional vessel groups and the ceramic assemblages of several early Byzantine contexts from different sites excavated at Sagalassos. — **a** Correspondence analysis of the full dataset. — **b** Correlation between the functional vessel groups. — **c** Plot of the contexts originating from the urban villa. — **d** Plot of the contexts originating from the lower agora. The dots indicate the contexts from the northern two rooms of the western portico. The crosses indicate the contexts from the early Byzantine complex at the eastern side of the lower agora. — **e** Plot of the contexts originating from the western portico of the upper agora. — **f** Plot of the contexts originating from the northeast building.

abandonment and that remains of meals attracted the animals. The palaeobotanical evidence consisted of cereals (wheat, millet, barley and rye), legumes (lentil) and seeds from plants with edible fruits (walnut, grape, olive) complemented by herbs used to spice meals (chervil and fenugreek). In addition, a large quantity of pine needles was found, which were probably brought into the room together with small branches of the tree itself used to light a fire. The center of the early Byzantine complex was dominated by a large room containing a varied ceramic assemblage with a high proportion of vessels for serving foods and drinks. A restorable container, jar and amphora were found within this room. The metal objects consisted of iron hooks, used for the suspension of goods or shelves, furniture elements and a bronze handle with a decorative Medusa medallion. This handle is a part of a late Roman to early Byzantine *authepsa*, a jug with a central hollow tube, which could be placed directly in a hearth by means of a tripod¹⁹. Such a jar normally contained a hot mixture of honey, spices, wine and water. Only a few animal bones and plant remains were recovered from this room, which seem to represent table and kitchen refuse. Overall, the evidence indicates that the room was mainly used for serving and consuming drinks and food. The other rooms mostly contained tableware assemblages, some consumption refuse and macro-botanical remains from wild plants growing in the environment. It was cautiously suggested that the complex might have served both as a *thermopolium*, a kind of restaurant for consuming hot drinks and food, and at the same time as the residence of its caretaker²⁰. Remarkable is the great resemblance in assemblages between the rooms of the Byzantine complex and those of the urban villa. In both cases the ceramic assemblages mainly consist of vessels for serving and preparing food. This might support the hypothesis that the early-Byzantine complex was used as the residence of its caretaker next to its function as a 'restaurant'.

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Conclusion

The quantification of ceramic assemblages according to functional groups and a subsequent statistical analysis made it possible to examine the function of various contexts excavated at Sagalassos. Variations between proportions of the functional groups within the ceramic assemblages showed that the contexts under consideration differ from each other. Comparative analysis of the other material categories provided further evidence. A full integration of the datasets, finally, made it possible to determine differences in the 'use of space' and enabled the partial identification of the multi-functional character of rooms and architectural units. These functional patterns in their turn provided new insights into the daily life at Sagalassos during the early Byzantine period. The usage of a similar contextual approach at other sites should make it possible to better evaluate the information inherent in the archaeological record.

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¹⁹ N. KELLENS in PUTZEYS ET AL. forthcoming. — J. S. CRAWFORD, The Byzantine shops at Sardis. *Archaeological Exploration of Sardis*, Monograph 9 (Cambridge 1990) 62 figs. 281–282.

²⁰ PUTZEYS ET AL. forthcoming. — M. WAELKENS/T. PUTZEYS/T. VAN THUYNE/W. VAN NEER/J. POBLOME/N. KELLENS, Two Late Antique to early Byzantine housing complexes at Sagalassos. In: S. ELLIS/Y. MARANO/L. OZGENEL, *Living through late Antiquity: Domesticity and Change at the end of the Roman Empire*. *Late Antique Archaeology* 3.2 (Leiden in press).