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ARCHAEOLOGICAL SURVEY AND THE CITY

ARCHAEOLOGICAL SURVEY AND THE CITY

Edited by

Paul Johnson and Martin Millett

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7 Tinkering With Urban Survey Data: How Many Sagalassos-es do we Have?

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and Philip Bes*

Setting the scene

In this paper, we wish to explore methodological possibilities inherent in urban survey pottery data to reveal chronological patterning and measure the effects of the application of simple data distribution techniques on how we perceive and interpret urban history/histories in antiquity.

The data-set pertains to the ancient town of Sagalassos and originated in the survey fieldwork organised in the urban area. The archaeological site of Sagalassos is located in the modern province of Burdur in South-Western Turkey, some 110 km north of the city of Antalya and 7 km from the present-day village of Ağlasun. The site lies at an altitude of about 1500 m above sea level in the western parts of the Taurus mountain range. In antiquity, the town formed part of the region of Pisidia. The ancient town overlooked the central and eastern parts of the Ağlasun Valley, and, in Roman imperial times, controlled a 1,200 km² wide territory. Ancient Sagalassos is a well-investigated archaeological site. The multi-strategy research programme of the University of Leuven at Sagalassos is holistic by design and developed its main scientific momentum on aspects of Roman imperial and early Byzantine urban and regional archaeology, with systematic excavations, urban, rural and territorial surveys, large-scale anastylosis projects and an interdisciplinary programme focussing on both the ancient town and its territory (Waelkens 1993; 2006; Waelkens and Poblome 1993; 1995; 1997; Waelkens and Loots 2000; Degryse and Waelkens 2008).

As the urban centre extended over 31.5 ha, and even large-scale excavation programmes can only do so much, the Sagalassos project invested in an intensive urban survey programme, supported by extensive geophysical mapping and the characterisation of the geomorphological build-up of the research area, in order to gain insight in the spatial and chronological development and functional organisation of the urban area outside the monumental centre (Martens 2005; Mušič *et al.* 2009; Martens *et al.* 2012). Although the ceramological analysis of the urban survey material indicated that the original systematic occupation of Sagalassos is to be situated in Classical/Hellenistic times (Poblome *et al.* in press), contemporary with

the proto-urban neighbouring settlement at Düzen Tepe (Vanhaverbeke *et al.* 2010) and many farmsteads in the Ağlasun Valley, this paper will consider the main body of urban survey data associated with the imperial, late Roman and early Byzantine periods, covering the entire chronological span of the locally mass produced tableware (Sagalassos red slip ware) between 25 BC and the end of the seventh century AD. (Poblome 1999; Poblome *et al.* 2010). As a result, also the so-called Dark Age and mid Byzantine occupation stages of Sagalassos (Vionis *et al.* 2009, 2010) are not considered in this paper.

Data classification

The specific chronological framework applied to the urban survey pottery collection was determined by the relative typo-chronological evolution of Sagalassos red slip ware (SRSW), established by seriating series of excavated assemblages using techniques of constrained correspondence analysis (Groenen and Poblome 2003; van de Velden *et al.* 2009). The seriated assemblages could be grouped into nine major relative chronological phases, each representing a typical collection of types of tableware, cooking, storage and other vessels (Table 7.1). The urban survey material was first typologically classified according to functional class and based on this identification allocated to one or more of the SRSW-phases. The survey data-set, representing all ceramic categories, is studied in general terms, in the sense that this paper does not consider the different (blocks of) grids in which the material was collected separately, but focuses on the totality of the available data. We also approached the pottery data as such, considering only the amounts of collected sherds brought back from the field, without taking methodological aspects of site formation processes, post-depositional

SRSW PHASE	DATE RANGE
Phase 1	c. 25 BC–AD 50
Phase 2	AD 50–100
Phase 3	AD 100–150
Phase 4	AD 150–200
Phase 5	AD 200–300
Phase 6	AD 300–350/75
Phase 7	AD 350/75–450/75
Phase 8	AD 450/75–550/75
Phase 9	AD 550/75–c. 700

Table 7.1: The nine phases of SRSW.

disturbances, surface densities, visibility calibrations or intensity of coverage into account (Martens *et al.* 2008). It is our opinion that the methodological approach and techniques presented below can be applied to both raw and corrected survey data, and we opted in this paper to mainly present the methodology and analytical techniques. The detailed methodological, spatial, chronological and functional analysis will be available in Martens (in press).

Following standard practice in the Sagalassos pottery processing shed, not only restricted to the periods under consideration, each rim, body, base and handle sherd was classified, counted and weighed. 23,464 sherds could be attributed to the chronological window under study. Indeed, the first axis of data classification concerns chronology. When dealing with survey pottery, this perspective of analysis should be framed in the right way. In the words of Joanita Vroom (2003: 83) 'survey ... was never meant as a refined method of exact chronological analysis [but it] is the single and unsurpassable research strategy when aiming to address problems of long-term habitation history in a regional perspective.' In contrast to her Boeotian case-study, where the construction of a 'horizontal chronology' proved an innovative tool in allocating dates to fabrics and products (Vroom 2003: 84–85), or in contrast to the Sydney Cyprus Survey Project, which developed the concept of 'chronotype' to increase the resolution on poorly documented central Cypriot wares (Meyer 2003), a lot of stratigraphical deposits are available from the urban excavation programme at ancient Sagalassos. In combination with the mentioned seriation exercises integrating the wide range of stratigraphically defined ceramic assemblages, each vessel type represented in the urban survey collection could be assigned an upper and lower date. By nature, survey pottery is non-contextual and its chronological positioning can only be borrowed or extrapolated from external data linked to excavated deposits. Therefore, survey pottery is best assigned date ranges translated into the distance between upper and lower dates.

The second axis of classification concerns functionality. In so far as possible, each sherd was attributed to a 'general functional category' (household implements, agricultural production, furnishings and toilet articles, surgical and cosmetic instruments), a 'functional category' (for instance kitchen wares and table wares in the household implements category), a 'specific functional category' (for instance preparation and cooking vessels in the kitchen ware category), an 'object identification, when possible (for instance mortarium, krater, jar/jug and bowl in the preparation category of kitchen wares) (Table 7.2) and a type definition, when possible (following the Sagalassos fabric system (Poblome 1999: 27–29), for instance 2E150 for a specific mortarium type, with '2' indicating the fabric, in this case Fabric 2, 'E' the class of open containers and '150' the specific type).

GENERAL FUNCTIONAL CATEGORY	FUNCTIONAL CATEGORY	SPECIFIC FUNCTIONAL CATEGORY	OBJECT IDENTIFICATION	
Toilet Articles, Surgical and Cosmetic Instruments			Unguentarium	
Household Implements	Kitchen wares	Preparation	Mortarium Lékane/Krater Jar/jug Bowl	
		Cooking	Chytra Kakkabos Lopas Tagénon Operculum/lid	
		Table wares	Serving	Jar/jug Oinophoros Lékane/Krater Plate/tray Stopper Operculum/lid
			Consumption	Cup Bowl Dish Ledge handle
	Agricultural production	Transport/import		Amphora Stopper
			Storage	Pithos Lid/stopper Amphora

Table 7.2: The functional characterization scheme operational in the Sagalassos pottery processing shed.

The general picture

Figures 7.1 and 7.2 represent the general chronological distribution of the available 23,464 sherds. Each graph is based on a different methodology to represent the data. To establish the amount per type within a data-set is straightforward and indicates the basic make-up of the find assemblage or, in this case, collection. In order to see what the data represents over time, however, a data distribution method must be applied. A widely used method was proposed by Elizabeth Fentress and Philip Perkins (1988) for African Red Slip Ware and is commonly applied in Roman pottery studies (e.g. Lund 2006). This method distributes the data in a linear way over time segments, based on dividing the attested amounts of a given type by its total period of circulation, presenting

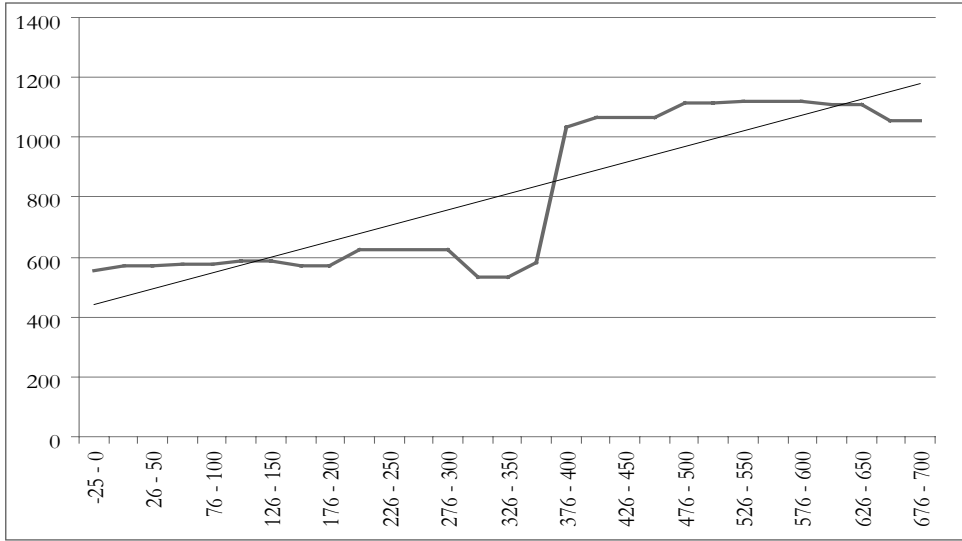


Figure 7.1: Linear representation of the Sagalassos urban survey pottery collection, with linear trendline ($n=23,464$ sherds).

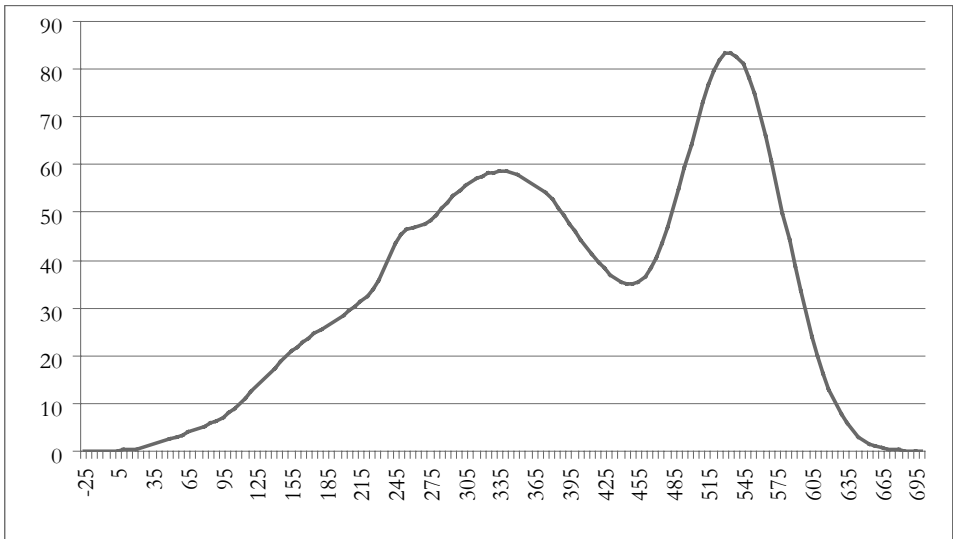


Figure 7.2: Gaussian representation of the Sagalassos urban survey pottery collection ($n=23,464$ sherds).

the results in a curve or bar chart with artificial, yet equal periodisation. This curve is a representation of the distribution of types or wares over time, revealing the relative distribution of a given data-set over time. The peaks and valleys in the curve indicate a higher and lower distribution of the studied material category in the corresponding periods. The problem with this linear distribution method is that it assumes an equal chance for a type to belong to its respective time-segments. Therefore, an alternative is found in a Gaussian distribution method as a comparative measure for the linear distribution. This Gaussian distribution method does not take the chances of type X belonging to all the corresponding time-segments to be equal, but rather projects a Gaussian or bell curve of the probability between the earliest and latest date of the type, which is then multiplied with the count of the type, concentrating the attested totals of types in the middle of their typological running-time (Willet, in press).

Both graphs are similar in general terms, but different in detail. In general terms, three main periods can be distinguished in the data, with a well represented first period, a middle period of declined representation and a final period of maximum representation. In linear terms, the first period is datable to the first three centuries AD, the middle period between the end of the third and the end of the fourth century AD, and within the final period the end of the fifth to the end of the sixth century is best represented. In Gaussian terms, the first period extends into the first half of the fourth century AD, the middle period lasts until the end of the fifth century AD, while the peak of representation is situated in the second quarter of the sixth century AD. By nature of the method, the linear representation feels more mechanical, with an abrupt start and end, and sharp jumps in the data line. The flowing line of the Gaussian methods looks more like a cardiogram and intuitively can be considered to represent the pulse of urban life in Sagalassos better. The question is, however, whether either or both of the patterns displayed in Figures 7.1–7.2 reflect the historical reality of the town of Sagalassos in Roman times? Indeed, both graphs are based on the same data and are only different as a result of the methodologies used to represent the data. For now, both graphs invite the following obvious comments: 1. Both data lines are determined by the start and end of the Roman local pottery production, 2. Both data lines represent the final large-scale urban occupation of Sagalassos in early Byzantine times best, which is most logical when dealing with survey data and 3. Both data lines seem to reflect the general pattern of urban evolution attested for Sagalassos so far (Waelkens 2011).

Comparison with excavated data

As a next step, it is useful to compare Figures 7.1–7.2 with relevant excavation data (Figs 7.3–7.4). The latter data-set totalling 53,910 sherds does not include all wares ever excavated at Sagalassos, but only diagnostic SRSW, classified and quantified from a range of deposits, selected on qualitative criteria and representativeness for the nature of the deposits and the excavation history of the site, in order to sustain

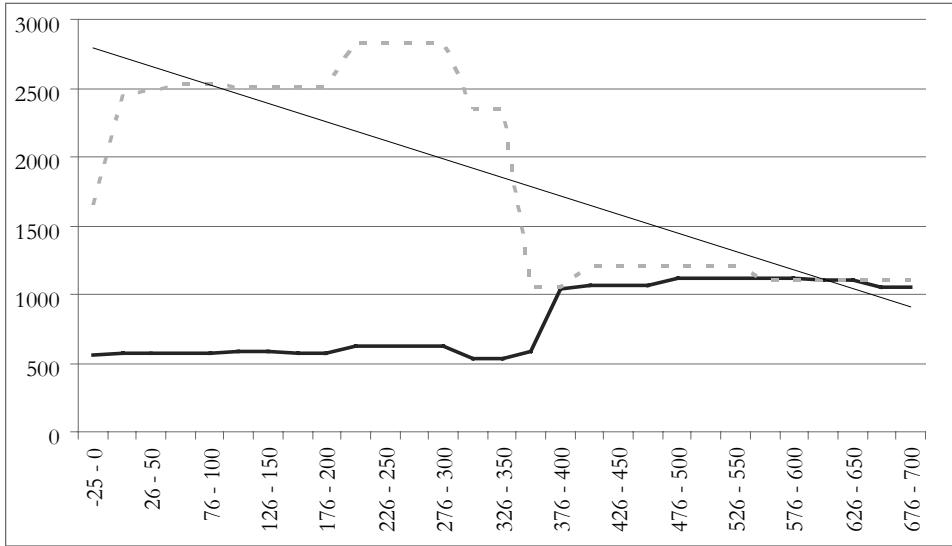


Figure 7.3: Linear representation of selected Sagalassos urban excavation pottery data (diagnostics; dotted light grey line), with linear trendline (n=53,910 sherds), compared to the urban survey data (all sherds; dark grey line).

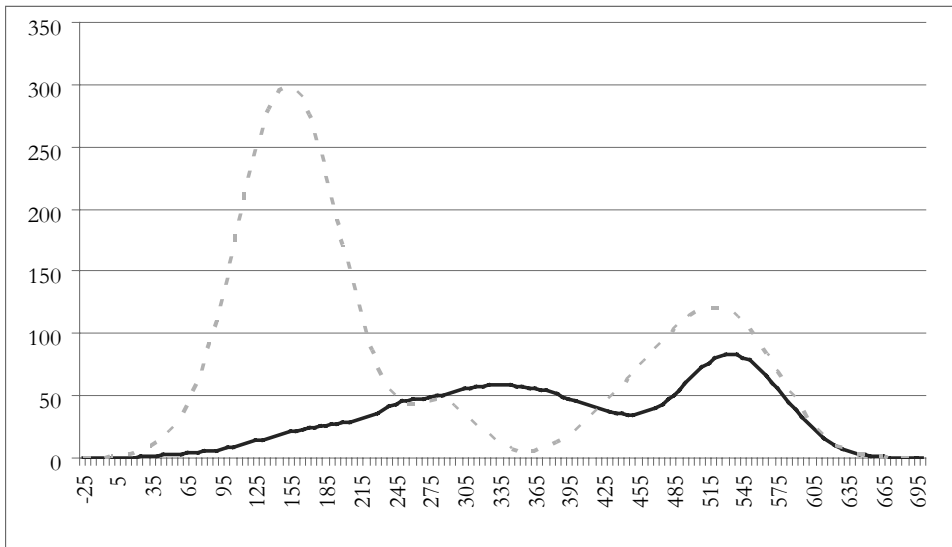


Figure 7.4: Gaussian representation of selected Sagalassos urban excavation pottery data (diagnostics; dotted light grey line; n=53,910 sherds), compared to urban survey data (all sherds; dark grey line).

the analysis of the relative chronological evolution of the ware in question, based on the mentioned principles of seriation. In other words, the nature of the urban survey data-set is intrinsically different from the urban excavation data-set as to the nature of the included wares, but these are compared here nonetheless in order to evaluate the general chronological development of both types of evidence.

The three periods represented in the urban survey data can also be distinguished in the urban excavation data, with the striking difference that, in the case of the excavation data, the first period is with a wide margin the better represented one. It is beyond the scope of this paper to establish the detailed relationship between our data-set and the urban history of the town, as documented in its architecture and stratigraphical build-up. In general, it is a truism that most monuments were built during the first three centuries AD, whereas, upon excavation, late Roman and early Byzantine modifications to these structures and related stratigraphy are the norm. This pattern certainly does not result from the greater number of imperial contexts selected for evaluating the typo-chronological evolution of SRSW. Rather, the deposits were chosen with the explicit aim of documenting the entire evolution of SRSW. Although this topic needs a dedicated paper on its own, including also other types of data-sets and comparisons, we consider the particular representation of the first period to result from a combination of possibly a higher production output in the earlier centuries of the ware, as well as the presence of residual material in most contexts studied so far. Similar proportions are noticed when considering the diagnostic urban survey material (Fig. 7.5), suggesting that this chronological pattern is a function of diagnostic materials, in need of further research.

When considering the linear data distribution technique, it is remarkable how minor changes in the excavation data curve reflect similar changes in the survey data curve, linked to similar proportions of popularity of types, and therefore possibly reflecting general patterns of production output. The deepest point on the linear excavation data curve is reached in the course of the second half of the fourth century AD, which is later compared to the linear survey data. It should also be noted how both excavation and survey curves are very close to one another during the third, late Roman/early Byzantine, period.

The Gaussian curve of the urban excavation data, on the other hand, has its highest peak around the middle of the second century AD, with a steep decline afterwards, resulting in the deepest point around the middle of the fourth century AD. In this sense, the Gaussian excavation data curve seems to reflect the linear survey data curve more closely. In the third period, the Gaussian excavation data curve is somewhat wider than the survey data curve, but the proportions of material are much more similar, as noted already for the linear distribution results. The main point of the comparison between the excavated and surveyed urban pottery data seems to be the importance of the three major periods in the material. Other than that, the excavated and survey urban data-sets each on their own do not seem to cover the entire story of ancient Sagalassos. But things need to get worse still.

The closely datable material

Indeed, the main methodological problem in translating survey pottery data into useful patterns of archaeological interpretation is the difference between closely datable material and less diagnostic material and the fact that typically the latter category abounds. In this case, we considered how many sherds could be allocated to one of the following three periods, each with consistent typological repertoires in the morphological evolution of SRSW (Poblome 1999): 25 BC–AD 300, AD 300–450 and AD 450–700. Each of these three periods, albeit of different duration, represents a break with the preceding typological repertoire and the creation of many new types in all functional categories which form a consistent morphological assemblage. As a matter of fact, only 1152 sherds, representing 4.8% of the general total of available survey material, could be attributed within the limits of one of these three periods (Figs 7.5–7.6). Although a range of types can be dated more narrowly than the periods used here, their representation by count becomes negligible in proportion to the general total, resulting in irrelevance for patterns of interpretation. In other words, the data used in Figures 7.5 and 7.6 are considered to be the closely datable material within the urban survey collection of Sagalassos.

In comparison to the previous graphs, two aspects are remarkable when considering the closely datable material. First of all, the general three-period pattern of popularity and decline of pottery representation is repeated, which is in a way logical to expect since the closely datable material is in effect a subset of the available data. Secondly, however, the proportions of better represented periods are different. In the same way as with the urban excavated data, most closely datable material can be associated with the first period, while the late Roman period becomes worryingly invisible, and the early Byzantine period only represents somewhat more than a quarter of the data. Although each of the three periods contains clearly recognisable series of types, when considering only the closely datable material, the pattern of the data seems inverse to our general pattern of expectation with the final period of occupation being better represented in the data-set. This fact in itself should be food for thought, but what worries us most is that a lot of survey evidence, throughout the ancient Mediterranean (and actually also a lot of excavated material, for that matter) is mostly regarded, patterned and interpreted based on the available closely datable material. Even where generic period data are used for survey material, which is often the case, the exclusion of less diagnostic material of whichever kind seems to reduce our capacity for interpretation. This simple observation does not imply that the conclusions from other surveys are invalid, but should be understood as an urgent appeal for the survey and ceramological communities to reconsider methodologies of data distribution in order to reveal more patterns with greater clarity.

The fact that no useful functional (domestic) assemblage of pottery can be reconstructed for either of the three periods under consideration, is another telling sign of how working

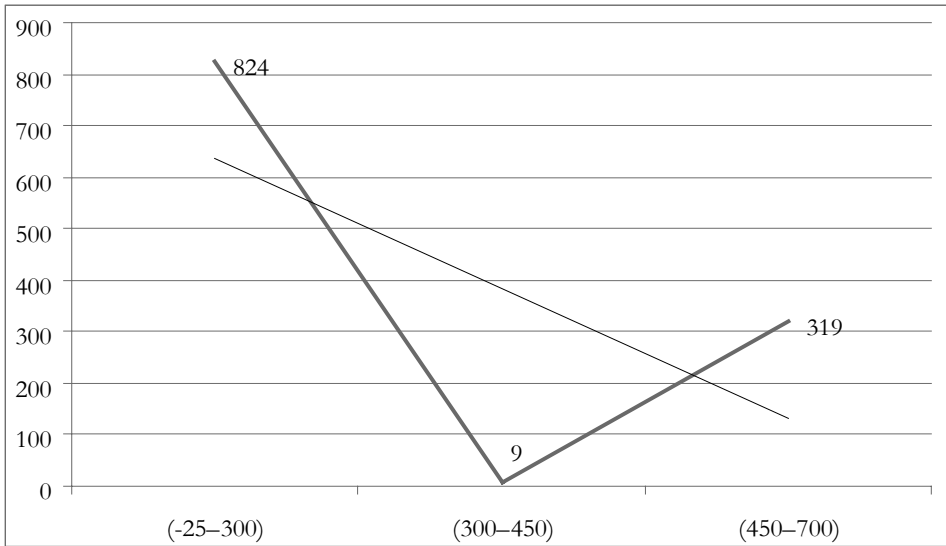


Figure 7.5: Linear representation of the closely datable urban survey data, with linear trendline (n=1152 sherds).

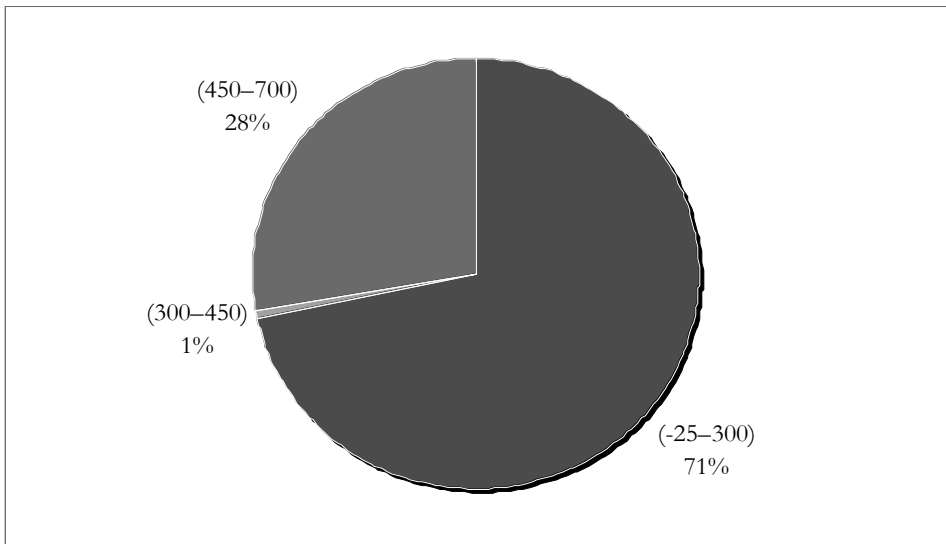


Figure 7.6: Representation in percentages of the closely datable urban survey data (n=1152 sherds).

only with closely datable data, in this case, does not seem to correspond or reflect historical realities (Figs 7.7–7.8).

There is no simple formula that represents the proportions of functional categories defining domestic or other types of assemblage in Roman ceramology. Considering the extent of the Roman empire, its different regional architectural and urban traditions, its variable social classes, make-up of families and ethnic mix, the different regional and other networks of exchange, the differential output in artisanal production, as well as aspects of consumption and differential use-life of objects, amongst other criteria of variation, makes circumscribing domestic assemblages at a generic level simply impossible. Even at the best documented local level, that of Pompeian households, variation in material culture assemblages is considered the norm (Allison 2009). Notwithstanding this general issue, we consider that an assemblage almost exclusively of table wares and no cooking wares, as indicated in Figures 7.7 and 7.8, is inconsistent with functions in daily life, confirming the difficulties of using only closely datable material. Even if the presence of a local table ware manufactory can be expected to boost the average representation of table wares in both the survey and excavation assemblages at Sagalassos, the attested proportions seem not to be viable in a domestic or general urban context.

Proportional chronological attribution of less diagnostic data

When the less diagnostic material, being sherds of all functional categories belonging to more than one of the discussed periods with consistent morphological repertoires, is fed to the equation, a different picture emerges (Figs 7.9–7.10). The addition is not done in mechanical ways by simply dividing the total count of types by 2 or 3, according to the periods it is dated to, as we wanted to take into account that even less diagnostic material has differences in its chronological attribution. Therefore, the following formula of proportional chronological attribution was applied to the data:

$$\text{Type} = \frac{\text{Time range of type within period} \times \text{Count}}{\text{Total time span of type}}$$

In a practical example, Type 2E150, following seriation results, can be allocated to the period AD 100–600, or part of period 1 (25 BC–AD 300), all of period 2 (AD 300–450) and part of period 3 (AD 450–700). 2 sherds of this type were registered during the urban survey campaigns, so its representation in period 1 is calculated using the formula above as follows:

$$2E150 = \frac{200}{500} \times 2 = 0.8$$

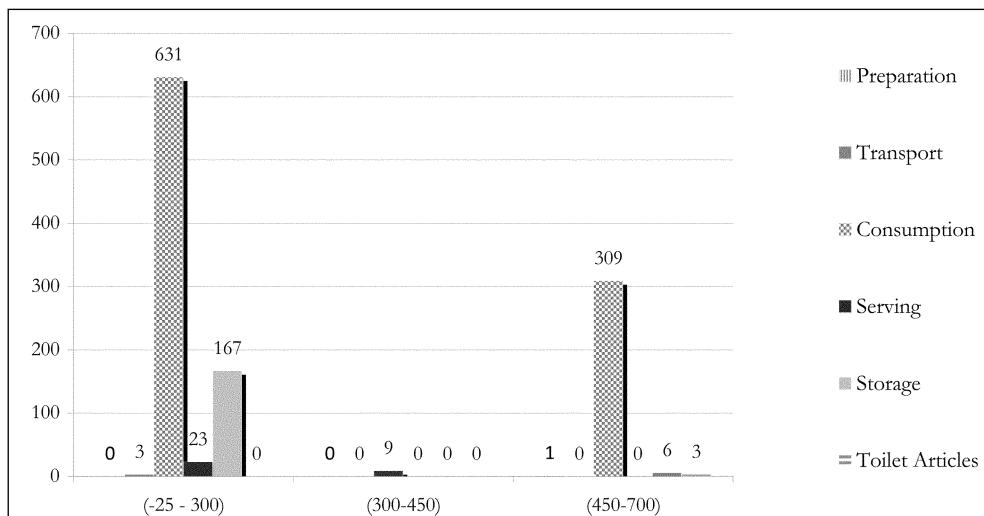


Figure 7.7: Histogram from a linear distribution of main functional groups within the closely datable material per period (n=1130 sherds).

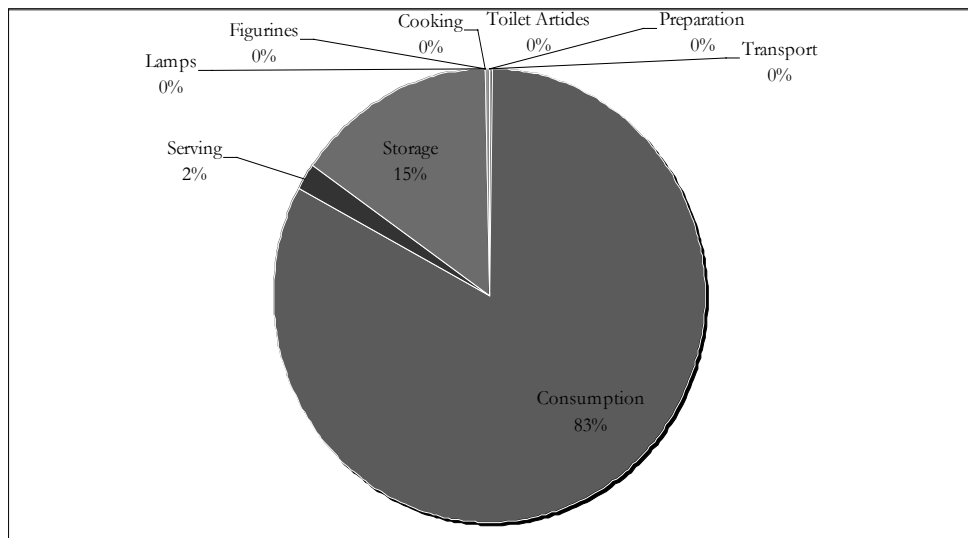


Figure 7.8: Representation in percentages of main functional groups within the closely datable material (n=1130 sherds).

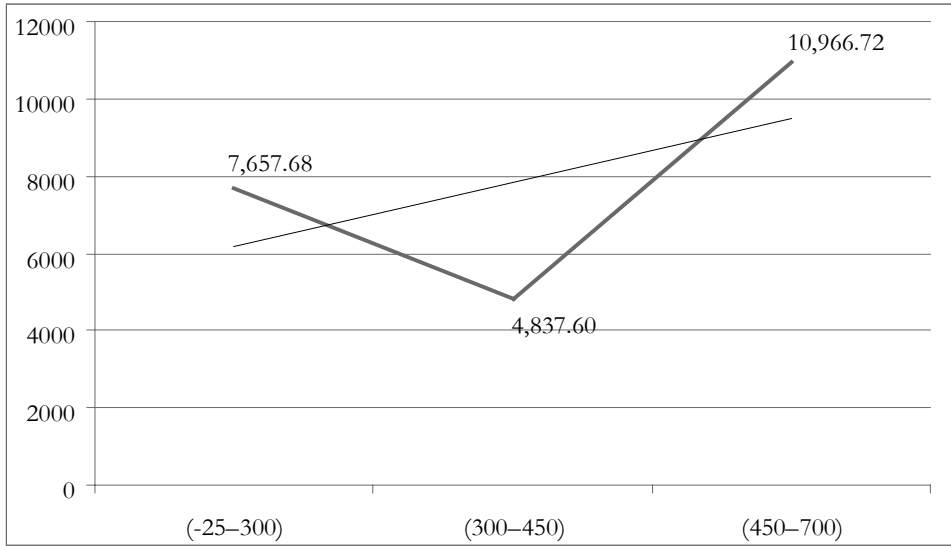


Figure 7.9: Linear representation of the closely datable and less diagnostic urban survey data, based on proportional chronological attribution, with linear trendline (n=23,574 sherds).

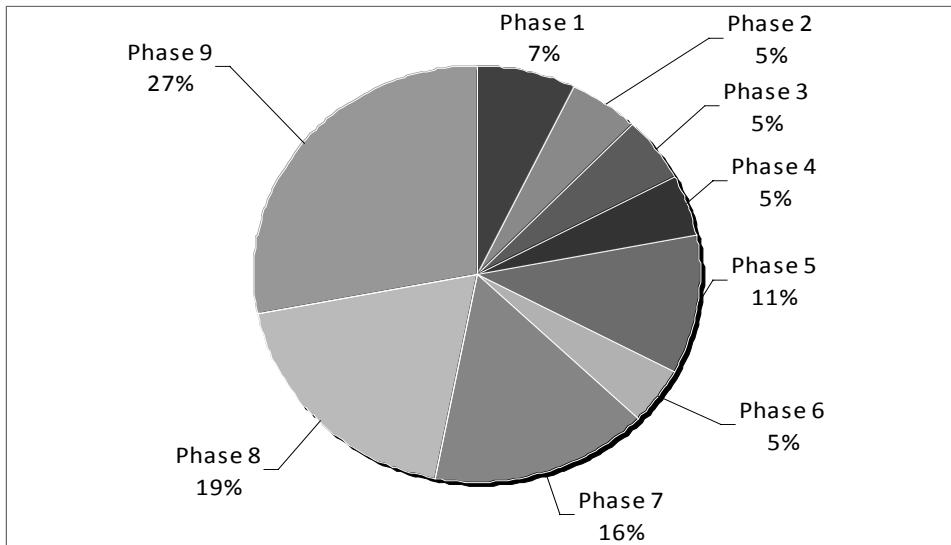


Figure 7.10: Representation in percentages of the closely datable and less diagnostic urban survey data, based on proportional chronological attribution (n=23,574 sherds).

As Type 2E150 forms part of both periods 2 and 3 during 150 years, its representation in these periods is 0.6 respectively, and $0.8 + 0.6 + 0.6$ equalling back to 2 sherds. This exercise is repeated for all less diagnostic material, resulting in Figures 7.9 and 7.10.

The overall trend is comparable to Figures 7.1–7.2, but the percentages are somewhat different as a result of the better representation of period 2, based on the proportionally attributed chronological data.

A total of 13,159 sherds can be attributed to (ranges within) the three periods, or 55.8% of the total survey collection. Within this group, 4325 (18.3%) undiagnostic SRSW sherds were counted, 3445 (14.6%) undiagnostic SRSW bowl fragments, 2016 (8.5%) undiagnostic SRSW jar/jug sherds and 1657 (7%) undiagnostic SRSW lékane/krater sherds.

1178 (4.9%) sherds can be attributed to the first two of three periods, with 533 (2.2%) sherds registered for Type 1C100, 222 (0.9%) sherds for Type 1B170 and 148 (0.6%) sherds for Type 1F150. Even when combining this total for periods 1 and 2 with the closely datable material of these periods, a fairly low total of sherds can be attributed to the imperial and late Roman periods at Sagalassos.

7822 (33.1%) sherds can be attributed to the final two of three periods, with 4228 (17.9%) sherds registered for less diagnostic jars/jugs in Fabric 4, 1472 (6.2%) sherds for less diagnostic cooking vessels in Fabric 4 and 529 (2.2%) sherds for Type 1B130. When combining this total for periods 2 and 3 with the closely datable material for these periods, the late Roman period is clearly poorly represented, while the early Byzantine phase holds between one third and half of the data, which seems to match with the general picture of the urban archaeology of Sagalassos, as documented from its architecture and stratigraphy.

Proportional phase attribution

The chronological evolution of the urban survey pottery can be further narrowed down by allocating the material of all functional categories proportionally to the relevant (range within the) phases of SRSW (Table 7.1) (Figs 7.11–7.12).

Figures 7.11 and 7.12 should be read as more detailed elaborations of Figures 7.9 and 7.10, with the same protagonist types. The longer chronological ranges of SRSW Phase 1 and 5 (75 and 100 years respectively) compared to SRSW Phase 2–4 (each of 50 years) explains the somewhat higher percentages for the former SRSW Phases. Considering the fact that SRSW Phases 6–7 represent a total chronological range of 150 years, compared to the 325 years of SRSW Phases 1–5 and the 250 years of SRSW Phases 8–9, it is a normal mathematical function that these phases are somewhat less represented as we need to take into account that more than half of the less diagnostic material could only be attributed to the three main periods, resulting in a lower representation for SRSW Phases 6–7 due to their shorter duration. The same effect,

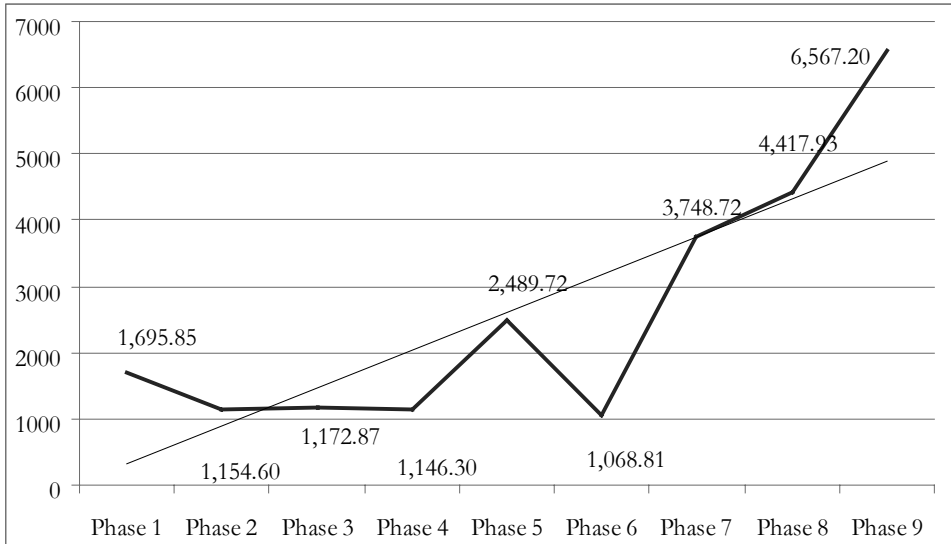


Figure 7.11: Linear representation of the urban survey data allocated to SRSW phases, with linear trendline ($n=23,574$ sherds).

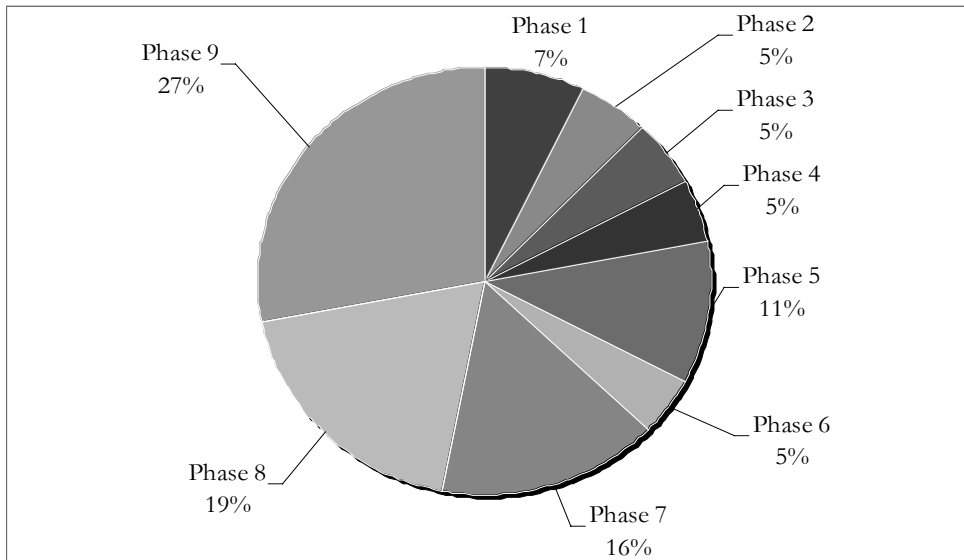


Figure 7.12: Representation in percentages of the urban survey data allocated to SRSW phases ($n=23,574$ sherds).

combined with the proportional allocation of the less diagnostic material pertaining to the main periods 2 (Phases 6–7) and 3 (Phases 8–9), explains the higher percentages of SRSW Phases 8–9. In other words, we should be careful in reading these data. The representation per SRSW Phase is dependent to a lesser degree on the material assigned per phase *sui generis*, rather than the distributed data of the less diagnostic material. We have already seen that working only with the closely datable material does not result in a viable assemblage representative of urban life, while adding the less diagnostic material also seems to entail a certain distance from the ‘real’ Sagalassos, in the sense that the Sagalassos we reconstruct is actually dependent on how we mathematically distribute the data, with high degrees of less diagnostic material represented. In a next step, we therefore decided to emulate our implicit pattern of expectancy in attributing the data to the upper date of their range, following the logic of stratigraphical superposition, implying that the most recent occupation phases should be closer to the surface and therefore better represented in the urban survey data.

Attribution to upper date

In order to guarantee optimal control over the chronological ranges, only material was selected for this technique with a strict type and functional definition (no less diagnostic material) which could be allocated either to one of the three main periods (=the closely datable material) or to two periods (=a proportion of the less diagnostic material). The less diagnostic material without type association was omitted from this equation.

This pattern seems to replicate our implicit pattern of expectancy, in the sense that the data proportions per period increase with time (Figs 7.13–7.14). In other words, the final period of urban occupation at Sagalassos, which is stratigraphically closest to the surface, is best represented in the urban survey data. Going backwards in time and, figuratively, deeper in the urban stratigraphy, the periods contain smaller amounts of ceramic data.

It is important, however, to contrast this technique of data representation with the linear distribution technique. Figure 7.15 displays the result of the latter method on the enhanced data-set of closely datable material. Following this method, the imperial period is actually the best represented one, while the late Roman drop in available data is once more marked, and the early Byzantine data better represented compared to Figure 7.5.

Calculating the distribution of functions per main period in this enhanced data-set of closely datable material indicates, however, that also this methodology has its inherent problems (Figs 7.16–7.18).

Although more functions are represented compared to Figure 7.8, and therefore the very high proportion of table wares under the headings of serving and consumption

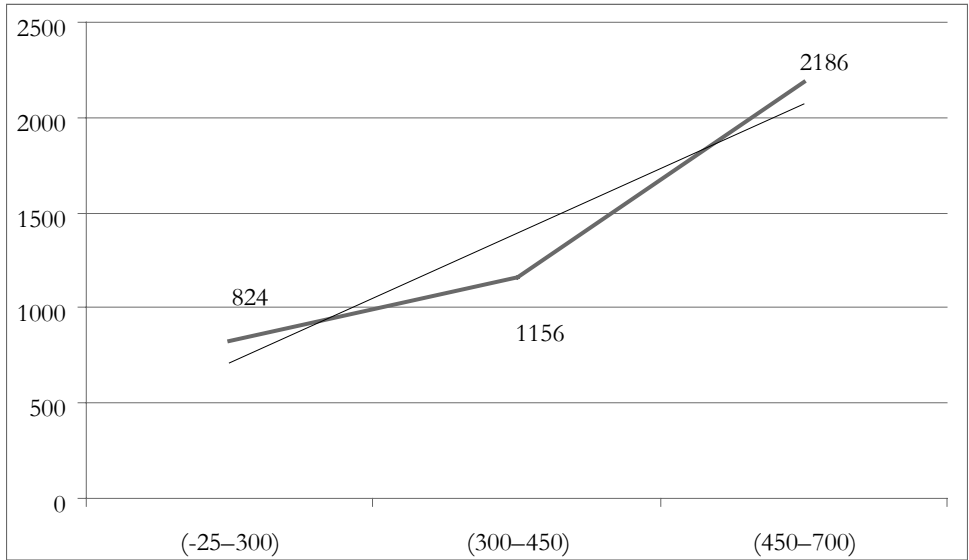


Figure 7.13: Linear representation of typologically definable material attributed to its upper date, with linear trendline (n=4166 sherds).

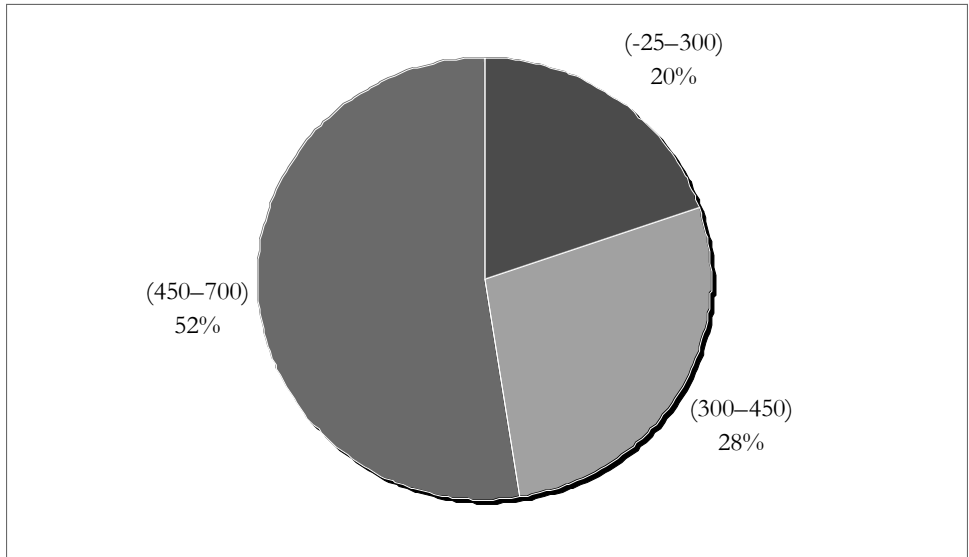


Figure 7.14: Representation in percentages of typologically definable material attributed to its upper date (n=4166 sherds).

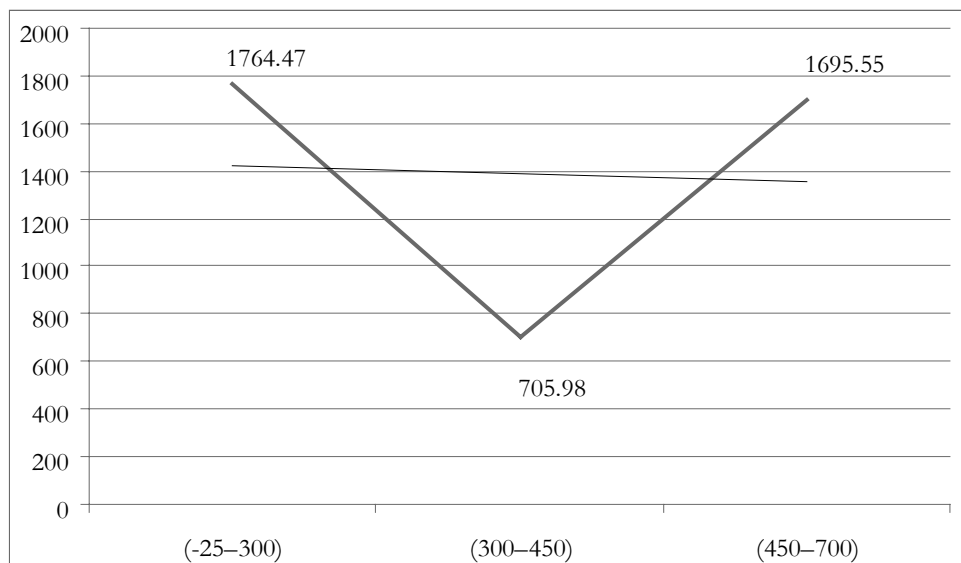


Figure 7.15: Linear representation of the enhanced data-set of closely datable material, with linear trendline ($n=4166$ sherds).

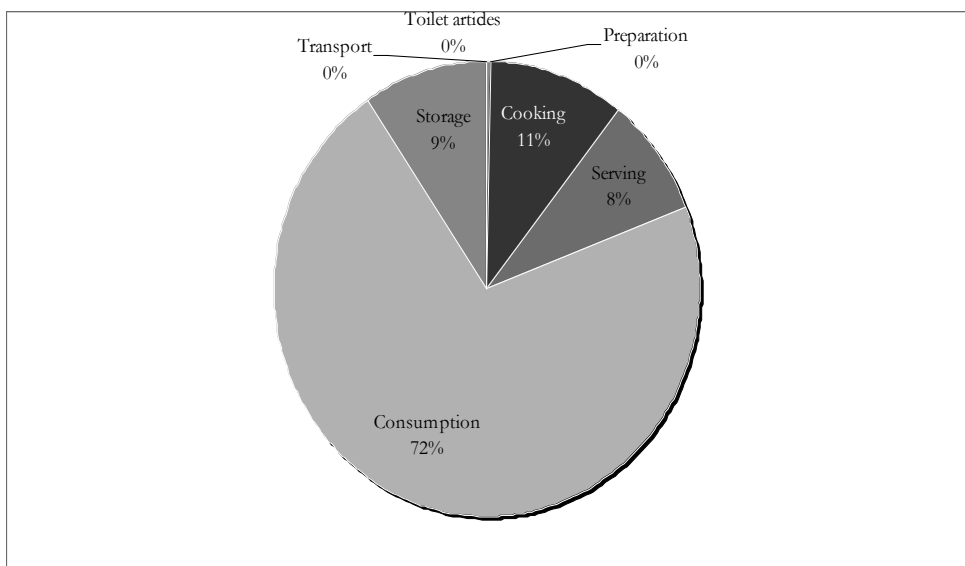


Figure 7.16: Representation in percentages of the functional analysis of period 1 (25 BC-AD 300) ($n=1764$ sherds).

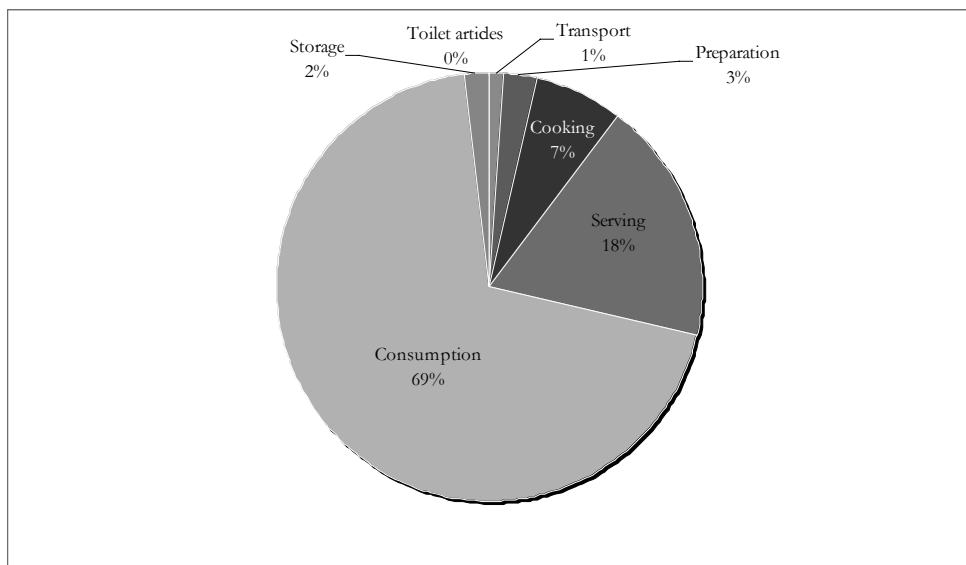


Figure 7.17: Representation in percentages of the functional analysis of period 2 (AD 300–450) (n=706 sherds).

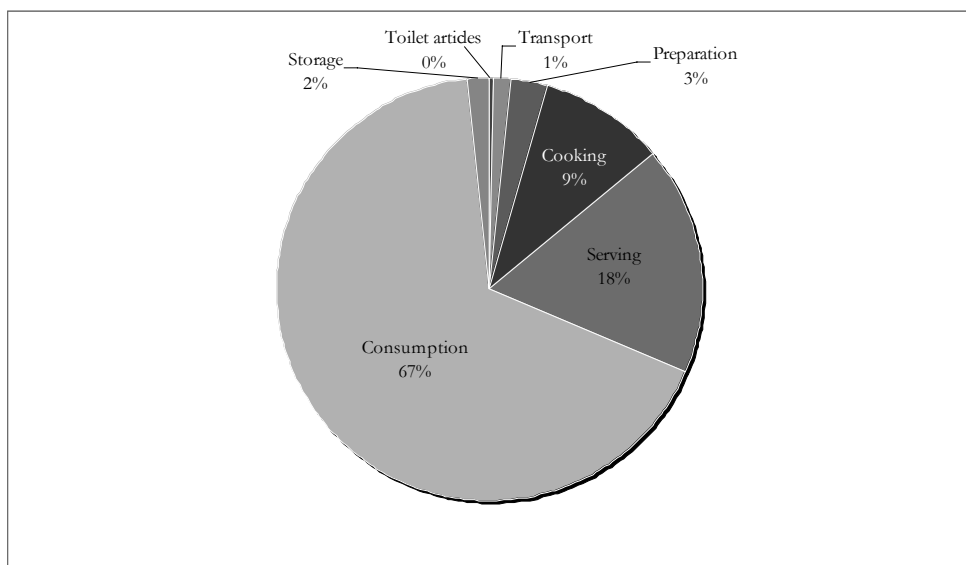


Figure 7.18: Representation in percentages of the functional analysis of period 3 (AD 450–700) (n=1696 sherds).

has come down somewhat, its proportion compared to cooking wares, for instance, does not suggest that these data represent viable functional (domestic) assemblages for any of the three main periods. Even if the latter cannot be poured into a definition, we consider a given proportion of cooking wares as an essential part of such functional assemblages.

Functional allocation of proportionally attributed data

In other words, the enhanced data-set of closely datable material of 4166 sherds, as the closely datable material itself (Figs 7.7–7.8), is insufficient in functional terms in order to recreate life back on the streets of ancient Sagalassos, based on the urban survey data-set. In a next step, the less diagnostic material, upon chronological attribution (Figs 7.9–7.10), was classified according to functional groups (Figs 7.19–7.21).

Figure 7.19 can be compared to Figure 7.16. Although the amount of data has increased nearly fourfold in Figure 7.19, the differences in functional proportions are less drastic. SRSW continues to dominate the spectrum. Combined with the functional category of serving, unfortunately mostly containing less diagnostic lékane/kraters and jars/jugs in SRSW fabric, both functions represent 95% of the data. This high total makes it not so realistic to expect to reconstruct viable functional (domestic) assemblages for the imperial period, even if the latter are hard to define. The near absence of vessels

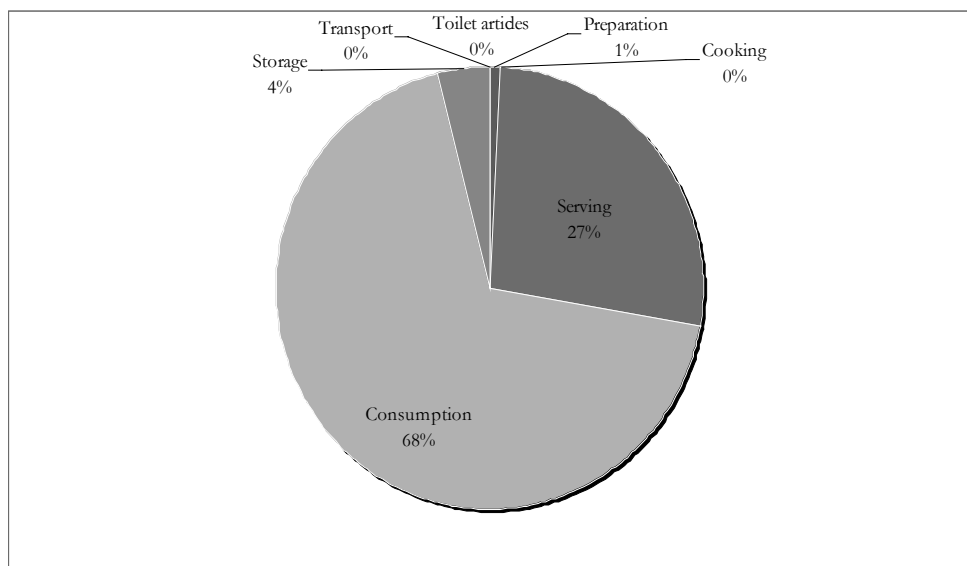


Figure 7.19: Representation in percentages of the functional analysis of period 1 (25 BC–AD 300) ($n=7629$ sherds).

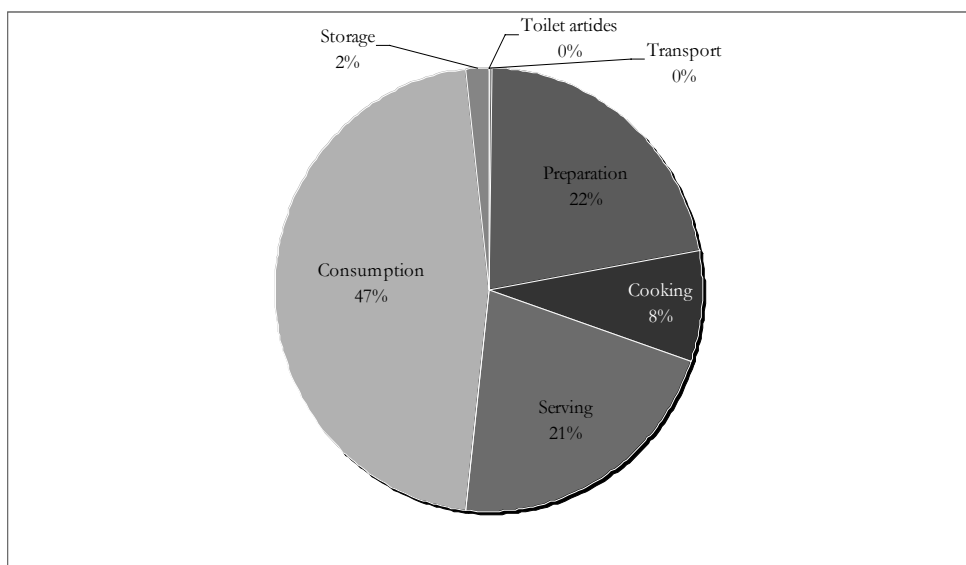


Figure 7.20: Representation in percentages of the functional analysis of period 2 (AD 300–450) (n=4804 sherds).

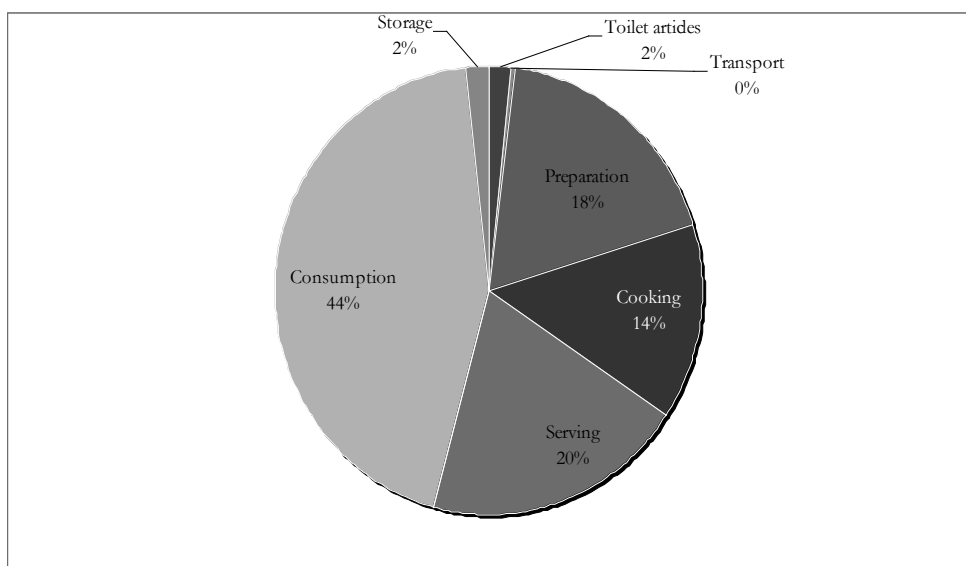


Figure 7.21: Representation in percentages of the functional analysis of period 3 (AD 450–700) (n=9160 sherds).

for cooking and preparation of foodstuffs confirms this statement. Therefore, other options need to be considered to explain the presence of imperial pottery at the surface in the urban landscape of Sagalassos, such as collapsed original terrace fills or other construction related deposits. For all three periods and especially for the first couple of centuries, the activities of a large-scale pottery manufactory in eastern suburbia are expected to have contributed to the degree of representation of SRSW.

Figure 7.20 can be compared to Figure 7.17. The amount of data has increased nearly sevenfold, entailing different functional proportions. Not only is the proportion of SRSW table ware reduced to less than half of the sherds, but mainly the functional categories of vessels for the preparation and cooking of foodstuffs represents nearly one third of the total. With the addition of less-diagnostic data, the chances are that the late Roman proportions do approximate to those of functional (domestic) assemblages.

Figure 7.21 can be compared to Figure 7.18. The amount of data has increased more than fivefold. As with the late Roman data, the chances are that the early Byzantine proportions reflect to some degree functional (domestic) assemblages.

A range of Sagalassos-es

Clearly, the interpretation of urban survey data, even with the relatively high amounts of material available from ancient Sagalassos, is not straightforward. There is no easy, let alone unidirectional connection between the available pottery data and the construction of a historical narrative.

At Sagalassos, the closely datable material forms a minority within the collection, displaying an inversely proportional evolution through time compared to the patterning of the entire collection of urban survey data (Figs 7.5–7.6 *vs.* Figs 7.1–7.2) and non-viable functional (domestic) assemblages dominated by SRSW (Figs 7.7–7.8). Enhancing the data-set of closely datable material modifies this pattern to a certain extent (Figs 7.15–7.18), but the same remarks remain basically valid. In other words, we consider it recommendable to include the less diagnostic material in the analysis, even if this reduces the chronological and functional resolution of the material to a large extent.

In general, considering the nature of survey ceramics we are fairly confident that we are not the only project facing the problem of less diagnostic material. The Kea Project, for instance, while reporting on the results of their survey on northern Keos, stressed that ‘the temptation to date finds with spurious precision or to ignore those that cannot be closely assigned, must be resisted much more firmly than has generally been the case in the past.’ (Cherry *et al.* 1991: 328). Of their total of more than 1,300 sherds, attributable between Archaic and Roman times, 35% could be dated to a single period, and less than 10% to a specific century (Cherry *et al.* 1991: 329). They related

this fact to the continuity of the studied fabrics, shapes and styles, and concluded that 'the bulk of surface pottery anywhere in Greece is neither closely datable nor yet largely undiagnostic but, in fact, somewhere in between.' (Cherry *et al.* 1991: 330). They therefore decided to redistribute the sherds as totals or percentages over periods or centuries, based on the assumption that 'any sherd dated to a range of periods (has) an equal chance of belonging to any phase within that range.' (Cherry *et al.* 1991: 331). This is basically what the linear data distribution and representation method discussed above is about (Fig. 7.1) and how scholars looking for wider socio-economic patterning in ceramological data go about things (Lund 2006; Fentress *et al.* 2004).

Compared to the careful attention by which surveying strategies are being reported, the methodological framework to process, report and compare survey ceramic collections has not received widespread attention, however. Obviously, the collected material should be presented as a whole (Rutter 1983: 137–142), applying quantification techniques, such as counting and weighing the material, in order to group the collection into ceramic phases and groups (Millett 2000). In the words of David K. Pettegrew (2007: 749) 'The process involves a closer critical examination of the data, in the same way that we might question a literary source, and it recognises that contextual analysis and interpretation of the source must precede any attempt to construct a historical narrative or draw conclusions', resulting in a appeal to develop 'an interpretive scholarship that deals with the pottery itself, and attempts to assess the visibility, diagnosticity and representativeness of ceramics within and between chronological periods'. In his study of late Roman Corinthia, the latter scholar considers a variety of data distribution techniques, based on the elimination of body sherds from the equation, the linear distribution of broadly dated material to better defined classes, calibrating survey data with excavated assemblages or assuming fixed functional proportions and extrapolating these in the available data (Pettegrew 2007: 771–775). To our knowledge, the Corinthia study is the most elaborate example of the application of data distribution techniques to survey data to date. Considering the higher diagnosticity of the Sagalassos survey pottery compared to the 'chronotype' system known in Corinthia and elsewhere in Greece, our focus has been very much to stress the usefulness of data distribution techniques, while incorporating as many sherds as possible in the analysis and stick with these empirical data and, for instance, not adjust for field conditions, estimate projected quantities of chronotypes or develop pottery indexes (Meyer and Gregory 2003). All material was also considered to have been on-site, eliminating the need to consider John Bintliff's (2007: 26–37) 'residual analysis' as part of the data analytical procedure. Admittedly, our focus on the available empirical data in contrast to some of the data modelling techniques discussed above reduces chances of comparing between projects, insofar such is deemed possible (Given 2004).

By nature, the less diagnostic material is difficult to define in precise chronological terms. In order to establish some degree of data patterning, the collected data needs to be parcelled up in some way. In this paper, we chose to determine three periods which

follow the logic of innovation in the typological repertoire of SRSW. As making pottery is a technological act, and technology is a reflection of its social matrix, we consider the main periods of typological innovation of the local table ware sets to reflect to some degree the general fate of the urban community of ancient Sagalassos (Roth 2007). The next issue to resolve is how exactly the data are distributed/presented? As in the case of late Roman Corinthia, the data distribution techniques applied in this paper are intrinsically simple, but result in a different appreciation of the same empirical data-set, solely based on the mathematical premise of the chosen technique. Not one technique is necessarily better than another one. Therefore, it seems logical to compare the different outcomes and accept that the archaeological reality which we wish to

Table 7.3 illustrates the three distinct phases or periods in the urban survey data collection. Following most techniques of data distribution, the late Roman period is least well represented, except for the Gaussian method and the allocation of ranges to their upper date. When looking at the detail of the data, the first half of the fourth century AD seems to be an especially problematic period. Also, in most cases, the early Byzantine period is best represented, except when dealing with the (enhanced) closely datable sherds, while the imperial centuries represent about one third of the data. In general, this pattern of evolution reflects the building history of Sagalassos as attested through architectural study and excavations mainly within the monumental centre, with a substantial building boom in the imperial centuries into the Severan period and a thorough early Byzantine urban reorganisation, partly instigated by the introduction of the Christian rituals and architecture (Waelkens 2011).

The open question is, however, in how far the urban survey data collection and the evidence of urban development can serve as proxy evidence for the general well being of the local community and its regional economy? Imperial bliss is fairly easy to read in the data. Although the survey pottery data cannot be linked to functional patterns during the imperial centuries, the attested quantity of data in areas which are mostly outside of the monumental town centre, and at the surface after many more centuries

METHOD	IMPERIAL 25 BC–AD 300	LATE ROMAN AD 300–450	EARLY BYZANTINE AD 450–700
Linear	32.6%	20.5%	46.8%
Gaussian	27.9%	29.9%	37.9%
Closely datable	71%	1%	28%
Enhanced closely datable	42.3%	16.9%	40.6%
Less diagnostic	33%	20%	47%
Upper date	20%	28%	52%
Average	37.8	19.3	42

Table 7.3: Proportional representation of periods by data distribution technique.

of continued occupation, can be seen as the translation of a stable urban environment and a productive climate for SRSW. As published elsewhere (Poblome 2006) and in contrast to other regions in the eastern Mediterranean, the urban survey data do not necessarily suggest a considerable impact for the third century AD crisis. After the Severan dynasty, local elite euergetism may have been less directed towards enhancing an already very complete urban fabric and more towards organising games and festivals (Waelkens 2011). The well-being of the local community in the third century AD may have depended a lot on the degree to which Sagalassos could continue to tap into wider networks and make its festivals, for instance linked to its neokoros titles, along with other urban services, work within its region, attracting external potential. In an earlier study, S. Mitchell (1999) coined this period as the 'second wave of romanisation' for the region of Pisidia highlighting the level to which local communities aligned their fates with that of empire. The way this actually worked on the ground is difficult to assess at Sagalassos, however, as few excavated deposits are available for the third century AD and also the urban survey data allocated to this period result from the application of data distribution techniques.

Unfortunately, this situation changes little in the fourth century AD. At some point in this century, a new line of SRSW was launched. The fact that very few excavated deposits are available, make it difficult to establish when exactly this happened. The new assemblage seems to have crystallised by the second half of the fourth century A.D., however, when it appears together with a new, regional line of wine amphora and mould-made oinophoros production (Poblome *et al.* 2008). In the case of the first half of the fourth century AD, the paucity of excavated data is now matched by the same paucity of survey data. This could indicate that this period was somewhat more problematic for the local community than the troubles of the third century AD. In general, the archaeology of contemporary Sagalassos is pretty silent. Pisidian Antioch, and not Sagalassos, was installed as capital of the Diocletian provincia Pisidia. The removal of courts and magistrates towards the new capital and the reduced importance of the neokoros titles and related festivals and possibly other urban services could have reduced the regional aura of Sagalassos (Waelkens 2011). The new line of SRSW, the well designed oinophoroi and perhaps most of all the regional attempt at wine production are to be read as attempts to reverse the fate of the community, possibly, as suggested earlier, in the wake of the foundation of Constantinople (Poblome *et al.* 2008). Building activities resumed by the end of the fourth century AD with the grand scale renovation of the Imperial Baths. A little later, a new town wall was erected and some churches built, heralding a new phase in urban development and production of material culture (Waelkens 2011). With the local community picking up again, we presume that Sagalassos regained some of its attraction towards its region. For a little place like Sagalassos, its regional socio-economic matrix should be seen as its most sustainable bond. The reverse effect could have been the failing of the attempt at rationalisation of part of the agricultural produce towards wine production, which was

initiated only a couple of decades earlier. The non-existent distribution pattern of the regional Fabric 4 amphorae, as well as their attested mixed content in early Byzantine times (Romanus *et al.* 2009), seem to indicate that as soon as Sagalassos scored again within its own region, there was no more need to try and reach further markets, with the local community falling back on its most natural regional matrix.

In general, the main urban survey data peak is situated in the period between the end of the fifth and the end of the sixth centuries AD and this seems a fair reflection of early Byzantine bliss. Although history recorded drastic events, such as the Plague of AD 541/2 for instance, no considerable signal of change is picked up in the urban survey data. After the *c.* AD 600–620 earthquake at Sagalassos (Waelkens 2011), fewer data are registered, albeit not necessarily representing a rapid decline. Changes in pottery repertoires are seldom sudden, and therefore linked to specific historical circumstances in only few exceptional cases. Pottery, as a medium of material culture, rather impinges on changes in societal fabric. Phase 9 pottery at Sagalassos is in some ways a continuation of existing patterns and in some ways new. In this way, the local material culture follows general trends of evolution of the local community, which would increasingly lack flexibility to come up with answers to a range of changing circumstances and therefore lost scale and started falling back mostly on its own.

Acknowledgements

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