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Mapping ancient Amathus

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Introduction*

The Swedish Cyprus Expedition excavated at Amathus during April and May 1930, and discovered 26 tombs in the western necropolis (Gjerstad *et al.* 1935: 1–141). The Swedish were not the first to be involved in the archaeology of ancient Amathus: Luigi Palma di Cesnola, the British mission of Murray, Smith and Walters, as well as occasional travellers and amateurs had already explored the region and carried out excavations, particularly within the rich necropoleis (Cesnola 1877: 249–292; Murray *et al.* 1900: 88–126; Hellmann 1984; Hellmann & Tytgat 1984: 101–105). The Louvre Museum acquired in 1865 the colossal stone vase from the acropolis, and the majestic Bes from the agora reached Istanbul some years later (Hellmann & Tytgat 1984: 102, nos 5, 7). Yet the Swedes were the first to publish extensively and to a high scientific standard the results of their excavations.

Starting from this pioneering scientific effort, almost 90 years later our knowledge of Amathus has increased remarkably, thanks to the excavations of the French School at Athens and the Department of Antiquities in the last 40 years (Hellmann & Tytgat 1984: 106–107; Aupert (ed) 1996; Hermary 2014). After so many discoveries and scientific activities on the site, the time has come to try to put together all the information, in order to build up a comprehensive scientific tool for understanding the city and its historical development in its entirety. The objective is to study the ancient city of Amathus as a single entity, so that each one of its excavated parts (the sanctuary on the acropolis, the city walls, the agora, the royal palace, the harbour, the basilicas, the necropoleis) can find its place and play its role in sketching the global history of the site. A holistic approach, devoted to collecting, registering and organising all the available information (published and unpublished) seems the best suited for establishing a reference system that can be useful, in the future, for each and every one of the scientific actors involved in the exploration and study of the site.

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Geographic Information Systems (GIS)

A Geographic Information System (hereafter GIS) seems the most powerful and flexible tool for assembling and exploiting a large, incomplete and dispersed documentation, in order to extract the most archaeological and historical information. A GIS can be defined in various ways, but what it is important to point out (beyond any technical and abstract analysis) is the coexistence and interaction of three basic elements: space and its representations (such as maps, plans and drawings), data (organised and registered into databases) and the digital media (‘a GIS is a computer-dependent technology’, Conolly & Lake 2006: 15; see also Wheatley & Gillings 2002: 9–10; Rodier (ed) 2011: 13–20). A GIS is, then, a system of digital cartography related to databases. GIS began to be used in the field of geography some decades ago, and was adopted by archaeologists at the end of the 1980s, but of course recent developments in digital technology have greatly transformed and improved the possibilities (Wheatley & Gillings 2002: 13–16; Rodier (ed) 2011: 23–38).

An archaeological GIS can be developed to manage excavation data (as in the case of a project currently being undertaken by Pascal Darque from the French School at Athens on the Neolithic site of Dikili-Tash: Depond 2014), to study a wider area, such as an entire economic region (in a Cypriot context see, among others, the Palaepaphos Urban Landscape Project directed by Maria Iacovou: Iacovou 2013), with a focus on, for example, accessibility to natural resources, visibility (see Papantoniou et al. 2015 on the sanctuary site of Vavla Kapsalae), the structure and development of hydrographical networks and the diachronic transformation of landscapes (including 3D reconstructions). Whatever the scientific issue, depending on the data collected and inserted into the system, it is possible to obtain a relevant cartographic output. Even when operating on a site-wide scale, the approaches can be very different. Among the various GIS projects that are currently being developed at the French School at Athens, the one on Delos, addressing issues related to architecture (the main scientific interest of the coordinator of the project, Jean-Charles Moretti) and to the publication of a paper archaeological atlas (Moretti et al. 2015), does not address issues related to chronology. Chronological development is, on the contrary, the main concern of the Kition GIS, a project of the French archaeological mission of Kition, directed by Sabine Fourrier from the University of Lyon (see Fourrier 2015b).

The use of GIS at Amathus

The Amathus GIS is a new project that started in 2014: besides myself (scientific coordinator), the team includes Lionel Fadin (topography) and Louis Mulot (informatics), and benefits from the collaboration of several colleagues (among others, Julie Durin, Antoine Hermary and Elisavet Stefani). It is being developed in accordance with the policy of the French School at Athens, which is intended to promote the use of GIS on all major sites being excavated by (or in collaboration with) the institution: Delos, Thasos, Delphi, Argos, Dikili-Tash and Malia are all the subjects of GIS projects, the development of which is more or less advanced at each site. Each program has scientific objectives and concerns that depend on the interests of the coordinators and participants. Adopting the model of Kition and Palaepaphos, we aim to develop at Amathus a GIS devoted primarily to topography and chronology, that is to say, a tool for understanding the historical development of the site and its relation to the surrounding natural and economic environment.
The site of Amathus and the history of its discovery and exploration have some particularities that influence the development of the GIS (Hellmann & Tytgat 1984; Aupert (ed) 1996; Hermary 2014). The urban centre, which has been the object of systematic excavations, is relatively well documented, with ground plans, drawings and photographs that are kept, for the most part, at the archives of the French School at Athens. The necropoleis, excavated by the Department of Antiquities during rescue operations, that is, in situations of extreme pressure leaving very little time for study and analysis, have also been documented within regular reports to the Director of the Department of Antiquities, even if only part of this documentation is easily accessible. It is, then, possible to locate the remains (either still visible, at least in part, or reburied) with a reasonable degree of exactitude. The plan published by the French mission (Aupert (ed) 1996: pl. I) already provides an accurate cartography of the remains within the city wall (updated to 1994), even though it does not provide an understanding of the chronological development of the site.

The archives to be studied in relation to these remains are large, disparate and dispersed, and they require a great effort of systematisation. One of the objectives of the program is to provide access to these archives and to the information they offer on the topography and history of the site to as large a public as possible (Cannavò & Fadin in press). Specifically, the informatics services of the French School have developed a GIS web platform which allows user-friendly consultation of the GIS and does not require any license or expensive software. The GIS can be developed within a traditional professional environment (such as ArcGIS, QGis or Autocad), but its use is possible for everyone, everywhere (since it is online), and without the need of specific training (Fig. 1). The outcome of the project in terms of visibility and accessibility to the scientific results and archives of long-term archaeological projects is evident and very important. Yet of greater importance and concern here are the scientific aspects of the project.

![General architecture of the Web GIS](image)

*Figure 1. General architecture of the Web GIS (EFA/Louis Mulot)*
The necropoleis of Amathus

In this paper I will focus on the example of the necropoleis, not only to honour the Swedish mission that excavated there, but also because it is still a relatively underexplored field at Amathus, and several new observations can be advanced by simply analysing the great mass of information collected after many years of (largely unpublished) excavations.

The Amathus necropolis is composed of three main sectors: the western, eastern and northern necropoleis, the last being the least known and explored. The basic funerary feature is the chamber tomb with a dromos, like everywhere else in Cyprus, with rock-cut and built tombs close to one another with no apparent geographic distinction, with the remarkable and unique exception of an incineration necropolis (still unpublished), discovered close to the southwestern border of the western necropolis (under the Four Seasons Hotel, Christou 1998; Agelarakis et al. 1998).

These funerary spaces were utilised from the beginning of the Iron Age (11th–10th century BC) until the abandonment of the town at the end of the Early Christian era (7th century AD). Thus we see 1800 years of occupation of the same spaces, but also of the same tombs: examples of reoccupation, as well as of continuous occupation for several centuries, are particularly numerous at Amathus (see e.g. Gjerstad et al. 1935: 64–69 [Tomb 10] and 94–100 [Tomb 16]; Parks & Steel 1996). This Amathusian particularity raises some questions: why this specific custom? And how was it possible? The excavations recently carried out by the French mission at Kition, at the necropolis of Kition Pervolia, have shown that memory of the ancient tombs, even if only a century after their filling up, was rapidly lost there—we shall suppose then that there were no durable burial markers, or no burial markers at all (Fourrier 2015a: 92). At Amathus the situation was certainly different—since it was possible to reoccupy, during the Roman period, numerous Cypro-Archaic tombs—and it would be interesting to try and find an explanation for this.

Generally speaking, the Amathus necropoleis are quite easy to access and study, since the various sectors as well as most of the built tombs have been preserved. This allows the repositioning of the general ground plans of the excavated assemblages through the geo-referencing of some of the visible tombs (Fig. 2): even if the plans are not always very precise and reliable, the global result is quite satisfying and accurate.

Nevertheless, the documentation is very disparate: very few tombs have been extensively published, with photographs, plans and sections. For most of the tombs we have only unpublished archival records. The same can be said of the finds: with the exception of the tombs excavated by the Swedish mission, and some important tombs (particularly but not exclusively of the Cypro-Geometric period) published in the Report of the Department of Antiquities, Cyprus (Christou 1978; Nicolaou 1985; Karageorghis & Iacovou 1990; Coldstream 1995; Tytgat 1995; Prokopiou 1996; Hermary & Iacovou 1999; Flourentzos 2004) or in the Bulletin de Correspondance Hellénique (Aupert & Tytgat 1984) with a complete catalogue of finds, the greatest part of the material is unpublished. During the 1980s Christiane Tytgat studied the material from 150 tombs excavated by the Department of Antiquities (Tytgat 1989), but unfortunately the publication resulting from this study, consisting of catalogues of objects with very short introductory remarks and chronology, has no illustrations (photographs, drawings, plans or sections). Other volumes within the same series, devoted to specific categories of material, are illustrated, but with no specific presentation of the funerary contexts (Karageorghis et al. (eds) 1987, 1991, 1992; Karageorghis & Hermary 1987; Chavane 1990). The tombs inventoried for the GIS
now number 1,258. It is evident, then, that what is available to the general public is only a small part of the archaeological data collected during such a large number of discoveries. The aim of the GIS is not to publish all these tombs, but to collect the information concerning their location and chronology, in order to integrate them into the general cartography of the town. Thanks to the collaboration of the Department of Antiquities, it was possible in 2015 to study a considerable number of the archival documents kept at the Cyprus Museum in Nicosia.

An additional difficulty arises from the great number of tombs excavated in the 19th century. Without discussing the Cesnola excavations (with extraordinary objects discovered in built, certainly royal, tombs impossible to locate now, having completely disappeared and never having been placed on a map), it is enough to mention the British excavations of 1893–1894. Three hundred and twelve tombs were excavated within the three necropoleis, primarily in the eastern necropolis. The publication does not contain any tomb plans or detailed catalogue of material, but only a selection of objects (Murray et al. 1900: 88–126). The exact location of the excavated tombs is impossible to determine, since the only site plan available is the general, very imprecise one from the publication. It is very likely that some at least of the tombs excavated by the British mission in the 19th century were excavated a second time by the Department of Antiquities in the 1970s, and generally considered as looted. Within the project of the GIS and a joint publication by Béatrice Blandin, Antoine Hermary, Thomas Kiely and Yiannis Violaris on the topography of the necropolis of Amathus (*La nécropole d’Amathonte* 7, in preparation), Julie Durin has tried to find correspondences between the descriptions of the tombs in the excavation notebooks of the British mission and the still visible and accessible tombs excavated by the Department of Antiquities in the eastern necropolis. With the exception, however, of three important built tombs, it has been impossible to identify any tombs.

In order to deal with the many issues concerning the necropoleis of Amathus, it is first and foremost necessary to integrate into the GIS all the available data. This process includes:

- The geo-referencing of all the visible remains and repositioning of all the available plans: the geo-referencing was completed in 2014, the repositioning is in progress.
- The creation of a database collecting all the available information on finds,
architectural and funerary practices, but especially on location and chronology. This database also provides the opportunity to fill the lacunae in our knowledge and to sum up the data. A first collecting phase was completed in 2015; the progressive insertion of the data is ongoing.

**GIS and open topics on the necropoleis of Amathus**

After the completion of these basic steps, many topics can be dealt with. Three of these are presented below:

A first issue, which is of a technical nature but entails scientific outputs, is to develop a methodology for the representation of uncertain data such as, for example, tombs for which the location is not precisely known. Many possibilities can be considered: one can use different colour tones or motifs in the representation of the tombs, according to the precision of their location—the more precise the location, the darker the tones or stronger the lines used for the drawing of the remains. Another possibility consists in visualising the data on different layers, according to the degree of certainty and precision.

The Kition GIS offers useful experience in this respect. On the first maps issued by the Kition GIS (e.g. Fourrier 2013: 115, fig. 6; 2015a: 88, fig. 2), the tombs with uncertain locations within a large area are represented by solidly coloured polygons. Although scientifically accurate, this gives the visual impression that the tombs are more numerous or important where the polygon is large (even if the tomb concerned is actually just one), while precisely located tombs may pass unnoticed. On subsequent, still unpublished maps, different methods have been tested: different symbols for certain and uncertain locations, or different colour scales in order to visualise densities. The importance of rendering visually in the clearest manner the precision of the information is crucial. An uncertain element represented on a map as certain is more dangerous than an element that is not represented at all: the risk is to produce factoids (on this notion see Maier 1985).

Another example is also instructive: for the preparation of the volume mentioned above, *La nécropole d’Amathonte* 7, Mathias Glaus prepared in 2011 a map of the Amathus necropoleis having at his disposal only partial and incomplete archival documents, and without the possibility to check the information in the field. This map, with all the preparatory documents, is kept in the French School archives. Glaus noticed and signalled important errors and inconsistencies, and provided an exhaustive list of the problems encountered. These uncertainties and difficulties, however, are not represented on the map which, on the contrary, with its great detail and quality gives the impression of topographical accuracy. It is precisely this impression that it is important to avoid, unless it is supported by certain information.

Secondly, the Amathus funerary architecture changed over time: the so-called ‘composite tombs’ (rock-cut shaft chamber tombs with stone slab roofs), located in the western and northern necropoleis and dating from the Geometric or beginning of the Archaic period, disappeared at the beginning of Cypro-Archaic II, and rock-cut chamber tombs (entirely rock-cut, or with a built stomion) became the norm. On the other hand, the built tombs of the Archaic period are concentrated in the western necropolis, the Classical ones in the eastern necropolis, with a large question mark concerning the northern necropolis, where Cesnola found built tombs of the Classical period which are no longer visible. It also seems that the spatial organisation of
the Amathus necropoleis changed during the Cypro-Archaic II period: the Archaic tombs, sometimes cut in the Geometric period, but in use until the end of the Archaic period, appear to be in the majority in the western necropolis, while Cypro-Archaic II–Cypro-Classical tombs are more numerous in the eastern necropolis.

Other characteristic Amathusian funerary customs—the long occupation and the frequent reoccupation of the tombs—should also be analysed more deeply: to what extent can we consider these practices as systematic? When speaking of a long duration of use, what time span should we have in mind? The GIS, providing a detailed cartography of tomb architecture and chronology, will be a very useful tool for the analysis of all these issues.

A third, very interesting topic concerns the burial markers. Since the reuse of tombs was so frequent, it seems reasonable to suppose that the tombs were visible or identifiable in some manner: this suggests that burial markers of some kind were used. The traces identified on the ground in the eastern necropolis (Fig. 3) indicate, during the Hellenistic period, a systematic use of burial markers, essentially stone steles, that seem however to have been far less numerous in the preceding periods.

Can we suppose the existence of burial markers of different kinds? Some elements suggest it, for example a Corinthian capital discovered by the Swedish mission in Tomb 2 (Gjerstad et al. 1935: 9), or the column known as the ‘Agucchia’ (or ‘Aiguille’, needle, in Stefano di Lusignano 1573, quoted by Hellmann 1984: 79–80, no. 137), mentioned by several travellers of the 18th and beginning of the 19th centuries and possibly located within the northern necropolis (Hellmann 1984: 79–80, no. 137, 81, no. 142, 82–83, no. 149, 84, no. 152 [and perhaps fig. 30]). These isolated columns, only some elements of which have survived, were possibly funerary monuments of Alexandrian inspiration, characterising the Amathusian funerary landscape in the Hellenistic and Roman periods (Cannavò in press). Among other isolated burial markers, the Swedish mission excavated a unique example of a funerary tumulus, covering an incineration in an alabaster urn, certainly the burial of an Alexandrian official (Tomb 26: Gjerstad et al. 1935: 136–138; Parks 2009: 237).

Figure 3. Eastern necropolis, cavities on the rock for the installation of steles and other ritual facilities (April 2014; EFA/Anna Cannavò)
A complete cartography of the Amathusian burial markers discovered in situ will allow us to better understand the Amathusian case within the larger, highly regionalised context of Cypriot funerary practices (Parks 2002). Even if some of the examples mentioned (the ‘Aiguille’, Tomb 26 of the Swedish excavations) are of very uncertain location, the cartography of many other elements, such as the numerous cippi of the Roman period found in situ, frequently inside the dromoi or funerary chambers, can provide important information on the reoccupation and the reorganisation of spaces within tombs.

Research on burial markers could be expanded to include other installations related to different phases of the funerary ritual—sarcophagi, benches, loculi and arcosolia, for the deposition of the inhumations; and poles, portable altars and other facilities on the ground related to funerary or commemoration rituals.

Conclusion

The necropoleis are just one field of investigation that can benefit greatly from the creation and development of a GIS on ancient Amathus. It is obvious that such a tool performs best as it is fed with new data and exploited for new researches. The primary databases and cartography are still under development, and are the result of a collective work conducted by a small team on the archives (mostly from the French excavations) and on the publications. As soon as this first step is completed, the GIS will be accessible online to the whole community of archaeologists and scholars working on ancient Cyprus and ancient Amathus, who will be invited to contribute, by testing and emending it, to improve its results and possibilities.

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