THE URBAN ORGANIZATION OF KOLOPHON AND ITS NECROPOLEIS


ABSTRACT

After a long period of neglect, archaeological research in the ancient Ionian city of Kolophon in western Asia Minor was renewed from 2010 to 2014. As a starting point, a joint team of researchers from Turkey and Austria used the documentation from the 1922 and 1925 excavation campaigns led by the American School of Classical Studies at Athens and the Fogg Museum of Art at Harvard University. The new team explored the city using extensive surveys, geophysical exploration, and LiDAR scans. The results from this research give context to the American excavations, provide new information on the extent of the city and its necropolis areas, and create a preliminary model of the settlement patterns in the ancient city.

INTRODUCTION

Starting in 2010, Christine Özgan from the Mimar Sinan University at Istanbul has directed an archaeological survey at the ancient city of Kolophon in Ionia, in collaboration with Ulrike Muss and Verena Gassner from the Institute of Classical Archaeology at the University of Vienna.1 As this survey represents the first major research project at the site of Kolophon in almost 90 years, after an excavation campaign under Hetty

1. Our warmest thanks for this collaboration go to our colleague and friend Christine Özgan, who also helped us with all administrative questions. We also thank the representatives of the Turkish Government, Umut Doğan (2010), Ayşe Akman (2011), Cansu Yılmaz (2012), Onur Yıldırım (2013), and Seval Ekintan (2014). Thanks go to Mario Rathmanner of Airborne Technologies for making the LiDAR scan possible. Participants of the campaigns were the authors of this contribution, as well as Anton Bammer (archaeologist), Erich Draganits (geologist), the students Carina Hasenzagl, Andreas Hochstöger, Jasmin Scheifinger, and Sarah Wanek; Torsten Riese and Sebastian Pfnorr (archaeologists-geophysicists of Posselt Zickgraf Prospections [PZP], in 2013). Luigi Vecchio (epigraphist, University of Salerno) joined our team in 2014. Kristina Klein provided valuable aid with the preparation of the plans and photographs for publication. We also thank the anonymous reviewers of Hesperia for their suggestions. The survey project “New Investigations at the Ancient Site of Kolophon in Ionia,” directed by Ulrike Muss, is funded by the Austrian Science Fund (FWF, P 24763-G 21). Olivier Mariaud’s participation was partially funded by the LUCHIE of the Université de Grenoble. The “Introduction” and “Methodology” sections were written by Verena Gassner and Ulrike Muss.
Goldman and Carl Blegen in 1922 and a short season in 1925, a large variety of research questions prompted our renewed interest. The main focus in 2010 was to study the ancient city's extent, development, and spatial organization over time by using modern survey methods during the annual field campaigns. After an initial orientation within the modern topography, the Turkish team decided to concentrate its activities on the acropolis, while the Austrian team started research in the plain and the adjacent hills where the necropoleis are located (Fig. 1).

Before our new investigations started, the best known part of ancient Kolophon was its acropolis, as this area had been the main site of the excavations carried out by the Americans in 1922 and 1925. Their results were published in detail by Leicester Holland. These excavations unearthed four major architectural features that are easily distinguishable on the plan (see Fig. 3, below): the so-called Metroon on the eastern side of the acropolis hill comprises a stepped altar on a huge terrace and two small additional rooms to the south. The elongated central plateau of the acropolis is dominated by a large, L-shaped stoa with a northern and western wing; each wing contains a number of differently sized rooms. To the immediate north and especially to the west of this stoa, residential quarters were uncovered, with dwellings articulated around courtyards and along paved streets.

Farther to the west, a larger bathing complex was found. Finally, parts of other, smaller structures of undetermined function were encountered by the Americans in trenches farther up the hill.

2. For a summary of the excavation history, see Holland 1944. Smaller rescue excavations had been carried out in the 1990s and early 2000s by the Archaeological Museum of Izmir, but have not been published, with the exception of some short remarks in Şahin 2008.

3. Holland 1944. Some of the structures mapped on the accompanying plates were not described in the article; they were reserved for a separate publication, which in the end was never realized. Restudying these unpublished structures is a part of the new Kolophon project and will be presented within the framework of the final project monograph.

4. For a discussion of this residential quarter, see Hoepfner and Osthues 1999, pp. 280–291.
When the Turkish team first examined the state of the ruins excavated by the Americans on the acropolis of Kolophon, in particular those in the area of the stoa, they found that these structures were generally in poor condition. In the following years their research concentrated in particular on the Metroon and then shifted to the documentation of several monuments scattered in the surrounding area that can be understood as rock-cut altars in the tradition of Phrygian monumental altars, probably also dedicated to Meter.

The Austrian team started in 2010 to retrace the course of the Early Hellenistic city walls, originally documented by Schuchhardt and Wolters in 1886, which are—apart from the buildings on the acropolis—the only built structure of the city still visible. In 2011 we focused on a study of the modern village of Değirmendere. We also initiated studies of the archival material from the 1922 and 1925 excavations now held by the American School of Classical Studies in Athens. From 2012 to 2014, we explored the extent of the ancient city with surveys inside and outside the fortification walls. This work comprised extensive and intensive surveys, geophysical prospection, and documentation of microtopographical features, as well as interviews with field owners and tenants. In 2013 an airborne laser scan (ALS or LiDAR) was conducted to guide the survey efforts in the city and provide a secure topographical basis. This article offers a preliminary summary of the five seasons of field research conducted at Kolophon by the Austrian team concentrating in particular on the results of the survey inside the fortification walls and on the necropoleis.

**METHODOLOGY OF THE SURVEY**

Initially, we were encouraged by the relative absence of modern construction in the territory surrounded by the Early Hellenistic city walls. Nevertheless, some problems arose during our work, necessitating a modification of our approach. Because our time frame was constrained by administrative concerns, our field season coincided with the agricultural use of some fields, and the temporary installation of solid greenhouses in others. A few other selected areas were inaccessible for a variety of reasons. The situation was further complicated by the intensive activities of illegal diggers (Fig. 2). Until now their work had continued largely unhindered and so they felt disturbed by our research activities. As a result our theoretical strategies had to be abandoned, making the selection of survey areas more random. In this context we were quite fortunate that the owners and tenants of the

7. Özgan et al. 2014, p. 98. For the topic in general, see Scherrer 2000, p. 60; Bammer and Muss 2006; Berndt-Ersöz 2006.
8. Schuchhardt 1886.
9. For the city walls, which are not the focus of this project, see in particular Bruns-Özgan, Gassner, and Muss 2011, pp. 203–213, figs. 4–22.
10. These studies are currently being carried out by Martin Gretscher and Ulrike Muss. Our warmest thanks go to Natalia Vogelkoff-Brogan for her continuous support.
11. In this preliminary report we do not discuss a possible Geometric settlement, nor our results of a survey in the territory of Kolophon (Özgan et al. 2013). The work of the Turkish team on the acropolis will be presented in a separate study.
12. For a strategic choice of survey areas, see, e.g., Bintliff et al. 2007, p. 44, with examples from Thespiai and Haliartos. For the use of modern fields as units, see Burgers 2012, p. 16.
fields in the northeast and southwest, which make up the central part of the Early Hellenistic zone of the city, allowed us access so that we could proceed with our work.13

Both extensive and intensive surveys took place within and outside the city walls.14 During the intensive survey, most of the fields were documented with line-walking by not more than five people, using simple hand-held GPS units. The intervals were between 5 and 10 m. On some occasions, we also laid out rows of quadrants, 5 × 5 m each, and one person collected the finds in a maximum time of 10 minutes.

The relatively small amount of pottery found in most areas inside the city walls was striking.15 For the cultivated fields—at the time of the survey mostly stubble fields—one possible explanation for this may be the fact that they are plowed only to a depth of 10–15 cm, thus often not coming into contact with ancient contexts. We were also surprised by the juxtaposition between the mostly very small and badly preserved sherds from the surveys and the finds left by illegal diggers in situ at the margins of their “excavations.” Only here do we have better preserved and larger fragments of pottery, allowing the development of a more precise chronological spectrum.

As all available modern maps are relatively imprecise, Schuchhardt and Wolters’s sketch from 1886 was still the most accurate plan of Kolophon when the project started in 2010.16 As a first step, using Google Earth and later orthophotos photographed during the LiDAR scan, we defined individual working areas by giving short codes to the fields in the supposed area of the city, including the necropoleis and part of the surrounding territory. These areas are basically oriented on the basis of the topography and the modern situation of the territory. To the east of the acropolis a broad plain sloping slightly from southwest to northeast is surrounded by the Early Hellenistic city wall. Today the area is cut by a modern road in a north–south direction, running from the village of Ataköy via Çamönü to Değirmendere and from there to Menderes. This modern road dominates the space and has been considered as a marker for the definition of the topographical areas. The area to the northeast of this modern road has been

13. We thank these field owners and tenants, especially Osman Ceviz, Aydın Özkan, and the members of the Karaoğlu family for their support and patience.

14. In this article we focus on the surveys carried out inside the fortification walls. For the methodology of urban surveys, see in general Vermeulen et al. 2012.

15. At this point in our research, exact calculations on the frequency of pottery per m²/ha are not yet available.

16. Schuchhardt 1886. The plan published in Holland 1944 likewise uses the Schuchhardt sketch as a basis.
The urban organization of Kolophon is classified as NO,17 and the part to the southwest as SW. Area SW covers the slopes of the acropolis hill and is confined to the south and northwest by sections of the city wall (Fig. 3). The part to the northeast incorporates the Kalabacık Tepe in the north, the Ambarkaya Tepe in the east, and is surrounded by section E–J of the city wall. The sectors outside the area of this region of the Early Hellenistic city have been marked with the identification T (for territory). TS (territory south) covers the sector lying between the southeastern city wall and the modern village of Çamönü. In ancient times a road proceeding to Klaros and the sea passed through this area. The village of Değirmendere was divided into four sections, designated as DO (Değirmendere East),18 DS (Değirmendere South), DW (Değirmendere West), and DN (Değirmendere North).

As a great part of ancient Kolophon—especially the area of the necropoleis—is densely overgrown with pine trees and maquis, survey from the air became an essential component of our study. A better understanding of the organization of the ancient city was made possible by an airborne laser scan, carried out and processed by the Austrian company Airborne Technologies.19 This made it possible to create a reliable topographic map, but in particular facilitated the exploration of the extent of the necropoleis.

Figure 3. Aerial photograph (2013) of Kolophon, including plan of American excavations, labeled fields, and areas of geophysical prospection. B. Grammer; georeferencing of American excavations B. Zickgraf (PZP)

17. NO stands for “Nordost” in German and corresponds to “northeast” in English. For more information about the terminology of the city wall sections, see Bruns-Özgan, Gassner, and Müss 2011, p. 200, fig. 1.
18. DO = Değirmendere Ost, i.e., Değirmendere East.
19. We thank Mario Rathmanner, Airborne Technologies, Wiener Neustadt (Austria), for his contribution to our investigation.
as will be seen below. Exemplary geophysical prospection—both magnetic survey and ground penetrating radar (GPR)—allowed first insights into the urban organization of the city in the plain, in particular in the northeastern area.20

During the survey campaigns we collected between 5,000 and 6,000 items of pottery, including fragments of bricks and tiles that sometimes represented the majority of the finds.21 As study of these finds is still ongoing, we here refer only briefly to some of the difficulties the material presented for chronological classification. Their mostly fragmentary state of preservation is normal for material originating from surveys, but the original surface of most sherds was so badly damaged that their diagnostic quality was lost. In the case of supposed black-glazed pottery, for example, the gloss was not preserved. This fact also complicated the classification of painted pottery of the 8th–6th century B.C. In many fields, mostly fragments of tiles were found, which are difficult to date as detailed studies of tiles in Asia Minor are largely missing. While it seems probable that tiles with black or red paint date from the 7th to the 5th century B.C., the question remains open as to whether tiles without paint generally belong to the 4th century B.C., or can also be dated earlier.22

THE URBAN ORGANIZATION OF THE TOWN IN THE PLAIN

One of the principal aims of the current project was the exploration of the extent of the urban area of Kolophon in a diachronic way. As the city walls belong to the Early Hellenistic period, we expected that they included the city of the late 4th and the 3rd centuries B.C. Evidence from the acropolis showed that at the end of the 4th century B.C., part of the previous residential quarter was changed into a public area by the construction of a stoa and the Metroon, the only sanctuary ever discovered.23 The famous inscription from the Metroon (dated between 311 and 306 B.C.) tells us that the newly built fortification walls also included the ancient agora in the plain, thus indicating a construction date for the new city at the end of the 4th century B.C.24 In 1922, the American excavators opened a small number of trenches in this plain as well; they can be approximately located to the northeast of the acropolis hill. The main result here was the discovery of a major structure some 115 m long, which was probably a public building.25 Unfortunately, the topographical position of this structure was not precisely

20. The geophysical prospection was carried out by Sebastian Pfnorr and Torsten Riese (PZP, Marburg, Germany). Benno Zickgraf was engaged in the processing of data, which will be published in more detail at a later date.

21. Most of the material came out in 2012 and 2014. The 2013 season was dedicated mainly to the geophysical survey, so only 200 items were collected.

22. For a helpful discussion of this class and the chance to have a look at the Archaic (and mostly painted) material from Klaros, we are grateful to Nuran Şahin. For a painted tile from Ephesus, dated to the 5th century B.C., see Scherrer et al. 2006, pp. 130–132, 146.

23. For a recent reconstruction of the chronological sequence see Bruns-Özgan, Gassner, and Muss 2011, pp. 218–219, with previous bibliography. Verena Gassner, Ulrike Muss, and Martin Gretscher contributed to this section.


recorded and therefore cannot be retraced. Two other trenches north of
this structure also produced a number of more modest walls, belonging to
at least two buildings of unclear function.26

We began surveying in the plain expecting to find part of the Early
Hellenistic settlement, though it remained to be discovered how the
settlement had grown and prospered. We were also interested in learning
how the transfer of the Kolophonian population to Ephesos during the reign
of Lysimachos influenced the development of the city.27 Similarly it was
unclear if and in what way the development of the settlement had occurred in
the plain between the Kabaklidere and Kurudere Rivers during the Archaic
period. Further evaluation of the geophysical survey is still ongoing, but
continues to be elusive as many factors have hindered the measurements.

We began by surveying the fields located in the plain between the
Kabaklidere and Kurudere Rivers in the northeastern quarter of the ancient
city (NO03–NO05, NO09–NO10; see Fig. 3). Here the existence of houses
was known from open trenches in these fields. Remains of walls were also
visible in several trenches opened by illegal diggers both in the plains and
in the forested area near the slopes of the surrounding hills (Fig. 4).

The geophysical survey confirmed the existence of a coherent
settlement pattern. In particular in field NO10 we found six parallel lines
reflecting walls oriented north-northeast to south-southwest (Fig. 5). The
average distance between these walls is 21 m; in the case of the second and
the third line from the east the distance is only 4.7 m, perhaps indicating
the presence of a street or a broad corridor. The space between the first
and the second walls provides evidence for the inner organization of a
house. Two small rooms are visible in the northern part, accompanied by
a corridor on the western side. In front of the two rooms to the east we
find more walls, perhaps indicating the area of a prostas and a courtyard.
Houses with similar ground plans have been excavated on the acropolis of
Kolophon, and also in Late Classical and Hellenistic contexts at Priene.28

To the west of the sixth line there follows an area of about 60 m where
no anomalies were visible. It is possible that this free space is due to the
modern situation or it could be of archaeological significance. If the latter, it

26. This can be understood from
sketches in the original excavation
diaries, which are kept in the Archives
of the American School of Classical
Studies at Athens.

27. For the history of Kolophon
and a summary of ancient sources,
see Rubinstein 2004, esp. pp. 1077–
1080.

28. For Kolophon, see Holland
1944, pl. XI; Hoepfner and Osthues
1999, pp. 285–290, with figures. For
Priene, see, e.g., Wiegand and Schrader
1904, pp. 285–297; Rumscheid 1998,
pp. 140–149; Hoepfner and Osthues
1999, pp. 338–351; Hellmann 2010,
p. 63, fig. 75.
could be interpreted as an open place. In field NO03 we found the remains of another *insula*/house, which shows the same width of 20 m.

Also striking is a square structure with a length of about 40 m farther east of the area we investigated, which is visible in the geomagnetic prospection. Its large dimensions could point to an important public or sacred building, which probably belongs to a period preceding the houses. Both in NO03 and in the southeast of field NO05 the ground-penetrating radar also provided evidence for walls that could be reconstructed as smaller houses, which do not display the regular layout of the houses described above. As their orientation is different, it seems probable that they belong to another period of the settlement, though a different function cannot be excluded. The very modest dimensions of about 5 × 6 m as a maximum and the irregular building plan are reminiscent of Archaic houses like those at nearby Klazomenai.29

Small structures were also found in the second area chosen for geophysical prospection, via both magnetic survey and ground-penetrating radar. Fields SW07 and SW09–SW10 (Fig. 6) are situated to the south of Halil Ağa Tepesi, near field SW06, where we carried out our first intensive survey in 2010. Though we had been given access to SW06 in 2010, the owner denied access in 2013. This forced us to carry out the prospection on the fields to the west, where modern interference had to be expected. Consequently, the results from these fields were not very conclusive. There are a few structures, mainly in field SW10, which might belong to small houses, maybe of an earlier date, or which may reflect artisanal activities, but their orientation did not correspond to any of the other known orientations. The nearly rectangular structures in the southwestern part of the area remain enigmatic. They might represent archaeological phenomena like pits, but show a striking correspondence to lines interpreted as modern drains.

Regarding the results in the northeastern fields, the existence of an overall street grid with *insulae* stands out. The width of a house can be approximately 21 m, but only in one case could the position of a street be assumed, so the overall organization of the quarter remains unclear. The inner organization could resemble Late Classical and Early Hellenistic houses like those of Priene.30 The fact that evidence for the inner walls of the houses was found only in the far east and in the west is intriguing. We could not decide if this meant that only these inner walls survived, or if it reflects the fact that the interiors of only some of the houses had been constructed, while for others only the outer walls were erected. This strange evidence perhaps can be connected with the abandonment of Kolophon under Lysimachos.

During the 2014 survey, it was not possible to walk all the fields in this area, as we were not granted permission to work in the fields immediately connected to those in the northeastern area of the city. Therefore we explored the southwestern part of the territory immediately east of the Kabaklıdere River, to ascertain if the settlement area also continued here.31 These gently sloping terraces had been investigated by the Archaeological Museum of Izmir in the late 1990s, in two areas where residential buildings were found, parts of which are still visible today (Figs. 7, 8). Most probably the walls present two phases, the latter of which show large, finely worked

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Figure 5. Interpretation of GPR on the NO fields with likely archaeological structures (red). B. Grammer; PZP

Figure 6. Interpretation of GPR on the SW fields with likely archaeological structures (red). B. Grammer; PZP
ashlar blocks at the corners, which seem to be spolia from older structures. Fields SW31 and SW33 revealed evidence for an ancient division of the area, recognizable by sporadic ashlar blocks with clearly worked edges in obvious alignment. The locations of all these features were recorded, and their correlation with the walls identified by the geophysical survey of 2013 in the northeastern part of the city showed that they corresponded to the orientation of these structures. This provides evidence for an overall grid-system organization of the urban area from at least SW31 to NO10, in a north-northeast–south-southwest direction.

One of our crucial research aims was to determine whether the Archaic city extended as far as the northern part of the valley, where the modern

Figure 7. SW area surveyed in 2014. B. Grammer

32. The geodetic surveying was handled by Kamran Citak and his collaborator (Mira Harita, Selçuk, Turkey).
the urban organization of kolophon

village of Değirmendere is situated. We assumed that this area was part of the Archaic settlement in the plain because the favorable environmental situation of the village provides good water supply during the whole year and is oriented toward the fertile plain of Menderes. From 2011 forward, we documented stone and marble spolia as well as many fragments of ancient tiles built into the houses of the village. Older inhabitants confirmed that the building material was collected in the area of the village, where at least some of the houses were built before 1922. However, it could not be proven whether the area belonged to the ancient settlement; even our surveys of some empty spaces in the village did not reveal any diagnostic indications.

As a result of our investigations in the plain, we know now of at least two periods of settlement, but a more detailed chronological framework still needs to be established. The typological classification of the houses led to the assumption that the small houses are evidence for the Archaic period, while the grid system with the insulae can be connected with contexts of the Early Hellenistic period. The direction of the street grid coincides with the orientation of sector G of the fortifications, belonging to the Early Hellenistic period (Fig. 9). When we georeferenced the stoa building on the acropolis, we discovered that it also followed this direction, so that a contemporaneous date of the city walls, the stoa, and the buildings detected in the plain seems most probable.33 The construction of the stoa can be connected with the reorganization of the town at the end of the 4th century B.C.34

Preliminary analyses of the diagnostic pottery demonstrated that the majority of these finds belonged to the Archaic period, while examples of the late 4th/early 3rd century B.C. are rare. Widely dispersed classes and types belonging to the Hellenistic period, such as moldmade bowls or black-glazed echinus bowls, are totally absent, although they should have

Figure 8. Remnants of residential buildings in field SW49, excavated by the Museum of Izmir in the 1990s. Photo U. Muss

33. The georeferencing was done by Benno Zickgraf of PZP.
34. Holland 1944, p. 169.
been easily recognizable even if poorly preserved. Though it is too early to draw far-ranging conclusions, this might indicate that a large part of the plain both in the northeast and the southwest was densely inhabited in the Archaic period, while the reorganization of the settlement in the 4th and the early 3rd centuries B.C. seems to have come to an abrupt end.

THE NORTHERN NECROPOLEIS

As is the case for the settlement, our knowledge of the burial areas of Kolophon is scanty because all the material from the early excavations led by Goldman was lost shortly after the excavation. Only one grave was published by Bridges in 1974, an LH IIIB–C tholos tomb, which had been partially robbed in antiquity. In 2011 a preliminary study of the archival material documentation has been partially scanned and is available on the internet site of the American School (http://www.ascsa.edu.gr/index.php/archives/Excavation-Records#Kolophon).

35. For the frequent appearance of these types in the survey materials of nearby Metropolis, see Meriç 2014.
36. For the archaeological, academic, and geopolitical context of Goldman’s excavations in Kolophon, see Davis 2003. Olivier Mariaud, who authored this section, would like to warmly thank James Wright for having drawn his attention to this article during his stay at Bryn Mawr in 2004.
37. Bridges 1974. This documentation has been partially scanned and is available on the internet site of the American School (http://www.ascsa.edu.gr/index.php/archives/Excavation-Records#Kolophon).
concerning the Geometric tumuli was published. But the main body of the archives of the 1922 and 1925 campaigns remained useless without direct observations in the field. These records include the Northeast (“Geometric”) Necropolis, as well as the two others, the South (“Classical”) Necropolis, and the North Necropolis (Değirmendere Cemetery/Cemetery B,” i.e., the area of the Late Bronze Age tholos; see Fig. 1).

In 2010, some preliminary topographic identifications were made during the first survey season. In 2013 and 2014, these were confirmed, modified, and expanded with systematic comparisons between archival material, field observations, and GIS and LiDAR data. In addition to general funerary topography, we also collected and documented any funerary features that could help to clarify the chronology of the necropoleis, which was far from precise. Finally, we focused on the documentation of the most impressive features, two large burial mounds designated as Mounds I and II in the Blegen and Goldman archives. Sketches were drawn and photographs taken in order to compare them with the evidence in Blegen’s notebooks. In sum, our goals were to integrate the evidence from the American excavations in their actual geophysical context and, in general, to improve our knowledge of the burial places of Kolophon.

The North Cemetery (Cemetery B or Değirmendere Cemetery)

The North Cemetery, identified as the “tholos necropolis” and also named Cemetery B or Değirmendere Cemetery in the Blegen and Goldman notebooks, was first located in the area of field DNO01–04. However, a closer observation of the topography led to the conclusion that, even though a funerary use of this field cannot be excluded, it did not correspond to the places excavated in 1922 and 1925, where Goldman uncovered the tholos. According to the notebooks and most of all to some photographs unknown in the 2010 season, it seems clear that the place where the tholos and a dozen other graves were found was situated in a flat area, bordered by a large hill on its north-northeast side (Fig. 10:a). This area corresponds exactly to the small plain bordered at the south-southeast by the hills of Halil Ağa and of Kalabacık Tepesi, while its north-northeast side is defined by the Yaren Tepesi (Figs. 1, 10:b). Though the precise locations of the many trenches excavated by Goldman and Cox have been obliterated by time, we were able to clarify their topographical context.

Even though the total number of graves of the North Cemetery is not yet clear, because some of them surely date to the Late Bronze Age, the...
temporal context for the tholos must also date to that time period. The other graves however seem to be associated with a later context, probably Geometric, but they may also have a date as late as the 7th century B.C. The area is a vast alluvial plain, formerly crossed by the eponymous Değirmendere (literally “river of the mill”), which became channeled at some point in the modern era. Today, the location of the necropolis comprises a farm and its adjacent fields. The intense modern agricultural exploitation has heavily disturbed the archaeological evidence. During our survey, thick straw covered most of the area, while the narrow path coming

45. For instance, “Grave 1” of Cox’s notebook contained a “stirrup jar.”
46. This low dating of one of the graves (grave 12) is based on the presence of an arrow or javelin head in the grave goods (M. Gretschel, pers. comm.). Gretschel associates its shape with those of the Baitinger IA2 Group (Baitinger 2001, p. 9, pl. 1:8–14). It should be considered though, that the absolute dating of these small bronze items is based on a broad time frame, and any attempt at precision becomes hypothetical. Since all other objects in the funerary material have been lost, including the arrowhead itself, this dating cannot be confirmed. The only remaining evidence is a rough sketch plan of the arrowhead in Goldman’s notebook (1922, p. 73).
down from the Yaren Tepesi and the small dried riverbed separating TNO30 from TNO11 were used as dumping grounds.

Consequently, although undeniable evidence of ancient activities was recorded, no evidence remained to clearly signify the presence of ancient tombs. This should not be surprising. Already in 1974, Bridges noted that there were few signs of the graves in that area. Forty years later, only a few haphazard stones located on the foothills of the Yaren Tepesi, close to the abandoned house shown on Fig. 10b (TN31–TN32), can be associated with early material. One piece in particular (Fig. 11:a) shows stunning affinities with the cover slabs described by Holland and Cox (Fig. 11:b, c), which

47. Worth mentioning here are at least two metallic slag, which indicate the possibility of an undated metal workshop located in the area, at least one large ancient wall, many fragments of tiles, and coarse wares. These discoveries will be detailed in the final publication.

belonged to one of the early grave sites. In fact, these slabs covered most of the tombs excavated by the American team in the North Necropolis. This covering technique, together with the apsidal shape of the pit, recalls some of the Protogeometric graves of Lefkandi.49 Such individual pit graves covered with large slabs and containing only a few grave goods are quite common at this early period in the Aegean area, including in Ionia and Caria.

Besides the confirmation of the location of the excavation area in the field adjacent to the Yaren Tepesi, this inquiry demonstrates that very few elements could be associated with an ancient funerary use. Only the forthcoming publication of the data from the Goldman and Cox notebook, examined in their true topographic frame, will shed new light on the general funerary disposition of the North Cemetery, providing a long-awaited context for the tholos tomb.

The Northeast Necropolis (Geometric Necropolis or Valley Cemetery)

Before 2010, examination of the American notebooks alone did not provide any secure location for the Geometric tumuli graveyard, otherwise known only from scanty mentions in reports and books. The topographical indications were limited and the analysis of the 15 photographs concerning this necropolis remained insufficient without a basic knowledge of the terrain. This explains the tentative nature of the southern location proposed in the preliminary account of the Geometric graves presented in 2007 and published in 2011.50 Also in 2011, Muss and Gassner suggested a new location for the necropolis along the northeast margins of the city (TNO61), which was immediately convincing.51 Not only did a road sign bearing the name Kurudere echo a name frequently used in the notebooks but, as we shall see, the form and size of the main monument of this necropolis corresponded almost exactly to the largest of the excavated tumuli, namely Mound I. Analysis of the LiDAR imagery from 2013 and the field observations recorded in 2013 and 2014 confirmed this identification. This then enabled us to concentrate our efforts on the documentation of some graves (Mounds I and II). Unlike the North Cemetery, in the Kurudere cemetery the marking of the graves—large tumuli—were still visible in the landscape, despite their poor state of preservation.

Mound I

The first tumulus is a huge, irregular, but mainly conical structure that rests on the low slope of the eastern flank of the Yaren Tepesi. It is, therefore, lower on its south–southwest side than on its north–northeast side, and this profile has remained unchanged since it was first documented in the 1922 pictures (Fig. 12). But with a size of 6–7 m in height and 40 m in width, the actual tumulus is both lower and wider than it was a century ago, when it measured 9 m and 30 m, respectively. Aside from natural erosion, it seems clear that human disturbance—either scientific or illegal—has also contributed to a substantial subsidence of the structure. This heavy perturbation makes the convergence with Blegen’s description of 1922 even more difficult, if not

49. See Popham and Lemos 1996, pp. 60, 80, pls. 18, 28.
50. Mariaud 2011.
impossible. The mound is actually largely cut by seven main pits, above all a large central crater (9 × 9 × 4 m; see Figs. 13; 14:a, b;K); Figure 13 also depicts the southern berm, the conical accumulation of earth at the mound’s foot (the “cone of dejection”) resulting from erosion, and the bedrock reached by the illicit diggers. Besides this huge crater, six more holes of various sizes have disemboweled the tumulus (trenches 1–6; see Fig. 14:b). Most of them cannot be easily matched with those from Blegen’s excavations mentioned in his journal or visible on photographs because of our ignorance of the level of backfilling in 1922 and the intensity of illegal digging.52 The trenches of the inner tumulus do, however, allow some observations.

For instance, we note that the inner filling of the tumulus is composed of alternative and irregular layers of orange-yellowish to very light brown earth, at least in the upper and middle parts of the trench. At the bottom, orange earth dominates. We can also consider the presence of some

52. One exception could be trench 1 north of the tumulus, which might correspond, by its size and positioning, to the “North trench” excavated by Blegen’s team (see Fig. 12).
Figure 14. Northeast Necropolis: (a) ground plan of Mounds I and II; (b) sketch of Mound I, both superimposed on LiDAR visualization (Local Relief Model/Hillshade). Drawings O. Mariaud and B. Grammer.
smooth stones of average size (0.30 × 0.20 × 0.15 m; 0.20 × 0.15 × 0.10 m), horizontally set in the profile and which seem to follow the same orientation as the surface (Fig. 15). According to Blegen, this “highly colored red and yellow hard earth” was found around 0.80–1.00 m below the tumulus surface (in its 1922 state) and represents the remains of the mudbricks that should have constituted the main body of the mound. However, the irregular aspect in the stratigraphy of these layers, together with the presence of small stones, leads to the conclusion that this compact earth was not placed as mudbricks, but more likely represents a random distribution of a great quantity of earth, probably carried in individual baskets considering the small size of each colored area in the profile.

The survey of Mound I revealed very few pottery sherds of good quality, undecorated coarse ware, with red-orange or orange clay. These sherds were not diagnostic, but correspond to Blegen’s description. Along with the decorated fine wares he regularly mentions some coarse ware or undecorated fine-ware pots with this type of clay (red-orange, with no mica), generally at some distance from the graves themselves.

Finally, the presence in one of the berms, trench number 5 located right at the south-southeast of the central crater (berm B5-1), of a relatively high quantity of charcoal or carbonated residue should be noted (the largest pieces are 0.02 × 0.02 m). This residue appears as a layer in the middle of the stratigraphy along a slightly horizontal orientation more or less following the surface inclination, at a depth of approximately 0.60–0.70 m and for a distance of approximately 2.50–2.60 m. Again, this observation matches Blegen’s explanation that carbonated residues were noticed when approaching the pyres of the primary cremations and were obviously linked to them, although the residue we saw is not the remains of the pyre itself.
Mound II

Less impressive than Mound I, Mound II was recorded at a location of 100 m north of the former.\textsuperscript{55} A regular heap of ca. 20–22 m diameter was first detected in the area by the LiDAR imaging and was then found on the ground (Fig. 14:a). Far less damaged than the first mound, the structure is also considerably lower. Its real height is difficult to estimate because of the field declivity, which in a few dozen meters goes from a steep foothill to the flat riverbed of the Kurudere. Set in the lowest lying area, we can postulate a height of 1–2 m, which is the same height recorded by the American excavators.\textsuperscript{56} One cannot help but notice the huge discrepancy in the height of the two tumuli, which is unlikely to be due to natural erosion or anthropic factors. Other probable tumuli, very close in size and form with Mound II, are visible in the vicinity, which makes the impressive dimension of Mound I even more intriguing. There is no doubt that Mound I, which is unique to this day in Kolophon and elsewhere in Ionia, must have been a remarkable landmark in the necropolis, and therefore the area that provides access to Kolophon from the northeast.

No material of any sort was found on or around Mound II. Among the few surface features (numbered F1–9), some can be associated in one way or another with observations in the American notebooks. For instance, hidden under dense bushes, a large pile of stones of the “river boulder” type\textsuperscript{57} can be related to those of the grave E enclosure. They could have been gathered at a short distance from the grave.\textsuperscript{58} But it is mainly four large green schist stones (F9)\textsuperscript{59} that attract our attention for their resemblance to some cover stones of one grave (grave A) associated with the mound (Fig. 16). Unlike Mound I, Mound II displays enough affinities with the notebook descriptions that we may cautiously superimpose our surface plan on the sketch plan from the 1922 excavations in order to provide a tentative reconstitution of the grave structure rigorously documented by our predecessors.

Despite our strides with Mound II, we still face many challenges. It is our hope that the location and the general topography of the two main funerary areas in the northern outskirts of the city (excavated by Goldman and her team) can be considered secure. Our documentation of Mounds I and II will allow a full publication of the data from 1922 and 1925, which will, at last, secure the place of Kolophon in the burial customs of early Ionia between the Late Bronze Age and the Early Archaic period. This will in turn lay the foundation for future excavations in the area.

THE SOUTHERN AND SOUTHWESTERN NECROPOLEIS

Many of the features of the Southern and Southwestern cemeteries were elucidated with the help of the LiDAR survey. This survey was conducted through a high-resolution digital elevation model (DEM) generated by means of an airborne laser scan.\textsuperscript{60} The aim of the survey was to document all of the monuments visible on the surface in the hills surrounding the city, including the previously known burial ground of the South Necropolis (Figs. 1, 17). The airborne laser scan produces a highly detailed DEM

\textsuperscript{55} Blegen 1922, pp. 148–149.
\textsuperscript{56} Blegen 1922, p. 183.
\textsuperscript{57} Dimensions of stones: 0.10 × 0.15 m; 0.30 × 0.25 m; 0.50 × 0.25 m.
\textsuperscript{58} See also Mariaud 2011, figs. 3, 5.
\textsuperscript{59} Stone dimensions of F9 are the following: F9-1: 0.80 × 0.30 × 0.25 m; F9-2: 0.75 × 0.50 × 0.20 m; F9-3: 0.60 × 0.50 × 0.20 m; F9-4: 0.65 × 0.40 × 0.20 m.
\textsuperscript{60} The interpretation of the LiDAR data was carried out by Benedikt Grammer. In the field, the survey was primarily conducted by Grammer and geoarchaeologist Erich Draganits, with Martin Gretschler, Olivier Mariaud, and Seval Ekintan supporting the survey efforts on several occasions. All participants contributed greatly to the successful interpretation of the data and provided pleasant company during the entire field trip. Erich Draganits and Michael Doneus offered valuable advice concerning the methodological and technical aspects of the ALS interpretation and the ground check. Grammer thanks all the aforementioned for their assistance.
Vegetation can be virtually removed from the resulting DEM, making it a very practical and efficient method for discerning surface structures even in a densely wooded and overgrown area. As such it was an appropriate method for surveying the hills around Kolophon, where intensive fieldwalking is impractical due to the inaccessibility and scale of the terrain. The DEM was interpreted after various filters had been applied to the data, and possible archaeological features were marked for a ground check. In 2014, during a two-week survey, a team of two to three people, using the LiDAR interpretation for orientation, documented about 150 archaeological features, among them 95 burial mounds, 10 grave terraces, 18 graves, and 17 walls or structures of unclear function (Fig. 17). The majority of features are located within

Figure 16. (a) Northeast Necropolis, Mound II, slabs of schist; (b) grave A, Mound II, before opening. (a) Photo O. Mariaud; (b) photo courtesy American School of Classical Studies at Athens, Archives, ExcRec, Kolophon Archive, photo C191

61. For the method in general, see Doneus et al. 2008; Bofinger and Hesse 2011.

62. The methodology of the LiDAR interpretation will be published in more detail in a later article.
Figure 17. South Necropolis, LiDAR shading, and archaeological features. B. Grammer
the South and Southwest Necropoleis on the hills of the Kale Tepe and Taşyalak Tepe of the Sivri Dağ mountain range. The analysis of the documentation and the find material is still in process, but a preliminary overview of the results can be offered here.

**South Necropolis: Kale Tepe**

The campaign’s survey work focused on the previously known South Necropolis located on the Kale Tepe south of Kolophon. During previous extensive surveys of the area, around 30 burial mounds had been mapped, and two mounds that had been excavated by the Museum of Izmir in 1999 were later documented in an architectural survey in 2013. The results of the LiDAR interpretation showed that the extent of the burial ground had been underestimated and a complete survey of the area was deemed necessary.

An easy-to-follow pathway leads from the southern plain of the city to this area, where the Museum of Izmir excavated several domestic buildings. As mentioned above, the Austrian team conducted a fieldwalking campaign in 2014 that went to the highest point of the city wall on the Kale Tepe, where a large structure is situated (TSW05-1). Curiously, the structure was not marked or mentioned during the first exploration of the city by Schuchhardt and Wolters at the end of the 19th century, even though they most likely visited this part of the city wall, as they marked a nearby grave. Closer examination showed TSW05-1 to consist mostly of a large heap of smaller rubble stones with a large pit in the middle, probably the result of illegal digging. The connection to the city wall could not be determined due to the badly preserved state of the structure and the thick vegetation. It remains unclear if the structure was a tower associated with the city wall that had been completely covered by refuse, or if it was possibly a burial mound that was incorporated into the defensive structure at a later point. From the location of this structure onward the pathway continues upslope on the eastern side of the Kale Tepe; beyond the intersection of a modern access road, the first burials of the South Necropolis become visible. The South Necropolis can be divided into three separate areas: a northwestern and southeastern part, as well as the ridge of the Kale Tepe.

**South Necropolis: Northwestern Part**

The ridge of the Kale Tepe is characterized by a protruding stone ledge. An abrupt rise in slope separates the lower northwestern part of the burial ground from the higher Kale Tepe Ridge. The topographically prominent point after the steep rise of the hill is marked by TSW10-61 (see below). The northern area is located on both the eastern and western slopes of the Kale Tepe (Fig. 17). It is possible to move from one side of the hill to the other at certain points on the northern part of the hill. On the western slope no clear pathway is visible, but the terrain forms a relatively flat, natural terrace, which facilitates movement. The grave monuments consist of 13 burial mounds, six grave terraces, and 10 simple graves on both the western and eastern slopes of the Kale Tepe. The burial mounds are composed of earth and smaller rubble stones, with sizes ranging between 3 m and 9 m in diameter. The height was difficult to determine due to erosion, later
disturbances by looters, and the general slope of the hill, but usually it did not exceed about 1 m.

The graves are built as rectangular terraces that were either freestanding or set against the slope of the hill, forming small grave districts of up to 6 m along one side. Simple grave markings consist of setting of smaller stones on top of a simple pit dug into the earth. The find of roof tiles next to illicit dig sites suggests that tiles might have been used for marking, covering, or defining the grave. It appears likely that additional graves with only a simple marking of stones are located in the area, but were not visible due to a thick layer of pine needles covering the entire ground and an overgrowth of bushes. All graves had visible signs of disturbance by thieves. The illicit excavations provided an unobstructed view of the mostly destroyed graves, which apparently were either simple pits reinforced or covered with stones, or partially cut into the rock and partially built of small stones. Sometimes large stone slabs were found in the vicinity, and one was still lying on top of a looted grave and partially covered it. In other cases no traces of constructed graves could be found. The size of the illegal trenches suggests that they contained inhumation burials, but since no traces of the burials could be found, the existence of cremation burials cannot be excluded.

It seems very likely that the American excavations on “Cemetery Hill” in 1922 took place in this part of the South Necropolis. In Goldman’s notebook the location of Cemetery Hill is described as being to the east of the acropolis ridge and to the west of a tower in the city wall. The comparison of a photograph taken in 1922 showing Cemetery Hill and a contemporary photograph of Kale Tepe taken from the Metroon on the acropolis displays a close resemblance. A notation in the excavation notebooks, that a grave exists on a higher ridge to the east, indicates that the American excavations probably started at the lower western slope of Kale Tepe and then gradually moved upslope. Later during the excavation Goldman mentions a grave “overlooking Tratscha” (modern Çamönü), suggesting that at some point graves on the top ridge or eastern slope of the hill were excavated. The type of tombs described by the Americans include burial mounds of about 5 m in diameter, consisting of stone walls filled with rubble, and simple inhumation graves covered by stones. The pits were either lined with stones or cut into the bedrock and supported with smaller stones, where necessary. Both types were covered with stone slabs. Small finds in the graves included black-glaze pottery and an Early Hellenistic or Classical coin; these finds led to the designation of the necropolis as the “4th-century necropolis.”

Although the sketches of the excavation could not be matched directly to any of the tombs found during the survey, the description fits the general types of tombs that were documented very well. Due to the lack of other datable evidence, these small finds from the American excavations remain our only lead to the proposed Classical or Early Hellenistic chronology of the burial ground. With the exception of roof-tile fragments found next to the illegal pits exposing the graves on the northern part of the area, no new finds were discovered in this area.

South Necropolis: Southeastern Part

The path which leads into the burial ground from the city continues along the slope of the Kale Tepe, but for a distance of about 180 m no graves were discernible either in the LiDAR or during the ground check until the path crosses the riverbed of the Kurudere (see Fig. 17, above). East of this riverbed a portion of the gently ascending hill is densely clustered with burial mounds. This area is encircled by the path, which continues eastward for 100 m but then turns south and finally west toward the ridge of the Kale Tepe, thus circumscribing the burial ground. Two tombs were found in a rather isolated position: a single burial mound was located to the west of the riverbed and 60 m south of the path, while tomb TSW10-65 (see p. 69, Fig. 19, below) was found at the northernmost edge of this part of the burial ground. The remaining 32 burial mounds, a single grave terrace, and one rock-cut grave are all found either directly adjacent to the path or at a distance of only a few meters from it.

Judging from the way the path encircles the burial ground, the close connection to the burial mounds and the clear visibility of the path in the LiDAR data, it seems very likely that the path has been used since antiquity. Whether the same holds true for the northern part of the path within the urban area is uncertain, due to modern reinforcement with rubble from its origin in the plains up to the point where it reaches the city wall. It would, however, seem likely that the same path has connected the domestic quarters of the city in the plains to this burial ground since antiquity. If the burial ground was still in use after the construction of the city wall in Early Hellenistic times, a gateway of sufficient dimensions to accommodate funerary processions would have to be expected at the point where the path reaches the city wall, but no evidence for such a construction was found. This might be due to the badly preserved state of the wall and the large structure TSW05-1 located here, but could also indicate that the South Necropolis was no longer in use after the construction of the fortifications.

The tombs found in the southeastern part of the South Necropolis were almost exclusively burial mounds with diameters between 6 and 10 m, but occasionally reaching up to 15 m. Similarly, their heights often exceeded those of the mounds of the northern part of the South Necropolis, where the largest mounds reach only a height of up to 4 m. Sometimes the tombs were grouped together in clusters of two or three, but are otherwise relatively evenly spread over the area of the southeastern part of the burial ground. The two burial mounds excavated by the Museum of Izmir (TSW10-6 and TSW10-7) and documented in detail in 2013 (Fig. 18) can be found in the southeastern part.

These two excavations offer a closer look at the way mounds were constructed. The foundation of TSW10-7 consisted on a carefully built krepis (a load-bearing wall, as opposed to a simple circle of stones), while TSW10-6 was constructed of stacked-up irregular or roughly broken stones of various sizes. Both had a filling of mostly smaller stones and reddish earth. Within TSW10-7, three graves were visible, and they exhibited the most common type of construction: they were partially cut into the rock
Figure 18. South Necropolis:
(a) Burial mounds TSW10-6 and TSW10-7, ground plans;
(b) burial mound TSW10-7;
(c) burial mound TSW10-6.
(a) Drawing J. Scheifinger, S. Wanek, and B. Grammer; (b, c) photos B. Grammer
and partially built of small stones. All were probably originally covered by stone slabs, as one such slab was still found lying on top of a grave. There were also several other slabs in the immediate vicinity. No sign of a grave could be found within mound TSW10-6. The construction of other mounds in the burial ground was not as readily discernable. Though these other mounds were covered by small, eroded stones, it was not clear whether they were laid down as the top layer of the fill, or discarded by looters. As far as we could tell, the other burial mounds in the area mirrored the construction of these two, although it appears the regularity of the mantle walls of TSW10-7 is rather exceptional.

A peculiar variation of tomb construction was present in the grave already mentioned above (TSW10-65), which apparently took advantage of a natural cave several meters in depth (Fig. 19). A series of regular, small steps were cut into the rock around the opening of the cave, perhaps serving the purpose of either holding a platform, a cover for a grave, or both. Erosion and illicit digging have heavily damaged the area surrounding the grave, but several larger, regular blocks found to the north suggest the existence of a krepis forming a half-circle or circle around the cave, which may have been covered with earth forming a burial mound of ca. 10 m in diameter.

During the 2014 survey no pottery fragments of any kind were found anywhere in the area other than a number of small modern pots probably connected to the extraction of tree resin. In 2013 during a thorough examination of refuse from the 1999 excavation a rim of a krater emerged. While it can probably be dated to the 5th/4th century B.C., it cannot be connected with certainty to any particular grave or activity and is of limited use for dating the structure. At the moment, given this very scarce dating evidence, this part of the South Necropolis can only be tentatively associated with the Classical period.

68. In Ionia the use of natural caves for burials is otherwise only rarely documented, but examples are known from Melie (Kleiner, Hommel, and Müller-Wiener 1967, p. 161) and Samos (Tölle-Kastenbein 1976, pp. 102–103).
Southern Territory: Kale Tepe Ridge

Following the path to the west one reaches the ridge of the Kale Tepe (Fig. 17). The ridge is defined to the west and east by two small structures built of rubble for a length of about 1 km, forming a 15–25 m wide plateau. The structures bordering the plateau show up clearly in the LiDAR data, but were found to be harder to trace on the ground due to a thick cover of pine needles and heavy erosion. These small walls do not measure more than about 0.5 m in height and consist of loosely stacked, mostly small stones. They do not seem to have served any practical function as a fortification or fence, but merely marked the path along the ridge. Due to time constraints and the length of the structures it was not possible to clean and document them in their entirety. Likewise the stratigraphic connection to other monuments situated on top of the ridge was not determined.

Starting at the northernmost point of the ridge, we located six large burial mounds. The location at this outpost, with the terrain falling off steeply to all sides other than the southern one, gave the large burial mound TSW10–61, ca. 15 m in diameter, a particularly prominent and elevated position (Fig. 20). The mound was mostly destroyed by looters, the refuse of which covers the structure and surrounding area. On the northern side, parts of a wall were visible, perhaps forming the *krepis* of the mound. Other walls on the southwestern and southeastern sides might have been part of a confinement wall or small grave district which adjoined the mound. The addition of later graves to existing burial mounds by adjoining a *krepis* is a configuration known from Samos and Larisa, but an intensive cleaning of this structure would be necessary to determine the stratigraphic relationship between the walls and the mound. The mound itself was composed of irregular rubble, which have been dispersed by looters over the entire area. The large number of stones suggests that the mound once was considerably higher than the ca. 1.5 m it measures in its current state.

About 30 m to the south of TSW10–61 another group of three large burial mounds was found. Each of the mounds is situated on top of the

Figure 20. South Necropolis, burial mound TSW10–61, Photo B. Grammer

69. A similar demarcation of a hill’s ridge with rubble walls was discovered in the LiDAR data on the ridge of the Taşyalak Tepe to the west, but this was even harder to trace on the ground, so documentation was postponed due to time constraints.
The urban organization of Kolophon

Two more mounds of similar proportions and building technique can be found another 250 m to the south. They are grouped closely together and occupy almost the entire width of the ridge. A singular, badly preserved wall of rubble could be seen protruding from the eastern burial mound, but a direct connection to the mound could not be determined (we speculate that it might be part of a *dromos*). The only finds at the mounds were large roof tiles lying on top of the refuse left by looters, which probably served as the original grave coverings.

Following the ridge and the accompanying structures a very large cave eventually presents itself (Fig. 21). It is at least 8 m deep, but could be considerably deeper, as the entire depth of the cave is not discernible from above. Wall-like structures similar to those mentioned above and
accompanying a ca. 20 m wide path were also found to the northwest of this cave, but they do not seem to lead to any particular point of interest or archaeological feature. The arrangement of these marked pathways meeting at this point and delineating an open square of about 2,000 m² suggests that the cave served some sort of function, perhaps as a grave similar to TSW10–65, or possibly a sanctuary. However, no artifacts of any kind could be found in the immediate area, so any interpretation is purely hypothetical. An examination of the cave itself was not possible during our survey due to the lack of climbing tools.

About 60 m further to the southwest and situated at the highest point of the crest, another small plateau is isolated from the ridge of the Kale Tepe. On the southern end of this plateau and protecting it from the steep slope to the south, the remains of a large, ca. 15 m long wall were found (TSW10–52; Fig. 22). It was carefully constructed out of mostly small stones and is badly preserved, but reaches a height of up to 1.5 m. Where the wall has collapsed, its refuse covers the section that is still standing and makes it hard to determine the actual width, but it probably exceeded 1 m. While a very large amount of rubble can be found in the vicinity on the slopes of the hill, the material visible is not sufficient to reconstruct any large stone structures. No stones showed any signs of decoration or workmanship, but it seems possible that the large wall served as a foundation for a mudbrick structure that was covered with roof tiles, large fragments of which can be found in great number on the plateau.

Due to the good visibility of the surrounding area and the large size of the wall, the structure possibly served as some sort of fortification or watchtower. An interpretation of the structure as a possible sanctuary connected with the cave to the north also needs to be considered. While not clearly visible on the ground, the LiDAR data shows that the stones which define the Kale Tepe ridge extend up to the end of the plateau, indicating a connection between the marked pathway and structure TSW10–52 (Figs. 17, 23). The only finds were fragments of roof tiles and a single piece of lead, possibly carrying the inscription of a letter (Δ) on one side.

71. A cave connected with a sanctuary is known in Ephesos and has been associated, albeit not conclusively, with the cult of Apollo (Karwiese 1995, pp. 215–219), Demeter (Soykal-Alanyalı 2005), and Athena (Scherrer 2000, p. 66). An association with caves was also proposed for the Pan-Ionian cult of Poseidon Helikonios in his function as an “earth-shaker” (Herda 2013, p. 427, n. 22). Another goddess closely connected to rocks of various kinds is Kybele/Meter, whose sanctuaries are usually attested in the form of rock-cut altars or niches; in general, see Naumann 1983; Graf 1985; Roller 1999. Caves in particular served as sanctuaries in nearby Metropolis (Meriç 1982, pp. 38–40), Pergamon (Nohlen and Radt 1978), and Aizanoi (Naumann 1967). A general connection of the cult with both isolated mountain sanctuaries and caves has been noted before, based on both the location of the sanctuaries and numerous epitheta (Körte 1898, p. 94; Lambrechts 1970, p. 138; Nohlen and Radt 1978, p. 70). In Kolophon it is yet uncertain if the Metroon on the acropolis had a predecessor before the 4th century B.C.; a publication of the findings of the American excavations in 1922 and 1925 is in preparation by Martin Gretsch. The sanctuary on the acropolis is unusual in the way it was embedded into one of the political and religious centers of the city, which is likewise only found in Athens. Additional and sometimes earlier sanctuaries of Meter would therefore not be surprising and the topographic situation of the cave in the hills would be a highly suitable venue for such a cult. However, besides the lack of finds at the cave, this seems so far to be contradicted by the absence of rock-cut altars, thrones, or niches, which are usually intrinsic for the cult of Meter and which can be found near the Metroon on the acropolis (Özgan et al. 2013). A closer examination of the cave with suitable equipment would be needed for a verification of this hypothesis.
Figure 22. Kale Tepe plateau, with the rubble wall TSW10-52. Photo E. Draganits

Figure 23. Kale Tepe ridge, with wall TSW10-52, looking north from the plateau. Photo E. Draganits
Southwest Necropolis

Another previously unknown burial ground was explored on the eastern slope of the continuation of the acropolis ridge (Fig. 17). Despite their relatively close proximity, this burial ground was apparently unconnected to the South Necropolis. Instead, it is most easily reached from the ridge of the acropolis by means of an access road. No pathways between this burial ground and the South Necropolis could be found, while the pathways leading up to the burial grounds from the city and within the necropolis areas themselves were clearly visible within the LiDAR data. It is possible that an earlier connection between the two burial areas was destroyed with the construction of the modern access road. Since no traces of pathways can be seen at all in the LiDAR it appears more likely that the Southwestern Necropolis was accessed only from the direction of the acropolis.

Within the Southwest Necropolis the predominant structures that were found and confirmed were 21 burial mounds, 3 graves marked by simple stone settings, and a single terrace. The mounds in the burial ground differed substantially from those within the South Necropolis; they were primarily heaps of earth of up to 8 m in diameter, mostly set against the sloping hill in the form of a half-circle. These mounds were partially covered and reinforced by rubble. Sometimes the setting of stones on the downslope part of the mound resembled a crudely built krepis wall, but in general the use of stones was limited. All burial mounds were looted, and sometimes the illegal digging in this area took the form of regular, large, and deep trenches, with dimensions up to $3.5 \times 3.5 \times 2$ m, indicating the removal of very large objects by looters. Clay or stone sarcophagi are known to be used frequently in combination with burial mounds in ancient Ionia and could be expected in Kolophon as well.72 Given that not all sarcophagi were decorated and therefore most valuable as complete objects, illicit excavations should have produced some remains of destroyed or broken sarcophagi. No such fragments of any kind were found in the vicinity of any of the graves, even in trenches with evidence of recent looting.

Unique within the burial ground was a single terrace (TSW13-1) measuring $8 \times 8$ m (Fig. 24). It is framed by badly preserved built walls, which included several large stone blocks of up to 1.2 m in length. Several heaps of smaller rubble stones and a larger stone lying on the terrace possibly marked the presence of graves.

Other Archaeological Features in the Territory of Kolophon

In addition to the features documented within the burial grounds, several other monuments were discovered along the Kale Tepe and Taşyalak Tepe ridges in the south and in the hills surrounding the city to the north (Yaren Tepe) and northeast (Ambarkaya Tepe). Most of these can probably be interpreted as isolated funerary monuments, in particular burial mounds and grave terraces. While very few artifacts were discovered in the burial grounds in the immediate vicinity of the city, the structures in the outlying

72. Philipp 1981, pp. 155–157; Mariaud 2007, pp. 58–66. Grammer would like to thank one of the anonymous reviewers of this article for highlighting this issue.
Southern Territory Burial Ground

Of particular interest was an isolated group of two small burial mounds and at least two simple grave markings made of rubble, found even further south of the South Necropolis on the Kale Tepe. This limited cluster of burials is located about 1.7 km south of the city wall, but no clear pathways connect it to either the South or Southwest Necropolis. As usual, the graves were looted and fragments of roof tiles were found in the remaining refuse. A small plateau to the east of these graves (TSW11-1) was encircled with a low, heavily eroded wall of rubble stones measuring only 0.5 m high. No building structures could be found on the thickly overgrown plateau, but the dimensions of the area defined by the encirclement, 50 × 25 m, suggest that the entire plateau served some sort of function in antiquity. To the west of the small burial ground we discovered another plateau, on which traces of low rubble walls could be found (TSW11-6). Looters heavily disturbed the entire area. The location of these graves and structures at a considerable distance from the city and its official burial grounds, in a rather inaccessible part of the hills, could be an indication of settlement activity within the southern territory of Kolophon.
DATING AND REGIONAL CONTEXT OF THE BURIAL MOUNDS IN KOLOPHON

A prevalent feature of the Kolophon necropoleis is the similarity of the burial mounds to those appearing in other Ionian and Greek cities on the western coast of Asia Minor. Geometric burial mounds are so far only known from Kolophon’s Northeast Necropolis. An early, distinct burial mound tradition can also be found in Caria from the Protogeometric period onward, but a regular use of burial mounds in the western Anatolian region starts in the Archaic period. In almost all Ionian cities isolated burial mounds have been found, but currently burial grounds with larger clusters of mounds are known only in Kolophon, Klazomenai, and Smyrna.

The occurrence of these burial mounds in northern Ionia has often been associated with a Lydian or Anatolian “influence” in Ionia, but the Geometric mounds in Kolophon clearly predate the Lydian examples, and find close parallels in contemporary burial mounds in Athens, Halos, and Naxos. Only a very few tombs in Ionian cities, like the Tomb of Tantalos in Smyrna, show a definite typological resemblance to the Lydian tombs with the use of a dromos, a grave chamber, and “phalloi” as a crest. Close parallels to the mounds from the South Necropolis of Kolophon are those found in particular in Old Smyrna (Fig. 25), Klazomenai, and Larisa. There are at least 16 examples known from Klazomenai, 35 from Old Smyrna, and a large, but unknown number from Larisa. The majority can be dated to the Archaic period, more specifically the 6th century B.C., but their use continues until at least Hellenistic times. No extensive documentation of these mounds exists, but a clear resemblance to the Kolophonian mounds can be seen in their size, construction, the existence of a krepis, their location on sloping hills adjacent to the settlement, and the use of rock-cut and cist graves for the inhumation burials. In Larisa the occurrence of tiles in the construction of graves has also been noted, just as we have seen at some of the burial mounds in Kolophon. In light of the regional trends and the typological similarities, it seems probable that some of the many burial mounds in Kolophon date to the Archaic period. A dating based purely on typology is severely limited, however, in particular with such long-lived and relatively simple grave forms.

Figure 25. Burial mounds of Kolophon and Old Smyrna. B. Grammer, after Miltner and Miltner 1932, p. 159, fig. 88

75. Mariaud 2011.
76. Miltner and Miltner 1932. On the question of Lydian/Anatolian and Greek burial mound traditions and the meaning of burial mounds in a regional context, see the forthcoming publication of a conference talk given by Benedikt Grammer.
77. Old-Smyrna: Miltner and Miltner 1932, pp. 158–162; Akurgal 1950, pp. 79–82; 1983, pp. 58–59. Klazomenai: Hürmuzlü 2004, p. 78; Aydin 2006, p. 99. Larisa: Meyer-Plath 1940. The exact number of burial mounds in Larisa is not reported. The total number of graves discovered is around 100, several of which appear to be relatively low burial mounds marked by either circular or rectangular stone settings or low walls.
CONCLUSIONS

After many years, new archaeological research in the Ionian city of Kolophon in western Asia Minor was resumed in 2010. In a series of field campaigns the city and surrounding areas were explored through extensive surveys, geophysics, and LiDAR data. Our recent investigations made it possible to contextualize the results of the original American excavations, to gain new information on the extent of the city and its necropoleis, and to establish a model of the settlement’s development.

Concentrating on the area of the city situated in the plain, geophysical survey revealed the existence of a regular street grid as well as the inner structure of single houses. Their inner organization resembles that of Late Classical and Early Hellenistic domestic architecture, while the orientation of both streets and houses closely matches that of the stoa on the acropolis and section “G” of the city walls in the plain. The geophysical data now supports the previously known epigraphical evidence for an overall reorganization of the city in the Early Hellenistic period.78 A pottery survey demonstrated that the majority of finds dated to the 6th and 5th centuries B.C. Examples from the 4th and early 3rd century B.C. were rare, and no ceramics were found from the later Hellenistic or Roman periods. The reorganization of the city at the end of the 4th century B.C. appears to have ended abruptly only a few years after it had begun. This evidence seems to correlate with the literary account of Lysimachos’s deportation of the inhabitants of Kolophon, which would have terminated major settlement activity in Kolophon.

In some of the areas examined in the northeastern sector the GPR readings also indicated structures of approximately 5 × 6 m with various orientations. We suggest interpreting these structures as the remains of Archaic houses.

By integrating data from our geophysical and pottery surveys, we can suggest a considerable residential settlement of the area at the foot of the acropolis hill during the Archaic and perhaps even the Classical periods, with a second, but short-lived floruit of this region of the city in the Early Hellenistic period.

During the American excavations in 1922 and 1925 two necropolis areas to the north of Kolophon were explored, but were barely mentioned in Holland’s 1944 report. Combining archival data from the excavations and a careful observation of the territory we were able to determine the locations of these burial grounds. Remains of the North Necropolis (“Cemetery B” in the American field notebooks) were almost completely absent, but a close analysis of the excavation notebooks seems to indicate that this burial ground was used mainly during the Late Bronze Age79 and perhaps until the Geometric period, if the vague evidence for a Geometric period occupation is accepted. In the Northeast Necropolis (called the “Valley Cemetery” in 1922), two of the large tumuli (called Mounds I and II) excavated by the Americans could be retraced, but were found to be heavily disturbed. Both tumuli were carefully documented and these notations were subsequently integrated with the original American descriptions, thus assuring that these monuments will play a role in any future interpretation of the funerary rites and topography of Kolophon.

78. Meritt 1935.
79. It contained the so-called tholos tomb of Kolophon; see Bridges 1974.
The survey based on the LiDAR scan greatly facilitated the discovery of surface monuments in the urban area, particularly the burial grounds to the south of Kolophon. The vast majority of features documented were burial mounds and a smaller number of grave terraces. The rest most likely related to funerary activities, though their true functions remain unclear. Evidence for dating the tombs was meager, with a single diagnostic pottery find within the South Necropolis pointing to the Classical period. Further evidence for a Classical or Early Hellenistic date comes from finds discovered during the American excavations, most likely from the northern part of the South Necropolis. The Classical date for some of the tombs therefore seems very probable, but it is still unclear whether the burial grounds remained in use during the Classical period. Due to the very high number of mounds, typological comparisons, and the vast extent of the South and Southwest Necropoleis, it is possible that both also contained burial mounds from the Archaic period. This would then suggest that burial mounds had been part of the funerary tradition in practice since the Geometric period, and might have been used continuously, in different forms, through each stage of occupancy in Kolophon. Nevertheless, we do not have any direct material evidence to support this assumption, so any conclusions about chronology must remain preliminary.

If the South and Southwest Necropoleis do not contain any Archaic tombs, the presence of another undiscovered burial ground needs to be considered. Possible locations include the fields west and east of the city occupied by the modern villages of Değirmendere and Çamönü. Unfortunately, our consecutive survey efforts yielded no additional evidence, due to the modern agricultural and building activity in both areas. During the American excavations of Cemetery B in the plains to the northwest of Kolophon, at least one grave that can possibly be dated to the Archaic period was found, but the general occupation of the burial ground was sparse and some of the other tombs in the area can be dated to the Late Bronze Age. Some of the isolated burial mounds mentioned before on Yaren Tepe and Ambarkaya Tepe could also be part of larger burial grounds with less overtly visible grave markers on the surface, which are hard to discern during fieldwalking. The hills of the Ambarkaya Tepe east of the city in particular show a high number of clearly visible pathways, as well as possible burial mounds and evidence of illegal digging in the LiDAR interpretation. The existence of another densely arranged burial ground in this area thus seems likely.

81. Grammer, forthcoming. A more detailed publication of these graves is being undertaken by Olivier Mariaud and Martin Gretschel within the scope of the Kolophon project. See also the contribution of Mariaud, pp. 54–62, above.
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