

Some Interesting Underground Cities and Peculiar Underground Structures of Kayseri (Turkey)

ALI YAMAÇ

OBRUK Cave Research Group, ayamac@gmail.com

Abstract

Cappadocia, like many other parts of the world, is loaded with underground defense structures. The volcanic tuff, characteristic of the region, is easy to carve through and covers hundreds of square kilometers, thus providing favorable conditions for numerous underground defense structures. Consequently, almost every village in Cappadocia boasts at least one or more rock-cut structures. Although some are small and stand-alone structures, others constitute large and elaborate underground cities, including hundreds of meters-long tunnels and countless rooms. For more than seven years now, the OBRUK Cave Research Group has carried out the Underground Structures Inventory Project in Kayseri province. To date, 33 underground cities have been systematically explored and surveyed. This article begins with an introductory overview of the historical background and research of underground cities in Cappadocia and continues with an account of some of the most telling examples of these structures.

Keywords: underground shelter; cliff settlement; cave dwelling; Cappadocia



Introduction

People have been using the underground for thousands of years for hiding and protection. Besides their well-camouflaged entrances, these shelters have numerous rooms connected by intricate tunnels. They are furnished with traps and equipped with doors that cannot be opened from the outside, rendering these subterranean structures excellent defense centers against all types of attacks. Therefore, throughout the world, from Vietnam to France, one finds countless underground defense systems that are relevant today as they were thousands of years ago (Triolet and Triolet 1996; 2013).

Nevertheless, Cappadocia is the first place that comes to mind concerning underground defense structures, mainly due to the sheer number and size of sites it harbors. They are so large and elaborate that they have been dubbed *underground cities*. Derinkuyu Underground City in Nevşehir illustrates this well: It has five levels, and it is 1,880 m long and 55 m deep (Yamaç and Tok 2015b). It is predicted that this defense structure extends beneath the entire Derinkuyu Village, and its total length is much greater than currently known. Similarly, the part of Kaymaklı Underground City, located 11 kilometers north of Derinkuyu, which can be visited today, is but a fraction of its total length (Bixio 2012: 85–98).

Small or large, almost every village in Cappadocia has at least one, often several, underground cities. However, scientific research on these structures is still lacking. Presently, two comprehensive inventories have been compiled: *Cappadocia: Records of the Underground Sites* (Bixio 2012) and *The Archeological Settlements of Turkey* (www.tayproject.org) (Akyürek et al. 2015). While these inventories encompass more than 120 underground cities, systematic surveys and plans are available only for a handful.

Since there is so little research on the subject, controversy inevitably abounds. Even the term *underground city* is a matter of contention in the international academic community. How appropriate is it to apply the same designation to a case like Derinkuyu, which had begun as small, separate defense structures under dwellings and evolved into an extensive, interconnected, and elaborate underground system and to comparatively modest defense structures with a few rooms and very short tunnels?

Nevertheless, to date, the term *underground city* has been applied to all sorts of underground defense structures (Ayhan 2004; Gülyaz and Yenipinar 2007; Ousterhout 2017; Triolet and Triolet 1993; Yörükoğlu 1989). On the other hand, in his book, Roberto Bixio defends a distinction between two different groups, reserving the notion of *underground city* for large interconnected systems while designating comparatively small and isolated structures as *underground shelters* (Bixio 2012:18–19).

Although this distinction has its merits, it fails to capture significant lines of variability. In more than thirty underground complexes we have researched and surveyed so far, we noted, for example, that some are notable for their great horizontal breadth while others have a distinctive vertical emphasis. Furthermore, one can encounter enormous systems with a single entrance but also comparatively small systems connected to several separate houses on the surface. Therefore, we believe the conditions are not yet ripe to support the distinction between *underground shelters* and *underground cities* and, in order to avoid a contradiction in terms, will continue using *underground city* in a nondiscriminatory way for all these types of subterranean systems.

Chronology is another object of controversy, especially concerning the incipience of these underground cities. No historical record and archaeological finds pertain directly to the issue. All rock-cut systems in the region have been changed and reused for centuries, sometimes to this very day. Indeed, substantial underground cities such as Filiktepe, Göstesin, or Derinkuyu must have a long history (Bixio 2012:18–19). But, even so, archaeological excavations of these features produced few footholds.

Nevertheless, most scholars agree that all these Cappadocian underground cities were excavated by the local population, seeking refuge and security during the tumultuous and chaotic events of the 7th to 11th centuries CE (Kempe 1988; Triolet and Triolet 1993; 2002). This began with the weakening of the Byzantine empire, recurrent attacks by the Sasanian Persians, and the eventual occupation and destruction of Caesarea in 611. Soon after, following the Sasanian civil war (628–632) and subsequent weakening of the empire, the region became a target of regular (practically annual) raids by Arabic armies, a condition that lasted until the 10th century CE. During the 11th century CE, the region faced the Seljuk Turks, who raided the area and destroyed Melitene in 1057 and Sebasteia in 1059. In 1067, they captured Caesarea, burnt it to the ground, and massacred all its residents, leaving the city deserted for the next half-century. In 1071, Byzantine Emperor Romanos IV was defeated in the Battle of Mantzikert, and the entire region came under Seljuk rule (Ash 2006; Hild and Restle 1981).

It is widely accepted that almost four centuries of continuous war and unrest caused the breakdown of civil and military order and massive population displacements throughout Cappadocia (Cooper and Decker 2012). Most of the population is presumed to have been Christian. This hypothesis is reinforced by the presence of churches in several underground cities, crosses engraved on the walls of most, and the exclusivity of Byzantine pottery in underground cities like Aydıntepe, Kavlakepe, and Oymalı (Bilici 2002; Erkmen 1998; Faydalı

1992; 1993; Özkorucuklu 1991; Şahin 1993). Furthermore, churches' location at the entrances of the underground cities in Ağırnas and St. Mercurius and the existence of tunnels protected with millstone doors, leading deeper into the subterranean system, demonstrate that these churches have been used in peaceful times as well as a place of refuge during the raids (Yamaç 2017; Yamaç, Tok, and Filikci 2014).

1. Kayseri Underground Structures Inventory Project

This paper offers a brief account of the results of the Kayseri Underground Structures Inventory Project, which constitutes the first comprehensive scientific research of rock-cut architecture in the region. The project began in January 2014 and was conducted by the OBRUK Cave Research Group. Like other projects by OBRUK (e.g., Gaziantep), this project was based on the support of three bodies: the ÇEKÜL Foundation, the Kayseri Metropolitan Municipality, and the Ministry of Culture and Tourism.

The Kayseri Underground Structures Inventory Project covers the entire Kayseri Province of 17,500 km² and includes the research, survey, mapping, and documentation of all underground structures in it (Figs. 1, 2). Still ongoing, it constitutes one of Turkey's and the world's most extensive underground-structure research projects, encompassing 46 Byzantine rock-cut churches, 39 underground cities, ten Assyrian tin mines, three underground aqueducts, and six different cliff settlements.



Fig. 1. Location map showing Kayseri Province (after Google Maps; adapted by A. Yamaç).

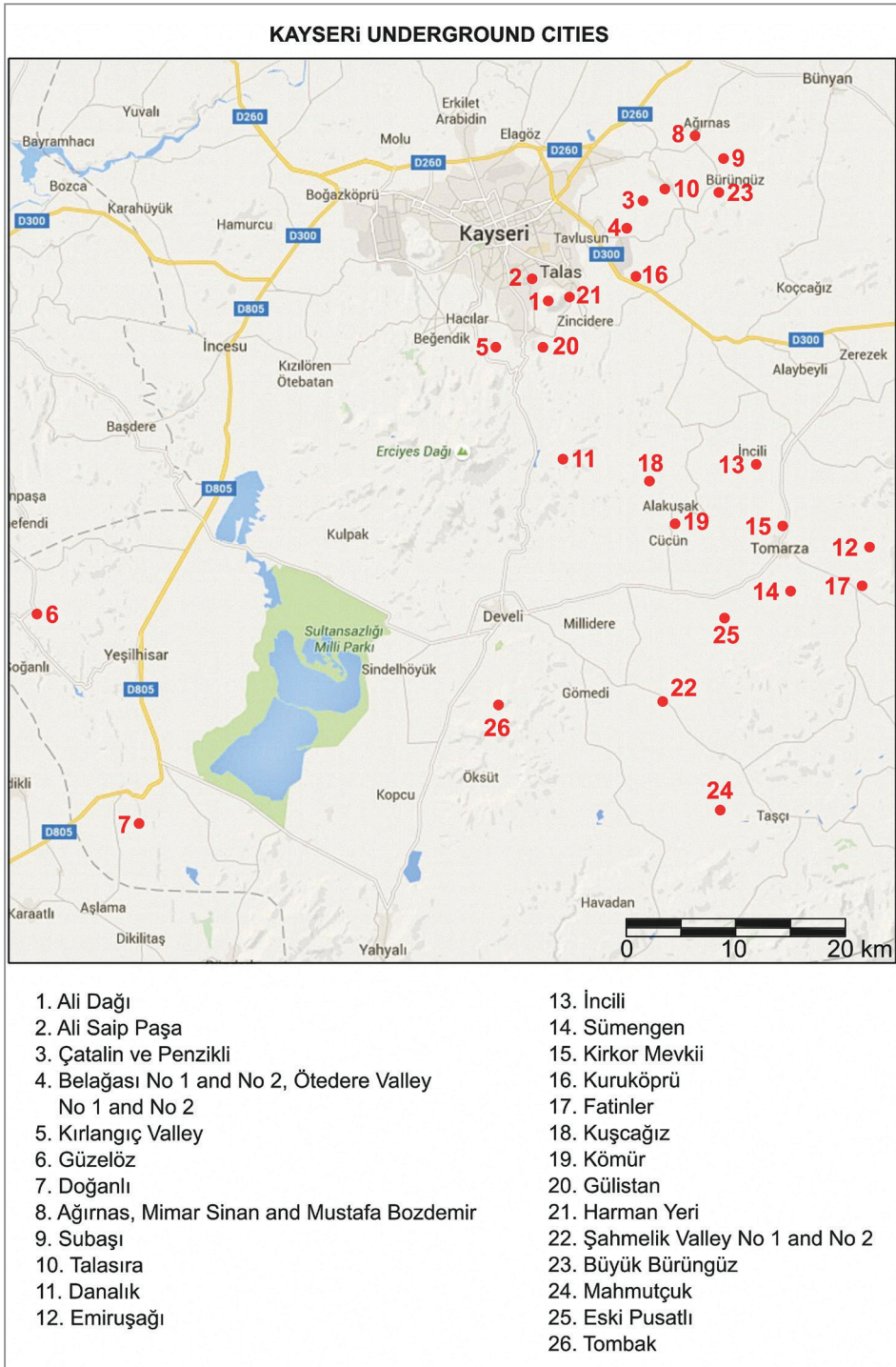


Fig. 2. Underground cities of Kayseri explored and surveyed by the OBRUK Cave Research Group (after Google Maps, adapted by A. Yamaç).

2. Underground Cities and Structures of Kayseri

The 39 underground cities explored, researched, and surveyed by the Kayseri Underground Structures Inventory Project produced at least three remarkable observations. The first is that at least six or seven have uncannily similar architecture, so much so that we joked that the same architect must have worked in all of these various locations. The second observation is the exact opposite: some underground cities are unique, idiosyncratic, and unparalleled in the region of Kayseri and Cappadocia as a whole. Notable examples include Ali Dağı, Ali Saip Paşa, Belağası No. 2, Harman Yeri, and Ötedere No. 1. The third and last observation is that, although widely perceived as underground defense systems, some subterranean complexes were produced with other purposes in mind (e.g., Kuruköprü, Tombak, and Şahmelik Western Rock Settlement).

To illustrate the diversity and peculiarity of the rock-cut structures at Kayseri, I review below a selection of 16 underground structures.

2.1. Büyük Bürüngüz Underground City (Figs. 3, 4)

The village of Büyük Bürüngüz is located 22 km east of Kayseri (Fig. 2:23) on the fringes of the Koramaz Valley. It has always been the largest settlement in the valley and, according to the Ottoman records, comprised 99 houses in 1500 CE (Inbaşı 1993). Unlike the other villages in the area, no rock-cut structures or cliff settlements were observed around Büyük Bürüngüz. However, in the course of our visits to the village, we were made aware of an underground city that can be accessed through the house gardens.

Our exploration of the Büyük Bürüngüz Underground City began from a subterranean storage room entered from a house garden still inhabited today (Entrance No. 1). It begins with a stone-carved tunnel leading to eight storage rooms (Fig. 3), beyond which is the main underground city (Fig. 4). Interestingly, a millstone door installed in the first room blocks movement from the deeper tunnel, suggesting that, originally, this was the component being defended. The second room had a double millstone door that could work both ways: towards the first room and the entrance or towards the inner part of the underground system.



Fig. 3. Büyük Bürüngüz underground city, the tunnels and chambers just after Entrance No.1 (Photo by A.E.Keskin).

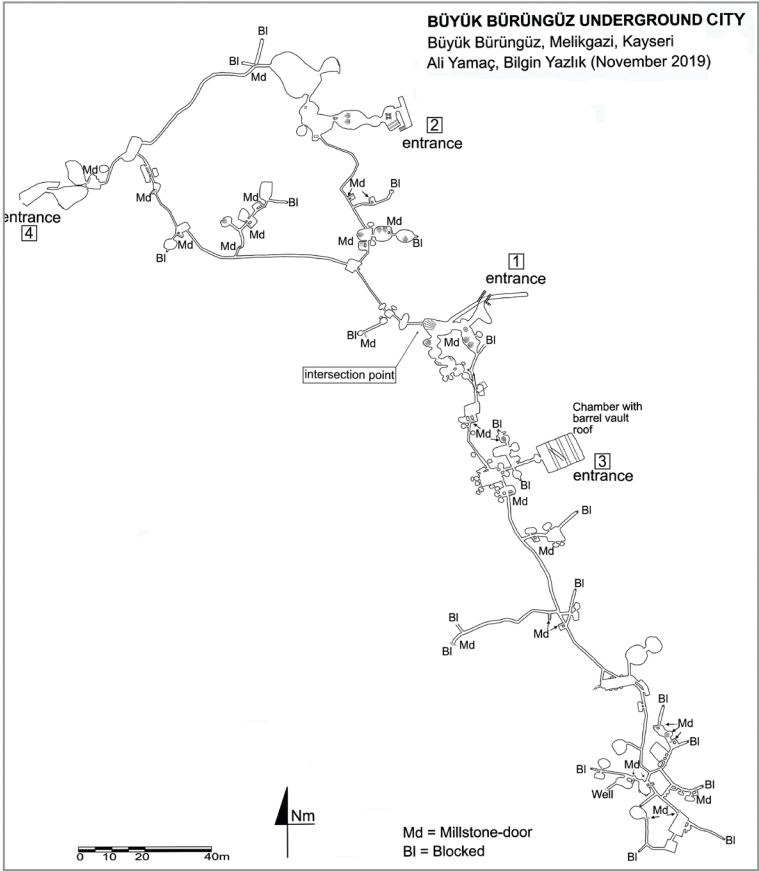


Fig. 4. Plan of Büyük Bürüngüz underground city (Drawn by A. Yamaç and B. Yazlık).

The defense mechanism facing the inner tunnels suggests that they connect with other houses. The second room (the one with the double millstone door) was probably a redoubt against enemies coming from both directions. This redoubt is at variance with patterns observed elsewhere in Cappadocia, where redoubts are regularly positioned at systems' deep extremities. The underground city of Büyük Bürüngüz constitutes the first instance of a redoubt recorded at the beginning of a tunnel.

Later, we found another entrance nearby (Entrance No. 2) that leads into a complex of four interconnected rooms. A 41 m-long tunnel heads from the complex south. One millstone door defended it against intrusions from the entrance, while two other millstone doors protected the rooms against encroachments from the inner tunnels. A second 54 m-long tunnel continues from the complex west. Near its end is a millstone door; it is the largest encountered in the entire Kayseri region: 1.85 m in diameter and 0.4 m thick.

Initially, we thought that beneath Büyük Bürüngüz were two different underground cities: one 701 m long and the other 572 m long. However, after discovering two more entrances and acquiring enough spatial anchors for the plans, we realized that these underground cities were connected, intersecting at a specific point. This location was blocked with rubble, which we subsequently cleared. Thus, the Büyük Bürüngüz underground defense system is, in total, 1,273 m long (Fig.4) and has 27 millstone doors, rendering it the longest and most elaborately defended underground city presently known in the Kayseri province. Notwithstanding, 23 blocked tunnels in this system indicate that the mapped and studied sections are but a fraction of the entire system that probably extends under the entire village.

2.2. Mimar Sinan Underground City (Figs. 5, 6)

Mimar Sinan (Sinan the Architect) is the most celebrated architect of the Ottoman Empire. He is responsible for ca. 400 buildings of historical and cultural value, the largest number attributed to any single architect, and, of these, 196 still stand today (Akin and Crane 2006). At the age of 70, Sinan had finished constructing the Süleymaniye Mosque in the name of Sultan Suleiman the Magnificent. Located in Istanbul, on a hill overlooking the Golden Horn, this building is one of the most emblematic structures of the Ottoman Empire. Next, he built Selimiye Mosque in Edirne in the name of Sultan Selim II. This mosque is considered his most outstanding achievement and is today included among the UNESCO World Heritage Sites, along with the bridge he constructed over the Drina River, Bosnia (Kuban 2011).

This extraordinary artist, who lived during the reign of four Ottoman sultans and built structures for three, was born in the Ağırnas village in 1489 CE (Akın and Crane 2006; Necipoğlu 2011). The house where Sinan was born was restored and turned into a museum. Under it, an impressive and complex two-leveled underground city was discovered. Subsequently, several parts of this city were cleared under Prof. Metin Sözen (2004) and opened to the public. During these operations, it became apparent that the underground city covered the entire village, tying many houses together through an intricate web of underground structures. However, many homeowners have blocked these tunnels to prevent access into their homes from below.

The complex below Mimar Sinan's house is a double-story system covering a total area of 1,850 m². It consists of four separate units, but it is evident they were once components of a single system. Four millstone doors, three of which were found *in situ* (Fig. 5), indicate that, through at least part of its history, the complex served a defensive purpose and is centuries old. Two of the millstone doors are gigantic, even according to Cappadocian standards, measuring 140 cm and 155 cm in diameter.



Fig. 5. A millstone in Unit 4 of Mimar Sinan Underground City (Photo by Ç. Çankırılı).

The four separate units we find in Mimar Sinan Underground City today (Fig. 6) are a consequence of structural changes introduced after defense concerns abated. Unit 1 is located under the museum house and can be accessed through a large room with a barrel vault roof, probably among the oldest structures in Ağırnas Village, dating from the middle ages (Sözen 1988). This unit stretches east under different rooms and neighboring houses to the east. Unit 2 is a small storage area accessed from under the stairs in the main museum building.

Depressions in the main room's floor, where jars were placed, indicate this structure's primary purpose. Unit 3 is a stand-alone storage area accessed from a narrow street beside the main building. Although it may have initially served as a living space connected with other underground structures, this function was evidently lost centuries ago when it was converted into a warehouse. Lastly, Unit 4 is the largest and most significant of the four—the one beneath Mimar Sinan's house. Its entrance is at the end of the same street mentioned above. It includes a room with a barrel-vaulted roof and furnaces south of the entrance, presumably an iron foundry. Via a narrow tunnel, the underground complex extends under other houses. The last chamber to the east was clogged with rubble stones. Some of the complex's deeper parts have not yet been cleared, while others are still being used by residents of neighboring houses.

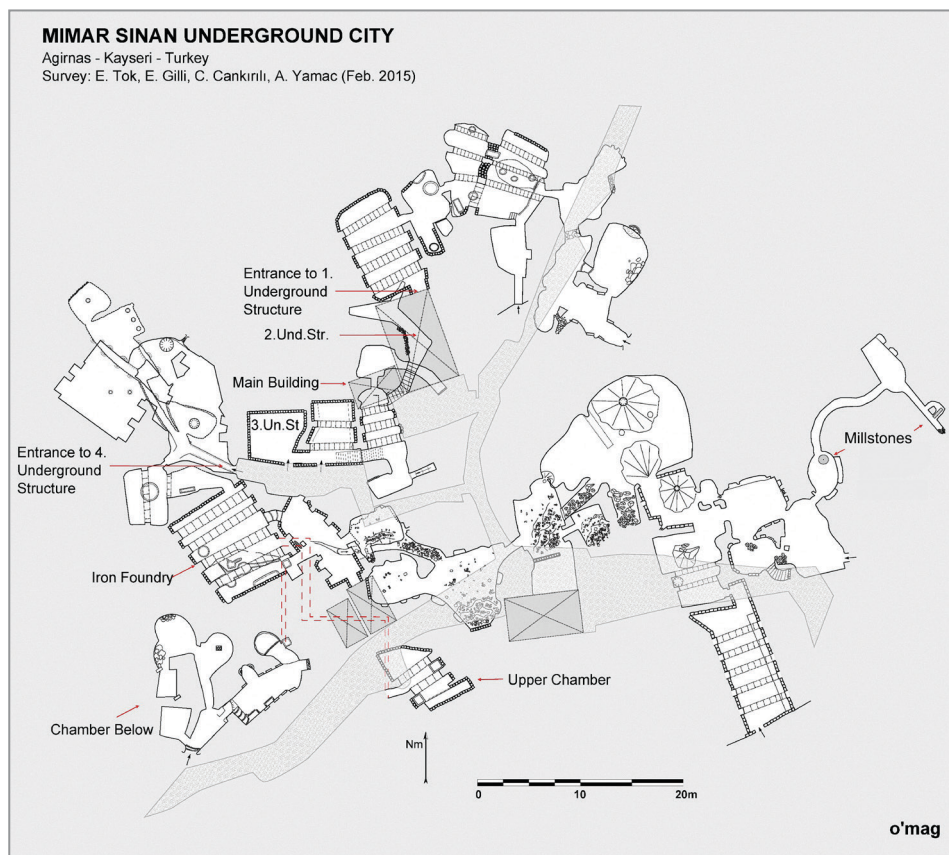


Fig. 6. Plan of Mimar Sinan underground city (Drawn by E. Tok, E. Gilli, Ç. Çankırılı, and A. Yamaç).

Later, we found additional parts of this once unified underground city under three more houses; they were blocked or featured closed tunnels. One of them had double millstone doors, and in another, ca. 450 m northeast of the Mimar Sinan underground city, three blocked tunnels were recorded. Therefore, we think that the Mimar Sinan underground city originally constituted an enormous underground defense complex that covered the entire village of Ağırnas, as was apparently the case in Büyük Bürüngüz as well (Yamaç and Tok 2015a).

2.3. Ağırnas Underground City (Figs. 7, 8)

Our expedition conducted the first comprehensive exploration and survey of this subterranean defense system, located 200 m south of Ağırnas (Fig. 2:8). It includes a large, carefully-hewn chamber, 24×4 m, accessed from the east (Fig. 7). Another entrance on the chamber's northeast was blocked, but the millstone door is still in place. The underground city's main tunnel is 60 m long; it extends southeast and adjoins 11 exceptionally large rooms (Fig. 8). A second blocked door is located near the tunnel's middle, and another big chamber with two adjoining rooms is located at the underground city's southeastern end. This chamber measures 11×5 m, manifests excellent artistry, and has an entrance from the northeast. Interestingly, it also has a millstone door that closes off the underground city's main tunnel (Fig. 8).



Fig. 7. One of the large chambers of Ağırnas underground city (Photo by Ç. Çankırılı).

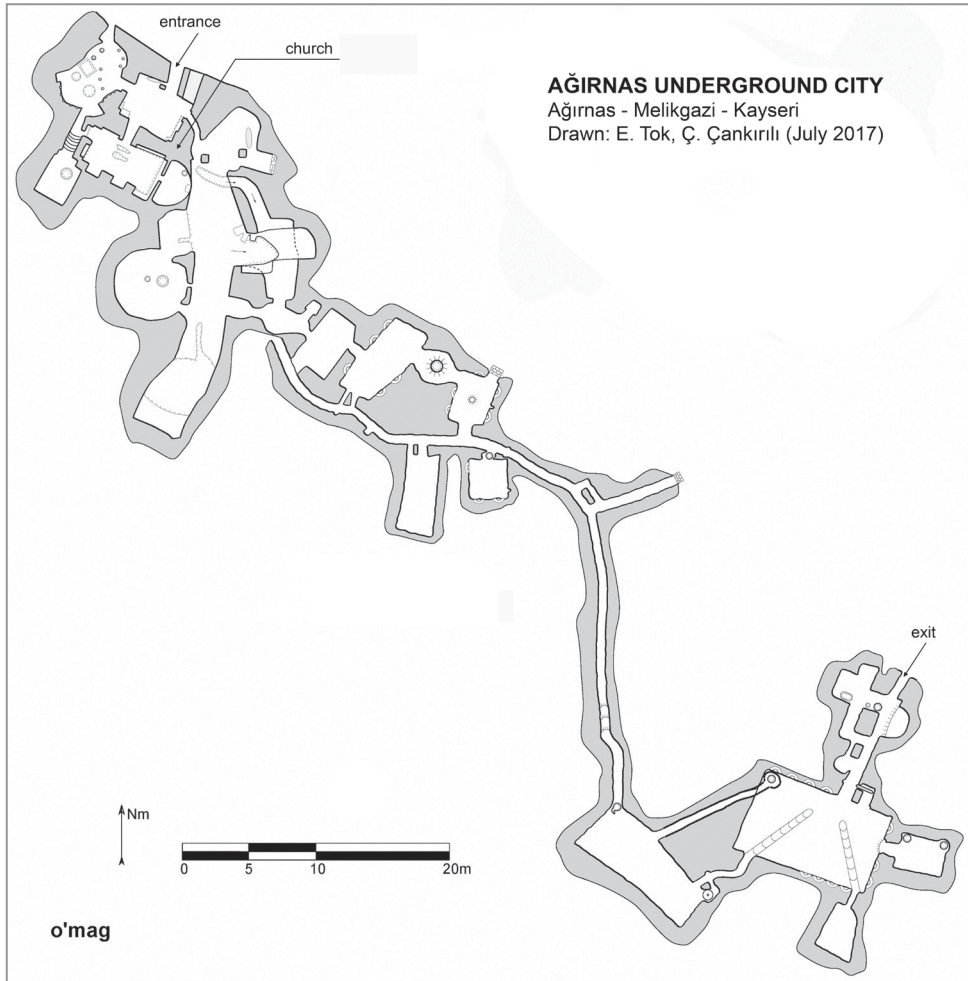


Fig. 8. Plan of Ağırnas underground city (Drawn by E. Tok and Ç. Çankırılı).

As noted above, for the Mimar Sinan underground city, an expansive subterranean complex extends beneath the entire village of Ağırnas. In this vein, the existence of a distinct underground city no more than 200 m away seems unlikely. Perhaps, a thousand years ago, another small settlement stood at this location, and its residents excavated their own defense system. On the other hand, however, it is improbable that a settlement located so close to the village would have disappeared completely.

Alternatively, the Ağırnas underground city may have operated as a religious complex independent of the village. Several unparalleled elements support this second theory. Firstly, there is a church at the entrance to the underground city, similar to the one in St. Mercurius (Yamaç, Tok, and Filikci 2014). Secondly,

a refectory is installed behind this church, including a rock-carved table and benches. Refectories of this sort, named trapeza (plural trapezai), are familiar Byzantine architectural features encountered in numerous rock-cut monasteries (Lucas 2003; Ousterhout 2010; Öztürk 2012). Lastly, a circular hall opposite the trapeza is likely to have operated as a kitchen: It is 5.5 m in diameter, has a high ceiling, a massive chimney, and a fireplace.

Thus, insofar as these elements constitute a refectory and a kitchen and noting the considerable size of many chambers, this underground city is probably best understood as a religious settlement and even a monastery.

2.4. Belağası Underground City No. 2 (Figs. 9, 10)

Belağası is the old Armenian village of Gesi on the outskirts of Ötedere Valley. It was founded in the 1600s and was part of the old Koramaz District. We surveyed and mapped a total of 28 abandoned rock-cut dwellings in this village. Some of them have 6–7 rooms. Two of the rock-cut dwellings in this village are connected to two different and long underground cities.

The system labeled *Belağası underground city no. 2* is accessed through the rear wall of a 12 × 9 m, rubble-filled rock-cut dwelling. Although there is no millstone door in the tunnel today, the door shaft on the wall is still observable. This rock-cut complex has a total of 52 rooms, most of them less than 1–2 m² in area, arranged in a unique maze-like pattern to the right and left of the main tunnel (Fig. 10). Contrary to its moderate dimensions, Belağası is one of the underground cities with most rooms in Anatolia, including the impressive Derinkuyu and Kaymaklı underground cities (Bixio 2012: 85–98). Although some of the rooms may have constituted storage areas, the existence of so many of them in a village that has only 28 cave houses and another underground city nearby is still inexplicable.



Fig. 9. Some of Belagasi Underground City No. 2's 52 small rooms, of which most are 1–2 m² (Photo by A.E. Keskin).



Fig. 10. Plan of Belagasi Underground City No. 2 (Drawn by A.E. Keskin and E. Tok).

2.5. Ötedere Valley Underground City No. 1 (Figs. 11, 12)

The valley extending south of Belağası village, 7 km east of Kayseri, is known as Ötedere Valley. While unsettled today, two underground cities have been recorded there. The complex labeled *Ötedere Valley Underground City No. 1* is located on a steep rocky wall and is described by the locals as a lepers' hospital (Fig. 2:4). While it has many rooms with broad windows facing the valley, it also has substantial stone walls, 4–5 m high (Fig. 11).



Fig. 11. Façade of Ötedere Valley Underground City No.1. Note high walls at the upper right corner (Photo by A. Yamaç).

Even if the high stone walls are not defensive, the inner tunnels and two large millstone doors indicate that the complex's initial purpose was not to serve as a lepers' hospital. After the entrance room, two tunnels branch east and west (Fig. 12). The eastern tunnel has a millstone door at its entrance and is blocked with debris 3 m in. The western tunnel has a millstone door 3.5 m in; this millstone is 1.2 m in diameter and 0.26 m thick. Here, the system has a small northern branch consisting of several rooms with windows facing the valley. Another tunnel leads east through a 43° incline and staircase to a chamber on an upper level, whose facade is completely open to the valley.

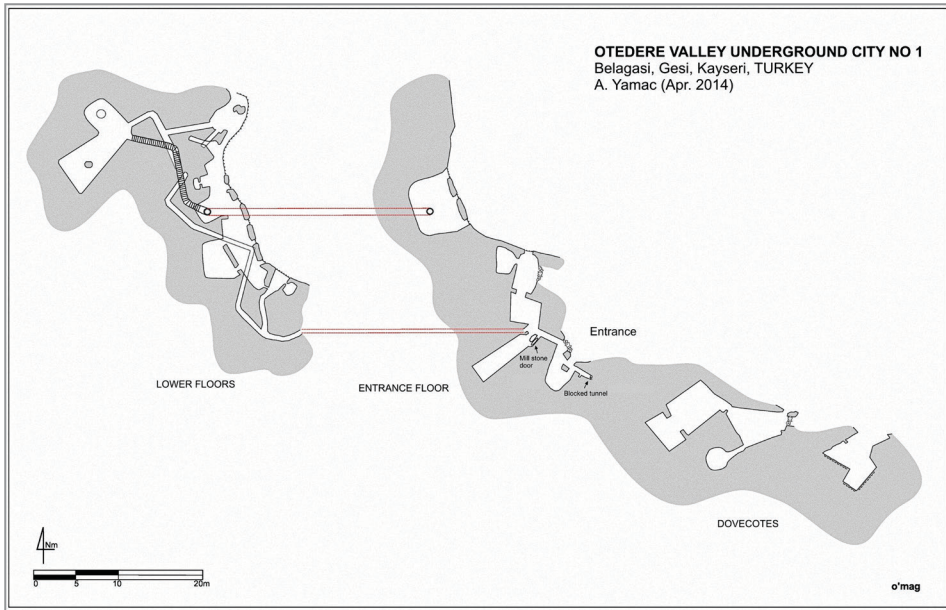


Fig. 12. Plan of Ötedere Valley Underground City No. 1 (Drawn by A.Yamaç).

This complex is unlike any other. Rooms open to the valley and broad windows imply that this rock-cut system was a place of habitation. However, underground passages, millstone doors, and a large windowless chamber on the lowest floor, descended by rock-cut stairs, suggest otherwise. Considered as a whole, perhaps this complex is best understood as an unfinished underground city that was later converted into a rock-cut settlement.

2.6. Doğanlı “Forty Steps” Underground City (Figs. 13, 14)

While widely discussed (Bixio 2012; Gülyaz and Yenipınar 2007; Yörükoğlu 1989), we are the first to offer a detailed survey and map of Doğanlı Underground City. One of its most distinguishing features is its position on an empty plateau, 2 km from the nearest settlement—Doğanlı Village. This is a curious situation: It is unlikely that, at times of crisis, the village’s inhabitants would have sought refuge 2 km away. A more probable explanation is that an old settlement used to occupy the plateau, but no remains are left today.

Another oddity of Doğanlı is its main chamber (Fig.13). Accessed through a carved 38°-inclined staircase, this chamber is 500 m² in size and supported by 15 rock-cut columns, constituting the largest underground chamber recorded to date. Its closest parallels in Cappadocia are Kemer Oren (400 m²) and Derinkuyu

(300 m²), both thought to have been used as churches (Bixio 2012: 97). Furthermore, the chamber has 14 rock-carved cells separated by thin walls along its north and east sides. It is also equipped with a cistern, 3 × 2 × 2 m, containing perfectly clean water, a remarkable testimony of ancient architectural and engineering skills. Why Doğanlı Underground City would have needed a 500 m² chamber is a mystery.



Fig. 13. The main chamber of Doğanlı Underground City (Photo by A. Yamaç).

From the chamber, the subterranean system branches in three directions: east, north, and south (Fig. 14). The eastern branch consists of a tunnel blocked by debris. The northern branch comprises a 74 m-long tunnel blocked with debris. However, this northern branch has an additional limb leading up to the surface through a large room. The southern branch exits from the beginning of the stairs in the main entrance. It consists of a tunnel, four relatively large rooms, several small rooms, and a chapel. One of the small rooms had a collapsed ceiling that provided access to the surface. The chapel is located on the east side of the branch; it is tiny, 3 × 2 m, and seems to have never been reused. Apparently, all tunnel connections reaching the surface were protected by millstone doors. Although some of them are no longer in place, their presence is indicated by operation rooms that opened and closed the millstone doors and millstone door slots in the tunnel walls.

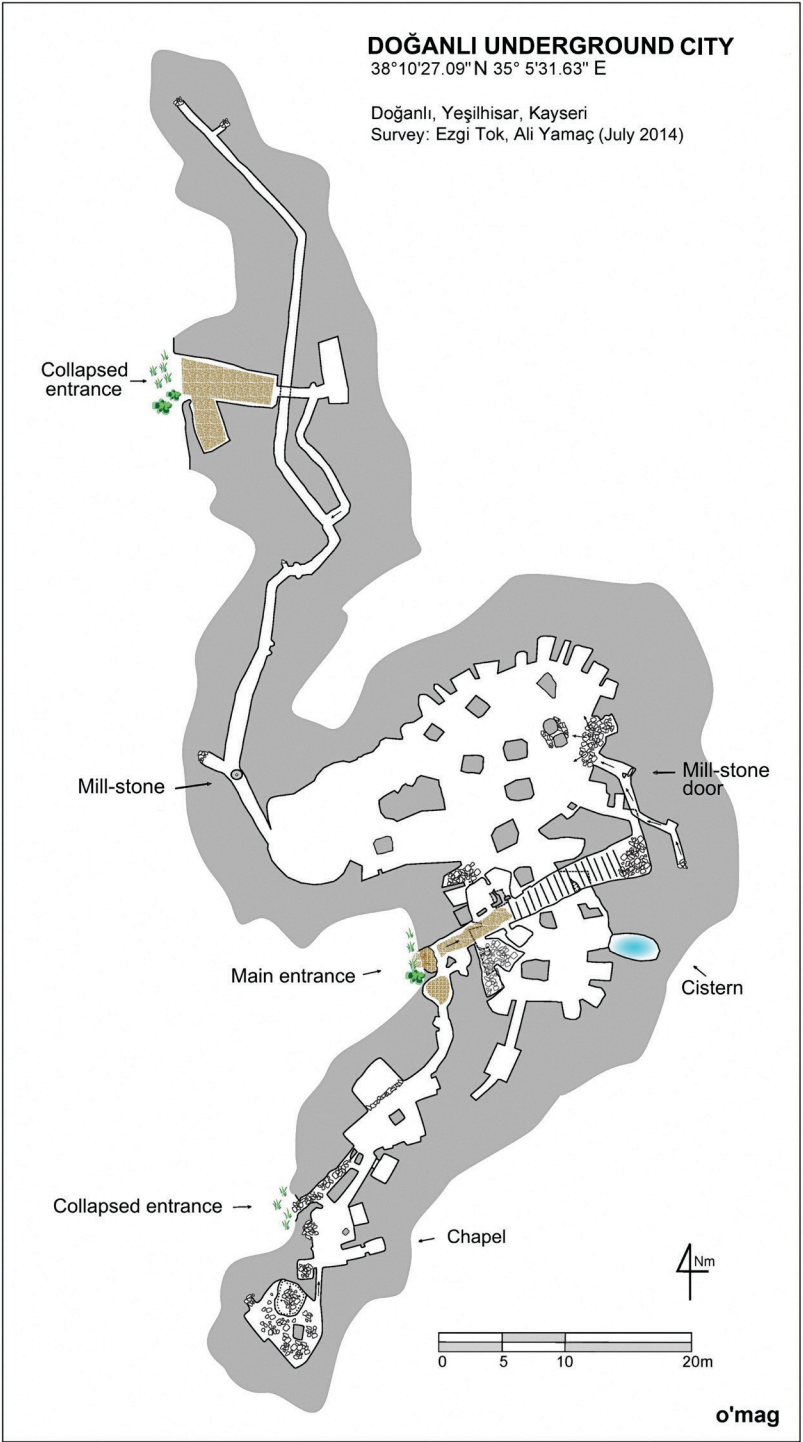


Fig. 14. Plan of Doğanlı Underground City (Drawn by E. Tok and A. Yamaç).

2.7. Talasıra Underground City (Figs. 15–17)

Talasıra is smaller than most underground cities. However, located on a plain between the villages of Güzelköy and Gürpınar, 15 km east of Kayseri (Fig. 2:10), it epitomizes the architectural appropriation of a small-scale natural formation for social needs. It capitalizes on an isolated tuff outcrop, 300 m in diameter, in an otherwise flat alluvial plain. The miners kept away from the outcrop's weaker and fractured parts in the west and focused on its southeastern section instead. Notably, the roofs of several rooms in the south collapsed and were subsequently converted into barns, perhaps long after they went out of their initial use.

The chamber on the northeastern side of the complex, located ca. 16 m north of the complex's center, is likely to have been part of the original system (Fig. 17). The site's northern part is completely destroyed by collapse. Two more tunnels offer access from this area; both have millstone doors and operation rooms. The city's middle section has another entrance also equipped with a millstone and an operation room. Altogether, 12 chambers were surveyed, almost all of which are equipped with silos.



Fig. 15. A millstone at Talasıra Underground City (Photo by A.E. Keskin).



Fig. 16. A rock-cut dwelling at the entrance to Talasira Underground City (Photo by A.E. Keskin).

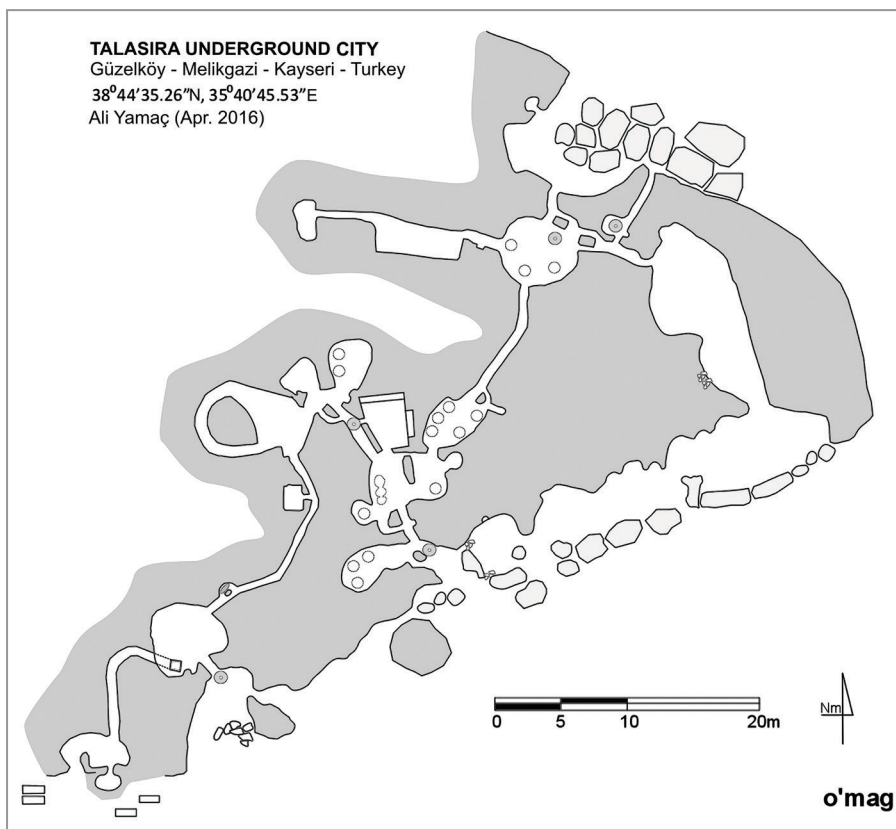


Fig. 17. Plan of Talasira Underground City (Drawn by A. Yamaç).

Talasira has peculiarly short and curved tunnels that begin and end in the same chamber. Similar tunnels were also recorded in the lowest level of Derinkuyu, and they seem functionally redundant. While they may have served as traps, we are inclined to consider them a particular quarrying method designed to expand the chamber by removing the rock block encircled by the tunnel.

Six millstone doors were documented in this small subterranean defense system. However, only one was in situ in the southeast tunnel. Several cave dwellings were observed in the area south of the underground city; however, they were partially collapsed and have been abandoned for a long time. Another interesting observation is the occurrence of graves south and east of the outcrop. We identified 22 graves, all looted, but the number is likely to have been higher.

2.8. Kuşcağız Underground City (Figs. 18, 19)

Kuşcağız Underground City is located in a valley, 3 km east of Kuşcağız Village, Tomarza District (Fig. 2:18), and it is one of the longest underground cities we have surveyed in the Kayseri region. It is 485 m long and has four different entrances on the side facing the valley. Due to heavy talus, it is impossible to determine the size of the cliff settlement. However, it is notable that numerous rock-cut tomb structures are observed in the valley walls, at least some of which date to the Roman and Byzantine periods, implicating that Kuşcağız was dug in a distinctly funerary area.



Fig. 18. Surveying a tunnel in Kuşcağız Underground City (Photo by A.E. Keskin).

From north to south, the underground city is 105 m long, and all four entrances are protected with millstone doors. The system has ten chambers, of which some are impressive. For instance, the chamber located after the second entrance to the north is a level lower than the entrance and measures 13×7 m. Another room in the northern part of the complex has 11 silos and must have functioned as a storage chamber. Another noteworthy observation is that while tunnels in the south reached dead-ends, two tunnels leading north were found blocked with debris. Roman and Byzantine-period ruins on the surface demonstrate the valley's archaeological significance, calling for more comprehensive surveys.

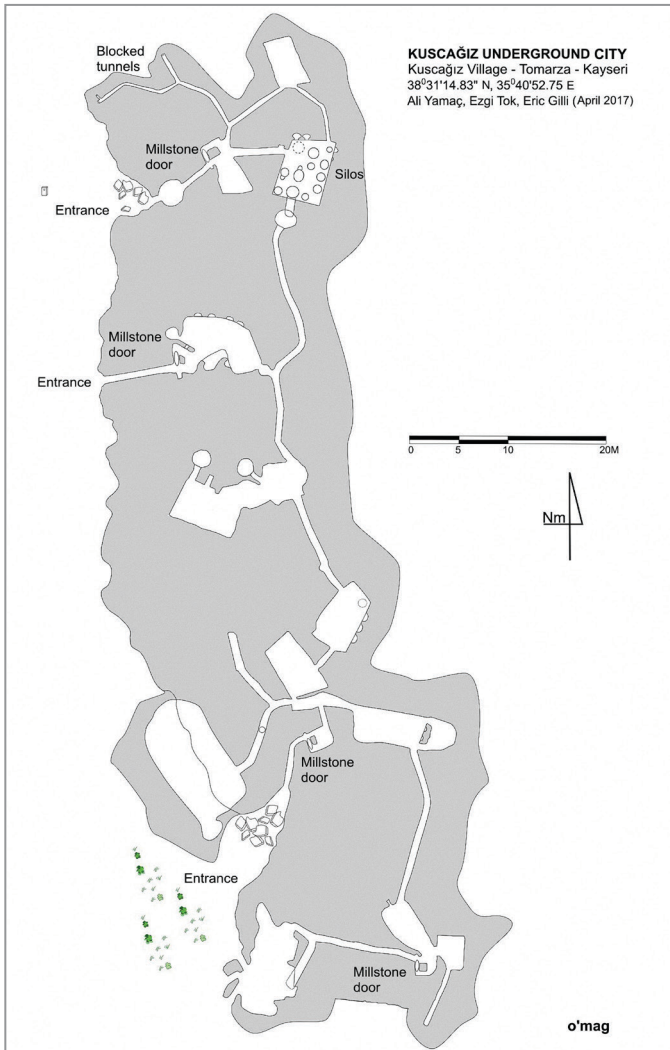


Fig. 19. Plan of Kuşcağız Underground City (Drawn by A. Yamaç, E. Tok, and E. Gilli).

2.9. Eski Pusatlı Underground City (Figs. 20, 21)

Locally known as *Old Pusatlı Village*, this underground city is located on a plain beside a rocky ridge, 2 km north of Pusatlı Village in the Tomarza District (Fig. 2:25). The striking feature of this subterranean complex is that it was excavated into the flat plain before the cliff instead of into the cliff walls, as is usually the case. It also demonstrates extraordinary workmanship, including a digging technique superior to any other noted in Tomarza, even across Kayseri.

Eski Pusatlı Underground City has two levels. The upper level has four interconnected chambers and four entrances, only one of which is still accessible. It comprises a shaft and a narrow inclined tunnel protected by a millstone door and originates on the lower floor. The lower level has four chambers east of the entrance and a westbound tunnel leading to four other large chambers. Two millstone doors defend the tunnel, one of which (3 m from the entrance) has no operation room.



Fig. 20. Surveying in front of a millstone door at Eski Pusatlı Underground City (Photo by A.E. Keskin).

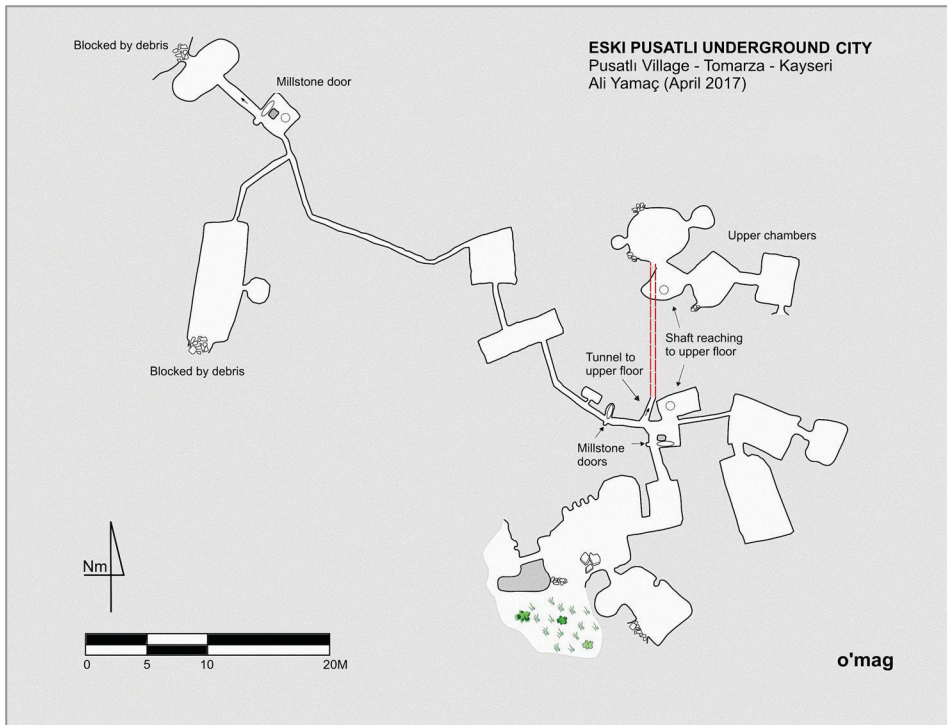


Fig. 21. Plan of Eski Pusatlı Underground City (Drawn by E. Tok and A. Yamaç).

2.10. Ali Dağı underground city (Figs. 22, 23)

This underground structure is located on the slope of Ali Dağı (Mount Ali), 12 km from the Kayseri city center (Fig. 2:1), and it is an architectural oddity on all accounts. A preliminary sketch plan was produced by Yörükoğlu (Yörükoğlu 1989: 21) but criticized by Bixio (2012: 53): “... the network of tunnels, as seen from the graphics, appears preposterous and, above all, unjustified. A topographic survey is expected to ... change the plan.”

Two years after Bixio’s critique, we conducted a systematic survey of the site and found that it consists of two principal branches with a total length of 528 m: an eastern branch and a western branch. The eastern branch comprises long and winding tunnels that terminate with dead-ends. The western branch is more elaborate and has three principal components, none suitable for refuge at a time of crisis: a large chamber, a 180 m-long tunnel, and a cistern. It is unclear why a cistern would require a tunnel of such length. Another notable peculiarity is the southwest-oriented bifurcation where the tunnel creates a ring, approximately

mid-way to the cistern. This bifurcation appears to have been abandoned quite early. To the north of today's exist are three small rooms. They were built to serve as a warehouse, a kitchen, and a church, but since then had been converted into dovecotes with windows opening to the outside.



Fig. 22. Plan of Ali Dağı Underground City (Drawn by A. Yamaç).

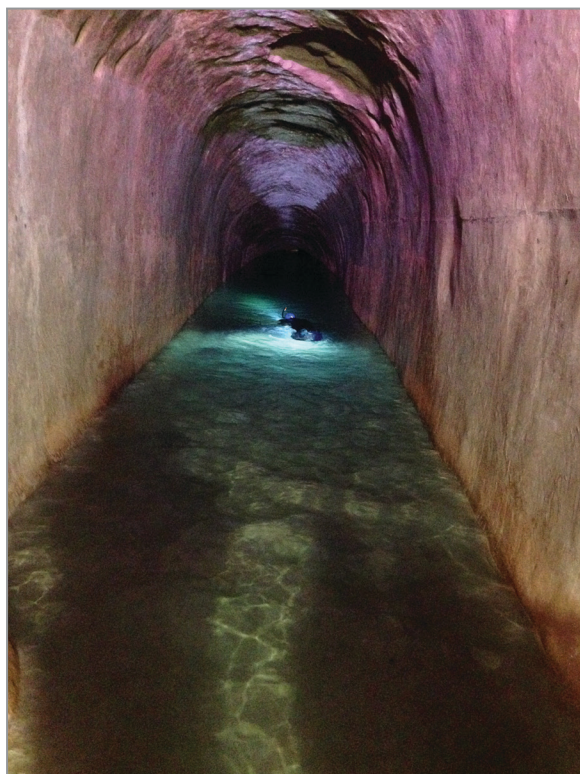


Fig. 23. Cistern of Ali Dağı Underground City (Photo by A.Yamaç).

2.11. Ali Saip Paşa Underground City (Figs. 24, 25)

This underground complex is located in Talas District, Kayseri (Fig. 2:2). It is open to the public and was undergoing restoration when we conducted our research. It is accessed through the basement of a 19th-century house and consists of a single 916 m-long tunnel, 60–90 cm wide and 1.5–2.1 m high, with an abrupt end. Interestingly, the tunnel's last 50 m features a V-vaulted ceiling, the like of which was recorded in no other underground city or tunnel. Additionally, there are some indications of galleries north of the entrance. These, however, are clogged or collapsed and have not yet been excavated and explored.

If Ali Saip Paşa is indeed an underground city, its main components have not yet been discovered and should be sought in the clogged galleries near the entrance. The absence of stone doors and bifurcations in the tunnel suggests it was intended to serve as an escape tunnel.



Fig. 24. Inside the tunnel of Ali Saip Paşa Underground City (Photo by A. Yamaç).

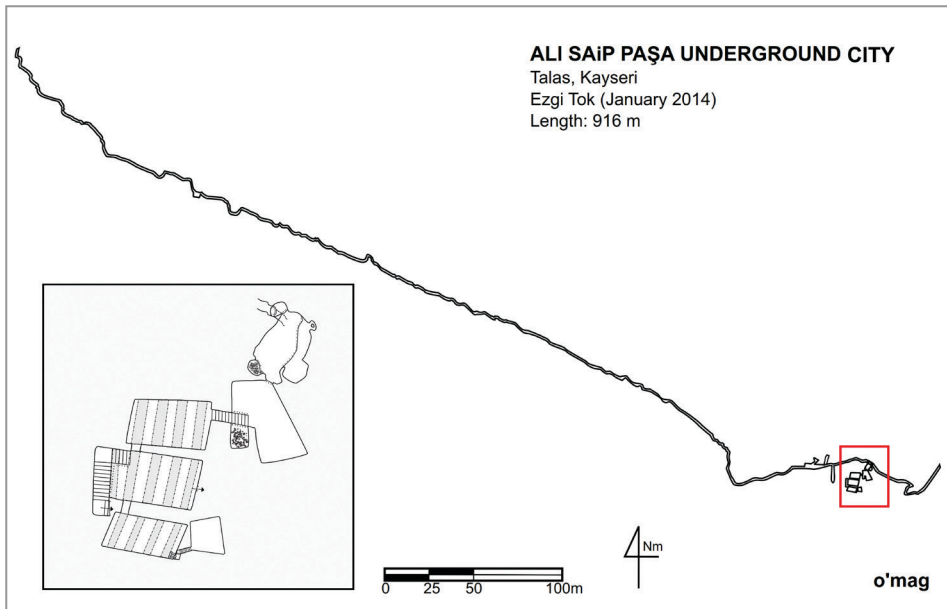


Fig. 25. Plan of Ali Saip Paşa Underground City (Drawn by E. Tok).

2.12. Kırlangıç Valley Underground City (Figs. 26, 27)

Kırlangıç Valley Underground City is carved into the western wall of Kırlangıç Valley, one of Kayseri's major natural attractions. It is located on the road from Kayseri to Erciyes Mountain, ca. 1 km north of the Hisarcık District (Fig. 2:5). It is extraordinary on two accounts: It has a five-story structure, and its entire front is open to the valley (Fig. 26).

In total, the complex is 505 m long and 56 m high. The upper three floors are accessible from the slope and are notable for their expansive halls and living spaces. The fourth floor is reached via a steep flight of stairs, and its rooms are comparatively small, while the bottom floor has no rooms but only a blocked tunnel that presumably reached the valley bottom. Perhaps, it connects with a tunnel observed at the level of the stream.

The absence of millstone doors and the broad windows open to the valley on most floors suggests that this complex was a settlement, not an underground city of refuge. However, it is also unlike other rock settlements known in the Kayseri area: It is relatively difficult to access (reached via a steep slope), its first hall is large enough to fulfill public functions, and the hall on the floor below is furnished with six carefully carved adjoining rooms.



Fig. 26. Entrance of Kirlangic Valley Underground City (Photo by A. Yamaç).

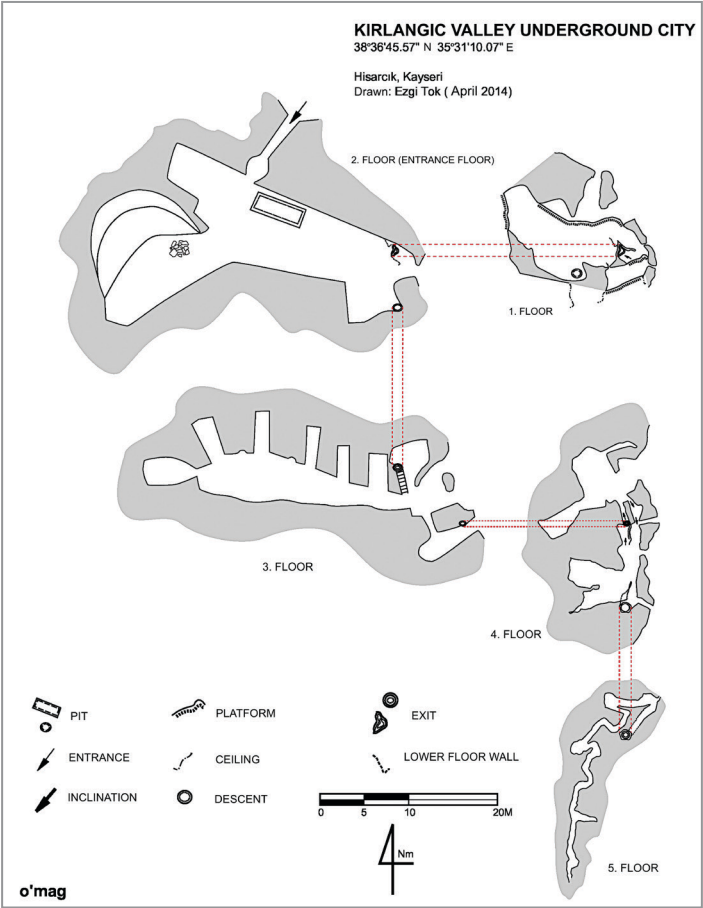


Fig. 27. Plan of Kirlangic Valley underground city (Drawn by E. Tok).

2.13. Harman Yeri Underground City (Fig. 28)

Throughout Anatolia, from Phrygia in the west to the Urartu Highlands in the east, one encounters deep cisterns equipped with broad rock-carved staircases. One such rock-cut cistern located in a small valley to the east of Kayseri's Talas District was converted with great effort into one of Anatolia's most architecturally distinct underground cities (Fig. 2:21). It consists of two components. The first is the 32 m-deep cistern and its spacious gallery of stairs, 1.5–2.0 m wide and 2 m high. The second component consists of a defensive tunnel and chambers cut from the gallery's wall and protected with a millstone door. Three additional small rooms quarried along the gallery leading to the cistern are attributed to this component, as is the deliberate sealing of the gallery's main entrance.

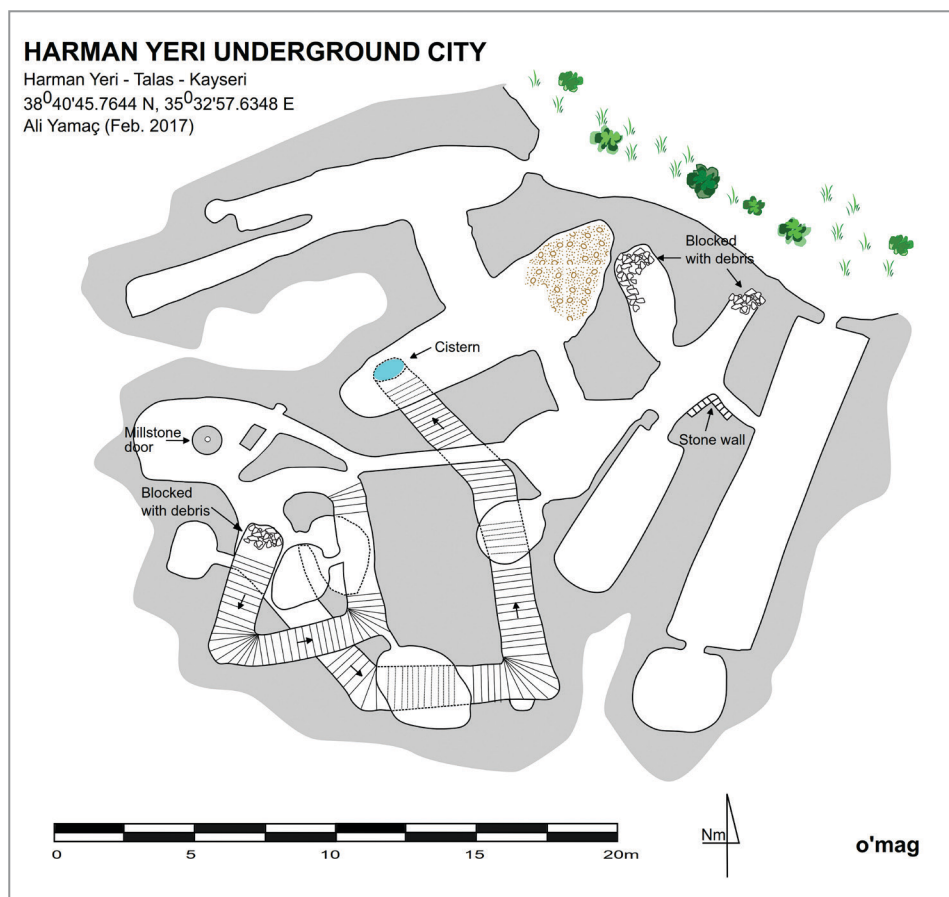


Fig. 28. Plan of Harman Yeri Underground City (Drawn by A. Yamaç).

2.14. Kuruköprü Underground Structure (Figs. 29–31)

Kuruköprü (Dry Bridge) in Talas District takes its name from the aqueduct located next to the district's main road (Fig. 2:16). It is widely believed that both before the aqueduct was built and after it went out of use, water was carried to ancient Kayseri by underground channels, although none have been identified to date. Either way, this basaltic area features one of the most interesting and strange underground structures in all of Turkey. It consists of a north-south oriented tunnel, 265 m long, 0.7 m wide, and 1.4 m high (Fig. 29). It is accessible from two locations, both extremities terminate in a cul-de-sac, six bifurcations branch from the tunnel westward (four are blocked), and no defensive doors have been observed. Interestingly, another parallel channel was detected due to local subsidences or breaks in the wall (Fig. 30). While this second channel is too narrow to be surveyed, it seems natural, extending both north and south beyond the artificial tunnel.



Fig. 29. Plan of Kuruköprü Underground Structure (Drawn by A. Yamaç).



Fig. 30. Natural waterway parallel to Kuruköprü Underground Structure (Photo by A.E. Keskin).



Fig. 31. Artificial tunnel of Kuruköprü Underground Structure (Photo by A.E. Keskin).

2.15. Şahmelik Western Rock Settlement (Figs. 32, 33)

Şahmelik Valley is located ca. 2 km north of Şahmelik Village in Develi (Fig. 2:22); it enjoys comparatively broad beds of arable land and has rock settlements carved in its steep walls. The most impressive of these settlements is probably the one we labeled the *Western Rock Settlement*, excavated into the valley's northwest wall. The entrance is 7 m up the cliff wall, and hand and foot recesses for climbing are visible (Fig. 32). The entrance opens onto a 65 m² hall consisting of four parts. The complex extends southwest, featuring a sequence of three relatively large rooms and three ancillary chambers. From the middle room, an 18 m-long tunnel branches to the northwest leading to a 12 m² space with a silo in its north corner and a small indeterminate rock-carved feature in the south corner. Given the absence of windows or other means of ventilation, it is safe to reject the hypothesis that this feature was a hearth; alternatively, we may cautiously suggest it may have been a toilet. While this complex resembles other rock-cut dwellings, its relatively high position above the valley floor and the deep isolated room at the end of a long tunnel constitute notable exceptions. Perhaps, this was a station for a military garrison.



Fig. 32. View of Şahmelik Valley Western Rock Settlement's facade (Photo by A. Yamaç).

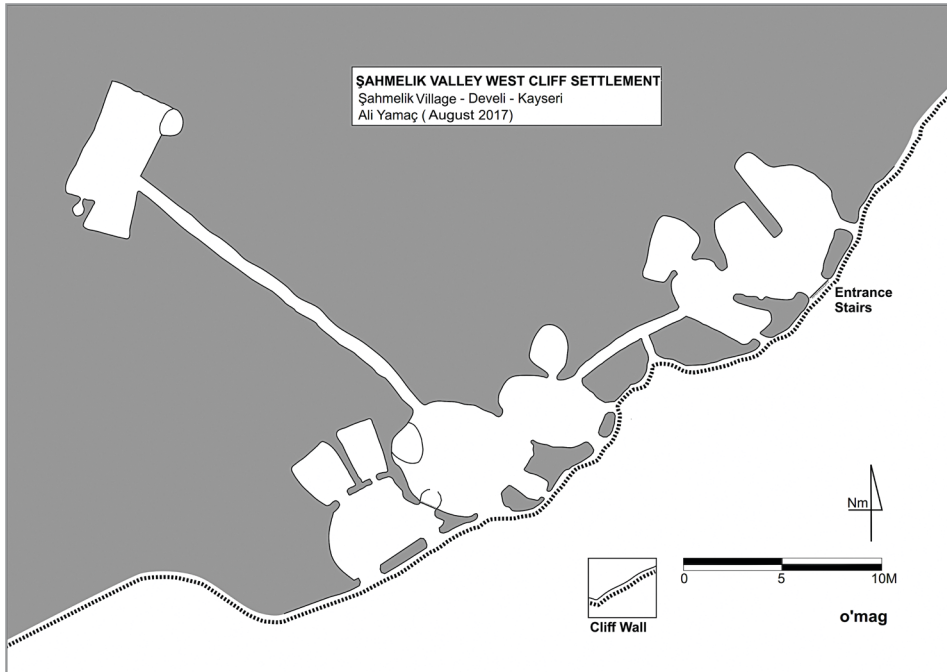


Fig. 33. Plan of Şahmelik Valley Western Rock Settlement (Drawn by A. Yamaç).

2.16. Tombak Cliff Settlement (Figs. 34, 35)

One km east of Tombak Village, a dense rock-cut settlement is observed in a rugged escarpment (Fig. 2:26). Most elements are houses and barns, while others are apparently silos and cisterns, suggesting this may have been where Tombak Village had begun. Among these components, occupying the lowest portion of the rocky wall, is an extraordinary two-level, seven-room structure known as the *Tombak Castle*. Out of the back wall of one of Tombak Castle's upper-level rooms extends a winding and descending northbound tunnel, 0.65–0.80 m wide and 89 m long. The elevation difference between the tunnel's ends is 6.5 m, and steps were installed in some sections to facilitate the passage.

Interestingly, although definitively dug for defensive purposes, no millstone doors, operation rooms, or traps were noted. Near its farther end, the tunnel transitions from the soft tuff rock formation to a relatively hard andesite breccia. At its end, the tunnel opens onto a room dug into the hard breccia. It is more than 100 m² and has an irregular plan. Two columns support its ceiling, and two large silos are carved into the floor. In a large depression in the room's north wall, a blocked tunnel was recorded.



Fig. 34. General view of Tombak cliff settlement's facade (Photo by A. Yamaç).

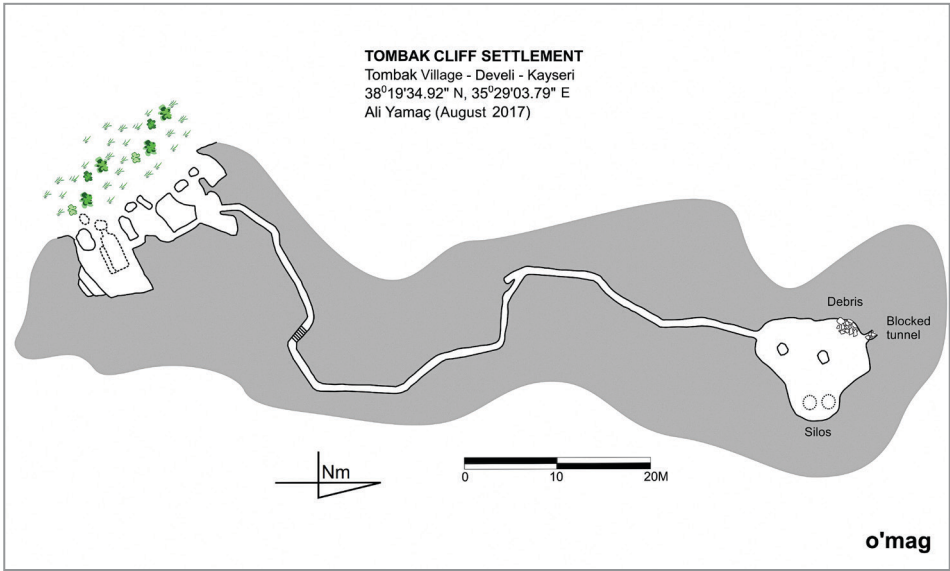


Fig. 35. Plan of Tombak cliff settlement (Drawn by A. Yamaç).

3. Discussion

While we stated in the introduction that all underground cities in Cappadocia were dug by local Christians between the 7th and 11th centuries CE for defense purposes, this is but an estimate based on limited data: the occasional engraved cross, several churches, and a handful of Byzantine pottery sherds. Since these structures are hidden defense shelters, historical evidence is naturally wanting, and alternative hypotheses arguing for much earlier inception dates are expected.

One such hypothesis was forwarded by Urban, one of the first researchers of underground cities in the region. He proposed that these defensive structures in Cappadocia date back to the 8th–7th centuries BCE (Urban 1973a; 1973b; 1973c). At this time, Cappadocia was a buffer zone between the Phrygian and Assyrian kingdoms. In principle, it was under Tabal rule, which was subservient to the Phrygian Kingdom. However, it is known that as Assyrian pressure mounted on the borders, Tabal kings would switch sides from time to time. Additionally, the Assyrians attacked Cappadocia on several occasions in 718 BCE and following years. Notably, the geopolitical strains on Cappadocia persisted also after the fall of the Assyrian Kingdom in 612 BCE, after which a conflict broke out between the Med and Lydia kingdoms (590–585 BCE; Sevin 1998). Recently, several studies voiced support for Urban's hypothesis, arguing that it cannot be ignored (Mora et al. 2020).

Another hypothesis dates the underground systems back to the 9th–8th centuries BCE, noting the proximity of Neo-Hittite inscriptions in Topada, Karaburna, and Sivasa to specific defense structures and their reference to military operations. According to this theory, the underground cities and refuges were dug by the region's Neo-Hittite residents for military and defense purposes (Mora et al. 2017; 2020).

Strictly speaking, any choice between the competing theories on the emergence of these defense structures must be firmly anchored in archaeological evidence. Unfortunately, for now, positive archaeological evidence only consists of crosses engraved on walls, churches, and a few Byzantine pottery sherds. Therefore, we provisionally argue that the underground cities are best dated to the Byzantine Empire between the 7th and 11th centuries CE.

4. Conclusion

Our ongoing research has effectively demonstrated the exceptional and often overwhelming diversity of the Cappadocian underground defense systems. It also underscored the architectural creativity and resourcefulness of the region's inhabitants. As monuments to a region's 400-year struggle for survival against repeated raids, Cappadocia's intricate subterranean systems embody humanist values beyond history and archaeology and, therefore, must be protected.

Acknowledgments

Eight years ago, when we started working together, none of us expected such results. Over the years, *Kayseri Underground Structures Inventory Project* proved uniquely important. It would have been impossible without the dedication and efforts of Prof. Osman Özsoy, Kayseri Coordinator of ÇEKÜL Foundation.

References

- Akın, E. and Crane, H. 2006. *Sinan's Autobiographies: Five Sixteenth-Century Texts*. Leiden: Brill.
- Akyürek, E., Çömezoglu, Ö., Tiryaki, A., Yamaç, A., Karakaya, N., Mimiroğlu, M., Barut, F., Uyar, T., and Evcim, S. 2015. *Türkiye Arkeolojik Yerleşmeleri 8: Bizans/İç Anadolu*. Istanbul: Ege Yayınları
- Ash, J. 2006. *A Byzantine Journey*. 2nd edition. London: Tauris Parke Paperbacks.
- Ayhan, A. 2004. *Geological and Morphological Investigations of the Underground Cities of Cappadocia Using GIS*. M.A. Thesis, Middle East Technical University.
- Bilici, M. 2002. Yeraltı Şehirleri Kazısı. Paper presented at the 13th Müze Çalışmaları ve Kurtarma Kazıları Sempozyumu, Ankara.
- Bixio, R. 2012. *Cappadocia: Records of the Underground Sites*. BAR International Series 2413. Oxford: Archaeopress.
- Cooper, E. and Decker, M. 2012. *Life and Society in Byzantine Cappadocia*. London: Palgrave Macmillan.
- Erkmen, M. 1998. Aydıntepe Yeraltı Şehri Çalışmaları. Paper presented at the 9th Müze Kurtarma Kazıları Semineri, Ankara.
- Faydalı, E. 1992. Kavlaktepe Yeraltı Şehri Kurtarma Kazısı. Paper presented at the 2nd Müze Kurtarma Kazıları Semineri, Ankara.
- Faydalı, E. 1993. Kavlaktepe Yeraltı Şehri Kurtarma-Temizlik Kazısı. Paper presented at the 3rd Müze Kurtarma Kazıları Semineri, Ankara.
- Gülyaz, M., and Yenipınar, H. 2007. *Underground Cities of Cappadocia*. Nevşehir: Dünya Kitap.

- Hild, F. and Restle, M. 1981. *Kappadokien (Kappadokia, Charsianon, Sebasteia und Lykandos)*. Wien: Verlag der Österreichischen Akademie der Wissenschaften.
- Inbaşı, M. 1993. 16. Yüzyıl Başlarında Kayseri. Kayseri: İl Kültür Müdürlüğü.
- Kempe, D. 1988. *Living Underground: A History of Cave and Cliff Dwelling*. London: Herbert Press Ltd.
- Kuban, D. 2011. *Sinan's Art and Selimiye*. Istanbul: Türkiye İş Bankası Kültür Yayınları.
- Lucas, P. 2003. Les établissements monastiques de la basse vallée de Göreme et de ses abords. *Dossiers d'Archéologie* 283: 32–41.
- Mora, C., Balza, M., Bixio, R., and De Pascale, A. 2017. A Link between “Ancient Words” and the “Underground World”: Cappadocian Landscape, Rock-cut Structures and Textual Evidence from Hittite Documentation. Paper presented at HYPOGEA 2017: International Congress of Speleology in Artificial Caves, Cappadocia, Turkey.
- Mora, C., Balza, M., Bixio, R., and De Pascale, A. 2020. Cappadocia, a “Hidden” Landscape: “Underground World” and Neo-Hittite Evidence. Paper presented at the 11th International Congress on the Archaeology of the Ancient Near East, Munich.
- Necipoğlu, G. 2011. *The Age of Sinan: Architectural Culture in the Ottoman Empire*. London: Reaktion Books.
- Ousterhout, R. 2010. Remembering the Dead in Byzantine Cappadocia: The Architectural Settings for Commemoration. Pp. 89–100 in *Architecture of Byzantium and Kievan Rus from the 9th to 12th Centuries*, ed. O. Ioannisian and D. Jolshin. Transactions of the State Hermitage Museum 53. St. Petersburg: The State Hermitage Publishers.
- Ousterhout, R. 2017. *Visualizing Community: Art, Material Culture, and Settlement in Byzantine Cappadocia*. Washington DC: Harvard University Press.
- Özkorucuklu, H. 1991. Aydıntepe Yeraltı Kenti. Paper presented at the 2nd Müze Kurtarma Kazıları Semineri, Ankara.
- Öztürk, F. 2012. The Unusual Separation of Cappadocian Refectories and Kitchens: An Enigma of Architectural History. *METU JFA* 29/1: 153–169.
- Sevin, V. 1998. MÖ I. Binyıl Demir Çağı: Krallığın Koruyucuları. Pp. 170–193 in *Kapadokya*, ed. M. Sözen. İstanbul: Ayhan Şahenk Foundation.
- Sözen, M. 1988. *Sinan, Architect of Ages: Arts in the Age of Sinan*. Ankara: Ministry of Culture and Tourism of the Turkish Republic.
- Sözen, M. 2004. *Mimar Sinan Evi Restorasyon Projesi*. İstanbul: ÇEKÜL.
- Şahin, S. 1993. Özlüce Yeraltı Şehri. Paper presented at the 3rd Müze Kurtarma Kazıları Semineri, Ankara.
- Triolet, J. and Triolet, L. 1993. *Les villes souterraines de Cappadoce*. Torcy: DMI édition.
- Triolet, J. and Triolet, L. 1996. Deux conceptions du grand souterrain: refuge Villageois Hiermont (Picardie, France) et Sivasa (Cappadoce, Turquie). *Subterranean* 97: 2–10.
- Triolet, J. and Triolet, L. 2002. L'organizzazione difensiva. Pp. 253–264 in *Cappadocia. Le città sotterranee*, ed. R. Bixio, V. Castellani, and C. Succhiarelli. Roma: Istituto Poligraficoe Zecca dello Stato.

- Triplet, J. and Triplet, L. 2013. Underground Refuges and War Tunnels (France, Cappadocia, Afghanistan, Vietnam and Lebanon). *Opera Ipogea*, 15/1: 51–60
- Urban, M. 1973a. Das Rätsel der unterirdischen Städte Südostanatoliens. Zweiter Teil: Geschichtlicher Rahmen und Deutungen. *Vorland* 7: 174–181.
- Urban, M. 1973b. Das Rätsel der unterirdischen Städte Südostanatoliens. Erster Teil: Der Befund. *Vorland* 6: 150–153.
- Urban, M. 1973c. Das Rätsel der unterirdischen Städte Südostanatoliens. Dritter Teil: Maginotlinie der Frühgeschichte. *Vorland* 8: 205–212.
- Yamaç, A. 2017. *Underground Settlements and Cave Dwellings of Agirnas Village, Kayseri (Southeast Turkey)*. Paper presented at the HYPOGEA 2017: International Congress of Speleology in Artificial Caves, Cappadocia, Turkey.
- Yamaç, A. and Tok, E. 2015a. An Architect's Underground City. *Opera Ipogea* 17/1: 37–46.
- Yamaç, A. and Tok, E. 2015b. *Surveying Some of the Touristic Underground Cities of Cappadocia (Turkey)*. Paper presented at the HYPOGEA 2015: International Congress of Speleology in Artificial Caves, Rome, Italy.
- Yamaç, A., Tok, E., and Filkci, B. 2014. St Mercurius Underground City of Saratli (Aksaray-Turkey). *Opera Ipogea* 16/2: 37–46.
- Yörükoğlu, Ö. 1989. *Underground Cities in Cappadocia*. Ankara: Aşık Ofset.