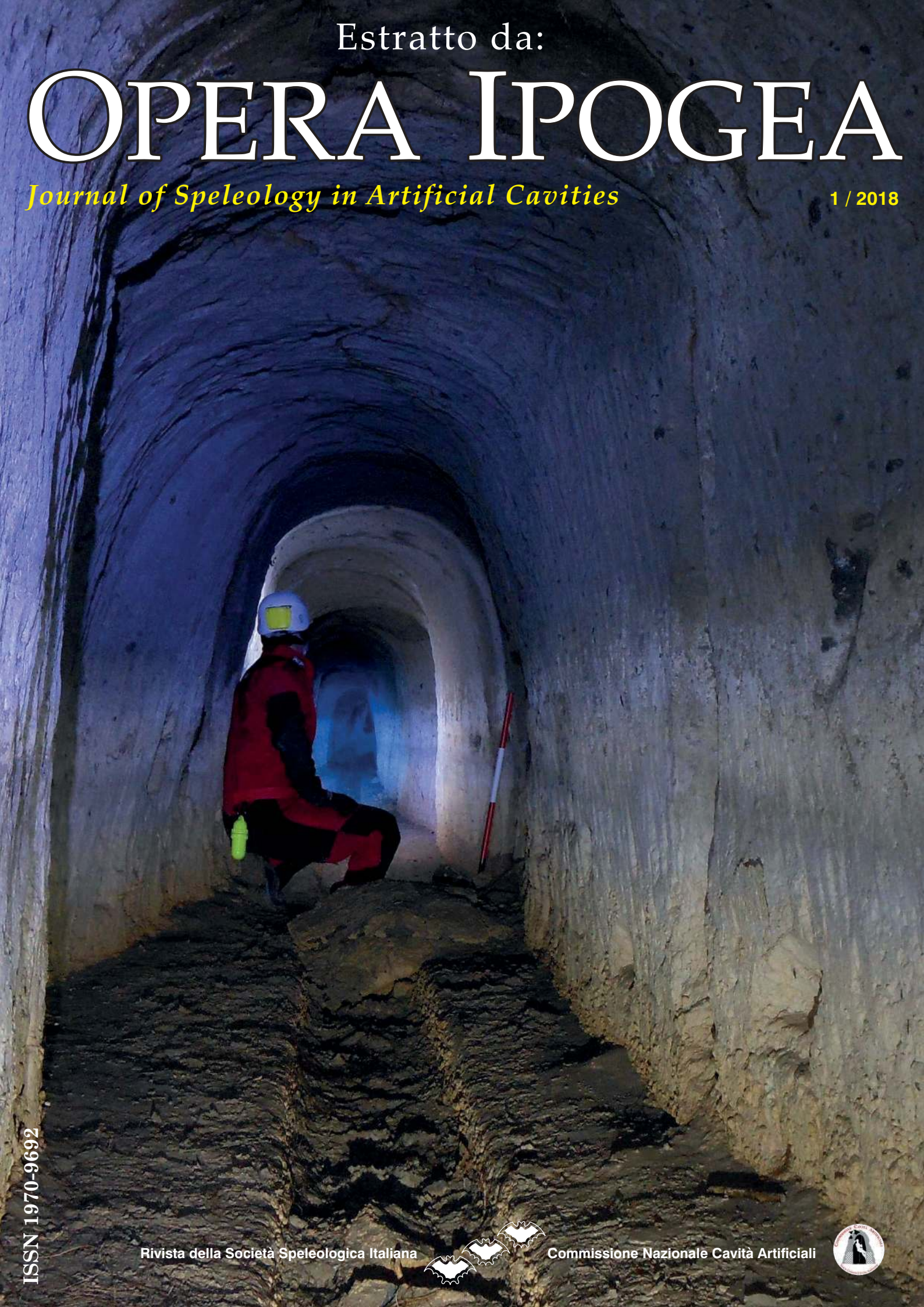
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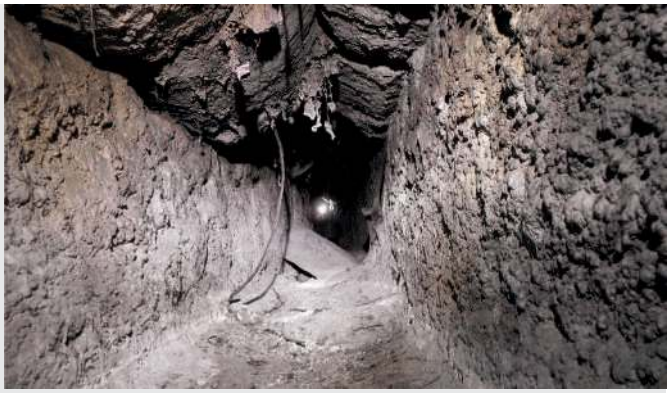
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Underground shelters of Tomarza (Kayseri – Turkey)

Ali Yamaç[1]

Riassunto

I rifugi sotterranei di Tomarza (Kayseri - Turchia)

Anche se la regione nota come "Cappadocia" fa attualmente parte della provincia di Nevşehir in Anatolia (Turchia), la capitale della Cappadocia in tempi antichi era la vicina antica Cesarea, che oggi è conosciuta come Kayseri. Analogamente a Nevşehir, nell'antica Cesarea il tufo vulcanico fu scavato dalla popolazione locale. Case, chiese e insediamenti difensivi sotterranei furono scavati in quelle rocce e vi fiorì una civiltà trogloditica. Le strutture più interessanti realizzate scavando le rocce sono probabilmente i "rifugi sotterranei". Tali strutture, utilizzate per scopi difensivi, si trovano frequentemente in tutta la Cappadocia. Le caratteristiche più importanti di tali strutture sono evidenti negli spazi abitativi e nei magazzini, collegati tra loro da cunicoli sotterranei e dotati di porte macine a difesa delle strutture. Ventinove rifugi sotterranei precedentemente sconosciuti sono stati esplorati e rilevati fino ad oggi nella provincia di Kayseri, dove abbiamo iniziato il nostro progetto nel gennaio 2014. Dopo due anni di esplorazioni nella città di Kayseri e dintorni, abbiamo iniziato ad indagare nel distretto di Tomarza. Questo articolo descrive otto diversi rifugi sotterranei situati in quel distretto che sono stati esplorati e rilevati fino ad oggi.

Parole chiave: Kayseri, Tomarza, rifugi sotterranei

Abstract

Although the region known as "Cappadocia" is currently a part of Nevşehir Province of Anatolia (Turkey), the capital of Cappadocia in ancient times was the neighboring antique Caesarea which is known as Kayseri today. As the same in Nevşehir, in antique Caesarea the volcanic tuff as dug by the local people. Houses, churches, and protective underground settlements were excavated into those rocks and a troglodyte civilization had been established. Some of the most interesting structures realized by digging rocks are probably the 'underground shelters'. These structures used for defense purposes, are frequently found throughout Cappadocia. The most important characteristics of these structures are evident in the living spaces and warehouses, connected by underground tunnels and equipped with millstones doors to protect the structures. Twentynine previously unknown underground shelters were explored and surveyed to date in Kayseri Province, since we began Inventory of Underground Structures of Kayseri Project in January 2014. After two years of survey in and around Kayseri city, we started to survey in Tomarza District. This article describes eight different underground shelters in that district that were explored and surveyed to date.

Key words: Kayseri, Tomarza, underground shelters

Introduction

Volcanoes that became active 11 million years ago, ejected tuff to Mid Anatolian Region, in an amount that reached 200 meters height at some places (Ketin, 1995; Sen et.al, 2003; Güctekin & Koprubaşı, 2009). This easy to carve soft rock has been dug by local people since antique periods, and a troglodyte civilization was established in the region that is known as Cappadocia today. The academic work and surveys of underground shelters of Cappadocia begun very lately and few different inventories have been prepared so far (Yorukoglu et al., 1989; Bixio, 2012).

During the Byzantine Empire, Cappadocia was the cradle of Christianity and the capital of the region was Caesarea. There are countless cave dwellings, rock churches and underground shelters carved into the tuff around this province, the modern name of which is Kayseri. We, as OBRUK Cave Research Group, began to survey the underground settlements and cliff dwellings located in Kayseri Province four years ago. To date, twentynine underground settlements/shelters and cliff dwellings have been explored, surveyed

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Fig. 1 - Location maps showing Kayseri Province and Tomarza District (drawing A. Yamaç).
Fig. 1 - Carte con la localizzazione della provincia di Kayseri e del distretto di Tomarza (grafica A. Yamaç).

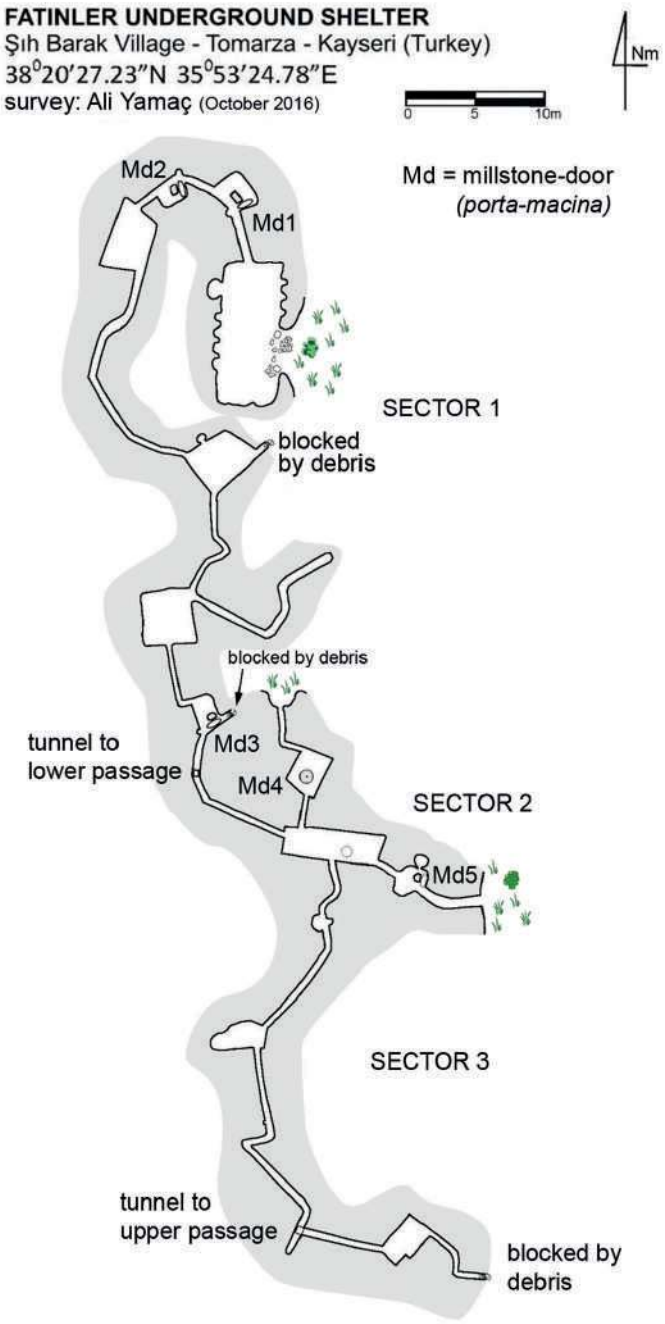


Fig. 2 - Plan of Fatinler Underground Shelter (drawing A. Yamaç).
Fig. 2 - Pianta del Rifugio Sotterraneo di Fatinler (grafica A. Yamaç)

and mapped in this province of which, almost none of them were previously studied. Regarding our project, in addition to articles which were published in OPERA IPOGEA (Yamac & Tok, 2015a; Yamac & Tok, 2015b; Yamac & Tok, 2016) and presentations in different congresses, four preliminary reports have been published so far.

From January 2014 to April 2016, we completed our surveys of underground structures around Kayseri city and surroundings, then we engaged in explorations in Tomarza District located to the south of Kayseri Province. Tomarza District has an area of 1485 km^2 and it is one of the 11 districts of Kayseri which is one of the largest provinces of Turkey (fig. 1).

This article describes eight different underground shelters that have been explored in this district to date. We believe that those structures are only a part of all underground structures in the region because during our every visit to the region, we continuously received new information about some other, previously unknown underground shelters.

At that point, we should note that in this article we prefer to use the name 'underground shelter' for the underground hiding places of Tomarza. However, all of such structures in Cappadocia were always named *yeralti sehri*, i.e. 'underground city' in numerous books and articles previously written (e.g. Yorukoglu, 1989; Triolet & Triolet, 1993; Seracettin, 1993; Faydalı, 1993; Castellani & Pani, 1995; Gülyaz & Yenipınar, 1995; Rodley, 2010). In his work published in 2012, Roberto Bixio was the first to suggest a differentiation between an 'underground town' [*sic*] and an 'underground shelter' for those structures (Bixio, 2012). Although it is reasonable to have a terminological difference between the 'underground protective settlement' with 3-5 chambers that was dug in a small village for hiding from local raids and another 'underground protective settlement' with several levels and tens of chambers as Derinkuyu, there is not a clear structural, dimensional or architectural standard between an 'underground town' and an 'underground shelter' in his article. In our opinion, as expressed by Bixio in his article, the 'satellite system' specification (Bixio, 2012) suggested for an underground defense structure to be-

come an 'underground town' can be reasonable but, architecturally discussable. We believe that a terminology standard needs to be developed for those hiding places, but we prefer to discuss that subject within a different article.

Underground Shelters of Tomarza District of Kayseri Province

Fatinler Underground Shelter

This interesting underground shelter located on the side slope facing the valley, 500 m east to Şıh Barak Village, has three different entrances. The tunnel located in the northernmost end should be the original entrance. It starts from the northern side of a large underground room with walls having niches, and it is defended by two successive stone doors.

The southern sector of the structure is at an upper level. During our survey, considering that three different tunnels blocked by debris go to east, to the valley, it is obvious that they cannot be very long if they do not go down to the lower level. The other entrance in the center of underground shelter has its own millstone door and operation room. What is interesting is that the millstone door in the very center of the structure was placed to prevent the attacks from eastern tunnels and to defend three rooms in the northern sector. In this underground shelter with seven rooms, four of the five millstone doors are *in situ* and all have operation rooms. The defence direction of each millstone reveals that the shelter, in case of need, could be isolated in at least three independent sectors (fig. 2).

İncili Underground Shelter

İncili underground shelter is located in İncili Village that is situated 10 km north of Tomarza. This underground shelter has access to surface through three entrances and two collapses and consists of three main sectors interconnected by tunnels. Two chambers in the first sector comprise two units that are connected to first of these chambers. In the cavity that is accessed by a large opening, the first chamber is 85 m^2 and has a large collapsed flue towards the north. This collapsed part has a room in the east, a blocked-end corridor connected to a passage leading outside in the

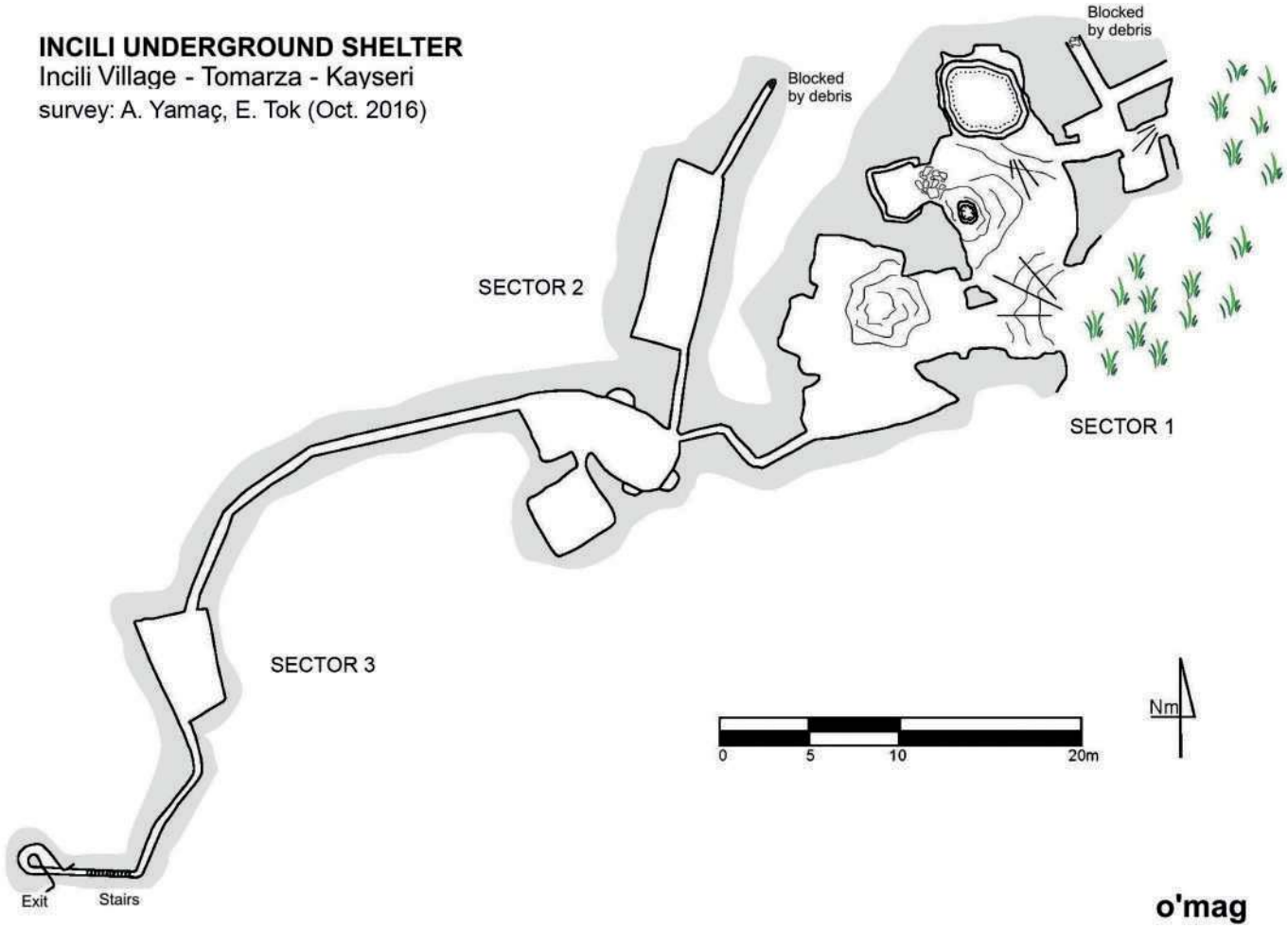


Fig. 3 - Plan of Incili Underground Shelter (drawing E. Tok and A. Yamaç).
Fig. 3 - Pianta del Rifugio Sotterraneo di Incili (grafica E. Tok e A. Yamaç).



Fig. 4 - The underground settlement which also has the main entrance to Incili Underground Shelter (photo A. Yamaç).
Fig. 4 - L'insediamento sotterraneo che ha anche l'ingresso principale al Rifugio Sotterraneo di Incili (foto A. Yamaç).

west, and a small recessed room. The second chamber is a large opening with a small collapse on the wall. The corridor connected to this chamber leads to the second sector of the cavity. This sector includes two rooms connected to the north with a short passage to a third room which ends in a blocked tunnel. Finally, the third sector, accessible through a long and wide corridor, consists of a chamber which leads to the south exit through a winding stepped tunnel. The second and third sectors have no considerable structures. It is explicit that this structure formed by rooms interconnected by narrow and long tunnels was dug for defense purposes. However, it is interesting that this structure has no millstone doors and operation rooms (figs. 3, 4).

Kirkor Underground Shelter

There is a hill 5 km north of Tomarza, immediately west to the main road. The location where this hill exists, which is apparently artificial, is named "Kirkor Place" by local people. As the pieces of pottery on the surface indicate, the history of this hill goes back to several centuries: Here there are numerous ancient tombs and an underground shelter on the plain to the south. The shelter is near the road and accessed by a very-hard-to-find entrance which opens to a room of 65 m^2 defended by a millstone door. The tunnel that extends to the north of this room ends with blocked flue after 38 meters. The gallery that goes to the south from the same room after 10 meters leads to a large chamber with six rooms. The narrow tunnel that extends to the south of the last group of chambers takes the shape of "T" after 68 meters. The tunnel going to the west from this junction becomes narrower after 34 meters, making impossible to go further. The tunnel going to the east from the junction leads to three large interconnected chambers. One of these chambers has a water well 14 m deep (figs. 5, 6).

Sümengen Underground Shelter

Sümengen Underground Shelter, located 7 km south of Tomarza and in the Sümengen Upland, is very interesting not structurally but due to its position. This underground structure is on mountain region and distant to both current and antique settlements, and must have been used as a barn for a long time. With all the tunnels blocked, this settlement seems to be a defense structure, as suggested by the presence of two millstone-doors. The first millstone is located in the central chamber, housed in a operations chamber. The second millstone is in the southern chamber, but has

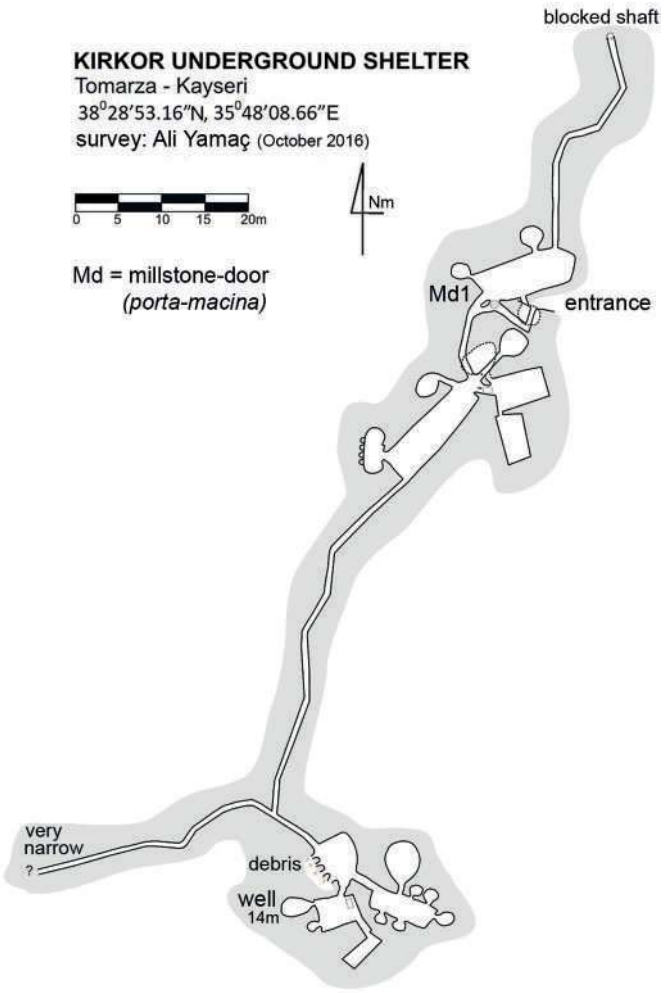


Fig. 5 - Plan of Kirkor Underground Shelter (drawing A. Yamaç).
Fig. 5 - Pianta del Rifugio Sotterraneo di Kirkor (grafica A. Yamaç).

been moved to be used in the construction of the wall near the entrance of a tunnel that goes south for 22 m. However, we do not know where the stone door was located because neither an operations room nor other possible housings are visible along the route (figs.7, 8).

Kömür Underground Shelter

This underground shelter is located in the narrow and rocky valley, 2 km south of Kömür Village of Tomarza District. The ceiling of the main hall in this underground shelter has a pit, 5.70 m height and 1.70 m diameter, with foot/hand steps on the walls. While the entrance tunnel leading to this chamber is protected by a millstone door, a pit on the chamber's ceiling that opens to the surface seems makes no sense. Thus, this pit must have been dug after the underground shelter was interrupt to be used as a defense structure. It is very difficult to use this large chamber as a silo / storage room even in this condition. The blocked main entrance tunnel of Kömür Underground City leading to the first room that is exposed by collapse is protected by a millstone door. Another millstone door protects the entrance at the beginning of narrow tunnel extending 32 meters to the northwest from the main hall. This tunnel, going up from the entrance, ends with three different rooms that were collapsed and thus open to the surface. The tunnel to the east of hall is blocked after a short distance (figs. 9, 10, 11).

Emiruşağı Underground Shelter

This underground shelter is in Emiruşağı Village located 22 km east of Tomarza. An attempt was made to offer this underground shelter to tourism



Fig. 6 - Main middle chamber of Kirkor Underground Shelter with two separate tunnels towards north. Third tunnel on the left opens to a small chamber and the hole in front descends down to two interconnected chambers (photo A.E. Keskin)
Fig. 6 - La principale sala intermedia del Rifugio Sotterraneo di Kirkor con i due cunicoli che si inoltrano verso nord. Il terzo cunicolo a sinistra immette in un piccolo vano (foto A.E. Keskin)

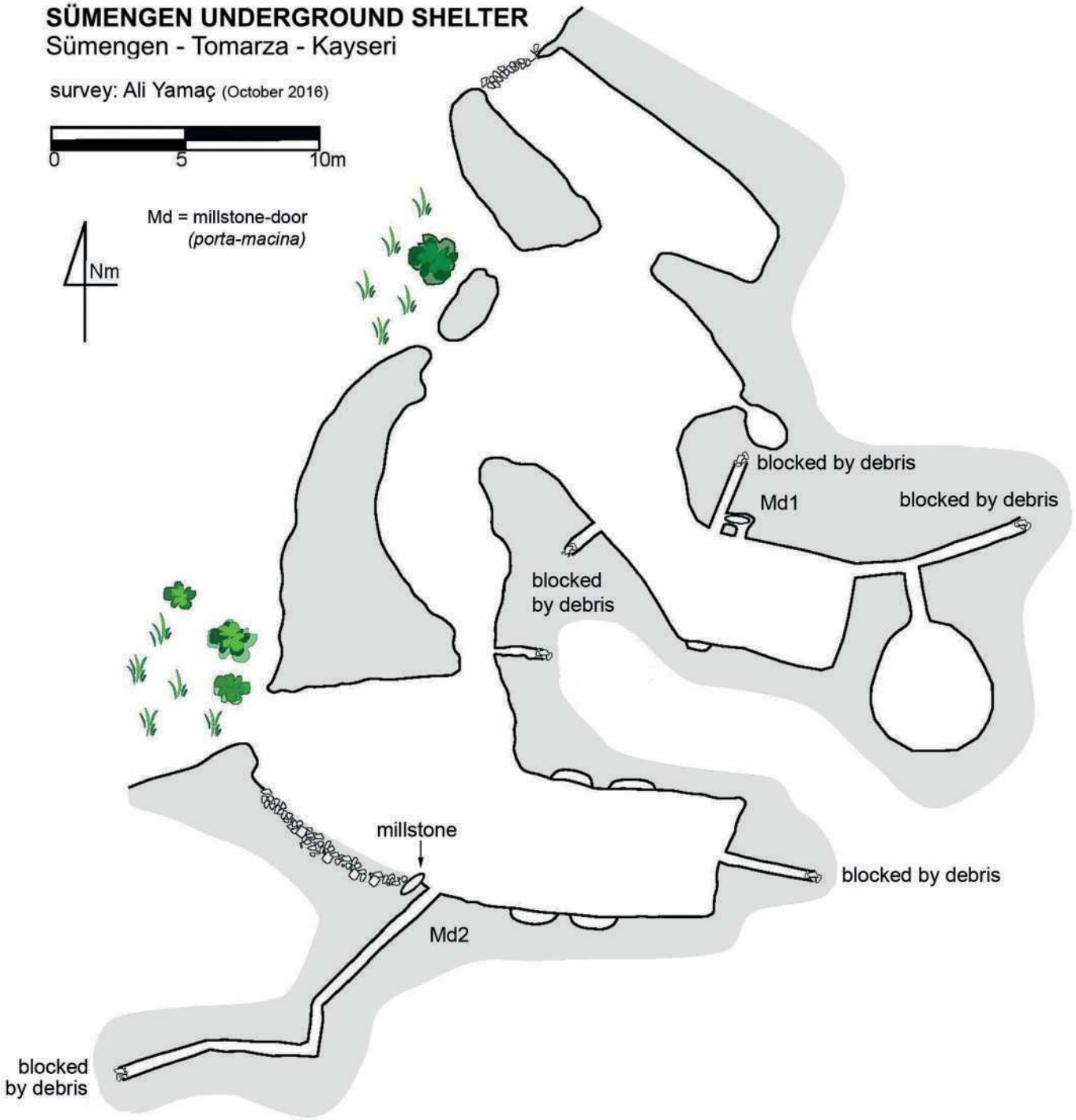


Fig. 7 - Plan of Sümengen Underground Shelter (drawing A. Yamaç).
Fig. 7 - Pianta del rifugio sotterraneo di Sümengen (grafica A. Yamaç).

years ago, and therefore an electrical wiring was installed, but it was left to its fate as probably there was no interest. The structure comprises a large hall of 33 m diameter and two main galleries extending to the north and south directions. This large hall, of which old ceiling was probably collapsed in some parts, comes after a main door that is located on the ridge of the village, on the side slope, and the walls at the entrance of this door were built by stones when were arranged for tourism purposes. The wide gallery leading to the south is full of debris and ruins. This gallery then becomes narrow and turns to the east, branching into four different arms in all of which the emptying operations from the sediments were interrupted. It is strange that an extremely well-planned defense structure has no millstone doors and "operations rooms" required to operate them, except for only one millstone door, upturned in the middle of a little chamber at the end of the southest tunnel, without the relative operations room which could be in the still buried part of the tunnel. The tunnel extending to the north of



Fig. 8 - A half buried millstone-door in Sümengen Underground Shelter (photo A. Yamaç).
Fig. 8 - Una porta-macina semi interrata nel Rifugio Sotterraneo di Sümengen (foto A. Yamaç).

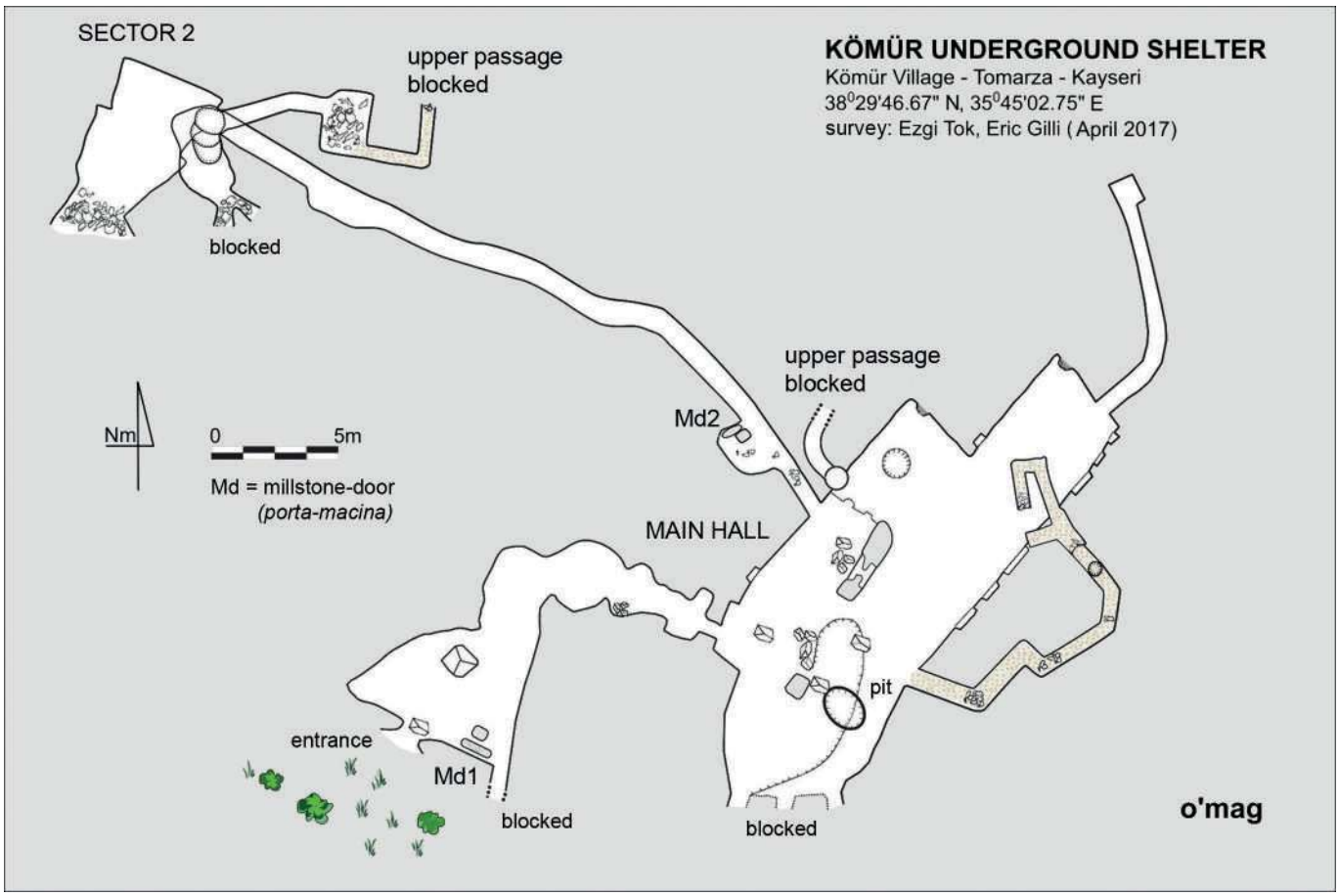


Fig. 9 - Plan of Kömür Underground Shelter (drawing A. Yamaç).
Fig. 9 - Pianta del Rifugio Sotterraneo di Kömür (grafica A. Yamaç).

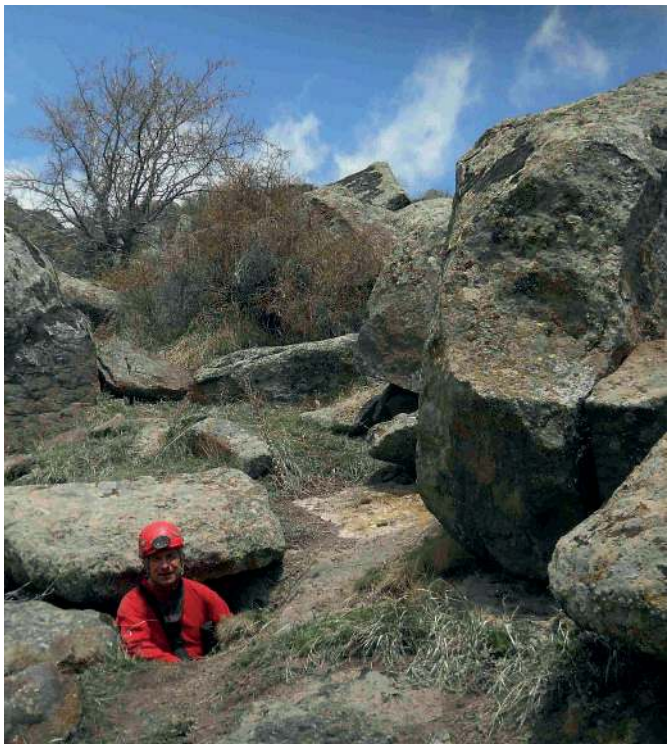


Fig. 10 - Entrance of Kömür Underground Shelter (photo A.E. Keskin)
Fig. 10 - Ingresso del Rifugio Sotterraneo di Kömür (foto A.E. Keskin).

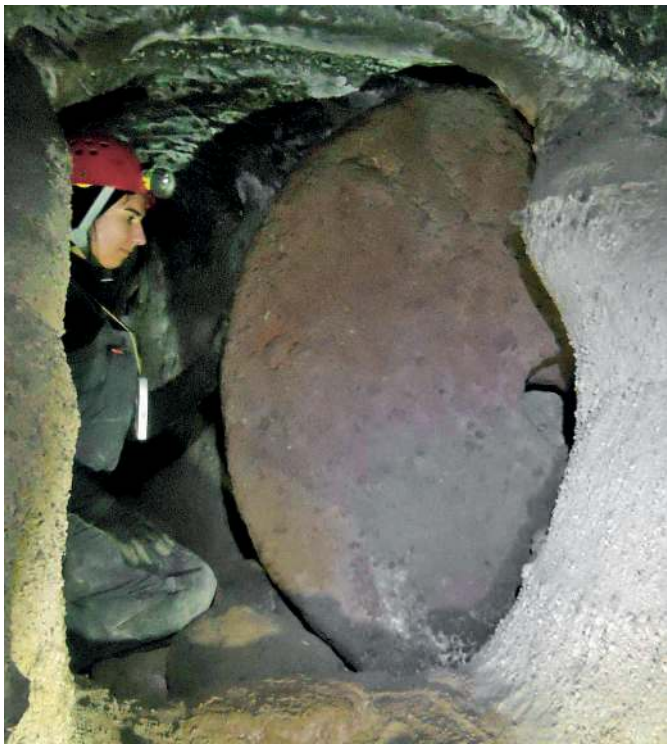


Fig. 11 - The millstone-door placed in the west tunnel of Kömür Underground Shelter (photo A. Yamaç).
Fig. 11 - La porta-macina collocata nel cunicolo occidentale del Rifugio Sotterraneo di Kömür (foto A. Yamaç).

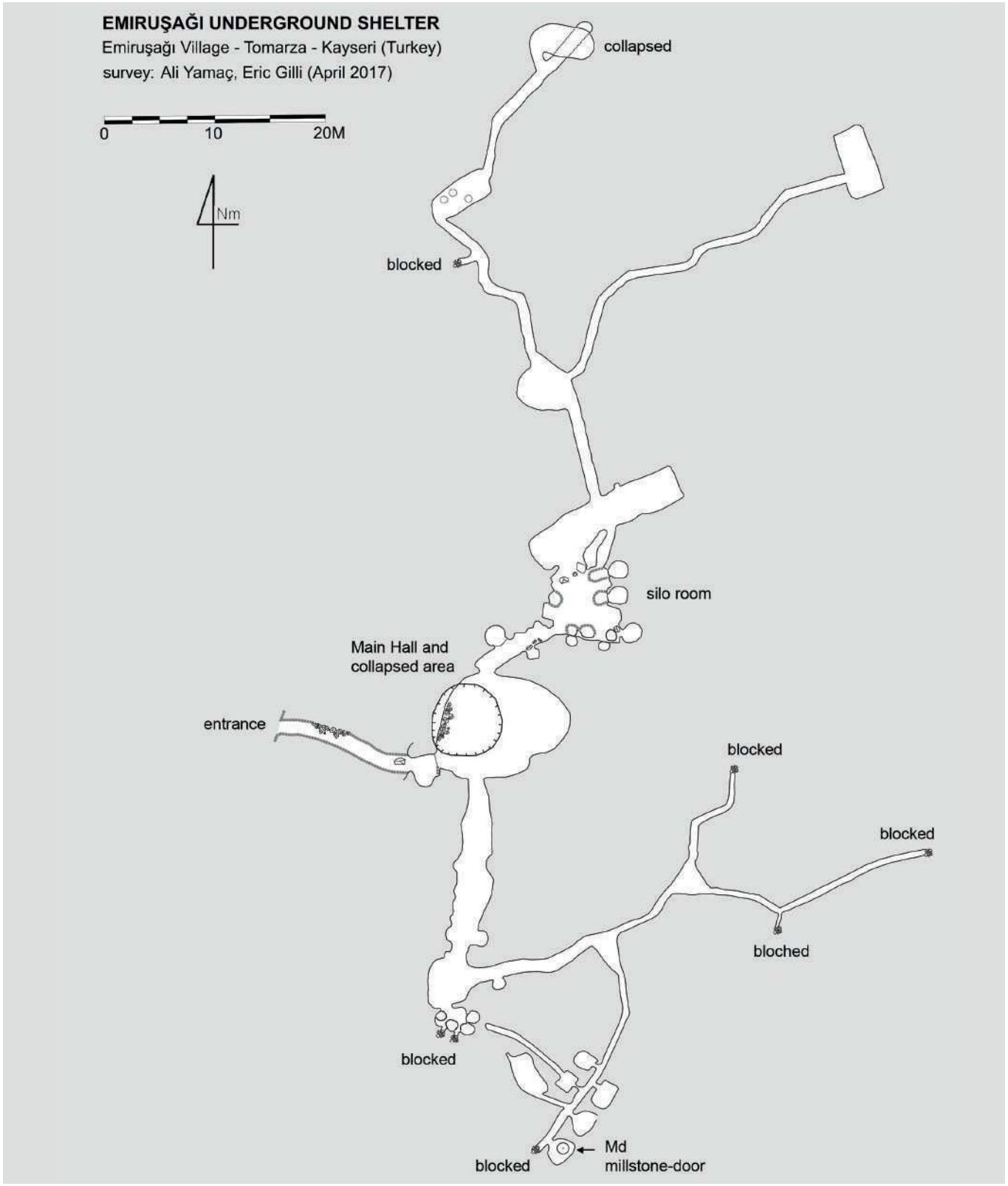


Fig. 12 - Plan of Emiruşağı Underground Shelter (drawing A. Yamaç, E. Gilli).
Fig. 12 - Pianta del Rifugio Sotterraneo di Emiruşağı (grafica A. Yamaç, E. Gilli).

the main hall is longer than the southern one. This tunnel bifurcates 13 m after a hall that is full of underground storage rooms. The tunnel that turns to the east ends after 38 meters with a small room of 16 m^2. If this room, accessed by a long tunnel, is a "last defense" point, it is interesting that there are no millstone doors, door shafts on the wall or operations rooms until this room. The other tunnel going to the north ends after a blocked branch and a room with three silos (figs. 12, 13).



Fig. 13 - Blocked south branch of eastern tunnel of Emiruşağı Underground Shelter (photo A.E. Keskin).
Fig. 13 - Occlusione della diramazione sud del cunicolo orientale del Rifugio Sotterraneo di Emiruşağı (foto A.E. Keskin).

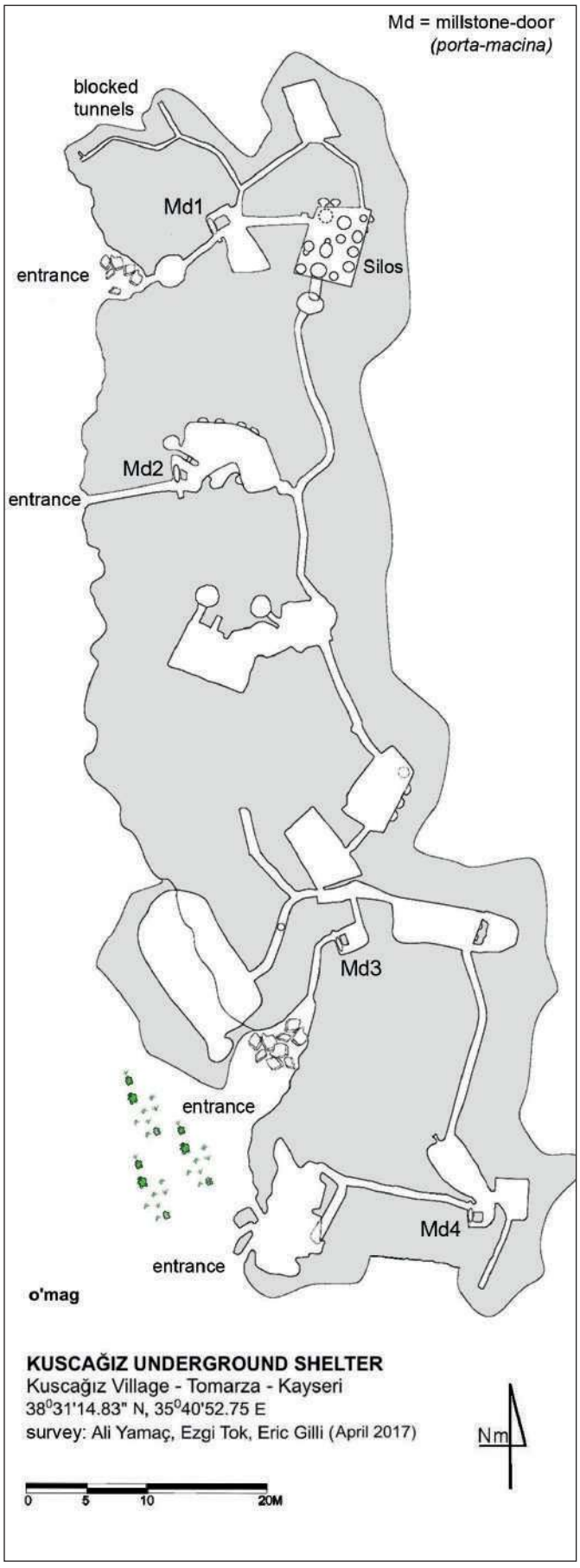


Fig. 14 - Plan of Kuşcağız Underground Shelter (drawing A. Yamaç, E. Tok, E. Gilli).
Fig. 14 - Pianta del Rifugio Sotterraneo di Kuşcağız (grafica A. Yamaç, E. Tok, E. Gilli).

Kuşcağız Underground Shelter

Kuşcağız Underground Shelter is located in the valley 3 km east to Kuşcağız Village, a village of Tomarza District, and is one of the largest underground shelters we have surveyed in Kayseri region so far. The measured total length of this structure is 485 meters, and it has three different entrances surrounded by collapsed rocks on the side facing the valley and a fourth entrance is in front of the valley. Due to collapses on the valley wall, it is not possible to clarify the size of the cliff settlement. But, the valley and its rocky sides have numerous tomb structures and some of those rock-cut graves were built in the Roman and Byzantine period. As Kirkor and Kömür underground shelters in the same region, it is interesting that Kuşcağız Underground Shelter was dug within an area of graves. The length of north-south axis of the shelter is 105 meters and all four entrances are protected by millstone doors. Some of the total 10 chambers are impressive like the one that is located after the second entrance to the north and on level lower than the entrance, having a dimension of 13×7 m. The room in the northern section that seems to be a storage chamber has 11 underground silos. On contrary to the tunnels in the south of structure that were stopped to be excavated, two tunnels leading to the north are blocked with debris (figs. 14, 15). The ruins on the surface are the proof indicating how the valley is archaeologically important, and this region deserves a survey much more comprehensive than our exploration that we conducted in harsh conditions of winter and in a relatively short time.

Eski Pusatlı Underground Shelter

There is an underground structure, known as "Old Pusatlı Village" by local people, that is located 2 km north of Pusatlı Village, a village of Tomarza District, on the plain in front of a rocky ridge. What is interesting is that this hypogeic settlement was realized digging into a flat lowland in front of an existing cliff: In other words, it was not dwelled into the cliff walls as we observe in many different parts of Kayseri region. A major part of approximately thirty underground structures identified in the region are blocked and destructed due to collapses or alluvium. On the other hand, an underground shelter, the only large structure we could find and survey among all those blocked settlements, has a digging technique with much higher quality than that of any defense structures we have surveyed in Tomarza, even across Kayseri in terms of workmanship. Although some parts are collapsed or subject to severe destruction of treasure hunters, the construction observed in the surveyed tunnel and chambers is perfect. The structure extends to the north through a narrow and inclined tunnel and leads to upper level after the entrance protected by a millstone door. This upper level has a total of four entrances with one exposing to surface and three blocked. There are three different chambers to the east of the entrance at the lower level. The west-



Fig. 15 - Southernmost tunnel and millstone door of Kuşcağız Underground Shelter (photo A.E. Keskin).
Fig. 15 - La porta-macina nel cunicolo più meridionale del Rifugio Sotterraneo di Kuşcağız (foto A.E. Keskin).

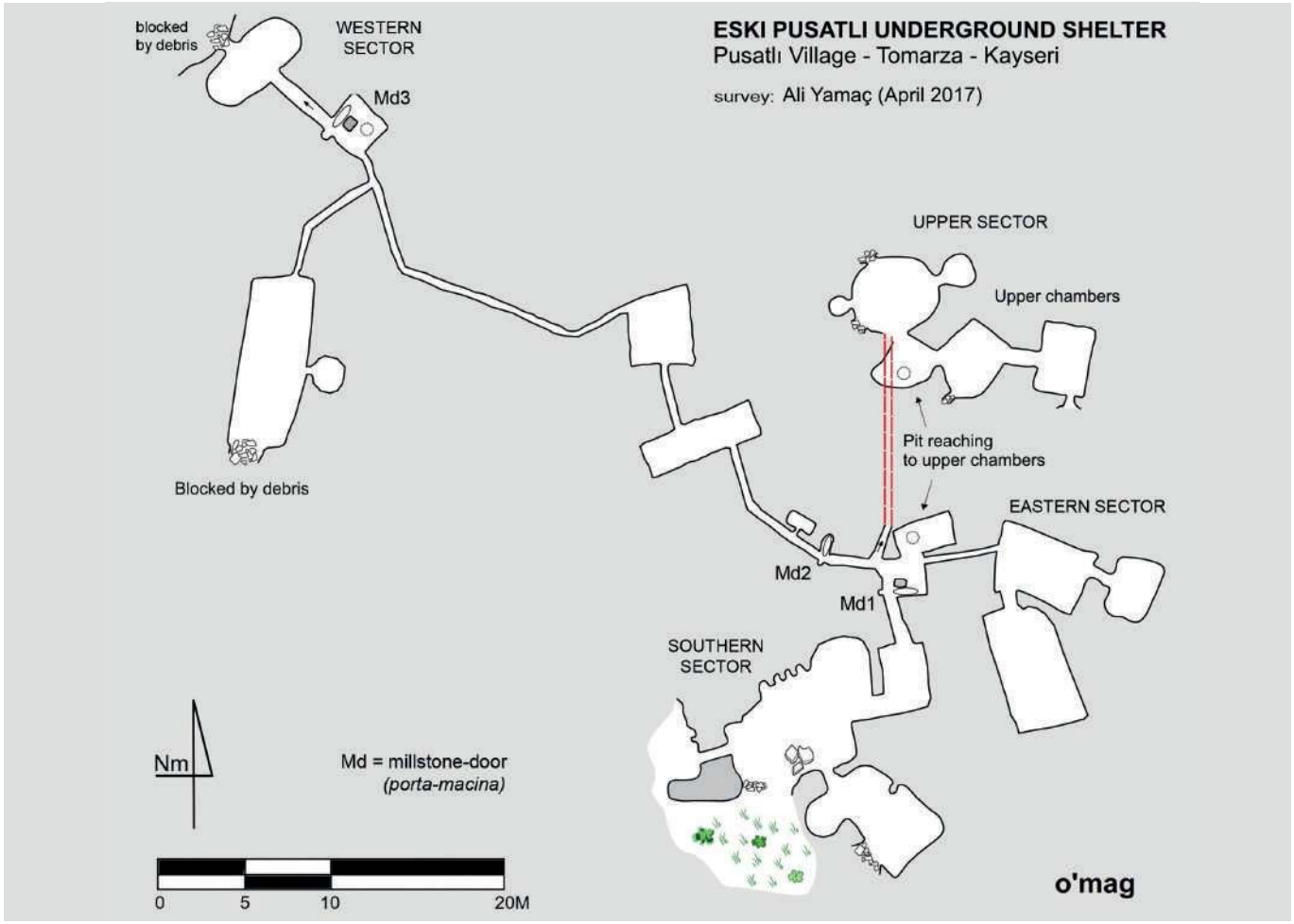


Fig. 16 - Plan of Eski Pusatlı Underground Shelter (drawing A. Yamaç).
Fig. 16 - Pianta del Rifugio Sotterraneo di Eski Pusatlı (grafica A. Yamaç).



Fig. 17 - Main entrance to Eski Pusatlı Underground Shelter from the southern sector (photo A.E. Keskin).
Fig. 17 - Ingresso principale del settore meridionale del Rifugio Sotterraneo di Eski Pusatlı (foto A.E. Keskin).



Fig. 18 - First millstone door after the entrance tunnel at Eski Pusatlı Underground Shelter (photo A.E. Keskin).
Fig. 18 - La prima porta-macina dopo l'ingresso del cunicolo del Rifugio Sotterraneo di Eski Pusatlı (foto A.E. Keskin).

ern tunnel leads to three large chambers defended by two different millstone doors. It is interesting that the millstone door that exists and still stands 3 m after the tunnel entrance has no operation room. This part extends to the west with three large rooms and one small room and ends with a settlement of which exit to surface is blocked by excavation after another entry point protected by another millstone door (figs. 16, 17, 18). On the other hand, this settlement, has never been scientifically surveyed, and it is likely that the region may have underground defense structures other than this underground shelter.

Conclusion

As in other districts of Kayseri, some villagers were occasionally unwilling to show us the underground shelters in Tomarza. Despite all our legal permissions, no information was obtained from some of the villages in this district. Therefore, we are inclined to conclude that it is highly probable that Tomarza has more than the above mentioned eight underground shelters.

Furthermore, we observe that, in general, these are modest and elementary structures. However, in view of the numerous tunnels obstructed by debris and, therefore, still unexplored, we have a well-founded suspicion that some of them, in addition to being more extensive, can be even more complex. Suffice it to say that, in the areas west of Nevşehir, underground shelters have been documented that exceed the kilometer of development, organized with multiple locking devices, with mutual and progressive defense, so as to constitute isolated sectors by means of insulating chambers (Bixio, 2012).

On the other hand, differently from neighboring districts, Tomarza has no cliff dwellings in the parts we surveyed, which may be interpreted as a natural consequence of region's geological formation.

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References

Bixio R. (ed.), 2012, *Cappadocia: Schede dei siti sotterranei / Records of the underground sites*. Archaeopress, Oxford.

Castellanı V., Panı G., 1995, *Filiktepe: a step toward underground towns*, in Bertucci G., Bixio R., Traverso M. (eds.), Le città sotterranee della Cappadocia. Erga edizioni, Genova, pp.53-67.

Faydalı E., *1993, Kavlaktepe Yeraltı Şehri Kurtarma-Temizlik Kazısı*, in III Müze Kurtarma Kazilari Semineri, Ankara.

Guctekin A., Koprubasi N., 2009, *Geochemical Characteristics of Mafic and Intermediate Volcanic Rocks from the Hasandağ and Erciyes Volcanoes (Central Anatolia, Turkey)*. Turkish Journal of Earth Sciences (Turkish J. Earth Sci.), Vol. 18, pp. 1–27.

Gülyaz M., Yenıpınar H., 1995, *Establissements rupestres et villes souterraines de Cappadoce*). Nevsehir.

Ketin I., 1995, *Erciyes Dağı Volkan Topluluğunun Jeolojik Evrimi*, (ed. Oğuz Güler, Antik Çağ İkonografisinde Erciyes, Arkeoloji ve Sanat Yayınları), İstanbul, pp. 97-115.

Rodley L., 2010, *Cave monasteries of Byzantine Cappadocia.* Cambridge University Press, Cambridge.

Sen E., Kurkcuoglu B., Aydar E., Gourgaud A., Vincent P.M., 2003, *Volcanological evolution of Mount Erciyes stratovolcano and origin of the Valibaba Tepe ignimbrite (Central Anatolia, Turkey)*. Journal of Volcanology and Geothermal Research no.125, pp. 225-246.

Seracettın S., 1993, *Özlüce Yeralti Şehri*, in III. Müze Kurtarma Kazilari Semineri. Ankara.

Trıolet J., Trıolet L., 1993, *Les villes souterraines de Cappadoce*. Editions DMI, Torcy.

Yamac A., Tok E., 2015a, *An Architect's underground shelter.* Opera Ipogea 1–2015, pp. 37-46.

Yamac A., Tok E., 2015b, *Cave dwellings and underground shelters of Belagasi village and Otedere Valley (Kayseri - Turkey).* Opera Ipogea 2–2015, pp. 41-50.

Yamac A., Tok E., 2016, *Doganli underground shelter (Capadocia – Turkey)*, Opera Ipogea 2–2016, pp. 57-62.

Yorukoglu Ö. et al., 1989, *Underground Cities in Cappadocia*. Ankara.

