Before and after: investigations of prehistoric land use in relation to the Early Iron Age settlement and tumulus necropolis on the Érd/Százhalombatta-plateau

by Zoltán Czajlik, Eszter Fejér, Katalin Novinszki-Groma, László Rupnik, András Bödőcs, Rebeka Gergácz, Balázs Holl, András Jáky, Géza Király, Gabriella T. Németh, Sándor Puszta and Bence Soós

Abstract
Located on the fringes of the Eastern Hallstatt culture, the tumulus cemetery at Érd/Százhalombatta is one of the earliest identified archaeological sites in Hungary. The first map of the site was drawn in 1847; the number of mounds registered at the time (122) did not change substantially until the end of the 20th century. The aerial archaeological investigations from 2001 and the magnetometer geophysical survey from 2012 led to the identification of another 103 ring ditches. In the framework of the Iron-Age-Danube project aerial archaeological and geophysical research were continued and complemented with systematical field walkings. Not only the Early Iron Age tumulus field but also the Iron Age settlement area was investigated. The results presented in this paper aim at giving an overview on the land use in the periods of the Bronze, Iron and Roman Ages.

1. Introduction

The area around Százhalombatta has been known to archaeological research for a long time: the fortified Bronze Age tell-settlement, the Early Iron Age tumulus cemetery, the Celtic fortification, the Roman road and *castellum* are emblematic archaeological features/peculiarities of the region. Over the past decades several macro- and micro-scale investigations have contributed to our knowledge on the occupation of the area.[1]

The expression *százhalom* ("hundred mounds") in the name of the town of Százhalombatta is attested in the form *Zazholm* at a fairly early date, around 1283, in Simon Kézai's chronicle, one of the most important medieval historical sources of Hungary.[2] Its Latin counterpart, *centum montes*, appears even earlier, in another early medieval chronicle, the *Gesta Hungarorum* of the Anonymous Notary.[3]

The Érd/Százhalombatta tumulus cemetery (*fig. 1*) lies south of Budapest, in a loessy area with a relative altitude of 100 m flanking the western Danube bank, north of the Benta stream, the largest watercourse of the area flowing into the Danube. Due to the bend of the river the Danube slightly cuts into the plateau, thus the area between the water and the plateau is not suitable for regular land traffic. In the

[1] Hungarian Archaeological Topographic Survey (MRT) (Dinnyés et al. 1986), the Százhalombatta Archaeological eXcavation Project (SAX) and the Benta Valley Project (Poroszlai 2000; Poroszlai/Vicze 2000; Poroszlai/Vicze 2005; Earle et al. 2010) investigated the archaeological remains of the region. The latter project focused primarily on understanding the Bronze Age network system in the Benta valley.
[2] Szentpétery 1937, 149.
[3] Szentpétery 1937, 95.

Fig. 1: Érd/Százhalombatta Early Iron Age tumulus field. Aerial view from north (Zoltán Czajlik, April 27, 2018)

past 230 years, the road along the Danube surely did not lead up to the plateau, avoiding this difficult section. The tumuli are located roughly parallelly to the river in a north/south and northwest/southeast direction; earlier surveys indicated that the site extended across a circa 50 ha large area measuring 1200 m × 400 m, which was declared as a protected archaeological monument.

2. Previous research

Topographic research on the imposing burial mounds known to the medieval chroniclers, who used them as a setting for various events of the Hungarian Conquest period, began some 170 years ago, when János Varsányi prepared the topographic map of the tumulus cemetery in 1847 (*fig. 2*).[4] His map depicts 122 tumuli, the location of which correlates surprisingly well with the mounds recorded during the survey conducted by Dénes Virágh and István Torma around 140 years later, who identified 123 barrows. Their map, the tumulus numbers of which has been used ever since, was based on an aerial photograph made in 1953.[5] Although the aerial archaeological investigation of the well-known site lying fairly close to Budapest

[4] Luczenbacher 1847, pl. 5.
[5] Dinnyés et al. 1986, 228–231.

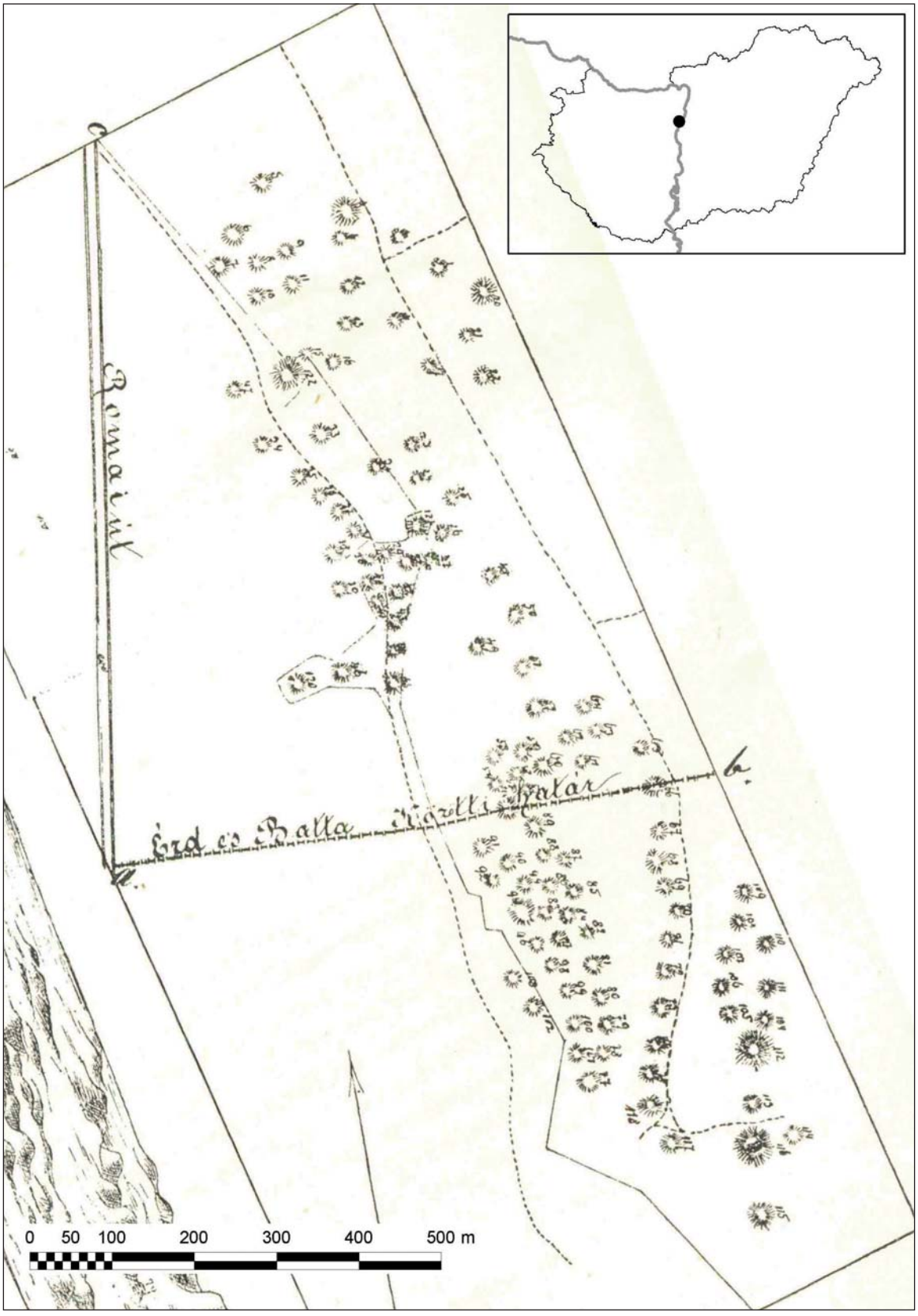

Fig. 2: The tumulus field on the 1847 map of János Varsányi (Balázs Holl)

Fig. 3: Tumulus 120 and its environs. Aerial photo of René Goguey (June 6, 1993)

has begun quite early, before World War II, the photos made by István Gersi in May 1934 were soon forgotten. D. Virágh and I. Torma were unaware of their existence at the time of their survey; the pictures have only been recently identified among the records kept in the Hungarian National Museum.[6] The area south of the tumulus cemetery was not built in at the time these photographs were made. Thus it was expected that the remains of possible additional tumuli would be visible – however, there were no soil marks or other features to indicate their presence.

Although several photos were made of the tumulus cemetery as a part of the Hungarian-French aerial archaeological project (*fig. 3*),[7] a systematic investigation only began in 2001, as part of a research collaboration between the Institute of Archaeological Sciences of the Eötvös Loránd University in Budapest and the Matrica Museum of Százhalombatta. The possibility that there were other archaeological features in the cemetery in addition to the already known burial mounds and their remnants were first conjectured during this project.[8] A few burial mounds of the tumulus cemetery were opened under the direction of the historian István Horváth before 1843; later, in 1847, János Luczenbacher (Érdy) excavated four tumuli.[9] In May 1866 Flóris Rómer investigated Tumulus 120; in 1872 Gyula Kereskényi opened two

6 Holl/Czajlik 2013, 27., fig. 2.
7 Goguey/Szabó 1995, 20., fig. 65.
8 Czajlik 2008.
9 Luczenbacher 1847.

mounds, and four years later, in 1876, another two mounds were explored by Elek Csetneki Jelenik.[10]

Between 1978 and 1996 Ágnes Holport conducted the salvage excavation and systematic research investigation of eight tumuli: in the case of Tumulus 118, she identified the traces of the 19th century excavation. It proved impossible to conclusively determine whether the other seven tumuli unearthed in the southern part of the cemetery had been studied previously;[11] it would appear that roughly 18 burial mounds had been opened during the 19th–20th centuries. However the investigation of the tumuli did not mean their complete excavation: in the 19th century, a trench cutting across the entire mound was only opened in the case of Tumulus 120, while the field documentation from the 20th century[12] indicates that with the exception of Tumulus 115, the investigations focused on the central part of the mounds. In summary, this means that we have information on the structure of not more than 15% of the known mounds and that this information is essentially restricted to the central burial zone.

Not all of the mounds have been raised over a wooden burial chamber; if there was one, it was usually constructed on a 4-5 m × 4-5 m large clay floor. Stone rings were often observed around the burial chamber, although these could equally well be interpreted as the remains of the stone packing once covering the burial chamber.[13] The remnants of a low bank preserved to a height of 0.7 m which once encircled Tumulus 115 were documented during the modern excavation;[14] however, no ring ditches enclosing the tumuli were observed in the case of the vanished tumuli and neither do the excavation reports mention other possible features between the mounds.[15]

3. Methodology

The area of the Érd/Százhalombatta tumulus cemetery is owned by several persons, who typically possess small fields, utilised variously: as ploughland, orchards and gardens. This means that the investigation of the area can only be conducted in several successive phases across smaller fields only, which are explored at a time when conditions are more suitable for that particular area (*fig. 4*).

In the framework of the Hungarian-French aerial archaeological cooperation, and later in connection with our own research programs, aerial photographs were regularly taken of the mosaic-like cultivated area. The first geophysical surveys were conducted between 2012 and 2014 thanks to them and to aerial photography, the number of tumuli known from the necropolis area increased by 103 mound-traces.[16] The aggregation of the new data on the one hand increased the area of the cemetery, but on the other hand it rebutted the earlier idea of dividing the cemetery

[10] Dinnyés et al. 1986, 230.
[11] Holport 1996.
[12] Holport 1985.
[13] Holport 1996, 40–41.
[14] Holport 1996, 40–41.
[15] Holport 1986; Holport 1996.
[16] Czajlik et al. 2016, 65.

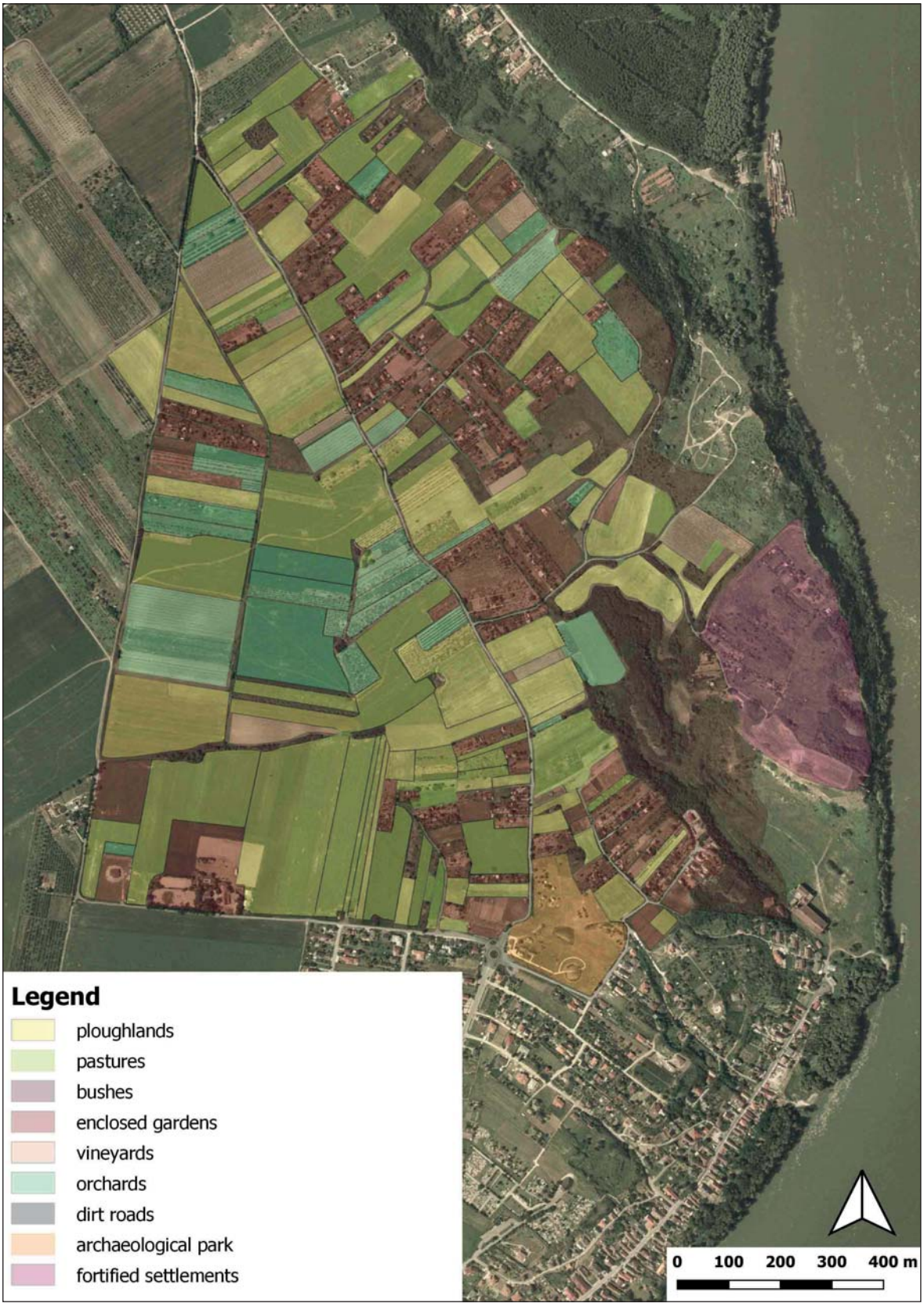

Fig. 4: Types of surface covers on the Érd/Százhalombatta plateau (László Rupnik)

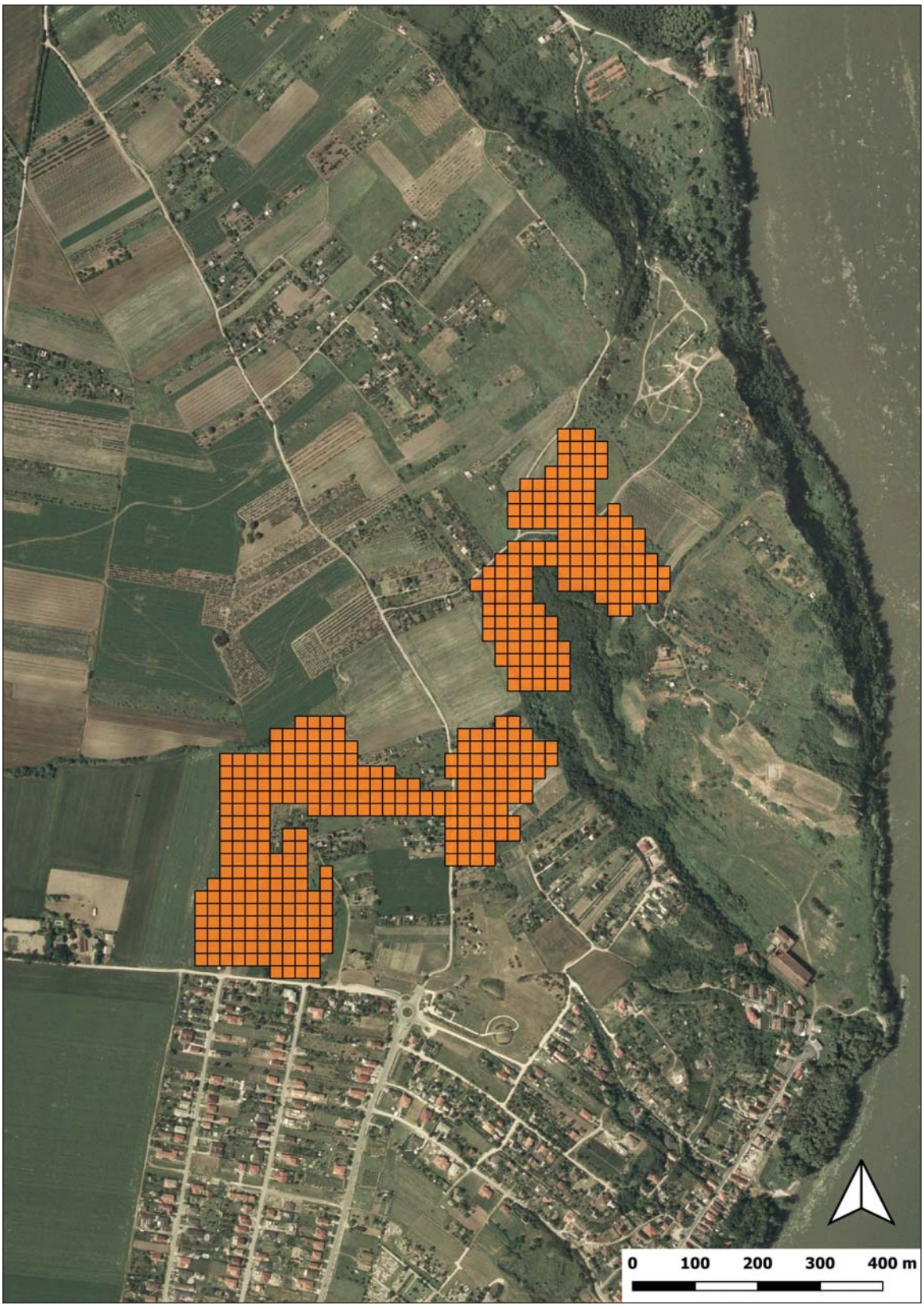

Fig. 5: Systematic grid walkings on the southern part of the Érd/Százhalombatta plateau (László Rupnik – Rebeka Gergácz, 2017–2018)

into two parts. In parallel with the topographic research, the Tumulus 64 and 49 were investigated with test excavations in 2013–2016.[17]

In the framework of the IAD programme, the aerial photographical activity was continued, based on which the magnetometer surveys were extended to new zones. Until February 2019 aerial archaeological photography took place 12 times, and magnetic mapping reached 50 ha in 30 working days between 2017–2018. In 2017–2018 systematic grid walking survey was carried out 6 times, on a total of 17.54 ha (*fig. 5*). Their main purpose was to gain more information about the southern edge and the eastern side of the tumulus field, furthermore about the settlement area connected to it, which are more difficult to survey with the above mentioned methods.

For the timing of our research, we had to constantly adapt to the current state of the diverse cultivation areas, looking for ideal time windows not only for aerial photography (clean air, good lighting and vegetation conditions), but also for magnetometer surveys (low noise, preferably non-ploughed areas, orchards in leafless periods) and field walking surveys (outside the vegetation period, under good prospection conditions).

In connection with field work, we reviewed the First (1763–1787), Second (1806–1869) and Third (1869–1887) Military (or Land) Surveys of the Habsburg Empire, and a 330 ha terrain model based on the ALS in 2017 of the Érd/Százhalombatta loess plateau. We conducted additional/experimental drone flights and gathered data about the Bronze, Late Iron and Roman Age topography of the area.

In order to understand the formation of the Early Iron Age monumental landscape and land use after the abandonment of the tumulus cemetery, a diachronic (that is, to analyze not only the topographical relations of the Hallstatt necropolis, but also the settlement and burial conditions of the periods before and after the Hallstatt period) approach is necessary.

4. Bronze Age antecendents

The earliest prehistoric remains in the area belong to the Early Bronze Age. EBA Nagyrév type material has been attested in the first layers of the Földvár tell settlement situated on top of the loess plateau.[18] In this period only a small settlement was established on the hilltop, and as the results of the Benta Valley Project suggest, the area adjacent to the tell also had a low population density.[19] The material collected during our systematic topographic survey does not allow us to safely outline the scope of the EBA site, since the heavily fragmented pottery of Nagyrév and Vatya style are very similar and difficult to distinguish from each other.[20] Based on our investigations carried out outside the Iron Age fortification we can agree on a restricted distribution area of the EBA settlement. It has been assumed that the EBA people had not only

[17] T. Németh et al. 2016.
[18] Kovács 1969; Poroszlai 2000.
[19] Earle/Kolb 2010, 72; Artursson 2010, 104. The estimated territory of the EBA site is around 2 ha.
[20] Cf. the method of the Benta Valley Project: Earle et al. 2011.

used the natural protection of the hillside but they had already built an enclosure around their occupation area.[21]

The tell site had been continuously settled until the end of the Middle Bronze Age. The transition between the layers characterized by Nagyrév and Vatya type archaeological material was uninterrupted. The largest part of the multi-layer site was accumulated during the MBA. In this period the settlement was fortified with a ditch and a rampart. A part of the Bronze Age fortification ditches could be identified during the exploration drilling by András Varga.[22] Based on this research and on the part of the fortification that can be observed on the surface today it is an approximately W-E oriented ditch running towards the loess wall sloping into the Danube on the east. Its W/NW section cannot be traced due to a brickwork quarry. According to Varga's examination on the topography of the subsoil, not only the above mentioned ditch, but also a palisade wall can be reconstructed. Furthermore, he was the first, who also draw attention to the earlier inner ditch, presumably used by the first inhabitants of the site. Using the results of the morphological survey Magdolna Vicze and György Füleky tried to clarify the extent and the geomorphological structure of the Bronze Age settlement.[23] It became clear that the brick factory established at the end of the 19th century in the vicinity of the tell destroyed at least two-thirds of the prehistoric site. Therefore our aerial archaeological research conducted since 2001 was limited to the present southern edge of the plateau, which was originally the northern part of the Bronze Age settlement. For this reason to study the former extension of the site we have to rely on old surveys and maps. Based on the Second Military Survey (1869) it can be stated that the possible southernmost boundary of the prehistoric settlement(s) was aligned with a network of gullies, in which the modern brick factory started to extract clay and subsequently the whole area became one large quarry and field (*fig. 6*). The fortified section was around 2.5 ha, but based on the distribution of the collected ceramic material the occupation spread north across another 3 ha – within the area which was enclosed later in the Iron Age.[24] The fact, that MBA settlement finds scatter in the area between the Iron Age rampart and the MBA fortification, and also in the territory north of the Celtic rampart was already known, but high density of MBA finds west from the long gully network could be identified only as the result of new systematical topographic research. In this recently discovered area mostly MBA and some LBA material was collected (*fig. 7*). Our investigations which focused on the area outside the Late Iron Age fortification were also able to define a further accumulation of MBA finds west of the tumulus cemetery. During our survey we discovered here a destroyed grave, parts of a vessel and small amount (ca. 30 pieces) of white cremated bones. Most of the bones belonged to the lower and upper limbs, but some remains of the skull were also described. The anthropological research proved that they are the cremains of a child (infans II, 8–14 years).[25] Contemporary

[21] Vicze 2005, 66–68.
[22] Varga 2000, 78., fig. 2, 5.
[23] Vicze 2001; Füleky/Vicze 2003; Vicze 2005, 67–68., fig. 3–4.
[24] Poroszlai 2000; Vicze 2005, 66–68; Artursson 2010, 107, cf. also Vicze et al. 2005.
[25] Anthropological analyses conducted by Mónika Merczi.

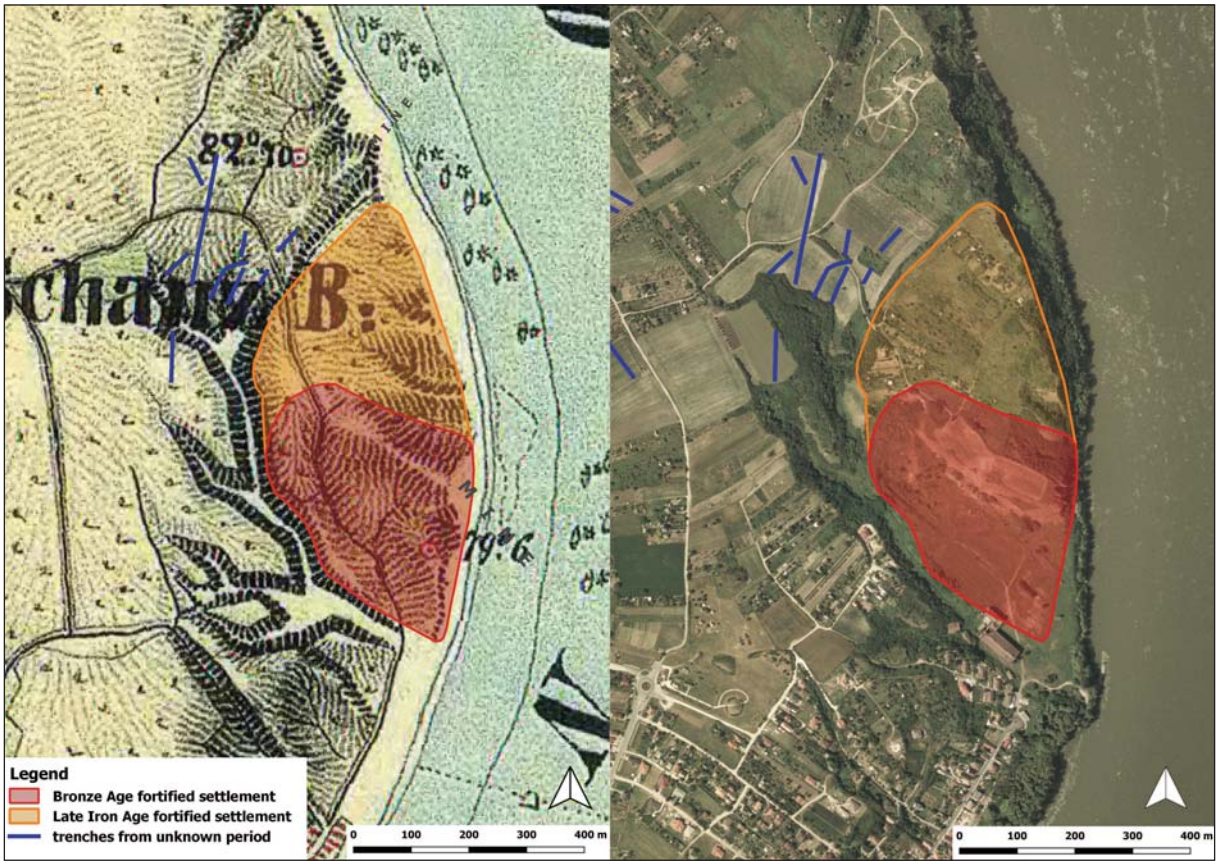

Fig. 6: Reconstructed extension of prehistoric settlements at Százhalombatta based on the Second Military Survey (Zoltán Czajlik – László Rupnik)

burials are barely known in the micro-region, but other elements (settlements) of a MBA network in the Benta valley are well known.[26]

After a 300–400 year long hiatus, the territory of the tell site was reinhabited during the Late Bronze Age in the Urnfield Period. Since the remains of this period were later destroyed by a Celtic settlement, only scatter finds and some excavated pits relate to this phase. The occupied territory reached over 7.7 ha, but seemingly it was less densely populated. Our survey has also proved the large extension of the LBA occupation: a huge amount of LBA ceramic was collected mostly northwest of the main Celtic rampart. In the territory of the tumulus cemetery some further finds dated to the LBA or EIA were detected. The northern zone of the distribution area of the LBA material approaches the nearest contemporaneous settlement and

[26] During the excavation of the Early Iron Age tumulus 74, a cremation burial of the EBA was unearthed in Százhalombatta (Holport 1980, 21). The grave we discovered is located just a few hundred meters away from the published burial, close to the EBA-MBA site of Százhalombatta-Tóth tanya (Dinnyés et al. 1986, 27/7; Vicze et al. 2005). Érd-Külső újföldek (Dinnyés et al. 1986, 9/3), Érd-Belső újföldek (Dinnyés et al. 1986, 9/4) are the nearest settlements (Dinnyés et al. 1986; Vicze et al. 2005; Earle/Kolb 2010, 71–76).

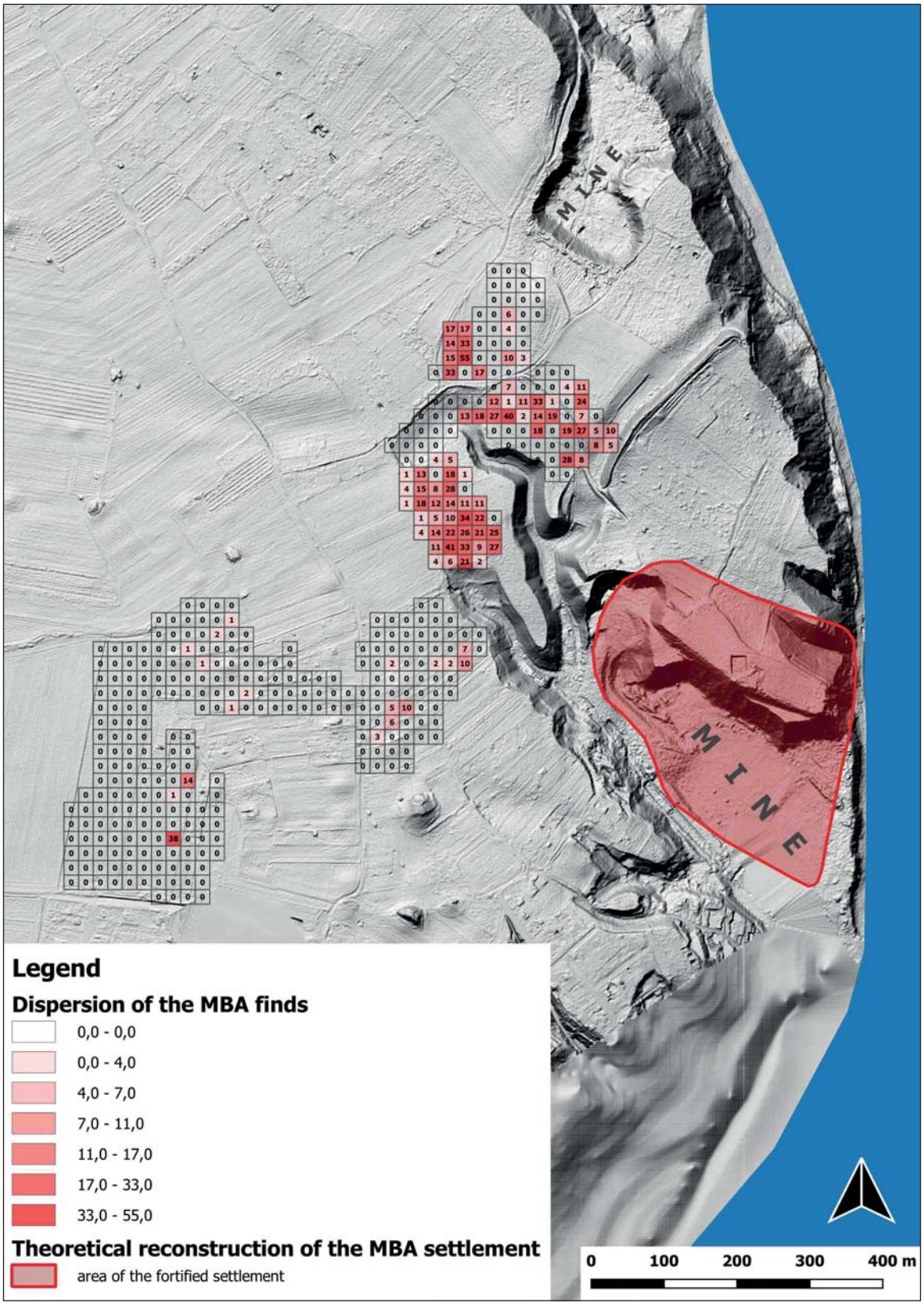

Fig. 7: Location of the MBA-settlement based on the grid collection (Rebeka Gergácz – Katalin Novinszki-Groma – László Rupnik)

cemetery of Érd-Téglagyár.[27] Other remains of the Urnfield Period are reported from several sites alongside the Benta valley.[28]

In summary, we can say that the inhabited zone on the top of the Érd/Százhalombatta plateau increased spectacularly during the periods of the Bronze Age and assumably it also affected the landscape use of the later periods as well. An important 'by-product' of our research was, that proving the previous presumptions we could identify the location of an EBA-MBA cemetery, which is situated at the edge of (and partially under) the later tumulus field.

5. Data for the reconstruction of the Early Iron Age landscape

Based on previous research, the Early Iron Age settlement was on the higher part of the plateau closed by ramparts. In the area of the clay extraction conducted by the brick factory, five Early Iron Age pits were discovered during the rescue excavations of Tibor Kovács and some further pits are known from the presently ongoing tell excavation.[29] The intensity and extent of the settlement are uncertain. The southern extension may be indicated by the bronze statuette found next to the former brick factory,[30] and Gabriella T. Németh collected ceramic sherds indicating an Early Iron Age settlement in the north, outside of the fortification as well. Early Iron Age finds are also present in the material collected in this zone during systematic field walkings (*fig. 8*). These settlement traces can also be followed in the west as far as the Middle Bronze Age antecedents. On January 25 in 2018, a trace of a trench situated north of, and running parallel to the Iron Age earthworks was recorded by aerial photography. Therefore, the magnetometer surveys have been extended to this zone. As a result, more traces of two or three (?) further ditches and/or ramparts in the same direction could be observed. The newly identified linear phenomena mostly connect to the long gully that borders the plateau in the west. Some of them have an uneven outline and irregular course of natural origin, while the regularity of others refers to artificial design. West of the trench systems, due to the enclosed gardens, neither geophysical measurements nor field walkings can be carried out. However, it cannot be ruled out that the western boundary of the prehistoric settlement zone was roughly the same since the Bronze Age, and that this area (which can be defined with approximately 50-100 m precision) is also the eastern boundary of the Early Iron Age tumulus field. Here again, the enclosed gardens make impossible the further research on this question. But, in addition, based on some aerial images, it is considerable, that there were lone burial constructs in this zone.[31] The southern edge of the cemetery can be drawn on the basis of the concordant data of aerial photography, magnetometer

[27] Dinnyés et al. 1986, 9/21 site. The extension of Érd-Téglagyár site and its relation to the LBA Százhalombatta-Földvár is less known, it could be the topic of further investigations.

[28] Based on the results of the Hungarian Archaeological Topographic Survey (MRT, Dinnyés et al. 1986) the closest sites are Érd-Külső újföldek (9/3), Érd-Belső újföldek (9/4), Érd-Országúti dűlő (9/7), Érd-Akácos-dűlő (9/10), Érd-Hosszú-földek alja (9/13), Érd-Simonpusztai-dűlő (9/16) (Dinnyés et al. 1986; Vicze et al. 2005; Earle/Kolb 2010, 76–77).

[29] Kovács 1963, 11; Poroszlai 2000; Poroszlai/Vicze 2004.

[30] Mozsolics 1954.

[31] Czajlik et al. 2017, fig. 3.

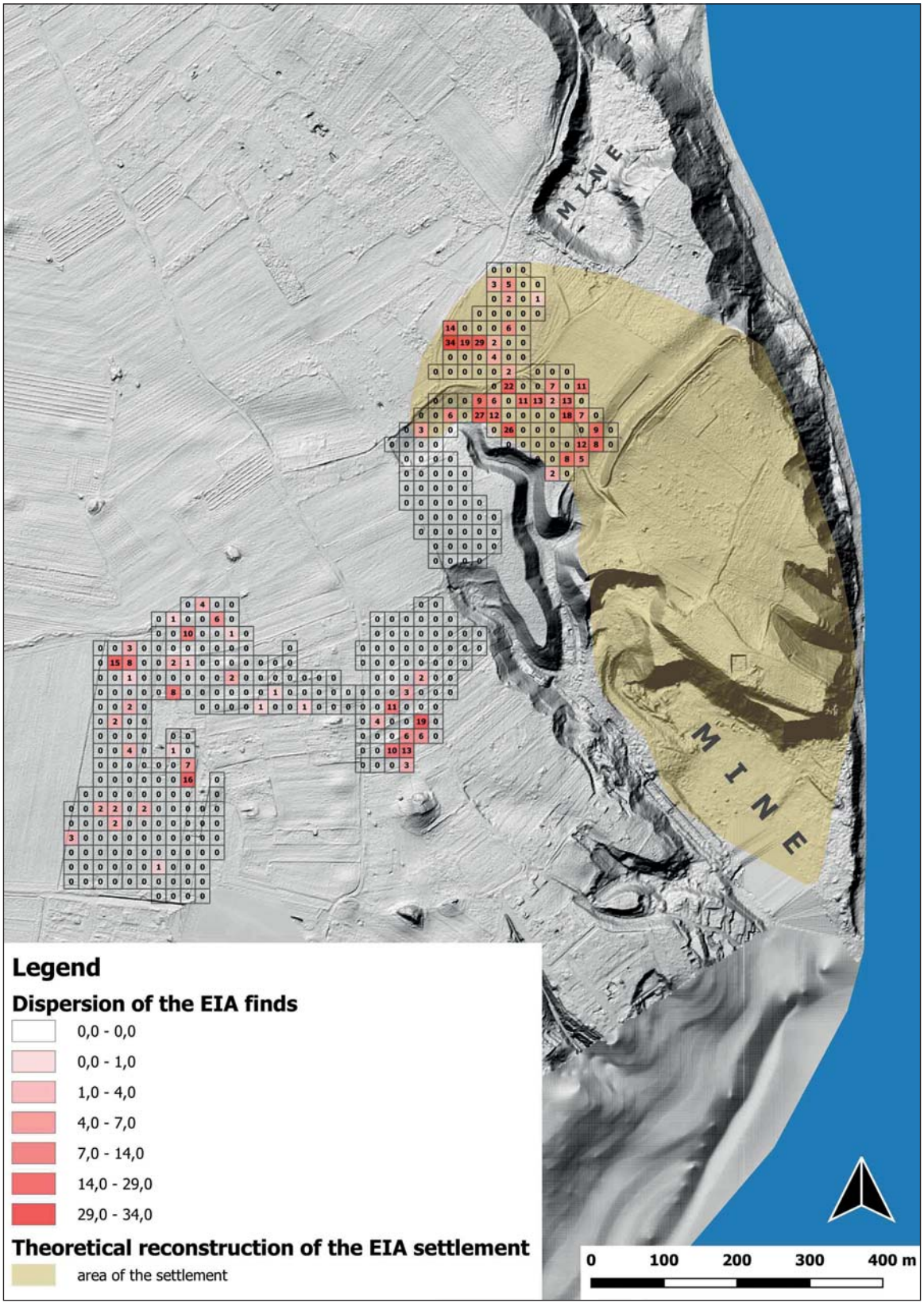

Fig. 8: Location of the Early Iron Age settlement based on the grid collection (Rebeka Gergácz – Katalin Novinszki-Groma)

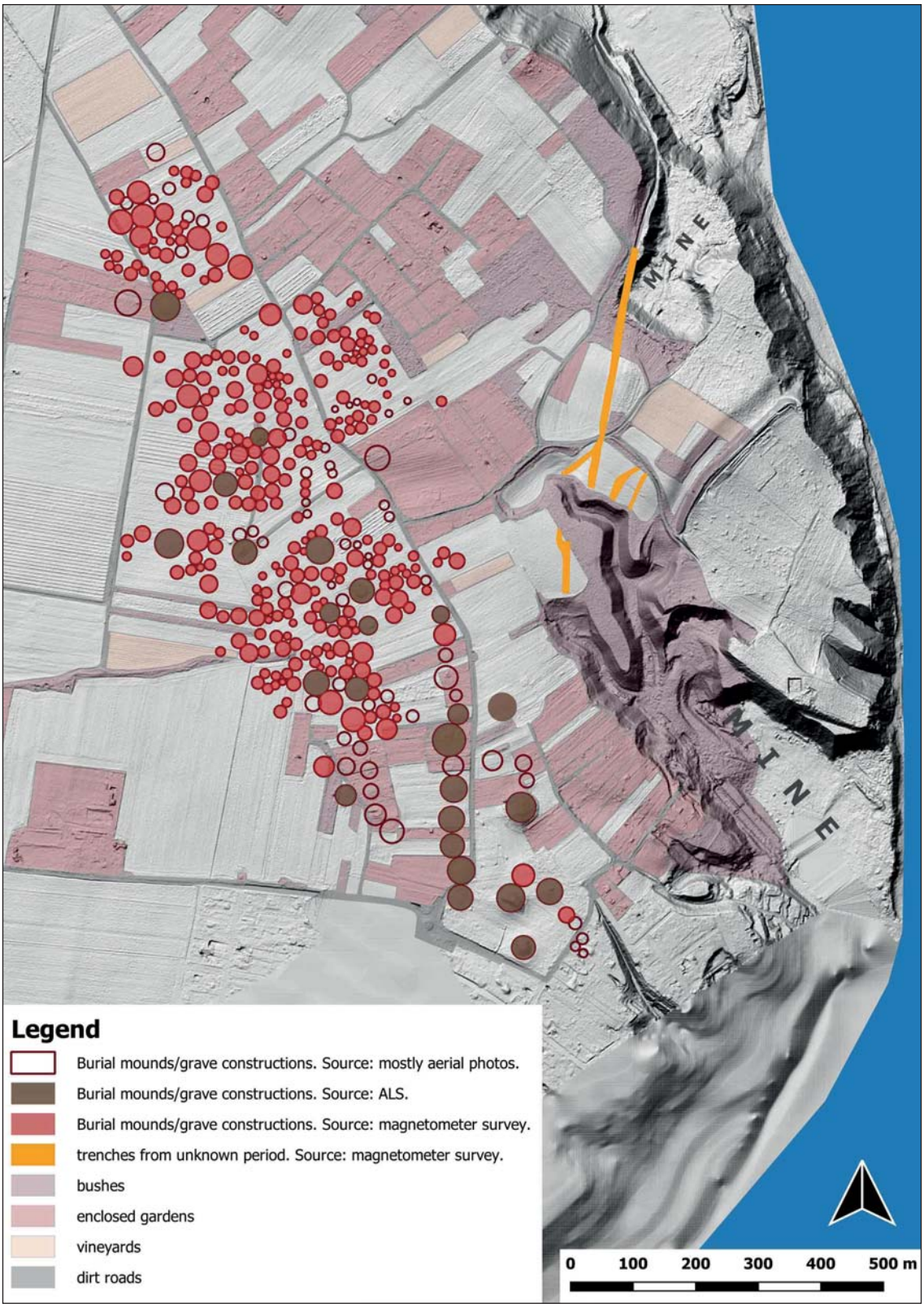

Fig. 9: Reconstructed map of the Érd/Százhalombatta tumulus field based on aerial archaeology, ALS and magnetometer geophysical surveys (Zoltán Czajlik – Géza Király – Sándor Puszta – László Rupnik)

surveys and systematic field walkings; essentially it coincides the northern line of today's urban boundary of Százhalombatta. The situation is even clearer in the west: with geophysical surveys, we have documented the lack of circular ditches indicating tumuli at several distant zones. This edge of the cemetery was noticeably adapted to the natural conditions, namely to an escarpment that can be easily tracked especially on the ALS model. The northern end of the necropolis can also be well determined by the results of aerial photography and magnetometer survey (*fig. 9*).

As a result of the mosaic surface cover, several smaller but important areas have been left out, whose magnetometer survey had to be postponed until the autumn of 2019. The systematic grid collection of surface finds should also be continued, extending it as far as possible, to all areas where the magnetic anomaly map is available or can be made in the future. It should be noted, that due to the mosaic surface cover, modern roads and electric lines, a complete measurement of the necropolis will not be possible in the future. Inevitably, there will be areas on which we can only get information from archive materials – mostly aerial photographs. In the quick evaluation of the raw anomaly map, compared to previous data and aerial photography, we have determined the number of circles referring to mounds in 365.[32] Although the anomaly map containing data processed from both geometric and geophysical points of view has been completed in the meantime, we also need to re-evaluate all aerial photographs in the next processing phase to produce a modern map of the site. Therefore, for this publication, we have created a map with only clearly visible circular structures in the magnetometer survey, supplemented by the mounds visible on the ALS survey, but not accessible by geophysical methods. On the map, these two data sources were marked with different colors, and the tumuli with a built burial chamber on the basis of magnetometer measurements (*fig. 9*).

It has been mentioned earlier that prior to the application of modern site detection methods, the tumulus field was divided into a southern, denser and a northern, more sparsely occupied zone based on visually observable and on the archive aerial photography of 1953 detected and assumed mounds. If we redraw the map of the necropolis based on the circular ditches visible on the aerial photographs and magnetometer anomaly maps, the above described grouping does not seem to be tenable. As indicated in our previous study,[33] the burial constructs were built not intersecting but relatively close to each other, and there are no spatial groups in the sense earlier studies suggested. At the same time, however, it is still acceptable – shown above all by the ALS survey – that most of the larger mounds are in the southern part of the tumulus field, and no trace of a mound with burial chamber north of Tumulus 120 can be observed. Comparing the ALS survey and the magnetic mapping, the observation of previous researchers, that the Iron Age visitors of the cemetery have been welcomed in the south by larger mounds, similarly as it is proved in other EIA tumulus fields (e.g. Sopron-Burgstall). Moreover, based on our data, it is also possible that the former road ran between two parallel rows of tumuli. For traffic within the densely-built necropolis a route along the same line as today's northwest-southeast road may have been required, which does not mean that other

[32] Czajlik et al. 2017, 350.
[33] Czajlik et al. 2016 .

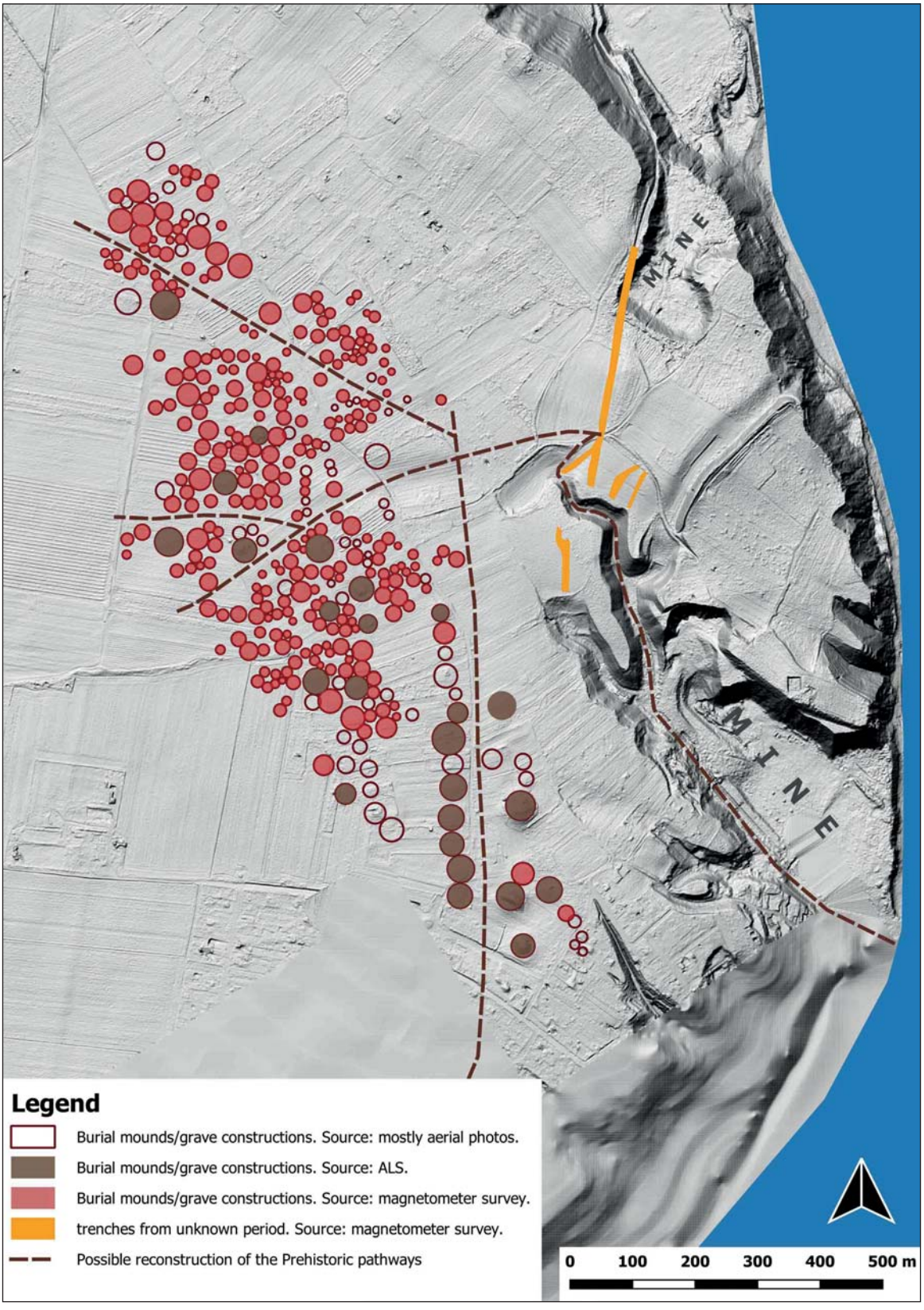

Fig. 10: Probable prehistoric paths of the Érd/Százhalombatta plateau (Zoltán Czajlik – László Rupnik)

(presumably smaller) paths could not have passed through among the tumuli. Due to the location of the gullies, which have largely delimited the settlement zone, it is likely that the tumulus field could have been connected to the settlement by a route similar to the current one. Finally, given that on the basis of previous maps the main gully system has reached the Danube, we cannot exclude that this natural route was used to provide the connection between the settlement, the cemetery and the river (*fig. 10*).

6. The presence of Late Iron Age landmarks

The northern part of Százhalombatta – Sánc is one of the most prominent and most undamaged Hungarian examples of the so-called *Fécamp*-type ramparts, which could be assigned to the Late Iron Age (*fig. 11*).[34] The fortification on the edge of the loess plateau is difficult to climb even in its present state; the gate is presumed to be from the direction of the ramp-way. Unfortunately, the results of both the old and more recent excavations are unpublished, so the classification of the hillfort as an *oppidum* is supported mostly by stray coins, an important stone statue head and painted pottery finds besides the spectacular rampart.[35] In 2017, we reconstructed the possible extent of the former Iron Age settlement based on the Second Military Survey

Fig. 11: The northen rampart of the Iron Age fortified settlement (aerial photograph by Zoltán Czajlik, November 27, 2017)

[34] Czajlik 2018, 95–96.
[35] Szabó 2005, 169.

or Franciscan Land Survey of the Habsburg Empire (1806–1869).[36] In the framework of the IAD project possible fortification ditches north of the *Fécamp*-type rampart have also been detected as a result of magnetometer geophysical surveys.[37] Although the age of the latter is still unclear, both data suggest that the former Late Celtic settlement could have been much larger than previously assumed, which reinforces the hypothesis of defining the fortified settlement as an *oppidum*.

7. Transition in the use of the landscape during the Roman Age

Due to their different interest and political structure the topographical setting of the area had significantly changed after the Roman occupation. The focus has moved from the higher loess plateau to the lower area south of the Early Iron Age site. The auxiliary fortress was built in the alluvial plain of the Danube south from the estuary of the Benta creek controlling the natural path towards the inner territory of the province (*fig. 12*). Owing to the excavations of Árpád Dormuth, András Mócsy and more recently Péter Kovács, the structure and phases of the camp can easily be reconstructed, despite the fact that in 1809 during the Napoleonic Wars the construction of ditches damaged the Roman ruins to a large extent (*fig. 13*).[38] The civilian settlement surrounded the camp on its western and southwestern and mainly on its northern side. The excavations concentrated chiefly on the northern part, and revealed several stone buildings, a bath and a *mansio* with a bath.[39] One of the cemeteries of the settlement is located along the limes road running to the south. During and prior to construction works 213 burials of the biritual graveyard possibly consisting of more than a thousand graves have been unearthed.[40] After its brightest period during the 2nd–3rd centuries, the civilian settlement was gradually abandoned, and those who remained moved within the fortifications. It is very likely that both the settlement and the camp were exposed to floods of the Danube, since during the excavations possible traces of inundations were documented. Furthermore, A. Mócsy even assumed based on his observations during the excavation of the *vicus* that the Romans endeavoured to defend themselves by building dams and ramparts.[41]

Beside the *castellum* and the surrounding *vicus*, the limes road was the other remarkable component of the Roman landscape. From our point of view the section connecting the fort of Campona (Nagytétény) and Matrica (Százhalombatta) claims particular attention. Recently, several authors touched upon the questions regarding the track line and possible traces of the *limes* road, also summarizing the results of the

[36] Czajlik et al. 2017, fig. 4.
[37] Czajlik et al. 2017, fig. 6.
[38] Mócsy 1955; Kovács 2000. About the investigations of the auxiliary fort including the assessment of old maps and aerial photos: Kovács 2000, 8–12; Kovács 2003, 109–111; Visy 2000, 62–65; Visy 2011, 74–75.
[39] Mócsy 1955; Topál 1972, 48; Topál 1973, 38; Topál 1975, 36–37; Dinnyés et al. 1986, 235–237, 27/7; Kovács 2003, 111.
[40] Topál 1981.
[41] Mócsy 1955, 59–60.

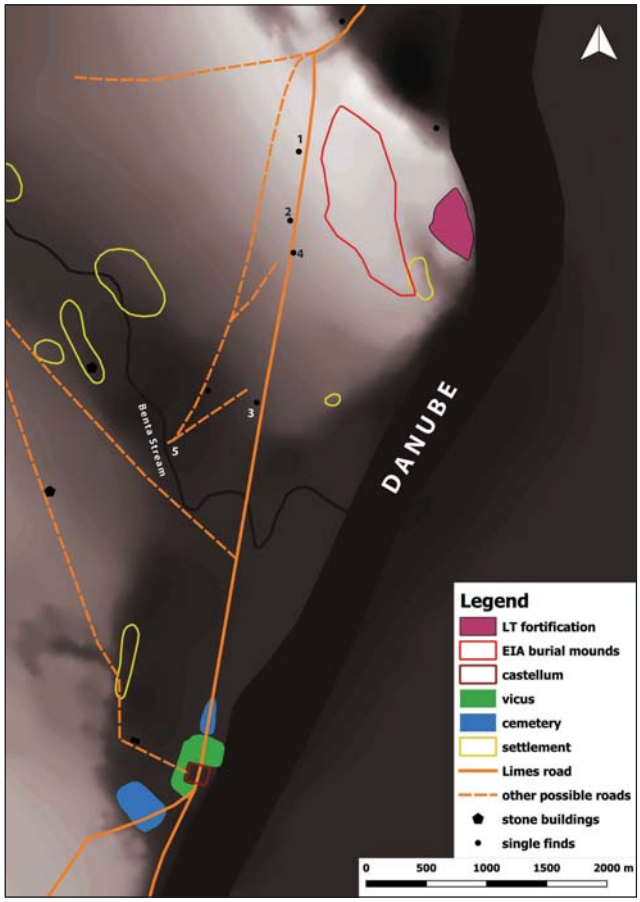

Fig. 12: The elements of the Roman landscape (László Rupnik)

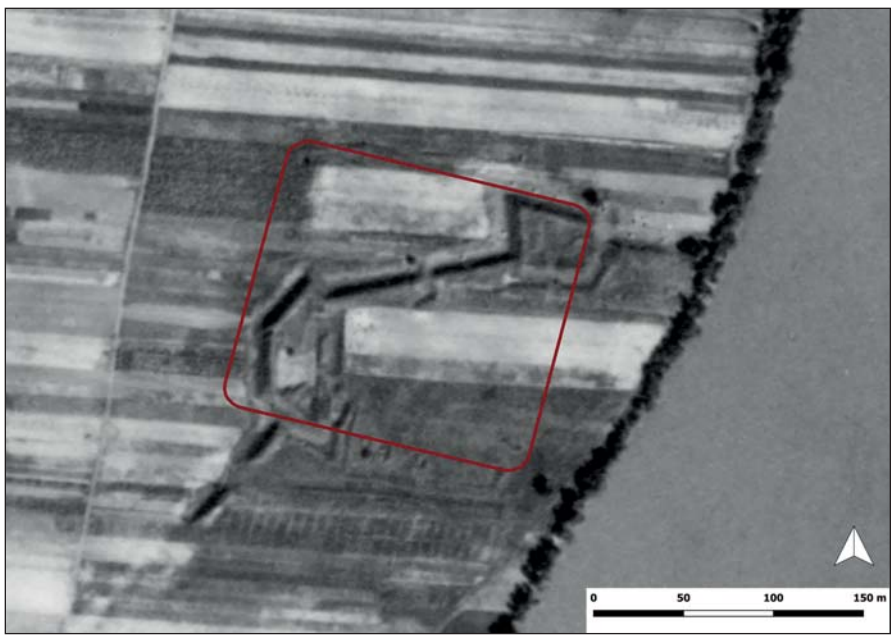

Fig. 13: The area of the Roman castellum with the traces of the Napoleonic Wars fortifications in 1955 (source: Military History Museum 35672; László Rupnik)

investigations in the last 150 years.[42] The road reached the area in question presumably through Érd-Ófalu, where it climbed upon the loess plateau in a gully presently called Római út ('Roman road'). It was a general belief that the stone pavement still clearly visible might originate from Roman times, however, in light of recent investigations, this assumption can be firmly rejected.[43] Based on old aerial photographs, the Roman road runs through the side of the actual gully, as due to the erosions of the last two millennia, it reaches the plateau farther to the west.[44] Farther away a track branches off the main road and runs to the south along a still used pathway, along which, based also on old aerial photographs Zsolt Visy would identify three watchtowers (*fig. 12, 1–3*).[45] Further evidence that would prove their existence, however, has not yet been found, even despite the fact that our geophysical prospections have reached the area of the northern tower. Furthermore, the existence of the assumed watchtowers on the edge of the plateau near Érd-Ófalu and within the prehistoric fortification of Százhalombatta,[46] respectively, is also still questionable. The road itself, however, is either detectable by our prospections or perhaps still visible at some points. Near the so-called Stich-tanya Máté Szabó succeeded in finding it with a small excavation and managed to date it beyond doubt to the Roman Period.[47] Earlier three pieces of a milestone had come to light in the close vicinity (*fig. 12, 4*).[48] This section of the road bypasses the tumulus cemetery along its western border in order to avoid the uncomfortable and uneven surface. Similarly, old georeferenced aerial photos help us identify further parts of the road. Based on these, it runs straight to the northern gate of the camp of Matrica. The structure of the road was archaeologically investigated at several points within the area of the *vicus* situated north of the camp.[49] There is another track visible on aerial photographs and old maps running west of the road which reaches the plateau at Érd. This one can be clearly traced as far as the bridge over the Benta creek within the territory of today's Százhalombatta. According to common belief, this bridge originates from Roman times, but neither this nor the post road leading to it could not have existed before the 18th century. Nevertheless, it cannot be ruled out that this tradition has some real foundation and there might have existed here a track branching off the *limes* road (*fig. 12, 5*).

Conclusion

Looking at the first two thousand years of nearly 4000 years of land use on the Érd/Százhalombatta plateau, we can come to interesting conclusions. Although not a novelty, but it is important to emphasize that extreme stability can be detected in the use of the settlement zone. From the Early Bronze Age, sometimes with larger

[42] Dinnyés et al. 1986, 102–103, 9/25; Dinnyés et al. 1986, 240–241, 27/10; Visy 1978; Visy 1981; Visy 2000, 60–65; Visy 2003, 64–65, fig. 82–85; Bödőcs 2008, 152–154, 167–168; Kovács 2007; Varga 2016.
[43] Mráv 2003, 134.
[44] Visy 2000, 61, fig. 84; Visy 2003, 65, fig. 84.
[45] Visy 2000, 61–62, fig. 85; Visy 2003, 65–66, fig. 85.
[46] Vicze/Nagy 2003, 14.
[47] Szabó 2014.
[48] Dinnyés et al. 1986, 103, 9/25.
[49] Mócsy 1955, 60.

breaks, but for nearly two thousand years people are settled on the same plateau along the Danube due to its favourable (a closed area in suitable dimensions) and despite its possibly unfavourable (access to the water is still in question) givens. The largest expansion of the settlement was reached in the Middle Bronze Age and the Late Iron Age, while the Early Iron Age settlement does not seem to be extremely intensive on the basis of the research at hand. Compared to this relative continuity and the special situation in all eras, it is a major change that after almost two thousand years, the Roman settlement was established 4.5 km away from the antecedents, in a not naturally protected area, but also much lower, closer to the bank of the Danube.

Although the significance of the Early Iron Age settlement may be smaller than in the earlier and subsequent periods, the landscape transformations related to the necropolis – which seems to belong to a rather short (maybe three or four generation) period, but covers the largest area (at least 60 ha) – are rather notheworthy. This landscape transformation is not only extensive but long-lasting as well: after an approximately 400-year break, the Celts, who settled on the eastern edge of the plateau, inevitably used the existing features. Not only the location of the settlement, but also its approach was similar to that of the Bronze Age and the Early Iron Age. In the Roman era, with the creation of the limes road, this relationship system has also changed; the new route bypassed the nearly 80 hectares of the prehistoric landscape of visible mounds and earthworks, running west of it at the edge of the tumulus field.

Acknowledgement

The manuscript was peer-reviewed by Magdolna Vicze.

Bibliography

Artursson, M 2010 Settlement Structure and Organisation. *in* Earle, T and Kristiansen, K (eds) *Organizing Bronze Age Societies*. New York, 87–121

Bödőcs, A 2008 *A római kori úthálózat térinformatikai vizsgálata a mai Magyarország területén [GIS-investigation of the Roman road-system in the territory of Hungary]*. PhD thesis. Budapest

Czajlik, Z 2008 Aerial archaeology in the research of burial tumuli in Hungary. *Communicationes Archaeologicae Hungariae* (28), 95–107

Czajlik, Z 2018 Aerial archaeological research of Late Iron Age fortified settlements in Western Hungary (Transdanubia). *in* Fontes, L, Cruz, G and Alves, M (eds) *Cultural Interactions and Changing Landscapes in Europe (2nd century BC / 2nd century AD)*. Braga, 93–103

Czajlik, Z, Holl, B, T. Németh, G, Puszta, S and Vicze, M 2016 New results in the topographic research on the Early Iron Age tumulus cemetery at Érd-Százhalombatta (Kom. Pest/H). *Archäologisches Korrespondenzblatt* 46 (1), 57–73

Czajlik, Z, Kovačević, S, Tiefengraber, G, Tiefengraber, S, Puszta, S, Bödőcs, A, Rupnik, L, Jáky, A and Novinszki-Groma, K 2017 Report on magnetometer geophysical surveys conducted in Hungary, Austria and Croatia in the framework of the

Interreg Iron Age Danube project. *Dissertationes Archeologicae Ser. 3* (5), 343–359

Dinnyés, I, Kővári, K, Lovag, Zs, Tettamanti, S, Topál, J and Torma, I 1986 *Pest megye régészeti Topográfiája. A budai és a szentendrei járás*. Magyarország Régészeti Topográfiája 7 [Archäologische Topographie Ungarns 7. Archäologische Topographie des Komitats Pest. Kreis Buda und Szentendre]. Budapest

Earle, T and Kolb, M J 2010 Regional Settlement Patterns. *in* Earle, T and Kristiansen, K (eds) *Organizing Bronze Age Societies*. New York, 57–86

Earle, T, Artursson, M, Polányi, T and Vicze, M 2010 Rapid Assessment of Bronze Age Settlement Studies in the Benta Valley, Hungary: A Micro-regional Approach / Bronzkori települési kutatások gyors és hatékony kiértékelése a Benta-völgyben: Mikro-regionális szemlélet. *Ősrégészeti Levelek* 12, 84–93

Earle, T, Kreiter, A, Klehm, C, Ferguson, J and Vicze, M 2011 Bronze Age ceramic economy: The Benta Valley, Hungary. *European Journal of Archaeology* 14 (3), 419–440

Füleky, Gy and Vicze, M 2003 Soil and archaeological evidence of the periods of tell development of Százhalombatta-Földvár. *in* Boschian, G (ed.) *Second International Conference on Soils and Archaeology Pisa, 12–15 May, 2003*. Pisa, 34–37

Goguey, R and Szabó, M 1995 *L'histoire vue du ciel. Photographie aérienne et archéologie en France et en Hongrie – A történelem madártávlatból. Légi fényképezés és régészet Franciaországban és Magyarországon*. Budapest, 1995

Holl, B and Czajlik, Z 2013 Where are all the tumuli? *in* Czajlik, Z and Bödőcs, A (eds) *Aerial Archaeology and Remote Sensing from the Baltic to the Adriatic. Selected Papers of the Annual Conference of the Aerial Archaeology Research Group, 13th–15th September 2012, Budapest, Hungary*. Budapest, 25–31

Holport, Á 1980 Százhalombatta. *Régészeti Füzetek* 1/33, 21

Holport, Á 1985 Ásatások Százhalombattán 1978–1982 (Előzetes jelentés) / Ausgrabungen in Százhalombatta 1978–1982 (Vorläufiger Bericht). *Studia Comitatensia* 17, 25–62

Holport, Á 1986 Questions in connection with recent excavations at Százhalombatta. *in* Jerem, E (ed.) *Hallstatt Kolloquium Veszprém 1984. Mitteilungen des Archäologischen Instituts der Ungarischen Akademie der Wissenschaften, Beiheft 3*. Budapest, 93–98

Holport, Á 1996 Építészeti emlékek az Érd-százhalombattai kora vaskori halomsíros temetőből / Architectural remains in the Tumulus cemetery of Százhalombatta. *in* Poroszlai, I (ed.) *Ásatások Százhalombattán 1989–1995 / Excavations at Százhalombatta 1989–1995*. Százhalombatta, 34–42

Kovács, P 2000 *Matrica. Excavations in the Roman Fort at Százhalombatta (1993–1997)*. Studia Classica 3. Budapest

Kovács, P 2003 Matrica (Százhalombatta). *in* Visy, Zs (ed.) *The Roman Army in Pannonia*. Pécs, 109–111

Kovács, P 2007 Római kor – Limes- és helyőrségtörténet Pest megyében [Roman Period – History of the Limes and military garrisons in county Pest]. *in* Fancsalszky, G (ed.) *Pest megye monográfiája*. I. kötet 1. rész. A kezdetektől a honfoglalásig. Pest megye régészeti emlékei. Budapest, 211–248

Kovács, T 1963 Százhalombatta-Téglagyár. *Régészeti Füzetek* 17, 11

Kovács, T 1969 A százhalombattai bronzkori telep. The Bronze Age Settlement at Százhalombatta. *Archaeológiai Értesítő* 96, 161–169

Luczenbacher, J 1847 A pogány magyar sírok körül tett felfedezések [Discoveries around the pagan graves of the Hungarians]. *A Magyar Tudományos Akadémia Értesítője* 7, 282–289

Mócsy, A 1955 A Százhalombatta-dunafüredi római tábor és település. Roman fort and settlement at Százhalombatta. *Archaeológiai Értesítő* 82, 56–69

Mozsolics, A 1954 Adatok a magyarországi Hallstattkori kisplasztikához. Zwei hallstattzeitliche Bronzestatuetten aus Ungarn. *Archaeológiai Értesítő* 81, 165–166

Mráv, Zs 2003 Érd, Ófalu, római vagy mélyút. *in* Kisfaludi, J (ed.) *Régészeti Kutatások Magyarországon 2000 – Archaeological Investigations in Hungary 2000* Budapest, 134

T. Németh, G, Czajlik, Z, Novinszki-Groma, K and Jáky, A 2016 Short report on the archaeological research of the burial mounds no. 64 and no. 49 at Érd-Százhalombatta. *Dissertationes Archeologicae Ser. 3.* No. 4, 291–306

Poroszlai, I 2000 Excavation campaigns at the Bronze Age tell site at Százhalombatta – Földvár I. 1989–1991; II. 1991–1993. *in* Poroszlai, I and Vicze, M (eds) *Százhalombatta Archaeological Expedition (SAX) Report 1.* Százhalombatta, 13–73

Poroszlai, I and Vicze, M 2000 (eds) *Százhalombatta Archaeological Expedition (SAX) Report 1*, Százhalombatta

Poroszlai, I and Vicze, M 2002 Százhalombatta – Földvár (Téglagyár) (MRT 7. k., 27/2. lelőhely). *in* Marton, E and Kisfaludi, J (eds) *Régészeti kutatások Magyarországon 1999 – Archaeological Investigations in Hungary 1999*, 246–247

Poroszlai, I and Vicze, M 2004 (eds) *Százhalombatta története a bronzkortól napjainkig [The history of Százhalombatta from the Bronze Age to the Present Day]*. Százhalombatta

Poroszlai, I and Vicze, M 2005 (eds) *Százhalombatta Archaeological Expedition (SAX) Report 2*. Százhalombatta

Szabó, M 2005 *A keleti kelták. A késő vaskor a Kárpát-medencében [The Eastern Celts. The Late Iron Age in the Carpathian Basin]*. Bibliotheca Archaeologica. Budapest

Szabó, M 2014 Római út Érd határában (Roman Road on the Confines of Érd) *in* Rajna, A (ed.) *Múltunk a föld alatt. Újabb régészeti kutatások Pest megyében*. Ferenczy Múzeum Kiadványai, A sorozat: Monográfiák 1. Szentendre, 87–93

Szentpétery, E 1937 (ed.) *Scriptores Rerum Hungaricum* I. Budapest

Topál, J 1972 Százhalombatta – Dunafüred-Déli gát. *Régészeti Füzetek* 26, 48

Topál, J 1973 Dunafüred-Déli gát. *Régészeti Füzetek* 27, 38

Topál, J 1975 Dunafüred, Római út 1149/71. *Régészeti Füzetek* 29, 36–37

Topál, J 1981 *The Southern Cemetery of Matrica. Százhalombatta-Dunafüred*. Fontes Archaeologici Hungariae. Budapest

Varga, A 2000 Coring results at Százhalombatta – Földvár. *in* Poroszlai, I and Vicze, M (eds) *Százhalombatta Archaeological Expedition (SAX) Report 1*. Százhalombatta, 75–81

Varga, G 2016 Római út Érd határában. Roman Road on the Confines of Érd. *Archaeologiai Értesítő* 141, 123–144

Vicze, M 2000 Background information to the field-survey. *in* Poroszlai, I – Vicze, M (eds) *Százhalombatta Archaeological Expedition (SAX) Report 1,* Százhalombatta, 119–129

Vicze, M 2001 The history of the Százhalombatta tell settlement and its environment: an overview. *in* Füleky, Gy (ed.) *Proceedings of the 1st International Conference on Soils and Archaeology*. Gödöllő, 142–144

Vicze, M 2005 Excavation methods and some preliminary results of the SAX Project. *in* Poroszlai, I and Vicze, M (eds) *Százhalombatta Archaeological Expedition (SAX) Report 2*. Százhalombatta, 209–235

Vicze, M and Nagy, L 2003 *Bronzkori és vaskori földvár Érd-Százhalombattán. The Bronze and Iron Age fortified settlement at Érd-Százhalombatta*. Régészeti értékeink. Budapest

Vicze, M, Earle, T and Artursson, M 2005 Bronze Age Site Gazetteer: Benta Valley, Hungary. *in* Poroszlai, I and Vicze, M (eds) *Százhalombatta Archaeological Expedition (SAX) Report 2*. Százhalombatta, 237–250

Visy, Zs 1978 Pannóniai limes-szakaszok légifényképeken. Pannonische Limes-Abschnitte auf Luftaufnahmen. *Archaeológiai Értesítő* 105, 235–259

Visy, Zs 1981 Pannonische Limesstrecken auf Luftaufnahmen. *Antike Welt* 12 (4) 39–52

Visy, Zs 2000 *A ripa Pannonica Magyarországon [The Ripa Pannonica in Hungary]*. Budapest

Visy, Zs 2003 *The Ripa Pannonica in Hungary*. Budapest

Visy, Zs 2011 *A Danube Limes program régészeti kutatásai 2008–2011 között. The Danube Limes Project Archaeological Research between 2008–2011*. Pécs