

Pliska – integrated geophysical prospection of the first Early Medieval Bulgarian capital

Roland Filzwieser ^{a*}, Andrey Aladzhov ^b, Jona Schlegel ^c, Alois Hinterleitner ^d, Nives Doneus ^e, Hannes Schiel ^f, Janko Dimitrov ^g, Martin Gamon ^h, Falko Daim ⁱ, Wolfgang Neubauer ^j

^a Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology, Hohe Warte 38, 1190 Vienna, Austria; roland.filzwieser@archpro.lbg.ac.at

^b National Institute of Archaeology and Museum, Bulgarian Academy of Sciences, Saborna 2, 1000 Sofia, Bulgaria; alajov@gmail.com

^c Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology, Hohe Warte 38, 1190 Vienna, Austria; jona.schlegel@archpro.lbg.ac.at

^d Vienna Institute for Archaeological Science, University of Vienna, Franz-Klein-Gasse 1, 1190 Vienna, Austria; alois.hinterleitner@archpro.lbg.ac.at

^e Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology, Hohe Warte 38, 1190 Vienna, Austria; nives.doneus@archpro.lbg.ac.at

^f Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology, Hohe Warte 38, 1190 Vienna, Austria; hannes.schiel@archpro.lbg.ac.at

^g National Institute of Archaeology and Museum, Bulgarian Academy of Sciences, Saborna 2, 1000 Sofia, Bulgaria; yanko_aim@mail.bg

^h Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology, Hohe Warte 38, 1190 Vienna, Austria; martin.gamon@archpro.lbg.ac.at

ⁱ Römisch-Germanisches Zentralmuseum, Leibniz-Forschungsinstitut für Archäologie, Ernst-Ludwig-Platz 2, 55116 Mainz, Germany; daim@rgzm.de

^j Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology, Hohe Warte 38, 1190 Vienna, Austria; Vienna Institute for Archaeological Science, University of Vienna, Franz-Klein-Gasse 1, 1190 Vienna, Austria; Wolfgang.Neubauer@archpro.lbg.ac.at

*corresponding author

ABSTRACT

Between 2016 and 2018, two large-scale geophysical survey campaigns were conducted at Pliska, the first Early Medieval capital of Bulgaria (7th – 11th century AD). The aim was to document yet unknown archaeological remains, mainly in the central Inner City of Pliska, to achieve a better understanding of the urban layout and the successive construction phases of the entire settlement.

The magnetic survey was conducted with a motorised Fluxgate magnetometer system, while the ground penetrating radar (GPR) survey was mainly conducted using a motorised four-channel 250 MHz GPR array. The integrated archaeological interpretation of the prospection data yielded countless newly discovered structures in the city centre, as well as several semi-urban settlements within the surveyed areas of the vast Outer City of Pliska.

The results lead to a more detailed understanding and depiction of the historical development of the Inner City during its capital- and post-capital phases of use, while the data collected in the Outer City improved the knowledge about the complex landscape of this area extending over several square kilometres. However, the surveys also showed how fruitful the large-scale geophysical prospection of the entire Outer City could turn out to be for an exhaustive study and a deeper understanding of Pliska, and how much there remains yet unknown.

KEYWORDS

Pliska, Early Middle Ages, Archaeological Prospection, GPR, magnetometry

Introduction

The fortified, and over 22 km² in size, settlement of Pliska, commonly referred to as the first Early Medieval Bulgarian capital, and especially its almost 50 ha residential centre, the so-called Inner City, has been under continuous archaeological investigation for over a century with its first excavations in 1899 (Rašev, Dimitrov 1999; Škorpil 1905; Dimitrov 2007; Henning 2007a; Rašev 2008). Pliska is entirely enclosed by an earthen fortification in the shape of an irregular trapezium consisting of an earthen rampart and a ditch. The earthen fortification dates to the first half of the 8th or the late 7th century AD. The territory enclosed by the earthen rampart is referred to as the Outer City. Approximately in the center of the Outer City, there lies a stone fortress marking the boundaries of the Inner City. The fortress encloses an area of 48 ha in the shape of an irregular quadrangle. There is a round tower on each corner and eight pentagonal towers arranged in pairs on each side of the fortress. The gates are abutted by quadrangular towers situated almost in the middle of each side of the fortress between the two pentagonal towers. The establishment of the fortress is dated back to the first half of the 9th century AD. A third wall was erected in the center of the inner fortress – it functioned as citadel enclosing a quadrangular area measuring 128 m x 84 m. The wall was made of bricks and is dated back to the first half of the 9th century AD. Its ground plan, the building materials as well as the construction technique provide reason to believe that it was built as a single act probably during the reign of Khan Omurtag (AD 814–831).

The earliest written records on Pliska are Byzantine sources concerned with the military campaign of AD 811 under emperor Nikephoros I (AD 802–811). According to a chronicle of the same year (Sophoulis 2010; Zlatarski 1918), the Byzantine army quickly defeated the first encountered Bulgarian troops and advanced to the *aule* of Khan Krum, where the Bulgarians were overthrown once again, and the town sacked. Upon leaving, Nikephoros had all the largely wooden buildings and the fortifications destroyed and set on fire. The source states further that Nikephoros was planning on rebuilding the town and to name it after himself, which was disrupted shortly after the Byzantine withdrawal by a catastrophic defeat and the death of the emperor. Yet the burnt down Bulgarian *aule* or residence, in historical research often identified with Pliska, was rebuilt by the victorious khan's successors. It must be stressed, however, that the respective written sources do not mention the name Pliska itself, which was initially documented in AD 822 and which is why there is an ongoing scholarly debate whether the destroyed *aule* of the khan actually is to be identified with Pliska (Prinzing 2007, 242–243; Ziemann 2007, 244–263).

In autumn 2016 and again in spring 2018, the Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology (LBI ArchPro), in cooperation with the National Institute of Archaeology and Museum – Bulgarian Academy of Sciences and the Römisch-Germanische Zentralmuseum in Mainz, conducted large-scale geophysical surveys in and around the Inner City of Pliska, using GPR and magnetometry (Filzwieser et al. 2019). The results included the discovery of numerous formerly unknown buildings, which in many cases could even be assigned to specific construction phases, based on their layout and orientation or due to their association with structures that have already been partially excavated. The integrated interpretation of the survey data, together with latest excavation results, thus not only offers an entirely new view of Pliska and its development but might also provide a valuable contribution to ongoing scholarly discussions about the origin of the city.



Fig. 1. Pliska is situated in the middle of a large open plain, about 70 km to the North-west of Varna and the Black Sea in the municipality of Shumen

Обр. 1. Плиска е разположена в община Шумен – в средата на голяма открита равнина, на около 70 km северозападно от Варна и Черно море

In this paper, we outline the main construction phases and the development of Pliska based on the current state of research. Then the recent fieldwork and applied methods will be described, followed by the presentation of the archaeological prospection data and the integrated interpretation of the different parts of Pliska. In the discussion, the data interpretation is analysed with regard to the individual construction phases of Pliska. Moreover, individual phases, as well as their further historical context, are analysed by means of the prospection data. Finally, conclusions will be drawn, and a perspective will be given, regarding the Outer City and the future potential for a comprehensive and seamless non-invasive investigation of the entire area of Pliska.

Background

Pliska is located in North-east Bulgaria in the province of Shumen, roughly 70 km to the North-west of Varna and the Black Sea coast (fig. 1). The name '*Pliska*' seems to be of Slavic origin, deriving from old Russian and could mean 'marsh' or 'lake'. This could indicate the founding of the city in a broad open plain, at that time probably surrounded by swamps, pastures, and water-rich plains (Dončeva-Petkova 2001, 359).

With an extent of approximately 22 km², Pliska is the largest post-Roman settlement in Europe (fig. 2) and was abandoned latest in the 11th–12th century AD. The Outer City today largely lies under arable land, while some parts of the central Inner City have been excavated and partly were reconstructed. The present-day town of Pliska, however, situated in the very South of the former Outer City, is the successor of a previously Turkish inhabited village named Aboba and shows no settlement continuity to the historical Pliska (Marzloff, Henning 2007, 417).

The first comprehensive archaeological map of Pliska was presented by Karel Škorpil, based on his field surveys and excavations between 1899 and 1900 (Škorpil 1905). Since then, many excavations and surveys have been carried out.¹ Especially in the years from 1997 to 2007, an extensive Bulgarian-German project took place documenting the Outer City and collecting crucial data, also including very promising first results achieved with magnetometry (Georgiev 2007; Henning 2007a; 2007b; Marzloff, Henning 2007; Prinzing 2007; Rašev 2007; Schleifer 2007; Stanilov, Dimitrov 2007; Vasilev 2007; Vitljanov 2007a; 2007b). These findings made it possible to locate settlement agglomerations, visible structures above the surface and changes in the topography that could be of archaeological meaning. However, it has been estimated that so far only about 8.3% of the Inner City and 0.5% of the Outer City have been excavated making it impossible to reconstruct Pliska's historical image and overall urban layout. Irrespective of this, a fairly comprehensive understanding of the material culture could be established, based upon the numerous archaeological artefacts that were discovered so far (Dimitrov 2007, 261; Rašev, Dimitrov 1999, 14).

However, even though it has not been possible to derive a ground plan of the entire city's organisation and structure, a relative chronological evaluation of the individual buildings revealed three development stages of the settlement. Based on these three phases and under consideration of the written sources, a settlement development model of Pliska was established resulting in five consecutive phases:

The first pagan capital phase (late 7th century AD – 811 AD) of Pliska, due to the absence of any older traces of ancient or early Slavic settlements in this area, begins with the probable erection of a military camp and settlement by Khan Asparuch in the late 7th century AD. Around the Inner City – the residence of the Khan, a surrounding ring of satellite settlements soon developed – the so-called Outer City. Investigations of four of these settlements concluded that rectangular pit houses with a stone stove in one corner were the most common type of building. The pit houses were concentrated in settlement agglomerations, and in some instances, these settlements were even surrounded by rectangular wooden palisades. Over the centuries, the settlements of the Outer City changed only in terms of their extent. Their general appearance, including the common type of buildings and the material culture, remained more or less the same. The Inner City, however, has gone through significant changes. It is assumed, that in the first pagan phase the buildings and ramparts were

¹ For a detailed research history of Pliska see Dimitrov 2007.



Fig. 2. The rampart of the Outer City (red) encloses an area of approximately 22 km² while the roughly 49 hectares Inner City is surrounded by a stone city wall (yellow). To the South, the modern town of Pliska can be observed, the former Turkish village of Aboba

Обр. 2. Валът на Външния град (в червено) обхваща площ от приблизително 22 km², докато Вътрешния град (голям приблизително 490 ha) е заобиколен от каменна крепостна стена (в жълто). На юг се вижда съвременният град Плиска, бившето турско село Абоба

mainly consisting of timber (Dimitrov 2007, 261-263). Khan Krum's reign (AD 803–814), however, led to an increase in building construction. A new palace was erected in the city centre, which is known as Krum Palace. The first secret passage was built, which connected the Krum Palace with the wooden defensive wall. This first phase supposedly ended in AD 811 with the plundering and burning of Pliska by the Byzantine emperor Nikephoros I and his army (Aladzhov 2010, 116).

The second pagan capital phase (AD 811–864) begins with Khan Omurtag's rebuilding of Pliska after the fire in AD 811. Many of the wooden residential buildings and pal-

aces were replaced by stone and brick constructions and the wooden fortification, that surrounded the Inner City, was replaced by a stone wall encircling an even larger area. Additionally, there was a third inner fortification wall built, made of bricks separating the residential area of the palace from its representative part. After this reconstruction work, it appears that the surrounding area remained largely uninhabited for some time. However, there is strong evidence suggesting that in this phase of the pagan period, already a clear separation existed, not only between centre and periphery but also between sacral and secular districts, residence and residential areas of the Inner City (Dimitrov 2007, 264-265).

The third and Christian capital phase (AD 864–893) is characterised by the Christianisation of the society and the associated construction of the first Bulgarian churches and monasteries. During this period, not only the Palace Basilica was built in the Inner City, as well as the Great Basilica with the Archbishop's court and the first Bulgarian monastery in the Outer City, but also a large part of the so-called Pliska-type basilicas found in all areas of the Outer City. The churches have often been integrated into pre-existing settlement-agglomerations. Thus, their remains can be used to detect former settlements. All these constructional activities made it possible to define this relatively short period quite precisely, the structures of which probably survived in this form until the transfer of the Bulgarian capital to Preslav in AD 893 (Dimitrov 2007, 267-268).

The fourth phase of Pliska, the post-capital phase (AD 893–971), is characterised by decisive changes of the Inner City, in which numerous pit houses and workshops are built in the open areas along the inner side of the city walls. Smaller residential and economic complexes of wealthy boyars are also emerging in these areas. Such aristocratic buildings are also found in the Outer City, where some were already known from the previous phase. The increased number of pit houses in the Inner City seems to indicate that a considerable part of the population must have given up its farming activities and might have moved from the surrounding settlements to the Inner City as craftsmen. Solely the area within the brick wall was not further urbanised during this period (Dimitrov 2007, 268).

The Byzantine phase (AD 971 – second half of 11th century AD) of Pliska was initiated by the conquest of the city by the Byzantine Empire in AD 971, which is attested by written evidence and countless finds of Byzantine seals and coins from this period. It brought further alterations to the urban design, although the citadel was apparently able to retain its representative function at first. However, numerous residential quarters grew closer and closer to the citadel, and further production sites expanded even to the formerly sacred palace courtyard. The Outer City, where necropolises with small crypts are now being built, appears to be even more sparsely populated than before, and the Inner City seems to accommodate now almost the entire population of Pliska. Several nomadic incursions in the second half of the 11th century mark the final stage of this development (Dimitrov 2007, 268-269).

Methods & Fieldwork

The first survey campaign, in which a total of 10 ha of GPR and 67 ha of magnetics was measured (fig. 3), took place between November 4th and November 10th 2016. The second campaign was conducted from May 1st to May 11th 2018, and a total of 25 ha of GPR and 34 ha of magnetics was measured (fig. 3). The fieldwork conditions in both years were rather challenging. Especially in 2016 the rainy weather and the wet ground, as well as the partly deep ploughing of the agricultural fields covering the Outer City and the dense veg-



Fig. 3. During the first campaign in 2016 (left), 10 ha of GPR (blue) and 67 ha of magnetics (red) were measured. In the second campaign in 2018, a total of 34 ha of magnetics (centre, red) and 25 ha of GPR (right, blue) was surveyed

Обр. 3. По време на първата кампания през 2016 г. (вляво) бяха измерени 100 ха с георадар (в синьо) и 670 ха с магнитометър (в червено). Във втората кампания през 2018 г. бяха изследвани общо 340 дка с магнитометър (в центъра, в червено) и 250 ха с георадар (вдясно, в синьо)

etation in the Inner City were rendering large parts of the area inaccessible.

In 2016 a Fluxgate magnetometer system, as well as a 16-channel GPR array, were applied. For the magnetometer system, eight Förster FEREX CON650 probes mounted on a non-magnetic cart with 25 cm cross-line-spacing were used. Due to the lack of an ATV during the campaign, the custom-built cart had to be towed by a small SUV. However, the 6 m long drawbar still provided enough distance between the magnetometer probes and the vehicle to keep the magnetic field disturbances at a minimum. A ruggedised notebook, a ten-channel Eastern Atlas analogue/digital converter as well as the LoggerVis software, developed by the LBI ArchPro, were used for data acquisition. Besides data collection, LoggerVis was also used for navigation and real-time data visualisation.

The same Fluxgate magnetometer system was applied again in 2018, with the only difference that this time the non-magnetic cart was towed by an ATV (fig. 4, above), which resulted in an improved all-terrain mobility of the survey system and an even better data quality. Although the survey fields of the Inner City had been cleared of bushes and scrub, the microtopography was at times fairly rough due to the upstanding archaeological remains. To avoid damage of archaeological structures as well as of the survey equipment, some parts of the Inner City could not be surveyed at all (fig. 3).

In 2018, a four-channel SPIDAR GPR array from Sensors & Software was applied. The four 250 MHz PulseEKKO PRO antenna pairs were mounted in a custom-built metal trailer-frame towed by an ATV (fig. 4, below) and arranged in parallel with 50 cm cross-line spacing. With a constant measuring frequency of 50 Hz, measurements were taken with an in-line trace spacing of about 3 – 6 cm, depending on the driving speed. In Pliska, due to the rough terrain and to achieve higher data quality, the surveyors never exceeded a speed of 8 km/h. The resulting spatial resolution for the SPIDAR-surveys thus amounted to about 50 × 4 cm, which proved to be sufficient for the massive walls and many other structures present in Pliska. The GPR-signal penetration depths in Pliska were rather low, both using 400 MHz antennae, which were applied in 2016, as well as using the 250 MHz antennae. Yet, applying a 250 MHz-system in 2018 resulted in a substantial better penetration depth and therefore visibility of the archaeological structures, even though the spatial resolution

provided by the 250 MHz-system is much coarser. In this article, thus, only the GPR data, surveyed in 2018 with the 250 MHz system will be presented. The ruggedised notebook, mounted in front of the driver, was equipped with LoggerVIS for navigation as well as Sensors & Software's data acquisition software SPIView.

Data positioning was realised with a Realtime Kinematic Global Navigation Satellite System (RTK-GNSS) from Javad in base and rover configuration and accuracy within a few centimetres was achieved. To make sure that the data were not corrupted during the measurements and that the entire area driven was present in the survey data, it was immediately processed on-site every day after the fieldwork. Processing and visualisation of the data, both in the field and in postprocessing, were conducted with the in-house developed software ApSoft (ApMag for magnetics and ApRadar for GPR), specially designed for large-scale high-resolution prospection data. Several automatic, as well as semi-automatic processing algorithms, were applied to produce georeferenced and optimised greyscale images (fig. 5, above). For the magnetic data, a clip-off range between -4 nT (white) and +6 nT (black) was used for data interpretation (Filzwieser et al. 2017).

Based on vertical 2D sections of the GPR data, a 3D data block was computed and then cut into horizontal depth-slices of various thickness (between 5 cm and 50 cm), that again can be visualised as greyscale images. Since soil composition, as well as soil humidity, affect the velocity of the radar signal, a velocity-analysis of the local soil is crucial to determine realistic average values for signal penetration depths. Reflection hyperbolae, that were applied to the GPR data from Pliska, showed rather low velocities, varying between 10 cm/ns and 7 cm/ns. As the time-to-depth-conversion of all individual datasets are based on average velocity values, the depths displayed in this article are relative values (Trinks et al. 2018).

During data acquisition, the ground was very uneven and the soil conditions rather challenging. As a result, in the radar measurements of the first fieldwork campaign, despite the expected archaeology, hardly any structures could be detected. This concerned first and foremost areas below approximately one meter in depth. In order to evaluate the GPR survey data optimally for archaeological interpretations, a special remove-average-trace-filter was used in addition to the usual processing steps such as bandpass filtering or migration (Hinterleitner et al. 2009). This average-trace-filter normally removes influences on the radar signal that do not originate from the ground, but from the surroundings above the radar antennae (antenna housing, antenna suspension, etc.). Usually, a mean radar signal is calculated from all radar signals of a measuring line and subtracted from all radar signals of this measuring line. This method was used for the data evaluation of Pliska, however, not a mean radar signal was calculated for the entire measuring line, but for each measuring point only the mean radar signal in the range of 0.5 m before and after. This allows the different local influences that overlay the very weak signals from deeper layers to be removed. In this way, the weak signals reflected from the deeper archaeological structures could be made visible.

For further integrated archaeological interpretation and analysis of the data, the resulting greyscale images from the GPR and magnetic data (fig. 5, above) were imported into a geographical information system (GIS), using a geodatabase as well as the GIS extension ArchaeoAnalyst developed by the LBI ArchPro (Neubauer 2004; Trinks et al. 2018), and interpreted separately (fig. 5, below).



Fig. 4. Survey systems applied at Pliska in 2018: A fluxgate magnetometer system (above) and a 250 MHz GPR-system (below) (photos by M. Gamon and J. Schlegel)

Обр. 4. Системи за изследване в Плиска през 2018: флузгейт магнитометър (горе) и 250 MHz георадар (долу) (снимки М. Гамон и Й. Шлегел)

Results

The results of the geophysical surveys from 2016 and 2018 are presented mainly focussing on dimensions, orientation and the probable material composition of the identified structures. We try to interpret these structures with regard to their possible use and the corresponding historical phases of Pliska. Three areas with an accumulation of archaeological structures were of utmost interest, one in the North-west (fig. 6.a), one in the South-east (fig.

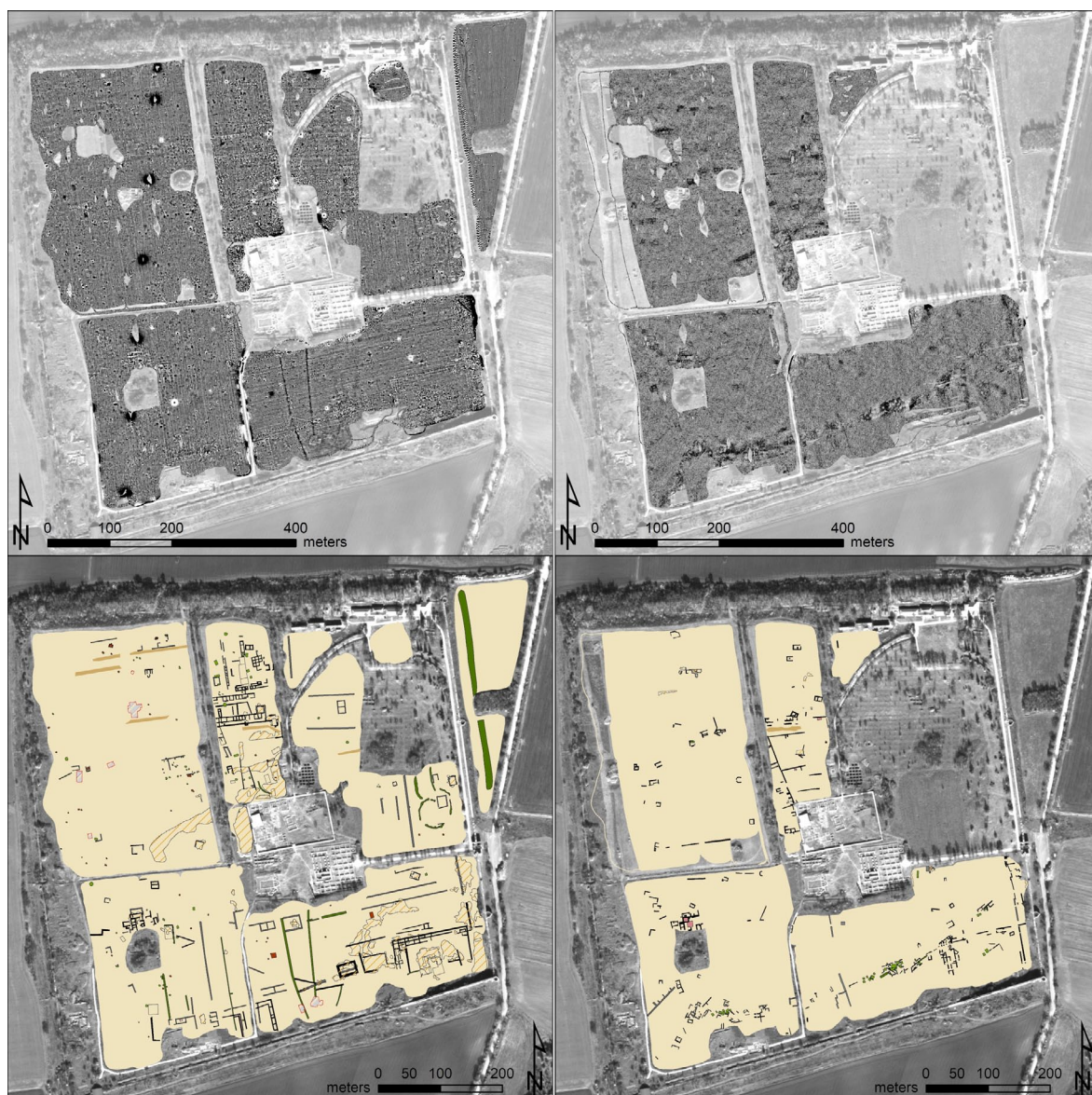


Fig. 5. Georeferenced and optimised greyscale images of the magnetic data (above left) as well as the GPR data (above right) collected in 2018 in the Inner City of Pliska. The magnetic (below left) and GPR (below right) data were interpreted separately. Even though in general, more archaeologically relevant structures could be observed on the magnetics, the radar data provided important additional information

Обр. 5. Геореферирани и оптимизирани изображения на сивите скали на магнитните данни (горе вляво), както и на георадарните данните (горе вдясно), събрани през 2018 г. във Вътрешния град на Плиска. Магнитните (долу вляво) и георадарните (долу вдясно) данни се интерпретират отделно.

Въпреки по-ясните археологически структури на магнетиката, радарните данни предоставят съществена допълнителна информация

6.b) and one in the South-west (fig. 6.c) of the Inner City. In what follows, these three areas will be discussed separately. However, as the interpretation of integrated large-scale archaeological prospection data is a complex and time-consuming process, it must be stressed that the result presented here are only preliminary. A more detailed interpretation, also including fainter structures and a more in-depth analysis of correlations between structures is still pending.

The North-west – area a

By surveying the field immediately to the North of the citadel, several elongated buildings consisting of many individual rectangular cells, commonly referred to as chain buildings, were discovered mainly by magnetics. Due to similar structures excavated near the Western wall and in the Western part of the palace district, it can be assumed that these buildings were used as workshops, for industrial production or commercial purposes (Curta 2009, 204; Aladzhov 2010, 118;) and might have been erected in the 10th century AD. However, chain buildings could also have had a residential function, in particular for the servants of aristocrats and soldiers. Usually limestone blocks were used to build these dwellings.

Most buildings are oriented parallel or perpendicular to Pliska's main road network. The Northernmost building complex, structure 18 (fig. 7), has a length of at least 79 m from North to South and a width of between 53 m and 74 m, depending on whether the Western building wing is considered part of the complex. Its magnetic anomalies are considerably weaker and the cells are smaller than those of the Eastern wing. However, the same orientation and analogies with similar compound buildings speak for a single large complex. The cells of the central and Eastern parts measure on average between 3–4 m x 4–5 m and those of the Western wing 2 x 2.5 m. The extent of the central building could not be precisely determined, as this area is characterised by a high number of magnetic dipoles. This accumulation of dipoles could be caused by thermoremanent magnetised material, such as tiles from a collapsed roof. Nevertheless, the data can be used to derive the approximate dimensions of the building, suggesting a slightly displaced continuation of the structures to the North. Two differently oriented buildings within the boundaries of structure 18, structures 1 and 31 (fig. 7, str. 1 and str. 31), which were probably built in an earlier phase, as well as several large pits, interpreted as pit houses, speak for a very dense and long-lasting development of this area. Due to its floor plan, structure 1 has a strong resemblance with another characteristic building type of Pliska known as three-part building. These representative buildings, interpreted as small palaces or boyar houses, are typical for the first half of the 9th century AD. Structure 31, which is very well visible in both the magnetics and the GPR data, may show the remains of a pagan temple and might therefore also date from the same phase. The interesting thing about this case is that these representative buildings from the first phase of Pliska's occupancy are located outside the early wooden fence, the predecessor to the stone wall, which again raises the question of the dating of the stone wall. The whole structure could also be interpreted as a separate aristocratic complex. In its enclosure, we see a palace building, a temple, small chain rooms, probably a warehouse and a large chain residential building.

The central part of area a (fig. 8) is dominated by an East-West oriented 74 m long and 42 m wide chain building complex (str. 19) with two long wings, each consisting of about a dozen individual cells, which enclose a large central square. The cells of the Northern wing are considerably bigger than those of structure 18, with which it even might have been connected. Yet, its use seems to have been different from that of structure 18 as well as from that of the southern wing of structure 19, in both of which the walls appear as negative magnetic anomalies. In the Northern wing of structure 19, however, the interior of the individual cells appears as negative magnetic anomaly with positively magnetised walls (fig. 8). The southern wing reaches further to the East, where it is connected to a square building with a side length of about 13 m, immediately to the North. The interior of the building, again, shows an accumulation of dipoles, probably indicating tiles of a collapsed roof. Based on

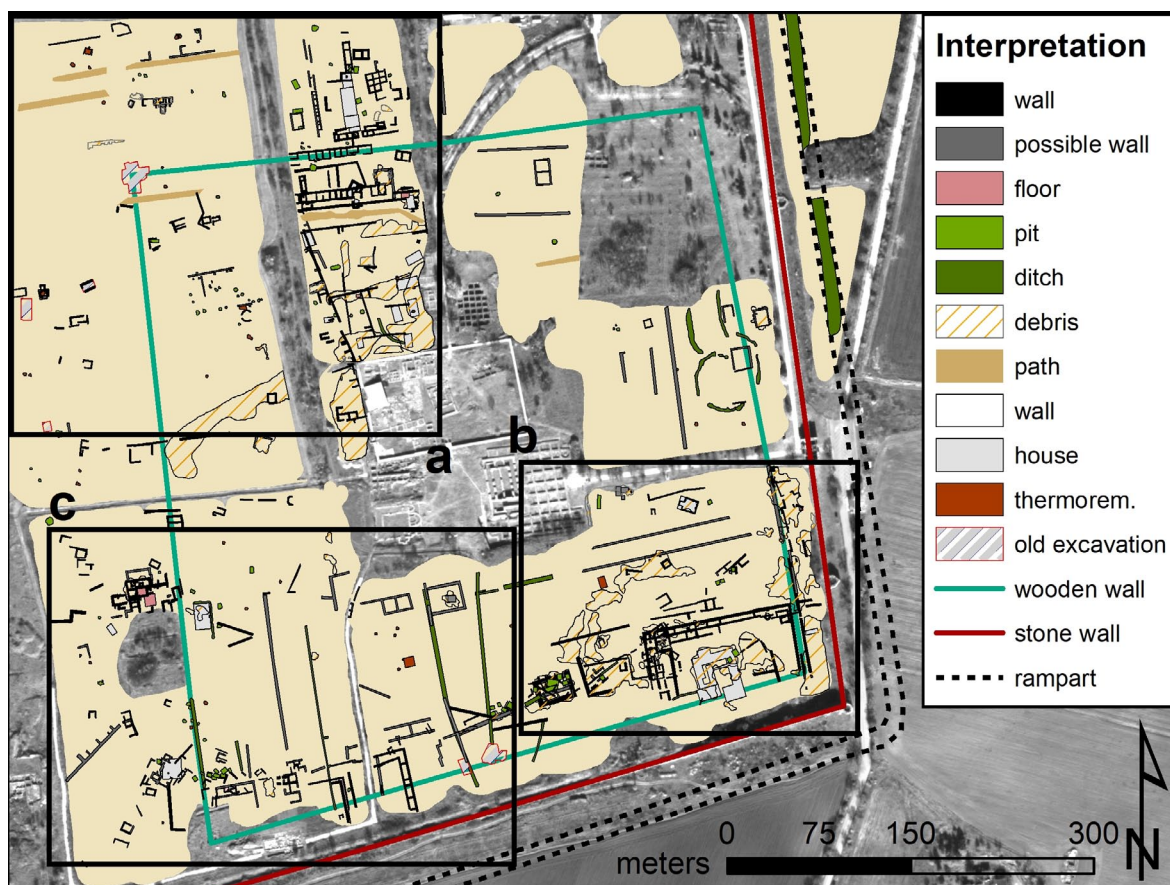


Fig. 6. Integrated interpretation map of the Inner City of Pliska, based on both magnetics and GPR data; three areas with an accumulation of archaeological structures become apparent: one to the North-west (a), one to the South-east (b) and a third to the South-west (c)

Обр. 6. Интегрираната интерпретационна карта на Вътрешния град на Плиска, базирана на данни от магнетиката и на георадарни данни; ясно се очертават три области с натрупване на археологически структури – една в северозападната част (a), една в югоизточната (b) и една в югозападната (c)

its dimensions, its layout and on analogies this structure may show the remains of a water reservoir or storage room. The presence of a water reservoir in the immediate vicinity of complex 18 once again confirms its aristocratic character.

In its centre, the southern wing seems to have been built over by a 16 m long so-called two-room building, oriented from North/North-east to South/South-west. However, the GPR data shows, that its foundations extend deeper into the ground than the chain building does, thus it is not possible to determine with certainty which building is actually older. On the square between the two wings, several up to 1.5 m thick walls can be observed, that could indicate the exterior walls of a central main building. In the GPR data to the East, a two-room building (str. 13) with a different orientation can be observed. This building type is typical for the second half of the 10th century AD. During excavations of comparable buildings, furnaces for processing iron and lead as well as numerous amphorae were found, which could give an indication for the use of structure 13 and which would also explain the very strong dipoles visible on the magnetic data in this area (fig. 8, left).

To the South of structure 19 and parallel to it, a corridor runs from West to East, about

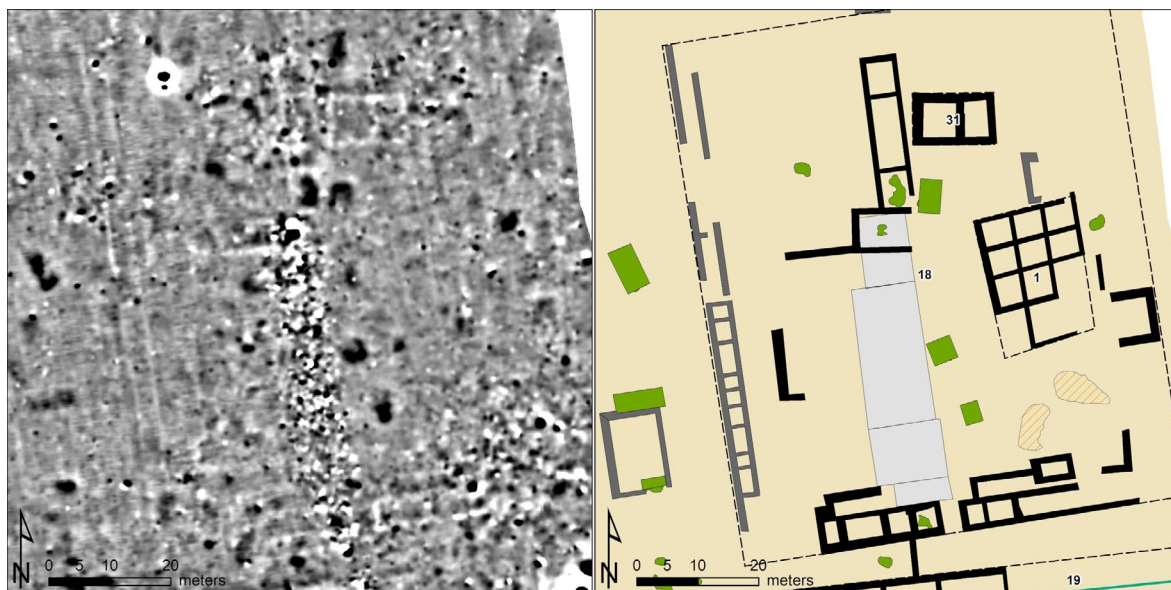


Fig. 7. Magnetic data (left) and integrated interpretation (right) of the northern chain building complex (18) in area a, as well as some other buildings (1, 31) that may originate from an earlier phase. Dashed lines mark the assumed overall dimensions of the structures

Обр. 7. Магнитните данни (вляво) и интегрираната интерпретация (вдясно) на северната верижна сграда (комплекс 18) в зона а, както и някои други сгради (1, 31), които вероятно са по-ранни. Пунктираните линии маркират предполагаемите общи размери на сградните комплекси

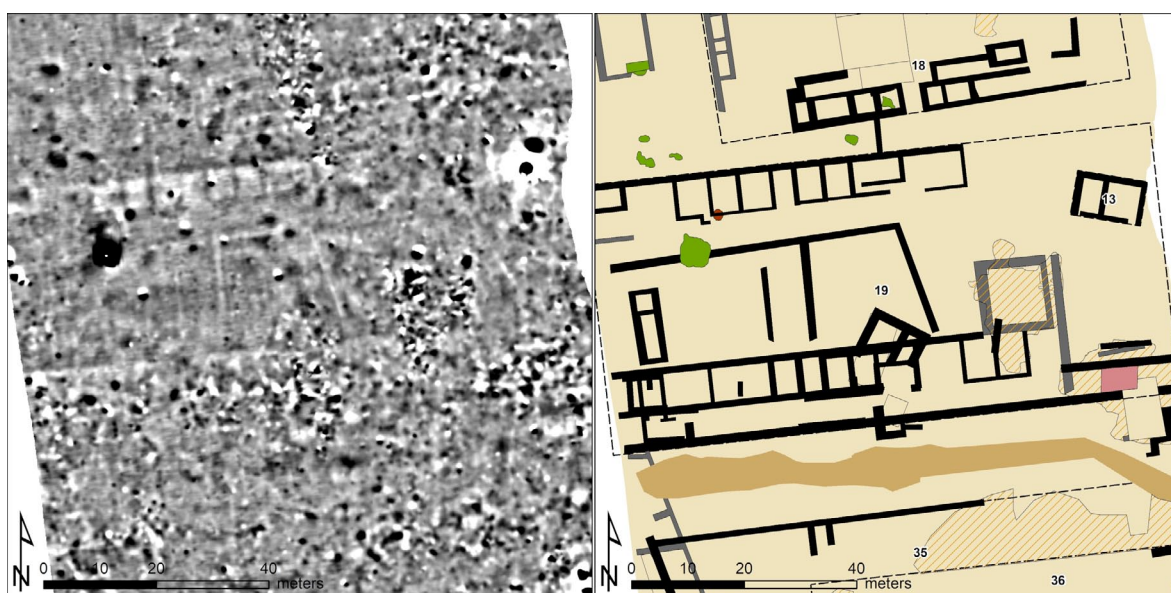


Fig. 8. Magnetics (left) and integrated interpretation (right) of the central part of area a: The data show an East-West oriented chain building (19), including a possible water reservoir. To the East, a two-room building (13) with a different orientation was observed on the GPR data

Обр. 8. Магнетика (вляво) и интегрирана интерпретация (вдясно) на централната част на зона а: Данните показват верижна сграда с посока изток-запад (19) и вероятно водохранилище. На изток по данни от георадара се наблюдава двуделна сграда (13) с различна ориентация

15 m wide and bordered by two walls (fig. 9). In its centre, a 5 m wide road is indicated. After about 80 m, the road meets an 11 m × 8 m building, which it evades to the South-east, where it seems to have reached the main road linking the citadel with the Northern city gate. The area to the South of the corridor, measuring about 100 m × 100 m, seems further subdivided by several 1.5 m thick walls. Its Northern half appears to be rather empty. Only in the North-eastern corner, at the transition to the corridor, and to the West, structures can be observed in the magnetic data that could be interpreted as collapsed buildings. In the middle of the area, the GPR data also show an 11 m × 7 m building, from which several walls seem to lead away in different directions.

The southernmost part of area **a**, bordering the citadel to the North and West, again appears to be more densely built-up. Especially in the vicinity of the citadel, numerous buildings can be anticipated. The data here are difficult to interpret, due to countless dipoles and anomalies, which might indicate a large amount of debris. It is likely that the adjacent buildings excavated along the road to the Northern gate are continuing beneath the field. What is particularly striking in this area is that most of the structures can be assigned to one of two contradictory orientations. One is running parallel to the Northern road (fig. 9, str. 36) together with the aforementioned excavated buildings and most of the structures within the citadel and can thus probably be attributed to the 10th century AD. The second orientation is turned about 14° counter-clockwise (fig. 9, str. 35). Only very few structures can be assigned to it, like the thick walls that seem to limit a large open space to the West and that can be observed in the data. Most interesting, however, is that these boundary walls have the same orientation as the large pagan temple (fig. 9, str. 39) in the centre of the citadel, which was dated to the first half of the 9th century AD (Aladzhov 2010, 123).

Very interesting in this area is also a curved linear and about 2 m wide magnetic anomaly (fig. 9, str. 33), that could be interpreted as a ditch. It is about 30 m long, begins 10 m to the North of the citadel and runs in an even wide arc to the North-west. This probable ditch could be the remains of a known secret passage, which led from the palace of Krum to the North, passed the pagan temple and split in this very area to leave the citadel in two directions to the North (Henning 2007, plate 29). It is difficult to trace the presumed secret passage further due to the countless other anomalies present in the data. However, two other comparable structures to the South of the citadel can be observed much better that will be discussed in more detail below. The last structure of this measured field to be dealt with here is located to the West of the citadel (fig. 9, str. 11). This concerns primarily the GPR data, in which a multi-room building can be seen. In the magnetics, the building is hardly recognisable due to the numerous superimposed magnetic disturbances caused by various modern structural additions to the wall of the citadel. Structure 11, as well as structure 1 discussed above (Fig. 8, str. 1), may show the remains of the so-called three-part buildings or boyar houses, which should logically be located around the Citadel.

The first settlers in Pliska were farmers and nomadic Bulgarian soldiers. They build their homes in the Inner City entirely out of wood and probably also used yurts as temporary dwellings. In the same phase, the Inner City of Pliska was completely encircled by a wooden fortification. These structures must have existed until 811 AD when the city was demolished (Georgiev 2014, 203). The wooden fortification could be barely detected directly by respective structures in the geophysical data. However, several building complexes found in the data are exactly aligned with the presumed course of the wooden protective walls and thus indirectly verify those (fig. 6). Structure 12 (fig. 10) is interpreted as a large wooden building with a wide entrance space, whose foundations are made of pairs of so-

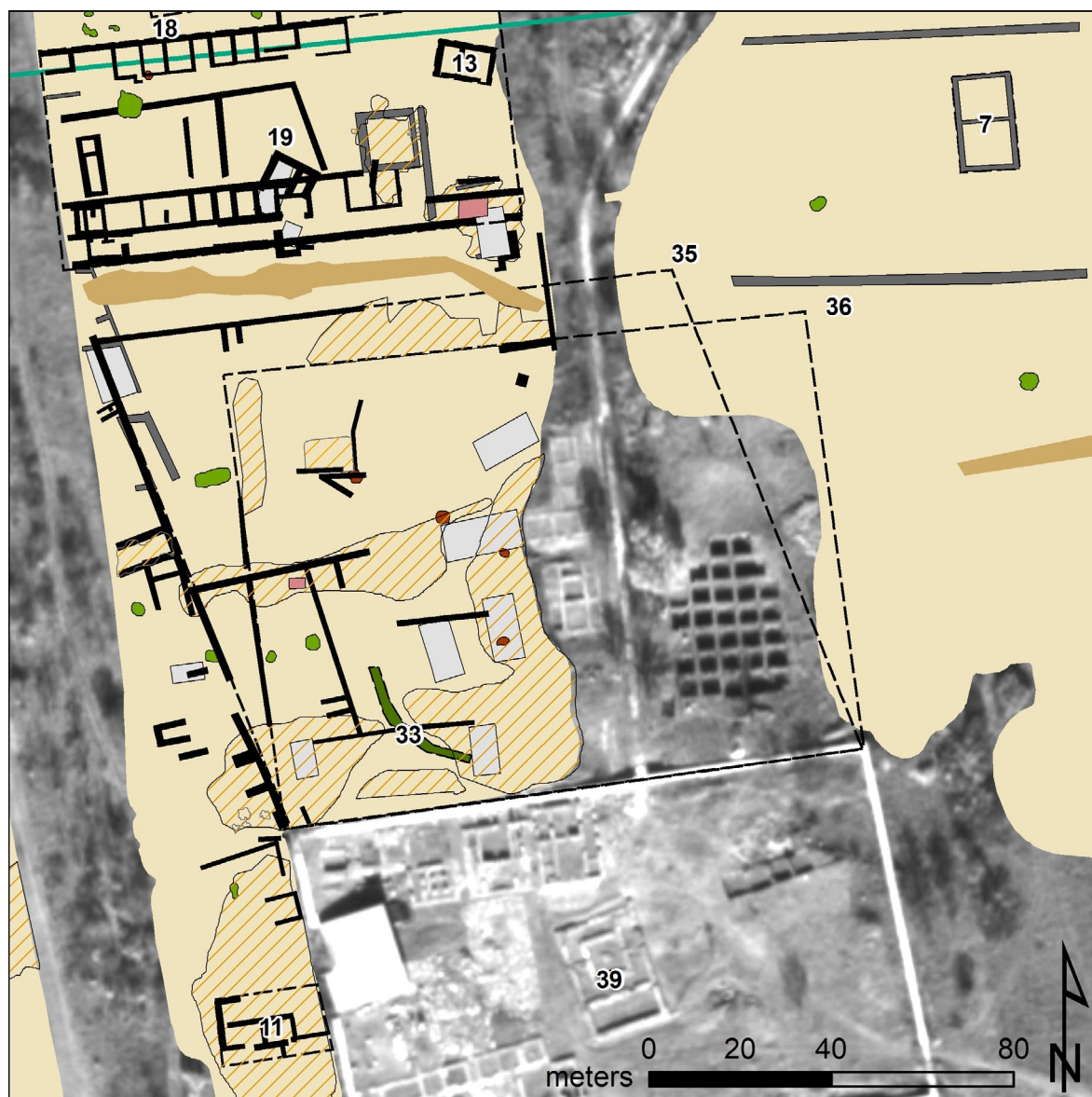


Fig. 9. On the integrated interpretation map of the field to the North of the citadel, several chain buildings are shown (18, 19). In the centre, a 15 m wide corridor with a 5 m wide road runs from West to East, after which a large open area follows (35,36) subdivided by several walls

Обр. 9. На интегрираната интерпретационна карта на полето северно от Цитаделата са показани няколко верижни сгради (18, 19). В центъра личи коридор с ширина 15 м и път с ширина 5 м с посока запад-изток, след което следва голяма открита площ (35, 36), допълнително разделена от няколко стени

called constructive pits - foundations for a wooden pillar construction and as such may be attributed to the earliest phase of occupation in Pliska. Just to the South of this building a circular trench becomes visible, structure 30 – the basis for a circular plan building, very similar to the plans of the earliest buildings in the Inner City.

The South-east – area **b**

The South-eastern sector of the Inner City is dominated by a quadrangular building complex of roughly 129 m x 65 m (fig. 11, str. 20). The enormous complex may present the remains of a large chain building or even barracks from the first half of the 10th century AD,

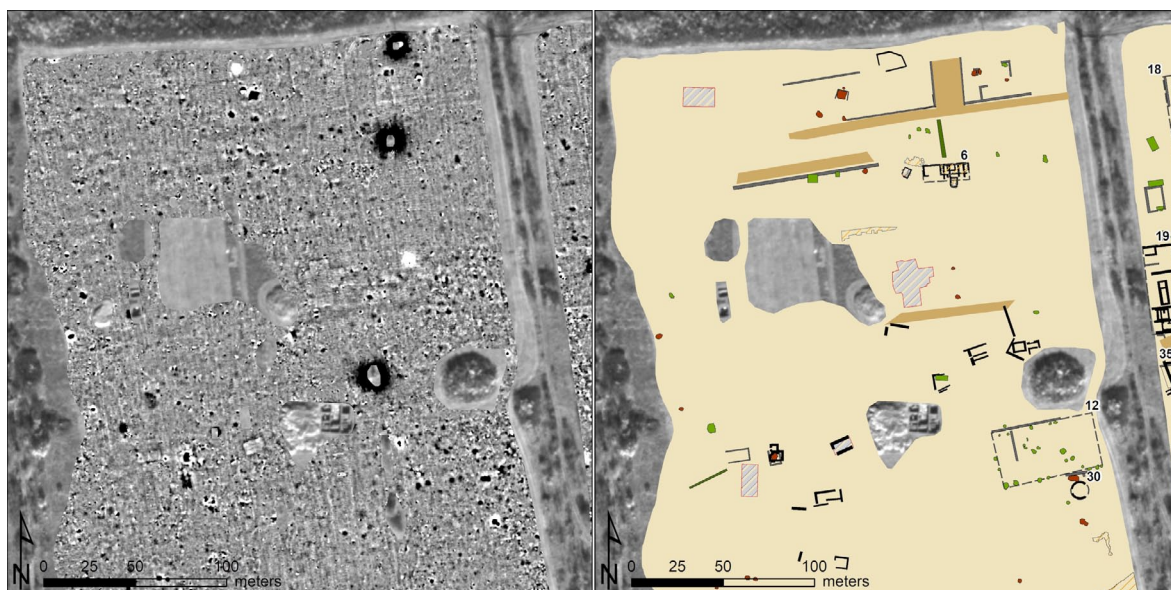


Fig. 10. In the magnetic data of the North-western quarter of the Inner City, several structures were detected that probably show the remains of wooden buildings and thus could be assigned to the first pagan phase of Pliska

Обр. 10. В магнитните данни на северозападния квартал на Вътрешния град са открити няколко структури, които вероятно показват останките от дървени сгради и по този начин могат да бъдат причислени към първата езическа фаза на Плиска

probably used for military accommodation, with rows of small rooms for soldiers or storage compartments to the North, West and probably to the East. These possible barracks, at first, seem to be oriented in relation to the course of the older wooden defence wall, being located in its South-eastern corner. However, if other structures and excavation results from this sector are considered, the barracks, instead, seem to have only been aligned to this old course in the East.

On the magnetic data, the walls of the barracks appear as clear negative magnetic linear anomalies (fig. 11, below-left) and are most likely built of stone. In the middle of a ca. 100 m × 50 m open courtyard, a structure measuring 47 m × 38 m can be observed (fig. 11, str. 2), which is only recognisable in its shape due to the debris of another probable collapsed roof. In relation to the outer barracks, the building seems shifted counter-clockwise by several degrees, and it is oriented exactly to the axis of the southern wooden defence wall. For these two reasons, this central building could be older than the barracks. However, it could also be interpreted as the main building of the barracks, whose different orientation was possibly only chosen due to older structures still visible at that time. Several excavations of stone buildings in Pliska revealed that they are very often preceded by timber constructions with a similar plan.

To the East of the barracks, massive linear structures accompanying the old wooden defence system could be observed in the GPR and the magnetic data. This is one of the few areas in which the wooden wall and its exact course could be clearly identified by geophysics. Due to several excavations in this sector in the last decades, intensive settlement activity with different post-utilisation could be proven here for the capital and post-capital phase of Pliska (8th–11th century AD), including stone buildings, pit houses, pottery kilns and other pits (Grigorov, Dimitrov 2013). Also, thanks to these excavations it is known how far the barracks extended to the South, near the later stone city wall, since this area could



Fig. 11. The South-eastern sector of the Inner City is dominated by a quadrangular building complex, interpreted as 10th century AD barracks (20). In its centre, another building can be observed (2). On the magnetic data (below left), the walls of the barracks appear as clear negative magnetic linear anomalies

Обр. 11. Югоизточният сектор на Вътрешния град е зает от четириъгълен строителен комплекс, интерпретиран като казарма от X в. (20). В центъра му се наблюдава друга сграда (2). Върху магнитните данни (долу вляво) стените на казармите изглеждат като ясни отрицателни магнитни линейни аномалии

not be measured as a result of the rough terrain. The remains of the walls uncovered here correspond very well to the results of the geophysical measurements and show the South-eastern corner of the building and its further course to the West (fig. 12). Based on these excavation results, it must be assumed that the building complex was also closed to the South. Here, however, no rectangular wing seems to have stood. Although its Northern wall might



Fig. 12. The interpretative mapping of the geophysical measurements corresponds very well to an excavation plan of the area, showing the south-eastern corner of the building and indicating its further course to the West (plan: Grigorov, Dimitrov 2013, 126)

Обр. 12. Интерпретативното картографиране на геофизичните измервания съответства много добре на плана на археологическите разкопки в тази зона, показващ югоизточния ъгъл на сградата и нейното западно продължение (план: Григоров, Димитров 2013, 126)

have been parallel and perpendicular to the other walls of the barracks, its southern wall rather must have followed the stone city wall and thus widened the wing to the West (fig. 11 and fig. 12, dashed line).

To the West of structure 20, two large buildings can be observed, measuring 42 m × 25 m and 31 m × 21 m. They are situated at a distance of about 30 m of the wooden defensive structure and 70 m of the stone wall. Together with several other buildings further West, they seem to have been erected in a line that runs roughly parallel to the two defensive lines mentioned above. However, this circumstance must be analysed in connection with the other structures in the South-western sector of the Inner City and will be discussed

below. The larger of the two buildings cannot be clearly defined in its dimensions, as it also appears to be overlaid by brick debris or a collapsed roof and is intersected by several South-west/North-east running structures, which most likely belong to a different phase. The Western building is rectangular and built of walls up to 4 m thick (fig. 11, str. 28). It is divided lengthwise by another wall into two rooms of unequal size. Based on its ground plan and orientation, it was speculated that structure 28 might be the remains of a church, probably dating to the first half of the 10th century AD.

The South-west – area c

Immediately to the West of the area discussed above and to the South of Krum's Palace and the palace basilica, two over 2 m wide North-South oriented ditch-like structures can be observed in the magnetic data (fig. 13, left). The Western ditch seems to originate at the basilica, runs almost directly to the South, until after 100 m it reaches a wall visible in the data, whereupon it branches off slightly to the East and runs another 70 m behind the wooden defensive wall to the limit of the measured area. It might have gone as far as the stone wall or served as a connection to the Outer City. The structure is also partly detectable in the GPR data. However, while it appears as positive anomaly in the magnetic data, indicating a backfilled ditch, the structures in the radar data suggest rather reflective material. This could, in turn, indicate stone, which is why the two ditches could be interpreted as collapsed tunnels, of which parts of the wood and stone construction may still be preserved in some places. Both these observations, as well as the position and course of these anomalies, are reminiscent of two partially excavated secret passages (Henning 2007c; Aladzhov 2010; Grigorov, Dimitrov 2013; Herold 2018).

These secret passages are presumed to have connected Krum's Palace with the wooden fortification and the basilica with the stone city wall respectively. In the Eastern passage, wooden construction elements were excavated together with a large amount of pottery, which dated to around AD 800, supporting this assumption (Grigorov, Dimitrov 2013; Henning et al. 2007, 439). Thus, the Eastern ditch must be equated with the oldest so-called Burnt Secret passage (fig. 13, str. 17). It started at the palace and led in exactly the same direction to the South as the respective structure in the geophysical data, connecting it with the wooden defence wall (Henning et al. 2007, 439; Aladzhov 2010, 120; Herold 2018, 920). At the southern end of the passage, where the corridor must have reached the fortification, an old excavation trench is visible in the magnetic data. This trench was excavated in 1999 by a German-Bulgarian team in which burnt wooden construction elements were unearthed. In the Northern part of the same secret passage, further wooden elements together with a large number of ceramics were found (Rašev 2004, 61-78; Henning et al. 2007, 439).

Consequently, the Western ditch-like structure must be identified with the younger so-called Big Secret passage (fig. 13, str. 32), connecting the palace basilica with the later stone city wall. This corridor was in use during the first half of the 10th century AD, in the post-capital phase of Pliska. Particularly interesting, are the reflective parts, mentioned above, being the only traces of the secret passages that can be observed in the GPR data. In general, only the floors of Pliska's secret passages were paved with stone, the walls and ceilings were supported with wood. However, it is very unlikely that the radar signal penetrated here to the bottom of the passage, but the entire structure above is not visible. Thus, the Big Secret passage might have been covered with a stone construction in these areas, which would contradict the excavation results from other parts of the same corridor. What is noticeable, however, is that in precisely these areas also several buildings can be assumed,



Fig. 13. Two ditches over 2 m wide can be observed in the magnetic data (left). They correspond in size and course to two excavated secret passages, connecting Krum's Palace with the wooden fortification and the basilica with the stone city wall respectively (red dashed line, after Henning 2007, plate 29)

Обр. 13. В магнитните данни (вляво) се наблюдават два рова с ширина над 2 м. Те отговарят на размерите и посоките на два частично проучени тайни ходника, свързващи съответно Крумовия дворец с ранното дървено укрепление и базиликата с каменната крепост (червена пунктирна линия, по Хенинг 2007, табл. 29)

based on the geophysical data. One possible explanation for this could thus be that the corridor was deliberately reinforced with a stone vault at those sections where it ran below buildings, while the rest of the corridor was constructed by timber.

The structures further to the West (fig. 14, str. 4 and 5), could be interpreted as a continuation of the buildings to the East of the secret passages. They follow the same line, roughly parallel to the wooden defensive wall until its South-western corner. Here the structures stop at a 75 m long and 2.5 m wide ditch, that can be observed in the magnetics. It runs along the assumed North-South oriented course of the Western wooden defence wall and can probably even be attributed to it. However, the assignment of all structures to the earliest phase of Pliska is rather unlikely, as a large, probably contiguous building complex to the East (fig. 14, str. 4) clearly extends beyond the old defensive wall. The complex is cut in a North-South direction by a modern path, which makes its interpretation even more difficult. Yet it could be interpreted as a chain building and thus dated to the 10th century AD. Whether such buildings within the Inner City were actually used for agricultural production during this phase, or whether they were only modelled on rural manor houses, since a building complex from the 10th–11th century AD with a very similar ground plan and dimensions was discovered in the North-western corner of the Outer City (Vitljanov 1984), remains open for discussion.

The anomalies comprising structure 5 could only be detected very poorly in the data, yet they seem to indicate another chain building (fig. 14, str. 5). In addition, it could only be verified to the North, since the area further South was not accessible. However, it can be assumed that both structures, similar to structure 20 in the East, originally reached up to the stone city wall, as during this phase, Pliska's free areas along the inner side of the wall were populated, according to excavation results (Dimitrov 2007, 268). Furthermore, it would also



Fig. 14. The structures further to the West (4, 5) can be seen as a continuation of the eastern buildings (17, 32). They stop at a North-South oriented 2.5 m wide ditch (green), which runs along the assumed course of the Western wooden defence wall

Обр. 14. Структурите на запад (4, 5) могат да се разглеждат като продължение на източните сгради (17, 32). Те достигат до ориентиран север-юг и широк 2,5 м ров (в зелено), който минава успоредно на предполагаемото западно трасе на ранната дървена крепост

be possible that both structures belong to a single large coherent building complex (fig. 14, str. 21), as some walls running from structure 4 to the West suggest.

About 100 m to the North, near the Western gate of the Inner City, there is another large building complex very well visible in both the magnetics and the GPR data (fig. 15, str. 3). It measures almost 50 m from East to West and up to 37 m from North to South, with smaller internal rooms of approximately 5 m × 5 m and probably some external side buildings. Immediately to the South, an area of about 3000 m² could not be surveyed, due to the spoil heap of an excavation that was carried out here. During this excavation, an aristocratic building from the post-capital phase was unearthed that showed clear Byzantine influences. It is thus very probable that structure 3 is also such an aristocratic building of the same phase. The dimensions are quite comparable and the orientation exactly the same. It is also conceivable that these two buildings may have been a part of the same complex and were built around a common courtyard. In the layout scheme of the central building in the complex, we can see an exact analogue of the Little Palace in the Citadel – a three-part building with a large central part flanked by smaller rooms. To the North-east of it lies a rectangular building, which could be interpreted as water reservoir. Such reservoirs were always built close to the palace buildings in the Inner City.



Fig. 15. About 150 m to the South-east of the Western gate, there is a large building complex very well visible in both the magnetics (above left, m4-p6 nT) as well as in the GPR data (above right, 0.6–1.0 m). The integrated interpretation of the magnetic as well as the GPR data (below) shows the remains of a possible aristocratic building from the post-capital phase

Обр. 15. Сграден комплекс на около 150 м югоизточно от западната порта, много добре видим както на магнитограмата (горе вляво, m4-p6 nT), така и на радарграмата (горе вдясно, 0,6–1,0 m). Интегрирана интерпретация на магнитните и на георадарните данни, показваща вероятно останките на аристократична сграда от следстоличния период

The Outer City

In autumn 2016, to the North and East of the Inner City, an area of about 67 ha was measured using magnetics. Hundreds of archaeological, geological and modern structures can be observed in these data. Pit houses located in Pliska are described in an excavation report of 1976, in which for the first time such a structure was carefully excavated and documented. Two types of pit houses were defined based on the excavation results. Both belong to the typical Eastern European sunken floor house type. One, however, has a stone oven in the North-west corner (Henning 2007b, 220-221). Whereas the other does not have a stone oven, but „a shallow stone hearth in one of its corners, which forms a platform of c. 80 cm diameter covered with clay that was burnt and, unlike the *grubenhäuser*, was not dug into the ground“ (Henning 2007b, 221). Pit houses were popular residential buildings in the Outer City of Pliska. Hence the outer area „would have been covered by loosely scattered rural settlement complexes of modest lodge dwellings of the dug into the ground type“ (Henning 2007b, 213). The geophysical measurements of the University of Frankfurt am Main and the field investigations confirmed agglomerations of these structures all around Pliska (Schleifer 2007). Also in the geophysical surveys carried out in 2016, a positive magnetic rectangular structures with sizes between of 5 m × 5 m up to 10 m × 10 m could be identified, especially in the 61 ha survey field to the North of the Great Basilica (fig. 16).

These buildings are not randomly scattered but form distinct clusters to be interpreted as smaller settlements, which are spatially separated from each other. This assumption coincides with the results of the systematic fieldwalking (Aladzhov et al. 2013) (fig. 17). Two main roads are visible in the data, both already known through previous archaeological investigations. One leads from the Inner City directly to the North and passes through the Western part of the measured area. The other road passes the basilica and leads through the centre of the surveyed area. Several small paths branch off this road and run in a North-west direction. Results also include numerous ditches that either overlap each other or form a larger ditch systems. Although they could derive from different phases and are not necessarily all related to the Early Medieval settlement, they also could be interpreted as enclosing ditches or the remains of wooden palisades, separating the various settlements or distinct settlement-areas from each other.

Many churches could also be located in the Outer City thanks to field surveys, the inspection of their still standing remains and geophysical prospection. These characteristic “Pliska-type” churches usually consist of three rather short naves with one or three apses. Churches were often built in the centre of settlement accumulations, which in turn also helps to locate pit houses and other residential buildings. In between the already mentioned settlement structures to the North-West of the basilica, a building was discovered in the magnetic data, strongly reminiscent of a small Pliska-type church. It is about 9.5 m wide and 10 m long, and on its Eastern side the building shows three apses. This newly discovered church is related to three other churches in the immediate vicinity (churches nr. 6, 7 and 26 in Škorpil’s numbering). All four churches respect a certain distance between each other (about 150 m to 200 m) and are oriented and aligned in almost exact East-West direction and might originally have been connected by a road or path, which, however, could not be detected in the survey data (fig. 18).

As a consequence of deep ploughing, many settlement structures seem to have been destroyed. This assessment also corresponds to the results of the systematic fieldwalking campaigns (Aladzhov et al. 2018), which documented numerous archaeological finds on

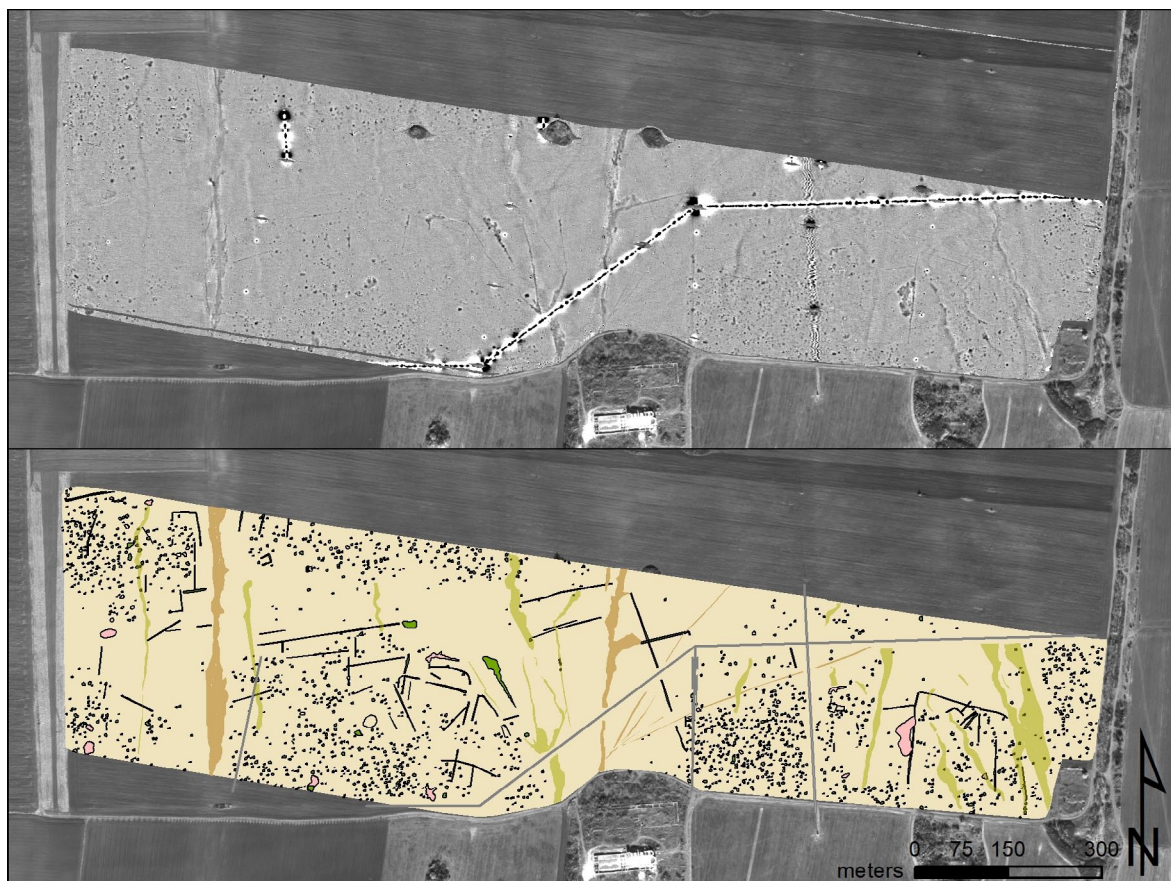


Fig. 16. In the field to the North of the Great Basilica, countless magnetic anomalies can be observed that may indicate the remains of pit houses

Обр. 16. Полето на север от Голямата базилика, където се наблюдават множество магнитни аномалии, които вероятно показват очертанията на земянки

the surface indicating the destruction of settlement structures. Other structures have been destroyed in the past during the construction of modern power lines and pipelines. Also, these modern installations cause a strong interference signal that is visible in the survey data.

The survey field immediately outside the Eastern gate of the Inner City amounted to 5.8 ha of magnetics (fig. 19). Here, only a few archaeologically relevant structures could be observed. Most of them are wide linear features crossing the field in North-South direction and may represent the remains of former roads or erosion channels. However, about 150 m to the East of the city gate the ruins of a roughly 265 m² rectangular stone building (no. 32 in Škorpil's numbering) are still preserved. In the survey field to the South of it, a 3 m wide linear structure can be observed over a length of 64 m, leading away from the building in a wide arc and leaving the field to the South. Its appearance in the data as well as its dimensions are strongly reminiscent of the secret passages found in the Inner City and described above. Therefore, it should be questioned, if here the remains of another underground passage might have been detected, maybe connecting the stone building with the South-eastern corner of the city wall. However, before any further interpretation can be made, more of the field needs to be surveyed, including GPR measurements.

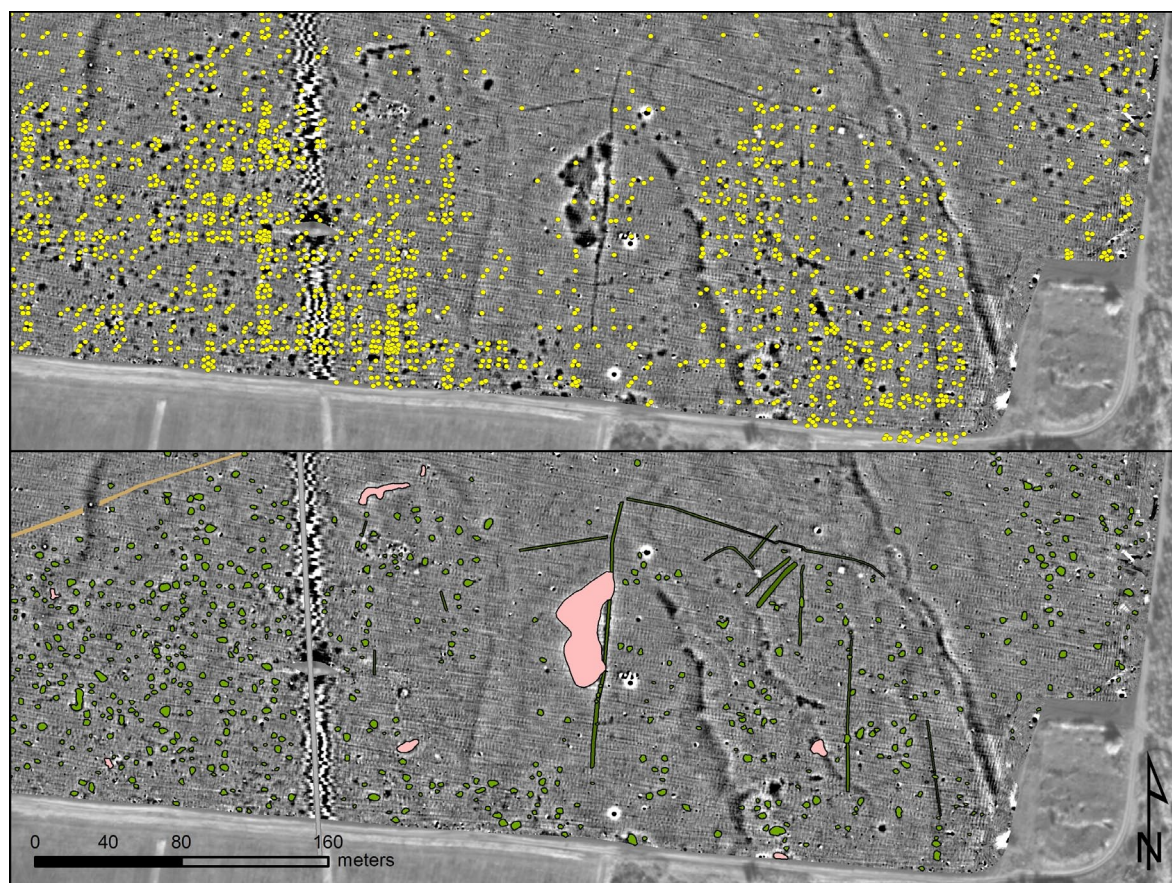


Fig. 17. Comparison between the results of the systematic fieldwalking where the pottery finds are marked as yellow dots superimposed to the magnetic data (above), with the interpretation of the magnetic survey (below)

Обр. 17. Сравнение между картата на керамичната дисперсия (горе) с тези на магнитното изследване (долу)

Discussion

As early as the 1940s, the first attempt was made to present a periodisation of the individual structures of the palace centre and to relate the relative chronology of the monuments to the most important events in Pliska's history (Dimitrov 2007, 254). Based on analogies drawn from the numerous excavation results collected over several decades as well as on stratigraphic sequences which in individual cases can be derived from the GPR data, the structures discovered in the geophysical data can be roughly classified and assigned to certain building phases of Pliska, as introduced initially in this article. However, the following figures should be understood merely as a depiction of newly built structures and changes within the city, not as representation of the actual urban layout at a given time.

In area **a**, several buildings could be assigned to the first half of the 9th century AD and thus the pagan capital phase of Pliska (fig. 20, left). These include structures 1 and 11 as probable three-part buildings or boyar houses, a pagan temple (str. 31) to the North, as well as the structures belonging to the large open space (str. 35) orientated toward the large pagan temple (str. 39) in the centre of the citadel, the large building with a wooden pillar structure (str. 12), and finally, the secret passage (str. 33), leaving the citadel to the North.

Structures 18 and 19 show the remains of typical 10th century AD chain buildings

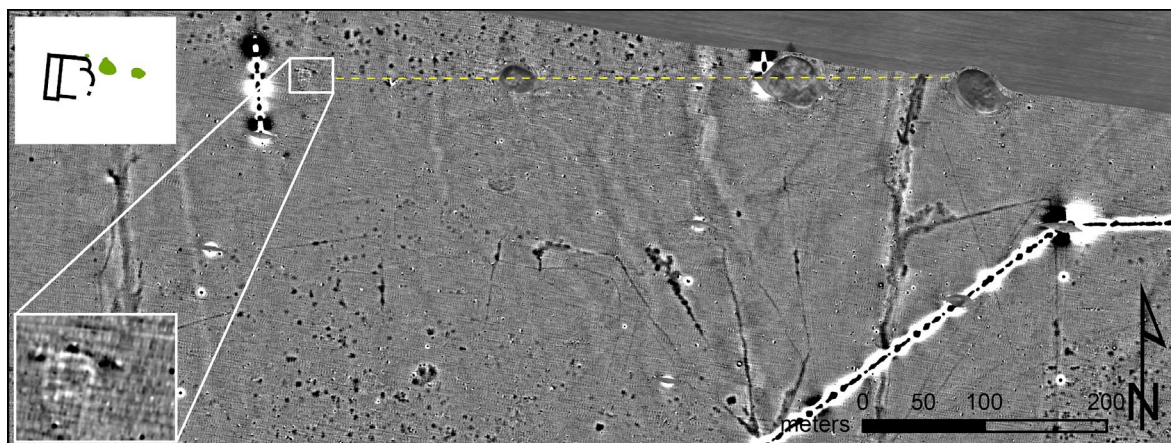


Fig. 18. The newly discovered church seems to be of the Pliska-type (rectangle). It is aligned almost exactly in East-West direction, together with three other churches to the East that are still visible on the surface (yellow dashed line)

Обр. 18. Новооткрита църква (плисковски тип), видима на повърхността и ориентирана (заедно с три други църкви, източно от нея) в посока изток-запад (жълта пунктирна линия)



Fig. 19. The survey field immediate to the East of the Inner City besides anomalies derived from modern power lines only shows relatively few archaeological structures

Обр. 19. Теренът, източно от Вътрешния град, който освен аномалии (резултат от съвременни електропроводи) показва сравнително малко археологически структури



Fig. 20. The same part of the Northern area of the Inner City with the integrated interpretation of those structures observed in the survey data that could be assigned to the 9th century AD and hence the pagan capital phase of Pliska (left), as well as those structures deriving from the post-capital phase in the 10th century AD, respectively.

Обр. 20. Схема на северната част на Вътрешния град с интерпретация на структурите, които, по данни от проучването, биха могли да бъдат причислени към IX в. – столичния езически период (ляво) и към X в. – следстоличния период на Плиска (дясно)

used as workshops for commercial production or other commercial purposes. Probably contemporary, although with a different orientation, was also structure 13, a two-room building, common in the second half of the 10th century AD. Also, the structures belonging to the large open space to the South, which show the same orientation as the later buildings within the adjacent citadel, can thus be assigned to the post-capital phase of Pliska (fig. 20, right).

It is not surprising that most of the structures visible in the survey data might originate from the post-capital phase. After all, any older buildings, if they did not fall victim to military events, must gradually have been superimposed and displaced by these buildings. However, also the architectural extensions of later periods are more difficult to detect, which is probably due to the much-reduced construction of solid representative buildings of this period and the assumed frequent re-use of still existing 10th century structures.

This can be observed even better at the data of area **b** to the South-east of the Inner City (fig. 21). Here the 9th century AD capital phase of Pliska is only present in form of the so-called Burnt Secret passage (str. 17), connecting Krum's palace with the Southern wooden fortification, as well as probably parts of that fortification to the East (fig. 21, above).

The post-capital phase, on the other hand, is very well depicted in the data (fig. 21, centre). The barracks (str. 20) are a good example of the documented increase in building activity in the open areas along the inner side of the city walls in this time. Although here also a possible military purpose was discussed above, which would differ from other buildings of this phase assigned mostly to workshops and residential buildings. Also structure 28, a probable church, the Big Secret passage (str. 32) connecting the palace basilica with the stone city wall and the chain buildings further to the West (str. 4 and 5) are to be dated to the 10th century AD.

Finally, this process of increasing production sites within the city walls was continuing during the Byzantine phase of Pliska in the 11th century AD. Many more residential buildings and workshops with pottery kilns were built, also along the walls to the East of the barracks (fig. 21, below). Some of those kilns could even be excavated and were dated accordingly, further supporting the interpretation presented here (Grigorov, Dimitrov 2013). Most of the 10th century AD structures, however, must have been still existing and in use.

Conclusions

The newly achieved geophysical prospection data from the Inner City of Pliska corresponds very well to the current state of research regarding the structural development of the urban centre and, in addition, makes it possible to follow its consecutive utilisation phases in greater detail and over a larger area than before. The existing knowledge about characteristic building types, common in certain periods, allows for classifications of the different structures observed in the data. The early phases of Pliska, i.e. the first and second pagan capital phase from the late 7th to the mid-9th century AD, are very difficult to trace, which was to be expected, due to the predominant timber constructions of this time and the extensive building activity of later centuries. However, there were certain structures observed within the data that can be assigned to these early phases with high probability. Future analyses together with excavation results will show whether these data can further substantiate the origin of Pliska. The 10th century AD with its many well investigated characteristic building types, on the other hand, is rather well represented in the data and comprises the overwhelming majority of structures observed. Also, structures from the 11th century AD could be rather rarely documented in the data. However, their construction must be seen as a continuation of the rural exodus towards the Inner City, which began already during the 10th century AD. The structures assigned to the 11th century show this very clearly and to the extent to be expected.

However, in order to be able to investigate presumed changes of the population in all parts of Pliska, it is necessary to further examine the settlement structure of the Outer City. The large number of archaeologically relevant structures and the excellent results obtained so far in the Outer City with magnetometry advocate for extensive geophysical measurements. With novel motorised survey systems, it is now possible to investigate the entire territory of Pliska. Given sufficient time to evaluate and interpret the collected data to their full potential, the archaeological structures that might be discovered during such an extensive survey will not only help to proof or falsify existing theories and to derive better predictions for population density and population number, they even could take our understanding of Pliska again to a whole new level.



Fig. 21. Structures assigned to the 9th century AD (above), the 10th century AD (centre) and the 11th century AD (below)

Обр. 21. Структури, отнесени съответно към IX в.(горе), X в. (център) и XI в. (долу)

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Плиска – комплексно геофизично проучване на първата българска столица

Роланд Филцвайзер, Андрей Аладжов, Волфганг Нойбауер, Йона Шлегел, Алоис Хинтерлайтнер, Нивес Донау, Ханес Шиел, Янко Димитров, Мартин Гамон, Фалко Дайм

(резюме)

Между 2016 и 2018 г. в Плиска, първата ранносредновековна столица на България (VII–XI в.), бяха проведени две мащабни геофизични проучвателни кампании. Целта беше да се документират все още неизвестни археологически останки, главно в централния вътрешен град на Плиска, за да се постигне по-добро разбиране на градската структура и да се изяснят последователните фази на строителство на селището.

Магнитното изследване е проведено с моторизирана магнитометрова система Fluxgate, докато основното проникващо радарно проучване се проведе чрез използването на моторизиран четириканален 250 MHz GPR уред. Интегрираната археологическа интерпретация на данните разкри много голям брой новооткрити структури в центъра на града, както и няколко селища в изследваните райони на обширния град на Плиска.

Получените резултати водят до по-детайлно разбиране на историческото развитие на Вътрешния град през неговите столични и следстолични фази. От друга страна данните, събрани във Външния град, увеличават познанията ни за сложния пейзаж на тази площ от няколко квадратни километра. Мащабните геофизични проучвания показаха също колко ползотворно може да бъде подобно измерване на целия Външен град за изчерпателното изследване и по-задълбочено разбиране на Плиска.

В настоящото проучване са очертани основните фази на строителството и историческото развитие на Плиска, въз основа на съвременното състояние на изследванията. Описани са използваните теренни и приложни методи, последвани от представяне на данните за археологическите проучвания и интегрираната интерпретация на различните части на Плиска. В рамките на дискусията интерпретацията на данните е анализирана в контекста на строителните фази на Плиска, които са представени с помощта на данните от недеструктивното изследване. Накрая са обобщени изводите и е показан бъдещият потенциал за комплексно проучване на цялата територия на Плиска.

Новите данни от геофизичното проучване на Вътрешния град на Плиска съответстват на настоящото състояние на научните изследвания по отношение на структурното развитие на градския център. В допълнение измерванията ни предоставят нови възможности за проследяване на строителните периоди на много по-голяма площ. Съществуващите знания за типовете сгради, характерни и често срещани през определени периоди, позволяват много точна класификация на различните структури, наблюдавани при измерванията. Столичният период на Плиска, т.е. първата и втората езически фази (края на VII – средата на IX в.) е много труден за проследяване, което можеше да се очаква поради характера на строителството от това време – преобладаващо дървени конструкции, както и поради последвалото широко застрояване през по-късните векове. Данните от магнитното изследване позволяват към ранните езическите фази с голяма вероятност да бъдат причислени новооткрити структури. Бъдещите анализи, заедно с резултатите от разкопките, ще покажат дали тези данни могат допълнително да обосновават основаването на Плиска в края на VII в., както и предполагаемото ѝ първо разрушение в началото на IX в.

Развитието на града през X в., с многото проучени характерни типове сгради, е добре представено и многократно потвърдено в данните от измерванията. В по-голямата си част сградите от XI в. трудно могат да бъдат документирани, но изграждането им трябва да се разглежда като продължение на преселването на обикновено население от Външния към Вътрешния град, започнало още през X в. Убедителни аргументи в този смисъл са интерпретираните като структури от XI в. магнитни аномалии.

Големият брой археологически значими структури и отличните резултати, получени досега с помощта на магнитометрията във Външния град, изискват обширни допълнителни геофизични измервания в границите на земеното укрепление. С модерните моторизирани системи за геофизични проучвания е напълно възможно да се измери цялата територия на Плиска. Археологическите структури, които могат да бъдат открити по време на такова обширно проучване ще подпомогнат доказването или промяната на съществуващите теории, както и ще хвърлят допълнителна светлина върху процесите на заселване на столичния град и броя на населението му. Такива комплексни изследвания биха могли съществено да обогатят нашето познание и разбиране за Плиска.