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EARLY BRONZE AGE PAMUKLI BAIR BARROW NEAR MALOMIROVO AND THE PROBLEM OF EAST-ORIENTED BARROW GRAVES IN UPPER THRACE

ABSTRACT

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In 2021, excavations of a barrow were conducted on the Pamukli Bair hill in Malomirovo, Elhovo municipality, Upper Thrace, Bulgaria. These excavations yielded a remarkable discovery – a sequence of graves dating back to the late fourth and third millennium BC. Notably, these findings prominently featured elements of the early Pit-Grave culture, also known as the Yamna culture.

However, the commencement of this burial sequence was marked by graves that diverged from the norms of the Yamna culture. These early graves contained individuals interred in a crouched position, with their heads oriented towards the east. Unlike the prevalent use of ochre in the Yamna culture, this type of funeral ritual exhibited its limited presence.

Comparable central graves of this kind have also been documented in other barrows throughout the Middle Tundzha region and various parts of Upper Thrace, particularly in the "Maritsa-Iztok" area. These burials can be dated to the end of the fourth millennium BC and display similarities to both local funeral traditions (Ezero A1) and graves analogous to the Cernavodă/Nizhna Mikhailivka traditions.

The horizon of barrow necropolises featuring these distinctive burials is clearly discernible within the Upper Thrace region and seamlessly connects to the horizon of the early Pit-Grave culture.

Keywords: barrows, Early Bronze Age, Upper Thrace, absolute chronology, funeral rite
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1. INTRODUCTION

In 2021, excavations were conducted on the burial mound situated atop Pamukli Bair hill in the village of Malomirovo, Elhovo municipality, Upper Thrace, Bulgaria. They yielded a wealth of information regarding the funeral customs of barrow communities from the fourth and third millennium BC, specifically from the Early Bronze Age (EBA) in the Balkan region. Extensive radiocarbon testing resulted in a series of 15 dates for the graves explored (Alexandrov and Włodarczak 2022). Notably, this research documented graves

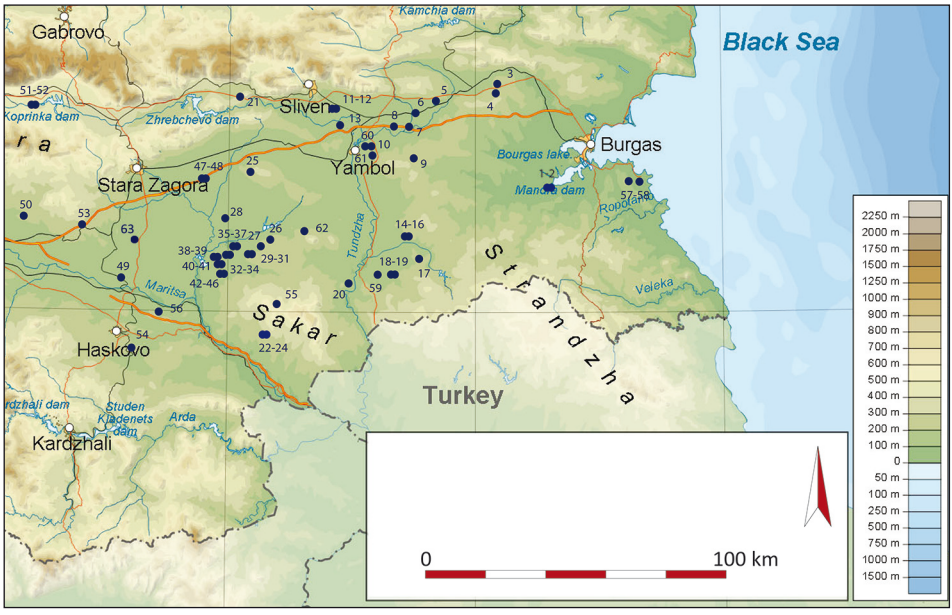

Fig. 1. Bronze Age barrows investigated in Upper Thrace
1-2 – Debelt/Deultum Barrows 1-2; 3 – Karnobat, Gyaurska Mogila; 4 – Chatalevo, Barrow 1; 5 – Venets, Tonchova Mogila; 6 – Atolovo, Barrow 1; 7 – Straldzha, Barrow 3; 8 – Zimitsa, Barrow 1; 9 – Irechekovo, Barrow 1; 10 – Mogila, Barrow 1; 11 – Kamen, Gabrova Mogila; 12 – Kamen, Sekerdzha Mogila; 13 – Drazhevo, Sabev Bair; 14 – Boyanovo, Lozyanska Mogila; 15-16 – Boyanovo, Baiylar Kayrak, Barrows 1 and 3; 17 – Popovo, Golyamata Mogila; 18 – Malomirovo, Golyamata Mogila; 19 – Malomirovo, Barrow 2; 20 – Sinapovo, Barrow 1; 21 – Tvarditsa, Barrow 1; 22-24 – Izvorovo, Barrows 1-3; 25 – Sokol, Barrow 1; 26 – Targovishte, Barrow 1; 27 – Kovachevo, Barrow 1, 28 – Petmogili, Barrow 2; 29 – Ovchartsi, Barrow 1; 30 – Ovchartsi, Barrow 2; 31 – Ovchartsi, Barrow 3; 32 – Malka Detelina, Barrow 1; 33- Malka Detelina, Barrow 2; 34 – Malka Detelina, Barrow 3; 35 – Golyama Detelina, Barrow 1; 36 – Golyama Detelina, Barrow 2; 37 – Golyama Detelina, Barrow 4; 38 – Beli Bryag, Barrow 5; 39 – Troyanovo, Kangalova Mogila, 40 – Troyanovo, Chernyova Mogila, 41 – Troyanovo, Barrow 1; 42 – Mednikarovo, Barrow 1; 43 – Mednikarovo, Barrow 2; 44 – Mednikarovo, Barrow 3; 45 – Mednikarovo, Barrow 4; 46 – Mednikarovo, Barrow 6; 47-48, Benkovski, Barrows 1-2; 49 Merichleri, Barrow 1; 50 – Bratya Daskalovi, Malkata Momina Mogila; 51-52 – Dolno Sahrane, Barrows 3-4; 53 – Svoboda, Barrow 1; 54 – Stambolovo, Barrow 3; 55 – Voden, Barrow 1; 55 –Bulgarska Polana; 56 – Chernogorovo, Barrow 1; 57-58 – Pomorie; 59 – Malomirovo, Pamukli Bair; 60-61 – Mogila; 62 –Prohorovo, 63 – Trakia

that preceded the typical Pit-Grave culture (PGC) burials, marking a significant discovery. These finds serve as a valuable starting point for organizing knowledge concerning barrow rituals in Upper Thrace around 3000 calBC.

Until the end of the 20th century, EBA barrows in Upper Thrace remained relatively poorly known. In the first comprehensive monograph for the Bulgarian region, Ivan Panayotov mentioned only two confirmed burial mounds – near Kovachevo and Troyanovo, along with one suspected burial mound near Sokol (Panayotov 1989, 20, 21). Significantly, an expansion of available data occurred with the publication of barrows excavated near Radnevo in the "Maritsa-Iztok" region (*e.g.*, Kanchev 1991; 1995; Panayotov and Alexandrov 1995) and in the vicinity of Yambol (*e.g.*, Iliev 2011; Iliev and Bakardžiev 2020). Equally important were the publications of research results on Lozyanska Mogila near Boyanovo (Agre 2015) and two burial mounds near Kamen (Gabrova Mogila and Shekerdzha Mogila; Dimitrova 2014; 2021), both in Tundzha river region. While recent comprehensive compilations demonstrate a significant expansion of the source material (Fig. 1; Kaiser and Winger 2015; Alexandrov and Kaiser 2016; Alexandrov 2020), a substantial portion of the materials remains incomplete or unpublished. Consequently, the results presented for the Malomirovo barrow currently hold a crucial role in studies focused on trends within the barrow ritual in the Upper Thrace region.

Analyses of the mortuary practices there have consistently highlighted the distinctive characteristics of materials from Upper Thrace, setting them apart from barrow necropolises situated north of the Balkan range (*e.g.*, Kaiser and Winger 2015; Alexandrov and Kaiser 2016). These distinguishing features encompass a significant quantity of graves within the barrows, the presence of numerous burials with accompanying equipment, the absence of traces of ochre usage in many instances, and the prevalence of graves associated with local EBA communities. These specific traits suggest a substantial indigenous influence on the development of barrow rituals, with less emphasis on signs of incursion by steppe communities from the northern Pontic zone. The taxonomic and chronological details presented below provide compelling arguments for further investigations of these problems.

2. THE EARLIEST BURIALS AT PAMUKLI BAIR IN MALOMIROVO

The burial mound near Malomirovo is situated atop Pamukli Bair hill, which overlooks the valleys of the Popovska and Kurudzadere rivers, left-bank tributaries of the Tundzha River (Fig. 2). It is part of a cluster of burial mounds extending along the west-east axis, including the renowned Golyamata Mogila, located on the border between the villages of Malomirovo and Zlatinitsa, with a royal burial from the 4th century BC (Agre 2011). These burial mounds are part of the network of larger necropolises near Elhovo, positioned to the

Fig. 2. Malomirovo, Elhovo municipality, Pamukli Bair barrow. View of site from the east. Photo P. Włodarczak

far south in the region of central Tundzha River. Nearby, in locations such as Boyanovo (Lozianska Mogila and Baylar Kayryak, Barrows 1 and 3; Agre 2015; Iliev and Bakardžiev 2020), Popovo (Golyamata Mogila; Agre 2007), and Sinapovo (Sechenata Mogila; Agre and Dichev 2013), similar barrows have been explored.

The diameter of the Malomirovo barrow measured around 40 metres, with a height of 3.5-4 metres. The mound fill consisted of layers of humus and weathered chalk rock. All three phases of its construction were associated with EBA burials. The oldest construction stage included Graves 18, 19, and 21 (Fig. 3). The second one featured Graves 16, 17, and 20. Graves 1 and 14 were linked to the third (the last and the largest) barrow enlargement. The two most recent EBA burials (Graves 3 and 5) were dug into the central part of the finally shaped mound. In the southwestern sector, three Middle Bronze Age graves were discovered (Graves 4, 12, and 13), while in the Late Antiquity period, Grave 2 was dug into the top of the barrow.

Until the 21st century, the mound remained remarkably well preserved. Unfortunately, in recent decades, the central part has suffered damage due to several unauthorized activities, including one in 2005. During these treasure-hunters diggings, an EBA burial was unearthed, showing significant ochre discoloration in the bones. Archaeologists conducting a rescue intervention found two gold hair-rings next to the disturbed remains, which

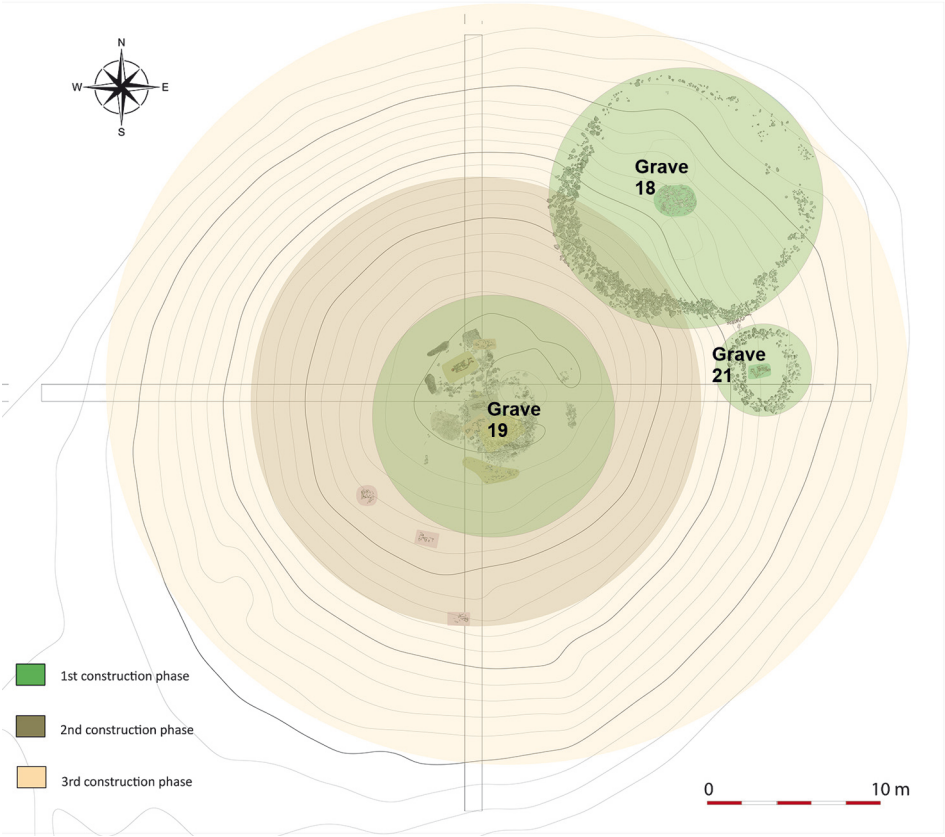

Fig. 3. Malomirovo, Elhovo municipality, Pamukli Bair barrow.
Graphic representation of the barrow construction phases. Illustrated by M. Podsiadło and S. Alexandrov

are currently in the collection of the Elhovo museum (Alexandrov *et al*. eds 2018, 475, cat. Nos. 144 and 145). Regrettably, no precise documentation was prepared to locate the robbery trench within the barrow at that time. In 2021 excavations, the remains of three robbery pits were discovered. One of them, designated as Feature 11, lay to the east of Graves 14 and 16 and was visible as a trough-shaped depression before the research began. The second trench, marked as Feature 10, was rectangular and had led to the complete destruction of Grave 16. The third robbery pit was placed directly north of Grave 16, containing iron elements of tools used for excavating earth. This excavation may have entirely obliterated one of the construction phase II graves.

In total, the excavations in Malomirovo revealed 10 EBA graves (Nos 1, 3, 5, 14, 16, 17, 18, 19, 20, and 21). These findings contribute to a complex stratigraphic system and, when combined with 15 radiocarbon dates, provide a significant sequence for a better

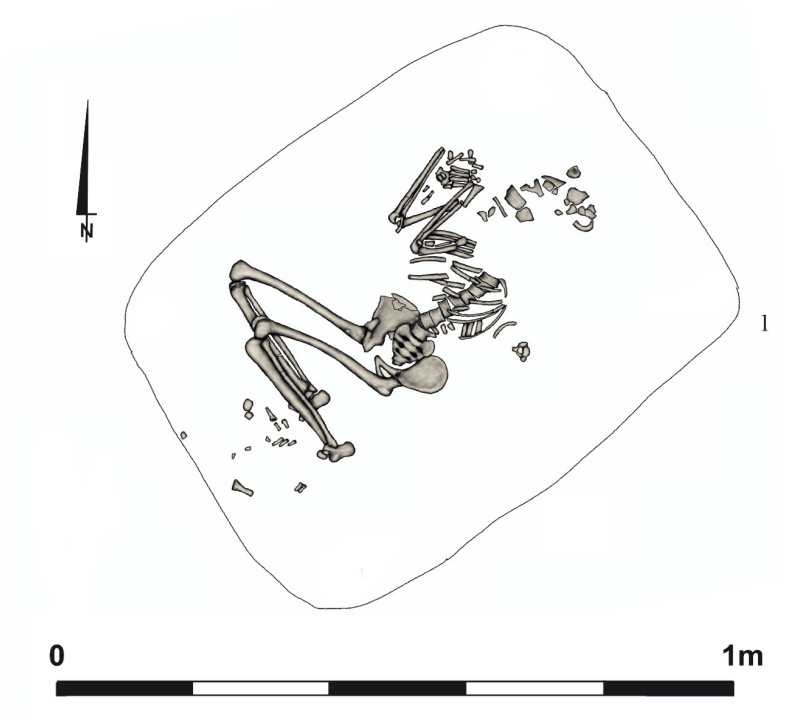

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Fig. 4. Malomirovo, Elhovo municipality, Pamukli Bair barrow.
1 – Grave 19, 2 – Central part of the barrow with Grave 19 and stone constructions of two PGC graves (nos 16 and 17). Illustrated by M. Podsiadło and P. Włodarczak

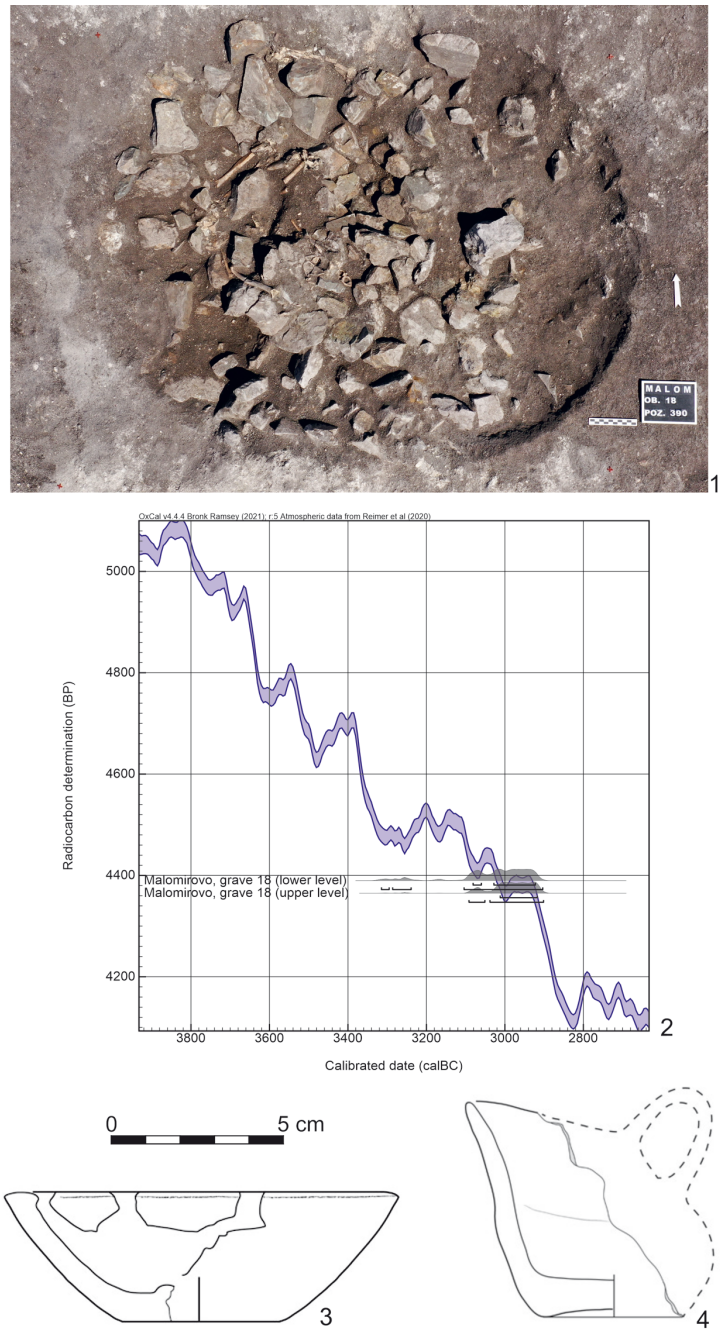

Fig. 5. Malomirovo, Elhovo municipality, Pamukli Bair barrow.
Grave 18 (1 – upper part of the grave pit, 2 – radiocarbon dates, 3, 4 – pottery). Illustrated by M. Podsiadło

Fig. 6. Malomirovo, Elhovo municipality, Pamukli Bair barrow. Grave 21. Illustrated by M. Podsiadło

understanding the cultural changes in Upper Thrace at the end of the fourth and the first half of the third millennium BC. Three burials are associated with the oldest phase:

Grave 19. Situated beneath the central part of the barrow, it was dug into the original ground level to a depth of 0.75 m, cutting through the chalk rock debris. The pit had a slightly irregular, semi-rectangular shape with rounded corners and measured 1.6 × 1.3 metres. At the bottom, the remains of a female individual, aged 30-40 were found (Fig. 4: 1).

She was laid on her back with a slight tilt to the right side, oriented along the NE-SW axis, with her head to the NE facing toward the NW. The upper limbs were bent with hands directed toward the face, while the lower limbs were curled at right angles in the hip joint and at an acute angle in the knee joint. The skull and the upper part of the postcranial skeleton suffered secondary damage, most likely caused by the 2005 robbery trench. No items or ochre traces were noted in the grave. The presence of wooden structural elements was also not documented. A mound of dark humus soil, about 10 metres in diameter and approximately 1 metre high, covered the grave. A PGC burial (Grave 16) was dug into the mound directly above this grave. This structure was entirely destroyed by a modern trench. Only lumps of ochre were found on the preserved fragment of its bottom. Nevertheless, on the top of a small mound connected to Grave 19, there were remnants of a stone wreath and traces of a wooden covering associated with the destroyed Grave 16 (Fig. 4: 2). The documented stratigraphic situation rules out the possibility of considering these two burials as a double-storey grave, akin to the features found in Boyanovo, Troyanovo, and Beli Bryag, mentioned below. Graves 16 and 19 in Malomirovo therefore represent two distinct chronological phases.

Grave 18. To the northwest of the barrow fill above Grave 19, another small barrow was constructed, delineated by a stone circle measuring 14-15 metres in diameter. A low mound, reaching up to 1 metre in height, was covered with stone paving, with better preservation in the southwestern part. At the centre of this structure, Grave 18 was dug into the original ground level, accompanied by two heaps of yellow virgin earth (so called "*vykids*"). This feature measured 1.9 × 1.4 metres and had a depth of 1.1 metres. In its fill, starting from the upper part, numerous human remains mixed with large stone blocks were discovered (Fig. 5: 1). The bones belonged to a 25-35 years old male individual. At the bottom of the grave, a small silver bead and an antler tool were found. Fragments of two EBA vessels were also discovered in the grave fill: a small ascoidal cup (Fig. 5: 4) and a bowl with a thickened, horizontally cut rim (Fig. 5: 3).

Grave 21. To the southeast of the stone circle connected with Grave 18, a smaller oval stone structure measuring 4.6 x 3.6 metres was found. Within it, Grave 21 was shallowly dug, approximately 20 cm below the stones. The deceased, about 20 years old male individual, was placed in a contracted position on his back with a slight tilt to the left side. He was oriented along the west-east axis, with his head facing east. A small lump of ochre was discovered near his left forearm (Fig. 6).

The exact stratigraphic relationship between Graves 18, 19, and 21 (along with the small barrows associated with them) is challenging to establish conclusively. The positioning of the stone circles connected to Graves 18 and 21 at a similar level suggests their approximate contemporaneity. However, both structures were already situated beyond the small mound created over Grave 19. Additionally, a low but extensive barrow was constructed above Grave 18, composed of earth and numerous stones. Generally, all three features (18, 19, and 21) are associated with phase I and indicate the intricate nature of the

burial arrangements, consisting of three circular or oval structures linked to individual inhumations. It seems probable that Grave 19 is slightly older, later serving as a reference point for the construction of a larger burial mound by the PGC people. Generally, the complex „ceremonial and funeral zone", featuring graves and additional elements (*e.g.,* sacrificial pits, hearths, or various types of stone structures), is a distinctive characteristic of the funeral rites before the emergence of PGC graves. Similar two- or multi-centric structures, often featuring various types of graves, are evident at other barrow necropolises such as Drazhevo, Sabev Bair (Iliev and Bakardžiev 2020) in the middle Tundzha, Mednikarovo, Barrow 1, in the „Maritsa-Iztok" group (Panayotov and Alexandrov 1995), or Merichleri, Kayryaka, Barrow 1 (Iliev 2019) in the middle Maritza River region.

3. PIT-GRAVE CULTURE (YAMNA CULTURE) HORIZON

In the context of Bulgarian burial mounds, during the early 21st century, some scholars began using the term „Yamnaya culture" (Ukrainian: Yamna, Bulgarian: Yamna), also known as the PGC, to encompass a wide range of EBA mortuary practices (*e.g.*, Nikolova 2000; Anthony 2009, 361-365). These practices included those that had been already previously categorized under various other burial traditions, collectively known as „Pre-Yamna". However, with more in-depth research, we have been able to distinguish between older burials dating back to the fourth millennium BC and those from both earlier and later phases of the PGC (Alexandrov 2011; Alexandrov and Kaiser 2016).

In Upper Thrace, we can identify a distinct group of barrow graves that exhibit characteristics typical for the early PGC, coming from the western Eurasian steppe, specifically the region between the Dnipro and Tisza rivers. These burials share several key features:

Burial chambers: Deceased individuals were placed in rectangular burial chambers. These chambers were covered with beams or wooden boards oriented lengthwise.

Number of individuals: All features were single graves.

Sex of the dead: Only males were buried.

Age of the dead: The remains were only of adult persons.

Body position: The deceased were laid on their backs with the lower limbs curled up and the upper ones extended alongside the body.

Head orientation: The heads of the deceased were placed in the western sector.

Use of ochre: The burial ritual consistently incorporated a red mineral known as ochre. Ochre is to be found in various forms, such as lumps, sprinkled over the bones, and at the bottom of the grave-pit.

Distinctive skull colouring: Notably, some burials, especially those with specific positions within the barrow, exhibit distinctive colouring on the upper part of the skulls.

Metal hair-rings: A common feature of these burials is the presence of metal hair-rings, often crafted from silver or gold.

These ritual elements closely resemble those associated with the early phase of the PGC found in the zone north of the Balkan mountain chain (Alexandrov 2011, 315).

At the Malomirovo barrow, all the aforementioned features of the early Pit-Grave culture were present in the case of Grave 17 (Fig. 7; Włodarczak *et al.* 2023), dated to 3008-2890 calBC period (Alexandrov and Włodarczak 2022, 222, table 1). Its grave-pit was dug within the small mound constructed above Grave 19 and is associated with construction phase II, during which the mound was substantially enlarged. In the middle Tundzha region, other examples of similar graves connected to the second chronological phase of their respective barrows can also be found such as: Graves 24 and 29 from Barrow 1 near Mogila (Iliev and Bakardžiev 2020, pl. 6: 1-3 and 9: 5, 6), Grave 25 from Gabrova Mogila near Kamen (Dimitrova 2014, 72, fig. 4: 4), Graves 18 and 20 from Lozianska Mogila near Boyanovo (Agre 2015, 27, fig. 37 and 29, fig. 41), and Grave 13 from Boyanovo, Baylar Kayryak, Barrow 1 (Iliev and Bakardžiev 2020, pl. 50 and 51). Less frequently, situations are recorded in which a burial typical for the early PGC serves as the primary one for the oldest phase of the barrow construction: Straldzha, Barrow 1 (Alexandrov and Iliev 2016), Zimnitsa, Barrow 1 (Alexandrov *et al.* 2023), and Kamen, Sekerdzha Mogila (Dimitrova 2014).

Fig. 7. Malomirovo, Elhovo municipality, Pamukli Bair barrow.
Typical burial of early Pit-Grave culture (Grave 17). Photo P. Włodarczak

4. EAST-ORIENTED BURIALS IN UPPER THRACE

Even if not all the details of the sequence of events at Malomirovo are conclusively outlined, the site could serve as a valuable reference point for a better understanding the trends in the barrow mortuary practices in Upper Thrace.

In the earliest phase of the Malomirovo barrow, Graves 19 and 21 revealed deceased individuals buried in a contracted position with their heads oriented towards the east. This body arrangement was found to be characteristic for other primary barrow graves in eastern Thrace as well, with head oriented towards the southeast (more commonly) or northeast (less commonly) within this group. In contrast to the regular, rectangular grave-pits associated with the PGC, these pits were typically oval or irregular in shape, though still somewhat close to rectangular. Analogous primary burials, akin to those in Malomirovo, were discovered in the middle Tundzha region, in barrows such as Boyanovo, Baylar Kayryak (Barrow 1, Grave 20; Iliev and Bakardžiev 2020, 178, pl. 54: 2-4), Boyanovo, Lozyanska Mogila (Grave 21; Agre 2015, 30, fig. 42), Drazhevo, Sabev Bair (inhumation graves 1 and 2; Iliev and Bakardžiev 2020, 90, 93), Mogila, Golemiya Kayryak, Barrow 1

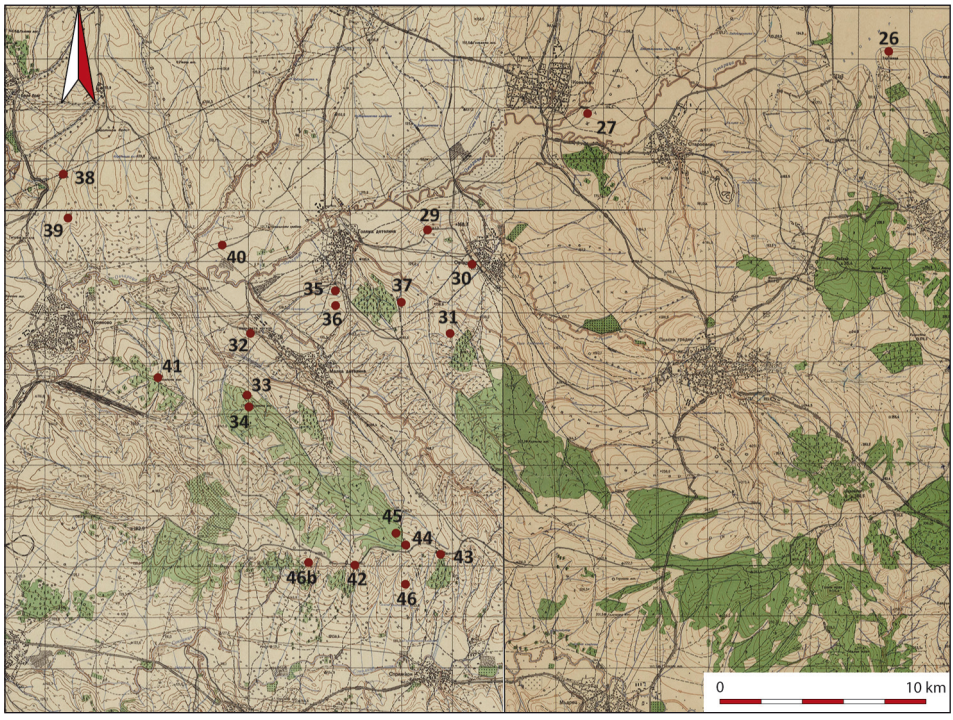

Fig. 8. "Maritsa iztok" cluster of barrows. Numbers of sites: as in Figure 1. Illustrated by S. Alexandrov

(Grave 30; Iliev and Bakardžiev 2020, 134, Pl. 10: 3, 4), and Sinapovo, Sechenata Mogila (Grave 6; Agre and Dichev 2013, 122, 123).

These burials were notably distinct from the graves of the early PGC due to their complete lack of ochre or the presence of only faint traces of its use. Another characteristic feature was the arrangement of the hands, with at least one limb bent at the elbow and directed towards the pelvis, chest, or head. Most of these burials featured individuals in a supine or semi-supine position, in stark contrast to the burial practices of the PGC (see section 3 above).

In the middle Tundzha River region, only the graves in Malomirovo, Pamukli Bair, have been precisely dated – to 3104-2921 calBC, with the possibility of slight variations (age modelled for the group of all three burials), with a slightly earlier estimate for Grave 19 (3321-3016 calBC; Alexandrov and Włodarczak 2022). Grave 19/20 from Barrow 1 in Boyanovo should have a similar calendar age. Its position was stratigraphically earlier than Grave 18 from this mound, whose age was determined at 3099-2938 calBC (Penske *et al.* 2023). Grave 19/20 should therefore be dated similarly to Features 19 and 21 from Malomirovo.

Also related to phase I, Grave 18 from Malomirovo, Pamukli Bair shows the custom of placing secondary burial remains disturbed in the grave fill. It is possible that in this case there was interference that resulted in the destruction of the classic inhumation burial. Fragments of vessels (an askos and a bowl – Fig. 5: 3, 4) and a silver bead found in the fill may be the remains of typical grave equipment from the EBA 1 period, or Ezero A1 (Leshtakov and Popova 1995; Leshtakov 2006). Because of this intrusion, the stones forming the structure of the grave chamber were mixed in the fill with the remains of the disturbed burial.

Also in some other regions of Upper Thrace, sequences in burial mounds from the Early Bronze Age confirm the observations for the Middle Tundzha region. Throughout this area, burial mounds built at the turn of the fourth and third millennium BC are clearly more numerous than those from the first half of the third millennium BC associated with the PGC. Particularly diagnostic data come from the "Maritsa-Iztok" barrow group, located east of Radnevo (Fig. 8). Table 1 illustrates the sequences of burial mounds from this region.

A telling example from the "Maritsa-Iztok" cluster is the group of burial mounds near Mednikarovo, in which four primary graves revealed inhumations with heads in the eastern sector (Fig. 9; Panayotov and Alexandrov 1995 for Barrows 1-4; Barrow 6 is still unpublished). In none of these burial mounds were grave facilities or burial arrangement typical for the early PGC found. Importantly, these mounds had small diameters, not exceeding 20 metres (except for the slightly larger mound no. 2, with a diameter of up to 30 m; see Table 1). These sizes were therefore similar to the diameter of the barrow connected to the earliest phase from Pamukli Bair in Malomirovo. Examples from Mednikarovo therefore indicate that the construction of large mounds, usually 30-50 metres in diameter and several

Table 1. General chronological sequences of barrows from "Maritsa-Iztokregion". Blue colour: burials dated to the end of the 4th millennium BC (east-oriented), red colour – typical burials of PGC (mostly west-oriented), green colour – Csongrad-type burial

Barow	Diameter [m]	1st phase of barrow construction	2nd phase of barrow construction	Remarks	Reference
Beli Bryag, Chitashki Mogili, Barrow 5	?	**Grave 2 (burials 2/1 and 2/2)**	**Grave 3 (burials 3/1 and 3/2)**		Alexandrov *et al.* 2016
Golyama Detelina, Malkata Mogila	21 × 18	**Grave 6**	**NONE**		Kanchev 1991
Golyama Detelina, Golyamata Mogila	46 × 41	**Grave 30**	**?**		Kanchev 1995
Golyama Detelina, Barrow 4	30	**Grave 4**	**Grave 5**	Reinterpretation of sequence presented by K. Leshtakov and B Borissov	Leshchakov and Borisov 1995
Kovachevo, Aldinova Mogila	36 × 30	**Grave 2**	**Grave 1**	Reinterpretation of sequence presented by M. Kanchev	Batsova and Kanchev 1974; Kanchev 1991
Malka Detelina, Manchova Mogila	32 × 30	**Grave 13**	**Grave 12**		Kanchev 1991
Malka Detelina, Tanyokoleva Mogila	31 × 27	**Grave 9**	**Grave 6?**	Grave 6 can be also related to 1st phase	Kanchev 1991
Malka Detelina, Kurdova Mogila	40 × 34	**Grave 5 (burials 5, 6 and 7)**	**?**	Not possible to establish which one of three graves (nos 2-4) was primary for 2nd phase	Kanchev 1991
Mednikarovo, Barrow 1	12 × 15	**Grave 2?**	**Graves 1 and 3?**	Graves 1 and 3 are in unclear position	Panayotov and Alexandrov 1995
Mednikarovo, Barrow 2	28 × 26	**Grave 1**	**Grave 2?**		Panayotov and Alexandrov 1995

Mednikarovo, Barrow 3	13	**Grave 1 (burials 1/1 and 1/2)**			Panayotov and Alexandrov 1995
Mednikarovo, Barrow 4	16	**Grave 1**	**NONE**		Panayotov and Alexandrov 1995
Mednikarovo, Barrow 6	20	**Grave 2**	**Grave 1?**		Unpublished excavation of I. Panayotov and S. Alexandrov
Ovchartsi, Golyamata Mogila	50-60	**?**	**?**		Unpublished excavation of I. Panayotov and S. Alexandrov
Ovchartsi, Barrow 2	10	**Grave 1**	**NONE**		Unpublished excavation of I. Panayotov and S. Alexandrov
Ovchartsi, Barrow in the vineyard	15	**Grave 1**	**NONE**		Alexandrov and Hristova 2009
Pet Mogili, Bodakovi Mogili Barrow 2	54?	**Graves 1-3**	**?**	Not possible to establish primary feature (due to the destruction of barrow)	Kancheva-Ruseva 1994
Targovishte, Gonova Mogila	?	**Grave 1?**	**Grave 2?**	Barrow partially destroyed	Kanchev 1991
Troyanovo, barrow 1 (Kamenna Mogila)	42	**Grave 1**	**Grave 2?**		Buyukliev 1964; Panayotov 1989
Troyanovo, Chernyova Mogila		**Grave 4**	**?**		
Troyanovo, Kangalova Mogila	40	**Graves 3 and 5**	**Grave 4**		Alexandrov and Kirov 2016

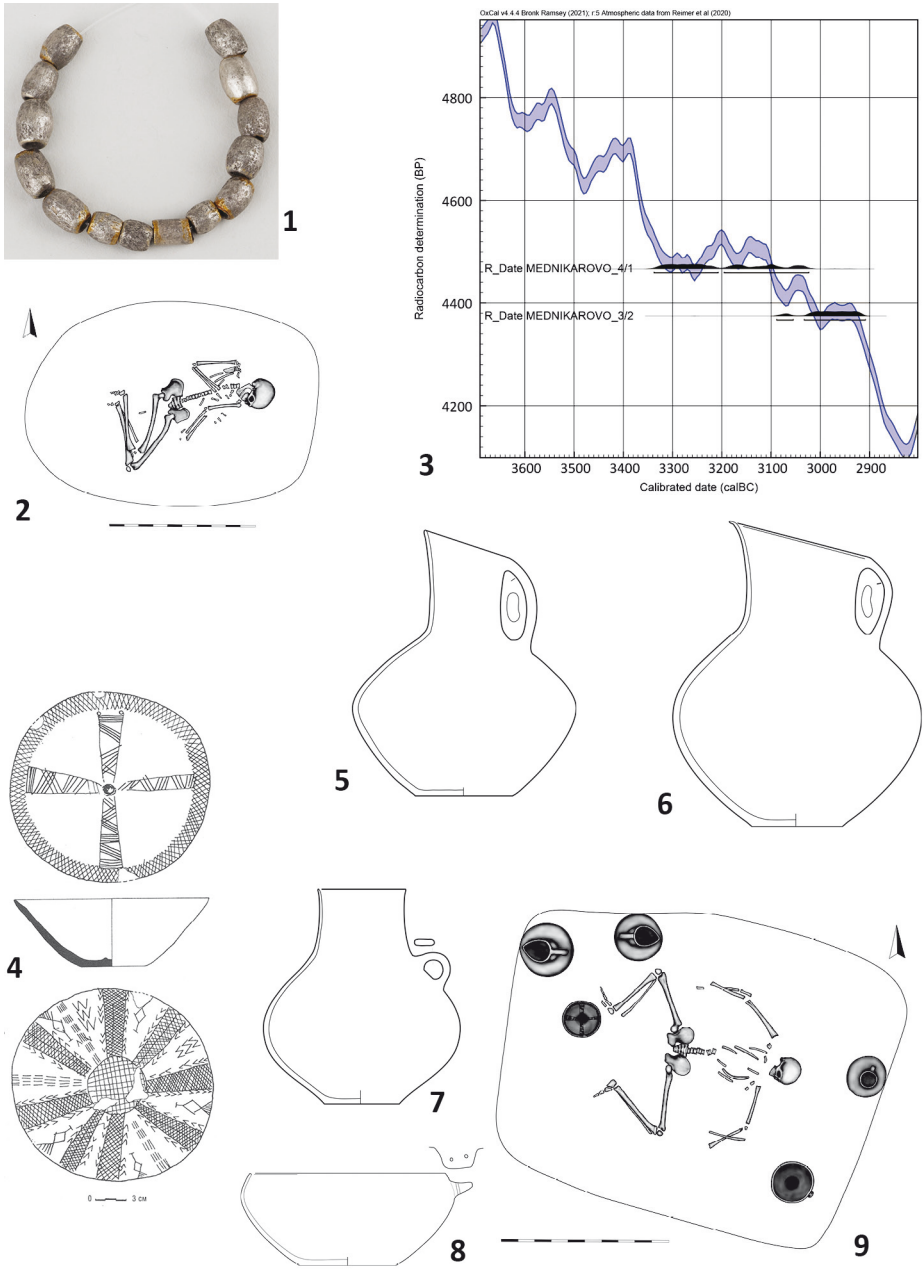

Fig. 9. Mednikarovo, Galabovo municipality, Barrows 2-4.
1 – Silver beads from Grave 4/1; 2 – Grave 1 from Barrow 4; radiocarbon dating of primary graves from Barrows 3 and 4; 4-8 – ceramic vessels from Grave 3/2; 8 – Grave 2 from Barrow 3.
Illustrated by S. Alexandrov

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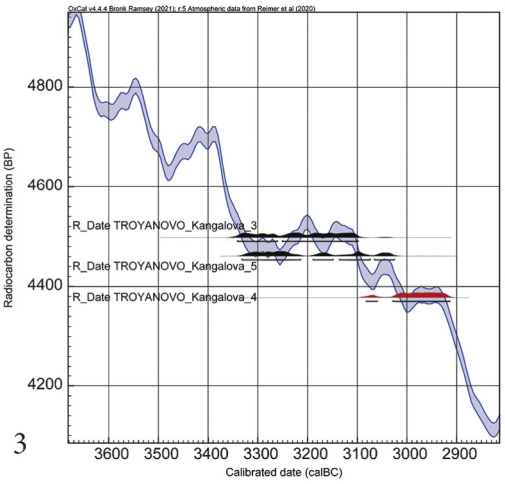

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4

5

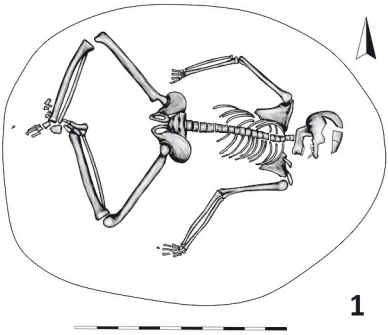
Fig. 10. Troyanovo, Radnevo municipality, Kangalova Mogila.
1 – Grave 3; 2 – Grave 5; 3 – radiocarbon dating of Graves 3-5; 4-5 – Grave 4.
Illustrated by S. Alexandrov

metres high, was associated with the PGC population of the early third millennium BC. Older tombs (from the end of the 4th millennium BC) are usually structures with a diameter of up to 15 metres and a height of 1-1.5 m. Radiocarbon dating of primary burials from Barrows 2, 3, and 4 in Mednikarovo place them in the period at the turn of the fourth and third millennium BC, or slightly earlier (Fig. 9: 3; Table 2), *i.e.*, they are close to the age of the graves from Malomirovo.

Five other barrows from the region: Troyanovo – Chernyova and Kangalova barrows (Figs 10 and 11), Beli Bryag, "Chitashkite mogili", Barrow 5 (Fig. 12), and Ovchartsi, Barrows 2 and 3 (Fig. 13) revealed primary graves wit eastern orientation as well. In Ovchartsi 3, Kangalova and Chernyova barrows, the primary burials were supine inhumations with flexed legs. In fact, in the Kangalova barrow the primary interments were Graves 3 and 5, forming a two-storey arrangement (Fig. 10: 1, 2). They were located under the central part of the mound. Approximately 10 metres north of these features, Grave 4 was dug into the barrow fill – a classic burial of the older phase of the PGC (Fig. 10: 4, 5). It was probably connected with the second phase of the construction of the barrow and, consequently, with a significant increase in its size about 40 metres in diameter (Alexandrov and Kirov 2017). In the Chernyova barrow, next in the burial sequence came supine inhumations with flexed legs, arms alongside the body and head to the west, some of them with traces of red ochre over the bones (Fig. 11: 4). The last grave from this group (no. 6) revealed an astonishing set of 83 silver beads as well as two pairs of massive gold and silver hair-rings (Fig. 11: 3; Alexandrov 2018). In Ovchartsi 3 ("Barrow in the vineyard") a supine inhumation was the only EBA grave in the barrow (Fig. 13: 4).

In the Beli Bryag barrow, located in the vicinity of the Kangalova one, Grave 2 was the primary one and in it, two layered burials were discovered (2/1 and 2/2 – Alexandrov *et al.* 2016, 153, fig. 2), both oriented with their heads to the east (Fig. 12: 1, 2). In the northern part of the barrow there was Grave 3 – a burial of two individuals lying on their side and semi-side, with legs tucked in, heads oriented to the west (Fig. 12: 4, 5). Apart from its western orientation, the other characteristics of this grave link it to a phase preceding the Pit-Graves horizon in Upper Thrace (Alexandrov *et al.* 2016). In the Ovchartsi – 2 barrow, the primary burial was a semi-supine inhumation (head to north-east, facing south – Fig. 13: 2), followed by two badly damaged burials, an EBA grave and a MBA one (unpublished excavations made by I. Panayotov and S. Alexandrov).

Radiocarbon dating from human bones from the graves discussed shows that primary barrow graves with east orientation in the "Maritsa-Iztok" region cover, generally the period 3300-2900 calBC (Fig. 14; Table 2). Some graves – the two early graves from the Kangalova barrow (nos. 3 and 5), Mednikarovo 4, Grave 1, and Beli Bryag, Grave 2/2 date prior to 3100 calBC and are, chronologically, earlier than Yamna graves. The rest of the discussed group enters, generally on the 3100-2900 calBC period and, as seen from the date of the typical Yamna grave from a Kangalova Barrow (no. 4; Alexandrov and Włodarczak 2022, 236, fig. 28) are contemporary with the early graves of that phenomenon.



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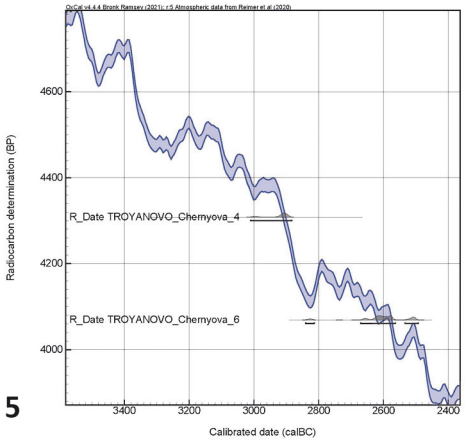

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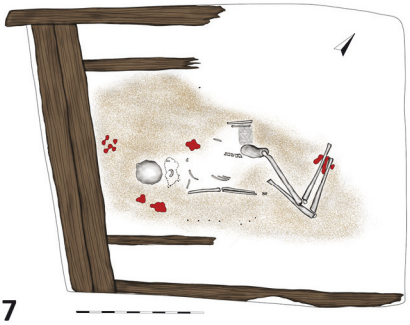

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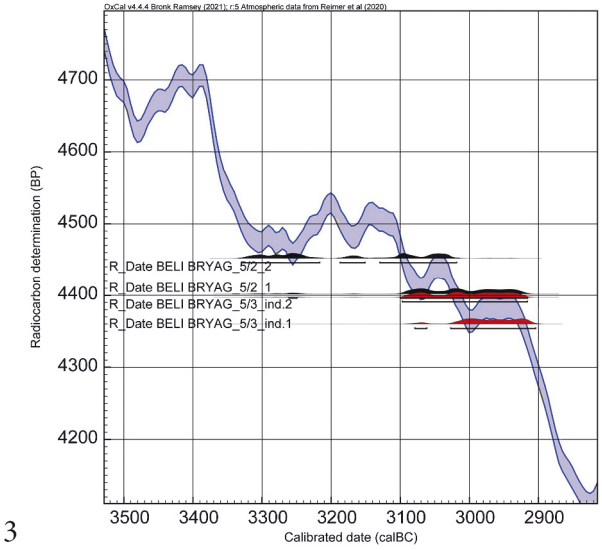
Fig. 11. Troyanovo, Radnevo municipality, Chernyova Mogila. 1, 2 – Grave 4; 3, 4 – gold and silver jewelry from Grave 6; 5 – radiocarbon dating of Graves 4 and 6; 6, 7 – Grave 6. Illustrated by S. Alexandrov

1

2



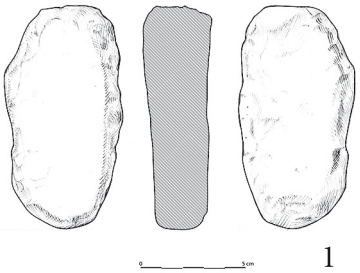
3

4

head to east

head to west

Fig. 12. Beli Bryag, Radnevo municipality, Barrow 5.
1 – Grave 2, Burial 1; 2 – Grave 2, Burial 2; 3 – radiocarbon dating of Graves 2 and 5; 5 – Grave 5.
Illustrated by S. Alexandrov



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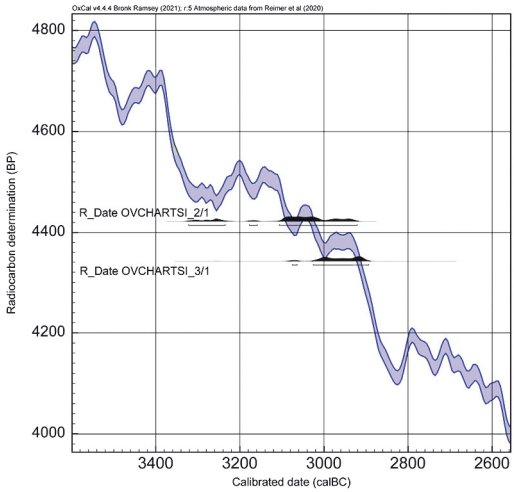

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4

Fig. 13. Ovchartsi, Radnevo municipality.
1 – Stone tool from Barrow 2, Grave 1; 2 – Barrow 2, Grave 1; 3 – Radiocarbon dating from Barrow 2, Grave 1 and Barrow 3, Grave 1; 4 – Barrow 3, Grave 1. Illustrated by S. Alexandrov

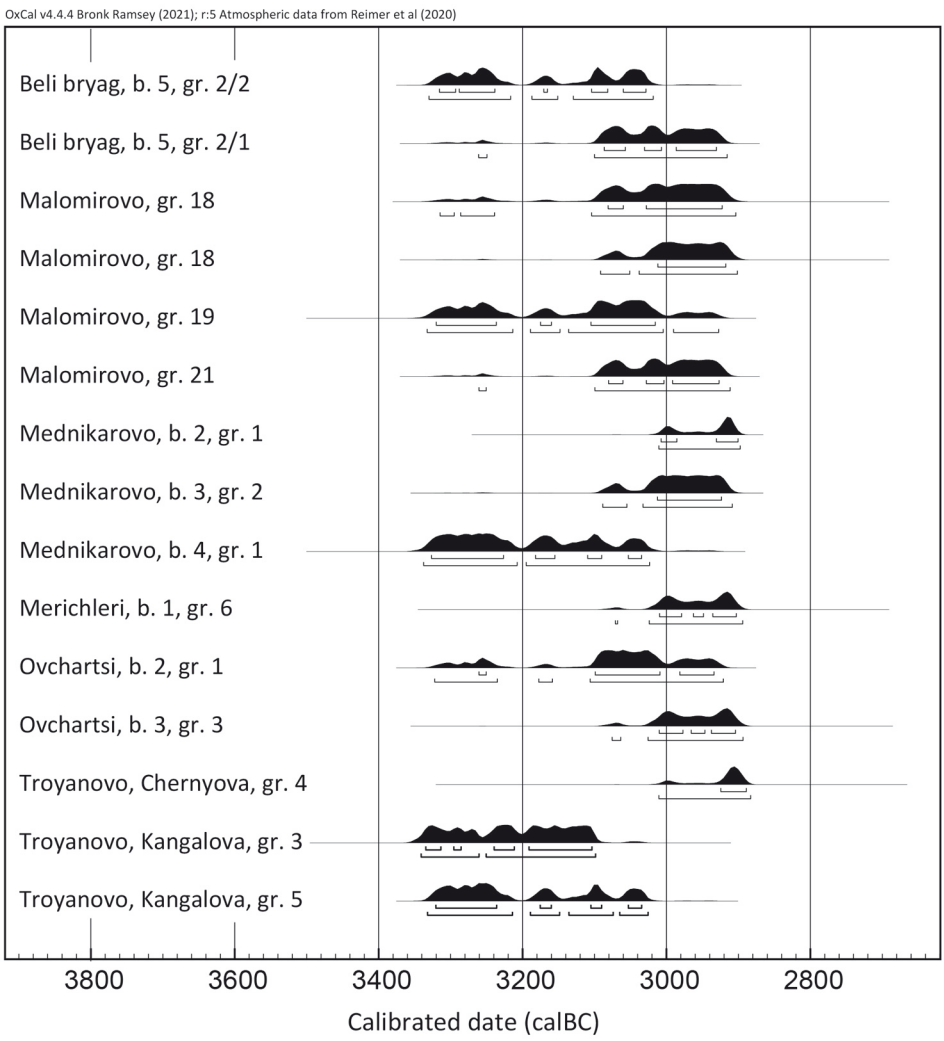

Fig. 14. Calibration diagram of radiocarbon dates obtained for east-oriented barrow graves from Upper Thrace. Prepared by P. Włodarczak (OxCal calibration program v. 4.4.4)

The period discussed here (the turn of the 4th and 3rd millennium BC) is also associated with a specific form of some graves – with burials placed on two levels (Boyanovo, Baylar Kayryak, Barrow 1, Graves 19/20; Mednikarovo, Barrow 3, Graves 1/1 and 1/2, Troyanovo, Kangalova Mogila, Graves 3 and 5; Beli Bryag, Graves 2/1 and 2/2). They had specific features: an oval or not very regular shape of the burial pit, eastern orientation, position on the back, side or semi-supine, bent upper limbs and lack of ochre. The double-storey graves

Table 2. Radiocarbon dates for east-oriented primary graves from Upper Thrace

Barrow	Grave no.	Lab code	Age BP	Calendar age BC (68.2%)*
Beli Bryag, Barrow 5	2/2	MAMS-26836	4452 ± 21	3316-3029
Beli Bryag, Barrow 5	2/1	MAMS-28027	4402 ± 27	3087-2931
Malomirovo, Pamukli Bair	18	Poz-141953	4390 ± 40	3082-2923
Malomirovo, Pamukli Bair	18	Poz-141997	4365 ± 35	3013-2918
Malomirovo, Pamukli Bair	19	Poz-141947	4440 ± 35	3321-3016
Malomirovo, Pamukli Bair	21	Poz-141952	4395 ± 30	3081-2928
Mednikarovo, Barrow 2	1	MAMS-26834	4333 ± 20	3008-2901
Mednikarovo, Barrow 3	2	SUERC-69358	4374 ± 28	3013-2924
Mednikarovo, Barrow 4	1	SUERC-69359	4466 ± 30	3327-3035
Merichleri, Barrow 1	6	Beta-432797	4340±30	3010-2904
Ovchartsi, Barrow 2	1	SUERC-69360	4422 ± 30	3261-2935
Ovchartsi Barrow 3 („In the vineyard")	3	SUERC-63829	4342 ± 33	3011-2905
Troyanovo, Chernyova Mogila	4	MAMS-28031	4308 ± 28	2925-2890
Troyanovo, Kangalova Mogila	3	MAMS 31403	4498 ± 21	3335-3104
Troyanovo, Kangalova Mogila	5	MAMS 31405	4461 ± 21	3321-3035

* OxCal calibration program v4.4.4 (2021)

are therefore connected with a broader trend of burials with the eastern orientation of the deceased's body, immediately preceding the horizon of the PGC. The two-level burial arrangement is also occasionally present in graves from the first half of the third millennium BC (*e.g.*, Kamen, Sekerdzha Mogila, Grave 10; Dimitrova 2014).

Double-storey burials also show another feature of the funeral rite from the time horizon analysed here: the presence of graves with more than one burial. Multiple graves (of more than two individuals buried in one grave) are rare – Kamen, Gabrova Mogila, Grave 30; Drazhevo, Sabev Bair, inhumation Grave 3, and Malka Detelina, Kurdova Mogila, Graves 5-7. Such burials illustrate several similar features of the funeral rite to the group of graves discussed above. Among other things, there is a visible tendency to orient the deceased with their heads to the east. The furnishings in these cases include pottery of a similar type as in burials from single and double graves, as well as from flat cemeteries dating back to the EBA 1 period. Therefore, the graves from Kamen and Drazhevo should be dated to the same chronological horizon: the end of the fourth millennium BC.

Data from other areas of Upper Thrace are much poorer and less diagnostic than the research results in the two regions described above. Only the situation recorded in Barrow 1 near Merichleri is worthy of attention (Iliev 2019). According to the researcher of this mound, the oldest phase is marked by a small mound with stone pavements and a cremation burial located next to it (Grave 7). Five more graves dug into the barrow are inhumation

burials. Among them, Grave 6 is noteworthy – it has the oldest radiocarbon dating. It was a burial lying on the back, with the upper limbs bent, with the head facing east. An ascoidal cup was found next to the deceased. Above this burial, in the same pit, was the burial of a child (Grave 4). This is another example of a two-level grave. Subsequent burials from the burial mound in Merichleri show clearer features of the older and younger horizons of the PGC (Iliev 2019, 321; Minkov 2021). This situation is therefore another example of a sequence with an early-dated east-oriented burial.

In conclusion, the period around the turn of the fourth and third millennium BC witnessed a distinct form of burial, featuring east-oriented, and in some cases two-level graves, and sometimes multiple burials. These burial practices were prevalent just before the emergence of the PGC. The evidence suggests a complex interplay of burial traditions in Upper Thrace during this transitional period. Notably, the graves discussed outnumber primary inhumations associated with the Pit-Grave tradition. This is an intriguing observation in the context of suggestions that emphasize the dominant role of PGC people in spreading the barrow burial rite in European areas (*e.g.*, Heyd 2011).

5. RELATIONSHIP TO EXTENDED INHUMATIONS

Burials in extended position have been dated to the period just before the emergence of the PGC graves (recently discussed by Włodarczak in 2020). Examples of these burials are known from Bulgaria, with one discovered in Upper Thrace at Troyanovo (Buyukliev 1964, 63-65; Panayotov 1989, 83, 32), although they are more common in the broader northern Balkan region and the north-western Black Sea area (Rassamakin 2013). In recent years, the number of extended inhumations containing valuable information about funeral rites has slightly increased. This has drawn attention to the unique characteristics of these graves, such as narrow pits with wooden floors and lower parts of the walls (Włodarczak 2020, 138). These types of graves are also found in the PGC funerary practices, as seen in burial mounds in the Pannonian Plain (Włodarczak 2021, 227). Additionally, a recently published burial in Aliman, Romania's Dobruja, suggests that extended inhumations can be traced back a little earlier to the second half of the 4th millennium BC (Stefan *et al.* 2023, 106, table 2), representing early manifestations of the barrow rite with an Eastern European origin. The significance of this practice in southern Bulgaria remains unclear.

6. CONCLUSIONS

Research on the Malomirovo barrow in Pamukli Bair has led to the discovery of three graves dating back to the late fourth millennium BC. The funeral rituals observed in these features differ in several aspects from those seen in early PGC burials. Their features include:

Stratigraphical position: They are primary for their respective barrows.

Barrow dimensions: The barrows were relatively small, rarely exceeding 20 m in diameter and 1 m in height.

Grave pits: Most of the grave facilities were oval pits; in two cases (Kangalova Mogila and Beli Bryag, Barrow 5) – two burials with east orientation (one above the other) were made in the same grave-pit. In three other graves, the original grave-pit was reused with graves presenting Yamna characteristics (Malomirovo 19/16; Mednikarovo Barrow 3 1/2; Merichleri 6/4). In Boyanovo, Baylar Kayryak, Barrow 1 above the primary grave an inhumation in crouched position was found.

Cover constructions: No cover of the pit-opening or pit-floor has been detected so far.

Number of individuals: All features but one (Boyanovo, Baylar Kayryak, Barrow 1, Grave 21-22 – female and infant) were single graves.

Sex of the dead: Persons of both sexes were buried.

Age of the dead: Persons of all ages were buried– from *infans* to *matures* age groups.

Position of the body: Most of the bodies were arranged in supine position with flexed legs; the arms were bent at the elbows, with palms in different position. It should be noted that, so far no grave had arms extended alongside the body. Semi-supine position with flexed legs with similar arm position is also presented.

Orientation: The orientation of the body was on an east – west axis, with head in the eastern sector.

Presence of ochre: The use of red ochre is reduced to small lumps or, occasionally small quantities over the bones.

Grave goods: Five graves (20%) contained a grave inventory – a necklace of 14 silver beads (Mednikarovo 4/1); five clay vessels and a hair-ring (Mednikarovo 3/2), one vessel (Mogila, Golemiya Kayryak, Barrow 1, Grave 30; Malka Detelina, Tanyokoleva Mogila, Grave 9, and Merichleri, Grave 6).

Currently, the group is composed of 25 graves found in 20 barrows: six graves in Middle Tundzha region (in five barrows), 18 graves in "Maritsa-Iztok" region (in 14 barrows), and one grave in Merichleri, Barrow 1 (Haskovo region, Maritsa River).

The analysis of the materials from burial mounds in Upper Thrace indicates that the majority of richly furnished burials, including ceramic vessels, tools, and metal decorations, date back to the period preceding the early PGC burials. The barrow graves of the latter do not significantly differ from the graves in neighbouring regions, including north-western and north-eastern Bulgaria. However, understanding the mortuary practices in the later phase of the PGC (*c.* 2800-2600 calBC) in the southern Balkans remains challenging. Therefore, the investigation into the specific nature of the barrow graves in Upper Thrace (*e.g.*, Kaiser and Winger 2015; Alexandrov and Kaiser 2016) should be focused on materials from the late fourth millennium BC. The key issue revolves around the role of local elements, such as Ezero in Upper Thrace, Coţofeni in North-Western Bulgaria, and

Ezerovo/Cernavodă II in North-Eastern Bulgaria. Nevertheless, the general principles of the mortuary practices in all three zones seem to be similar, with the apparent difference stemming from the larger number of burials from this period discovered in the southern zone.

Stratigraphic sequences observed in burial mounds consistently indicate that some east-oriented inhumations predate early PGC burials. Absolute dating suggests a slight time difference between the two rituals, indicating a potential temporal overlap as shown by the "Maritsa-Iztok" barrows discussed above. This overlap results in the incorporation of features from the older ritual into PGC necropolises (*e.g.,* the presence of a small ascoidal cup in Grave 13 from Boyanovo, Baylar Kayryak).

From a taxonomic perspective, the graves listed here have close analogies in the burials classified by Igor Manzura as part of Cernavodă I culture (*e.g.*, Manzura 2013, 127, fig. 18), also associated in the northwestern Black Sea with the Nizhna Mikhailivka tradition (*e.g.*, Rassamakin 1999). They can be part of the broader trend in the western Eurasian steppe, encompassing barrow burials and possibly aligning with the funeral practices in flat cemeteries of local Early Bronze Age communities in the northern Balkan zone. The extent of the impact of Eastern European steppe community migrations on the development of this barrow ritual type remains uncertain. It should be emphasized that I. Manzura and some other researchers of the North Pontic zone pointed to the dating of this type of burials to the end of phase C/II of the Trypillia culture, *i.e.,* to the end of the 4th millennium BC (*e.g.*, Ivanova *et al.* 2005, 110; Manzura 2003-2004, 77; 2013, 139).

Although there are some taxonomic similarities between the early east-oriented barrow graves in Upper Thrace and Cernavodă I/Nizhna Mikhailivka mortuary practices, we think that the current stage of the investigations of the so called "*transitional period*" to the Bronze Age here (*i.e.*, the first half of the 4th millennium BC) does not allow a profound discussion on that matter. So far, no settlement structures from that period have been explored here, with only one small group of graves being investigated. The Chernomorets, Akladi Cheiri site at the Black Sea coast revealed one inhumation in supine position, similar to the discussed above but with western orientation of the head. The radiocarbon dates place the grave in the first two centuries of the 4th millennium BC (Leshtakov *et al.* 2020; Krauss *et al.* 2020, table 1).

On the other hand, at least three settlements in Upper Thrace – tell Karanovo, Drama (Yambol region) and Yazdach (Chirpan region) revealed radiocarbon dates similar to the one from the early east-oriented barrow graves discussed here (Fig. 15). Drama ^{14}C dates, related to Cernavodă III, centre on the 3500-3100 calBC period (Gleser and Thomas 2012, 192-199, Abb. 7, table 3). Slightly older is the chronological position of the Cernavodă III Yazdach site, currently dated to 3500-3350 calBC (Hristov *et al.* 2023). Other Cernavodă III settlements near Karnobat (Devetak, Bada bunar *etc.* – Hristova 2009) probably have the same date, securely placing the beginning of the Bronze Age in Eastern Upper Thrace in the context of Boleráz – Cernavodă III – Usatovo phenomenon. EBA 1 layers in the Ka-

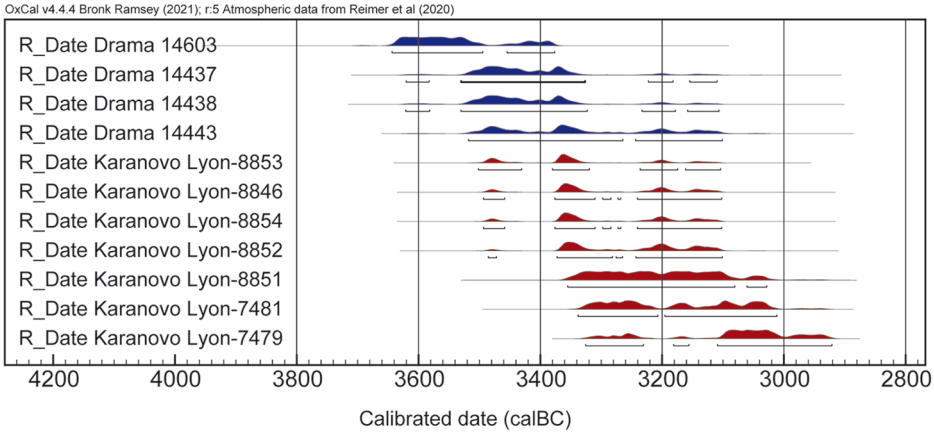

Fig. 15. Calibration diagram of radiocarbon datings obtained for EBA sites in Drama (blue) and Karanovo (red). Prepared by S. Alexandrov (OxCal calibration program v. 4.4.4)

ranovo and Dyadovo tells are younger or slightly overlap the Cernavodă III chronological position in Thrace. In Karanovo, the beginning of the EBA is set around 3310 calBC, the life-span of the layer EBA 1 lasting to approximately 3100 calBC (Nikolov and Petrova 2016, 136-139). The Ezero (EBA 1) stage in the Dyadovo tell is dated to 3200/3100-2900 calBC (Semmoto and Kamuro 2015).

In the regions discussed, "open settlements with ditches" such as Ovcharitsa (Leshtakov *et al.* 2001) and Simeonovgrad (Boyadziev *et al.* 2015) in the "Maritsa–Iztok" area, and tells such as Veselinovo (Tundzha area) and Sokol ("Maritsa–Iztok" area) have also been settled. Around them barrow clusters were formed. In the plain areas, such as Stara Zagora field, tells with defence features (*e.g.*, Ezero, Dyadovo) were settled as well. In these plains, flat graves (Zagortsi) and necropolises (Bereketska tell) are documented (Hristova and Uzunov 2012; Kalčev 2002). It is worth mentioned as well that the EBA pottery discovered in all these settlements and graves is quite similar.

As seen from the above, the end of the fourth millennium BC in the eastern parts of the Upper Thrace presents a colourful picture, in which the east-oriented graves had, probably, an important place. Their investigation is in its very beginning so, we think it is too early to resolve the problems related to their origin, relations to the other contemporary barrow or flat graves and, to the settlements listed above.

The first results of DNA research on barrow graves from Bulgaria indicate the complicated nature of the processes leading to the genesis of a community characterized by the specific nature of mortuary practices described here. It turned out that they could not be directly linked to the steppe origin of the barrow population (Preda-Bălănică and Diekmann 2022, 117). In particular, burials from the late 4th millennium BC demonstrate genetic differentiation. The results for Burials 4 and 6 from Merichleri mentioned above do

not show steppe ancestry (Mathieson *et al.* 2018; Lazaridis *et al.* 2022, Supplementary materials, 260; Preda-Bălănică and Diekmann 2022, 114, 115). In turn, for the burial from grave 1 in barrow 2 in Mednikarovo, a high share of steppe ancestry was registered (Preda-Bălănică and Diekmann 2022, 115). Generally, these first genetic studies show a complex mechanism, taking into account the adaptation of the barrow ritual with an individual grave in local, northern Balkan mortuary practices.

Without doubt, future DNA research will shed much better light on the problem of expansion of the Eastern European Pre-Yamna populations and its role in the genesis of the barrow burial rite.

Acknowledgments

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References

Agre 2007. Arheologicheski razkopki na nadgrobna mogila v zemlishteto na s. Popovo, obshtina Bolyarovo, Yambolska oblast. In K. Vagalinski (ed.), *Arheologicheski otkritia i razkopki prez 2006 g*. Sofia: Balgarska Akademiya na Naukite, Natsionalen Arheologicheski Institut s Muzey, 74-75.

Agre D. 2011. *The tumulus of Golyamata Mogila near the villages of Malomirovo and Zlatinitsa*. Sofia: Avalon, 2011.

Agre D. 2015. Archaeological investigation of the "Lozianska Mogila" barrow located near the Village of Boyanovo, Municipality of Elkhovo, South-eastern Bulgaria. *Prahistorische Zeitschrift* 90/1-2, 141-171.

Agre D. and Dichev D. 2013. Arheologicheski razkopki na mogila № 1 „Sechenata mogila" v zemlishteto na s. Sinapovo, obshtina Topolovgrad. In L. Vagalinski (ed.), *Arheologicheski otkritiya i razkopki prez 2012 g*. Sofia: Balgarska Akademiya na Naukite, Natsionalen Arheologicheski Institut s Muzey, 122-125.

Alexandrov S. 2010. Prehistoric barrow graves with extended inhumations between the Danube and the Balkan Range. *Studia Praehistorica* 13, 277-292.

Alexandrov S. 2011. Prehistoric barrow graves between Danube and Balkan range: stratigraphy and relative chronology.In E. Borgna and S. Muller Celka (eds), *Ancestral Landscapes. Burial Mounds in the Copper and Bronze Ages (Central and Eastern Europe – Balkans – Adriatic – Aegean,*

4th – 2nd millennium B.C.) (= *Travaux de la Maison de l'Orient* 58) Lyon: Maison de l'Orient et de la Méditerranée, 307-320.

Alexandrov S. 2018. Early Bronze Age tumular grave near Troyanovo, Radnevo region. In S. Alexandrov, Y. Dimitrova, H. Popov, B. Horejs and K. Chukalev (eds), *Gold and bronze: Metals, technologies and interregional contacts in the Eastern Balkans during the Bronze Age*. Sofia: Balgarska Akademiya na Naukite, Natsionalen Arheologicheski Institut s Muzey, 323-324.

Alexandrov S. 2020. Bronze Age barrow graves in Upper Thrace: Old and new questions. In S. Hansen (ed.), *Reprasentationen der Macht. Beitrage des Festkolloquiums zu Ehren des 65. Geburtstags von Blagoje Govedarica* (= *Kolloquien zur Vor- und Fruhgeschichte* 25) Wiesbaden: Harrasowitz, 147-170.

Alexandrov S., Galabova B. and Atanasova-Timeva N. 2016. Spasitelni arheologicheski prouchvaniya na nadgrobna mogila № 5, zemlishte na s. Beli briag, obshtina Radnevo. In L. Vagalinski (ed.), Arheologicheski otkritiya i razkopki prez 2015 g. Sofia: Balgarska Akademiya na Naukite, Natsionalen Arheologicheski Institut s Muzey, 153-154.

Alexandrov S. and Kaiser E. 2016. The early barrow graves in West Pontic Area. Cultures? Migrations? Interactions? In V. Nikolov and W. Schier (eds), *Der Schwarzmeerraum vom Neolithikum bis in die Fruheisenzeit (6000-600 v. Chr.). Kulturelle Interferenzen in der Zirkumpontischen Zone und Kontakte mit ihren Nachbargebieten. Humboldt-Kolleg Varna, Bulgarien, 16-20. Mai 2012* (= *Prahistorische Archäologie in Südosteuropa* 29). Rahden/Westf.: Leidorf, 351-362.

Alexandrov S. and Kirov I. 2017. Spasitelni arheologicheski prouchvaniya na nadgrobna „Kangalova" mogila ot rannata bronzova epoha, zemilshche na s. Troyanovo, obshtina Radnevo. In L. Vagalinski (ed.), *Arheologicheski otkritiya i razkopki prez 2016*. Sofia: Balgarska Akademiya na Naukite, Natsionalen Arheologicheski Institut s Muzey, 126-127.

Alexandrov S. and Iliev I. 2016. Spasitelni arheologicheski prouchvaniya na nadgrobna mogila (obekt no. 6 po traseto na tranziten gazoprovod za Turtsiya), zemlishte na grad Straldzha, obshtina Straldzha. In L. Vagalinski (ed.), *Arheologicheski otkritiya i razkopki prez 2015 g*. Sofia: Balgarska Akademiya na Naukite, Natsionalen Arheologicheski Institut s Muzey, 113-114.

Alexandrov S., Dimitrova Y., Popov H., Horejs B. and Chukalev K. eds 2018. *Gold and bronze: Metals, technologies and interregional contacts in the Eastern Balkans during the Bronze Age*. Sofia: Blgarska Akademiya na Naukite, Natsionalen Arkheologicheski Institut s Muzey, 2018.

Alexandrov S., Vasileva E. and Iliev I. 2023. Spasitelni arheologicheski prouchvaniya na nadgrobna mogila v zemlishteto na s. Zimnitsa, oblast Yambol (AM „Trakiya", LOT 4, obekt No. 14A – razkopki 2009 g.). In S Alexandrov and T. Stefanova (eds), *Spasitelni arheologicheski prouchvaniya po traseto na AM „Trakia" LOT 3-5*. Sofia 2023 (in print)

Alexandrov S. and Włodarczak P. 2022. Chronological sequence of the Early Bronze Age graves in the Pamukli Bair Barrow at Malomirovo and the Pit-Grave Culture expansion in the Middle Tundzha Valley. *Studia Praehistorica* 16, 207-240.

Anthony D. W. 2009. *The horse, the wheel and language. How Bronze-age riders from the Eurasian steppes shaped the modern world*. Princeton-Oxford: Princeton Univeristy Press.

Batsova E. and Kanchev M. 1974. Novootkriti trakiyski pogrebeniya v Novozagorsko. *Arheologiya* H1, 50-57.

Boyadzhiev Y., Andonova A., Petrov V. and Boyadzhiev K. 2015. Obekt „Chavdarova cheshma", Simeonovgrad. In L. Vagalinski (ed.), *Arheologicheski otkritiya i razkopki prez 2014 g*. Sofia: Balgarska Akademiya na Naukite, Natsionalen Arheologicheski Institut s Muzey, 70-73.

Buyukliev H. 1964. Dve rannotrakiyski mogilni pogrebeniya ot Starozagorsko. *Arheologiya* 4, 63-65.

Dimitrova D. 2014. Grobove ot bronzovata epoha pri Kamen, Slivensko. *Arheologiya* H1-2, 69-82.

Dimitrova D. 2021. Grobove ot rannata bronzova epoha v Gabrova mogila. In D. Georgeva (ed.), *Sbornik v pamet na Rumen Katincharov* (= *Izvestiya na Natsionalniya Arheologicheski Institut* 47). Sofia: Balgarska Akademiya na Naukite, Natsionalen Arheologicheski Institut s Muzey, 191-202.

Gleser R. and Thomas T. 2012. *Drama. Forschungen in einer Mikroregion, Band 1. Merdžumekja-Südosthang. Spät Kupferzeit und früheste Bronzezeit: Ergebnisse siedlungsarchäologischer Forschungen*. Bonn: Verlag Dr. Rudolf Habelt GmbH.

Heyd V. 2011. Yamnaya groups and tumuli west of the Black Sea. In E. Borgna and Muller Celka (eds), *Ancestral Landscapes. Burial Mounds in the Copper and Bronze Ages (Central and Eastern Europe – Balkans – Adriatic – Aegean, 4th-2nd millennium B.C.)* (= *Travaux de la Maison de l'Orient* 58) Lyon: Maison de l'Orient et de la Méditerranée, 535-555.

Hristov M., Panayotova K., Gurova M., Panayotov I. and Mikov R. 2023. Spasitelni arhyeologicheski prouchvaniya na obekt № 16, km 195+300 – 195+600, LOT 1, AM „Trakiya" (predvaritelni nabliudeniya). In S. Alexandrov and T. Stefanova (eds), *Spasitelni arheologicheski prouchvaniya po traseto na AM „Trakia" LOT 3-5*. Sofia (in print)

Hristova R. 2009. Materiali ot rannata i kasnata bronzova epoha pri prouchvane na traseto na AM „Trakiya", LOT 5, km 6+700 – 6+800. In D. Momchilov and R. Georgieva (eds), *Spasitelni arheologicheski prouchvaniya po traseto na AM „Trakiya", LOT 5, obhoden pat na grad Karnobat, km 6+400 – 6+800*. Varna: Zograf, 33-49.

Hristova T. and Uzunov Z. 2012. Kolektiven grob s trupopolagane ot rannata bronzova epoha pri Sabrano, Novozagorsko. *Arheologiya* 53/1, 62-67.

Iliev I. 2011. The Pit Grave culture in the lower Tundzha valley. *Studia Praehistorica* 14, 381-398.

Iliev I. and Bakardžiev S. 2020. *Kurgane der frühen bis späten Bronzezeit im Bezirk Jambol, Südostbulgarien* (= *Yamnaya Impact on Prehistoric Europe* 1). Budapest: Archaeolingua.

Iliev S. 2018. Tumulus from the Early Bronze Age near the town of Merichleri, Southeast ulgaria. In S. Alexandrov, Y. Dimitrova, H. Popov, B. Horejs and K. Chukalev (eds), *Gold and bronze: Metals, technologies and interregional contacts in the Eastern Balkans during the Bronze Age*. Sofia: Balgarska Akademiya na Naukite, Natsionalen Arheologicheski Institut s Muzey, 318-322.

Ivanova S., Petrenko V. and Vetchinnikova N. 2005. *Kurgany drevikh skotovodov mezhdurechia Yuzhnogo Buga i Dnestra*. Odessa: Institut Arkheologii Natsionalnoy Akademii Nauk Ukrainy.

Kaiser E. and Winger K. 2015. Pit graves in Bulgaria and the Yamnaya Culture. *Prähistorische Zeitschrift* 90/1-2, 114-140.

Kanchev M. 1991. Nekropoli ot bronzovata epoha v rayona na Maritsa-iztok. In I. Panayotov, K. Leshchakov, R. Georgieva, S. Alexandrov and B. Borisov (eds), *„Maritsa-iztok" Arheologicheski prouchvaniya* 1. Radnevo: Ekspeditsiya „Maritsa-iztok", 41-70.

Kanchev M. 1995. Nadgrobna mogila II (Golyamata mogila) do selo Golyama Detelina, obshchina Radnevo (chast I). In I. Panayotov, R. Georgieva, K. Leshchakov, S. Alexandrov and B. Borisov (eds), *„Maritsa-iztok" Arheologicheski prouchvaniya* 3. Radnevo: Arheologicheski muzey „Maritsa-iztok" – gr. Radnevo, Arheologicheska ekspeditsiya „Maritsa-iztok", 35-63.

Kancheva-Ruseva T. 1994. Yamni pogrebeniya v mogila II ot mogilniya nekropol v zemlishcheto na s. Pet mogili, Novozagorsko. In S. Alexandrov and B. Borisov (eds), *„Maritsa-iztok" Arheologicheski prouchvaniya* 2. Radnevo-Nova Zagora: Arheologicheski muzey „Maritsa-iztok"-Obshchinski svet, 91-94.

Krauss R., Tsirtsoni Z., Maniatis Y., Oberlin C., Pernicka E. and Leshtakov P. 2020. Absolute Chronology of the Excavated Features at Akladi Cheiri and the Beginning of Copper Metallurgy in the Eastern Balkans. In R. Krauss, E. Pernicka, R. Kunze, K. Dimitrov and P. Leshtakov (eds), *Prehistoric mining and metallurgy at the Southeast Bulgarian Black Sea coast* (= *Ressourcen Kulturen Band* 12). Tübingen: Tübingen University Press, 177-184.

Lazaridis I., Alpaslan-Roodenberg S., Acar A., Açikkol A., Agelarakis A., Aghikyan L. *et al*. 2022. The genetic history of the Southern Arc: A bridge between West Asia and Europe. *Science*, 377(6609), doi/10.1126/science.abm4247.

Leshchakov K. 2006. Bronzovata epoha v Gornotrakiyskata nizina. *Godishnik na Sofiyskia Universitet, Istoricheski fakultet* 3 (2002), 141-216.

Leshchakov K. and Borisov B. 1995. Nadgrobna mogila IV ot rannata bronzova epoha v zemlishcheto na selo Golyama Detelina, obshchina Radnevo. In I. Panayotov, R. Georgieva, K. Leshchakov, S. Alexandrov and B. Borisov (eds), *„Maritsa-iztok" Arheologicheski prouchvaniya* 3. Radnevo: Arheologicheski muzey „Maritsa-iztok" – gr. Radnevo, Arheologicheska ekspeditsiya „Maritsa-Iztok", 9-33.

Leshchakov K. and Popova Ts. 1995. Nadgrobna mogila II (Golyamata mogila) do selo Golyama Detelina, obchtina Radnevo (vtora chast). . In I. Panayotov, R. Georgieva, K. Leshchakov, S. Alexandrov and B. Borisov (eds), *„Maritsa-iztok" Arheologicheski prouchvaniya* 3. Radnevo: Arheologicheski muzey „Maritsa-iztok" – gr. Radnevo, Arheologicheska ekspeditsiya „Maritsa-Iztok", 63-86.

Leshtakov K., Kancheva-Russeva T. and Stoyanov S. 2001. Prehistoric studies. Settlement sites. In I. Panayotov et al. (eds), *Maritsa-Iztok. Archaeological Research* 5. Radnevo, 15-68.

Leshtakov P., Klasnakov M., Samichkova G. and K. McSweeney 2020. The Prehistoric Site Akladi Cheiri, Chernomorets. In R. Krauss, E. Pernicka, R. Kunze, K. Dimitrov and P. Leshtakov (eds), *Prehistoric mining and metallurgy at the Southeast Bulgarian Black Sea coast* (= *Ressourcen Kulturen* 12). Tübingen: Tübingen University Press, 89-120.

Manzura I. 2003-2004. Severnoe Prichernomorie v eneolite i bronzovom veke: stepeni kolonizatsii. *Stratum plus* 2, 63-85.

Manzura I. 2013. Kultury stepnogo eneolita. In: I. V. Bruyako and T. L. Samoylova (eds), *Drevnie kultury severo-zapadnogo Prichernomoria*. Odessa: Odesskiy arkheologicheskiy muzey Natsionalnoy akademii nauk Ukrainy, 115-153.

Mathieson I., Alpaslan-Roodenberg S., Posth C., Szécsényi-Nagy A., Rohland N., Mallick S. *et al.* 2018. The genomic history of southeastern Europe. *Nature* 555(7695), 197-203.

Minkov P. 2021. Askoi from the Early Bronze Age in the burial contexts from the present-day Bulgarian lands (observations on relative chronology, characteristics and volume data). *Proceedings of the National Museum of History* 33, 92-120.

Nikolov V. and Petrova V. 2016. Tell Karanovo: the hiatus between the Late Copper and the Early Bronze Age. In Z. Tsirtsoni (ed.), *The Human Face of Radiocarbon. Reassessing chronology in prehistoric Greece and Bulgaria, 5000-3000 calBC* (= Travaux de la Maison de L'orient et de la Méditerranée, 69). Lyon: Maison de l'Orient et de la Méditerranée, 127-141.

Nikolova L. 2000. Yamnaya kultura na Balkanakh. *Stratum plus* 2, 423-458.

Panayotov I. 1989. *Yamnata kultura v Balgarskite zemi*. Razkopki i prouchvania 21. Sofia: Balgarska Akademiya na Naukite, Natsionalen Arheologicheski Institut s Muzey.

Panayotov and Alexandrov 1995. Mogilen nekropol ot rannata bronzova epoha v zemlishtata na selata Mednikarovo i Iskritsa. In I. Panayotov, R. Georgieva, K. Leshchakov, S. Alexandrov and B. Borisov (eds), *„Maritsa-iztok" Arheologicheski prouchvaniya* 3. Radnevo: Arheologicheski muzey „Maritsa-iztok" – gr. Radnevo, Arheologicheska ekspeditsiya „Maritsa-iztok", 87-113.

Penske S., Rohrlach A. B., Childebayeva A., Gnecchi-Ruscone G., Schmid C., Spyrou M. A., Neumann G. U., Atanassova N., Beutler K., Boyadzhiev K., Boyadzhiev Y., Bruyako I., Chohadzhiev A., Govedarica B., Karaucak M., Krauss R., Leppek M., Manzura I., Privat K., Ross S., Slavchev V., Sobotkova A., Toderaş M., Valchev T., Ringbauer H., Stockhammer P. W., Hansen S., Krause J. and Haak W. 2023. Early contact between late farming and pastoralist societies in southeastern Europe. *Nature* 620, 358-365.

Preda-Bălănică B. E. and Diekmann Y. 2022. Ancestry and identity in the Balkans and the Carpathian basin between the 5th and 3rd millennia cal BC. In A. Whittle, J. Pollard and S. Geaney (eds), *Ancient DNA and the European Neolithic: Relations and Descent* (= *Neolithic Studies Group Seminar Papers* 19). Oxford and Philadelphia: Oxbow Books, 107-122.

Rassamakin Yu. 1999. The Eneolithic of the Black Sea Steppe: Dynamics of Cultural and Economic Development 4500-2300 BC. In M. Levine, Yu. Rassamakin, A. Kislenko and N. Tatarintseva (eds), *Late prehistoric exploitation of the Eurasian steppes*. Cambridge: Oxbow Books, 59-182.

Rassamakin Yu. 2013. From the late Eneolithic Period to the Early Bronze Age in the Black Sea Steppe: What is the Pit Grave Culture (Late Fourth to Mid-Third Millenium BC)? In V. Heyd, G. Kulcsár and V. Szeverényi (eds), *Transition to the Bronze Age. Interregional Interaction and Socio-Cultural Change in the Third Millenium BC. Carpathian Basin and Neighbouring Regions*, Budapest: Archaeolingua, 113-138.

Stefan C. E., Vasile G., Petcu R., Heroiu A., Preda-Bălănică B. and Trautmann M. 2023. The Bronze Age mounds from Aliman (Constanţa County, Romania). In B. Preda-Bălănică and M. Ahola (eds), *Steppe transmissions* (= *Yamnaya Impact on Prehistoric Europe* 4). Budapest: Achaeolingua, 95-133.

Włodarczak P. 2020. Sequence of graves in barrows 4th-3rd millennium BC in the Danube-Tisza region. *Pontica* 53, 135-155.

Włodarczak P. 2021. Eneolithic and Early Bronze Age barrows in Vojvodina. In: P. Jarosz, J. Koledin and P. Włodarczak (red.), *Danubian Route of the Yamnaya Culture. The barrows of Vojvodina* (= *The Yamnaya Impact on Prehistoric Europe* 3). Budapest: Archaeolingua, 215-255.

Włodarczak P., Manova R., Podsiadło M., Trautmann M. and Alexandrov S. 2023. The old man and the three *babi*. An exceptional burial from the Pamukli Bair barrow near Malomirovo, Southeast Bulgaria. In A. Lahelma, M. Lavento, K. Mannermaa, M. Ahola, E. Holmqvist and K. Nordqvist (eds), *Moving northward. Professor Volker Heyd's Festschrift as he turns 60* (= *Monographs of the Archaeological Society of Finland* 11). Helsinki: Archaeological Society of Finland, 34-49.