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EARLY TO MID - HOLOCENE HUMAN - RIVER INTERACTIONS IN THE LOWER DANUBE VALLEY: NEW RESEARCH AT POIANA (TELEORMAN COUNTY)

Steve MILLS [*]
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Mark MACKLIN [****]

Abstract: *This paper presents new research in an alluvial basin of the Lower Danube Valley between Turnu Măgurele and Zimnicea in southern Teleorman County. In terms of archaeology, the area had not been previously systematically investigated. During the twentieth century, and especially before the late 1960s to early 1970s, there were major landscape changes as result of massive desiccation and impoundment. Most prehistoric and ancient archaeological finds were previously discovered incidentally. The earliest traces of human activity were identified on the loess terraces bordering the north of the Danube floodplain. Noteworthy is the research focused on the Upper Palaeolithic at Ciuperceni, first carried out in the late 1970s, and then, more recently, between 2006 and 2008. Other prehistoric evidence has been discovered during systematic research around Poiana village (formerly Flămânda) on former Danube terraces and the northern bank of former Lake Bercelui. Importantly, the oldest evidence could date to the Mesolithic, followed by the early and developed (late) Neolithic. Starting in 2013, a collaborative research project between Cardiff and Lincoln Universities from the UK and the Teleorman County Museum aims to better understand this chronological sequence and will investigate the palaeoenvironmental and hydrological histories of the Danube and the impact of the river on human communities over time.*

Rezumat: *Acest articol prezintă noile cercetări efectuate în bazinul aluvionar al Dunării de Jos, între Turnu Măgurele şi Zimnicea, în sudul judeţului Teleorman. În ceea ce priveşte situaţia arheologică, în trecut, zona nu a fost investigată sistematic. În secolul al XX-lea şi mai ales înainte de sfârşitul anilor '60 până la începutul anilor '70, s-au produs schimbări majore ale mediului natural ca rezultat al desecărilor masive şi al îndiguirilor. Cele mai multe descoperiri arheologice preistorice şi antice făcute anterior au fost descoperiri arheologice întâmplătoare. Cele mai timpurii urme ale activităţii umane au fost identificate pe terasele de loess aflate la nord de lunca inundabilă a Dunării. De remarcat este cercetarea axată pe locuirile din paleoliticul superior de la Ciuperceni, realizată pentru prima oară la sfârşitul anilor 1970, iar apoi, mai recent, între 2006-2008. Alte dovezi preistorice au fost descoperite în timpul cercetărilor sistematice din jurul satului Poiana (fost Flămânda) pe terase Dunării şi pe malul nordic al fostului lac Bercelui. Este important faptul că cele mai vechi dovezi ar putea fi datate în mezolitic, urmate de neoliticul timpuriu şi dezvoltat (târziu). Începând cu anul 2013, un proiect de cercetare derulat în colaborare între universităţile Cardiff şi Lincoln din Marea Britanie şi Muzeul Judeţean Teleorman îşi propune să înţeleagă mai bine această secvenţă cronologică şi să investigheze istoria mediului natural străvechi şi a hidrologiei Dunării, precum şi impactul fluviului asupra comunităţilor umane de-a lungul timpului.*

Keywords: *Lower Danube Valley; alluvial archaeology; flint; 'bullet' core; Mesolithic.*
Cuvinte cheie: *Valea Dunării de Jos; arheologie aluvială; silex; nucleu tip 'glonţ'; mezolitic.*

Introduction

The valuable contribution of the General Urban Plans (P.U.G.) programme (e.g., Mirea *et al.* 2011) in identifying, researching and recording archaeological and historical sites within Teleorman County has led to new research in a study area within an alluvial wetland basin of the Lower Danube

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Valley centred on the village of Poiana, formerly Flămânda (Teleorman County). The broader study area is the alluvial basin of the Danube located between Turnu Măgurele and Zimnicea (Figure 1).

Recent research in the Teleorman River valley (Macklin *et al.* 2011) has demonstrated the benefit of an alluvial archaeology approach for better understanding the relationships between fluvial dynamics, sedimentation and the identification and preservation of the archaeological record. Research of this kind needs to be extended to include the Lower Danube Valley (Mills, Macklin and Mirea 2017). New research by the authors around Poiana has identified surface lithic scatters that contain a wide range of worked pieces including cores, flakes, blade fragments and importantly a number of 'bullet' cores. The 'bullet' cores may indicate a Mesolithic presence in this area of the Lower Danube Valley. These lithic scatters have the potential to provide important new evidence to help further our understanding of human-river interactions in the region during the early Holocene and immediately before and during the transformation from hunter-gatherers to Neolithic herding and farming communities at around 6000 cal BC (the First Balkan Neolithic, see Thissen 2017).

Except for the considerable research within the Danube Gorges (e.g., Bonsall 2008; Bonsall, Boroneanţ and Radovanović 2008; Bonsall *et al.* 2015; Bonsall and Boroneanţ 2016, 2018; Borić 2011; Borić and Cristiani 2016; Borić *et al.* 2014; Boroneanţ 2012; Radovanović 1996; Srejović 1972; see also chapters in Mărgărit and Boroneanţ 2017), there is little recent research on the Mesolithic further east in the Lower Danube Valley. We hope that new research at Poiana will contribute to further understanding about the presence and lifeways of Mesolithic communities in the region.

P.U.G. in Teleorman County

From 2007 onwards the Teleorman County Museum, on behalf of the Teleorman County Council, has been conducting archaeological surveys within, and for the benefit of, the communes of Teleorman County. These contribute to the General Urban Plans (P.U.G) for the communes. After 12 years of systematic field research, archaeological investigations for P.U.G.s for 57 communes have so far been conducted and more than 860 sites recorded. These are helping to provide a new understanding of human activities and habitation in the south-west of Walachia during prehistoric, protohistoric, antique and medieval times.

Within this research framework, the study as part of the Ciuperceni commune P.U.G., comprised of the two villages of Ciuperceni and Poiana, provided the archaeological background, the historical evolution of the localities and some aspects related to local ethnography (Mirea *et al.* 2011). The archaeological survey for the P.U.G. identified 20 sites (Mirea and Torcică 2011) from different periods, mainly from prehistory. An additional 6 sites were identified in 2016 and 2017. Details of these sites are outlined in the next section below.

Archaeology at Poiana (Flămânda)

Archaeological fieldwork within the loess covered terrace on the northern side of the study area – the left bank of the Danube – since the 1970s has identified and studied Upper Palaeolithic (Aurignacian c. 30,000 BP) activity at three locations ('La Tir', 'La Vii' and 'La Carieră') near the village of Ciuperceni (now 2km NW of Poiana) (e.g., Boroneanţ 1978; Boroneanţ and Vlad 1992; Dobrescu *et al.* 2011; Dobrescu, Tuffreau and Balescu 2015; Păunescu 2000: 236-42, 244; Tuffreau *et al.* 2014). The evidence from these location comprises of worked flint, and there are layers of pebbles with unworked flint within the terrace, particularly at 'La Carieră'. It is likely then that the flint used in the Upper Palaeolithic at Ciuperceni was sourced locally. In addition to this evidence for an Upper Palaeolithic presence near Ciuperceni, other lithic scatters had been noticed within the Danube floodplain around Poiana but they had not been the subject of in-depth investigation. In 1975 M. Bitiri and V. Boroneanţ excavated such a type of site at the NE proximity of Poiana cemetery, on the remains of a terrace destroyed by the Danube waters. A precise chronological assessment of the flint tools discovered was not possible because of the lack of any stratigraphical context and over the next years the scholars focused on other locations at Ciuperceni (Boroneanţ 1981: 23, nota 1).

Previously known archaeology around Poiana from later periods includes the Roman *Limes Transalutanus* and fort that formed part of the boundary of the Roman Empire against the Geto-Dacians using local topography and changes in the geomorphological character of the wetland (Cătăniciu 1997; Teodor 2015). A medieval rural settlement (second half of the fourteenth century AD) overlaps the Roman fortress (Ţânţăreanu 2005). There was also a medieval fortress at Turnu Măgurele, originally built by Romanians and conquered by the Turks.

As mentioned above, the Ciuperceni P.U.G. added to this existing knowledge by identifying at least 26 new sites and/or find spots and recording their location with GPS. These new points have the

prefix of FLM (for Flămânda) followed by a number in the sequence in which they were discovered (FLM 001, FLM002, FLM 003 etc.). A number of these new FLM points have prehistoric material culture including Palaeolithic, possible Mesolithic, Neolithic, Developed Neolithic and Eneolithic. Material culture dating to later periods is also present including that dating to the Bronze Age, First Iron Age (Hallstatt), Geto-Dacian period, Roman, post-Roman and Medieval periods.

In addition, during the field research for the Turnu Măgurele P.U.G. study, in 2014 another 3 sites (labelled TRM) were identified on the north bank of the former Lake Bercelui, (Mirea and Torcică 2014) (Table 1, Figure 2).

Site code / FLM	Palaeolithic	possible Mesolithic	Neolithic (unspecified)	Early Neolithic	Developed Neolithic	Early Eneolithic	Late Eneolithic	Eneolitic-Bronze Age transition	Bronze Age	Hallstatt	Geto-Dacian	Roman	post-Roman	Medieval
001		■												■
002		■												■
003		■	■		■									■
004		■	■								■			■
005		■												
006		■												■
007		■												■
008		■	■		■						■			■
009		■												■
010														
011									■					■
012														
013											■			
014											■			■
015	■			■		■	■						■	■
016											■			
017		■												■
018	■								■					■
019	■								■					
020		■	■						■			■		■
021				■				■		■				
022	■								■			■		■
023	■								■		■	■		
024	■	■	■		■						■			■
025	■	■	■											■
026	■	■												
TRM														
001	■		■							■				■
002				■						■	■			■
003				■										■

Table 1 The chronological framework of archaeological discoveries around Poiana and Turnu Măgurele. Cadrul cronologic al descoperirilor arheologice de la Poiana şi Turnu Măgurele.

Many of the FLM points are located on upstanding areas slightly raised above the surrounding floodplain and therefore largely above the surrounding wetlands and not subject to flooding. The discovery of these new prehistoric FLM points around Poiana, as well as the existing knowledge of an Upper Palaeolithic presence at Ciuperceni, provided the starting point for a new project using an alluvial archaeology approach that aims to understand the context of these finds in relation to Holocene river dynamics.

Alluvial archaeology in the Lower Danube

Previous alluvial archaeology research in the Lăceni reach of the Teleorman Valley as part of the Southern Romania Archaeological Project (SRAP) successfully mapped and radiometrically dated the Late Pleistocene and Holocene development of the Teleorman Valley (Macklin *et al.* 2011). This was conducted with a specific interest to better understand how processes of fluvial dynamics and sedimentation impacted the visibility and preservation of the Neolithic archaeological record. This research demonstrated the benefits of an alluvial archaeology approach and suggested that it could be fruitfully applied to other rivers in Southern Romania, and in particular within the Lower Danube Valley.

An important lesson from alluvial archaeology research is that conclusions drawn by archaeologists of population increases or decreases over time based on the number of archaeological sites in river valleys for different periods need support from the geomorphological record. Unless the timing of Pleistocene and Holocene fluvial aggradation and incision events are radiometrically dated, the highly variable effects of river dynamics on site preservation and visibility cannot be quantified. These concerns can only be more fully addressed in the Lower Danube area with more studies of the kind already conducted in the Teleorman Valley.

There have been successful applications of alluvial archaeology and sedimentological research further east along the Lower Danube Valley focussed at and immediately surrounding Eneolithic sites including at Pietrele (Benecke *et al.* 2013; Nowacki and Wunderlich 2012), Hârşova (Popovici *et al.* 2017: 65) and Taraschina (Carozza *et al*. 2012). To date, however, there has been much less concern with the application of an alluvial archaeological approach to better understand early Holocene human-river interactions in the Lower Danube Valley and in areas that do not have visible prehistoric archaeology (e.g., *tells*) at surface.

Alongside alluvial archaeological studies, there has been considerable recent interest in investigating the possible impact of Rapid Climate Change (RCC) events on prehistoric communities. The 8.2ka RCC event in particular has been the focus of much research because of its possible association with the spread of the Neolithic (e.g., Berger and Guilaine 2009; Weninger *et al.* 2006, 2009, 2014). Its timing is a little earlier or approximately contemporaneous with the appearance and spread of the Neolithic in the Lower Danube area and hence is of particular interest to this region. The potential impact of flooding and RCC events on prehistoric communities and the preservation of the archaeological record within the Danube Gorges has been considered (Bonsall 2008; Bonsall *et al.* 2002, 2015; Borić 1999; Borić and Miracle 2004). A reduction in the number of radiocarbon dates in the sequences at some Danube Gorges sites around the time of the 8.2ka RCC event may indicate that during periods of increased flooding prehistoric people transferred their activities to other locations. While it is certain they impacted the region, there is currently very little direct evidence for these early to mid-Holocene RCC events within the Lower Danube area. No evidence for the 8.2ka RCC event was identified during the Teleorman Valley study.

A major limitation of comparing variations in archaeological site numbers with climate records from distant locations such as Greenland ice-cores is a disconnect in scale. Catchment-based, interdisciplinary studies, such as those carried out in the Teleorman Valley are essential in the way that they link across geographical and temporal scales, enabling meaningful correlations and explorations of causality to be made.

Following and developing on the above, the main aims of an alluvial archaeology to be applied in the Lower Danube Valley are to examine the interplay between river dynamics and the early to mid-Holocene (c. 9500-55000 cal BC) archaeological record in terms of:

1. the effects of river erosion and sedimentation on the preservation and visibility of archaeological sites and,
2. the impact of abrupt, climate-related changes in local hydrology and floodplain environments on prehistoric communities.

New research at Poiana (Flămânda)

Informed by the Ciuperceni P.U.G. and by the successful alluvial archaeology research in the Teleorman Valley, new research from 2013 has focussed within an alluvial basin of the Lower Danube Valley centred on the village of Poiana, Teleorman County. The alluvial basin between Turnu Măgurele and Zimnicea is one of the largest in the Lower Danube Valley with an area of approximately 48,732 ha. It is bordered to the north by the loess terraces of the Romanian Plain and to the south by the foothills of the Stara Planina in Bulgaria.

At the western end of the study area (around Poiana) the valley floor is relatively confined (3 km wide) with extensive late Pleistocene and early Holocene river terraces and well-developed

braided and meandering palaeochannels. To the east of Poiana the valley floor is wider with a transition to an anabranching river with large islands, levees and adjoining flood basins that contain lakes. On some of these late Pleistocene terraces linear dune features are present, forming upstanding areas in the alluvial wetlands. It is these upstanding areas within the study area that appear to have been preferentially selected for activities by human communities from prehistory through to the present. The Călmăţui River drains into Lake Suhaia with a channel leaving the lake at its southern end and joining the Danube. At the eastern end of the study area (at Zimnicea) there is another upstream constriction (2 km wide) where the river resumes a more entrenched and confined course.

During the twentieth century, and especially before the late 1960s to early 1970s, there were major landscape changes in the alluvial basin as result of massive desiccation and impoundment. Irrigation channels and pumping stations were constructed to reclaim land for agricultural use and to pump water from the Danube up to the terraces on the north of the valley floor. Large chemical works were also constructed with one to the west of Poiana on an upstanding area on the valley floor and a second on the bank of the Danube south of Turnu Măgurele. Examination of historic maps dating to between the eighteenth and the early twentieth centuries provide a sense of the scale of these landscape changes (Figure 3). For example, immediately to the west of Poiana, former Lake (Balta) Bercelui is now completely drained to reclaim land for agricultural use. Lake Suhaia at the east end of the study area is now less than half of its former size following draining (reduced from 3104 ha to 1050 ha). The lake formerly had islands with archaeology dating to the late Neolithic and Iron Age and burial mounds from late prehistory and antiquity. The historic maps also show the former larger extent of areas of semi-permanent wetlands including Balta Lişteava Mare, Balta Lişteava Mica, Lacul Sărat, Balta Luciei, Balta Ciora, Balta Rosie and Lişteava Văsluelului. In the present some of these areas still contain water after significant rainfall. Following the irrigation works there are large areas for agricultural use and also extensive grazing areas for cattle, sheep and goat and some of the upstanding areas are still used by shepherds for temporary residence.

Historical records provide evidence of the dynamic nature of the Lower Danube Valley in the study area, in particular documenting episodes of major flooding. The 1976 publication by the *Institute of Geography* about Teleorman County mentions Danube flooding and deposition around Poiana, the size of lakes, the flow of rivers, and Danube channels in the area (Gâştescu, Rusenescu and Breier 1976: 33, 35, 36). It also documents an ice jam around islands near Belina in the Danube in 1942 that forced water around old channels resulting in a major flood that destroyed the village of Ciuperceni. After this event it was necessary to move the village in its entirety from its former location next to a palaeochannel to higher ground. A ruined church is all that remains to mark the former location of the village. An embankment has since been constructed along the Danube to help prevent similar flooding events. Prior to embankment of the Danube and the development of the port at Turnu Măgurele, Poiana had been a mooring place for craft navigating the Danube and waterways in the basin.

With its range of geomorphological features and dynamic fluvial character, the alluvial basin study area has the potential to provide geomorphological and geochronological constraints for early to mid-Holocene fluvial dynamics in this part of the Lower Danube and to correlate these with the archaeological record. With this potential in mind, a short walk over assessment of the area was conducted in summer 2013 which identified key fluvial geomorphological features around Poiana worthy of further study including palaeochannels, raised linear dune features either side of channels and terraces. This work also identified the potential for a high-resolution hydrological and extended palaeobotanical sequence in a major palaeochannel (around Poiana) next to scatters of prehistoric material culture (the FLM points).

Further fieldwalking visits within the Poiana area took place in the summers of 2016 and 2017. Each visit aimed to assess different plots of land based on variation in the crop regime and vegetation cover from one year to the next: recently harvested and/or ploughed plots being the most suitable to detect and identify archaeological material on the surface. During these visits two new surface scatters of worked lithics were identified that were designated with the appropriate sequential FLM numbers as FLM 024 and FLM 025. The high density of unworked and worked flint in these scatters and the presence of 'bullet' cores makes them of particular interest (see section below). In autumn 2017 more extensive fieldwalking within the study area to the east of Poiana (partly for the Seaca P.U.G.) confirmed the much higher density of archaeological material around Poiana relative to the rest of the alluvial basin area. These field assessments have established that Poiana should be the focal area of further research.

The provisional field research around Poiana in 2016 and 2017, and in particular at FLM 024 and FLM 025, has included: fieldwalking, surface collection, the start of surface scatter density

mapping, some auger coring, and some analyses of the collected lithic materials at the Teleorman County Museum. In summer 2018 small 2 m by 1 m (maximum) archaeological assessment sondages were excavated, two at FLM 024 and one at FLM 025. At the time of writing the archaeological material collected from these sondages has yet to be analysed.

The next section provides a summary of the provisional analyses of the lithics recovered from FLM 024 and FLM 025 during the 2016 and 2017 field visits.

Lithic scatters FLM 024 and FLM 025 at Poiana

The lithic scatters FLM 024 and FLM 025 are located next to former palaeochannels on the sides of probable late Pleistocene/early Holocene upstanding areas (Figure 4). It is possible that these upstanding areas may not have been affected by later Holocene and historical flooding and sedimentation, but further geomorphological research is required to resolve this. Based on provisional field assessment, the dimensions of the surface scatters are approximately: FLM 024 is 80 m east-west and 95 m north-south; FLM 025 is 50 m east-west and 25 m north-south.

Relative to the immediate surrounding area, both scatters contain a high density of unworked and worked lithics, predominantly flint but with some chert also present, providing evidence of multi-period activity. They exhibit a wide range of worked pieces including those of Palaeolithic, possible Mesolithic, Neolithic, and Bronze Age date. FLM 024 is only 250 metres to the southeast of FLM 003 and 150 metres to the east of FLM 004 which both also contain a similar range of lithic material as identified at surface. FLM 003 is on the northwest side of a palaeochannel separating it from FLM 024 and FLM 004 which are both on the southeast side of the same palaeochannel (the palaeochannel is labelled as *Valea lui Enache* on some of the historic maps). Given the proximity of these FLM points, it is possible that they were closely related activity areas in prehistory (indeed FLM 004 may be a westward extension of FLM 024).

In addition to lithics, archaeological material collected from FLM 024 includes prehistoric, medieval and modern ceramics. Some of the ceramics may be of developed Neolithic origin, very probably Dudeşti period. No definite early Neolithic Criş period ceramics have so far been identified at FLM 024. A few potsherds showing typical Neolithic fabric, including chaff temper, were identified at FLM 025, but the small sizes do not permit a more precise assessment. Late Medieval and modern ceramics have been identified at both at FLM 024 and FLM 025.

At both FLM 024 and FLM 025 the majority of worked lithic pieces were manufactured on flint, nodules of which were also recovered from the surface scatters. There is much variety in the type and colour of the flint with colours including: black, dark grey, grey, brown, yellow and honey (some of which is similar to 'Balkan flint' – see below). Some pieces have white or grey spots within them and others exhibit a blend of different colours. There are a number of pieces that appear to be burnt. The quality of the raw materials chosen for the production of worked lithics varies, with some pieces displaying multiple flaws in the flint and some cores worked around holes in the original nodule. Flaws are characteristic of water-borne flint and it is not surprising to find flawed material being exploited at these sites, indeed it is testament to the skills of the knappers that they were able to achieve high quality cores and tools on relatively poor quality materials. Much of the flint has chalky cortex, similar to that on pieces in the quarry at Ciuperceni, although water rolling is evident on most (Figure 5).

A significant proportion of the flint within both scatters is dark grey and black in colour and there appears to be more of this darker flint on the FLM sites than was observed at the Ciuperceni quarry. This dark coloured flint is similar in colour to worked pieces that are probably Dudeşti in date found across a large area including at Măgura 'Buduiasca' in the Teleorman Valley, at Poroschia in the Vedea Valley and at Beciu in the Olt Valley. The source of the Măgura 'Buduiasca' dark flint is not known and perhaps it originates from within the Lower Danube Valley at locations such as those around Poiana.

By the end of the autumn 2017 phase of fieldwork a total of 3832 worked pieces of flint had been collected from all the FLM surface scatters around Poiana, of which 10.5% (402) are cores or core fragments. Provisional analyses of the flint collected from FLM 024 has identified 919 worked pieces (out of 1013 collected), of which 14.91% (137) are cores or core fragments. Of the 81 single-platform blade cores from FLM 024, 15% (12) have narrow blade scars less than 3mm width. The average blade scar width is 7.9 mm, the minimum 1.1 mm, and the maximum 25.7 mm. Provisional analyses of the flint collected from FLM 025 has identified 277 worked pieces (out of 285 collected), of which 27% (74) are cores or core fragments. The single-platform blade cores from FLM 025 have yet to be analysed and quantified.

There is a limited range of tool types from amongst the flint collected at FLM 024 and FLM 025 with only scrapers, piercers and notched pieces identified in the initial assessment. Most of the worked

pieces are chips and shatter. Neither scatter has so far produced large numbers of complete blades and bladelets. There is, however, an unusual number of cores within the scatters. Combined with the low number of blades and other tools, the high ratio of cores may indicate that finished blades and tools were removed and reworked elsewhere. Combined, this suggests that non-domestic activity at FLM 024 and FLM 025 may have been an important characteristic of both locations and that they were perhaps flint workshops.

Of particular importance at FLM024 and FLM025, and at a number of the other FLM points around Poiana, is the presence of what appear to be 'bullet' cores (Figure 6). These are single-platform conical-shaped cores that have been worked by a percussion technique to produce narrow blades or bladelets. Similar 'bullet' cores have been identified within Mesolithic contexts along the north coast of the Black Sea in Ukraine and Crimea and in early Neolithic contexts in northwest Turkey (Biagi and Kiosak 2010; Gatsov and Nedelcheva 2016; Kiosak 2016; Nadezhda 2009; Reingruber 2016). To the west of these two regions 'bullet' cores have not so far been identified in Romania or Bulgaria including within the Lower Danube Valley. Their presence around Poiana may therefore be an important new discovery particularly if they provide evidence of human activity in the area dating to between the Upper Palaeolithic and the Neolithic. If the scatters do, in part, evidence Mesolithic activity areas then, to the best of our knowledge, these are the only ones so far to have been discovered within the Lower Danube Valley east of the Danube Gorges.

The lithic scatters around Poiana and the presence of 'bullet' cores raise important questions that must be addressed to drive forward our knowledge of the use of the Lower Danube Valley during the early to mid-Holocene. Firstly, how did the unworked flint at the scatters get there in the first place and what is its origin? Given its quantity and the size of many of the nodules, it is unlikely that the flint has arrived there by fluvial action during episodes of flooding in the Holocene. It is more likely to be from older gravel beds with flint similar to those found within the Danube terrace at the quarries at Ciuperceni and Seaca and as exposed during construction works at Lisa. Across the Danube in Bulgaria, immediately opposite Poiana, at and around Nikopol outcrops of flint occur in the terrace and on the Danube beaches. These have been subject to recent provenance identification research with results suggesting that limestones of Late Cretaceous Mezdra Formation (Campanian-Maastrichtian) age in the Pleven-Nikopol region of north Bulgaria are likely sources of 'Balkan' flint used widely during the Neolithic and Eneolithic (Bonsall *et al.* 2010; Gurova 2012; Gurova and Bonsall 2014a; 2014b; Gurova *et al.* 2016). This area on both sides of the Lower Danube Valley was therefore well known as a source of flint from at least the Upper Palaeolithic onward. Flint provenance identification research in tandem with geomorphological studies are required on the Romanian side of the Danube to better understand the origin and use of the lithic scatters around Poiana (see Ciornei 2013 for some provenance work on the Romanian side of the Lower Danube valley).

Secondly, how might people in prehistory have been using these flint resources on upstanding areas within a surrounding alluvial wetland? As already mentioned, flint resources in the area had clearly been known about for a long time and apparently used over many thousands of years from at least the Upper Palaeolithic. A continuation of this knowledge and use of these flint resources after the Upper Palaeolithic through into the Neolithic and later periods seems very likely. The presence of 'bullet' cores suggests some continuity of use during the Mesolithic. Following provisional analyses of flint from FLM 024 and FLM 025, the composition of the worked flint (high core ratio to low tool ratio) suggests use of these areas for workshops, for the creation of blades and bladelets that were then removed for use elsewhere as required.

Future research

Between 2010 and 2017, the archaeological assessments around Poiana and the provisional analyses of some of the flint collected from two of the FLM points have clearly demonstrated the presence of an important archaeological record that requires further study. To advance knowledge of this archaeology and its geomorphological and palaeoenvironmental context the authors propose further research from 2019 onward of the kind outlined below.

- Test sondages at selected FLM sites (particularly FLM 024 and FLM 025) to determine stratigraphic context of flint scatters and associated sedimentology and to collect material culture and dating samples.
- Systematic programme of coring and test pits across selected FLM points and palaeochannels to better understand sedimentology, geomorphology and fluvial processes and to collect any identified palaeobotanical and palaeoenvironmental data, to include pollen analysis as appropriate.

- Continued geomorphological, archaeological and hydrological mapping using historic maps and GPS and total station in the field, in particular to better understand the development of the terraces, palaeochannels, and upstanding areas.
- Detailed analyses of flint and ceramics collected from surface scatters and from test sondages, this to include flint provenance identification if possible.
- Radiometric dating (^{14}C and OSL) of suitable samples collected from test sondages, cores and test pits to constrain archaeological contexts, and fluvial and geomorphological processes.
- Historical studies to find sources that document local Danube flooding events and their impact; the construction of the irrigation systems and chemical works and any associated hydrological/sedimentological/geological studies and perhaps boring; use of the alluvial wetlands by local people before the major landscape changes when it was a more natural wetland area. Interviews with local people who may have knowledge of the 1942 flooding event and the need to move Ciuperceni.

Conclusion

Recent archaeological assessments around Poiana in an alluvial basin of the Lower Danube valley, Teleorman County, have identified 26 new locations with archaeology on the surface. Of particular importance are lithic scatters that contain 'bullet' cores that may provide evidence for the use of the area during the early Holocene by Mesolithic communities. Confirmation of a Mesolithic presence around Poiana could provide a significant contribution to our understanding of early Holocene human-river interactions in the Lower Danube Valley east of the Danube Gorges. More research that considers the Mesolithic is required in the Lower Danube region. To drive forward research in the Lower Danube Valley it is essential that studies adopt an alluvial archaeological approach that fully integrates investigations of local geomorphological and fluvial processes. This will help to better understand the effects of river erosion and sedimentation on the preservation and visibility of archaeological sites and, the potential impact of abrupt, climate-related changes in local hydrology and floodplain environments on prehistoric communities. The alluvial basin between Turnu Măgurele and Zimnicea, with evidence for Palaeolithic, possible Mesolithic and Neolithic activities, along with a representative range of river valley environments and land forms, provides the opportunity for research of this kind.

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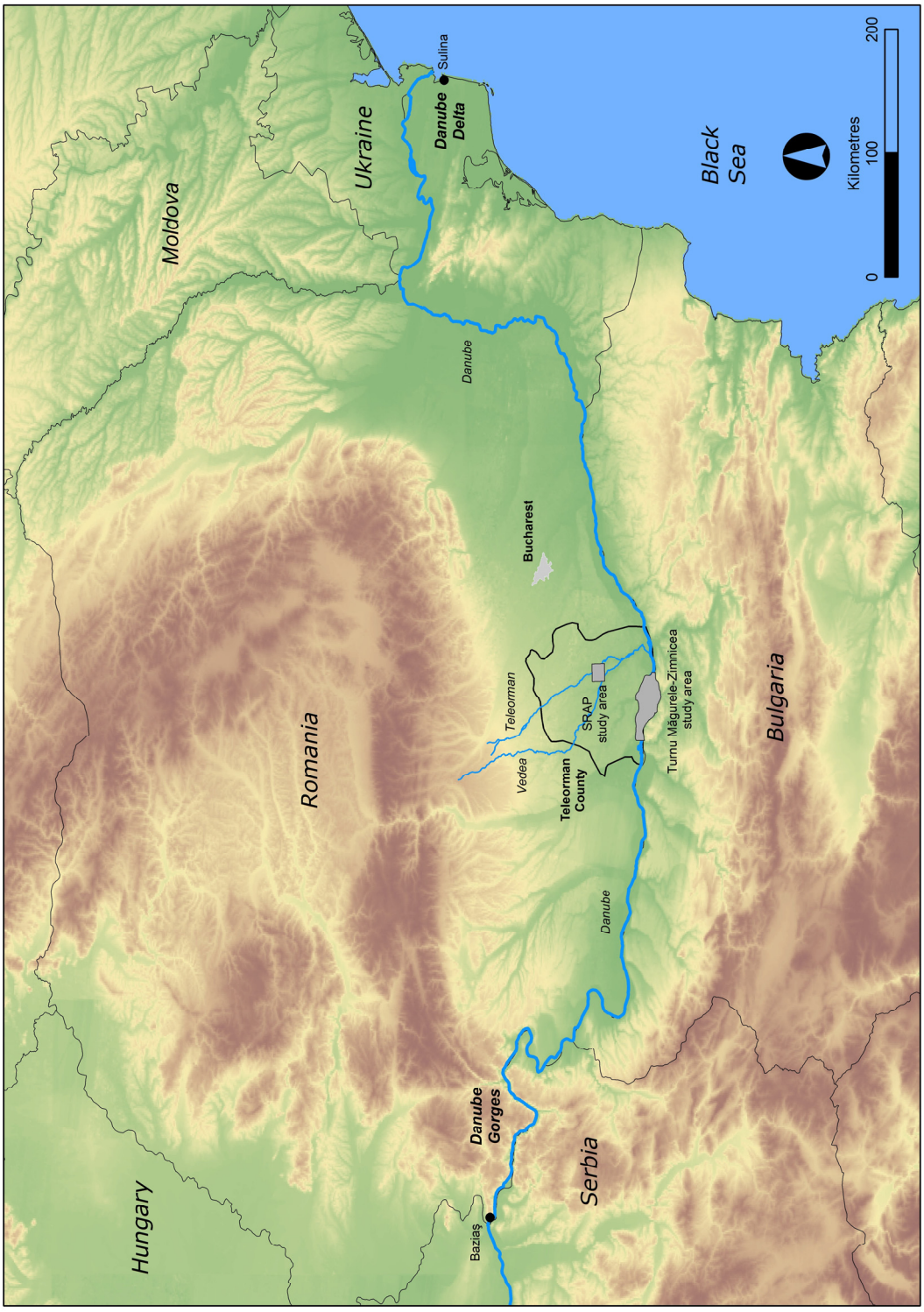

Figure 1. Location of the study area, the alluvial basin of the Danube between Turnu Măgurele and Zimnicea. Base map made using the global digital elevation model (DEM) derived from GTOPO30, made available by the European Environment Agency at: https://www.eea.europa.eu/data-and-maps/data/digital-elevation-model-of-europe.

Amplasarea zonei de studiu, bazinul Dunării între Turnu Măgurele şi Zimnicea. Hartă realizată utilizând modelul de modelare digitală a terenului (MDT) derivat din GTOPO30, pus la dispoziţie de Agenţia Europeană de Mediu la: https://www.eea.europa.eu/data-and-maps/data/digital-elevation-model-of-europe.

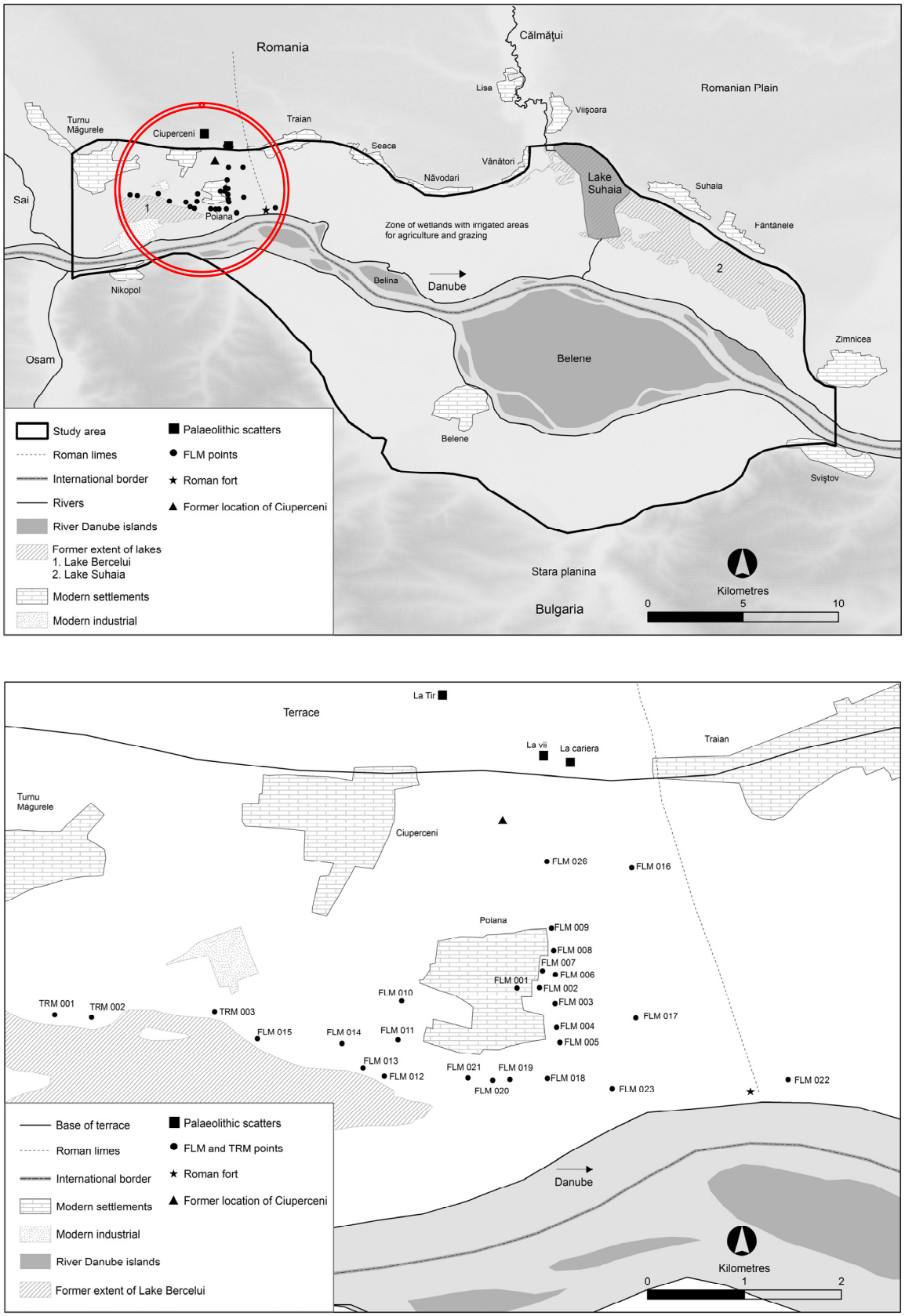

Figure 2. Map of the study area showing the location of archaeology around Poiana referred to in the text.

Harta zonei studiate cu amplasarea siturilor arheologice din jurul satului Poiana.

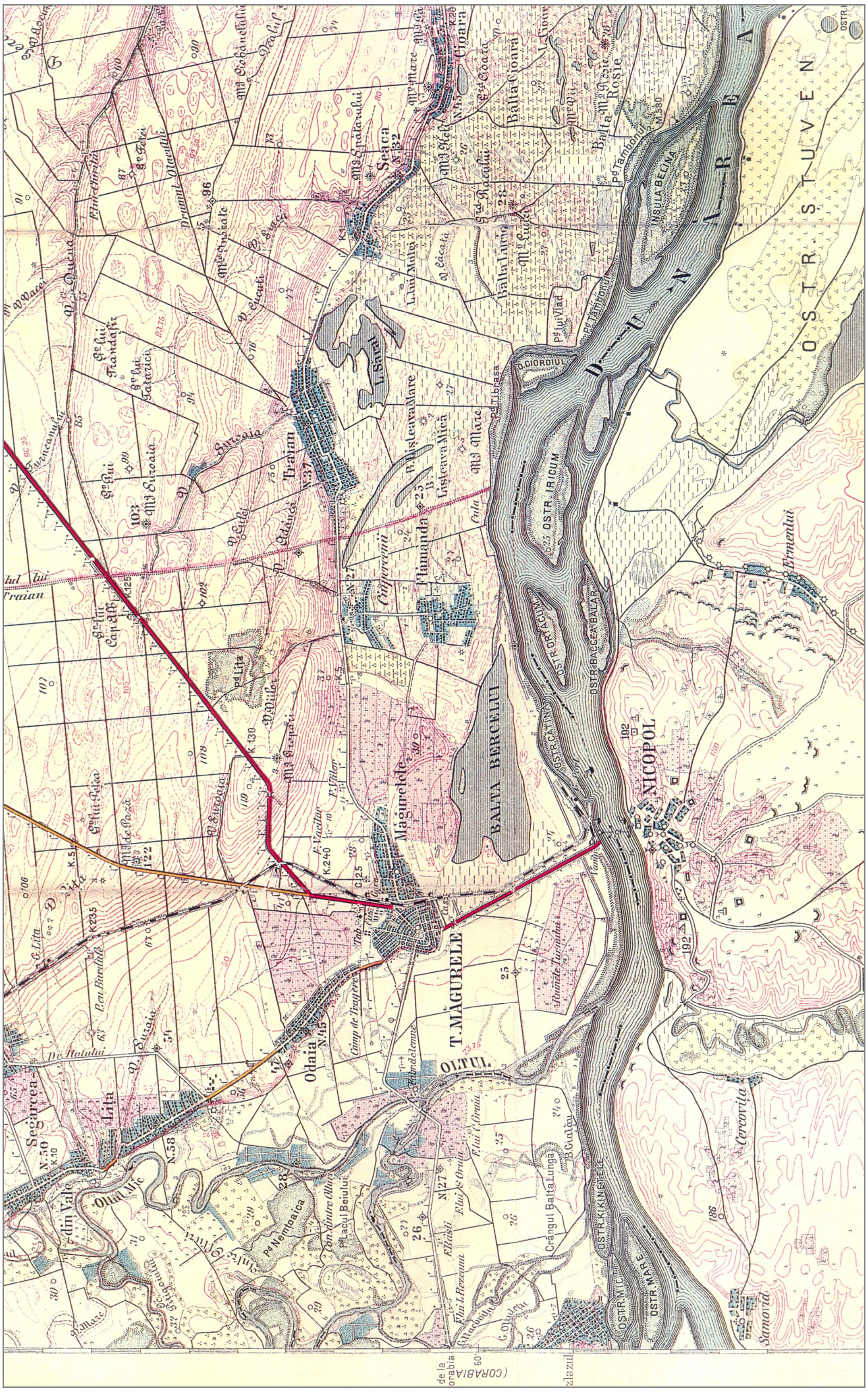

Figure 3. Example of an historic map of the study area showing the former extent of lakes and wetland areas and the original position of Ciuperceni village. Military Map of the Romanian Army of 1910.

Exemplu de hartă istorică a zonei studiate pe care sunt indicate suprafaţa anterioară a lacurilor şi zonelor umede şi poziţia iniţială a satului Ciuperceni. Harta militară a Armatei Române din 1910.

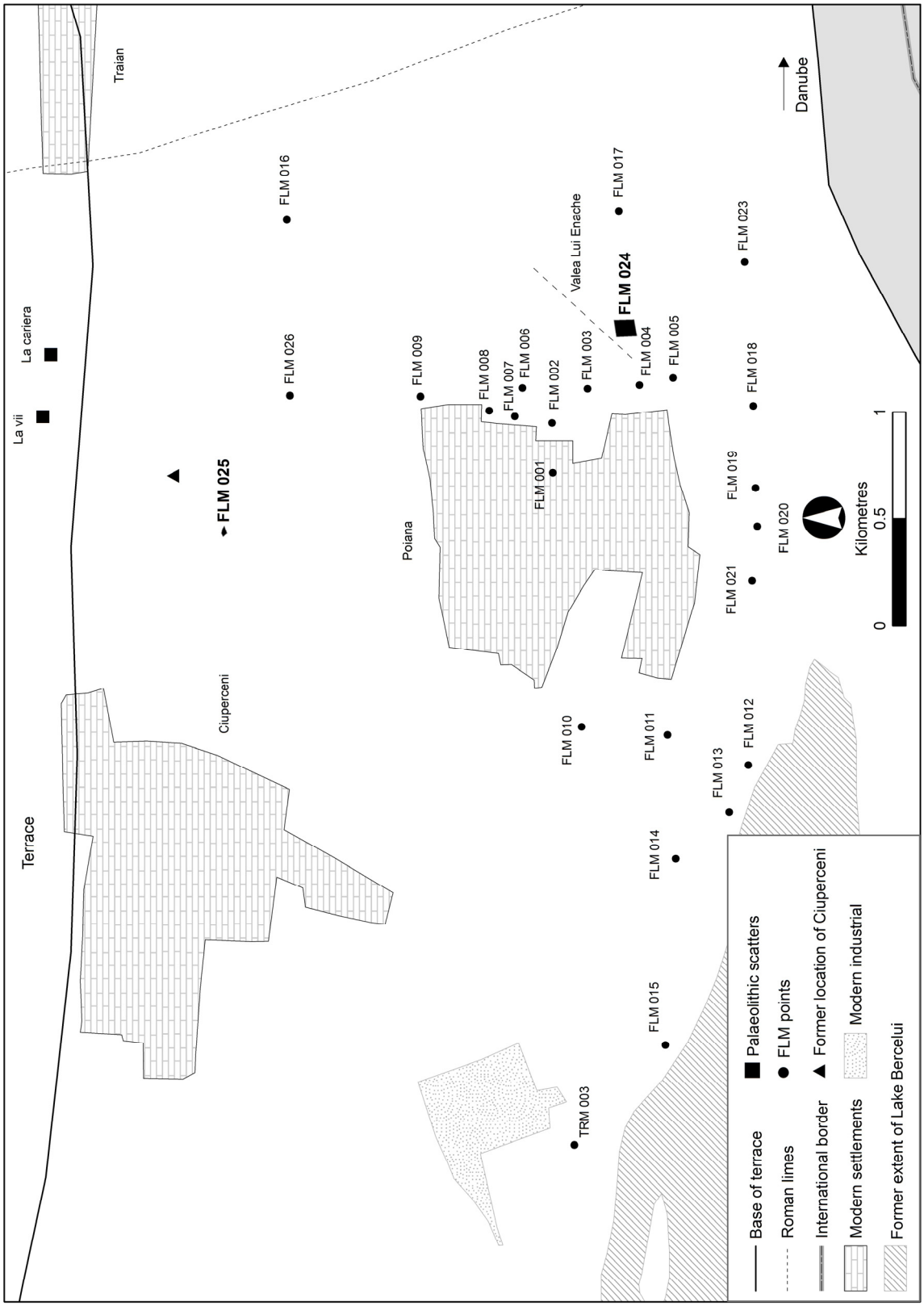

Figure 4. Location of lithic scatters FLM 024 and FLM 025.

Amplasarea siturilor FLM 024 şi FLM 025

Figure 5. Examples of flint pieces from FLM 024 and FLM 025 showing variation in colour, quality and types of worked items.

Exemple de piese de silex din punctele FLM 024 şi FLM 025 care prezintă variaţii de culoare, calitate şi tipuri de unelte.

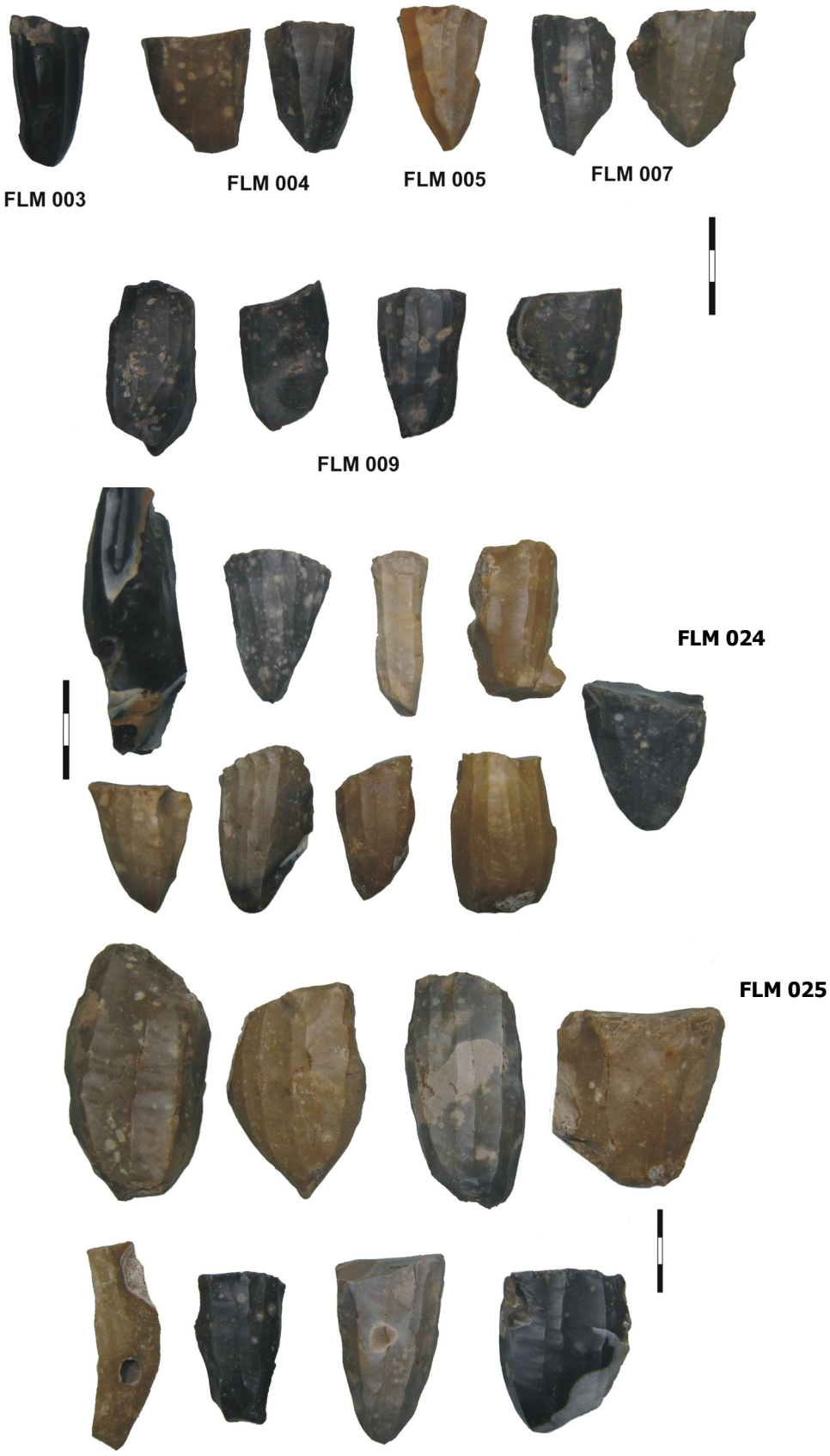

Figure 6. Examples of 'bullet' cores from FLM 003-FLM 005, FLM 007, FLM 009, FLM 024 and FLM 025.

Exemple de nuclee de silex tip 'glonţ' provenite din punctele FLM 003-FLM 005, FLM 007, FLM 009, FLM 024 şi FLM 025.

MUZEUL JUDEȚEAN TELEORMAN

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