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Editura Renaissance
Bucureşti
2011

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The International Conference **The Lower Danube in Prehistory: Landscape Changes and Human-Environment Interaction** was part of the **Art-Landscape Transformations EC Project 2007-4230**, Cardiff University partner scenario **Măgura Past and Present** funded by the European Union.

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Cover design: Pompilia Zaharia (Teleorman County Museum, Alexandria)

Descrierea CIP a Bibliotecii Naţionale a României

The Lower Danube in Prehistory: Landscape Changes and Human-Environment Interactions/Proceedings of the International Conference, Alexandria 3-5 November 2010/
Editori: Steve Mills; Pavel Mirea

Bucureşti, Editura Renaissance, 2011

ISBN 978-606-8321-01-1

I. Steve Mills (Ed.)

II. Pavel Mirea (Ed.)

903(282.243.75)

This volume has been supported by the **Art-Landscape Transformation EC Project 2007-4230**. European Union Education, Audiovisual and Culture Executive Agency Culture Programme (2007-2013).

Renaissance 2011 - www.editurarenaissance.ro
(Recognized Publishing House by C.N.C.S.I.S.)
Director: Sorin Alexandru ŞONTEA
Phone/fax: +4.031.808.91.97/+4.0744.652118
E-mail: sorinsontea@rdslink.ro

ISBN 978-606-8321-01-1
Printed in Romania by ABSTRACT MEDIA SRL
Tel/fax: +4.031.808.91.97

F O R E W O R D

This volume is dedicated to the conference 'The Lower Danube in Prehistory: landscape changes and human-environment interactions' held in Alexandria between the 3rd and 5th November 2010. The conference was funded by the European Commission as part of the Art-Landscape Transformations Project 2007-4230 - Cardiff University partner scenario: 'Măgura Past and Present'. The Măgura project was developed by Cardiff University and a local partner, the Teleorman County Museum, Alexandria. The project is a continuation of the fieldwork conducted in the Teleorman Valley between 1998 and 2004 as part of the Southern Romania Archaeological Project (SRAP); SRAP is a collaboration between Cardiff University, the Romanian National History Museum and the Teleorman County Museum.

For three days, 36 specialists (archaeologists, archaeozoologists, geomorphologists, and palaeobotanists) from Bulgaria, France, Great Britain, Romania and the U.S.A. met in the Alexandria Museum. The participants gave presentations that focused chronologically from the Neolithic to the Bronze Age and geographically throughout the Lower Danube Basin, both north and south of the Danube and including the Danube Delta and western Black Sea coast.

This volume includes papers that are based on some of the conference presentations as well as other research relevant to the conference topics. In keeping with the conference working sessions, the volume is divided into several sections: 'Landscape, settlements and paleoenvironmental reconstruction', 'Landscape, demography and funerary space', 'Seasonality, subsistence and raw material sourcing', and 'New approaches to prehistoric landscape research'.

The volume editors and the conference organisers (Cardiff University, School of History, Archaeology and Religion, and the Teleorman County Museum) express their gratitude to all of the participants and especially for the research contributions that drive forward our understanding of the prehistory of south-eastern Europe and of the Lower Danube area more specifically.

Steve Mills and Pavel Mirea

C O N T E N T S

I. LANDSCAPE, SETTLEMENTS, AND PALEOENVIRONMENTAL RECONSTRUCTION

RIVER DYNAMICS AND THE NEOLITHIC OF THE LOWER DANUBE CATCHMENT

Mark G. MACKLIN, Douglass W. BAILEY,
Andy J. HOWARD, Steve MILLS,
Ruth A.J. ROBINSON, Pavel MIREA,
Laurens THISSEN

Abstract: *In the last decade new archaeological and geomorphological research in the lower Danube catchment (LDC) has transformed our understanding of prehistoric river-society interactions, particularly with respect to the environmental context in which farming first developed in Southeast Europe at around 6100 cal. BC. This paper critically reviews these recent developments and using a new Late Pleistocene and Holocene fluvial chronology from the Teleorman Valley (TV), southern Romania, examines the interplay between river dynamics and the Neolithic archaeological record from two perspectives. First, considering the likely impacts of rapid, climate-related changes of floodplain environments on communities. And secondly, the effects of river erosion and sedimentation on the preservation of archaeological sites within river valleys. Although chronologically the Neolithic period in the LDC falls between the so called 6600-6200 and 4000-3200 cal. BC rapid climate change events, the well dated TV fluvial record allows more precise relationships to be established between changes in river dynamics and prehistoric settlement patterns. Early Neolithic Starčevo-Criş sites (c. 6100/6000 cal. BC) are located on a Late Pleistocene river terrace (36.8 ka), 10 m above modern river level (AMRL) and were unaffected by Holocene fluvial erosion and sedimentation. Later Boian sites (4810 - 4680 cal. BC) are preserved on the surface of Last Glacial Maximum (21.6 ka, 8 m AMRL) and Late Glacial (15.8 - 12.8 ka, 7 m AMRL) river terraces, the lower parts of which are covered by a thin (< 0.5 m) veneer of Holocene alluvium. No Neolithic sites have been found either on the surface or within Holocene fluvial deposits in the study reach. The development of monumental tells in the Gumelniţa period from c. 4500 cal. BC does not coincide with a change in river dynamics and suggests that this new settlement style was not enforced by an alteration in river behaviour or flooding regime. The abandonment of tells in the TV from c. 3800 cal. BC does coincide with a marked increased in river erosion and sedimentation at c. 3900 cal. BC that continued until c. 2000 cal. BC. What is perhaps most striking from our investigations in the TV is the continuity of Neolithic sites in particular riparian locations, which seem to have been facilitated by more than 2000 years of relative river quiescence, certainly when compared to the period after c. 3900 cal. BC. While this new model of Holocene river valley development needs to be tested and further refined elsewhere in the region, it does suggest a radical re-thinking of the Neolithic record in the LDC may be required.*

Keywords: *Late Quaternary river development; alluvial geoarchaeology; lower Danube catchment; climate change and flooding; Romania.*

Introduction

In the last decade new geoarchaeological (e.g. Bailey 2006; Bailey *et al*. 2002; Bonsall *et al*. 2002; Carozza *et al*. in press; Giosan *et al*. 2009; Howard *et al*. 2004; Kadereit *et al*. 2006) research in the lower Danube catchment (LDC) has transformed our understanding of prehistoric river-society interactions, particularly with regard to the development of agriculture in the region. These events, centred on the River Danube and its major tributaries in present day Bulgaria and Romania, were remarkable in terms of the speed at which farming was adopted - probably within a generation or two (Thissen 2009), the continuity of an agricultural system that continued with very little change for nearly 2500 years, its reconfiguration at 4300 cal. BC and 'collapse' at 3500-3300 cal. BC. As a result of improved radiometric dating control, the temporal coincidence of large-scale climate change with the adoption of farming in the LDC at 6100 cal. BC, and major cultural and economic changes at c. 4300-4100 and 3500-3300 cal. BC is now well established (Weninger *et al*. 2009). The so called 6600-

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 9-14.

6200 and 4000-3200 cal. BC rapid climate change events (Mayewski *et al*. 2004) effectively bracket the beginning and end of the Neolithic in the LDC and one important corollary is that the intervening period must have represented an environmental 'window' favourable for farming especially in a riverine context. Although there are data to suggest that the adoption of farming in the LDC was preceded by major flooding in the Danubian Iron Gates (Bonsall *et al*. 2002), evidence for an extended period of hydrological stability lasting for nearly two and a half millennia in the river valleys of Southeast Europe during the Neolithic, followed by renewed environmental instability associated with the 4000-3200 cal. BC climate event, has not been forthcoming. This has arisen primarily because of the limited geographical and temporal scales of archaeological, environmental and geomorphological investigations in the LDC, which have tended to be site- as well as discipline-specific. One critical area that has been neglected in this respect is the interplay between river dynamics and the cultural record of the Neolithic in the LDC. First, in terms of the way that abrupt and unanticipated change in floodplain hydrology may have influenced community decision making, settlement location, the use of wetland resources and hazard mitigation in river valleys. And secondly, the effect that river erosion, sedimentation and flooding had on the preservation of the archaeological record. The principal aim of this paper is therefore to critically review the interplay between river dynamics and the Neolithic record in the LDC. The study focuses on the Teleorman Valley (TV), southern Romania, a major north-bank Danube tributary where since 1998 multi-period archaeological survey and excavations have been carried out over a c. 12 km^2 area of valley floor, centred on the confluence of the Claniţa and Teleorman rivers (Figure 1). Archaeological studies have been carried out in parallel with geomorphological and geochronological investigations of Late Pleistocene and Holocene river terraces on which archaeological sites and finds are preserved. Probably uniquely for the Neolithic in the LDC, river behaviour at the transition to the early Bronze Age is recorded and, most importantly, dated. This allows us to evaluate if settlement and find recovery patterns reflect cultural actions or are the result of natural river processes of erosion and sedimentation that destroy, bury or re-distribute artefacts. Issues such as real or apparent continuity in the archaeological record, as well as the impact of rapid environmental change on prehistoric riverine communities, are addressed.

Late Quaternary fluvial and archaeological records in the Teleorman Valley

Seven Late Pleistocene and Holocene age river terraces have been mapped in the TV study reach (Figure 1). These span the last 37,000 years and importantly for understanding long-term people-river interactions, each terrace has been radiometrically dated (Table 1). Late glacial and Holocene alluvial units have multiple dating assays that enables the duration of sedimentation phases to be dated with some precision. Late Pleistocene age terraces - T0 and T1 - cover the largest area in the study reach within which less extensive Holocene river terraces are inset. Distinct palaeochannel traces are preserved on most terrace surfaces, which have not been modified by modern land drainage and recent agricultural activity. No channel forms are evident on T0 but on T1 an anabranching system of channels with large (up to 500 m in length) sandy islands are preserved. On T2 and T3 meandering palaeochannels with small medial bars are evident and meander amplitude on these terraces is up to five times larger than the modern Teleorman River. Holocene river terraces are located towards the centre of the valley floor and are inset c. 3 m below Late Pleistocene river units.

All Neolithic age archaeological sites that have so far been identified and excavated in the TV study reach are located on Late Pleistocene age river terraces. No Neolithic or later prehistoric material has been found on or within Holocene fluvial deposits. Starčevo-Criş and Dudeşti sites (Teleor 003) are located on the oldest Late Pleistocene river terrace in the TV study reach dated to 36,800 (± 500) ka whose surface lies 8 m above present river level (Figure 1, Table 1). The majority of Boian sites appear to be preferentially located on T1 (21,600 ± 500 ka) and T2 (15,800 - 12,800 ka) on former islands that lie c. 0.5 m above the general level of these terraces (Figure 1, Table 1).

The preservation and visibility of Neolithic sites in the TV study reach is primarily the result of long term river entrenchment, most notably between 12,800 and 11,300 ka (the last glacial - Holocene transition) that created a series of elevated river terraces. These extensive Late Pleistocene terraces (T0, T1, T2) were not significantly affected by floods during the Neolithic and Boian sites located on the lowest of these terraces (T2, 7 m above modern low flow river level) are covered with a thin veneer (< 0.5m) of fine-grained Holocene river sediment. It seems likely that Boian communities chose former island and bar locations on Late Pleistocene terraces not only because these areas were above the level of major floods but also because these elevated sites would have been less vulnerable to groundwater induced surface flooding.

The period around 3900 - 3500 cal. BC marks a significant change in river behavior in the TV with evidence for accelerated valley floor entrenchment, lateral channel movement and sedimentation locally of up to 5 m of gravels, sands and clays (Howard *et al*. 2004). A second phase of river entrenchment (T4□T5) is bracketed by C^{14} dating to c. 2000 cal. BC (Table 1) and was followed by valley floor refilling that began at c. 1800 cal. BC and continued to c. AD 1050. The most recent phase of river incision occurred between AD 1150 and 1550 with partial refilling of the floor in the past 300 years or so.

Rethinking the prehistoric alluvial archaeological record in the lower Danube catchment

The comprehensive nature of both archaeological and geomorphological investigations in the TV study reach, and the good radiometric dating control for both fluvial and human settlement/finds records, allows some important site-specific and more general observations to be made regarding people-river environment interactions in the LDC. This includes how river dynamics and hydrological variability could have influenced the behavior and resource choices of communities living in river valleys, as well as helping us to understand the influence of river processes on the preservation and visibility of the archaeological record from the Palaeolithic through to the historical period.

Starting with interpretation of the regional Palaeolithic record, it is noteworthy that the entire Teleorman valley floor - up to a level c. 10 m above the channel bed of the present river - has been eroded, swept and sedimented in the last 37,000 years. The modern village of Măgura and the Starčevo-Criş/Dudeşti site of Teleor 003 are located on the oldest Late Pleistocene river terrace (T0) in the study reach. One important implication of this new finding is that *in situ* Palaeolithic sites/artefacts older than c. 37,000 years will not be preserved in the TV below 10 m above modern river level. This does not imply that before this time river valleys in the region were not used by Palaeolithic people but that artefacts older than 37,000 years will not be found in primary context in the TV. River aggradation at c. 37,000 ka is recorded in many parts of southern Europe (Macklin *et al*. 2002) and was in response to a period of major climatic cooling in the North Atlantic region.

A second group of observations relate to the enigmatic and presently elusive Mesolithic/Epi-Palaeolithic in the LDC. Certainly after 21,600 cal. BP and most probably shortly before 16,000 cal. BP, there was a change in river morphology in the TV from a braided, multi-thread channel system with large sandy islands (T1) to a meandering, probably single-thread channel with large amplitude meanders (T2). The latter type of channel is best seen on the western side of the TV study reach (Figure 1) where they are inset below an older Late Pleistocene braided river network (T1), showing that river metamorphosis from braided to large-scale meandering was accompanied by 1 m of incision. The development of a new river system style coincides with the beginning of the Epi-Palaeolithic in the region at c. 15,000 cal. BP. An incision event between 12,800 and 11,500 cal. BP, coinciding with the Younger Dryas climatic cooling (and separating T2 and T3), did not result in a change of river channel planform. The extensive Late Pleistocene T0 and T1 terraces would have been above the level of regular flooding during the Epi-Palaeolithic and *in situ* sites of this period could be expected to be found on the surface of these river terraces. Later Epi-Palaeolithic sites, dating to shortly after 12,200 cal. BP, could also survive on the surface of T2.

The results of this study also have an important bearing on interpreting people-river environment interactions in the TV study reach during the Neolithic. At the time of the first Holocene herders and settlers in the region at c. 6100 cal. BC, the Teleorman River would have been located somewhere within a 500 m wide zone in the central part of the valley floor (Figure 1), presently covered by terraces T4, T5 and T6. No fluvial deposits in the TV study reach have been dated to the Neolithic in the period 6200 - 4000 cal. BC (Howard *et al*. 2004. See Table 1 in this paper). Terraces T4, T5 and T6 post-date the Neolithic and *in situ* sites of this period will only be found outside of these areas. This certainly holds true for late Neolithic Boian age (c. 4800-4700 cal. BC) sites that are preserved only on the surface of Late Pleistocene river terraces (T1 and T2). The development of monumental tells in the Gumelniţa period from c. 4500 cal. BC does not correspond with a change in river dynamics or hydrology in the TV study reach, and suggests that at least locally this change in settlement style and choice of occupation site was not enforced by a radical change in river behaviour or flooding regime. However, the abandonment of tell sites in the TV from c. 3800 cal. BC happens at the same time as a marked increase in both vertical and lateral river instability at c. 3900 cal. BC, which continued in the study reach at least until 2000 cal. BC. What is therefore striking is that both the phasing and the duration of the Neolithic in the LDC coincide with more than two millennia of river

quiescence, certainly when compared to the periods before c. 6200 and after 4000 cal. BC. A reduction in flooding at this time is also evident in other river valleys in Eastern and Southeastern Europe (Macklin *et al*. 2006), which suggests that this was a regional and not just a local phenomena. However, a note of caution does need to be introduced at this point. We are not trying to advocate a simplistic climatic or fluvial determinism because obviously an incontrovertible causal link between prehistoric cultural and environmental change cannot be presently demonstrated in the TV. Nevertheless, this study has demonstrated that Late Pleistocene and Holocene river activity significantly affected the preservation and visibility of the archaeological record, and that extended periods of less frequent flooding created a favourable environmental 'window' for the first Holocene herders and settlers to use the natural resources that river valleys in the region offered. The improved insight that this study and dating of Late Quaternary fluvial sequences provide for understanding longer-term river-society interactions is an important 'take home' message for archaeologists. A greater appreciation of environmental realism concerning river dynamics is required for interpreting 'correctly' temporal and spatial patterning in the archaeological record, and to develop more informed and effective survey and excavation strategies in river valleys.

Finally, there are some cautionary lessons for the archaeological community that can be drawn from the TV study, particularly in relation to recent approaches to modelling the number of people living in river valleys during prehistory. On the basis of our investigations, conclusions drawn by archaeologists of population increases or decreases over time based on the number of sites in river valleys for different periods have no support from the geomorphological record. Put simply, unless the precise age of Pleistocene and Holocene river incision and aggradation events are known, the variable effects of site preservation and visibility related to river dynamics cannot be quantified. In the case of the TV, the preferential survivorship of Neolithic sites in particular valley floor settings is a direct reflection of river stability during this period as well as the availability of extensive Late Pleistocene terraces suitable for growing crops, grazing animals and construction of semi-permanent habitation structures. To enable human population numbers to be correctly estimated from site information in river valleys, areas occupied by active river channels and floodplains during a specific archaeological period must be known. It might be obvious to point out that not all rivers or river valleys are the same. They are highly diverse and those like the Teleorman have been actively and radically transformed on many occasions during the Late Quaternary. The TV's Late Pleistocene and Holocene river sequence presently constitutes the best dated fluvial record not just in the LDC but probably in the whole of Southeastern Europe. It highlights the considerable benefits of fully integrated archaeological-geomorphological studies but also the significant pitfalls of interpreting river valley archaeological sites without chronologically well constrained records of river erosion, sedimentation and flooding.

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River Terrace	Age *OSL+ ^{14}C	River Environment	Height above present river (m)	Archaeological record
TO (P)	36.8 (□500) ka*	Wandering-braided, sandy gravel bed river	10	Starčevo-Criş
River erosion and entrenchment (≥2 m)				
T1 (P)	21.6 (□1500) ka*	Wandering-braided, sandy gravel bed river, large islands/bars	8	Boian
River erosion and entrenchment (≥1 m)				
T2 (P)	12.8-15.8 ka *+	Wandering-meandering, sandy gravel bed river, large amplitude meanders	7	Boian
River erosion and entrenchment (≥3 m)				
T3 (H)	11.5-11.3 ka *	Meandering, sandy gravel bed river, meanders similar amplitude to modern river	4	Not found to date
River erosion and entrenchment (≥0.5 m)				
T4 (H)	3960-2040 cal BC+	Meandering, sandy gravel bed river, fine-grained floodplain sediment. Meanders similar amplitude to modern river	3.5	Not found to date
River erosion and entrenchment (≥0.5 m)				
T5 (H)	1870 cal BC – cal AD 810+	Meandering, sandy gravel bed river, fine-grained floodplain sediment. Meanders similar amplitude to modern river	3	Not found to date
River erosion and entrenchment (≥1.5 m)				
T6 (H)	Cal AD 1530+	Meandering, sandy gravel bed river, fine-grained floodplain sediment. Meanders similar amplitude to modern river	1.5	Not found to date

Table 1. Late Quaternary fluvial and archaeological records in the Teleorman Valley.

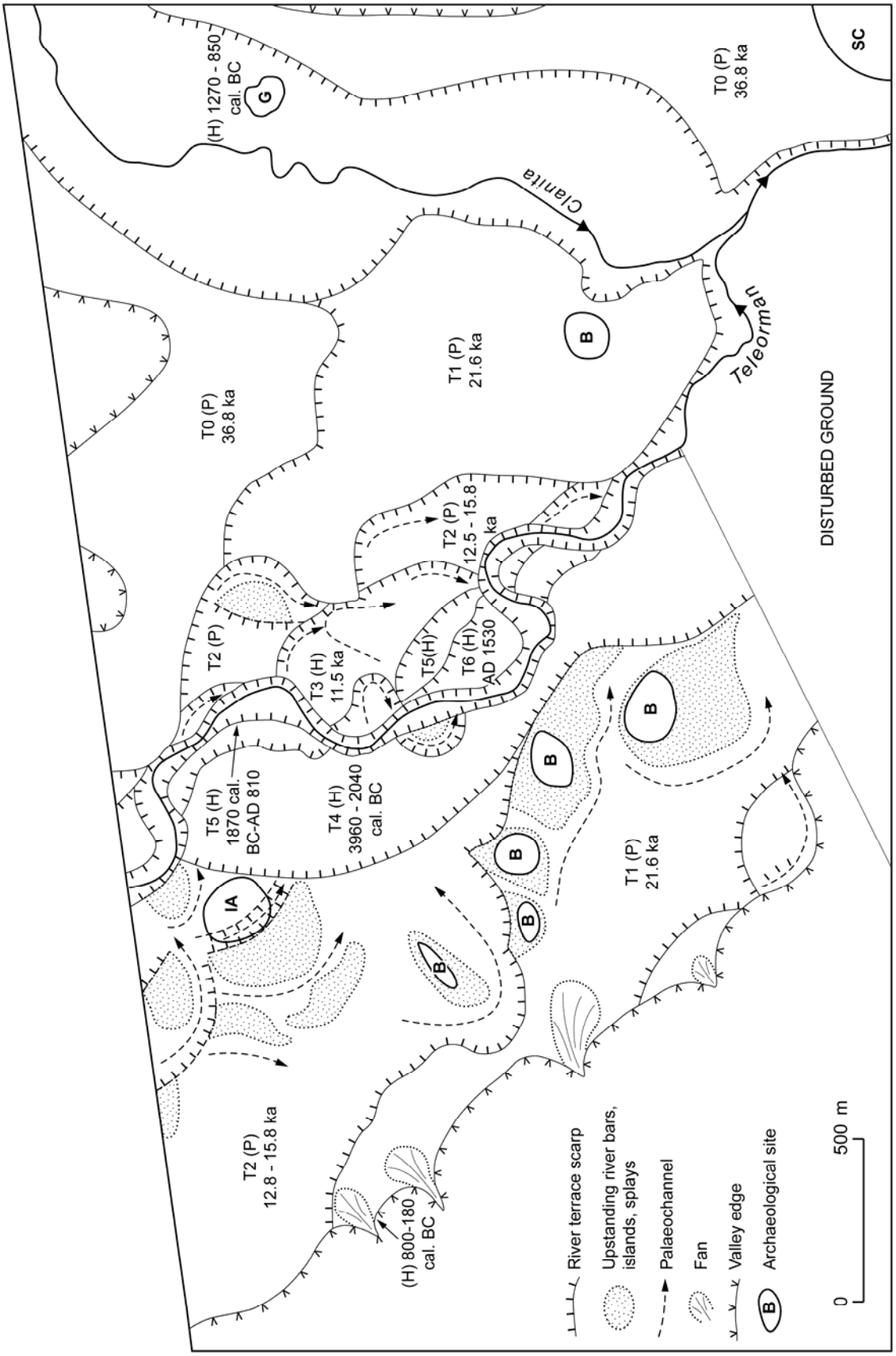

Figure 1. Geomorphological map of Teleorman Valley study reach showing river terraces P=Pleistocene, H=Holocene) and associated palaeochannels, and location of archaeological sites (SC= Starčevo-Criş, B=Boian, G= Gumelniţa, IA=Iron Age).

DYNAMIC OF NEOLITHIC HABITATION IN TELEORMAN VALLEY, SOUTHERN ROMANIA

Radian-Romus ANDREESCU,
Katia MOLDOVEANU

Abstract: *This paper aims to illustrate some aspects regarding Neolithic habitation in the Teleorman Valley in a study area between Măgura and Vitănești villages. This area consists of a wide flood plain bordered by high terraces. Many Neolithic sites were discovered in this area dating from the Early Neolithic to the Eneolithic. The habitation dynamic in the Teleorman Valley seems complex. Human communities chose to live in different environments from the terrace extensions to the flood plains.*

Key words: *Neolithic; Teleorman Valley; dynamic; habitation; landscape.*

Two decades ago the information regarding Neolithic sites from western Walachia, including Teleorman County, was scarce (Ursulescu, Petrescu-Dîmboviţa and Monah 2001: Figs. 8, 12, 18). Most sites were concentrated in central-east Walachia due to more intense research undertaken in this area. Complex research in recent years in Teleorman County completed the archaeological map of this area with many Neolithic sites. This research was based on the information provided by an amateur archaeologist, the priest I. Spiru, who conducted field walking in Teleorman County for decades. The result was a series of data about sites belonging to different periods including the Neolithic (Spiru 1996). A complex program of archaeological field research started in 1993 by the National History Museum and the Teleorman County Museum on the basis of this information. Its aims were, and still are, to verify the old information and to find new Neolithic sites. The results are spectacular with more than 100 Neolithic sites discovered so far in Teleorman County (the data are still being processed so a complete image of all discoveries is not currently available). These sites belong to the entire Neo-Eneolithic period (6000-3500 BC). Research covered the whole of Teleorman County with special attention in the Teleorman River Valley (Figure 1: 1). The most detailed research was conducted at the confluence of the Teleorman and the Clănița Rivers between Vitănești and Măgura villages.

Research began in 1993 at Vitănești *tell* type settlement. The Southern Romania Archaeological Project - SRAP[1] (Bailey *et al.* 1999; 2001) started in 1998. Research within this project was mainly undertaken in the Teleorman Valley. From 2006 research has been undertaken within the program of 'The Beginning of the European Civilization. The Neo-eneolithic at the Lower Danube'[2] (Andreescu 2009: 365-8).

This paper aims to illustrate some aspects regarding the Neolithic habitation in the Teleorman Valley in a study area between Măgura and Vitănești villages (Figs. 1: 2; 2: 1[3]). This study area is about 5km long and 3.5-1.5km wide. At its northern side there are the Teleorman and Clănița Valleys separated by a low terrace. The confluence of the two rivers is near Măgura village resulting in a wide flood plain of 2.5km (Figure 2: 2). After this the Teleorman River turns back toward the east and then flows south. With only one exception the valley is bordered by high terraces.

Near Măgura village, where the Teleorman River flows towards the east a small distance, the high terrace slowly descends to the flood plain (Figs. 2: 2; 3: 1-2). Here is the site known as Măgura-'Buduiasca' (Andreescu and Bailey 2002). After this the high east terrace slowly descends towards the flood plain but the low lands are narrower than in the Măgura-'Buduiasca' area (Vitănești village is located on this terrace to the south). After the site Vitănești-'Măgurice' the east terrace becomes higher with abrupt slopes. So the area consists of a wide flood plain bordered by high terraces with one exception on the east terrace which slowly descends towards the Teleorman Valley.

Intense research undertaken in this area has discovered many Neolithic sites from the Early Neolithic to the Eneolithic; a unique situation so far for southern Romania.

Neolithic habitation in this area starts at the boundary of the 7th-6th millennium BC near Măgura village. The site is located on a terrace extension of the Teleorman River flood plain in a location known as 'Boldul lui moş Ivănuş' (Figure 4: 1). Research has revealed many archaeological complexes, pits and one dwelling with a rich archaeological material belonging to the Early Neolithic (Andreescu and Bailey 2007). This period is called Starčevo-Criş I culture, Pre-Criş culture or Gura Baciului-Cârcea cultural group. Archaeological complexes belonging to a later stage of the Starčevo-

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 15-30.

Criş culture (Starčevo-Criş III phase) dated at the end of the first quarter of the 6th millennium BC were also discovered on the low terrace in the north-eastern side of the site (Andreescu and Bailey 2002).

The situation is even more complex in the area known as 'Buduiasca'. The terrace which slowly descends to the Teleorman Valley occupies many hectares and it is covered by crops and cut by the local road from Vitănești to Măgura villages. Archaeological research, where the land owners allowed this, revealed complexes belonging to the Neolithic but also to other periods: the Iron Age and Medieval Age. This research was focused on a small area of the site which spreads on for many hectares. The large sondages, and systematic coring, revealed that human activities, identified by a cultural layer with anthropic remains, existed on the terrace over wide surfaces. The sondages (the standard sondage is of 2x1m) were made in different locations but the archaeological complexes were concentrated only in certain areas (Figure 4: 2). In many sondages only sporadic traces of habitation or isolated complexes were discovered. The Neolithic archaeological complexes belong to the Dudești (second half of the 6th millennium BC) and Vădastra civilisations (last quarter of the 6th millennium BC). Surprisingly these archaeological complexes were discovered in the same place as those belonging to the Starčevo-Criş civilisation.

There were important changes in Neolithic habitation in the area in the 5th millennium BC. Boian culture communities lived in the first half of the 5th millennium BC. The site known as Lăceni-'Cioroaica' is located about 4km north-west of Măgura-'Buduiasca' in the flood plain of the Teleorman River (Figure 5: 1); a location totally different from Măgura-'Buduiasca' which is on the terrace. The Neolithic habitation from Lăceni-'Cioroaica' has special characteristics. Complex research regarding the natural history of the Teleorman Valley in this area has revealed interesting features.

The Teleorman Valley is up to 2km wide in this area and the present, slightly sinuous, course of the river is located in the central part of the valley with a depth of 5m. Traces of five old terraces associated with a system of paleo-channels were identified within a 50m width area of the river course. These elements are best preserved in the east side of the valley; the west side being affected by agricultural works. The oldest elements are two terraces on the west side, identified by islands and banks of gravel and sand, raised about 1-2m above the flood plain level. These are separated by a series of paleo-channels 150-200m wide. A ^{14}C date from one of these channels has an estimated age of 12,800BP (Beta 158851). Traces of Neolithic Boian culture habitation and archaeological materials were discovered on these 'islands' (Figs. 5: 2; 6: 1-2) and also material dating to other periods (Iron Age and a 4th century AD necropolis). It is very possible that other materials are covered by sediments brought by the river. Three other more recent terraces, separated by paleo-channels with a sinuous course and a width of c. 50m, were discovered on the east side of the valley (Howard and Macklin 2001; Howard *et al.* 2003; 2004).

The study of alluvial deposits correlated with ^{14}C data indicates changes in alluvial activity and acceleration of the process of sedimentation around 4900-4800BP, 4000-3800 BP, 3300-2800 BP, 1000 BP and in the last 200 years. All these changes can be correlated with episodes of climate cooling, abundant rains and increases in alluvial activity associated with the rise of floods, and were also documented for central, western and northern Europe (Howard *et al.* 2004).

Research at Lăceni-'Cioroaica' produced hypotheses regarding the natural environment in the first half of the 5th millennium BC; the period when several Boian culture habitations are documented.

A first hypothesis proposes the river had only one static channel. The valley was a stable and predictable environment with rich resources suitable for habitation and long term activities. In a second hypothesis the river was flowing through a single channel which was migrating across the valley. Such a course would create an unstable environment which would make the river less suitable for habitation and long term activities. In a third hypothesis the river would have many static channels leading to stability and predictability in the environment. This, maybe marshy, environment was rich in resources allowing long term occupation. In a last hypothesis the river would have many mobile channels. The environment was rich in resources but the mobility of channels makes it unpredictable and so less suitable for long term occupation (Bailey *et al.* 2002).

How can these data be corroborated with data from archaeological research?

Many Boian culture sites (named as follows: Teleor 001, 008, 009, 010) were discovered in the study area on the remains of old terraces represented by islands and banks of sand and gravel (Figure 5: 2). The last phase of the Boian culture, Spanţov, was found in all four sites. An earlier level (Giuleşti phase) was found at Teleor 008. In this last case the habitation is complex and is made up of many occupation sequences horizontally distributed: the first one is Boian-Giuleşti culture probably

with two phases followed by another Boian-Spanţov culture sequence. A dwelling made of unburned building material was discovered at Teleor 001, but the level belonging to Boian-Spanţov was rather thin. At Teleor 009 the cultural level was also very thin and concentrated in a small area with a possible pit house. In this case Boian-Spanţov habitation was placed directly on a sand layer. At Teleor 010 only isolated Boian-Spanţov ceramic materials were found.

In these circumstances we can only define the different habitations in terms of duration of use. So, Teleor 001 and 008 seem to represent long term habitations compared to Teleor 009 and especially Teleor 010 which represent short term occasional habitations (Andreescu *et al.* 2002).

A possible explanation for this fact could be based on the natural environment of the first half of 5th millennium BC characteristic during Boian habitation. The natural environment was probably relatively unstable and suitable only for temporary habitation and activities. The rough sand and gravel and the absence of fine sediment from alluvial deposits would suggest that the river and channels migrated relatively often along the valley (Bailey *et al.* 2002). Consequently the habitations were of short term and probably for the exploitation of rich resources presumed for such an environment. Their duration was conditioned by the intensity of alluvial activity where in some cases floods led to the abandonment of settlements.

The second half of the 5th millennium BC brought a dramatic change in habitation in the Vitănești-Măgura area. This change was marked by the emergence of a special settlement type, namely *tells*, characterised by long habitation in a restricted area. The result of this habitation is the raising of mounds (*tells*) in river valleys.

The emergence of *tell* type settlements is a complex process involving, in our opinion, many factors (natural, economic, social). Archaeological research, less numerous and on small scale, has not yet been able to elucidate this matter.

The beginning of the Gumelnița culture in the study area is not very well established. Archaeological research has not yet traced the lower levels at *tell* type settlements in order to establish whether these settlements appeared in the early phase of the Gumelnița culture (A1). An early Gumelnița habitation on the high east terrace near Măgura village has been mentioned. Also, two sedimentological sondages excavated at Vitănești *tell* settlement reached, in a limited area, the lower levels of the *tell*. The small amount of archaeological material has some characteristics which could suggest the existence of the early phase (A1) of the Gumelnița culture. Two other sondages made at the *tell* settlements from Măgura-Bran and Alexandria-Gorgan produced archaeological materials which could also belong to the Gumelnița A1 phase. In summary, we can cautiously agree that tell settlements appear in this area somewhere before the second half of the 5th millennium BC. We have no proof so far to indicate the presence of an earlier Boian culture habitation as documented in other *tell* settlements in southern Romania (Berciu 1961).

The location of *tell* settlements in the Măgura-Bran area and the Teleorman Valley follows a particular pattern. So the *tell* settlements are placed near the terraces or on terrace extensions in the valley. In this way the *tell* settlements are protected by the nearby terraces and, at the same time, they have good visibility over a part of the surrounding flood plain.

Complex research regarding the origin and location of *tell* settlements has been conducted at Vitănești-*Măgurice* (Figure 7: 1-2). The *tell* settlement is located near, and protected by, the east and, at the same time it has a wide view towards the Teleorman flood plain (Figure 8: 1-2). Geo-mophological analyses indicate that the settlement is located on a gravel bar (possibly a paleo-terrace extension) at the base of the north-east terrace of the Teleorman Valley (Newmann and Haită 1999; Haită 2002). The settlement seems to have two habitation phases. The first one is under the present day flood plain level and comprises two habitation levels separated from each other by a natural layer. The first phase is covered by a thick level of sediments suggesting that the settlement was abandoned or the inhabited space suffered certain transformations. These events correspond to the Gumelnița A1 phase so they can be placed somewhere in the middle of the 5th millennium BC when the environment was quite unstable. The second habitation period, corresponding to the Gumelnița A2 and B1 phases, is represented by a substantial cultural level of 4m thickness (Andreescu, Mirea and Apope. 2003). This indicates long term habitation in the second half of the 5th millennium BC/ the first half of 4th millennium BC in a relatively stable environment.

One of the biggest *tell* settlements in Teleorman Valley known as Măgura-'Bran' (Figure 9: 1-2) is located about 6km north of Vitănești. The site is located on a terrace remnant or a terrace extension in the flood plain of the Clăniţa River (Figure 10: 1). Its shape is rather triangular and its 11m height makes it a dominant feature in the landscape (Figure 10: 2). The location is very well chosen being protected by terraces on three sides and, at the same time, controlling the valleys of the

Teleorman and Clănița Rivers (the confluence of the two rivers is 1km south of the site). The initial location, the terrace remnant or extension, was transformed for habitation and the thickness of anthropic remains is about 6m. Most of it belongs to the Gumelnița culture. Bronze and Iron Age materials were also discovered on the site.

These are the main Neolithic period habitations researched in the Măgura-Vitănești area. It is the first time that the whole Neolithic age habitation dynamic can be traced in a small area. The habitation dynamic is complex with interesting changes in location occurring through time.

We present in summary some preliminary conclusions regarding the habitation dynamic research in the Măgura-Vitănești area.

At the boundary of the 7th-6th millennium BC the first Neolithic Starčevo-Criș (Precriș) communities chose to live on an extension of the east terrace of the Teleorman River at the location known as 'Bold'. This area, between Măgura and Vitănești villages, is very suitable for life. In this area the terrace slowly descends to the Teleorman Valley and a small lake was probably situated in front of the site (today there is a marshy area here with much vegetation and a lake). To the south and west was the Teleorman flood plain with a width of 2.5km. At this spot the river makes a small curve to the east which created a wide flood plain. This location is very suitable for living, agriculture and animal breeding. The terraces and also the flood plain were probably covered with woods with plenty of game. After about two centuries another, this time Starčevo-Criș culture, community settled a few hundred metres north-east on the terrace at some distance from the flood plain. Another Starčevo-Criș culture settlement is located about 1km south on the terrace base in the Vitănești village area. The location at Măgura-'Buduiasca' was so suitable for living that by the second half of the 6th millennium BC it is occupied by other Dudești culture Neolithic communities. Moreover, at the beginning of the last quarter of the 6th millennium BC this location is inhabited by communities of another Neolithic culture: Vădastra. In a strange way the Starčevo-Criș, Dudești and Vădastra culture archaeological complexes are placed in the same restricted area. So the Starčevo-Criș complexes (mainly pits) are cut a few hundred years later by Dudești and Vădastra culture complexes.

There has been no research regarding the environment in the 6th millennium BC for this area and it is therefore difficult to explain the major change in human habitation at the beginning of the 5th millennium BC. Surprisingly, the Boian communities from the first half of the 5th millennium BC chose an unusual location for living: the flood plain of the Teleorman River. So habitation on the terrace at Măgura-'Buduiasca' is abandoned in favour of living on the flood plain. The reasons for this change are unclear and perhaps they are related to the environment, but detailed analyses are missing. People were living on the flood plain, sometimes in temporary settlements, perhaps for opportunistic exploitation of resources offered in this area. Around the second half of the 5th millennium BC the area witnessed the spectacular emergence of *tell* type settlements at Vitănești-'Măgurice' and Măgura-'Bran'. Both are placed near the terrace with broad openings to the flood plain.

The changing location of sites during the Neolithic is a very interesting subject. It is difficult to explain why these changes occurred in some periods without complex interdisciplinary research. For about a thousand years at the beginning of Neolithic period people chose to live on a low terrace which borders the Teleorman Valley in the location known as Măgura-'Buduiasca'. In the next millennium the locations chosen changed dramatically. The terrace is abandoned and for the first half of the 5th millennium BC people chose to live in the flood plain. Why did people not use the terrace anymore? Did some environmental changes make the terrace inappropriate for living? A hypothesis related to the springs on the terrace and with water in general could be proposed. The river was too far away to be a suitable water resource. So the disappearance of springs could make the terrace at Măgura-'Buduiasca' unsuitable for living. It must be remembered that in some areas the archaeological complexes belong to different cultures: Starčevo-Criș, Dudești and Vădastra. These complexes are separated by hundreds of years. The fact that they are located in the same place could mean that this specific spot was favorable for living, perhaps a sort of clearing on a terrace covered by wood, with a necessary water source nearby.

The settling of Boian communities may be related to certain opportunist exploitation of the natural resources. Some settlements are temporary and built probably for short term exploitation of certain resources.

The emergence of *tell* settlements located in the flood plain or on terrace remnants are related, on one the hand, with controlling communication routes (Măgura-'Bran') and, on the other hand, with exploitation of flood plain resources (Măgura-'Bran', Vitănești-'Măgurice'). Three other Gumelnița culture habitations were found at Vitănești and they are also located in the flood plain; one of them being placed near the *tell* settlement (Vitănești II). Environmental analysis seems to indicate

that at least in the second half of 5th millennium BC a stable environment enabled the development of life at *tell* settlements.

Even though they have different locations the Neolithic habitations in the Măgura-Vitănești area seem to focus on the flood plain. Perhaps the flood plain played a special role in the economy of Neolithic society. The flood plain has a width of 1-3km in this area. It offered land for agriculture and animal breeding, game from woodlands on the river bank and fish and shells from the river and nearby wetlands.

The study of the habitation dynamic is complex and requires interdisciplinary analyses. A series of analyses regarding the natural history of the river have been conducted in the Teleorman Valley in the Măgura-Lăceni area. This has enabled connections to be identified between the natural environment and human communities especially for the Lăceni-'Cioroaica' sites. This type of analyses emphasise the importance of the environment on human living conditions. Environment has a special influence on the habitation dynamic but it is not the only factor which influences it. The way of life of communities including economic activities, demographic factors and relations between communities are other important factors that influence the habitation dynamic.

This paper aimed to emphasise environmental factors in a restricted study area with evidence for habitation continuity for two and a half millennia. This is a case study for a specific area which was the focus of intensive interdisciplinary research in recent years. The dynamic of Neolithic habitation from the Măgura-Vitănești area is not necessarily a pattern for the whole of southern Romania. Complex research is also necessary in other areas in southern Romania in the search for patterns of Neolithic habitation dynamics.

Notes

1. Southern Romania Archaeological Project – the following institutions participated in this project: National History Museum of Romania, Cardiff University (Douglass Bailey) and the Teleorman County Museum. The project was funded by the British Academy, the Society of Antiquaries of London, Cardiff University, the Ministry of Culture and Religious Affairs and the Teleorman County Council.

2. The program is the result of an agreement between the following museums: the National History Museum of Romania, Buzău County Museum, the Lower Danube Museum - Călăraşi, Prahova County Museum, the Romanaţi Museum - Caracal and the Teleorman County Museum.

3. The aerial photographs were realised by Carmen Bem (Institute for Cultural Memory - CIMEC, Bucharest).

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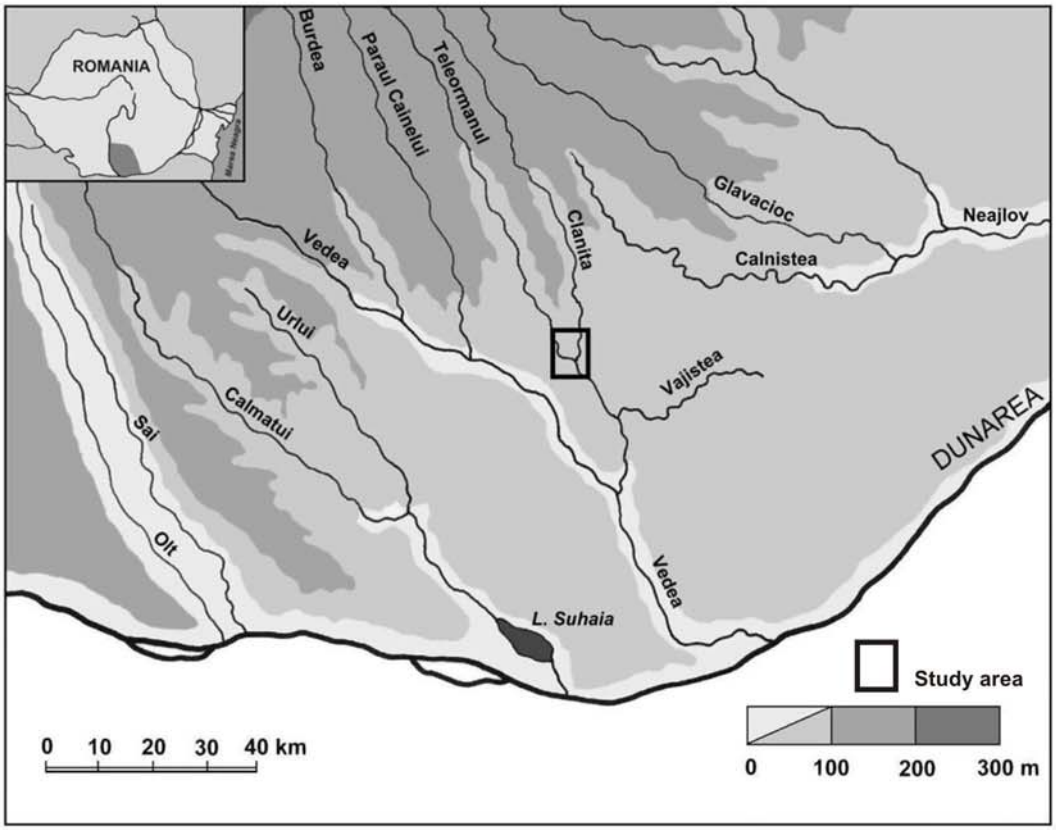

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Figure 1. 1. South-Eastern Romania; 2. Location of Neolithic sites from Măgura - Vitănești area.

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Figure 2. 1. Aerial view of Măgura - Vităneşti area (©CIMEC); 2. Flood plain of Teleorman River. Măgura-'Buduiasca' site in background.

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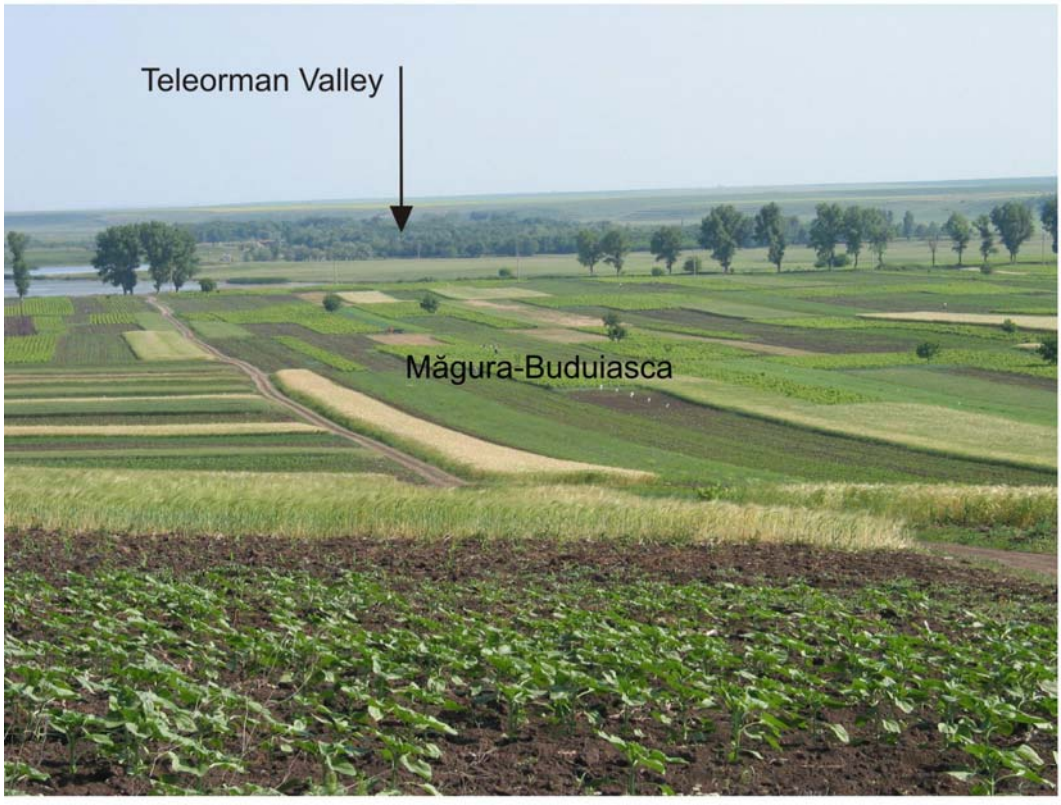

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Figure 3. 1. Aerial partial view of Măgura- 'Buduiasca' site (©CIMEC); 2. Măgura -'Buduiasca' site - view from the high terrace.

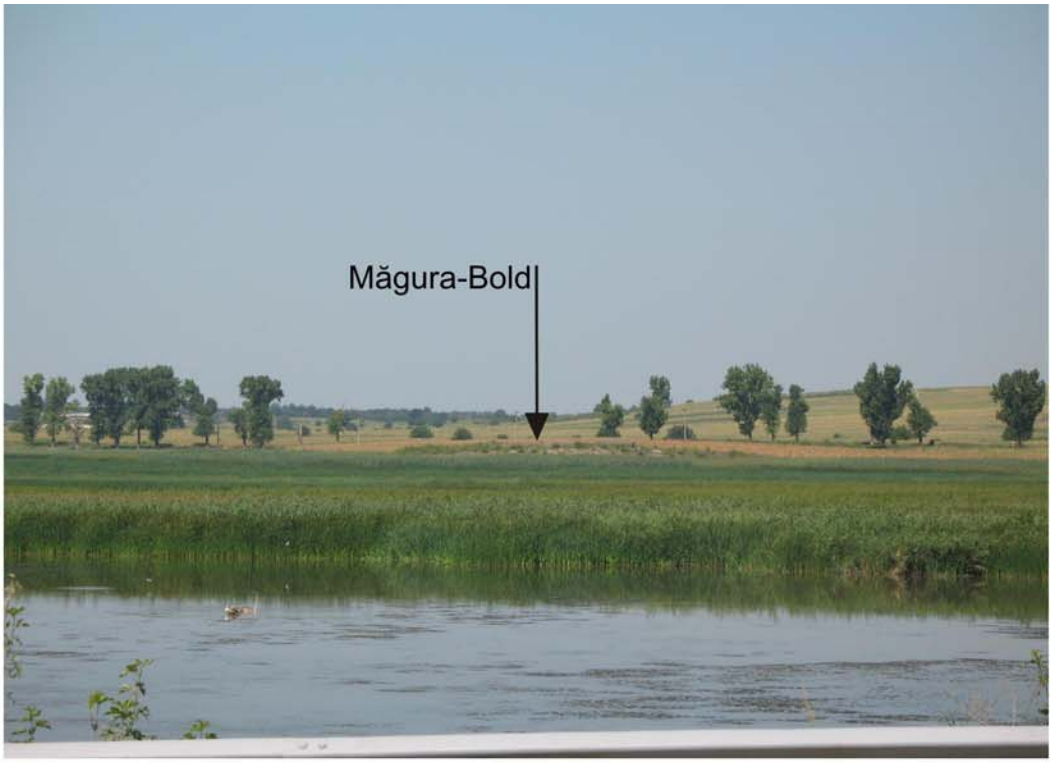

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Figure 4. Măgura-'Bold' site; 2. Măgura-'Buduiasca' site during excavations.

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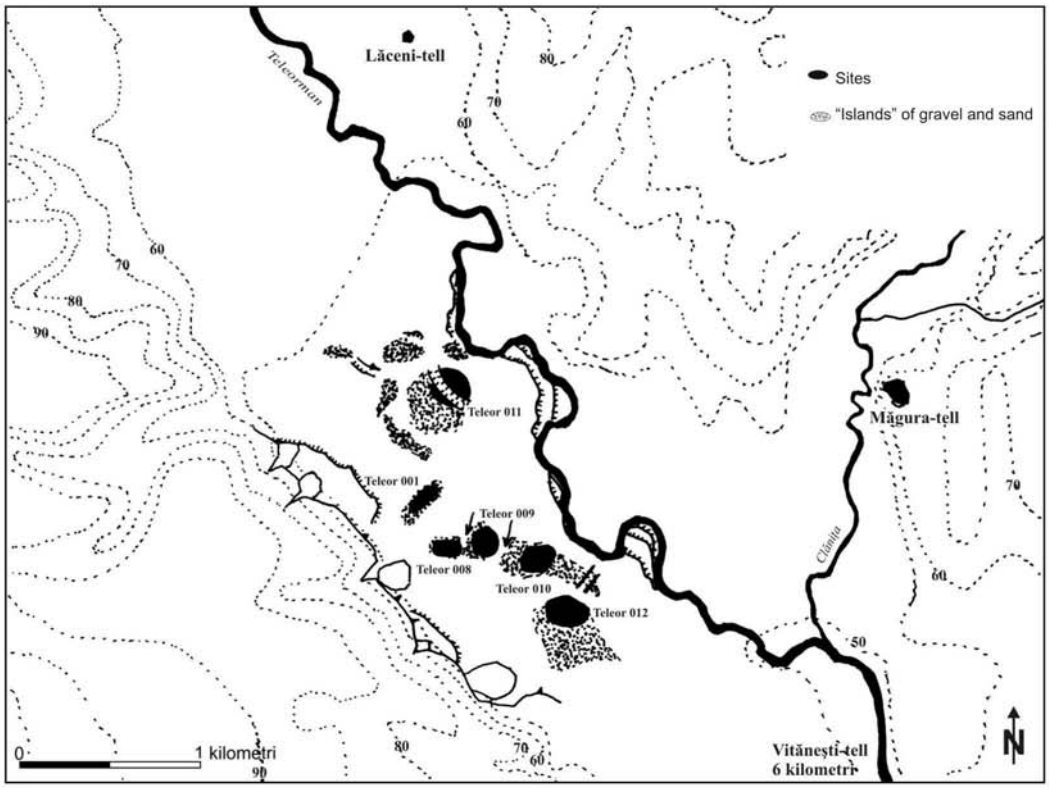

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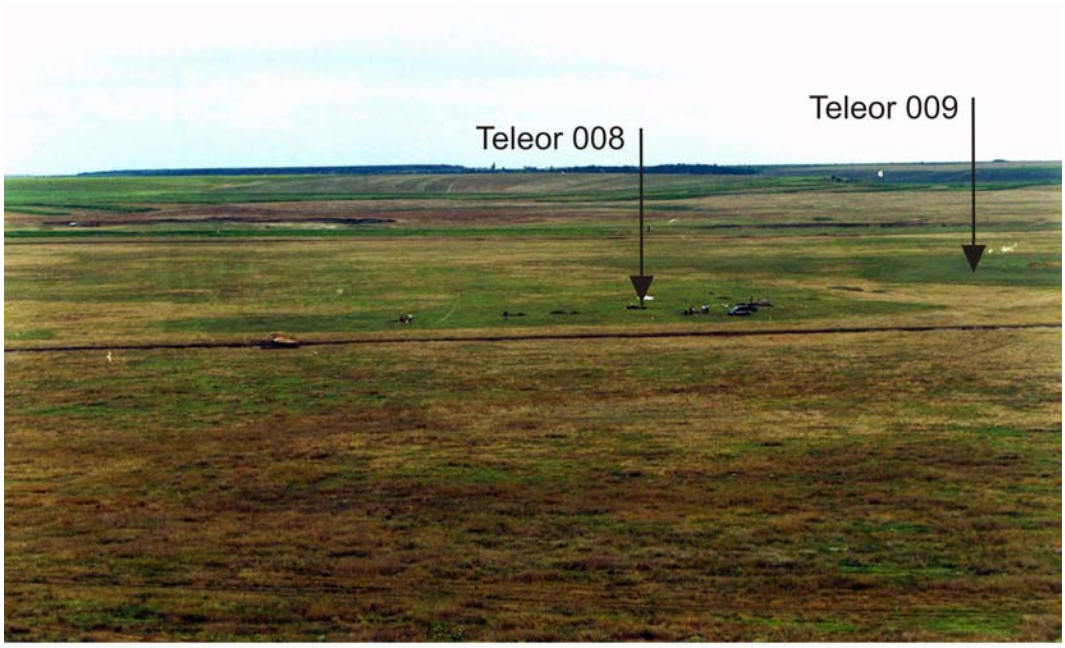
Figure 5. 1. Teleorman Valley - Lăceni-'Cioroaica' site; 2. Map with Lăceni-'Cioroaica' sites locations.



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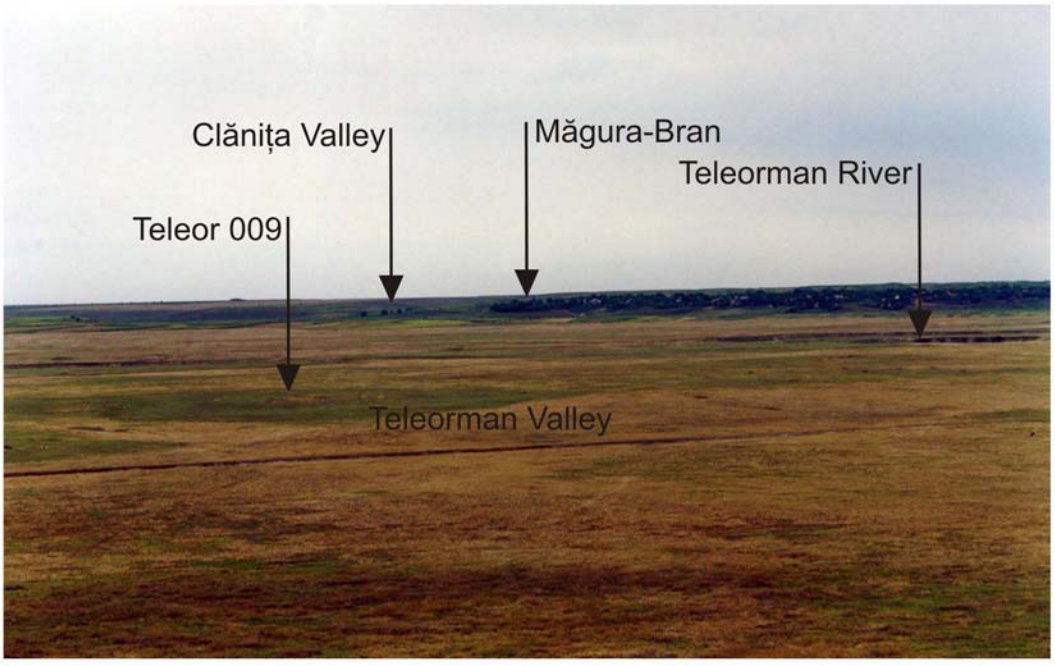

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Figure 6. 1. Teleorman Valley with Lăceni-'Cioroaica'

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Figure 7. 1-2. Vitănești-'Măgurice' *tell* settlement.

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Figure. 8. 1-2. Aerial view of Vităneşti-Măgurice *tell* settlement (©CIMEC).

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Figure 9. 1-2. Măgura-Bran *tell* settlement.

1

2

Figure 10. 1-2. Aerial view of Măgura-Bran *tell* settlement (©CIMEC).

L'HABITAT CHALCOLITHIQUE DE TARASCHINA (MILA 23 - ROUMANIE) ET LE PEUPLEMENT ANCIEN DU DELTA DU DANUBE DURANT LA PREMIÈRE MOITIÉ DU 5ÈME MILLÉNAIRE AVANT NOTRE ÈRE

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Résumé: *Les fouilles archéologiques conduites sur l'habitat Chalcolithique de Taraschina (Mila 23, commune de Crişan, dep. de Tulcea), permettent de jeter un nouveau regard sur la plus ancienne occupation préhistorique avérée dans le delta du Danube. L'habitat de Taraschina forme actuellement une paléo-topographie bombée qui émerge d'environ 1 m au-dessus de la surface marécageuse du delta du Danube.*

Les carottages réalisés sur le site archéologique montrent l'alternance de niveaux organiques, formés de déchets domestiques et de sols archéologiques avec des niveaux peu ou faiblement anthropisés. Les carottages réalisés sur le gisement montrent une forte homogénéité spatiale dans l'alternance de niveaux domestiques et de phase d'abandon. La séquence stratigraphique de cet habitat, puissante de 3 m, livre 4 niveaux d'occupation principaux qui s'échelonnent entre 4850 et 4350 BC.

En surface, les vestiges archéologiques sont inégalement répartis. Si la partie centrale du gisement présente une faible densité de vestiges, ces derniers sont très fréquents à la périphérie du site. Dans ce secteur, la fouille d'une première zone, a permis de mettre en évidence, sous le niveau de terre de labour, d'un premier niveau archéologique. La présence de grandes fosses, profondes de plus de 1,1 m, montre que l'on se trouve en bordure de la zone habitée.

L'analyse de ces dépotoirs permet de caractériser l'environnement durant le Chalcolithique (culture de Gumelniţa A1), entre 4500 et 4300 BC. Les analyses archéozoologiques indiquent que le milieu était alors ouvert comme le montre la présence de mammifères domestiques. L'assemblage faunique traduit un milieu naturel extrêmement riche et diversifié avec des espaces forestiers, des espaces ouverts et des milieux humides (lacs, bras morts…).

Mots-clés: *Delta du Danube; Chalcolithique; culture Gumelnita; séquence stratigraphique, datation radiocarbone; milieu naturel; paleo-economie.*

1. La mer, le fleuve et les hommes

Les zones côtières constituent des milieux particulièrement exposés aux changements environnementaux. Si la mobilité du trait de côte représente une contrainte évidente pour les sociétés, les modifications de la géométrie du littoral ne sont qu'une composante d'un système plus complexe. En effet, les littoraux ne peuvent se résumer à la seule bande côtière et s'entendent comme des territoires relevant d'une forte interaction terre/mer, tant du point de vue économique, social, que physique. Nous pouvons identifier trois entités distinctes que sont les zones terrestres contraintes (bassins versants connectés aux zones fluviales, zones humides, lacs…), les zones d'interface (delta/lagunes) et les zones à dominante maritime.

La compréhension de ces milieux et des conséquences de l'élévation du niveau marin sur le fonctionnement de systèmes littoraux constitue un enjeu qui doit être appréhendé dans la longue durée. Dans ce domaine, les modèles rétrospectifs ont particulièrement insisté sur les forçages externes (climat, tectonique, eustasie, niveau marin global…), délaissant quelque peu la dimension bio-géographique. Si les littoraux se transforment et s'adaptent sous l'impulsion des forçages externes, ces changements touchent également les capacités de ces espaces à créer de la biodiversité.

Un des objectif de la mission archéologique «delta du Danube»[1] est d'approcher le lien entre mobilité géomorphologique et bio-géographique, et notamment de proposer des outils pour approcher les temporalités des changements socio-environnementaux. *In fine*, notre projet a pour objectif de modéliser les stratégies d'exploitation de la biodiversité par les communautés humaines en privilégiant le concept de co-évolution.

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 31-47.

L'intérêt de développer des approches rétrospectives dans la zone aval du cours du Danube réside dans les fortes mobilités enregistrées durant le premier Holocène (7000-4000 BC). L'élévation très rapide du niveau marin (Ryan *et al*. 2003) a provoqué des transformations du milieu dont on mesure encore mal l'incidence pour les sociétés de la Préhistoire récente, et plus particulièrement pour le néolithique et l'énéolithique (6000-3800 BC). Ce phénomène a induit la modification des dynamiques hydrologiques et sédimentaires des bassins versants connectés au fleuve, et très probablement des formes du peuplement.

2. L'environnement géographique

La zone du bas Danube, et plus particulièrement la partie nord Pontique du littoral de la mer Noire, a connu, durant l'Holocène ancien, des évolutions paléo-géographiques importantes. La submersion de plateforme continentale, au profil particulièrement peu marquée et large de plus de 100 km, a favorisé ces modifications paléo-géographiques majeures. Cette transformation du littoral s'engage au moment où apparaissent, en méditerranée orientale, les premières communautés Néolithiques, probablement à la fin du 7ème millénaire BC dans cette partie des Balkans (Guilaine 2003). Ce processus a modifié en profondeur les milieux des communautés Néolithiques. Dans le contexte particulier du delta du Danube, la mise en évidence d'habitats datés du Néolithique livre de nouvelles informations relatives aux modalités du peuplement de la zone de l'actuel delta du Danube, susceptibles de contribuer à donner des indications chronologiques aux différents stades de la formation des lobes deltaïques et de permettre d'appréhender la manière dont ces sociétés se sont adaptées aux changements environnementaux.

Alors que l'étude des sociétés du début Néolithique a largement bénéficié des recherches conduites dans les Balkans (Bulgarie, Macédoine), la zone du bas Danube est restée paradoxalement un terrain de recherche davantage en sommeil. Dans cette partie de la Roumanie, la compréhension des dynamiques anciennes du peuplement est rendue complexe en raison des modifications paléo-géographiques induites par l'exhaussement (Ryan *et al*. 2003; Lericolais *et al*. 2009), durant l'Holocène, du niveau de la mer Noire et ses conséquences sur les hydrosystèmes.

Dans le contexte particulier du littoral de la Dobroudja et du delta du Danube, l'élévation du niveau marin a provoqué des transformations du milieu par transgression d'une part et modification des dynamiques alluviales d'autre part, dont on mesure encore mal l'incidence pour les sociétés de la Préhistoire récente.

Contrairement à la Méditerranée orientale où l'évolution du niveau marin est contrôle principalement par l'eustasie et les fluctuations du niveau mondial de l'océan, la Mer Noir du fait de son isolement partiel par les détroits du Bosphore et des Dardanelles connaît une évolution asynchrone de la remontée post-glaciaire de son niveau de base et des alternances entre phases lacustres d'eau douce et marines d'eau salée. Il n'est donc pas possible dans ce cas de recourir aux modèles de remontée du niveau marin mondial et de caler les phases d'évolution paléogéographiques sur des référentiels externes. La question de la reconnexion de la Mer Noire à la Méditerranée, la chronologie des fluctuations de son niveau de base et de la nature douce ou saumâtre de ses eaux fait l'objet d'intenses débats (Yonko-Hombach, Gilbert et Dolukhanov 2007 pour une synthèse).

Si la plupart des travaux paléo-géographique s'intéressent au Tardiglaciaire et aux débuts de l'Holocène et envisage le phénomène à petite échelle - la Mer Noire (Yanko-Hombach *et al*. 2007), peu de recherches interdisciplinaires portent sur les effets induits à grande échelle et sur les stratégies d'adaptation développées par les communautés humaines (Peev 2007; Dergachev et Dolukhanov 2007; Bailey 2007). Dans ce contexte, si l'on envisage, comme le proposent les travaux du programme Assemblage (Lericolais *et al*. 2007), une élévation du niveau marin de près de 80 mètres en 2000 ans (entre 7000 et 5000 BC), ce phénomène induirait une transgression rapide et la submersion d'une grande partie de la plateforme continentale de la Mer Noire occidentale (plusieurs milliers de km²). Cet épisode coïnciderait avec le moment où se développent les premières communautés agro-pastorales.

Dans le bas Danube où les territoires de l'homme et de l'eau se confondent, l'étude des dynamiques de peuplement du Néolithique et des âges des Métaux ne peut se concevoir qu'en regard de l'évolution paléo-géographique des espaces fluvio-deltaïques. On pourra alors s'interroger sur les raisons de notre méconnaissance du peuplement de la zone aval du fleuve durant le Néolithique ancien, alors même que les régions limitrophes témoignent (groupe de Starčevo) de l'ancienneté du processus de néolithisation (Demoule et Lichardus 2001; Guilaine 2003). Ce fait est-il la conséquence de l'alluvionnement de vastes territoires bordant le fleuve et le littoral et d'un biais taphonomique ? Ou bien le processus de néolithisation connaît-il ici un hiatus ? Ce questionnement est récurrent tout

au long de l'Holocène, et le dialogue qu'il induit entre la part des dynamiques sociales et celle des modifications de l'environnement.

3. Recherches archéologiques dans le delta du Danube

L'étude des relations qu'entretiennent les sociétés avec leur environnement constitue un enjeu pour l'archéo-géographie. Dans la zone du bas Danube, ce questionnement est particulièrement prégnant pour la période correspondant à la néolithisation et l'émergence des sociétés complexes. Ce type d'étude nécessite de croiser des données relatives au peuplement et au paléo-environnement. Dans l'actuel delta du Danube, ces recherches sont particulièrement contraintes par l'indigence des données archéologiques. Des recherches de surface et quelques fouilles permettent de donner une image du peuplement ancien de la zone de l'actuel delta.

En 1966, le Musée du Delta du Danube de Tulcea a inclus dans son plan d'activité la réalisation des recherches archéologiques sur les rides du Delta (Simion 1971). Les recherches en surface et les fouilles réalisées sur les rides de Caraorman et Letea ont permis l'identification d'objets et de complexes archéologiques antiques et médiévaux.

Des travaux en surface et quelques sondages - apparemment sans résultats très importants - ont été réalisés par St. Olteanu et L. Chitescu en 1974, à l'est et au sud de la localité Chilia Veche, jusqu'au point 'Câşla' (Iliescu 1978). Des fouilles de sauvetage ont permis d'identifier des complexes archéologiques à proximité de cette même localité.

Plusieurs fouilles ont été conduites entre 1984-1985 sous la direction de I. Vasiliu (Vasiliu 1995). Les deux tumuli fouillés à cette occasion ont révélé des tombes attribuées à la période de transition à l'âge du Bronze, à la fin du Bronze moyen et à la période médiévale ancienne.

P. Haşotti (Haşotti 1997) mentionne quant à lui la découverte de quelques éclats en silex sur la ride Caraorman et émet l'idée que l'un d'entre eux paraient avoir des traces d'utilisation.

L'historique de ces recherches montre clairement qu'aucune occupation antérieure à l'âge du Bronze n'avait été mise en évidence jusqu'à dans les années 1990 dans l'actuel territoire du bas delta du Danube. Les seules découvertes attribuables au Chalcolithique ont été enregistrées à proximité du delta, sur la rive droite de la branche du bras Saint Gheorghe. Il s'agit d'une céramique mis au jour à Mahmudia (Oberländer-Târnoveanu 1980) et de quelques tessons trouvés a Nufăru, tous attribués à la culture Gumelniţa. On doit également mentionner quelques tessons appartenant à la culture Hamangia, découverts sur l'île Popina, sur la lagune du lac Razim (Comşa 1971).

Plus récemment, dans les années 1990, un habitat Chalcolithique a été découvert à proximité de la localité de Mila 23 (commune de Crişan, dep. de Tulcea), au lieu-dit Taraschina (Micu *et al*. 2009). Le site forme un léger relief tabulaire culminant actuellement à près 1,5 m au-dessus du niveau de l'eau (Figure 2). Il est actuellement bordé par un canal artificiel dont l'aménagement date de la seconde moitie du 20ème siècle. Sur la partie opposée, l'habitat néolithique est bordé par une roselière. Les premières enquêtes orales indiquent que ce canal aurait pu être creusé au début des années 1980.

4. Recherches archéologiques sur l'habitat Chalcolithique de Taraschina

Les recherches conduites sur le site de Taraschina visent à étudier l'habitat Chalcolithique (Gumelniţa A1) et de définir les modalités de l'appropriation d'un environnement particulier par les communautés de la fin du Néolithique. Si l'établissement de Taraschina se trouve aujourd'hui au coeur du delta du Danube (Figure 1), les données paléo-géographiques déduites des recherches que nous avons effectuées sur le terrain laissent supposer que, vers 4500 BC, l'habitat était implanté sur un lobe deltaïque, à l'interface des milieux maritime, lagunaire et terrestre (Carozza *et al*. 2010a). Cette configuration, tout à fait originale pour cette période, offre de surcroît la possibilité de proposer une chronologie de la mise en place des cordons littoraux et de la remontée du niveau marin.

L'enjeu de la fouille est de préciser, outre le statut de ce vaste habitat, les bases de l'économie des sociétés chalcolithiques face un événement majeur, celui des modifications rapides du milieu. Ces premières recherches ont fait l'objet d'une publication dans la revue Quaternary International (Carozza *et al*. 2010a).

4.1. Les prospections de surface

L'ensemble de la surface du site a été topographiée et un carroyage a été mis en place. La maille d'échantillonnage est formée de carrés de 2 mètres de côté. Des bornes topographiques ont été disposées et relevées au GPS différentiel.

La conduite de prospections de surface a permis de dresser des cartes où l'on observe des zones de concentration de mobilier (Figure 3).

La distribution spatiale des céramiques montre la présence de zones où se concentre l'essentiel des tessons (Figure 3). Au sud du site, une surface de près de 100 m^2 (I-L/76-70) se démarque clairement. Certains carrés recèlent plus de 100 fragments et la densité tend à décroître en périphérie de la zone. Plus au nord, une seconde zone, plus petite, se démarque par de très fortes concentrations de céramiques (plus de 110 restes). Ici, les fragments de torchis brûlés sont très nombreux et de grande taille. Ces éléments pourraient signaler la présence d'une maison incendiée.

D'un point de vue typologique, nous pouvons identifier plusieurs formes caractéristiques de la culture de Gumelniţa A1. Les jattes et les écuelles forment une partie importante de l'assemblage (Figure 4). Nous retrouvons des formes carénées (Figure 4: 67). Certains de récipients possèdent un bord à léger marli. L'essentiel des écuelles présente un profil ouvert (Figure 4: 19, 27). Ce type de type de récipients est l'un des plus fréquemment attesté dans les assemblages domestiques. Les formes carénées sont plus rares.

Les formes au profil segmenté, plus rares, livrent de meilleures indications chronologiques. Les jattes à épaulement rond proéminent (Figure 4: 36), parfois ornées de fines incisions obliques (Figure 4: 72) ou de cannelures sont très fréquentes dans la phase initiale de la culture de Gumelniţa (phase A1). On les rencontre par exemple dans la zone du bas Danube sur l'habitat de Trestenic (Lăzurcă 1995) et de Panduru (Lungu et Micu 2003). D'autres éléments ornementaux, comme les incisions obliques (Figure 4: 64-66), représentent de bons indicateurs chronologiques qui assurent une datation de l'étape moyenne du Chalcolithique. La présence de céramiques graphitées, ornées de lignes horizontales (Figure 4: 9), s'inscrit pleinement dans le contexte du Chalcolithique de type Karanovo VI / Gumelniţa.

4.2. Le sondage 2 et la stratigraphie de la partie supérieure du site

En complément des investigations de surface, des sondages ont été réalisés de manière à observer l'état de conservation du site et pour estimer la nature de la stratigraphie. Le sondage 2, d'une superficie de 4 m^2, a été réalisé dans la partie sud-est du site de manière à reconnaître la stratigraphie dans une zone où les vestiges de surface étaient denses. Ce sondage a été interrompu à la côte -0,80 m en raison de la remontée du niveau de l'eau. Des corrélations ont été établies entre les unités stratigraphiques du sondage et les ensembles sédimentaires observés dans le carottage (Figure5).

La stratigraphie se développe comme suit:

- le mobilier présent en surface du sondage 2 a été attribué à l'Us 1200 (équivalente à 1100 du sondage 1);
- l'Us 1201 correspond à l'horizon de culture des jardins, puissant ici d'environ 0,25/0,30 m. Cette Us a livré 156 fragments de céramique de type chalcolithique (Figure 6: 1-28), mais également des mobiliers antiques et d'époque byzantine. La céramique Gumelniţa se caractérise par des formes ouvertes de type écuelles à bord rentrant (Figure 6: 7) ou en calotte (Figure 6: 10, 11, 18). D'autres formes ouvertes et à épaulement sont représentatives de cette période;
- l'Us 1202 correspond à un niveau argilo-limoneux hétérogène, de teinte beige-marron. On observe la présence concrétion formant des «poupées». Cette couche, puissante de près de 45 cm, a livré 114 fragments de céramique d'époque chalcolithique mais également 4 éléments de céramique d'époque historique. La céramique Chalcolithique se singularise par la présence de jattes biconiques (Figure 6: 43), de larges plats à marli (Figure 6: 33, 34), mais également par céramiques peintes au graphite (Figure 6: 44, 49). Deux fragments de grès fin aux surfaces actives signalent la présence de meules (Figure 6: 53, 54).

Tout porte à croire que cette couche est pour parti formée de la dégradation de sols archéologiques et de zones de rejets domestiques. La forte bioturbation a altéré cette formation uniforme au sein de laquelle il est difficile d'identifier de probables creusements postérieurs. Ces structures sont apparues plus clairement à l'approche de l'Us 1209, formée d'un sédiment beige, fin et compact. L'Us 1209 a été recoupée par 3 fosses.

La fosse FS 5 (F.1206) est apparue dans la partie nord-ouest du carré K70. De plan probablement ovalaire et au profil tronconique, cette structure a été fouillée partiellement jusqu'à la cote -1,12 m sous le sol actuel. Le remplissage (Us 1203), homogène, est formé d'un sédiment limoneux fin. Cette unité a livré 37 fragments de céramique Chalcolithique (Figure 6: 59, 60), mais également un fragment intrusif d'époque historique.

La fosse FS 6 (F.1207) est apparue dans la partie méridionale du carré K70. Ce creusement présente un contour irrégulier, mais ses dimensions n'ont pu être estimées compte tenu de l'exiguïté de la fouille et de l'ampleur du creusement. Son remplissage a pu être suivi jusque à la côte -1,16 m sous le niveau du sol actuel. L'Us 1204 correspond au remplissage brun-marron et de texture limoneuse. Ponctuellement, ce sédiment incluait des formations plus claires et des concrétions. Elle a livré 28 fragments de céramique Chalcolithique (Figure 6: 61-63).

- La fosse FS 7 (F.1208) a été pour partie recoupée par la structure FS 5. De plan ovalaire, son diamètre minimum est de 0,46 m et le creusement présente un profil tronconique. La fouille de la fosse a été interrompue à 1,05 m sous la surface actuelle du sol. Le sédiment est brun et homogène (Us 1205). Il a livré quelques fragments de céramique de type Chalcolithique ainsi que des restes osseux.

4.3. Carottages et reconnaissance de la séquence stratigraphique du site archéologique

Dès la première campagne de terrain, en 2009, il nous est apparu nécessaire de reconnaître la nature de la stratigraphie du site archéologique de Taraschina. Dans l'impossibilité de conduire des sondages profonds, nous avons opté pour la conduite de carottages. Nous allons présenter les séquences acquises à l'aide d'une tarière pédologique. Quatre carottages ont été réalisés selon un axe Nord-Sud (Figure 7). Deux forages ont été réalisés dans l'actuelle zone palustre, à la limite de la zone inondée, de manière à tenter de caractériser la zone située hors de l'habitat *stricto sensu*. Les deux autres carottages ont été opérés au centre du sondage 2, après la fouille des premiers horizons archéologiques, de manière à atteindre une côte dépassant les 3 mètres sous la surface actuelle du sol.

L'utilisation de la tarière pédologique a permis, avec une progression par paliers de 20 cm, de relever des logs avec une précision de l'ordre de ±5 cm. Des échantillons ont été prélevés dès lors que l'on pouvait observer des modifications significatives de la nature des sédiments. Ce modèle de tarière ne met pas à l'abri de perturbations sédimentaires (remobilisation, pollution possible).

En 2010, quatre nouveaux carottages ont été opérés à l'aide d'un carottier mécanique à percussion avec tubage sous gaine PVC, permettant ainsi d'atteindre la côte -8 m. Ces données sont en cours de traitement, mais elles indiquent que la séquence archéologique n'excède pas 3,20 m de puissance. Les séquences acquises en 2010 ne viennent pas contredire les observations déduites des séquences analysées l'année précédente.

4.3.1. Description des logs

Deux carottages ont été prélevés au sein du sondage 2 (Figure 7), permettent de disposer de deux logs prélevés en parallèle, à 50 cm de distance. Bien que l'on observe quelques discordances, la tendance générale montre l'alternance d'horizons stériles et de couches anthropiques.

La première partie de séquence archéologique a pu être observée directement sur la coupe du sondage.

- 0-0,85 m: la partie supérieure de la séquence stratigraphique a fait l'objet d'un sondage et d'observations directes sur la coupe. L'Us 1201, puissante d'environ 0,30 m correspond aux horizons de culture. La terre végétale, limoneuse, comporte de nombreux éléments anthropiques. Il est probable qu'il s'agisse de la partie supérieure d'un sol démantelé. L'Us 1209 est puissante de près de 0,50 m, le sédiment présente une texture limono-sableuse fine. Des structures en creux sont excavées dans cet horizon, ainsi que dans la couche sous-jacente. Sur une coupe, on remarque la présence d'un horizon davantage organique.

Un prélèvement en colonne a été réalisé dans le but de réaliser une analyse micro-morphologique (étude Constantin Haită). Les premières observations montrent sur le bloc prélevé la présence d'un niveau limoneux (limono-sableux), jaune et brun-jaune, qui s'apparente à un niveau anthropique qui pourrait correspondre:

- soit à un niveau de destruction d'une structure anthropique (architecture de terre), mais le matériel ne se présente pas sous la forme de torchis, il n'est pas mélangé avec des matériaux végétaux;

- soit un niveau d'aménagement d'établissement (de type remblai).

La suite de la stratigraphie a été observée par carottage (Log 3 et 4). Nous ne donnerons que les tendances générales.

- 0,80-1,35 m: cet horizon correspond à un sédiment argilo-limoneux fin, exempt de tout témoin archéologique façonné.

- 1,30-1,40 m: sédiment organique comportant des fragments de céramique, de torchis brûlé, de faune et des concrétions de cendres formées sur des fragments de torchis non brûlés. Les fréquentes inclusions anthropiques, mêmes fines, peuvent correspondre à un niveau d'occupation extérieur.

- 1,40-1,70/1,75 m: sédiment argilo-limoneux beige homogène et vierge de tout vestige anthropique.

- 1,70-1,80 m: niveau limoneux anthropique comportant des rejets domestiques.

- 1,80-1,95 m: horizon anthropique brun foncé comportant des rejets domestiques peu denses. On observe toutefois un fragment d'écuelles carénées de type Gumelniţa.

La suite de la séquence stratigraphique présente des discordances entre les 2 logs. Le log 3 se singularise par un puissant horizon argilo-limoneux entre -1,95 et -2,80 m. A la côte -2,30 un horizon rubéfié puissant de moins de 5 cm correspond à un niveau de combustion ou d'incendie.

A la côte -2,85 m apparaît un horizon organique gris foncé et noirâtre, avec très rares et fines inclusions, fort probablement remaniées.

Entre -2,85 et -3,00 m se développent deux horizons argilo-limoneux vierges de tout apport anthropique.

Entre -3,00-3,10 m: argile limoneuse brun gris comportant des restes de faune, de coquilles, de céramique et de charbons de bois.

La carotte prélevée sur le log 4 montre la présence d'un horizon anthropique, correspondant probablement à un niveau de sol, à la côte -2,45 m. Sous ce niveau de sol se développe une puissante couche argilo-limoneuse brune (-1,60-2,95).

Vers la côte -3 m se développe un mince horizon brun, organique, identique à celui observé sur le log 3. Sous ce niveau se développe une couche limoneuse gris-clair comportant de petits charbons de bois ainsi que des macro-restes carbonisés (datation ^{14}C 5840±40 BP soit 4800-4580 BC). A la base de cette unité apparaît une couche plus argileuse, de teinte gris-clair, qui se développe jusqu'à la côte -3,35 m. La base de la séquence est vierge de tout témoin anthropique.

Le carottage 1 a été réalisé au nord du site (Figure 7). La séquence a été prélevée dans une zone actuellement immergée. La stratigraphie se décompose comme suit:

- 0-0,70 m: niveau limoneux organique brun en grande partie bio-turbé par les racines de roseaux;

- 0,70-1,60 m: niveau limoneux, brun et chargé en matière organique. On remarque à la côte -1,50 m un fragment de céramique non tournée d'aspect Chalcolithique;

- 1,60-1,65 m: niveau organique brun comportant des éléments céramiques ainsi que de la faune;

- 1,65-2,00 m: niveau limoneux beige clair, vierge de tout vestige anthropique;

- 2,00-2,35 m: niveau organique brun comportant des concrétions carbonatées.

Cette première carotte, prélevée en marge du site et à l'écart de zone d'habitat, se caractérise par la présence d'éléments anthropiques (céramique) et de sédiments résultant très probablement de l'altération de paléosols.

La carotte 2 a été prélevée à l'opposée de la précédente, au sud et en contrebas du site (Figure 7).

- 0-0,85 m: niveau limoneux organique brun en grande partie bio-turbé par les racines de roseaux;

- 0,85-1,90 m: niveau limoneux d'aspect au sein duquel on observe la présence de 2 horizons comportant des éléments anthropiques (céramique, faune). Ces horizons apparaissent à la côte -1,10 m et 1,60 m. Ils se singularisent par la présence de concrétions carbonatées. Un niveau semblable ne comportant aucun témoin céramique apparaît à la côte -1,80 m;

- 1,90-2,15 m niveau organique brun.

A l'instar de la carotte précédente, le log 2 montre une alternance entre des horizons stériles et d'autres comportant des apports anthropiques.

4.3.2. Chronologie de l'occupation: les datations ^{14}C

Nous pouvons estimer la durée de l'occupation du site grâce à deux datations radiocarbone (Figure 5). La première datation a été réalisée sur un carporeste carbonisé recueilli par tamisage dans le prélèvement 2. Situé à 3,20 m sous la surface du site, le sédiment dont est issu le reste daté est formé d'un sédiment argilo-limoneux gris-clair, plastique, situé directement sous un niveau anthropique qui comportait de la céramique ainsi que des restes osseux (poisson). La date, 5840±40 BP - soit 4880-4580 BC, s'inscrit nettement dans la première moitié du 5ème millénaire avant notre ère.

Si l'on tient compte des plages de probabilités maximales, on observe qu'à 61,8 %, la plage de temps s'inscrit entre 4870 et 4680 BC.

Une seconde datation a été réalisée sur un ossement de bovidé issu de la fosse 3 (Us 1107) Poz-36217: 5580±35 BP, soit 4487-4348 BC avec une probabilité de 95.4%) et 4449-4369 BC à 1 sygma. Cette date, obtenue dans une fosse qui correspond à l'ultime étape de l'occupation du site archéologique, montre que celle-ci intervient au tout début de la seconde moitié du 5ème millénaire avant notre ère, soit entre 4500 et 4350 BC. Cette donnée de chronologie absolue concorde avec l'analyse céramologique qui fixe la dernière phase d'occupation durant l'étape A1 de la culture de Gumelniţa. En l'absence de données matérielles; la caractérisation culturelle de la base de la sequence demeure plus difficile à établir.

Dans le contexte du chalcolithique de la zone du bas-Danube et de la Dobroudja, l'établissement de la séquence chrono-culturelle repose sur un très petit nombre de dates offrant, après calibration, des plages de temps susceptibles d'éclairer notre propos.

Si l'on considère les dates dans leur globalité, et malgré des écarts-types importants, on observe qu'il existe durant le 5ème millénaire avant notre ère une forte plage de recouvrement entre les ensembles attribués au Boian-Spanţov et ceux relevant du Chalcolithique de type Gumelniţa. En considérant le seul cumul des plages de probabilités maximales, on peut estimer que pour Boian-Spanţov on a un grand nombre de dates se situant durant la première moitié du 5ème millénaire, soit 4800 et 4500 BC. C'est dans cet intervalle que la date de Taraschina s'inscrit. Néanmoins, les datations des ensembles Gumelniţa présentent un léger recouvrement de la plage temps (4900-3800 BC), mais l'essentiel des dates se rapporte à la seconde moitié du 5ème millénaire (4600-4100 BC).

Les carottages réalisés tant à l'intérieur qu'à l'extérieur du site montrent que la stratigraphie de l'habitat chalcolithique de Taraschina se développe sur près de 3 m de puissance. La datation obtenue à la côte -3,20 m témoigne de la présence d'un horizon domestique daté de la première moitié du 5ème millénaire avant notre ère (4800-4580 BC). Le mode opératoire ne nous a pas permis de collecter de mobilier céramique, et l'un des enjeux d'une fouille à venir sera de préciser l'attribution culturelle des niveaux de fondation de l'habitat dont on pourrait imaginer qu'elle relève du Chalcolithique ancien.

L'analyse de la stratigraphie permet d'établir que le site de Taraschina est formé de la succession de paléosols, de structures domestiques et d'horizons stériles ne comportant aucun ou de très rares témoins anthropiques. La forme singulière en dôme, qui émerge légèrement de la roselière, montre que cette succession s'opère par accumulation au sein d'un espace bien délimité. Enfin, la reconnaissance stratigraphique permet d'avancer l'hypothèse, que, vers 4800 BC, l'habitat de Taraschina est implanté dans une zone sèche et exondée. Les données paléo-écologiques soutendent cette hypothèse.

4.4. Paléo-économie et implications environnementales

L'analyse du matériel faunique prélevé en 2010, dans le Zone 1 révèle la présence de plusieurs classes d'animaux: mollusques, poissons, reptiles, oiseaux et mammifères. Cet assemblage a été étudié de manière à caractériser la paléo-économie et l'environnement du site. Les mammifères sont les plus nombreux (51.48% NR et 72.49% poids), suivis par les mollusques (36.6% NR et 19.91% poids) et les poissons (6.66% NR et 4.62% poids) (Figure 8).

La distribution spatiale de tous ces restes concorde avec l'étude faite sur d'autres artefacts, comme la céramique ou le lithique (Carozza *et al*. 2010b).

Parmi les espèces aquatiques, les coquillages genre Unio (moule de rivière) sont les mieux représentés. Nous avons réussi à distinguer les espèces *Unio pictorum* et *U. tumidus.* On remarque aussi la présence de coquillages lacustres - genre *Anodonta*.

Les poissons sont présents avec des espèces de grande taille: le silure (*Silurus glanis*), la carpe (*Cyprinus carpio*), le sandre (*Stizosetdion lucioperca*) et les esturgeons. Les silures sont généralement de petite ou de taille moyenne, mais on observe toutefois des individus dont la taille dépasse 2 m et une masse estimée de 80 kg. La carpe et le sandre sont représentés par des individus de taille moyenne et grande. On observe, dans tous les carrés analysés, la présence de restes de carapace et de plastron de tortue aquatique *Emys orbicularis*. Les oiseaux sont rares dans cet échantillon faunique. Généralement les restes proviennent d'individus de petite et de très petite taille.

Même si les populations chalcolithiques ont exploité les ressources du milieu aquatique pour leur alimentation, il est évident que les mollusques, les poissons et les tortues ne jouaient pas un rôle prédominent dans l'alimentation.

Les mammifères sont représentés par 889 restes dont 310 ont été déterminé spécifique (34,9 %). Tous ces restes sont issus de zones de rejets (fragmentation élevé, traces des découpe et décarnisation, traces des dents des carnivores etc.). L'essentiel des taxons identifiés correspond à des espèces domestiques: bœuf (*Bos taurus*), mouton (*Ovis aries*), chèvre (*Capra hircus*), cochon (*Sus domesticus*), chien (*Canis familiaris*). On observe toutefois quelques espèces sauvages telles que le sanglier (*Sus scrofa*), le cheval (*Equus* sp.), le loup (*Canis lupus*), le blaireau (*Meles meles*), la loutre (*Lutra lutra*) et le lièvre (*Lepus europaeus*).

La prédominance des restes d'espèces domestiques (266 NR - 91,4% ou 2744 g poids - 90,62%) suggère que l'élevage joue un rôle économique très important. Les animaux domestiques les plus exploités sont les caprinés et les bovins, animaux dont l'élevage nécessite des espaces ouverts ou des espaces forestiers dégradés (Vigne 1991). L'une des caractéristiques de cet assemblage réside dans la faible représentation des cochons. Peut-être s'agit-il d'une spécificité culturelle plutôt d'une contrainte liée au milieu.

Les espèces sauvages, avec les six espèces, décrivent un milieu naturel extrêmement diversifié et riche, avec des biotopes forestiers (illustrés par sanglier), mais également des espaces ouverts, tel que le montre la présence du cheval et du lièvre (Figure 9).

5. Conclusion

Les recherches engagées sur le site de Taraschina, dans le delta du Danube, montrent la présence d'un habitat stratifié. Ce site, daté du chalcolithique, est occupé durant un laps de temps relativement long, compris entre 4900 et 4350 BC, soit près d'un demi-millénaire si l'on prend en compte les probabilités maximales fournies par les datations ^{14}C. La stratigraphie, puissante de près de 3 mètres, montre la présence de plusieurs niveaux d'occupation riches en matière organique et en matériel archéologique. L'analyse de la microtopographie et des carottages permet d'établir que le site de Taraschina est formé de la succession de paléosols, de structures domestiques et d'horizons stériles incluant pour parti des éléments de dégradation des architectures de terre crue. Cette stratigraphie témoigne de la relative stabilité de l'occupation humaine puisque l'habitat se développe sur place, par strates successives, à l'image d'un tell. La forme singulière en dôme qui émerge légèrement de la roselière est à ce titre singulière.

Les données stratigraphiques permettent d'avancer l'hypothèse selon laquelle durant la première moitié du 5ème millénaire BC, la communauté chalcolithique de Taraschina était implantée dans un environnement exondée. L'étude des faunes recueillies dans le dernier niveau d'occupation, daté du milieu du 5ème millénaire BC (vers 4500-4350 BC) conduit à décrire un milieu ouvert, formé d'une mosaïque de paysages. L'élevage des bovins et des caprinés implique des espaces ouverts, tout comme la suggère la présence du lièvre. La mise au jour d'un fragment de lame en silex portant un poli très important résultant d'une probable utilisation comme faucille accrédite cette hypothèse. La présence de semences de céréales carbonisées dans le comblement des fosses et dans le dégraissant de certaines céramiques constitue un autre indicateur de l'existence de vastes espaces ouverts. D'autres espèces, comme le sanglier ou la loutre pourraient relever d'espaces davantage forestiers ou de la ripisylve. Enfin, les activités de pêche et de collecte des coquillages d'eau douce, montrent l'empreinte de la composante fluvio-lacustre du milieu.

Les données déduites de ce premier travail accréditent l'hypothèse que la transgression marine n'a pas encore atteint, au milieu du 5ème millénaire BC, une côte suffisante pour provoquer le recouvrement de la zone de Taraschina. En revanche, la faune aquatique très nombreuse illustre la présence proche de bras du fleuve et/ou de plans d'eau douce. Dans ce contexte, le site de Taraschina constitue le jalon essentiel pour appréhender le processus de transgression marine.

Note

[1.] Nos recherches sont réalisées grâce au soutien du Ministère Français des Affaires Etrangères et Européennes, du Conseil Départemental de Tulcea, et de l'Institut Ecologie Environnement (INEE du CNRS) dans le cadre d'un PEPS.

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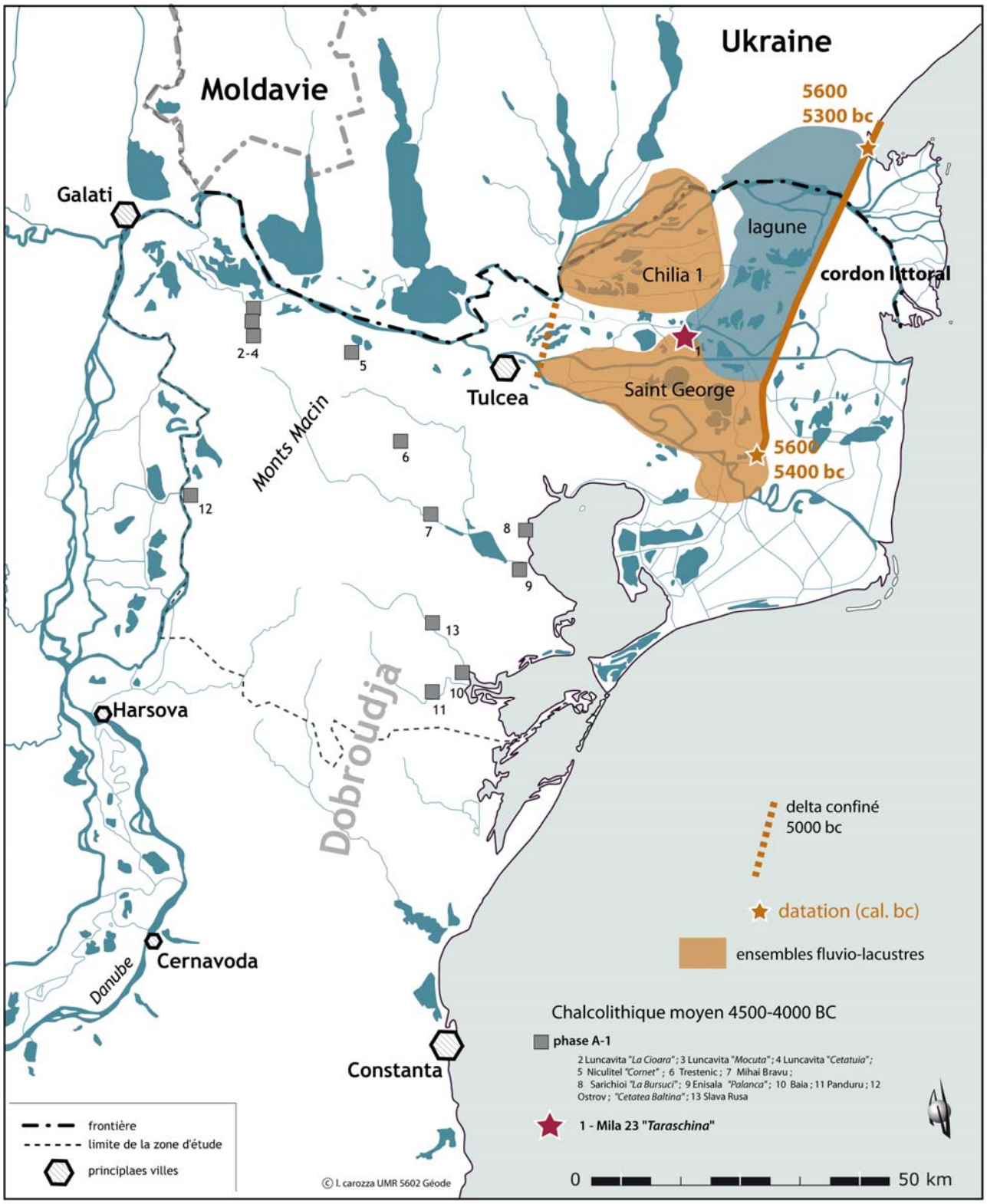

Figure 1. Position de l'habitat de Taraschina dans son contexte paléo-géographique.

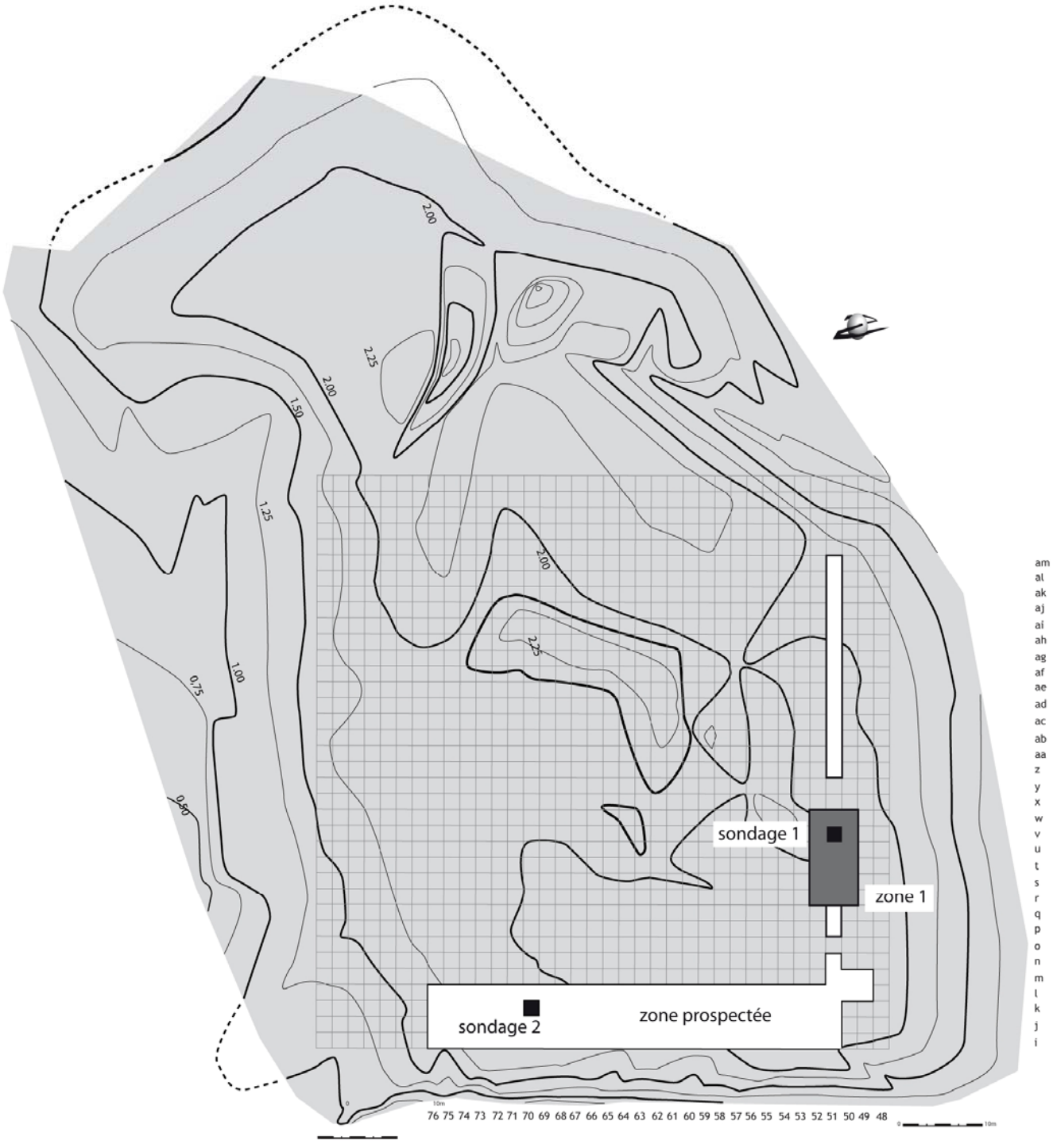

Figure 2. Topographie du site de Taraschina et localisation des sondages et des zones prospectées.

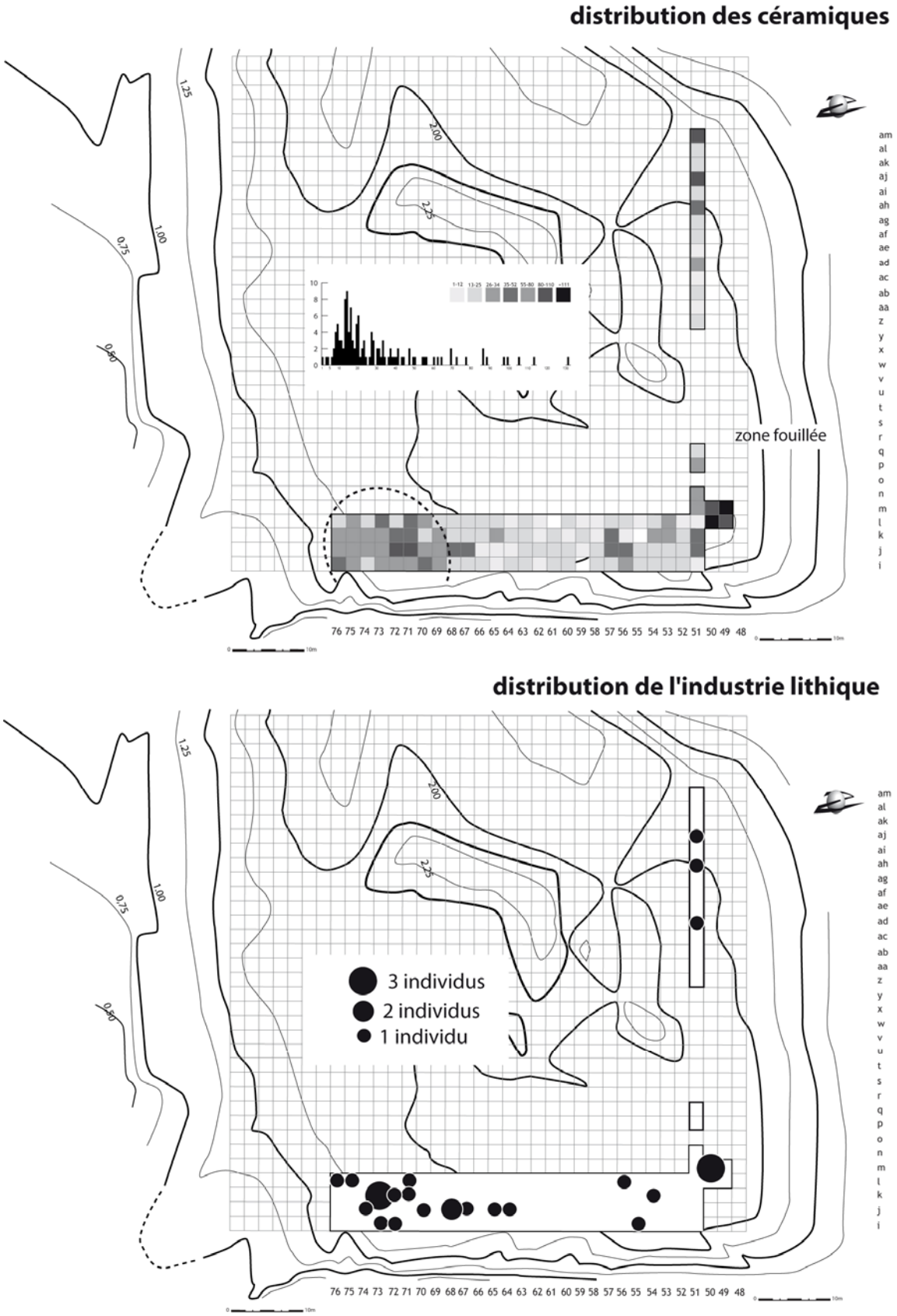

Figure 3. Cartes de distribution des céramiques et de l'industrie lithique collectée en surface (Us 1000) lors des prospections.

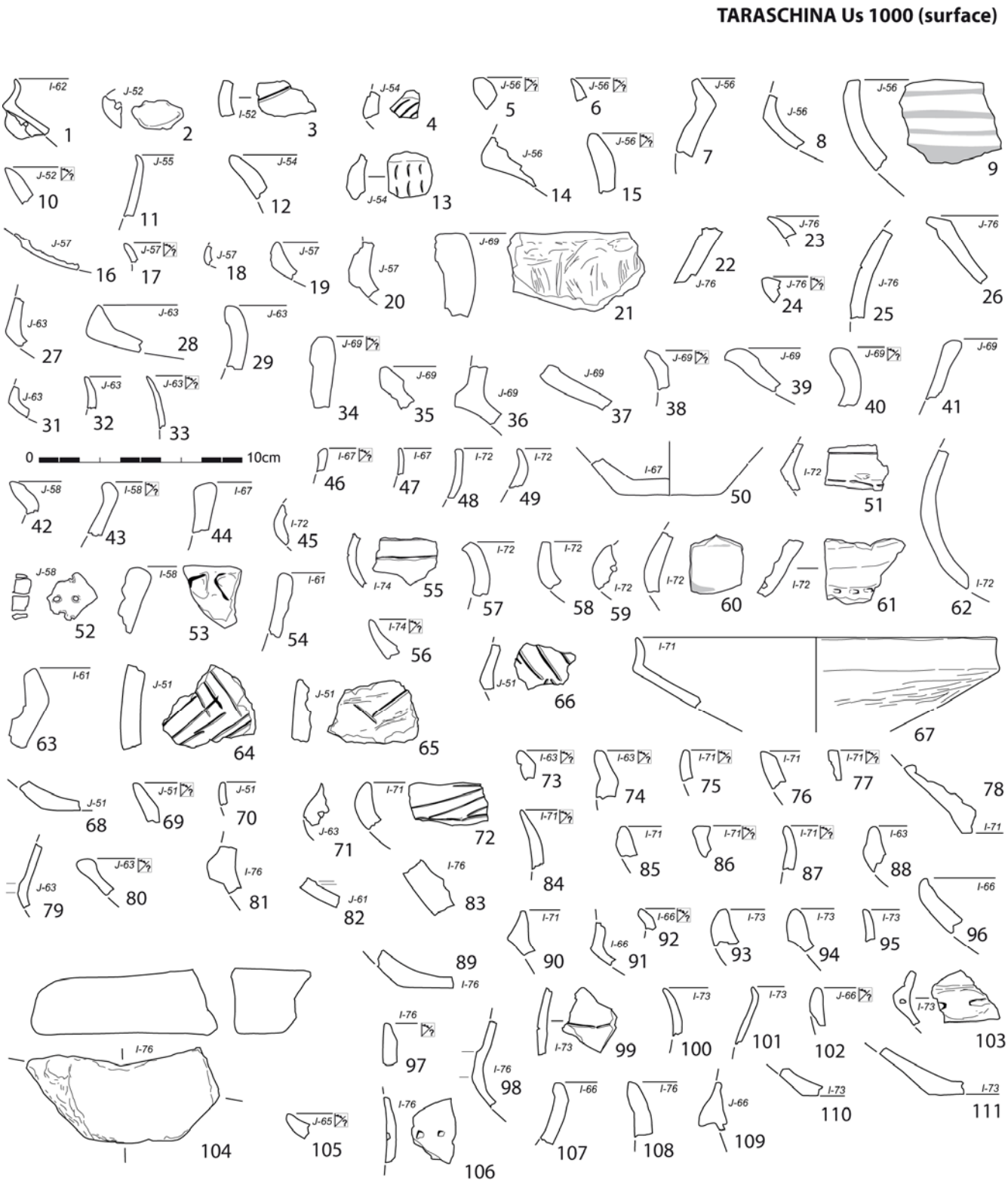

Figure 4. Echantillon de céramiques collectées dans l'Us 1000.

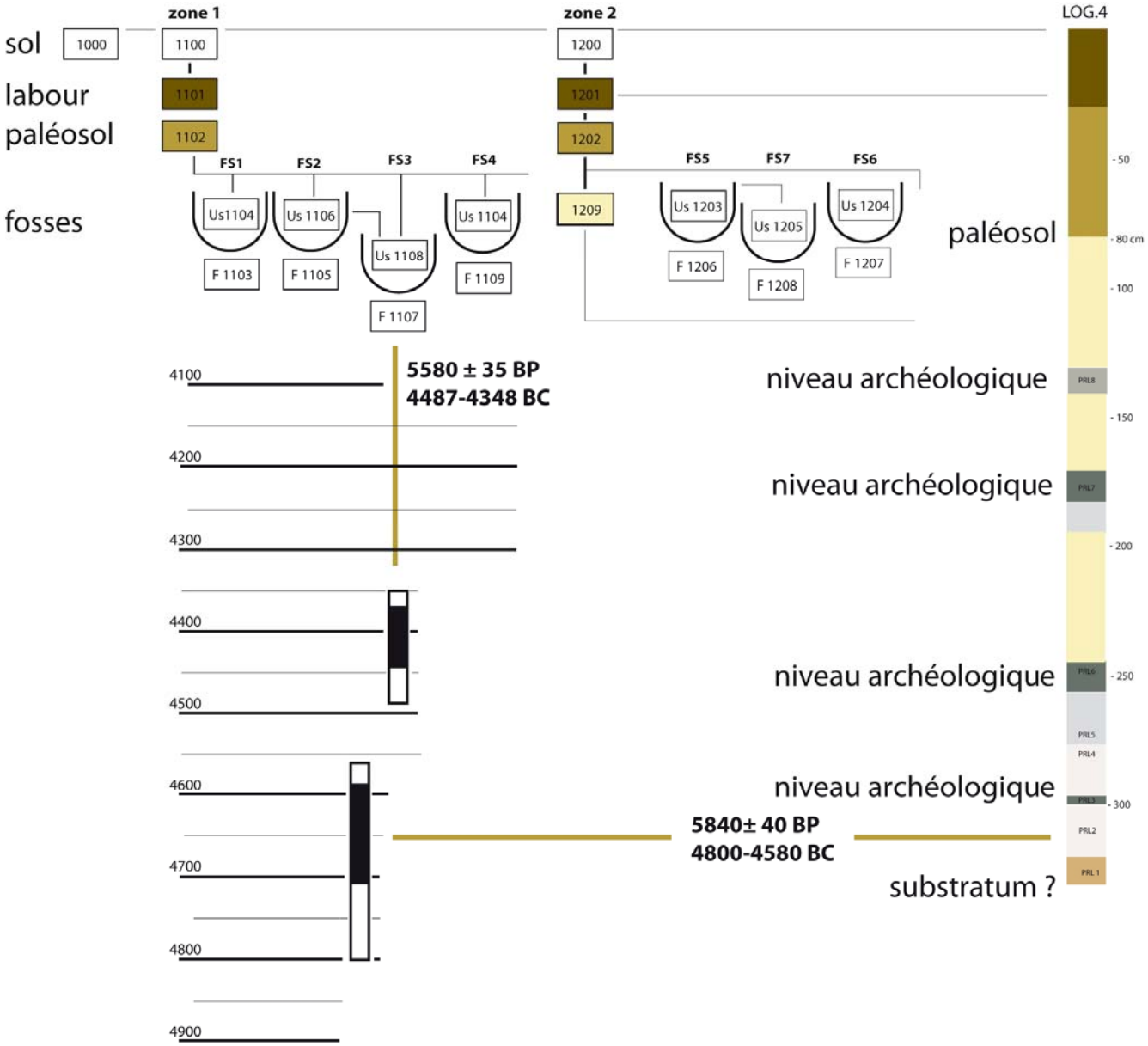

Figure 5. Diagramme stratigraphique du site de Taraschina établi d'après la description des carottes 2 et 3 et des Us enregistrées dans les sondages 1 et 2.

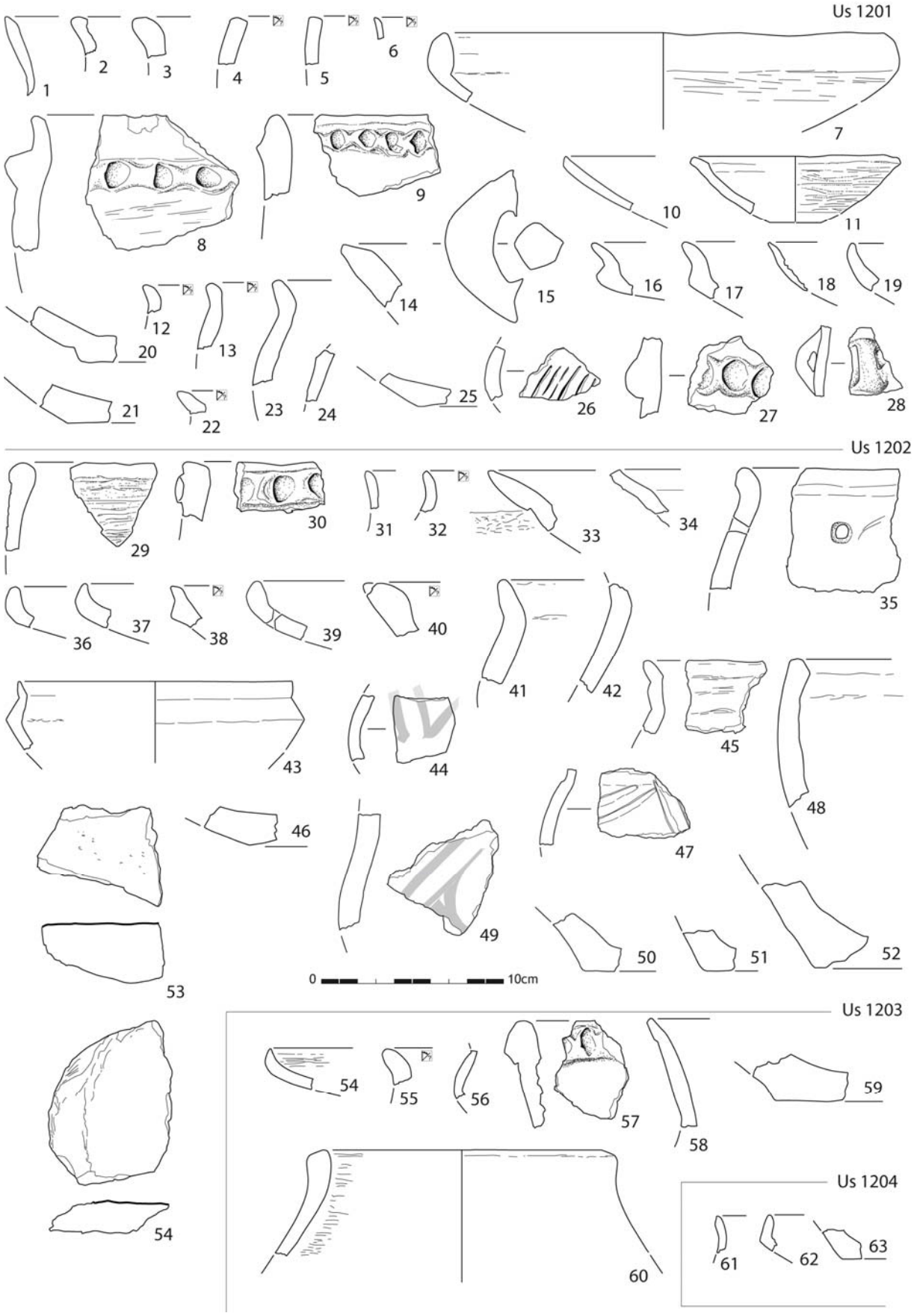

Figure 6. Mobilier des différentes Us du sondage 2.

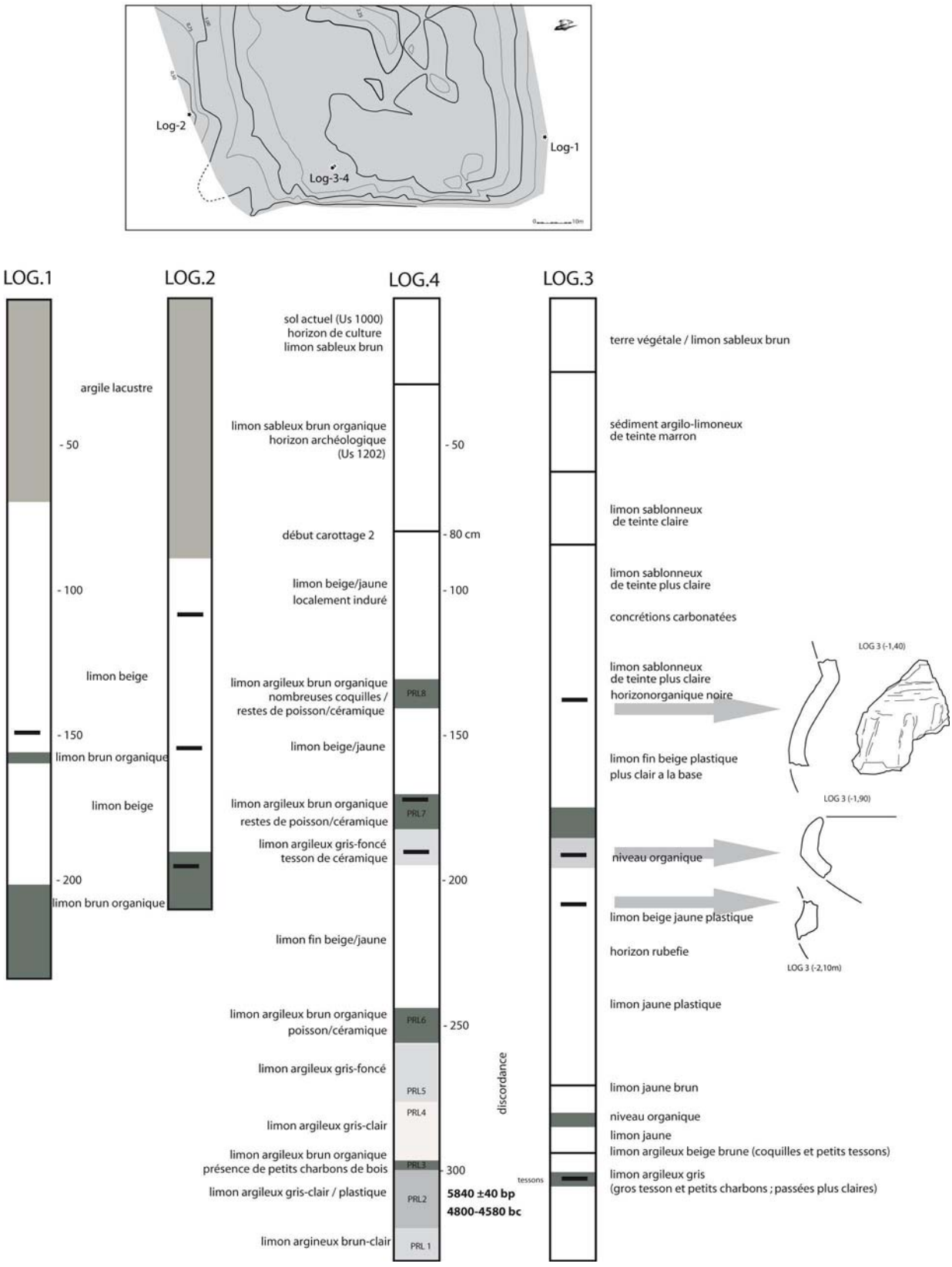

Figure 7. Situation et description des 4 carottes réalisées en 2009 sur le site de Taraschina.

Classe	NR	%	Poids	%
Mollusca	632	36.60	1280	19.91
Pisces	115	6.66	297.3	4.62
Reptilia	70	4.05	165	2.57
Aves	21	1.22	26.7	0.42
Mammalia	889	51.48	4661	72.49
Total	**1727**	**100.00**	**6430**	**100.00**

Figure 8. La répartition numérique et le taux du nombre de restes (NR) et du poids de restes (Poids) par classes d'animaux.

Taxon	**NR**	**%**	**Poids**	**%**
Bos taurus	104	33.55	2001	61.23
Ovis/Capra	130	41.94	487	14.90
Ovis aries	6	1.94	49	1.50
Capra hircus	2	0.65	17	0.52
Sus domesticus	3	0.97	52	1.59
Canis familiaris	21	6.77	138	4.22
Sus scrofa	4	1.29	195	5.97
Equus sp.	2	0.65	14	0.43
Canis lupus	1	0.32	26	0.80
Meles meles	4	1.29	19	0.58
Lutra lutra	4	1.29	10	0.31
Mustelidae	9	2.90	18	0.55
Lepus europaeus	1	0.32	2	0.06
Bos taurus/Bos primigenius	2	0.65	65	1.99
Bos/Cervus	4	1.29	73	2.23
Ovis/Capra/Capreolus	1	0.32	8	0.24
Sus sp.	12	3.87	94	2.88
Total mammiferes determines	**310**	100.00	3268	100.00
Bois de cervide (*Cervus/Capreolus*)	1		4	
Homo sapiens	4		65	
Total	**315**		3337	
Indetermines mammiferes de taille grande	**222**		950	
Indetermines mammiferes de taille moyenne/petites	**352**		374	
Total Mammalia	**889**		4661	

Figure 9. La répartition numérique et le taux du nombre de restes (NR) et du poids de restes (Pds) pour les mammifères.

HUMAN - ENVIRONMENT COEVOLUTION IN WESTERN BLACK SEA COASTAL REGION (5TH MILLENNIUM BC)

Valentina VOINEA
Glicherie CARAIVAN

Abstract: *More than any other areas, coastal areas have best recorded the climate and geo-morphological changes produced over millennia. Morphological and geo-archaeological research undertaken in the past decades in the Black Sea Basin have shown that prehistoric habitations of the western Black Sea coast were more sensitive to climate changes (temperature, precipitation) than the mainland, mostly concentrated along the fertile valleys within the Balkan Peninsula. Neo-Eneolithic Period settlements, found today in areas of marine lagoons and lakes, on islands, or in the Danube Delta, enjoyed a more generous landscape in the 5th millennium BC away from the current maritime limits. What exactly led to the end of these flourishing communities, and how did their disappearance influence the subsequent evolution of the Gumelniţa settlements from the neighbouring regions?*

In the absence of the Early Neolithic many researchers have attempted to fill this hiatus by extending the previous culture period; the Late Mesolithic cultural background from which local communities overlapped with the Hamangia culture. What can be said with certainty is that from 5200/5000 BC the mouths of the rivers from the western Black Sea coast were intensely inhabited by Hamangia communities for over half a millennium. Settlements, some submerged, focus around coastal lakes: Mangalia, Tatlageac, Techirghiol-Zarguzon, Agigea, Siutghiol, Taşaul, Gargalâc, Sinoe, Istria and Goloviţa along the Casimcea and Carasu Valleys. Given that most cultural ties were established only on the basis of pottery typology, to establish the existence of these complex cultural events DNA tests could be conducted to confirm the presence, or not, of genetic links with Egeo-groups who inhabited the Anatolian and Balkans from 5th BC millennium.

For a long time regarded as a naive interpretation of fantasy literature, it is little wonder that the theme of natural disasters, told metaphorically in ancient myths, is now the attention of researchers. In this context, the causes for the end of the Gumelniţa civilisation appear more complex than was initially thought. The hypothesis of violent penetration by the North Pontic tribes is today increasingly challenged. What led to the end of flourishing Neolithic settlements and how did this influence the subsequent disappearance of Gumelniţa community developments in neighboring regions?

The Gumelniţa settlement discovered on the Island of 'La Ostrov' in Lake Taşaul provides new data on changes in the final Eneolithic Period. The last level of habitation has the texture of a flooded layer indicated by the richness and diversity of biological material. The material culture displays different stages of fashioning and wear: unrefined, whole or fragmentary, with strong signs of wear, burned. Some Cucuteni type C imports are present in the last level that was flooded during the final Gumelniţa A2 phase.

According to the chronology established by Bulgarian researchers the settlements ended at the end of Eneolithic. What were the causes of population movements? Interdisciplinary studies indicate the general picture of climate change at the end of the Atlantic period further complicating the puzzle. The period, ranging between 6050-5600 BP, was characterised by a sharp warming of climate with warm and long summers. In the area of the West-Pontic coast pollen diagrams for the Varna, Durankulak and Shabla - Ezeretz Lakes indicate that the Late Atlantic was characterised by the receding of mixed coniferous forests and by the expansion of lands cultivated with cereals. The influx of salinity also suggests a rise in seawater level for the same period. With the exception of the late settlement of Sozopol, the coastal area was abandoned for over 200 years (4100-3850 BC) due to the rise of seawater level. Combining the ^{14}C data published for the 'lake' settlements with the chronological table of the Romanian Eneolithic, we obtain, for the 4000-3900 cal. BC interval, the following synchronicities: Gumelniţa A2c - beginning of Gumelniţa B1 - Cernavodă Ia - Cucuteni A3 / A4 - Varna III.

In the area of the West-Pontic coast there is no evidence to suggest a violent penetration of eastern tribes. A period of abandonment followed the level of the final Eneolithic (Varna III). Most of the investigated settlements were flooded with destroyed dwellings covered in an alluvial layer rich in sea shells. The Neolithic Black Sea transgression should not, therefore, be viewed as an isolated

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 49-59.

phenomenon because similar and synchronous events are reported in remote areas. The effects of this warming were felt in the coastal areas too determining the process of the marine transgression.

Keywords: *geomorphology; marine transgression; flood; Black Sea; Hamangia; Gumelniţa - Varna and Cernavoda I cultures; ceramic Cucuteni C.*

Progress during the last decades in the sphere of inter-disciplinary theory has left its mark on archaeological investigation and interpretation methods. It is not surprising that the attention of researchers has returned to the theme of natural catastrophes, narrated metaphorically since ancient times, after being considered, for a long period of time, a naïve interpretation of a fantastic literature. The controversies concerning the amplitude and duration of the Neolithic transgression of the Black Sea are far from being solved. Theories vary from the diluvial theory proposed by the geologists W. Ryan and W. Pitman presented in *Noah's Flood: the New Scientific Discoveries about the Event that Changed History* (1998) and supported by P. Dimitrov (2003) to the hypothesis of slow geomorphological changes accelerated only during the last millennium due to anthropic factors (Genov and Peychev 2001).

More than any other areas, coastal areas have best recorded the climate and geo-morphological changes over millennia. Morphological and geo-archaeological research in the past decades in the Black Sea Basin have shown that prehistoric habitations of the western Black Sea coast were more sensitive to climate changes (temperature, precipitation) than the mainland sites mostly concentrated along the fertile valleys in the Balkan Peninsula. Neo-Eneolithic period settlements, found today in areas of marine lagoons and lakes, on islands, or in the Danube Delta, enjoyed a more generous landscape in the 5^{th} millennium BC away from the current maritime limits. Their extraordinary flourish, demonstrated by funeral findings from Durankulak (Todorova 2004), Varna (Fol and Lichardus 1988; Eluère 1989) and Devnia (Todorova 1971a), is explained by greater use of both maritime shipping lanes (Aegeo-Mediterranean and Circumpontic) and those bordering along the rivers that communicate with the Black Sea (for example the Casimcea River).

What led to the end of flourishing Neolithic settlements and how did this influence the subsequent disappearance of Gumelniţa community developments in neighboring regions?

Romanian Black Sea coast. Geomorphological data

The Black Sea is one of the largest enclosed seas in the world covering an area of about 4.2 x 10^5 km^2 and with a maximum depth of 2212m. Its total volume is 534000km^3, but most of the water (the 423000 km^3 that lies below a depth of 150-200m) is anoxic and contaminated with H_2S. The Bosphorus and Dardanelles Straits provide the only connection between the Black and Mediterranean Seas. The Bosphorus is narrow (0.76-3.6km) and shallow (presently 32-34m). It restricts the two-way water exchange between the very saline Mediterranean Sea (with a salinity of 38-39‰) and the more brackish Black Sea (about 17‰ at the surface and 22‰ at the bottom). The north-western corner of the Black Sea is especially suitable for a study of sedimentation and coastline migration during the Late Quaternary. Here, the continental shelf widens dramatically and encompasses about 25% of the total area of the sea. Here, also, two of the largest rivers in Europe deliver their water and sediment load into the Black Sea - the Danube, with a water discharge of about 200km^3/yr, and the Dnieper, which contributes 54km^3/yr. The discharges of smaller rivers, such as the Dniester (310m^3/sec) and the Southern Bug (82m^3/sec), add a little more bringing the total inflow into the north-western Black Sea to about 255km^3/yr.

The Romanian littoral is situated between the southernmost part of the Chilia Secondary Delta in the North and the border with Bulgaria (Vama Veche) in the South. Its length is about 243km. The coast can be divided into two sections based on geological, sedimentological and geomorphological factors. The limit between these two sectors is conventionally located at Cape Midia. Nevertheless, Cape Midia represents the limit between the two sections based on geology and geomorphology (northernmost limit of the cliffs); the original limit was situated further south based on the origin of littoral sediments. Thus, until the building of the Midia Harbor, the littoral section under the influence of the Danube also included Mamaia Bay.

The coastal evolution in both sections is determined by the existing relationship between the quantity of sediments available for transport, processing and accumulation and sea energy in terms of waves and marine currents. The coastal current that redistributes the littoral sediments is north-south oriented and parallel to the shore. Each section has its own specific sources of sediments and energy influence of the sea.

The Northern Unit, with a length of about 160km, is located between the border with the Ukraine and Cape Midia. This unit represents the beaches in front of the Danube Delta consisting of sandy littoral bars that set the limit between the inner part of the delta and the sea or cuts off the former lagoons and sand bars. The main source of sediments is from the Danube and redistributed by the littoral currents. The essential feature of the sediments is the arenite mineral fraction mainly made of quartz, with some additional local heavy minerals. The carbonates ratio, represented by shells and mollusc shell fragments from the beach sediments, increases from north to south from a few percentages (Sulina) to over 90% (Periboina). This variation is due to the increasing distance from the Danube mouths. The northern part of the littoral is part of the Danube Delta Biosphere Reservation.

The Southern Unit has a total length of about 80km and is located between Cape Midia and Vama Veche. This unit consists of cliffs separated by low sandy shores (Mamaia, Eforie, Costineşti, Olimp - Mangalia). According to Shepard's genesis classification (Shepard 1963) the southern part of the Romanian littoral is situated in the secondary shores category with two main sub-types: erosional (with cliffs) and depositional (barrier type shores). The geology of the coastal zone affects the amount of beach sediments and influences the entire morphology of the southern coastal zone.

The Holocene. When the Mediterranean and the Black seas reached the same level (close to its present-day position) some 9000 – 7500 BP a two-way water exchange was established and the process of transformation of the Black Sea into an anoxic brackish sea was initiated. The maximum rise of the Black Sea water level to 3 - 5m above its present-day level occurred at 4000-3500 BP in the Sub-boreal. During this sub-phase the so-called 'Old Black Sea' terrace was formed. This was followed by a rather rapid lowering of the water-level to -5 / -8m below the present-day level, corresponding to Fedorov's 'Phanagorian regression' and the first Greek colonisation of the Black Sea coast (Panin 1983; Caraivan 2010). A new short-lasting ingression of the sea - the 'Nymphaean' transgression of Fedorov, the 'Istrian' transgression of Bleahu and the 'Dzhemetinian' transgression of Nevesskya (Nevesskya 1963) - resulted in a level of +1-3m. This was succeeded (in about the 10th century) by a lowering of the water-level by 1-2m and then by a slow rise which continues today. Based on studies of the Caucasian coastal zone (Ostrovskiy *et al*. 1977) a much more complicated pattern of water-level fluctuations for the Black Sea was reconstructed. In our opinion, however, data from other areas of the Black Sea are not consistent with their results.

In the second half of the 1990s the new hypothesis of a very rapid flooding of the Black Sea with Mediterranean waters at about 7500 BP was proposed (Ryan *et al.* 1997a; 1997b; Ryan and Pitman 1999; Ballard, Coleman and Rosenberg 2000). At about 12000 BP retreat of the ice-sheet front led to redirection of melt water to the North Sea for a limited period. The Black Sea, deprived of the incoming melt water during the Younger Dryas cooling (~11000 BP) and under a more arid and windy climate (up to 9000 BP), experienced a new lowering of the water level (down to -156m). At the same time the sea level of the Mediterranean continued to rise reaching the height of the Bosporus sill by 7500 BP. This generated a massive input of salt-water into the Black Sea basin. In the opinion of B.F. Ryan (Ryan *et al.* 1997b: 121) the input rate was several hundred times greater than the largest waterfall and caused the level of the Black Sea to rise by 30 to 60cm per day and filling up the basin in a few years. A deeper Bosporus sill (approximately - 85m), however, could lead to an earlier re-connection with the Mediterranean and to a slightly different scenario of mixing Black Sea and Mediterranean waters.

This hypothesis, however, is still debated. Recent studies on the southern coast of the Black Sea in the Strait of the Bosphorous and in the Marmara Sea propose different models for the flooding of the Black Sea (Aksu *et al.* 2002). These models indicate that the Black Sea was flowing into the Marmara Sea between 9500 BP and 7200 BP. Their evidence for this flow in the Marmara Sea is based on the westward direction cross-stratification of the sand-prone deposits and on the presence of a sapropel layer coeval with the Mediterranean sapropel S1, and by dating in the Sakyya coast zone that indicates a high water level in the Black Sea at 7200 BP (about -18m below the present level). One of the main oppositions to the Younger Dryas sea level lowering to -156m, and the consequent relief reshaping and 'catastrophic' flooding of the Black Sea, arises from data existing about the Danube Delta evolution during the Upper Pleistocene and Holocene (Major *et al.* 2006; Ongan *et al.* 2009).

The main stages of the Danube Delta evolution during the Holocene have been identified and dated through corroboration of geomorphologic, structural, textural, geochemical, mineralogical, faunal analyses and ^{14}C dating (Panin 1983; 1997). These phases can be summarized as follows: the formation of the Letea-Caraorman initial spit (11700-7500 BP), the St. George I Delta (9000-7200 BP), the Sulina Delta (7200-2000 BP), the St. George II and Kilia Deltas (2800 BP-Present) and the Cosna-Sinoie Delta (3500-1500 BP). This model, if the ^{14}C dating is correct, leads to a scenario of a rather

higher water level by 11700 BP (very close to the present-day level) as the delta coastline was represented by the 'Letea-Caraorman initial spit' located at about 25-30km westward of the present coastline. Since this time no catastrophic event (a sea level drop to -156m) is recognised on the delta. The subsequent successive phases of delta development are perfectly continuous and the different delta lobes progradation steps can be followed without gaps. Some results of the geological study by Caraivan on the Mamaia barrier beach drillings, including the ^{14}C data provided by the Laboratory of Geochronology, University of Georgia, USA, were also referred to (Caraivan 2010).

To conclude, we emphasise the importance of the Upper Quaternary sea-level changes during the last 30,000 years that determined the movement of the coastline across the western Black Sea shelf. During periods of relative stability in the Black Sea level coastal accumulative (barrier beaches), or erosional (abrasion terraces) features were formed. The Dobrogean Rivers extended their valleys across the former shelf out to the corresponding coastlines that were situated at lower sea levels compared to the present. Consequently, ancient human communities living on the coast established their settlements mainly on protected shores near former river mouths. During the last 3,000 years we assume sea-level values were very close to present ones; previous to that we must remember that sea level was much lower. These older coastlines were located more to the east and with complex coastal geomorphology.

When and how the Black Sea turned from a lake into a sea?

Complex marine geological analysis shows that during the Quaternary glaciations the Black Sea level was 150 m lower than at present and fed by adjacent freshwater rivers. The link with Marmara Sea and, indirectly, with the Aegean Sea occurred in the Early Holocene. When, how and why the Bosporus and Dardanelles straits formed is, even today, a controversial topic. Hypotheses have ranged from a natural disaster scenario, like the biblical Flood, to a slow process over several millennia of sea level changes combined with tectonic movements of earth descent more evident in the south-western part of the Black Sea coast. ^{14}C analysis for the first euryhaline molluscs (specific to salt water) that inhabited the flooded northern part of the Black Sea and for the black sapropelic mud deposits are concentrated around 7500 BP (Melinte and Oaie 2008).

From Mesolithic to Neolithic

The absence of the Early Neolithic in Dobrogea, NE Muntenia and NE Bulgaria remains a controversial topic. The proposed causes for this hiatus are culturally different and sometimes even fanciful. Most scenarios are based on the idea of adverse environmental conditions unsuitable for long-term habitation. In a recent study, P.I. Peev indicated the existence of a single Mesolithic site in the eastern Balkan Peninsula, west of Varna, near the dunes at Pobiti Kamuni, and explains the absence of Mesolithic traces in the western Black Sea by the flooding of the palaeo-rivers Paleoprovadiyska, Paleovoydnitya, Paleosredetska and Peleorezovska (Peev 2009). Possible Mesolithic and Early Neolithic sites must now be submerged similar to those sites from the North Pontic area (e.g., southern Ukraine) (Dolukhanov and Arslanov 2009; Dolukhanov, Kadurin and Larchenkov 2009).

In the absence of the Early Neolithic many researchers have attempted to fill this *hiatus* by extending the previous culture period; the late Mesolithic cultural background from which local communities overlapped with the Hamangia culture. What can be said with certainty is that from 5200/5000 BC the mouths of the rivers from the western Black Sea coast were intensely inhabited by Hamangia communities for over half a millennium. Settlements, some submerged, focus around coastal lakes: Mangalia, Tatlageac, Techirghiol-Zarguzon, Agigea, Siutghiol, Taşaul, Gargalâc, Sinoe, Istria, Goloviţa, along the Casimcea Valley and Carasu Valley (Figure 1). Given that most cultural ties were established only on the basis of pottery typology, to establish the existence of these complex cultural events DNA tests could be conducted to confirm the presence, or not, of genetic links with Egeo-groups who inhabited the Anatolian and Balkans from 5th BC millennium. Circumpontic - Egeo - Anatolian Cultural exchanges are clearly demonstrated by the presence of both raw materials and artefacts specific to the area in Egeo-Anatolian settlements in the Balkans: *Spondylus* ornaments, *Dentalium*, marble, obsidian, common types of anthropomorphic representations, pots and tables of worship. In the West Pontic coastal area marine currents were favorable for cabotage shipping and therefore more links could be made at sea and to inland valleys.

Theories on the end of the Eneolithic and natural disasters

Progress during the last decades in the sphere of inter-disciplinary theory has left its mark on archaeological investigation and interpretation methods. It is not surprising that the attention of

researchers has returned to the theme of natural catastrophes, narrated metaphorically since ancient times, after being considered, for a long period of time, a naïve interpretation of a fantastic literature.

In this context, the causes for the end of the Gumelniţa civilisation appear more complex than was initially thought. The hypothesis of violent penetration by the North Pontic tribes is today increasingly challenged. More than any other region, the western Black Sea coast area is unique in having the spectacular funeral discoveries at Varna (Fol and Lichardus 1988), Durankulak and Devnia (Todorova 1971a), and the rapid disappearance of flourishing Neolithic settlements without cultural metamorphosis so common in other regions. What led to the end of flourishing Neolithic settlements and how did this influence the subsequent disappearance of Gumelniţa community developments in neighboring regions?

The Gumelniţa settlement discovered on the Island of 'La Ostrov' in Lake Taşaul provides new data on changes in the final Eneolithic Period (Marinescu-Bîlcu *et al.* 2000-2001, Voinea 2001). Even though the waters of the lake have destroyed much of the settlement the stratigraphy best seen in the north-western part of the island offers important clues concerning the end of the habitation. In the 'Sα' section (8 sectors of 4 by 4 meters, 128 square meters), under the vegetation level and with a thickness not surpassing 0.30m, we have discovered a compact layer of rocks, chaotically positioned, and without delineating foundations as is the case with the constructions at Durankulak (Dimov 2003).

The blocks of stone are found all over the island and are present in the 'Sβ', 'Sγ' and 'Sδ' surveys. We therefore rule out the possibility of an anthropic action having led to the formation of that layer. After analysis of the sediments C. Haită has reached the following conclusion: "*The silt matrix with elements of pebble corresponds to a natural accumulation, in another period of rising of Lake Taşaul water level. What we cannot say for sure to what chronological moment it corresponds."* (Haită 2000-2001: 152). As the blocks of stone directly cover the last habitation level the stratigraphic position of this rock layer suggests a moment that is close to abandonment. Thus, vessels that could be completely reconstructed, broken *in situ*, or even complete have been discovered across the entire investigated surface underneath and among the blocks of stone.

The last habitation level, with the texture of a flooded layer, has rich and diverse material: blades; graters; microliths; small axes; small flint chisels; schist; limestone anchors and weights for fishing nets; needles; spikes; small chisels; polishers; bone spindles; horn handles; spindles; weights; ceramic colanders; copper spikes; bone, stone and pierced shell beads; bone idols with a rectangular upper side; and idols of the 'en violon' type. The pieces display different stages of fashioning and wear: unrefined, whole or fragmentary, with strong signs of wear, burned.

The ceramic material discovered in this level has its best analogies in the Gumelniţa A2 final levels from Hârşova and Carcaliu: dishes with an inwardly inclined edge (Lăzurcă 1984; Haşotti 1997). Along with the typical Gumelniţa decoration (graphite painting) there are also, in a small percentage, elements of the Varna tradition: black polished engobe - '*Pseudo-Firnis*' - and the decoration of 'Ezerovo type' (incised, notched motifs, covered with white or grey paste, alternating with polished surfaces). H. Todorova has dated these decorative elements, seen in a much larger percentage in the settlements from the region of the Varna-Beloslav lakes, to the Varna II-III phases (Todorova 1971b; Todorova and Tončeva 1975: 45).

Also noteworthy are a few decorative elements used both at the end of the Gumelniţa A2 phase and during the Gumelniţa B1 / Varna III phase. This includes the luxury category of bi-tronconical, bulging shoulder vessels with decoration in which two techniques were associated: graphite painting - motifs organized in registers, on the neck - and 'parantheses' - impressions positioned in horizontal rows on the bulging part of the belly. Pieces similar to those from Năvodari (Marinescu-Bîlcu *et al.* 2000-2001: 146, pl. 12), with or without small conical ears, have been discovered in the entire area of the Gumelniţa - Karanovo VI cultural complex: in the coastal region in Kozareva - a tell in the vicinity of Kableshkovo - (Georgieva 2003: 228, fig. 4: 1-4), in northern Thrace in Karanovo (Hiller and Nikolov 1997: Tafel 137: 4, 8), in the vessel complex of Smjadovo (Fol and Lichardus 1988: 86, Kat. 18, Abb. 4), in Dolnoslav (Fol and Lichardus 1988: 88, Kat. 23, Abb.46) and north of the Danube in tells including Căscioarele (Voinea 2005: pl. 123) and Pietrele (Hansen *et al.* 2004: 23, fig. 19:4).

Chronological inclusion in the last level that was flooded during the final Gumelniţa A2 phase is suggested by the presence of some Cucuteni 'type C' imports: two sallow ceramic fragments with shells in their paste and decorated with the 'comb' (Voinea 2001). Based on the periodisation proposed by A. Dodd-Opriţescu, the imports date from the old phase, which is also partially contemporary with Cernavodă Ia, when the string-like decoration had not yet appeared (Dodd-Opriţescu 1980: 548). The oldest imports of this kind in the Gumelniţa area occur on the line of the

Danube in the final Gumelniţa A2 level at Carcaliu and in the Cernavodă Ia level, alongside Cucuteni A4 imports, at the tells from Hârşova (Haşotti 1997: 128-9).

In the same flooded level a special double grave complex was discovered which is unique in the Gumelniţa area. The grave, covered by a cemented silt sediment, cuts into the lower layer of the destruction level of a dwelling (L. I) and there are pieces of baked adobe in the fill. The clear stratigraphic position leads us to attribute this grave to a habitation sequence. If the NNE-SSW orientation is found in the majority of contemporary funeral discoveries the placing of these two bodies was not usual (Marinescu-Bîlcu *et al.* 2000-2001: 125; Voinea 2004-2005: 24).

The lack of an abandonment level between the stones and the flooded layer together with the richness of the archaeological material dispersed across the entire investigated surface and the presence of the double grave suggests the fast abandonment of the settlement and probably caused by a quick flood.

"The level of the Black Sea was with about 20m lower than today's level. At the current location of Lake Taşaul the river Casimcea flowed in a deeply incised valley, with steep slopes, ending in a fluvial-marine liman, probably barred by a coastal belt, situated much more in the offing. …During the period 7000-3000 BP an intense alluvial process along the coastal sector south of the Clisargic promontory takes place in the context of a continuous rise of the sea level, closer to the present day height. The coastal belt was probably situated between the two promontories represented today by the islands of Ada and La Ostrov, but at much lower heights (between -15 / -10 metres). The Casimcea River was rather strong, and pierced the coastal sand barrier." (Popescu and Caraivan 2002-2003: 57).

This data accords with ichthyological analysis of an osteological sample taken from the flooded level: both the number of osteological remains and the dimensions of the determined individuals are superior for the fresh water taxa (Radu 2000-2001: 167-8). Of the total of 154,673kg, estimated on the basis of the reconstruction of the dimensions, 88% represent fresh water fish: carp, catfish, pikeperch, perch and average or large perch. Fishing was chiefly in fresh water; the Eneolithic settlement was probably situated on a promontory near the mouth of the Casimcea River. The flooding of the settlement could have resulted from a combination of geomorphological transformations: the rise of the water level, corroborated with the vertical descending movement of the tectonic block, to which we add an important water presence from the Casimcea Valley (Haită 2000-2001: 152).

The majority of the 'lake' settlements of the West-Pontic coast, dating from the end of the Eneolithic and/or to the Early Bronze Age (according to Bulgarian periodisation), are located in the same geographical position at the mouth of a river, close to the sea: at the mouths of the rivers Djavolska, Rapotamo, Patovska and Batova; in the Kamcia valley from the confluence of the Louda and the Goljama Kamcia rivers up to the point where they flow into the sea; in the Provadyska valley, the most populated of them all (Lazarov 1993; Ivanov 1993; 1994; Draganov 1995). Only a rapid rise in the seawater level could have led to the simultaneous flooding of the Eneolithic settlements clustered in this valley: Ezerovo I ('Train Station'), Ezerovo II, Strachimirovo 1 ('East'), Poveljanovo, Morflotte ('Varna I') and Arsenala (Figure 2). Based on the presence of the layer of rocks that directly overlaps the late Eneolithic evidence and of the pollen in the flooded level covered by the rock layer, I. Ivanov was inclined to accept the idea of a large scale cataclysm which would have ended the existence of the Eneolithic settlements of the Varna area (Ivanov 1989: 56).

When was this phenomenon triggered?

According to the chronology established by Bulgarian researchers the settlements ended at the end of Eneolithic. What were the causes of population movements? Interdisciplinary studies indicate the general picture of climate change at the end of the Atlantic further complicating the puzzle. The period, ranging between 6050-5600 BP, was characterised by a sharp warming of climate with warm and long summers (Tomescu 1998-2000: 268).

In the area of the West-Pontic coast pollen diagrams for the Varna, Durankulak and Shabla - Ezeretz Lakes indicate that the Late Atlantic was characterised by the receding of mixed coniferous forests and by the expansion of lands cultivated with cereals (*Triticum monococcum, Triticum dicoccum, Triticum aestivum, Hordeum vulgaris*) (Bozilova and Filipova 1991). The deterioration of the mixed coniferous forests can be explained by the expansion of agricultural terrain where anthropic factors had a considerable role in the desiccation of the climate (deforesting, repeated cultures in the same area). The influx of salinity also suggests a rise of the seawater level for the same period (Christova 2003: 37, tab. 1; 40).

With the exception of the late settlement at Sozopol, the coastal area was abandoned for over 200 years (4100-3850 BC) due to the rise in seawater level (Draganov 1995: 236). Combining the ^{14}C data published for the 'lake' settlements (Bojadžiev 1995: 183, tab. 5) with the chronological table of the Romanian Eneolithic (Bem 2000-2001: 44-5; 49, fig. 7) we obtain, for the 4000-3900 cal. BC interval, the following synchronicities: Gumelniţa A2c - beginning of Gumelniţa B1 - Cernavodă Ia - Cucuteni A3 / A4 - Varna III.

At first glance the synchronicities may seem impossible, but a thorough analysis of the ^{14}C data in relation to Cucuteni ceramic imports (Cucuteni A3 and Cucuteni type C - the old phase) makes this contemporaneity possible. While Gumelniţa communities from Dobrudja and north-eastern Muntenia maintained their old traditions, the ceramic material is predominantly Gumelniţa A2, in the rest of the Romanian Plain more and more western elements appear (probably coming from a Sălcuţa-Krivodol environment) determining the transition to the Gumelniţa B1 phase. This explains the presence of Cucuteni A3 imports in a Gumelniţa A2 level at Brăiliţa, Lişcoteanca (the sites of 'Moş Filon' and 'Movila Olarului'), Rîmnicelu, Cireşu, Carcaliu, Hârşova and Târguşor-'Sitorman' and in a Gumelniţa B1 level at Gumelniţa and Căscioarele.

Stratigraphy at Hârşova rules out the possibility of violent invasions: between Cernavodă Ia and Gumelniţa A2 levels there is no stratigraphic pause with the first Cernavodă dwellings built over a layer of levelling with Gumelniţa ceramics. Following simple analysis of the artefacts discovered in these dwellings the Gumelniţa tradition is obvious, indicating a peaceful cohabitation of the two communities[1].

In the area of the West-Pontic coast there is no evidence to suggest a violent penetration of eastern tribes. A period of abandonment followed the level of the final Eneolithic (Varna III). Most of the investigated settlements were flooded with destroyed dwellings covered in an alluvial layer rich in sea shells. During the early Bronze Age - the periodisation of Bulgarian researchers - habitation resumed for a short time only because the 'lake' settlements were again flooded.

Given the complexity of the problem, our approach emphasises a few aspects:

- Climatic changes at the end of the Atlantic Period determined chain processes that surpass the cultural limits;
- Ceramic typology when reduced to sites or micro-regions risks offering an erroneous chronological succession. Reconsiderations of old periodisations are required to accord with ^{14}C data and the ceramic imports. The partial Gumelniţa A2c - Gumelniţa B1 - Varna III contemporaneity demonstrates the existence of several regional aspects with distinct evolutions;
- Cultural symbioses and peaceful cohabitations make the notions of culture and phase - sometimes established *a priori* - increasingly inoperative only on a typological basis.

The Neolithic Black Sea transgression should not, therefore, be viewed as an isolated phenomenon because similar and synchronous events are reported in remote areas. The effects of this warming were felt in the coastal areas too determining the process of the marine transgression.

Notes

1. *"In the eastern half of Muntenia and in Dobrudja, and south of the Danube down towards Varna, partly over a Cernavodă I basis and partly over a void produced by the dislodgement of these populations (s.n.), we see the settling of tribes that penetrated during the Usatovo movement, whence a new culture resulted, which received its name from another representative settlement from Cernavodă (II), situated on a low terrain, close to the Danube."* (Roman 1981: 40).

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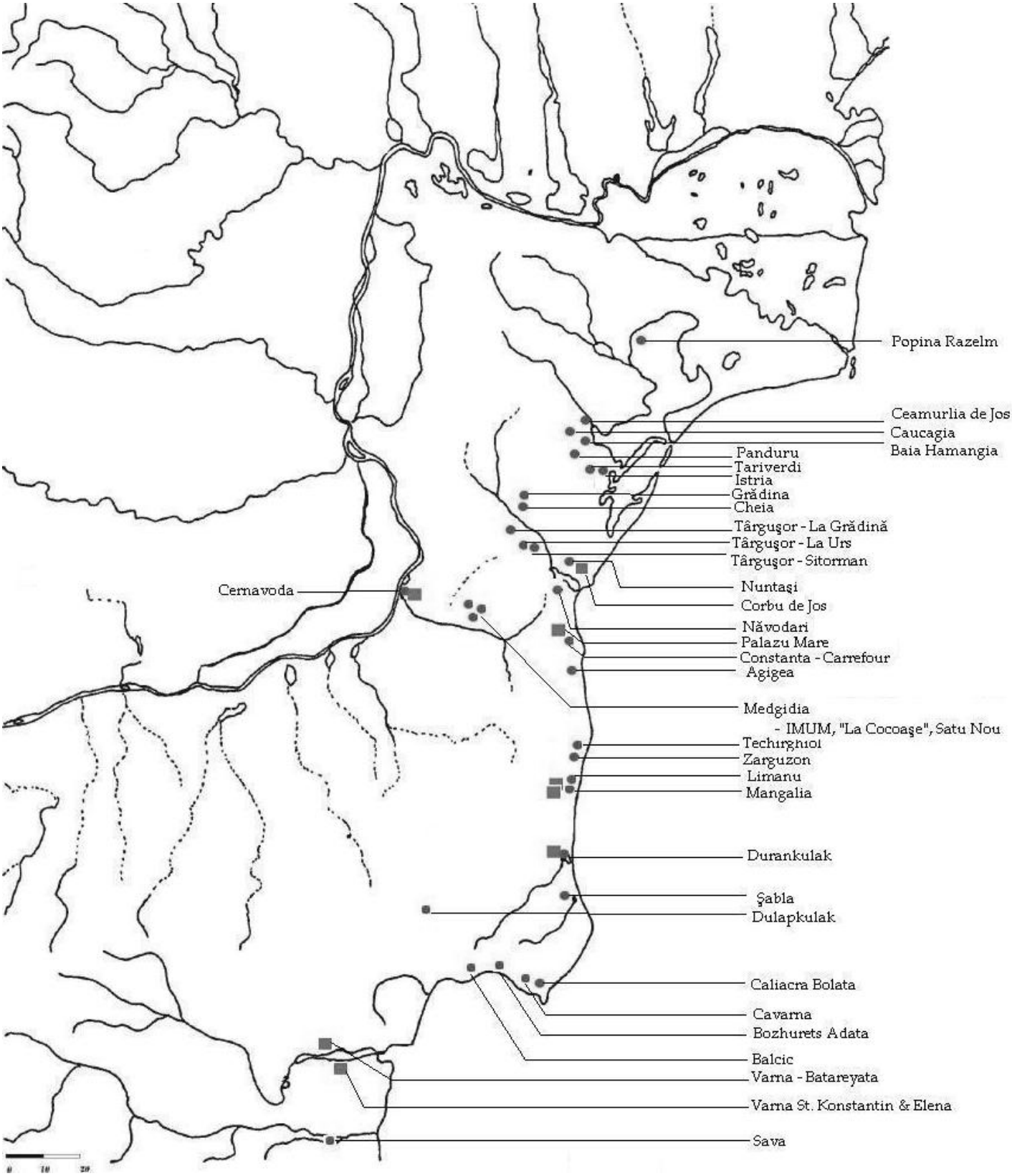

Figure 1. Settlements (●) and necropolis (■) Hamangia culture in West - Pontic coast region.

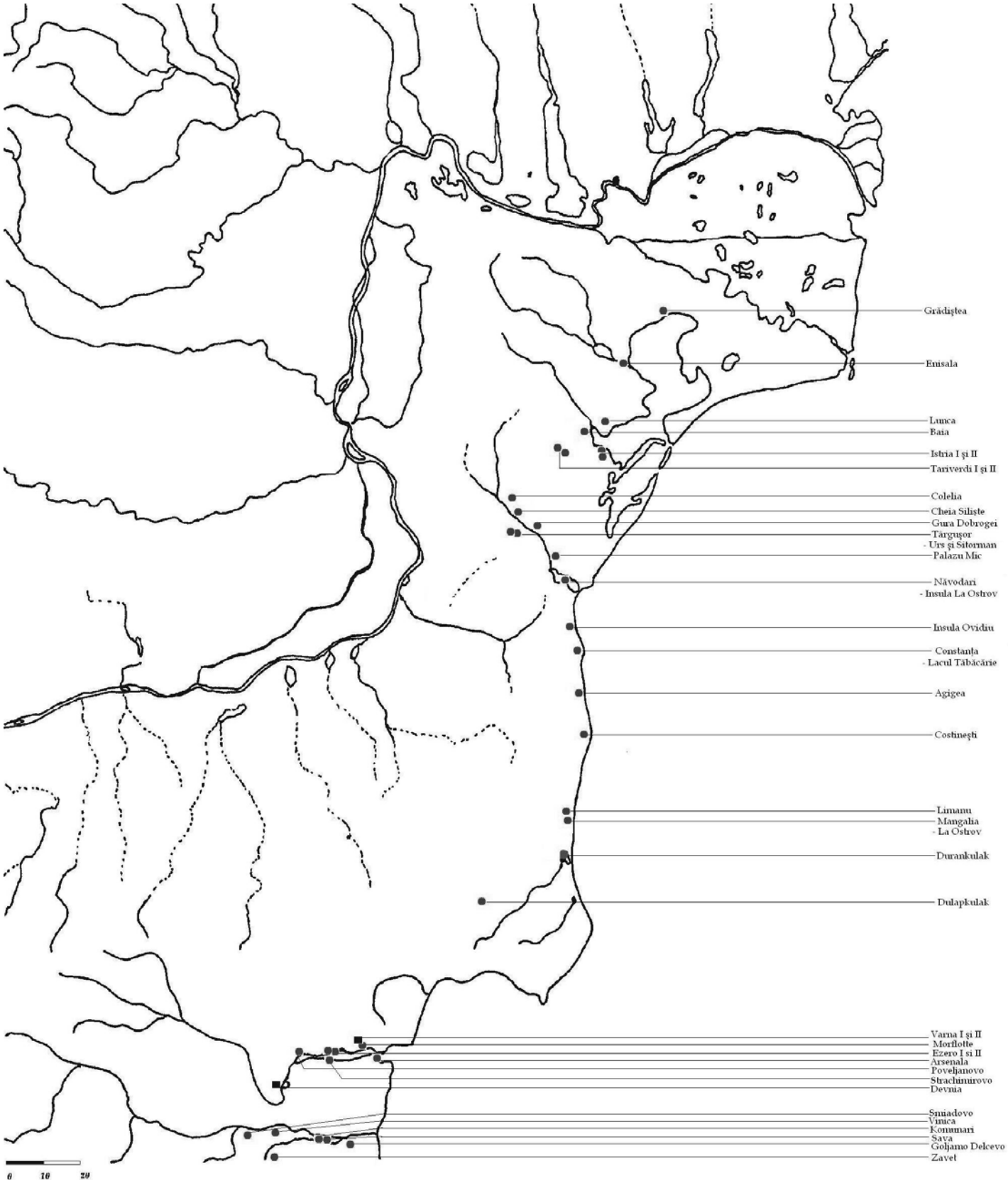

Figure 2. Settlements (●) and necropolis (■) Gumelniţa / Varna culture in West - Pontic coast region.

NOUVELLES DONÉES SUR LE NEOLITHIQUE ANCIEN DANS LE NORD-OUEST DE LA BULGARIE

Georges GANETZOVSKI

Résumé: *Cette nouvelle est basée sur les recherches archéologiques dans le site néolithique près du village Ohoden, département de Vratsa. Pendant la période 2002-2010 nous avons fait des fouilles archéologiques d'une agglomération du début du néolithique qui se trouve prés du village Ohoden, région de Vratza. La localité 'Valoga' (encore connue sous le nom 'Dolnitte laki') est localisée à 1,5 km au nord-est du village Ohoden. Le site néolithique est situé sur une terrasse, légèrement penchée à l'est, de type alluvial - prairie sur la rive gauche du fleuve Skat. La surface de la contrée est d'environ 100 ares.*

Dans le site, on a trouvé les vestiges des bâtiments et des tombes qui appartiennent à deux couches culturelles de suite pendant l'époque du néolithique ancien. La première couche concerne 'le néolithique monochrome' de la fin du VIIème et le commencement de VIème millénaire av. J.-C. et appartient à la phase Protostarchevo II. Le deuxième niveau concerne la culture Starchevo B. Les structures des deux couches sont disposées en stratigraphie horizontale.

Jusqu'à ce moment sont rencontrées quatre tombes qui se groupent dans la partie nord-est du site et constituent un secteur sacrifiant. Deux tombes des individus âgées sont très intéressantes. La tombe Nº 1 (l'individu que nous avons appelé 'Todorka') est une ouvrage funéraires monumentale sans analogies. Dans la tombe se trouve le squelette d'une femme d'âge moyen. Le type anthropologique est méditerranéen. La femme est enterrée en pose hocker de gauche et sa tête est tournée vers l'est. La tombe Nº 4 avec un individu masculin (que nous avons appelé 'Christo') a été découverte pendant l'été de l'année 2010 à six mètres sud-est de la tombe Nº 1. D'après l'analyse anthropologique, dans la tombe se trouve un squelette qui appartient au type protoeuropèen avec une taille de 1,65 m. Son crâne est aussi tourne vers l'est. Derrière la nuque du crane du squelette on a trouvé deux offrandes funéraires - un récipient en argile et une longue lame de silex. Le récipient en argile prouve que la tombe Nº 4 appartient de la 'phase monochromique du néolithique ancien' (culture Protostartchevo II). Les deux tombes avec des squelettes in situ ont été empaquetées et transportées d'une façon unique dans le musée de Vratsa.

Au sud de l'agglomération nous avons découvert 22 trous pour l'extraction de silex. On peut dire que s'est une mine pour l'extraction de silex par l'utilisation de la méthode du feu. On á constaté que le site était un centre de préparation et de diffusion des matières premières et des outilles de silex pendant le néolithique ancien.

L'analyse de la céramique nous donne une raison d'ajouter la première couche de l'agglomération a 'l'étape monochrome du début du néolithique' (culture Protostartchevo II) qui précède le phénomène du début du néolithique Gradechnitza A. Les prospections à Ohoden-Valoga donnent une confirmation nouvelle sur l'apparition des premières agglomérations d'agriculteurs au nord-ouest de la Bulgarie.

Le complexe céramique de la deuxième couche culturelle présente des formes et des éléments ornementaux typiques d'une étape plus tardive du néolithique ancien qui constituent l'étape Starchévo II.

Mots-clés: *le néolithique monochrome; la phase Protostarchevo B; des squelettes de type anthropologique méditerranéen et de type protoeuropèen.*

Cette nouvelle est basée sur les recherches archéologiques dans le site néolithique Ohoden-Valoga, situé à 24 km de la ville Vratsa au nord-ouest de la Bulgarie.

Le début du néolithique dans le nord-ouest de la Bulgarie est faiblement étudié. Les premières personnes qui ont fait des analyses dans la caverne, nommée Dévétachka, sont Vasil Mikov et Nicolaï Djambazov (Mikov, Djambazov 1960: 33-46). Pendant les années soixante et soixante-dix du XXème siècle, Bogdan Nikolov a accomplit des fouilles archéologiques des agglomérations du début du néolithique Tlatchéne, Gradechnitza-Malo Polé et Banitza (Nikolov 1962: 65-71; 1974: 4-35). L'analyse des matériaux obtenus permet de déterminer la culture du début du néolithique Gradechnitza-Kartcha avec un propre champ d'action territorial et limites - la Bulgarie nord-ouest

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 61-73.

contemporaine entre les fleuves Iantra et Timok et la région Oltenia en Roumanie (Nica 1976: 435-463; Nikolov 1983: 29-43; 1984: 5-217; 1992: 11-23).

La localité Valoga (encore connue sous le nom 'Dolnitte laki') se trouve à 1,5 km au nord-est du village Ohoden, région de Vratsa (Figure 1). Le site néolithique est situé sur une terrasse, légèrement penchée à l'est, de type alluvial - prairie sur la rive gauche du fleuve Skat. La surface de la contrée est d'environ 100 ares.

Les recherches archéologiques ont été faites pendant la période 2002-2010 sur une superficie de 860 m^2, sous la direction de Georges Ganetzovski (le Musée Régional Historique à Vratza) avec le consultant - professeur Henriéta Todorova. Dans l'équipe interdisciplinaire ont pris part le docteur Lazar Ninov de l'Institut Archéologique de Sofia, le docteur Elena Marinova, le docteur Radka Uzunova de l'Université de Sofia 'St. Kliment Ohridsky' et Viviana Miteva.

Durant les parcours du terrain autour du village Ohoden en 1994, nous avons localisé un objet préhistorique qui était inconnu jusqu'à présent. Après une analyse comparée des matériaux assemblés mais non pas stratifiés par rapport aux objets ayant servis de modèle en Bulgarie nord et nord-ouest, on a fait une supposition que cet objet appartienne à l'étape 'monochrome du début du néolithique' (Ganecovski 1999: 25-6).

D'abord on a constaté que le site contient seulement une couche culturelle qui se situe vers le début du néolithique ancien, mais les recherches poursuivies sur une surface plus vaste ont établi deux couches culturelles avec des structures disposées en stratigraphie horizontale. Les vestiges des bâtiments et des tombes appartiennent à deux sites successifs pendant l'époque du néolithique ancien. La première couche culturelle concerne 'le néolithique monochrome' de la fin de VIIème et le commencement du VIème millénaire av.J.-C. Elle appartienne à la phase Protostarchevo II qui précède le phénomène du début du néolithique déjà connu, Gradechnitza A de la culture Gradechnitza-Kartcha. Le deuxième niveau culturel présente la culture Starchevo B. La stratigraphie horizontale que nous avons constatée présente les édifications consécutives des deux agglomérations. Les débordements de la rivière Skat que nous avons constatés expliquent la faible presence des matériaux tardifs dans les structures blessés.

La stratigraphie

Le premier niveau culturel est représenté par les Structures 1 (Figure 2) et 4 qui probablement sont les restes des bâtiments.

Les profiles de contrôle présentent presque toujours la même situation stratigraphique (Figure 3). Sous la jachère se trouve une couche de couleur brun foncé d'une densité élevée contenant des accumulations compactes des fragments de céramique, des artefacts siliceux, des crépis d'argile d'une couleur brune brique, des os d'animaux et des charbons. Cette couche remplit principalement les parties creusées des structures. Ici sont localisés des amas en grande quantité d'écailles siliceuses, qui se sont amasses grace au travail du silex. On a constaté que la plus forte concentration d'artefacts siliceuse se trouvés dans la partie supérieure de cette couche de remplissaje, située au dessous des crépis émiettées et des tessons céramique. Cela montre que le travail du silex à l'époque a été accompli dans certaines parties de structures creusées dans le sol, sur une plate-forme en bois bien enduite en argile.

En profondeur, la concentration du silex diminue peu à peu en échange d'un nombre augmenté des fragments céramiques, des os animaux, des charbons et des pierres brûlés.

La couche suivante a une couleur gris foncé brun et une épaisseur entre 0,20 et 0,75 m. Elle est considérablement plus pauvre en matériaux archéologiques, mais on aperçoit un contenu plus haut de charbons. En profondeur, la concentration des matériaux archéologiques diminue graduellement. Dans cette couche se trouvent des strates minces avec une longueur de 0,90 m et une largeur de 0,70 m. Elles sont composées de charbons et de crépis finement cassés. Ce sont probablement des vestiges d'un équipement d'une forme ovale, brûlé et détruit, qui se trouvent au centre des structures prospectées.

Le plus bas, directement sur l'argile jaune et stérile, il y a une couche jaune-blanchâtre d'une épaisseur de 0,50 à 0,40 m. Cette couche est pauvre en matériaux archéologiques. On y a trouvé des petits morceaux de crépis en argile et des objectés uniques, des d'artefacts siliceux. Il fait une impression que sa plus grande épaisseur est dans la parcelle du terrain enterrée de la structure. D'après nous elle provient des crépis murales qui se sont délavés et ont fait des strates sur le fond. Dans l'argile jaune stérile, on a nettoyé des restes des pieux dont le diamètre est entre 0,15 et 0,25 m. Au sud-ouest de la Structure 1, se trouve une fosse bridée de deux trous des pieux, remplie de

charbons, de crépis, de pierres brûles et de la cendre (Figure 2). Il s'agit probablement d'un âtre qui est couché sous un appentis devant la demeure.

Les structures des maisons, d'après le plan, ont une forme ovale d'orientation est-ouest (Figure 2). La profondeur des travaux est entre 0,40 et 0,60 m par rapport au niveau ancien du terrain. Les dimensions de la partie creusée sont: une largeur de 5,30 m et une longueur de 8,50 m. Les fosses qui sont excavées d'une façon dégressive sous la surface habitable probablement étaient des fosses pour drainages et pour isolation aérienne. L'emplacement de la construction des pieux montre que les parties supérieures des structures sont plus grandes en superficie (s'élargissant vers le sud et vers le nord d'environ 1,50 m).

Les observations du terrain montrent que les places des structures d'habitat sont situées en haut de la surface du terrain ancien. Ici on a fait des pointes en silex et de la céramique. L'état fortement morcelé de la céramique montre que les récipients ont été tombés de haut et sont définitivement émiettés à cause des murs solides tombants sur eux de la partie d'en haut.

Il existe des preuves indirectes qu'il y a eu effectivement un four exactement dans la partie supérieure de la demeure. Il paraît que les fours ont été détruits par la suite par la chute des murs en même temps que la construction qui les couvre. Ils sont tombés dans les parties creusées des structures de l'habitat. Si on juge d'après la position des trous des pieux trouvés, on peut supposer que les entrées se trouvaient dans les parties sud-est.

L'analyse formelle et technologique de l'ensemble céramique

Le trait caractéristique des catégories céramiques c'est le rassasiement de composantes organiques dans l'argile.

La céramique se sépare en groupes technologiques suivants (Figure 4, 6-11):

A. *La céramique engobée*, qui se subdivise en deux petits groupes:

- *Rouge-vineux* (Figure 4, 6, 9). Avec l'engobe rouge-vineux sont couverts en même temps les récipients aux parois minces ainsi que les récipients aux parois épaisses.

- *La groupe brune-engoba* (Figure 4, 7, 10). Dans ce groupe il y a un engobe brune (ou brun foncé). On a couvert des récipients aux parois minces. Ils ont une facture de plus bonne qualité et aussi des murs polis en brun brillant.

On y voit des récipients qui ont une couverture d'engobe rouge sur la surface extérieure. On a constaté dans quelques cas une couverture rouge sur les murs extérieurs et de couleur brun foncé à l'intérieur.

B. *La céramique qui n'est pas engobée* (Figure 4, 8, 11). Les récipients aux parois fines dans ce groupe technologique ont une surface bien aplanie.

Les caractéristiques de la pâte de la céramique aux parois épaisses dans les deux groupes technologiques montrent que l'argile avait été cuite dans un milieu d'oxygène bas et respectivement à une température basse. La céramique trouvée était fragmentée à cause de sa faible solidité.

L'analyse formelle de la céramique donne les groupes suivants:

- des récipients coniques (des écuelles) avec une embouchure arrondie ou aiguisée, parfois décorée par des petites fosses (Figure 5). Dans quelques cas elle est profilée en dehors et coupée d'une manière ondulatoire;

- des récipients hémisphériques (des bols ou des écuelles) avec une embouchure arrondie ou aiguisée (Figure 6, 4);

- des récipients sphériques (des pots) ouverts ou fermés avec une embouchure arrondie ou aiguisée (Figure 6, 1-3);

- des récipients sphériques (et d'une manière pareille, des pots) avec une embouchure cylindrique ou pliée en dehors et un ventre profilé (Figure 7);

- des récipients sphériques profonds (des pots) avec un cou haut cylindrique. Leur embouchure est pliée en dehors, arrondie ou également coupée;

Les récipients décrits sont fournis avec une petite base-piédestal ou bien une base plate.

Différents sortes de décoration sur les récipients (Figure 4, 1-5). On y voit la décoration suivante:

- des concavités en griffe ou des petites fosses situées sur les murs du récipient;

- un ruban en relief avec un *impresso* griffé collé sur les murs du récipient. Dans quelques cas il est combiné par des griffonnages peu profonds ou des points piqués;

- une barbotine dans un relief bas modelée en deux couleurs. Dans quelques cas elle est combiné par un ruban en relief et un *impresso* griffé;

- des trous coniques dans les murs du récipient; des boutons en relief avec une cime concave; des boutons coniques et des boutons appelés 'médaillon'.

- on a trouvé quelques fragments qui sont décorées en peinture porcelaine sur un engobe rouge.

Les anses sont identiques. Ici sont représentes les anses caractéristiques pour cette période, semblables avec les 'tunnels' percés horizontalement ou verticalement. Les anses, appelés aussi 'tubes', respectent l'ordre chronologique et culturel.

On a constaté une plus grande variété par rapport aux fonds des récipients. Il y a des fonds plats, des fonds mis sur une petite piédestal haute compacte, des fonds qui ont une petite piédestal compacte et annulaire, ou bien avec une petite piédestal vide annulaire.

L'analyse de la céramique nous donne des raisons pour considérer la première couche de l'agglomération appartenant à 'l'étape monochrome' du début du néolithique (culture Protostartchevo II; Srejović 1973: 252-26) qui précède le début du néolithique Gradechnitza A.

Des objets de la culture matérielle. Des objets de culte

Dans la couche de la 'Structure 1' on a trouvé les objets suivants:

- une plaque céramique avec un trou pour un fuseau.
- des fragments des figures anthropomorphes et zoomorphes;
- des disques en pierre ou en argile;

Des artefacts en silex et en pierre de la première couche de l'agglomération. Le travail et l'analyse de l'ensemble en pierre est fait par Radka Zlateva-Uzunova.

Les outilles en pierre sont en petite quantité par rapport aux articles siliceux. Parmi les exemplaires uniques sont présentes: des herminettes, des pioches, des haches, des polissoires, des mortiers, des enclumes et des abrasives, au grand regret, la plus d'entre eux fragmentés. Pour les élaborer, on a utilisé des types variés de pierre - une touffe andésite, des grès, des schistes etc.

Il est impressionnant le grand nombre des découvertes en silex - 1059 artefacts et 2032 éclats de pierre taillée, ainsi qu'une grande variété de matériaux de silex utilisés qui ont été trouvées dans la Structure 1. Les artefacts appartiennent au début du néolithique et se séparent en deux catégories: des outils de pierre polis et des artefacts en silex.

On a localisé des objets, des variétés en pierre prédominent dans l'ensemble - elles sont originaires du pays, mais en même temps on y voit des matériaux de la région de la ville Pléven et de la région de la ville Razgrad. Parmi la collection siliceuse, les objets les plus nombreux appartiennent au groupe du débitage suivi par le groupe des noyaux et des formes naturelles avec des traces d'exploitation. La structure typologique de l'ensemble en silex est dominée par les outils aux plaques retouchées, des gratte-pieds et des gros éclats. On rencontre plus rarement des plaques avec un émoussement transversal et longitudinal, des écosses, des forets, des tranchants. L'une des particularités du groupe c'est la présence d'outilles microlithiques - des segments, des trapèzes et des perçages (Figure 11: 1).

Les traces de l'utilisation dans les groupes du débitage et les outils prêts rentrent fondamentalement dans deux catégories - un travail du bois et des activités liées à l'agriculture. On peut lier à l'agriculture les éléments des faucilles et les couteaux pour les céréales, qui prédominent dans l'ensemble.

Les caractéristiques de la collection en pierre des structures observées permettent de constater que les parallèles les plus-proches sont les matériels du début du néolithique, des objets d'Orlovetz, Pomochtitza et Koprivetz, en Bulgarie du nord.

C'est difficile d'expliquer quelques gisements en silex et en pierre en forme de disque du point de vue de la fonction et de la destination. Des artefacts pareilles sont découvertes dans l'agglomération du néolithique ancien Iabalkovo dans la vallée de la rivière Maritsa (Sud Bulgarie; Leshtakov *et al*. 2007: 185-234).

Dans la Structure 4, on a trouvé une plaque retouchée d'obsidienne (Figure 11: 2). C'est possible que les artefacts d'obsidienne proviennent du bassin Carpatique. Nous trouvons quelques parallèles aux artefacts d'obsidienne de l'agglomération Goura Batchiului en Transilvanie (Lazarovici, Maxim 1995: 436). On peut proposer que pendant cette période il y avait des contacts commerciaux bien développés entre les localités des deux côtés du Danube.

Au sud de l'agglomération nous avons découvert 22 trous pour l'extraction de silex. On peut dire que s'est une mine pour l'extraction de silex par l'utilisation de la méthode du feu. La présence d'artefacts de silex des autres gisements nous montre que le silex ou la matière première était transportée et façonnée dans le territoire du site. Dans les trous on a trouvé quelques fragments de

céramique qui appartiennent à la première couche de l'agglomération. On peut dire que le gisement était exploité pendant le néolithique ancien. On á constaté que le site était un centre de préparation et de diffusion des matières premières et des outilles de silex pendant le néolithique ancien.

D'après l'analyse de taphonomie, les os des animaux ne sont pas bien conservés à cause du sol agressif qui couvre les restes du site.

Parmi les os des animaux, prédominants sont ceux de boeuf et d'aurochs suivis par les restes de chien (l'analyse a été faite par dr. N. Spasov). C'est un phénomène insolite parce-que le chien est parmi les plus rares animaux domestiques qui se rencontrent dans les sites néolithiques. Très intéressant est un fragment de molaire bas de cheval sauvage. Les restes des os de cheval sauvage sont aussi très rares dans les sites du néolithique ancien. Dans la région de Vratsa c'est le deuxième site néolithique après la localité Gradeshnitsa-Malo pole où on a trouvé des restes de cheval sauvage.

Jusqu'au aujourd'hui nous avons rencontré quatre tombes qui se groupent dans la partie nord-est du site et constituent un secteur sacrifiant. Deux tombes des individus âgés sont très intéressantes.

La tombe Nº 1 (l'individu que nous avons appelé 'Todorka') est une ouvrage funéraires monumentale sans analogies. (Fig. 8). On a trouvé une structure creusée (Structure 2) avec la tombe Nº 1 qui est située dans la partie centrale de la structure. Dans la tombe se trouve le squelette d'une femme d'âge moyen (*Adultus*, dans les limites vers 25-30 ans; Iordanov 1999: 3-173). On a constaté que les dents de la femme sont très usées. Le type anthropologique est méditerranéen. La femme est enterrée en pose hocker à gauche et sa tête est tournée à l'est. Dans le sol brun fonce qui remplit la partie creusée de la structure et la tombe ont été trouvés des fragments de céramique, des artefacts de silex, des crépis d'argile d'une couleur brune brique, des os d'animaux et des charbons.

La tombe Nº 4 avec un individu masculin (que nous avons appelé 'Christo') a été découverte pendant l'été de cette année (2010) à six mètres sud-est de la tombe Nº 1 (Figure 9). D'après l'analyse anthropologique, l'individu avait un âge moyen (*Adultus*, environ 30-35 ans) avec une taille de 1,65 m. Le type anthropologique est protoeuropèen. Son crâne est aussi tourné à l'est. Derrière la nuque du crâne du squelette on a trouvé deux offrandes funéraires - un récipient en argile (Figure 10) et une longue lame de silex. Le récipient en argile prouve que la tombe Nº 4 appartient à la 'phase monochrome du néolithique ancien' (culture Protostartchevo II).

Les deux tombes qui sont bien conservées avec des squelettes *in situ* ont été empaquetées dans des cuves de gypse et transportées d'une façon unique dans le musée de Vratsa.

Interprétation

L'analyse des donnés présentées plus haut nous donne la raison d'assigner les decouvertes à la deuxième phase de la culture Protostartchevo (Srejović 1973: 252-63). Des agglomérations pareilles existent aussi dan l'est de la Serbie et au sud-ouest de la Roumanie. On a trouvé des structures creusées analogues à Divostin I près de Cragouévatz (Bogdanovič 1987: 7). On voit une pleine parallèle comme dans les formes des récipients ainsi que dans les quelques ornements comme l'*impresso* griffé et des griffonnages sur les murs (Bogdanovič 1987: 9, Fig. 5, 7-12; 10, Fig. 6, 7). Sur le territoire de la région on a trouvé aussi d'autres agglomérations pareilles, parmi elles Zmaievatz, Lepensky Vir IIIa et Gura Baciului. Dans les dernières années, on a prospecté des parties des agglomérations synchroniques sur le territoire de la Bulgarie contemporaine centrale et nord-est - Polianitza-le plateau (Todorova 1989: 9-25), Drenkovo dans la vallée de Strouma moyenne et Djoulunitza, Koprivetz I (Popov 1994: 51-76). Cette constatation est confirmée par le datage au radiocarbone de la Structure 1 qui a été effectuée au laboratoire à Köln (Allemagne) KN-5655, 6830+/-45 BP - 5710+/-40 cal. BC (68%).

Quelques artefacts de silex portent des caractéristiques mésolithiques. Ce signe nous donne raison d'admettre la présence des restes de la population du pays de la période du mésolithique qui avait été néolithisés par les agriculteurs nouveaux venus du sud (Renfrew 1990: 2-399) - un phénomène qui est typique à la culture Protostartchevo (Srejović 1981: 24).

La deuxième couche culturelle (appelée Ohoden II) est présentée par les Structures 5 et 7 qui probablement aussi sont les vestiges des bâtiments. La stratigraphie et les vestiges de l'architecture sont analogiques aux celles des Structures 1 et 4. Les groupes technologiques de la céramique sont identiques aux celles de la première couche culturelle mais dans le complexe céramique prédominent des formes et des éléments ornementales typiques d'une étape plus tardive du néolithique ancien qui constituent l'étape Starchévo II. Ce sont des formes à profil évasé, des récipients en brun foncé ou noire, engobe et bien polis, des récipients mis sur une piédestal haute,

vide, conique ou cylindrique, des récipients nombreux, décorés avec des ornements noir sur une engobe rouge et des fragments des tables cultes ou des autels avec des chenaux profondément concaves sur les pieds.

Dans la deuxième couche culturelle prédominent les restes des os de chèvre et de moutons.

Des éléments plus tardifs aux ruines trouvées dans les tombes 2 et 3 nous donnent raison de les ajouter vers la deuxième période de l'agglomération - Ohoden II.

Les découverts à Ohoden-Valoga jettent une lumière nouvelle sur le problème de la pénétration et du peuplement des premiers agriculteurs en commencement du VI millénaire av.J.-C. dans nord de la Bulgarie (Tasič 1983: 53-61). Par suite de tout ce qu'on a déjà dit, on voit bien l'importance du site pour les prospections du début du néolithique en Bulgarie.

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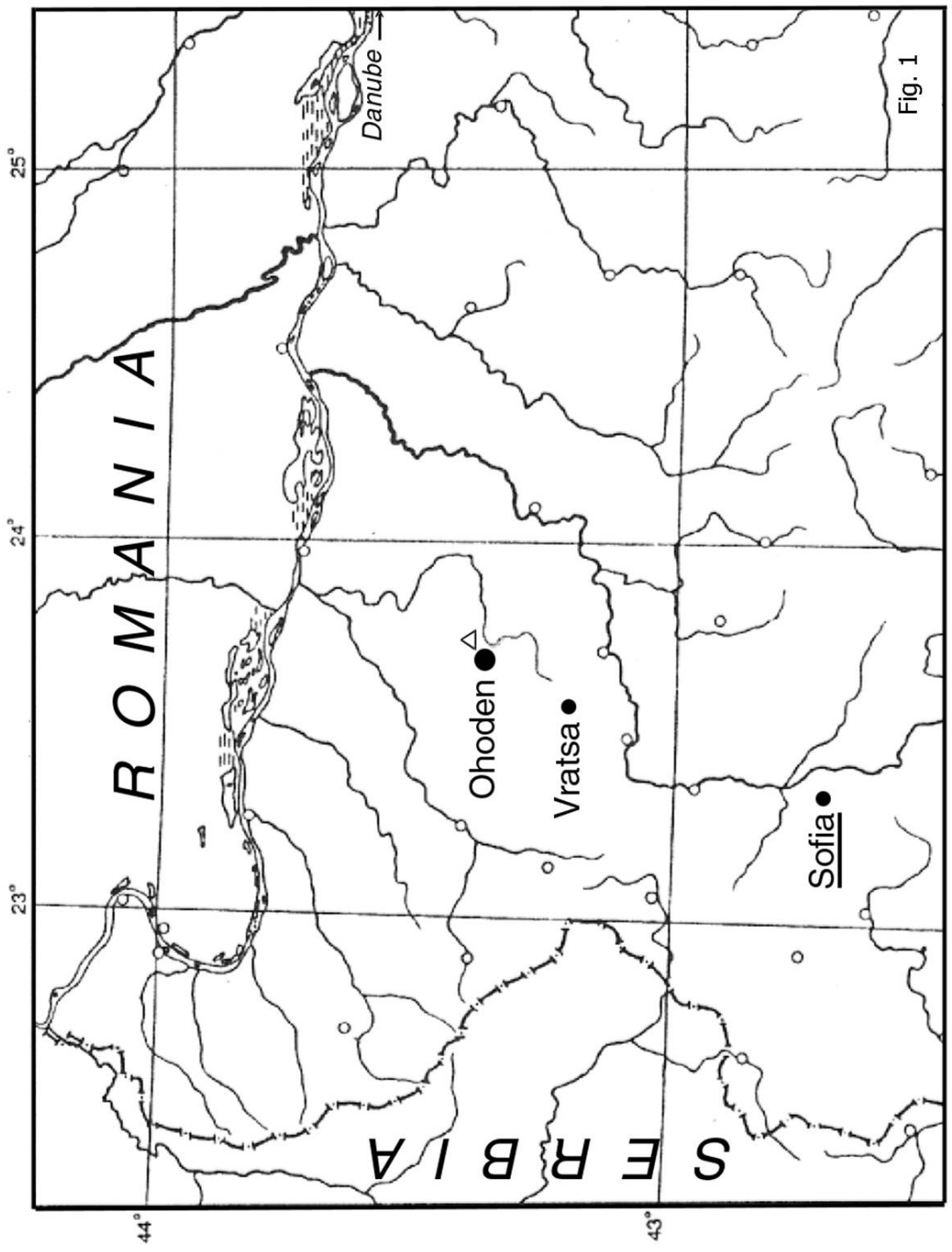

Figure 1. Plan du Nord-Ouest de la Bulgarie avec la localisation du site Ohoden-Valoga.

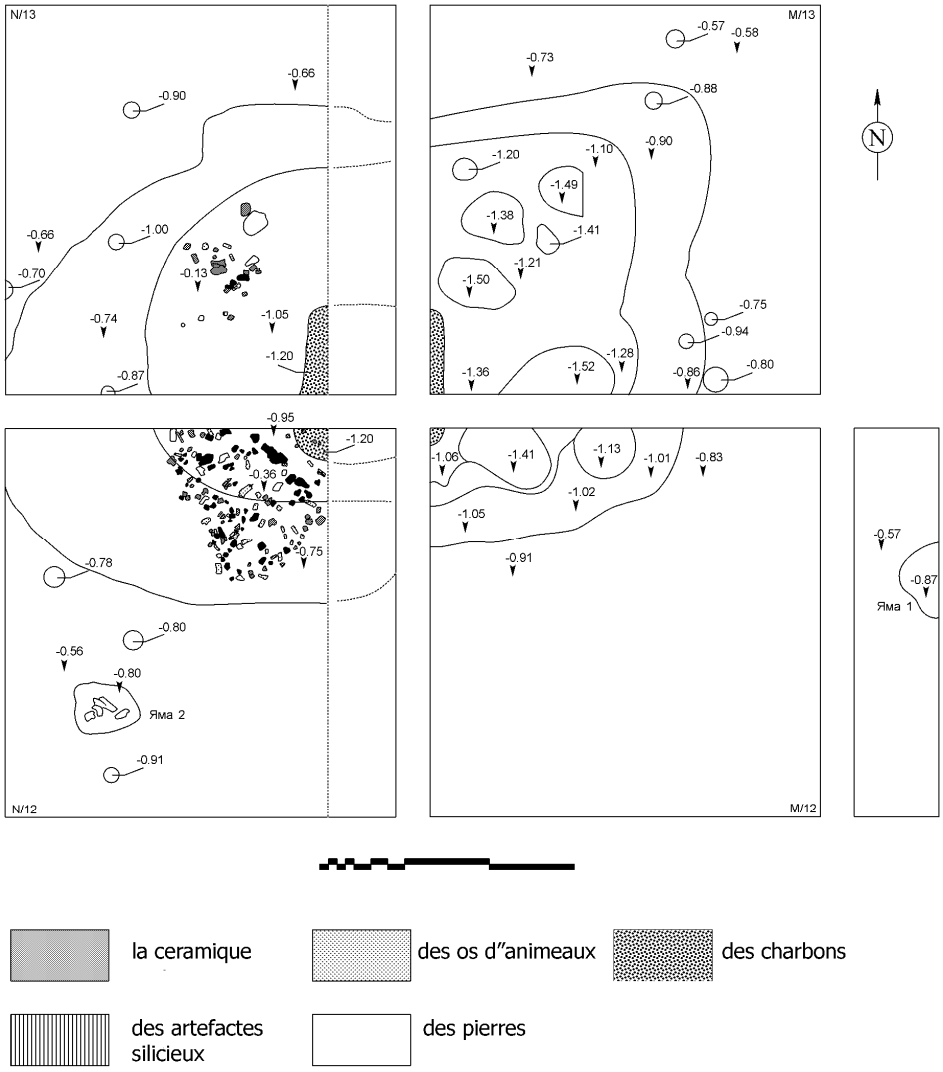

Figure 2. Plan des rassemblements des matériaux archéologiques dans la partie basse de la Structure 1.

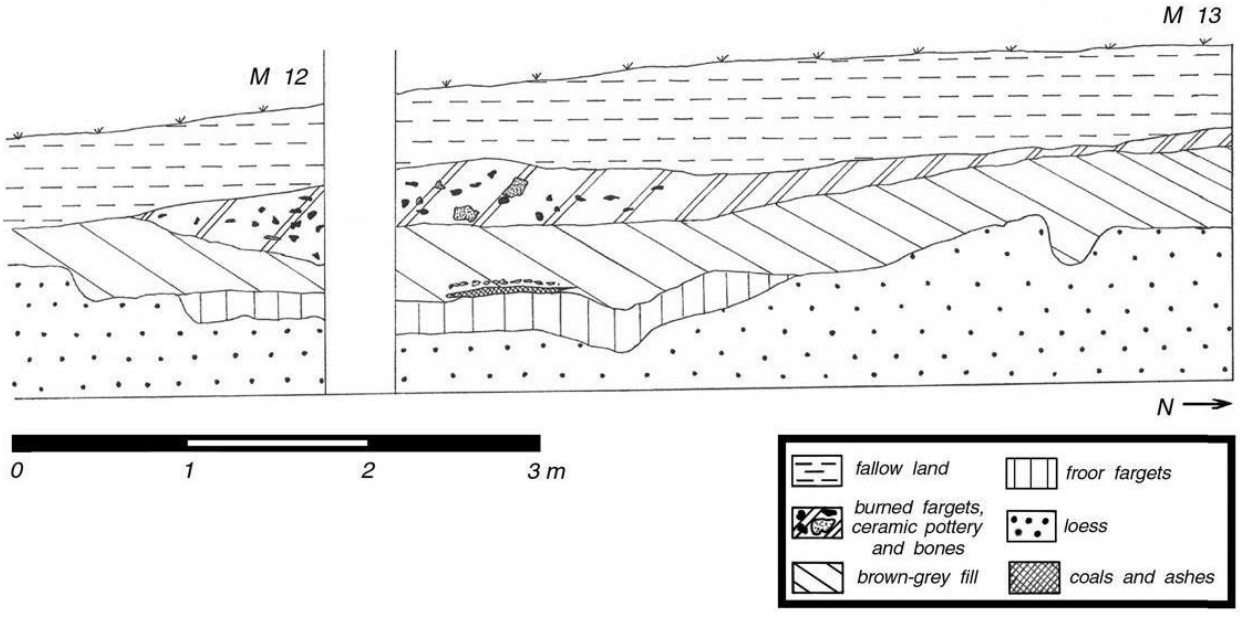

Figure 3. Profil de l'ouest des carrés M12-M13 et profil de l'est des carrés N12-N13 de la Structure 1.

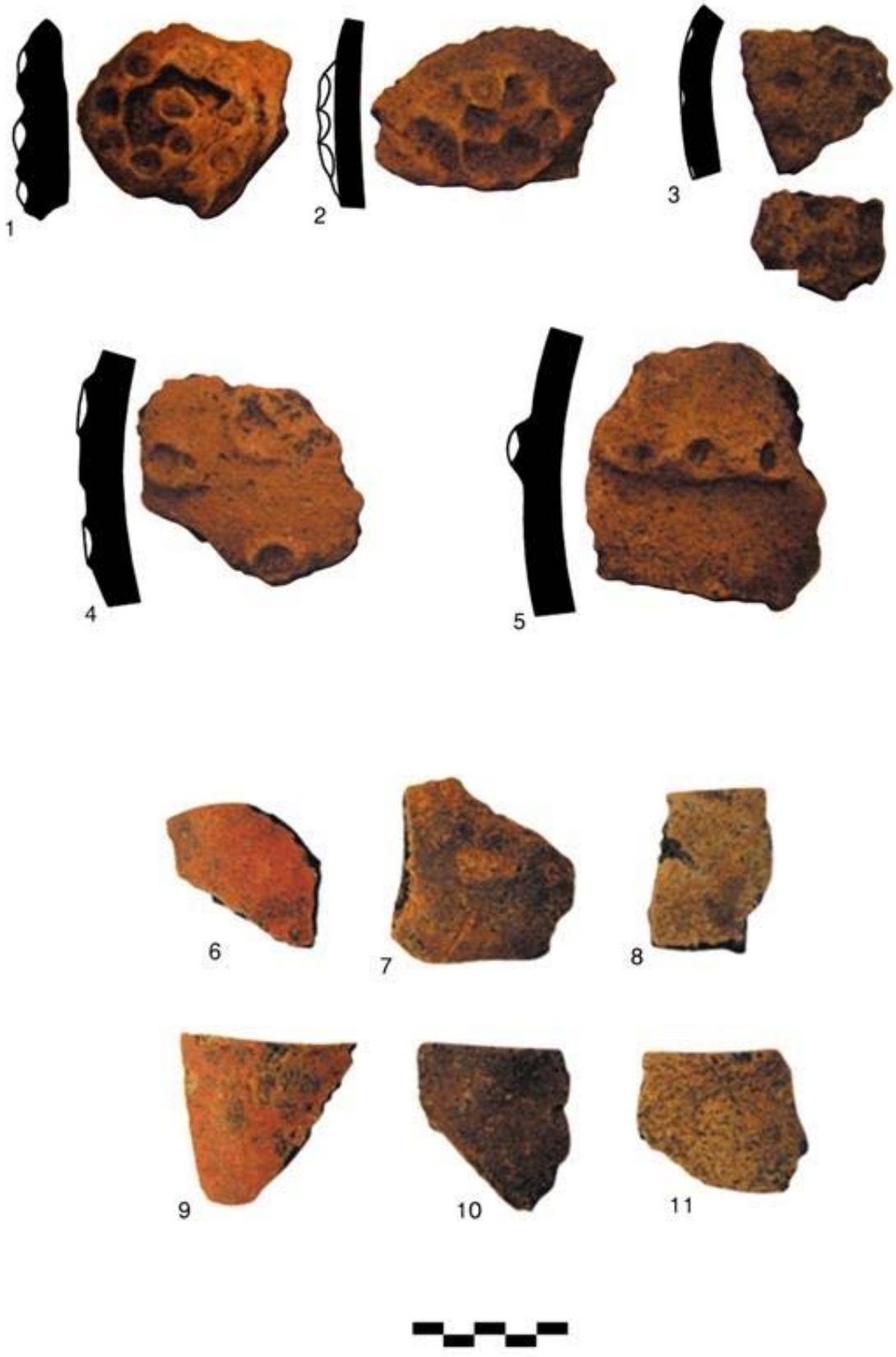

Figure. 4. Décorations de la céramique (1-7); Groupes technologiques de la céramique (6-11).

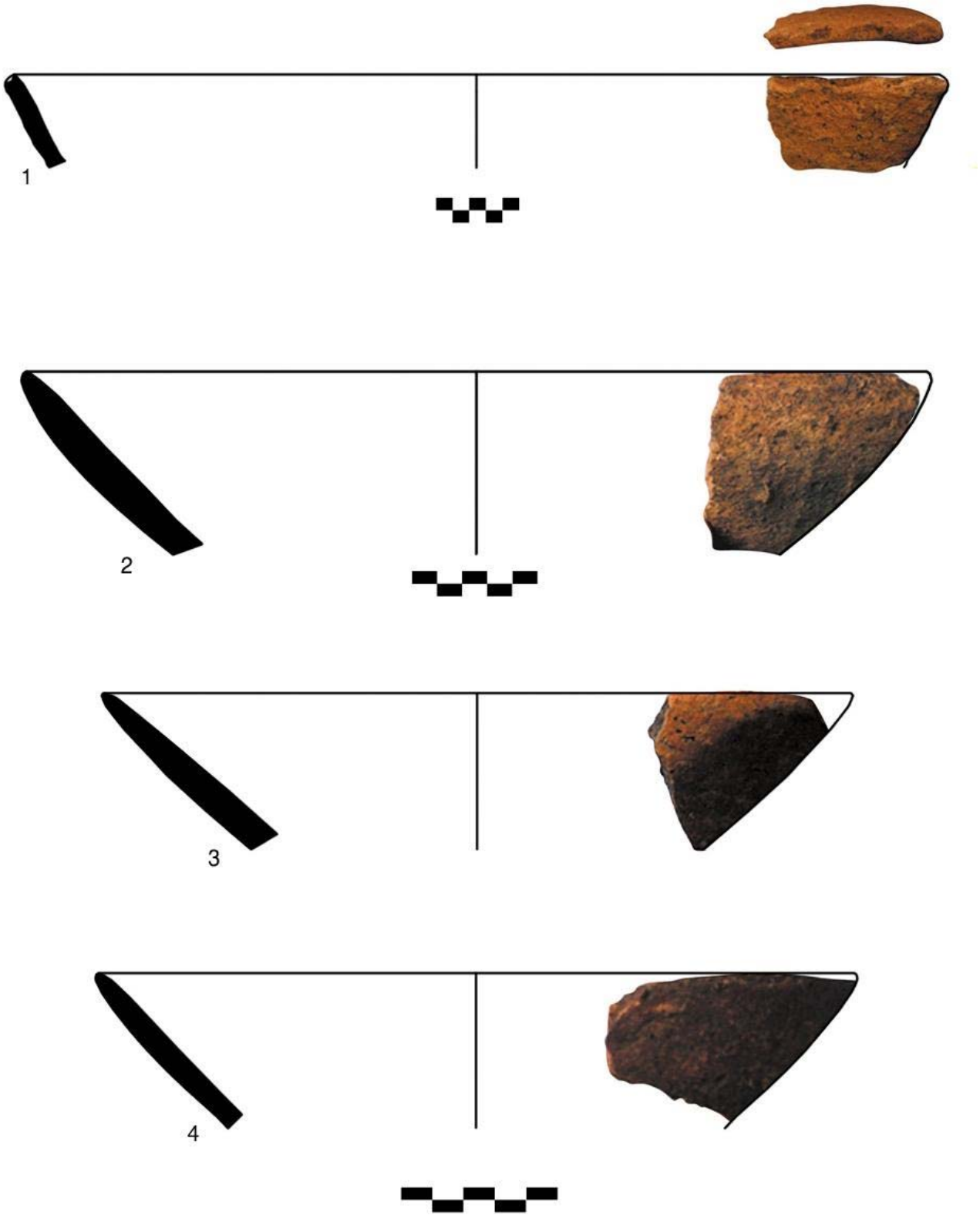

Figure 5. Des formes de céramique.

Figure 6. Des formes de céramique.

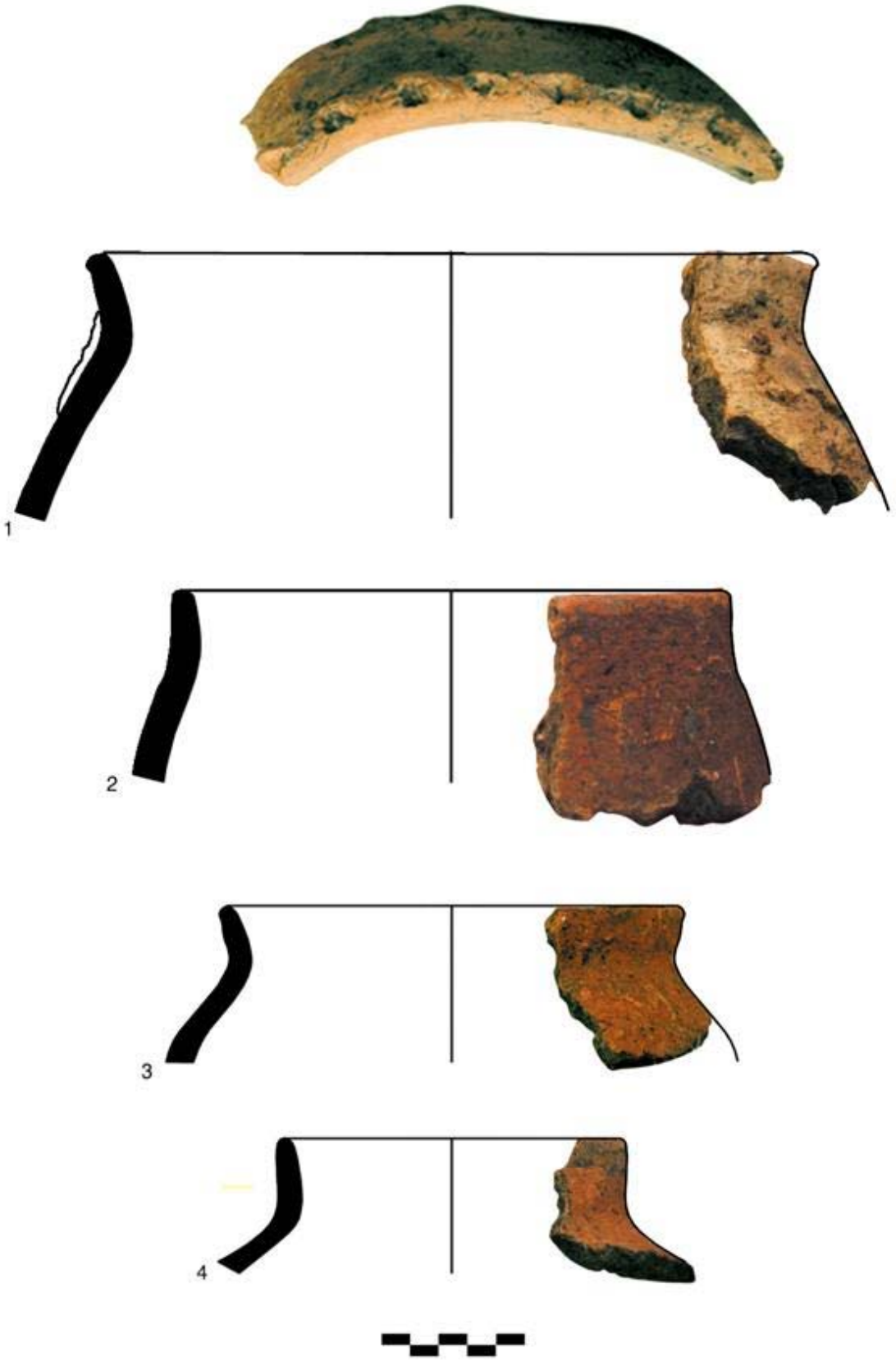

Figure 7. Des formes de céramique.

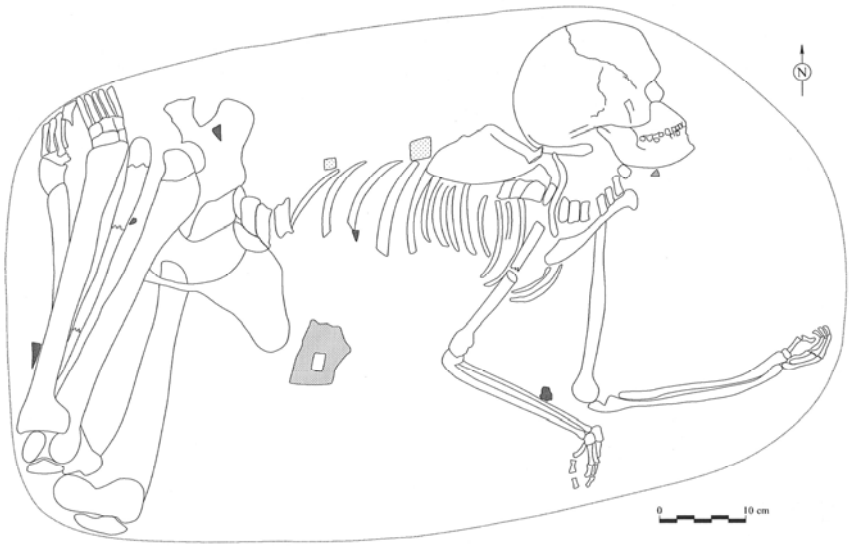

Figure 8. Plan de la tombe № 1.

Figure 9. Image de la tombe № 4.

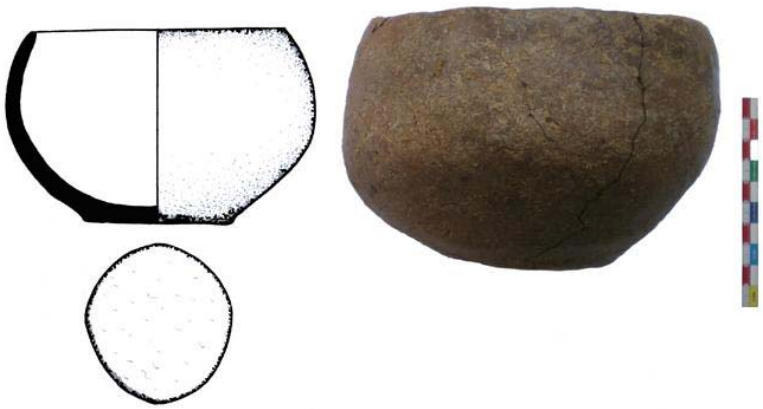

Figure 10. Récipient en argile découvert dans la tombe № 4.

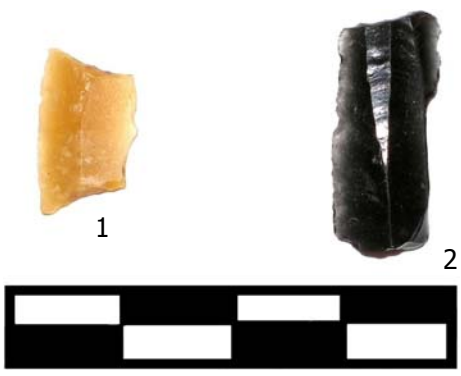

Figure 11. Outil microlithique de type 'trapèze' (1) et plaque retouché d'obsidienne (2).

EARLY VINČA CULTURE DYNAMIC IN SOUTH - EASTERN TRANSYLVANIA

Cosmin Ioan SUCIU

Abstract: *South-Eastern Transylvania is a key point for controlling the middle Mureş Valley, for access from the Banat and the Hungarian Plain to Northern Transylvania and to Eastern Transylvania and the Southern area of Oltenia and Muntenia. The early Vinča communities secured the area in the middle of the sixth millennium BC and the Danube Gorge at almost the same time. A new way of life quickly spread marking the transition to the Middle Neolithic period.*

Keywords: *Early Vinča Culture; settlement distribution; Late Starčevo-Criş; radiocarbon.*

Vinča is a widespread culture including Macedonia, Kosovo-Metohija, Croatia, Bosnia, western Bulgaria, Oltenia, Banat, Vojvodina, southern Hungary and Transylvania, but its cultural influence extends beyond its area of origin (Lazarovici 1977: 19; Chapman 1981: 1).

Vinča culture is part of the second great wave of southern origin, and marks the end of the Early Neolithic and the start of the Middle Neolithic. It is considered to be part of the 'Balkan-Anatolian Chalcolithic' (Berciu 1961: 36; Lazarovici 1977: 20; Lazarovici 1987-1988: 17; Lazarovici and Nica 1991: 5; Ursulescu *et al.* 1991: 157; Lazarovici 2000, 276; Maxim 1999: 63; Chapman 1981: 2; Luca 2008: 26; Özdoğan 2003: 352; Horvàt 2003: 100; Garasanin 1951). This phenomenon is chronologically located in the third part of the Early Neolithic in all the civilizations and groups from the Balkans areas from Central Europe (Lazarovici and Nica 1991: 5).

The beginning of the middle Copper Age at about 5500 cal BC is a critical time for the communities in Asia Minor where the entire region of the Aegean Sea coast is reoccupied from the Black Sea shores and throughout the Konya Plain.

The 'Balcano-Anatolian Chalcolithic' does not imply the existence of identical cultures in the area from the Danube to the eastern side of Taurus Mountains. The term corresponds more to active interactions and similar phenomena as parallel developments that are present but without a certain time of origin. This moment is known as Vinča or/and Karanovo III in the Balkan area and is present in the Anatolian part of the Marmara Sea (e.g., black pottery, canelated and incised decoration, pots with feet, bitronconical shapes, large deposit vessels, reinforcing of horn and bone industry). Construction technology is also influenced. This is seen best at Ilipinar - levels VII-V. The number of settlements in eastern Thrace grows extremely rapidly in this period, a sign of the arrival of new groups in the region. A good example is the settlement of Pinar Aşaği where level 5 presents elements showing drastic changes. Levels 5-7 show a gradual increase in so-called Vinča elements, with the peak level of this development being recorded in the third level. The typological development is increasing in parallel with the extraordinary technological development. At this time the importance of artefacts indicating social status increases, a good example being the shaped bead workshop that used as raw materials malachite, Spondylus or rock crystal (Özdoğan 2003: 353). Level 5 from Ilipinar has analogies with the Vinča culture, with early Dudesti and Karanovo III. The situation is dramatically changed from previous levels and the artifacts are similar to the Vinča from Salhane, Yarimburgaz (niv. 3-2), Karanovo II / III, Can Hasan I (level 2B), Beşik-Sivritepe, Hacilar I Paradimini, Vesselinovo and even far into eastern Anatolia at Alişar (Lazarovici 1979: 131-2, notes 40, 56; Roodenberg *et al.* 1989-1990: 102-107). This moment is marked by great changes in the Konya plain when, at about 6000 cal BC, the early Copper Age begins. At Çatalhöyük the settlement is transferred to Çatalhöyük West and the habitation at Can Hasan I begins, approximately 1km south-east of Can Hasan III. Other smaller sites are beginning to be occupied during this period. Links to the previous phase are very weak with a different ceramic typology including new forms (the abundance of vessels with feet at Çatalhöyük West). Old elements (iconographic, but also in the stone industry and obsidian) from Çatalhöyük East seem to have survived in the Cappadocia region and in Karaman plain.

This moment corresponds to a continuous contact with the Balkans, and the rise of technology transfer and trade routes (Thissen 2001: 19-21). Since the 1980s Vinča analogies were found with Can Hasan I (Lazarovici 1979: 74-75, 131), in particular Level 2B, highlighted by black or grey pottery, polished with incised dotted band and bitronconic forms (French 1962: Plate I-b, c; Fig. 9-2.36). The widely spread Vinča elements from Thrace to western Anatolia, in large quantities and diverse types, exclude the possibility of imports and strengthen a wider genetic relationship (Roodenberg *et al.* 1989-1990: 102-107).

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 75-85.

This phenomenon is noted by Holmberg in his analysis in the early 1960s as 'black polished ware' - polished black pottery - with bitronconic forms appearing in Greece at a time chronologically contemporary with the end of the Sesklo culture, linked to Anatolia, and leads to the appearance of the Vinča phenomenon in the Danube area (Holmberg 1964).

Theories supporting the local origin of the culture have been removed one by one. A last attempt was made by Leković in 1990 when trying to find arguments for a typological and decorative transformation of Starčevo-Criş elements in Vinča over an area covering the middle of the Danube and the south-east of Pannonia (Leković 1990). His analysis is reduced to a small area and the elements of synthesis observed are not suitable (Lazarovici and Lazarovici 2006: 121).

This period stops at the end of the VI millennium BC when Çatalhöyük West and Can Hasan I are destroyed. The sites are abandoned at a level comparable with the abandonment of villages in Cappadocia at exactly the same time somewhere around 5000 cal BC (Thissen 2001: 19-21). This is a moment of great change in the Balkans too when large-scale events start: the Vinča C moment and its consequences (Draşovean 1996: 98-9; Luca 2001: 108-9; Lazarovici 1987: 40; Suciu 2009: Fig. 258).

In terms of radiocarbon dating, at Can Hasan I Level 2B corresponds to the transition phase from early Copper age to middle Copper age. Most radiocarbon dates from here correspond to an interval between 5710-5640 cal BC (Thissen 2007: 1 - for 4 data) compared to 5450-5370 cal BC for the oldest Vinča date in Transylvania (GrA-33 127 - Biagi *et al.* 2007: fig. 3) belonging to a Vinča A_2 horizon. It most probable that the Vinča A_1 horizon (no available radiocarbon data) is earlier in time, around 5700-5600 cal BC.

In Transylvania (Figure 5) the Vinča culture appears from the earliest stages. Vinča A_1 communities apparently enter Transylvania through the Haţegului Depression from the Banat, as indicated by the presence of materials from the Poiana Ruscă Mountains caves in Hunedoara, Mures valley, and then in Transylvania. Material of similar date comes from Nandru-'Peştera Curată', Romos - 'Făgădău' (Luca *et al.* 2000: 43) and possibly Limba-'Bordane' (Suciu 2009) and Miercurea Sibiului-'Petriş' (Luca *et al.* 2010: 125). The arrival of these communities we believe is linked to the control over salt resources and an obsidian route towards the North as indicated by the appearance of Pişcolt type ceramic imports and 'Lumea Nouă' (Zau) ceramics. Occurrences of obsidian cores that have no traces of chip processing certify that the material was brought from the north-Carpathian area for local processing and exchange. Distribution maps show that this obsidian was carried further towards the south or east. The occurrence of Spondylus ornaments only in the north area of the culture suggests trade or influence related to the late Starčevo-Criş world and then with Linear Pottery which were the final beneficiaries (Figure 2 and Figure 4). The distribution area passed clearly through the settlements from the Mureş area (Limba, Alba Iulia-'Lumea Nouă', Tărtăria) where they came from the Banat or Oltenia. They have not been detected in Miercurea Sibiului-'Petriş'. The rich copper ore outcrops in the south-west of Transylvania should not be neglected either. For most of the Vinča sites analyses of the settlements are hampered by limitations of the area excavated, but also due to insecurity regarding the complexes and published materials (Suciu 2009).

Looking at Figure 1 we can see the chronological level for Can Hasan I Level 2B (shown in brown) is very close to Dudeşti data from Cârcea-Viaduct (Suciu 2009: 29). The earliest Karanovo III dates go back to 5500 cal BC.

The Dudeşti culture contains Karanovo III elements (Nica 1999: 88; Andreescu *et al.* 2008: 197; Lazarovici and Lazarovici 2006: 388) and Vinča (Lazarovici and Lazarovici 2006: 388). Even if the term used to define the chronological moment at Cârcea settlement is 'Dudeşti-Vinča B' (Mantu 2000: 99) there seems to be an error by M. Nica, also used at Leu settlement for Dudesti III. These correspond to an earlier moment at the Vinča A_2 horizon (Lazarovici and Lazarovici 2006: 389-90). A recent discovery in the Early Dudeşti context from Măgura shows typical Karanovo III elements documented by the presence of vessels with feet and handles with discoid and cylindrical projections. There are also truncated bowls with the entire surface highly polished and sometimes decorated with fine folds (Andreescu *et al.* 2008: 197). Radiocarbon dates have not been published yet, but they represent the earliest Karanovo III moment.

The arrival of new communities in the Balkans is represented in the appearance in the VI millennium BC of a variety of ditches, walls and palisades. Many of them built for purely defensive purposes, some have an animal protection role, others for defining the perimeter of the settlement and, last but not least, some are built in places not directly related to settlements (Parkinson and Duffy 2007: 97). In Romania elements appear in Starčevo-Criş contexts at Golu Ostrovul and Cârcea. In an early Vinča context there are fortifications at Gornea (ditch), Liubcova (Lazarovici and Lazarovici

2006: 193-194), Parţa (in the Banat culture, a culture contemporary with Vinča, 7c level - Lazarovici and Lazarovici 2006) and Miercurea Sibiului-'Petriş' (Luca *et al.* 2009: 147-8, Mischka 2008).

Out of the 19 sites with finds only 14 have been systematically excavated (Table 1; Figure 5). Of these, trenches were only dug at four, with only sections at the rest, most of which were 1m wide. The exact location of two settlements is not identified, only mentioned in surveys. There are two possible locations of material in caves (one disputed, material has been published for Turdaş). The overwhelming majority of settlements are located on the first terrace, usually in strategic locations in the middle of the valley close to the Mureş or Secaş (Miercurea Sibiului-'Petriş', Alba Iulia-'Lumea Nouă', Limba, Balomir, Tărtăria, Sântimbru, Sebeş-'Podul Pripocului'). Miercurea Sibiului-'Pustia' and Romos-'Făgădău' are located near tributaries of the Secaş River or Mureş River. The Romos, Sântimbru, Miercurea Sibiului triangle represents the main nucleus of early Vinča settlements from south-east Transylvania.

The settlement at Ocna Sibiului is located 20km from Miercurea Sibiului and 4 km from the sources of salt on a strategic terrace in the Visa Valley. Access to salt resources might also explain the presence of ceramic fragments at Şeuşa-'La Cărarea Morii'. Finds from Cauce, Nandru-'Peştera Curată' and 'Sf. Nicolae' church in Hunedoara county are dissimilar to the other settlements from the Mureş Valley and can be correlated more with networks connecting the middle Mureş Valley with the Banat area.

Pottery features, and also the positioning of the settlements, support the penetration of early Vinča communities in Transylvania from the Balkans, through Oltenia following the mild peaks of the Southern Carpathians in the Cindrel, Lotru and Parâng sectors. This route is supported by the early Vinča discovery from the 'Peştera cu Vas' cave in the Căpăţânii mountains (Luca *et al.* 2000: 49) in the southern Carpathians. Penetration of these communities occurs, especially in the area surrounding the intersection of Mureş and Secaş rivers, due to the salt resources which could be easily transported to the Banat and Oltenia. Unfortunately, the stratigraphy, complexes and materials from Limba are not published systematically. Gh. Lazarovici, who has seen the materials from Limba, believes that, among the material of the huts from Limba-'Bordane', there are some A1/A2 phases (or longer A1 using the typology of W. Schier - pers. comm. Gh. Lazarovici). Some material may belong to a Vinča A_3 hut having the characteristics of Vinča pottery from Banat. The A2 phase pottery at the settlements Miercurea Sibiului-'Petriş', Orlat, Vurpăr, Limba-Bordane shows features that are related to the Serbian version of the culture and the polychrome world (Luca *et al.* 2000: 49). The occurrence of early materials in the Caşolţ area indicates links to eastern Transylvania.

North-Carpathian obsidian was brought from the North into the Mureş, Someş and upper Tisa valleys, and then sent to Oltenia and southeast Transylvania.

The habitat near these settlements was excellent for live stocking large cattle. Mountain forests nearby provided the necessary wood for buildings and defensive systems. Mountain pastures in the Cindrel-Şureanu area were excellent for keeping sheep and goats. We consider the discovery of a so-called pebble idol (Lazarovici 1979: Pl. XXIII E) in B8 hut at Miercurea Sibiului-'Petriş' rather as a weight for fishing nets (Suciu 2009: Figure 167). A bone hook from Limba was used for catching large fish with analogies in the settlements of Vinča, Drenovac, Selevac, and Gomolava (Mazăre 2005: 266-7) that certifying fishing. Rivers (Mureş, Secaş, Cibin) are an important part of Vinča community life. The Cibin and Secaş flow was likely much higher in prehistoric times than today. Their decline is due to present day deforestation in the Cindrel mountain areas and the dam at Gura Râului which reduces much of the Cibin's flow. Massive deforestation on the Secaş plateau has significantly reduced the size of the Secaş. The Mureş River is still navigable today.

Analyses on the traces of the wooden beams from Limba show the use of softwood which could be easily processed (Ciută 2008: 120) and is found in the forests nearby.

Sites	Systematic excavations	Complexes	Large trenches	Narrow sections	Published materials	Settlement type	Enclosures	Comments
Alba Iulia 'Lumea Nouă'	x	x	x	x	x	River terrace	ditch	Few materials published unitary on complexes
Aiud 'Cetăţuie'	x			x		River terrace		Few materials found. Northern area limit

Balomir 'Gura Văii Cioarei'					From field walking	River terrace		
Caşolţ 'Poiana în Pisc'	x		x	x	Pottery from old excavation	Hill terrace		Initially wrongly dated as *Turdaş* Culture
Cerişor 'Cauce'	x			x	x	Cave		Few potsherds
Hunedoara 'Biserica Sf. Nicolae'	x			x		River terrace		Uncertain discovery
Limba	x	x	x	x	Few materials published out of context	River terrace	Possible	Few materials published
Nandru 'Peştera Curată'	x			x	Few	Cave		
Miercurea Sibiului 'Petriş'	x	x	x	x	x	River terrace	Fence, enclosure ditch	
Miercurea Sibiului 'Luncă'				x	x	River terrace	Possible	
Miercurea Sibiului 'Gară'					Field walking, materials in Sebeş Museum	River terrace		Not found in the field
Ocna Sibiului 'Faţa Vacilor', 'La Roghină'	x		x	x		River terrace	Possible	Initially wrongly dated as *Turdaş* Culture
Orlat 'Poduri'					x			Not found in the field
Romos 'Făgădău'	x			x	x	River terrace		
Sântimbru 'La Ţărmure', 'La Ierugă'	x			x	x	River terrace		Destroyed
Sebeş 'Podul Pripocului'	x		x	x		River terrace		Initially wrongly dated as *Turdaş* Culture
Şeuşa 'La Cărarea Morii'	x			x	Pottery	Hill settlement		
Tărtăria 'Gura Luncii'	x	x	x	x	One cult complex published. Other materials only fragmentary	River terrace	Possible	
Vurpăr				?	x			Not found in the field

Table 1. Features present and information available for Vinča sites. The settlement order is present in Suciu 2009:181-183 however we missed one settlement: Sebeş - *Podul Pripocului* (Popa and Totoianu 2001: 34-5) but that was present on the map (Suciu 2009: Figure 262).

The distances in a straight line between the settlements of south-west Transylvania are not very long. The Distance (data are approximated with an error of ± 500m) between Caşolţ and Ocna Sibiului is 24km, between Ocna Sibiului and Miercurea Sibiului-'Pustia' is 17km, between Miercurea Sibiului-'Petriş' and Sebeş-'Podul Pripocului' is 14km, between Sebeş-'Podul Pripocului' and Limba is 10km, and to Tărtăria is 14 km and between Tărtăria and Romos is 14km.

Movement is likely to have been along river courses where the distances become larger. We will demonstrate this by taking a route from Caşolţ to Mureş. From Caşolţ we use the Cibin to Orlat-'Poduri' (35.13km) from where, following the route at the base of the mountain, we arrive at Miercurea Sibiului-'Pustia' (48km) where it reaches the Secaş valley (Miercurea Sibiului-'Petriş') which is followed by Sebeş-'Podul Pripocului' reaching the Mureş River (81 km Limba). A distance that can be covered in 2 days of walking and some 3-4 days with herds.

The first levels of Vinča communities have sunken housing architecture known as pit-houses (for descriptions see typology and series Lazarovici and Lazarovici 2006: 143-151) which can be very well observed at Miercurea Sibiului-'Petriş', levels IIa_1 and IIa_2, followed by a surface dwelling level

(Luca *et al.* 2009; 2010: 125; Suciu 2009: 89). In the following period the village pit-houses expand in size. Similar to Miercurea Sibiului-'Petriş', although stratigraphic information is poor, early habitation pit-houses appear in the oldest level at Alba Iulia-'Lumea Nouă' following excavations made by I. Berciu in 1961. In Section I/1961 two successive pit-house levels are mentioned followed by a level of surface dwellings (Berciu 1968: 55-56). An interesting situation is observed in Section V / 1962 where several Vinča hut holes go down into the natural from level II (5 pits). From level II there are traces of more surface dwellings (3-7 meters, 11-13, 15-18) which have 'fallen' into the Vinča pits (Gligor 2007: 21). The situation is confirmed by I. Paul's excavations in 1976 where he identifies three levels. Although we do not have a lot of architectural details (Paul 1992: 26-31), if you look at the published profile you can see the huts in the levels Ia and Ib, and also in the following levels IIa and IIb. The situation is very close to that at Miercurea Sibiului-'Petriş'.

In the settlement at Limba, Bordane point, there were problems with defining levels of habitation because they are affected by an arable layer (Paul and Ciută 1998: 41-42). The existence of several pit-house horizons can be identified using fragmentary published data on chronology (complexes were not published, there are only disparate articles). Publication of the osteological material provides a preliminary picture of how the deepest complexes were dated. There is a pit-house horizon dating to Vinča A_{2-3} and a hut horizon dated B_{1-2} (Mazăre 2005: Tabel 1).

At Ocna Sibiului-'Faţa Vacilor' there is just one pit-house horizon (Paul 1970: fig. 2, 3) but the information is fragmentary.

At Tărtăria (Horedt 1949: 47-9, 50-1) pit-houses are confirmed in the lower level. N. Vlassa mentions pit-houses in the earliest level, level I (Vlassa 1963). The situation was confirmed through excavations in 1989 by I. Paul which identified pit-houses in the lowest level (one with a fireplace inside) followed by successive levels of deposits that might belong to some other pit-houses (Paul 2007: 28).

In Transylvania holes for a central pillar were not identified in this chronological horizon, but they are present in the Vinča area (Lazarovici and Lazarovici 2006: 147). The situation is similar in Gornea. It may be that the pillar was elevated on a wooden bed for large huts and not present for the small huts (ethnographically attested). We have analogies in the earliest horizons at Gornea-'Căuniţa de Sus', in the Banat, where the first Vinča communities dug huts. The earliest here is a $B21_b$ hut which dates to the Vinča A_1 phase (Lazarovici 1977a: 51-2). At Gornea over 27 sunken huts have been identified for the entire A phase (Lazarovici 1977a: 51-2, Lazarovici and Lazarovici 2006: 145). The excavated pit of the pit-house does not represent the original surface, but that part where it is possible to move up. Storage, sleeping and various household activities areas are on the edge of the pits. Ethnographic analogies show that for a 2x3m pit-house with a pit surface of $6m^2$, the actual size may reach 15 to $16m^2$. Earth excavated from the pit is visible on the edge forming a side wall that protects against water leakage. Often the roof is supported by this wall, but there are no traces of the pillars. The pit has an average depth of 0.7m, and an average height of the lateral wall and roof height of 0.7 to 0.9m. The area of the centre is about 2m and over 1.7m at the edge of the pit. This produces an acceptable living and storage space with heating problems only in very cold periods. Hearths in the huts are very rarely found in the Vinča area. Some hearth remains were identified on the edge of the pit-house. Also identified are clay trays or the bases of large vessels suitable for a fire with dried wood used for heating (Lazarovici and Lazarovici 2006: 144-6).

Large surface dwellings are present at Miercurea Sibiului-'Petriş' in a Vinča A_3-B_1 level with corners paved with river stones (L_{11} and L_{14}) or the whole floor paved (L_{13}). No traces of poles were identified and the clay slake or adobe is missing. This suggests a wooden architecture with massive beams supported by the stone corners that protect against moisture similar to the system used today in mountain areas for wooden stables. Hearths are placed outside the dwelling on the west side protected from winds from the east. Also, near the east part of L_{11} a burnt adobe structure was identified which seems to be a barn or storage place. There are no further details on the roofing or the elevation. The dwellings have a clear east-west orientation (Luca *et al.* 2005; Luca *et al.* 2006: 122, 124; Suciu 2009: 122-34). At Miercurea Sibiului-'Petriş' burned dwellings were found at the same level as L_{11}, L_{13} and L_{14} (Luca *et al.* 2010: 125).

Surface dwellings were discovered at Alba Iulia-'Lumea Nouă' that cover the hut levels in SI/1961. In SII/1961 a dwelling from level II has an interior fireplace (Berciu 1968: 55-6). In Section V/1962, level II, there are more traces of dwellings covering Vinča pits (Gligor 2007: 21). Iuliu Paul observed that the percentage of dwellings increases in level II (Paul 1992: 26-31). An example similar to the type of architecture from the Banat was found in Sp I/2005 on Şoaită's property with the

remains of two dwellings with adobe (L_1, L_2) and traces of wattle and poles. This level has a thickness exceeding 25cm (Gligor 2007: 30-3).

At Limba-'Şesul Orzii' there are more dwellings, one with traces of a ritual complex or grain storage (L_1/1996) (Paul and Ciută 1998; Daisa 2001).

Also at Limba-'Bordane' in SX/1998 are the remains of a slightly burned dwelling (L2/1998) with fragments of adobe. The dwelling was repaired twice. It has an irregular shape and is dated at a very early level: Vinča A_2 (dated by the excavators, materials are not entirely published). Another very large dwelling is also mentioned at more than 26m^2 (limits not yet detected) with massive adobe walls and rich material (L1/1998). The walls seem to retain poles (5-7cm in diameter) and traces of wattle. Beneath it there is a hut which has material similar to that in the dwelling (Paul and Ciută 1999).

At Romos-'Făgădău' a compact layer of river stone was discovered placed evenly into three layers surrounded by Vinča fragments (Luca *et al.* 2000: 42-45).

At Tărtăria there are also Vinča dwellings. One of them, only partially detected, was found in trench E/1943 (Figure 231) with a fireplace inside and corners made with stones (Horedt 1949, fig.6). I. Paul's new excavations have revealed successive levels of dwellings (Paul 2007: 28-9) in level III (dated by I. Paul as Vinča B_1 or Vinča B_2) which are unique to this chronological level.

The appearance of fences, ditches and enclosures are not unique at this chronological moment. The development of Balkan tells in this period required advanced defence systems, but it seems that they are also present at other settlement types. Miercurea Sibiului-'Petriş' was controlling access to the Secaşului Valley and the salt sources in the Ocna Sibiu area.

Fence 1 from Miercurea Sibiului-'Petriş' was built to protect the first Neolithic village here consisting of a pit-house (IIa1). There are only traces of massive columns excavated side by side. There was no ditch in front (Luca *et al.* 2009: 147-8; Mischka 2008; Suciu 2009: 122). Magnetometer surveys confirmed the presence of ditches at Miercurea Sibiului (Luca *et al.* 2009: 147-8, Mischka 2008). The small earth wall placed in front of the ditch has analogies with the ditch from palisade 2 at Parţa (Lazarovici and Lazarovici 2006: 366-8). If the theory that there are two parallel grooves is confirmed, the similarities with the almost contemporary system at Parţa may continue.

At Tărtăria fortification systems appear to have been chosen because of its strategic position. The site has the look of a tell and satellite images clearly show the edges of the settlement suggesting at least the existence of a palisade. We are waiting for magnetometer data to support this hypothesis. The settlement from Limba has the same characteristics: naturally protected from two sides by the steep banks of the Mures.

At Ocna Sibiului-'Faţa Vacilor' a satellite image shows a terrace almost identical to that at Miercurea Sibiului-'Petriş'. Observable today, this is slightly elongated on one side of the Visa with large ditches at the ends of the terrace, but new excavations and a magnetometer survey are required to be sure that these ditches are not later in date.

At Zau de Câmpie (Zau Culture IIb), Zau 2c level from -3.05 to 2.9m, we observed an inner palisade and it is possible that there was a larger palisade. The inner palisade indicates the existence of a hazard and the need for an inner structure of defence. It is assumed that there is a greater defence system on the outside which led to the formation of deposits thicker than 3m. The main settlement is over seven acres, but at different times around it there were 3-4 secondary settlements. At the end of this phase dwellings P9, P10 and P8 were destroyed (Lazarovici 2009: 195).

If the dimensions of the fortification are considered, the size of the settlement at Miercurea Sibiului-'Petriş' is approximated at between 0.7 to 1.8ha. We calculated the approximate diameter of the area enclosed by the ditches (the settlement is about 150m in diameter) to about 1.76ha for the surface dwellings phase. For the earlier level of huts the calculation gives a settlement area of 0.6 to 0.7ha (the diameter of the settlement is about 40m).

By comparison, the Tărtăria terrace is about 3 hectares, the site at Gomolava 2.5ha, Matejski Brod 3.5ha and the eponymous site Vinča-'Belo Brdo' 6ha (Vinča Culture). Aegean tells (Chapman 1981, 45) are smaller: Sitagroi is 0.7ha and Dimini is 0.5 ha. In Bulgaria Karanovo is 4.25ha and Tell Azmak 0.5ha. In Anatolia Can Hasan is 7.5ha, Hacilar is 1.9ha and Çatalhöyük is 12ha (Chapman 1981: 47).

A proposal for population density at Vinča sites is an average of 50-100 people/ha and for early Vinča sites with an area from 1 to 1.9ha the population is between 50-200 people (Chapman 1981: 48).

Compared to the 'First Temperate Neolithic' (Starčevo-Criş Culture) or the Alföd Linear ceramic type sites where large sites are an exception, there is an increase in the number of large sites which become the norm in the Vinča culture (Figure 2 and Figure 4). At the same time the number of

sites during the Middle Neolithic decreased compared to the Early Neolithic. Tell site settlements do not evolve in the area as they do in the other areas of the Vinča Culture. The spread of the early Vinča culture in south-east Transylvania pushes the Starčevo-Criş Culture to the north and east and it soon transforms.

By the end of the early Neolithic Vinča sites from south-east Transylvania are linked; there is a general spread of Lumea Nouă (Zau) pottery in a Vinča B_1 level. The dates and the complexes are few and the literature is limited in explanation. The exact evolution to the Turdaş culture has yet to be determined (Suciu 2009: Fig. 258).

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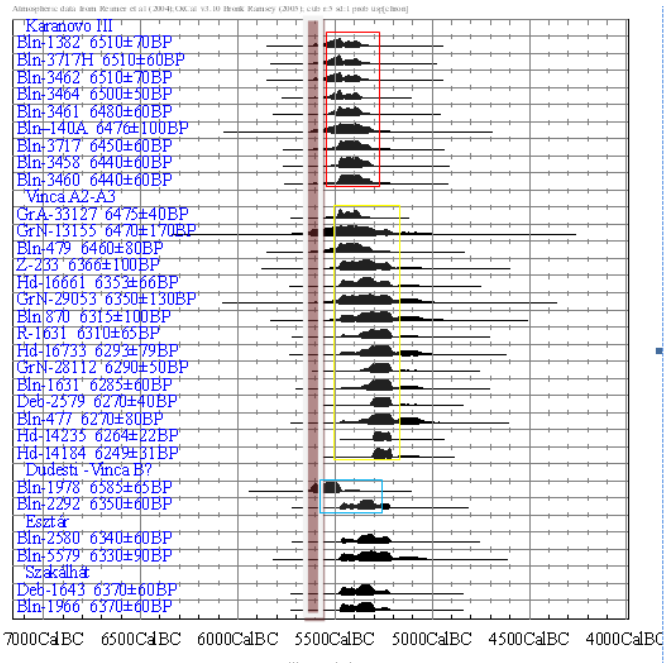

Figure 1. Early radiocarbon data for Karanovo III (red), Vinča A_2-A_3 (yellow), Dudeşti (blue), Esztár Szakálhát cultures. Can Hasan I, level 2B suggested with brown line (5710-5640 Cal BC).

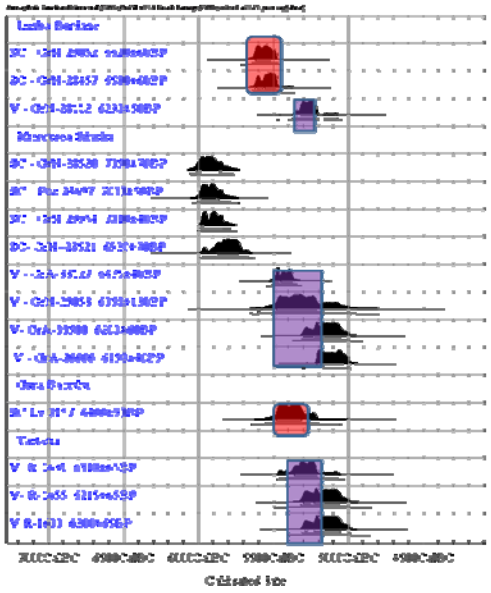

Figure 2. Radiocarbon data from early Vinča sites from: Miercurea Sibiului, Limba, Gura Baciului and Tărtăria (blue and 'V' for Vinča A) in front with Starčevo-Criş data ('SC' and with red the contemporary data with early Vinča).

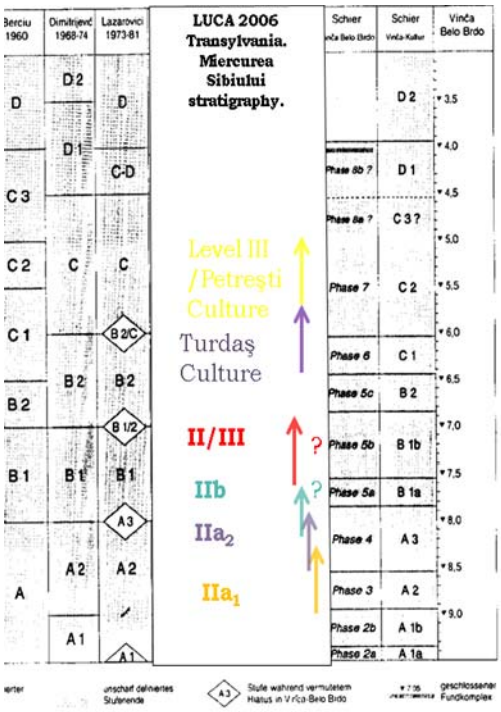

Figure 3. The evolution of Early Vinča culture as shown in stratigraphy from the eponymous site.

Figure 4. Borders between the early Vinča (mauve) and late Starčevo-Criş world (yellow). The white lines are early linear Starčevo-Criş influences as given in Luca *et al.* 2000. The initial Linear Culture area Culturii Liniare (Alföd).

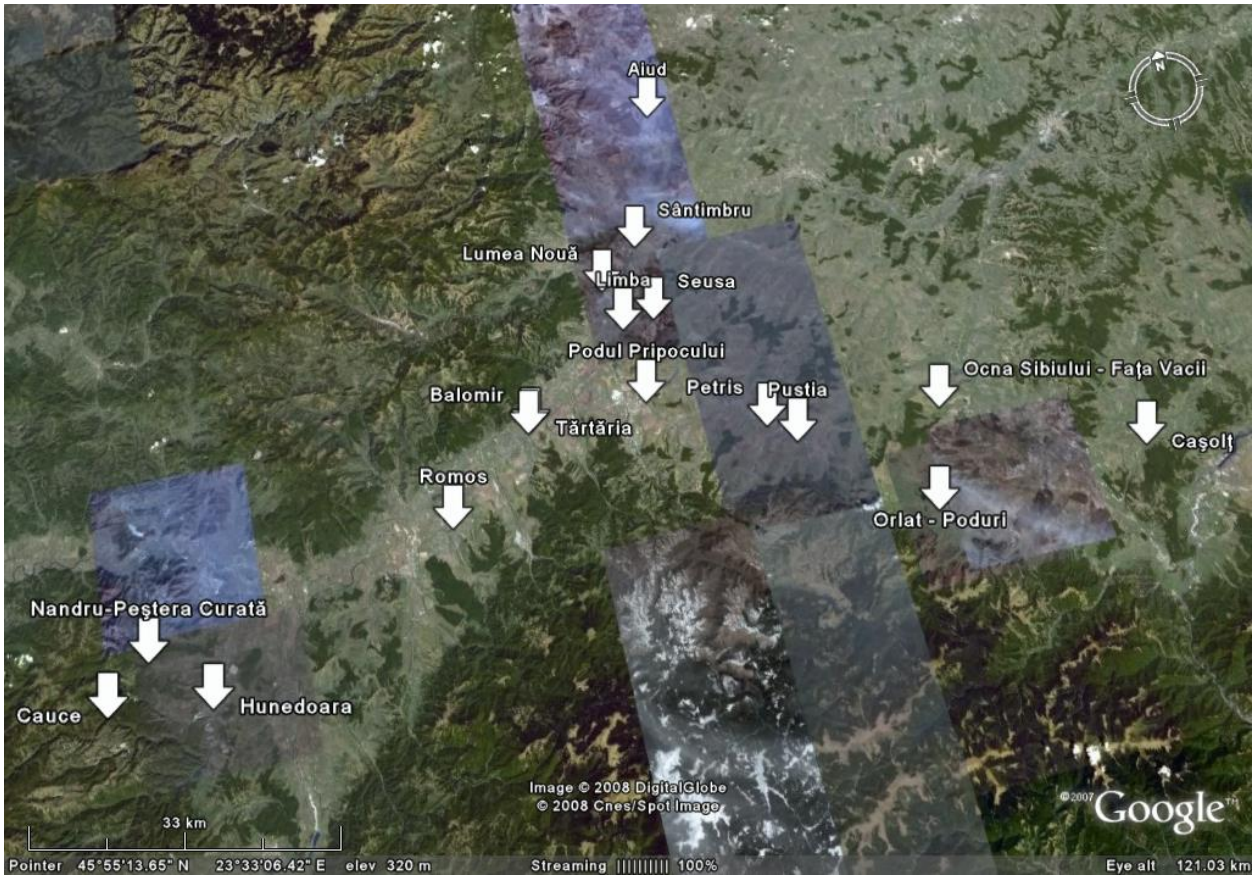

Figure 5. Distribution of early Vinča settlemets from South-eastern Transylvania.

ARCHAEOLOGICAL RESEARCH OF THE IVANOVO CHALCOLITHIC TELL, SHUMEN REGION, IN 2008 - 2010

Svetlana VENELINOVA

Abstract: *This article presents the results of the excavations on the east periphery of the 'Baniata' Tell near Ivanovo, Shumen region, from 2008 to 2010. An attempt is made to explain the stratigraphy of the tell.*

Seven building levels were found on the east periphery of the Ivanovo Tell. The earliest of them was registered through a part of a palisade. Five of the building levels were burned: II, III, V, VI and VII. Three phases of existence of the settlement with different dynamics are interpreted based on the observations on the north, central and south profiles of the 2008 sounding.

The pottery of the tell has the special features of the Polyanitsa III and IV cultures.

In terms of chronology, the Ivanovo Tell was settled in the last phases of the Early Chalcolithic Period, about the middle of 5th millennium B.C. and occupation continued for about 300 years.

Keywords: *Ivanovo tell; Golyama Kamchia river; Early Chalcolithic; excavations; stratigraphy.*

Around 80 prehistoric settlement sites are known in the Shumen region. Most of them are located in the Golyama Kamchia valley. It was a famous water route in the past and connected people from northeast Bulgaria and the Black sea areas. The Ivanovo village is situated immediately near the Golyama Kamhia and the dam of Ticha. At the northeast end of the village there is a prehistoric tell of 6.12m height and 80m diameter at the base. The east periphery of the Ivanovo Tell (an area of 80m^2) was destroyed during unlawful construction activities in 2008. Rescue archaeological excavations were made in the destroyed part of the tell (Venelinova 2009a: 80-2). The walls of the ditch made by the diggers were set straight up and were formed in the north, central (west) and south profiles. The cultural deposits in the east periphery of the tell reached a total height of 2.20m. Regular archaeological excavations were carried out in 2009 and 2010. The research was concentrated to the west and to the south of the 2008 ditch in squares I6, I7, I8, J7, J8 and J9 (Venelinova and Gurova 2010: 68-71). In 2010 a ditch with an area of 37m^2 was dug in the north periphery of the tell in squares M11, N11, O11, P11 and Q11 (Figure 1).

This paper provides a summary of the results of the excavations on the tell near Ivanovo in 2008 - 2010. Seven building levels were discovered in the east periphery of the tell and four levels in the north periphery. It is difficult to chronologically compare the two investigated sectors at this stage because of the lack of a connection between them. The accent of the paper is on the stratigraphy of the levels in the east periphery of the tell only.

The levels are described in their stratigraphic sequence from bottom to top and they are marked with Roman numerals. The particular seams in them are named with Roman letters. The uncovered features in the levels are numbered with Arabic numerals (Figure 2, 3).

The base of the tell was composed of yellow-green clay over which lied a layer of gravel. Four stake-holes were identified in the layer of gravel in the central profile of the 2008 ditch. A hole made by a stake was uncovered under the lowest level. It was located in front of the central profile together with another two holes. The holes formed a row with a north-south direction (feature 1) (Figure 4). It marked the base of the palisade of the earliest settlement of the tell. The settlement of the first level was situated in the west part of the tell and is as yet unstudied (Figure 4) (Venelinova 2010).

A second level was investigated in the 2008 ditch. The thickness of the layer in the central profile of the ditch is 10 to 55cm. Two stages were established in it.

From the early stage of the second level a floor and debris of a building were investigated (feature 2) (Venelinova 2009a: 82). A fragmentary vessel with charred beechnuts and cornel (*Cornus mas*) was found on the floor. To the south of the building plasters of different features were uncovered (features 3, 4, 5). They were contemporary for a short time with the building. In a later stage over these features a seam of greyish-brown clay, gravel and debris with thickness from 13 to 44cm was deposited. Its purpose is not clear. It might be an out-of-building area.

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 87-93.

A third level was investigated in the 2008 ditch. There are two stages in the third level.

A building from the early stage was partially investigated in the north sector of the ditch. The floor was slightly burnt and charred einkorn (*Triticum monococcum*) was spilled over it (feature 6). The debris was deposited over the floor. A burnt clay feature was found among them (feature 7). Fragments of a vessel with charred emmer (*Triticum dicoccum*) were found in it. An oval clay negative feature with 25cm diameter was excavated to the south of the building (feature 8). The building of the third level was situated immediately over the building of the second level (feature 2). Excavations - complete or over a large area - will clarify the connection between the buildings (Venelinova 2009a: 80-2)

In the late stage of the third level in the north sector a seam of yellow clay, gravel and burnt plasters was deposited. The thickness of the seam is 13 - 52cm (IIIa layer). Possibly it had a levelling function. In the south sector of the ditch the third level corresponds to a different cultural deposit (IIIb layer). It is composed of greyish-green, crumbled clay and gravel. Its thickness is 25 - 91cm. Stripes of decayed wood, burnt debris and the holes of stakes belonging to different features were observed in the layer (feature 9).

A seam of green compact clay with a wood construction in it was investigated in the south-east part of the 2008 ditch (Figure 5) (Venelinova 2009b). Observations of the south profile of the ditch established that the seam with the wood construction was not situated on the natural terrain of the tell. There is a cultural deposit under it probably belonging to the second level. In terms of chronology, I interpret that the clay seam with the wood construction belongs to the third level (feature 10). There is a connection between the seam of the green clay and the row of sixteen holes of stakes situated in front of the central profile. The diameters of the holes are 16 -20cm. They form a corner and enclose an area of about 3.50m by 7.00m. The row of holes marked the permanent way of a palisade and the clay-wood feature was probably the wall. The wall had two wooden facades with a backfill of clay with 80cm thickness.

The layer of burnt clay and gravel investigated in the north half of J8 square probably belongs to that third level. It is not completely excavated. A feature of burnt clay was found in the northeast corner of the J8 square (feature 11) (Venelinova 2010; Venelinova and Gurova 2010: 69-70). Part of the feature is under the north and the west profiles of the square where four layers of plaster were observed. To the east of this feature another oval-shape feature is located with much burnt plaster. Part of it was under the north profile of the square (feature 12).

A fourth level was investigated in J7 and J8 squares. A layer of clean, greyish-green clay with a wood construction was uncovered in both squares. A slight concentration of ceramic fragments was observed. An area of around 2.60m (NS) by 1.85m (EW) between both areas has not been investigated. A displacement of 1.09m to 1.29m was observed in an east-west direction. The wood constructions in the two neighbouring squares are characterised by both universal features and differences. They are not completely investigated and hence are presented as two different features.

Feature 13 from J7 square is a wood construction of 'sticks' with diameter 5mm. The sticks have different directions and they were smeared with clay. Boards, most of them with a north-south direction, were situated around 5cm under them (Venelinova 2009a: 80).

A wood construction was found in an area 3.30m (NS) by 2.80m (EW) in the west part of the square J8 (feature 14) (Venelinova 2009b; Venelinova 2010; Venelinova and Gurova 2010: 69). Part of it was under the later burnt feature in the south-west corner as well as under the west profile of the square. The wood construction was composed of boards made of oak. They were positioned parallel and form eight rows with an east-west direction and one row with a north-south direction. Wood stakes of 8cm diameter were situated every 20cm. They have a north-south direction. There is a displacement of 70cm in an east-west direction and 30cm in a north-south direction. Some of the boards and the stakes were positioned a distance of 10 - 22cm from each other. I interpret the feature was composed of alternating seams of clay and wood constructions. To the north of the wood-clay feature is a row of stake holes with 30cm diameter (feature 15). They marked the permanent way of a building wall.

Complete excavation will determine if the wood-clay features of J7 and J8 squares are parts of one and the same feature or two different features. It could be presumed that they represent a clay-plastered wood floor or a fallen wall of a building.

A fifth level was investigated in the 2008 ditch in I7 and J8 squares in 2009. The layer was composed of brown earth with greyish-green clay and gravel. A high concentration of fragments and animal bones was observed there. A feature with a large number of layers of clay plaster with thickness 10 - 48cm (feature 16) is located in the north-west corner of the 2008 ditch. An oval

negative feature of 25cm diameter which was clay-plastered and surrounded with a rim (feature 17) belongs also to this level. Both features were situated in the north-west corner of the 2008 ditch. A floor or feature whose west and south sides formed a low wall (feature 18) was found in the south-west corner of the ditch. It is probably for grain storage. Interestingly, an anthropomorphic figurine, a bone spoon, two ceramic models of houses and 'a small chair' were found in the immediate proximity of the feature.

A burnt feature in a seam of burnt clay and gravel in the south-west corner of the square (feature 19) belongs to the fifth level (Venelinova 2010; Venelinova and Gurova 2010: 69).

There are three seams in the sixth level. The higher seam is composed of greyish-brown earth with burnt debris and a high concentration of pottery fragments. There is a mass of clay in the earth from the middle seam. The lowest seam is composed of compact, greyish-green clay. The clay 'closed' the debris of the burnt features in the fifth level and probably had a levelling function too. The thickness of the cultural deposit in the sixth level is 31cm - 1.05 m (Venelinova 2010; Venelinova and Gurova 2010: 69).

A burnt feature is located in J7 and I7 squares (feature 20). Compact burnt plaster with smooth, higher surface of the floor of a destroyed building were uncovered. The thickness is 10cm. Burnt plasters with smooth surface of floor were excavated in the south–west part of J8 square (feature 20). They are located immediately above the burnt feature 18 of the fifth level. The floor plasters of the burnt feature 21 were investigated in west and south directions in I8 and J9 squares during the 2010 excavations. It covers an area of 28m^2. To the west of it, in J9 square, there is a row of holes with 27 - 35cm diameter (feature 22). The row marked the permanent way of a building wall with a north-south direction. To the west of it a wooden floor made of boards was uncovered (feature 23). Debris of a burnt feature with two stages was deposited in the south–west corner of J9 square over the wooden floor (feature 24). Thin seams of charred seeds were observed among the fragments of burnt plaster. Future research will determine if the holes of stakes result from a partitioning wall and if features 21, 22, 23 and 24 belong to one and the same building or to two neighbouring buildings.

In I8 square the debris of the burnt feature 20 was 'closed' with a thick seam of clear clay. An accumulation of stones which look like 'a pavement' of arranged stones was located over it (feature 25). Burnt compact plasters with smooth surface of floor 10cm thick were investigated above them. A part of the burnt feature with an accumulation of stones is under the west profile of I8 square. Feature 25 belongs to the seventh level.

Seven levels were investigated in the east periphery of the Ivanovo Tell. The earliest level was established through a part of the palisade (Fig 2, 3). Five of the layers were burnt: the second, third, fifth, sixth and seventh. 25 features were uncovered including plasters of floor, grain storage, walls of buildings and fortification. Complete excavation of the features and research over a larger area will confirm the stratigraphic sequence of the tell.

Three phases of development of the settlement site with different dynamics are interpreted based on observations on the north, central and south profiles of the 2008 ditch. The first phase corresponds chronologically to the earliest settlement of the site in the first level when the stake-holes of the palisade are observed uniformly along the central profile of the ditch. During this stage the east periphery of the tell was not inhabited: there is no cultural deposit to the east of the row of holes (the palisade). The archaeological assemblages of the second, third, fourth and fifth level can be defined as a second phase in the development of the tell site. At first the features were concentrated in the north and central sectors. In the final part of the third level as well as in the fourth and fifth levels a gradual extension occurred in a south direction. In addition, a parallel accumulation of two different seams is observed in the third level, IIIa, in the north sector of the ditch and in IIIb in the south sector. There was no fourth level in the north part of the 2008 ditch. A uniformity of settlement all over the investigated area is observed in the last, third phase that corresponds to the sixth level.

More than 370 finds were found during the archaeological excavations including adornments of *Spondylus* and bone, pestles, axes and adzes of stone, vessels, spindle whirls, weights for a vertical loom and ceramic scrapers. There are many flint artefacts: flakes, blades and tools such as end-scrapers, a perforator and retouched blades. Among the cult objects are small altars, a chair, an anthropomorphic figurine and a large collection of 38 fragmentary ceramic models of houses. A great number of bone polishers and antler tools were discovered. Eleven of them are axes of antler which were located over the fallen wood-clay wall of the palisade of the third level.

A large amount of highly fragmented pottery was found. More shapes of the ceramic assemblage can be reconstructed graphically. The surface of the vessels is roughly smoothed,

smoothed, very well smoothed and burnished. Several shapes were distinguished in the ceramic assemblage: dishes with inverted conical or semispherical body; bowls with four basic series - semispherical and elongated spherical, cylindrical-conical, biconical, bicylindrical-conical; pots with conical mouth; lids with cylindrical-conical lower and conical upper part and flat lids with a cylindrical knob. There are three main groups in the decoration of the vessels according to the technique used on the surface: addition, removal or painting. Most of the vessels were decorated with a combination of barbotine on the body and plastic buttons and 'needled' decoration is often combined with graphite ornaments, white-incrusted and red-ochre painted. Excised ornaments combined with paint were used on the vessel-granaries and their lids with cylindrical-conical body and high cylindrical knob.

The main characteristics of the ceramic assemblage enable us to class it as Polyanitsa III and IV cultures and synchronise the investigated layers of the tell with horizon V-VII of Polyanitsa Tell, horizon V-VII of Ovcharovo Tell, horizon I of Vinitsa Tell, early layer of Salmanovo Tell, horizon II-III of Radingrad Tell and layer 4 of Provadia-Solnitsata Tell.

Chronologically, the tell Ivanovo was settled in the last phases of the Early Chalcolithic Period, about the middle of fifth millennium B.C., and occupation continued for a short period of about 300 years.

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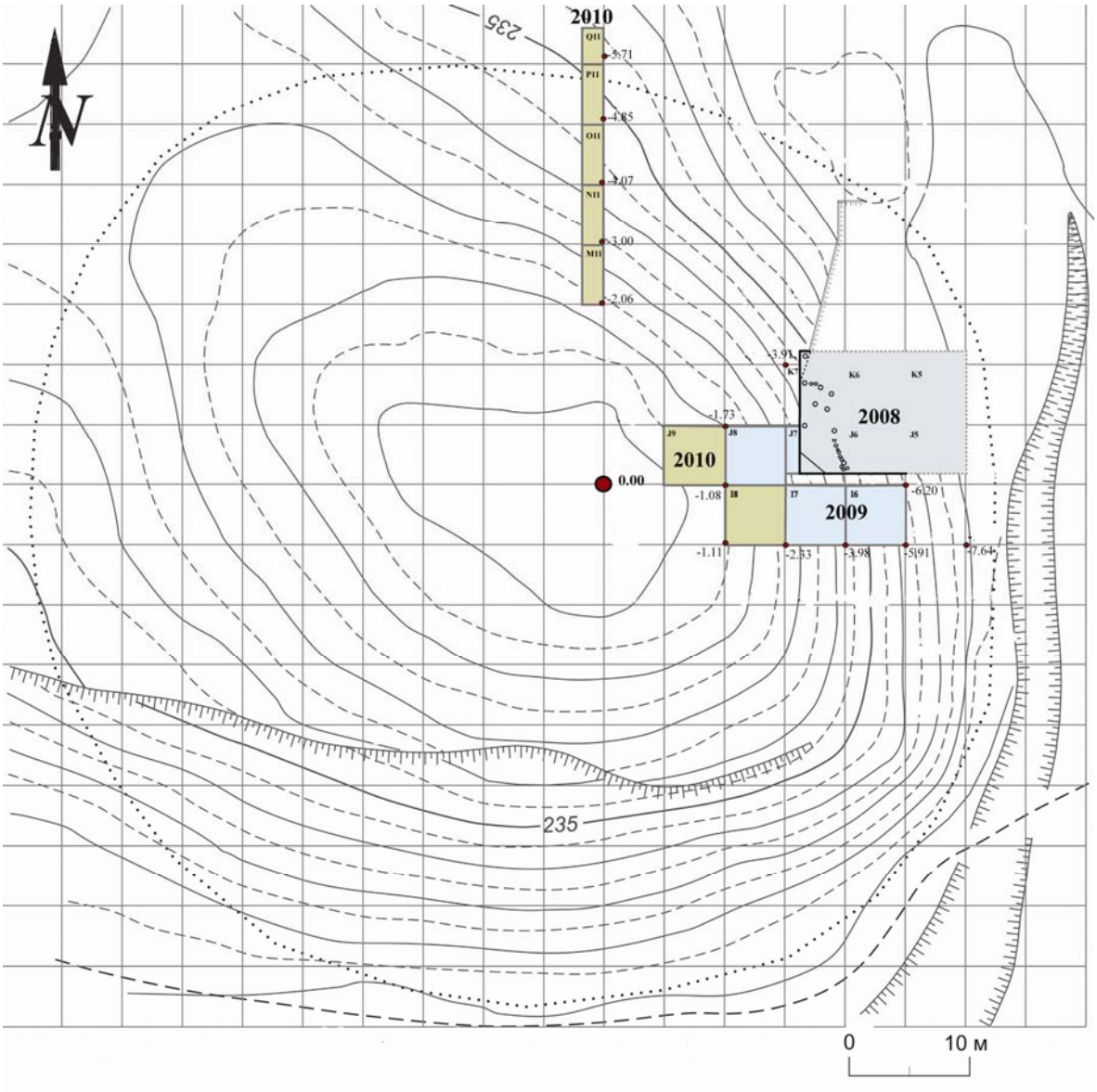

Figure 1. Square grid showing the investigated sectors in 2008 - 2010 of the Ivanovo Tell.

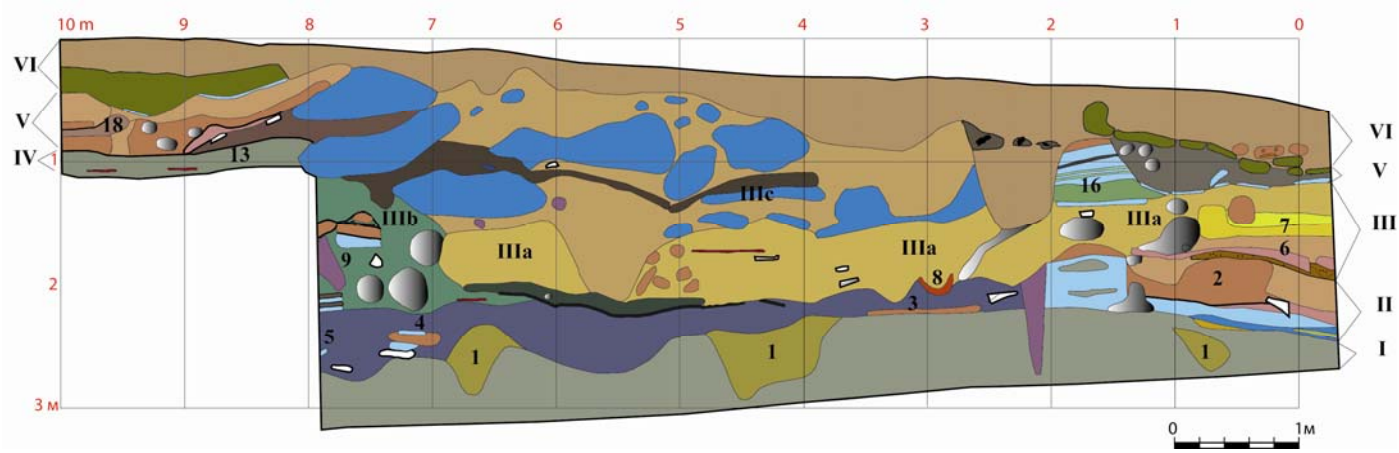

Figure 2. Stratigraphy of the levels in the central profile of the 2008 ditch.

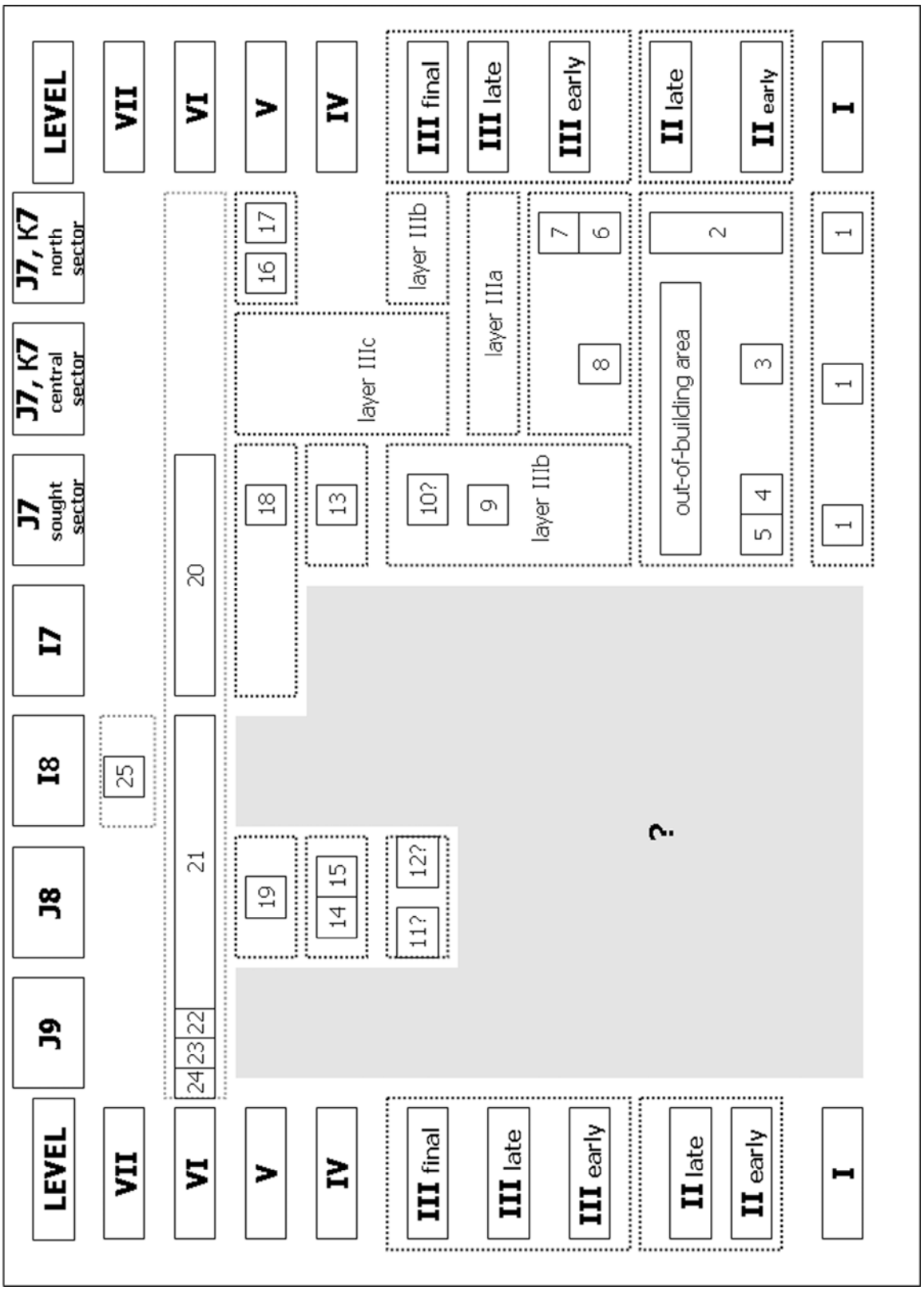

Figure 3. Stratigraphy of the levels in the east periphery on the Ivanovo Tell

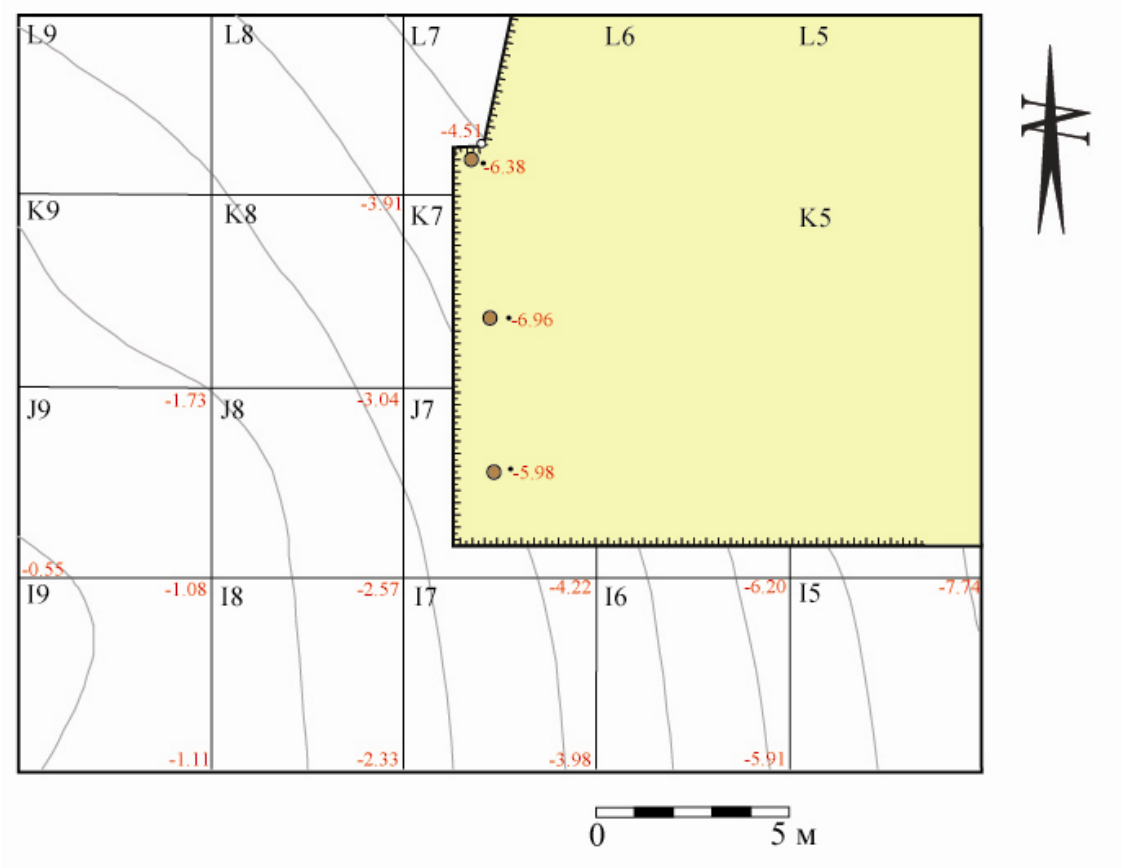

Figure 4. First level. Palisade of the earliest settlement site.

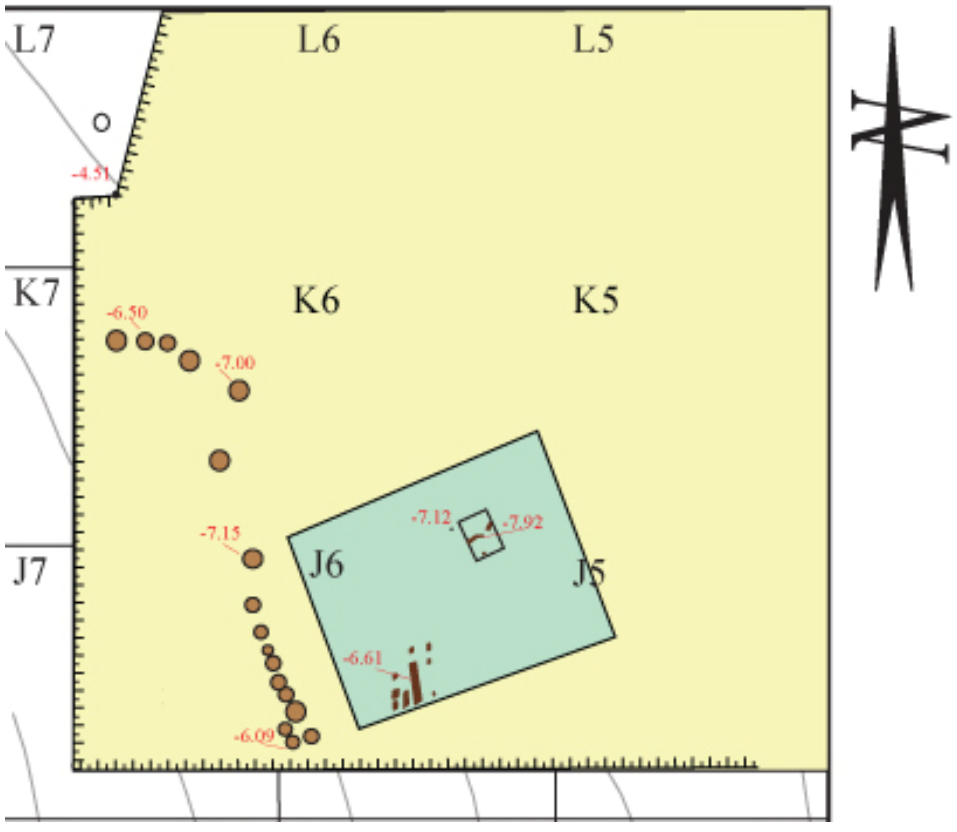

Figure 5. Stake holes and clay-wood construction of the palisade from the third level (final).

II. LANDSCAPE, DEMOGRAPHY, AND FUNERARY SPACE

SOME OBSERVATIONS ABOUT SPATIAL RELATION AND LOCATION OF THE KODJADERMEN - GUMELNIŢA - KARANOVO VI EXTRA MUROS NECROPOLISES

Cătălin LAZĂR

Abstract: *Currently more than 30 Kodjadermen-Gumelniţa-Karanovo VI culture necropolises are known in Bulgaria and Romania. Most of them are extramural necropolises with just 3 intramural necropolises (Kubrat, Ruse, Yunatsite). This article aims to establish ways of locating necropolises areas in relation to settlements, the factors underlying the choice of these areas, rules of spatial organization and the existence of a possible pattern used by Kodjadermen-Gumelniţa-Karanovo VI communities. Although, apparently, ways of organizing funerary areas near settlements appears to be similar for the entire area of this culture, in fact there are many particular aspects (e.g. two tell settlements and just one cemetery - Căscioarele 'D'aia Parte' and 'Ostrovel'; or two cemeteries for a single tell settlement - Gumelniţa I and II etc.). The issue of spatial location and spatial organization of cemeteries is very complex and there are still many questions awaiting answers.*

Keywords: *Eneolithic; Kodjadermen-Gumelniţa-Karanovo VI culture; necropolis; landscape; topography.*

One of the most important Eneolithic civilizations of southeast Europe from the second half of the fifth millennium BC was the Kodjadermen-Gumelniţa-Karanovo VI[1].

Currently more than 30 known necropolises belong to this culture (Figure 1). In Bulgaria 18 extramural Eneolithic cemeteries (Vinica, Goljamo Delčevo, Durankulak, Devnja, Radingrad, Varna I, Targovište, Liljak, Omurtag, Demir Baba Teke-'Sboryanovo', Pomoštica, Kosharna, Smyadovo-'Gorlomova koria', Poljanita, Ovčarovo, Stara Zagora-'Bereketska Mogila', Sushina, Rupkite-'Sinorski grobita') and 3 intramural (Kubrat, Ruse, Yunatsite) have been partially or completely studied (Mikov 1927; Georgiev and Anghelov 1952, 1957; Ovcharov 1963; Todorova-Simeonova 1971; Todorova 1978, 1982, 2002; Todorova *et al.* 1975, 1983; Radunčeva 1976; Ivanov 1978a, 1978b, 1980, 1988, 1989, 1991; Ivanov 1982; Dimov *et al.* 1984; Angelova 1986, 1990, 1991; Todorova and Dimov 1989; Mateva 1997; Boyadžiev 2006; Lichter 2001; Kalčev 2002; Bačvarov 2003; Chohadzhiev and Venelinova 2008a, 2008b; Chernakov 2010, 2011). There are also two other hypothetical extramural cemeteries - Sava and Kamenovo (Todorova 1981: 17, 19; Lichter 2001: 77; 2002: 27) for which information is insufficient and contradictory[2] (Figure 1). Consequently they will not be included in the present analysis.

In Romania 11 extramural cemeteries belong to this culture (Figure 1) - Vărăşti-'Grădiştea Ulmilor', Gumelniţa I, Gumelniţa II ('Valea Mare'), Chirnogi I ('Terasa Rudarilor'), Chirnogi II ('Şuviţa Iorgulescu'), Cetatea Veche-'Grădiştea' (Spanțov), Căscioarele, Radovanu, Dridu, Sultana-'Malu Roşu' I, Măriuţa-'La Movilă' - and another 5 hypothetical cemeteries (Pietrele-'Gorgana', Hârşova, Palazu Mare, Curcani, Sultana-'Malu Roşu' II) (Comşa 1960, 1974, 1980, 1990, 1995, 2000; Galbenu 1965; Ghianopoulos 1966; Şerbănescu 1982-1992a, 1982-1992b, 1985, 1988, 1997; Bălteanu and Cantemir 1990; Cantemir and Bălteanu 1993; Dumitrescu 1996; Haşotti 1997; Şerbănescu and Șandric 1998; Marinescu-Bîlcu 2000; Lazăr 2001a, 2001b, 2010a, 2010b; Song 2006; Lazăr *et al.* 2008, 2009; Toderaş *et al.* 2009).

In this paper we present only *extra muros* cemeteries of Kodjadermen-Gumelniţa-Karanovo VI communities (Figure 1). Unfortunately many of these cemeteries have only been partially studied and publication is incomplete, and in other cases the data related to excavations was not published. Therefore we have information only about some of these cemeteries making our proposed approach more difficult.

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 95-115.

Location, topography and features of necropolises

The main funeral form for Kodjadermen-Gumelniţa-Karanovo VI communities are the extramural cemeteries although there are other forms of treatment of the deceased (e.g. intramuros necropolises, burials in settlement). Necropolis becomes an institutionalized form of treatment of the dead; an authentic funeral standard.

Necropolises represent a special kind of use of space involving a separation of the domestic area from the funerary area, a spatial and conceptual delimitation of the living from dead. From conceptual point of view cemeteries are another form of use of space different from others (e.g. burials in settlement) involving locations in the natural environment; they are a transformation of the landscape into a human/social space leading to an integration of environment in human space.

Burial in cemeteries away from settlements, but in sight and perhaps sound (Bailey 2000: 208), indicates a parallel and deeper decoupling of ritual practices. This lead to the more intense ritualization of mortuary practices than was evident in household mortuary ritual through the creation of more public performance space to express individual and group identities (Bailey 2000: 208; Chapman *et al.* 2006: 171).

From a geographical point of view, within the large area occupied by the Kodjadermen-Gumelniţa-Karanovo VI culture (Figure 1) the necropolises have been found mostly in northeast Bulgaria, in southeast Romania and in the Black Sea coast area. The absence of cemeteries in specific geographical regions (e.g. southwest Muntenia, Thrace) more likely reflects the research stage in these areas than a feature of these communities.

From a topographical point of view the funerary areas were located in places not liable to flooding, usually on the high terraces (e.g. Gumelniţa I and II, Chirnogi I and II, Sultana-'Malu Roşu' I and II, Măriuţa-'La Movilă', Căscioarele) or hills (e.g. Goljamo Delčevo, Kosharna, Smyadovo-'Gorlomova koria', Poljanita, Ovčarovo, Radingrad), on the edge and on slopes. Sometimes cemeteries are located on islands (Vărăşti-'Grădiştea Ulmilor') or on the shores of coastal lakes near the Black Sea (Durankulak, Devnja, Varna I, Palazu Mare). All these present-day coastal lakes (Siutghiol, Varna, Durankulak) were marine bays, coastal lagoons or estuaries in the fifth millennium BC as demonstrated through geological and sedimentological survey of the Romanian and Bulgarian Black Sea (Orachev 1990; Caraivan 1998; Bozilova and Tonkov 2002; Filipova-Marinova 2007; Filipova-Marinova and Bozilova 2008).

Unfortunately, the complete dimensions of the Kodjadermen-Gumelniţa-Karanovo VI cemeteries are not known because most of them have not been fully investigated for various practical reasons[3]. This situation does not allow us to determine the spatial limits of the funeral areas.

At present delimitation features of the funeral areas have not been discovered, but their existence should not be excluded.

Determinant factors of placement of the necropolises

First, the area of the settlements and cemeteries is determined by the natural environment: geo-topographical features of landscape (position, elevation, depth, geomorphology) and environmental characteristics (vegetation, water, soils).

Second, visibility, distance and accessibility to the location are other major determinants in choosing the place for future cemeteries.

Beyond that, the cemeteries are located probably in affordable, manageable areas unused for economic activities. The zone separating the cemeteries from settlements seems also to be easily accessible (flat or sloping) and of short distance (with a few exceptions - see below) allowing transport of deceased to the necropolis.

It is important to note that the location of the settlement determines the future placement of the cemetery and not *vice versa*. The criteria underlying the choice of the areas for the two entities (the settlement and cemetery) are different. Numerous variables underlie the decision of placement of settlements (water, raw materials and food sources, dominant position). In the case of cemeteries the situation is different because their position is determined by the settlements.

Finally, choosing the place for the cemeteries by the communities is largely determined by how this space is perceived. The concept of space is very complex, and must be considered in relation to the various types of archaeological finds, in this case the cemeteries. As suggested earlier, funeral space is subscribed to natural space (environment). They are all (including domestic space) inherently circumscribed to another dimension - social space. However, depending on the perception, this space can be divided into concrete space (material, tangible, perceptible) and abstract space (ideal, intangible, irrational, imperceptible) (Tilley 1994).

From a conceptual point of view, cemeteries are another form of use of space different from others involving location in the natural landscape; they are a transformation in anthropic space leading to an integration of the environment in social space, but also a cultural transformation. This leads to an expansion of the social and cultural spaces and a transformation of natural space by assigning new, generally abstract, meanings. These new visions also result in a change in perception of the surrounding landscape by the communities.

Relationship with settlements

A first remark related to Kodjadermen-Gumelniţa-Karanovo VI cemeteries is that they are less known than the settlements. This is not a rule specific to these communities, but reflects the stage of archaeological research in Romania and Bulgaria[4].

Usually the necropolises were located near the settlements (Figure 10a) in a visually perceived space. The distances between the two entities vary from one settlement to another.

For example, at Smyadovo-'Gorlomova koria' (Bulgaria) the necropolis is located 200m northwest of the tell (Figure 2b) (Chohadzhiev and Venelinova 2008a: 213) and in the case of Demir Baba Teke-'Sboryanovo' the cemetery is about 60m west of the settlement (Mateva 1997: 25; Boyadžiev 2006: 39).

At Măriuţa-'La Movilă' the cemetery is 200m northeast of the settlement (Figure 4d) (Lazăr and Parnic 2007: 140) and in the case of Vărăşti-'Grădiştea Ulmilor' the necropolis is about 60m north-northwest of the 'Boian B' tell settlement (Figure 3b) on the shore of Boian Lake (Comşa 1983: 111; 1995: 55).

In the vicinity of the Pietrele-'Gorgana' tell geo-magnetic prospection reported the existence of a necropolis approximately 100m southwest of the settlement (Figure 7a) on the high terrace of the Danube (Song 2006: 8; Toderaş *et al.* 2009: 42), but in our opinion this requires verification[5].

The Vinica cemetery is located about 50m south-southeast of the tell settlement (Radunčeva 1976: 142) and in the case of Stara Zagora-'Bereketska Mogila' (Figure 5a) the necropolis is 150m east from the settlement (Kalčev 2002: 11).

In the case of Durankulak the cemeteries are on the high terrace of the Durnakulak Lake (Figure 2a) 300m southwest from the 'Big Island' tell[6] (Dimov 2002: 28), and at Kosharna the necropolis is 160m west-northwest of the settlement (Figure 3a) (Chernakov 2011).

The hypothetical cemetery at Hârşova (Lazăr 2010a) is about 300-400m southeast of the tell settlement (Lichter 2001: 405), and the Pomoštica necropolis is 300m northwest of the settlement (Bačvarov 2003: 1).

Near the Sushina tell settlement a cemetery was discovered 100-120m to the south-west that is probably associated with it (Chohadzhiev and Venelinova 2008a: 98-9).

The famous necropolis Varna I is located 300-400m north-northwest from the submerged 'Morflotte' settlement[7] (Margos 1961: 128-9; 1978: 146-8; Ivanov 1993: 20), and in the area are another seven contemporary settlements[8] (Slavchev 2010).

The necropolis at Targovište is about 900m west of the settlement (Angelova 1991: 104; Lichter 2001: 80), and in case of Radovanu the necropolis is about 100-150m northwest of the settlement (Figure 5b) (Comşa 1990: 105; 1998: 265).

In the case of the Devnja cemetery the settlement is 150m east (Figure 6a) (Ivanov 1972: 250, 253; Margos 1978: 147-8), and the Omurtag necropolis is located to the southwest of the famous tell Omurtag, but unfortunately the distance between them is not indicated (Angelova 1990: 31-2).

Finally, the well-known cemeteries from northeast Bulgaria - Radingrad, Liljak, Goljamo Delčevo, Ovčarovo and Poljanita (Figs. 3c, 4a-c) - are located in directions close to west at distances between 50 and 200m from the tell settlements (Ovcharov 1963: 53; Todorova *et al.* 1975: 53-4; Todorova 1982: 106, 143, 163; Ivanov 1982: 174; Lichter 2001: 80-1).

There are some exceptional situations. In the case of Căscioarele there are two tell settlements - 'D'aia parte' and 'Ostrovel' - and just one cemetery (Figure 8b). The necropolis is 300m northwest of the 'D'aia parte' tell and about 600m northwest of the 'Ostrovel' tell (Şerbănescu 1982-1992a, 1997; Cantemir and Bălteanu 1993: 3; Şerbănescu and Şandric 1998; Marinescu-Bîlcu 2000: 115; Lazăr 2001a). We must, however, state that the two settlements from Căscioarele are unlikely to be contemporary because at the 'Ostrovel' tell the A2 and B1 phases of the Gumelniţa culture were stratigraphically identified and at 'D'aia parte' tell only the A1 phase of this culture was identified. In this situation two communities from different time periods were using the same cemetery[9].

In other cases there are two cemeteries for a single settlement. At the Gumelniţa eponymous site there are two cemeteries (Figs. 9a-b): the first necropolis is on the high Danube terrace 250m east of the tell and the second one is on the same terrace, but 950m northwest of the tell in the intersection area of the Danube terrace and a valley called 'Valea Mare' (Şerbănescu 1985: 25-34; Dumitrescu 1996: 207; Lazăr 2001b: 173; 2010a).

A similar association of a single tell settlement with two cemeteries is known at Chirnogi. The first cemetery was identified in the east of the village Chirnogi ('Terasa Rudarilor' point) on the high terrace of the river Argeş (Chirnogi I). The second necropolis from Chirnogi ('Şuviţa Iorgulescu' or Chirnogi II) has been identified on the high terrace of the Danube river about 500m (Lichter 2001: 80) from the tell settlement 'Florea Baltag' (Şerbănescu 1982-1992b; 1988: 1-6; Bălteanu and Cantemir 1990: 3; Marinescu-Bîlcu 2000: 115; Lichter 2001: 398; Lazăr 2001b, 2010a). Unfortunately data about these cemeteries are not yet completely published.

Also, at Sultana-'Malu Roşu' it is possible there is the same type of association: two cemeteries and just one tell settlement (Lazăr 2010b). We found the first necropolis in 2006 at 200m west of the tell settlement (Figs. 7b, 8a) on the high terrace of the Mostiştea Lake (Lazăr *et al.* 2008, 2009). The existence of a second cemetery at Sultana-'Malu Roşu' is hypothetical at this stage. Previously, in 1974 C. Isăcescu found one Gumelniţa grave during research of the IVth century necropolis at the northeast edge of the site (Lazăr 2010b). That area is 300m south of the tell settlement near an irrigation channel (Figure 8a). In our opinion this grave may belong to another cemetery from Sultana-'Malu Roşu' tell settlement.

Site	**Distance (m)**	**Higuchi Index**		
		Near-Distance Visibility (0 – 120 m)	**Middle-Distance Visibility (120 – 2200 m)**	**Far-Distance Visibility (2200 m - Infinity)**
Căscioarele	300	-	●	-
Chirnogi II	500	-	●	-
Demir Baba Teke-'Sboryanovo'	60	●	-	-
Devnja	150	-	●	-
Durankulak	300	-	●	-
Goljamo Delčevo	60	●	-	-
Gumelniţa I	250	-	●	-
Gumelniţa II ('Valea Mare')	950	-	●	-
Hârşova (?)	300-400	-	●	-
Kosharna	160	-	●	-
Măriuţa-'La Movilă'	200	-	●	-
Ovčarovo	100-150	●	●	-
Pietrele-'Gorgana' (?)	100	●	-	-
Poljanita	200	-	●	-
Pomoštica	300	-	●	-
Radingrad	50-100	●	-	-
Radovanu	100-150	-	●	-
Smyadovo	200	-	●	-
Stara Zagora-'Bereketska Mogila'	150	-	●	-
Sultana-'Malu Roşu' I	200	-	●	-
Sultana-'Malu Roşu' II (?)	300	-	●	-
Sushina	100-120	●	-	-
Targovište	900	-	●	-
Varna I	300-400	-	●	-
Vărăşti-'Grădiştea Ulmilor'	60	●	-	-
Vinica	50	●	-	-
Total		**8 cases**	**19 cases**	**0 cases**

Table 1. Applying Higuchi's Visibility Indices to Kodjadermen-Gumelniţa-Karanovo VI cemeteries.

In five cases we do not know the spatial relation between settlements and cemeteries: Dridu, Palazu Mare, Cetatea Veche-'Grădiştea' (Spanţov), Curcani and Rupkite-'Sinorski grobita'.

Another important aspect of the relationship between settlement and cemetery is inter-visibility. This is always a major determinant in placing the cemeteries in the landscape.

The necropolis and settlement are always inter-visible. Using Higuchi's visibility indices as a guide[10] (Higuchi 1983) we tried to fit the distances between settlements and cemeteries (Table 1). Most of the cemeteries are in the middle-distance visibility range (19 cases - 68%) and the rest in the near-distance visibility range (9 cases - 32%).

The spatial separation of funerary areas from the settlements is not 'segregation' of the dead from the living. Between the settlements and cemeteries the living maintained some relationships of interdependence and interaction. Typical elements of the domestic space are transferred into the funeral space (Oanţă 2006: 57). Especially transferred are material elements (pots, tools, adornment objects, other artifacts), but also organizational patterns (of burials), technical solutions (grave construction) and conceptual elements (identity, feelings, beliefs). The cemeteries may reflect the status of the settlements and their evolution, but also, in accordance with the symbolism, ideology and social structure adopted by communities, reflect rules, order and community values.

Conclusions

The issue of location and spatial organization of cemeteries is very complex and there are still many questions awaiting answers. Unfortunately, most of the Kodjadermen-Gumelniţa-Karanovo VI cemeteries have only been partially investigated and published making our proposed approach more difficult.

Based on the available information, we can conclude that the Kodjadermen-Gumelniţa-Karanovo VI communities have some specifics funeral rules.

Generally, cemeteries were located in high places not liable to flooding, in accessible and manageable areas not far from the settlements, and in the direction close to west from the settlements (81%) (Figure 10a). This result seems to indicate a preference of these communities to place their necropolises to the west of the settlements and probably it is a specific funeral rule. This hypothesis has also been formulated previously by other authors (Todorova 1978, 1982, 1986), but based on a much smaller group of only 7 necropolises. The current group of known cemeteries is more representatives (more than 30 necropolises) but leads to similar conclusions.

Distance between settlements and cemeteries ranges from 50 to 950m (Figure 10a) placing them in the near- and middle-distance visibility index of Higuchi (Higuchi 1983) and this is possibly another specific funeral rule of these communities.

In terms of settlement association, in most of the cases (73%) the cemeteries are associated with a single settlement. Sometimes there are two cemeteries associated with one settlement (9% - three cases); in other cases there are two settlements and just one cemetery (3% - one case). For the rest of cemeteries (15% - five cases) there are no data available about the association with settlements. These situations demonstrate the behavioural variability of these prehistoric communities, but also the existence of local peculiarities and some preferences in expression of self identities. Furthermore, where cemeteries have been associated with multiple settlements (Căscioarele, Durankulak and maybe Varna I) it is clear that these communities were not contemporary and therefore there is a continuity in the use of cemeteries. Also, the discoveries considered in the settlement's cemeteries, based on geo-topographic attributes and artefact characteristics, indicate that cemeteries may be populated with the dead of other communities whose bodies have been 'brought back' from the places where they lived (Parker Pearson 1993: 211). The settlements associated with two cemeteries (Gumelnita, Chirnogi, Sultana-'Malu Roşu') presumably reflect the particular evolution of those communities, but also certain demographic realities or some events associated with changing perceptions of these individuals to the environment-landscape. At conceptual and concrete levels, the cemeteries, as well as settlements, have their own dynamics, history, memory, development and temporality.

From our point of view, there are three major factors that determine the choice of the location of the cemeteries: topography of the landscape, visibility and the perception of that space by a prehistoric community.

The issue of location and spatial organization of Kodjadermen-Gumelniţa-Karanovo VI cemeteries requires further research and debate. This paper has not attempted to resolve all issues, but to quantify the existing data and present new viewpoints about this subject.

Acknowledgements

We thank Steve Mills (Cardiff University) for improvement of the English translation and Carmen Bem (Institute for Cultural Memory, Bucharest) for the aerial photos of the Sultana, Gumelnița and Căscioarele sites. Also, for the information, explanations and clarifications provided in connection with cemeteries in Bulgaria, we would like to thank colleagues from Bulgaria - Dimitar Chernakov (History Museum Rousse), Alexander Chohadzhiev (Archaeological Museum Veliko Tarnovo), Boryana Mateva (Historical Museum of Isperih), Vladimir Slavchev (Archaeological Museum Varna) and Stoilka Terzijska-Ignatova (Pazardzhik History Museum).

This work was supported by CNCSIS-UEFISCSU, project number 2/03.08.2010 PN II-RU code 16/2010.

Notes

[1.] Bulgarian archaeologists use the term 'Varna culture' to define the cultural variant of the Kodjadermen-Gumelniţa-Karanovo VI in the Dobrogea region and along the Black Sea coast (Todorova and Tončeva 1975; Todorova 1978, 1985; Boyadžiev *et al*. 1993), but this term is not accepted / used in Romanian Archaeology and by the other specialists (for critical comments see Dumitrescu *et al*. 1983; Șimon 1983; Lichardus 1988; Haşotti 1997; Voinea 2005). The term 'Varna culture' will not be used in this paper.

[2.] The situation of these two cemeteries is not at all clear. The Kamenovo cemetery was excavated at the beginning of 20th century by A. Yavashev from Razgrad. In this area is a tell settlement, excavated by I. Ivanov and L. Manolakakis in 1998-1999, but we do not know the relation of this with the cemetery (pers. comm. V. Slavchev). The situation from Sava site is even less clear. The excavation was led by D. Zlatarski during the late 1950s and he wrote in one sentence that he excavated a skeleton close to the Sava tell. But it is not clear to which period the grave belongs, and where it was located. About 600m to the southeast of the tell there is a Late Bronze settlement which is also problematic (pers. comm. V. Slavchev). H. Todorova mentions that G. Tončeva excavated some graves in the 1970s (Todorova 1981: 19), but does not specify how many and where they were discovered.

[3.] The largest cemetery known for Kodjadermen-Gumelniţa-Karanovo VI communities is Durankulak. Excavations have uncovered over 1200 burials making it one of the largest concentrations of prehistoric burials in Southeast Europe. But the cemetery continues under the Durankulak Lake (Todorova 2002). At the Varna I necropolis 310 burials were investigated, but it has not been fully excavated (Slavchev 2010). Vărăşti-'Grădiştea Ulmilor' with 122 graves was not fully investigated because in the north the cemetery extends beneath the Boian Lake and to the south there was a plantation of willows (Comşa 1995). The other cemeteries in Romania and Bulgaria each contain less than 100 graves (Vinica - 53 graves; Sultana-'Malu Roşu' I - 36 graves; Omurtag - 31 graves; Goljamo Delčevo - 30 graves; Poljanica - 25 graves) (Radunčeva 1976; Todorova 1982; Angelova 1990; Lazăr *et al.* 2008, 2009).

[4.] For example, in Romania identification of cemeteries has not been a priority for archaeologists with research focusing on the settlements. Thus most Gumelniţa cemeteries have been discovered accidentally. In only three cases (Radovanu, Măriuţa-'La Movilă' and Sultana-'Malu Roşu' I) have cemeteries been identified following a systematic research approach (Comşa 1990; Lazăr and Parnic 2007; Lazăr *et al.* 2008, 2009).

[5.] The authors of the research believe this discovery represented the cemetery of the Pietrele-'Gorgana' tell settlement (Song 2006: 8; Toderaş *et al*. 2009: 42). In our opinion the absence of archaeological excavations to verify the results of geo-magnetic prospecting makes it difficult for this cemetery to be assigned to the Gumelniţa culture.

[6.] The information on the distance between the cemetery and settlement from Durankulak is contradictory. In this paper we use the data from the Durankulak monograph recently published (Todorova 2002), but other authors indicate a distance of 400m west (Honch *et al*. 2006: 1495) or 450m southwest (Slavchev 2005: 13).

[7.] In one of the first articles related to this settlement, A. Margos denotes this site with the name 'Maksouda-Bojkov tchair' (Margos 1961: 128-9). Then I. Ivanov renamed it 'Morflotte' because the Morflotte factory was at this location in the 1970s - 1980s (pers. comm. V. Slavchev).

[8.] Some researchers have attempted to explain the situation of Varna I cemetery by supposing that it was a cult place or inter-regional necropolis for burying the chiefs of different tribes or groups united by a large intertribal alliance from the eastern part of the Balkan Peninsula (Ivanov 1983; Debois, Otte 2005; Debois 2007). Other researchers consider Varna I cemetery as not clearly associated with a settlement (Bailey 2000: 197, 208). But near present-day Varna Lake eight synchronous settlements are known (Figure 6b), the distance between them being 2.5 to 3km (Ivanov 1993; Slavchev 2010). This represents a high density of farming communities; no comparable concentration of population has been recorded elsewhere in the Balkans during the Eneolithic period (Slavchev 2010: 206). We think that the Varna I cemetery belongs to the 'Morflotte' settlement (Figure 6b), and it is a 'normal' case for this period. We do not, however, exclude the possibility that the eight settlements near Varna Lake represent a single community and that there was one cemetery used by one local community which used several settlements. Also, we should not ignore the perception of space by these prehistoric communities. Perhaps what appear to us today as several settlements were perceived by those people as a single settlement. Unfortunately, 'Morflotte' and the other submerged sites near Varna Lake have not been excavated which makes it difficult to understand and explain the situation here. But dredging activities at the lake bottom have brought to light numerous artifacts from these settlements (cooper tools, ceramic pots) demonstrating the economic prosperity of these communities (Margos 1961: 128-9; 1978: 146-8; Slavchev 2010: 206; see also the exhibition at the Archaeological Museum Varna).

[9.] The case of Căscioarele is almost similar to that of Durankulak. Here, during the first three phases (I–III) of the Hamangia culture, the cemetery was situated about 150 to 200m south of the 'Nivata' settlement on the most elevated and flat part of the landscape at that time. In the Hamangia IV phase (and after that during the Kodjadermen-Gumelniţa-Karanovo VI culture/Varna culture in the opinion of Bulgarian arcaheologists) the cemetery began to be used by communities from the 'Big Island' settlement (Dimov 2002: 28; Boyadžiev 2008: 85-7).

[10.] The use of the physiological limits of human vision in the delineation and characterization of landscape visibility has been visited thoroughly, though infrequently, in the past. The most notable examinations, however, have been applied to problems of landscape architecture by T. Higuchi. He specifically defines visual space in terms of how we perceive 'here' and 'there' based upon visual proximity. His indices of viewshed distance divide a landscape into three classes: near-distance; middle-distance; far-distance. The near-distance corresponds with the visual extent within which the features of a standard observed object are visible and distinguishable (0-120m). This viewshed class defines the 'intimate' space defined by human vision within which individuals are identifiable. The middle-distance describes the visible range within which, while not individually distinguishable, the standard observed object is visually distinguishable from the landscape (120-2,200m). Within this viewshed class a human would be visible and distinct from their surroundings though they would not be individually identifiable. Beyond the middle-distance, the far-distance described the distance beyond which the standard object is no longer discernable from the landscape (more than 2200m) (Higuchi 1983).

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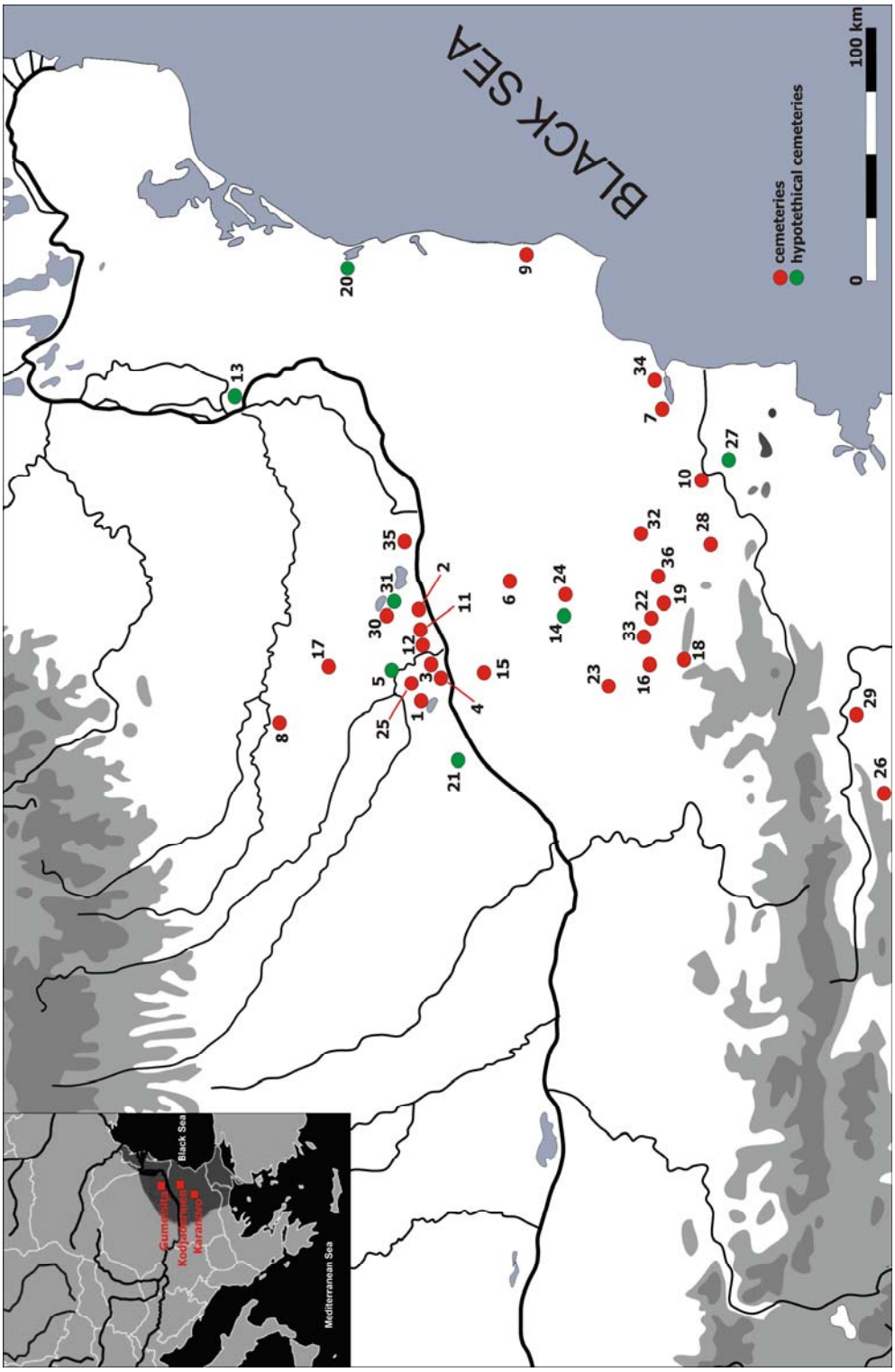
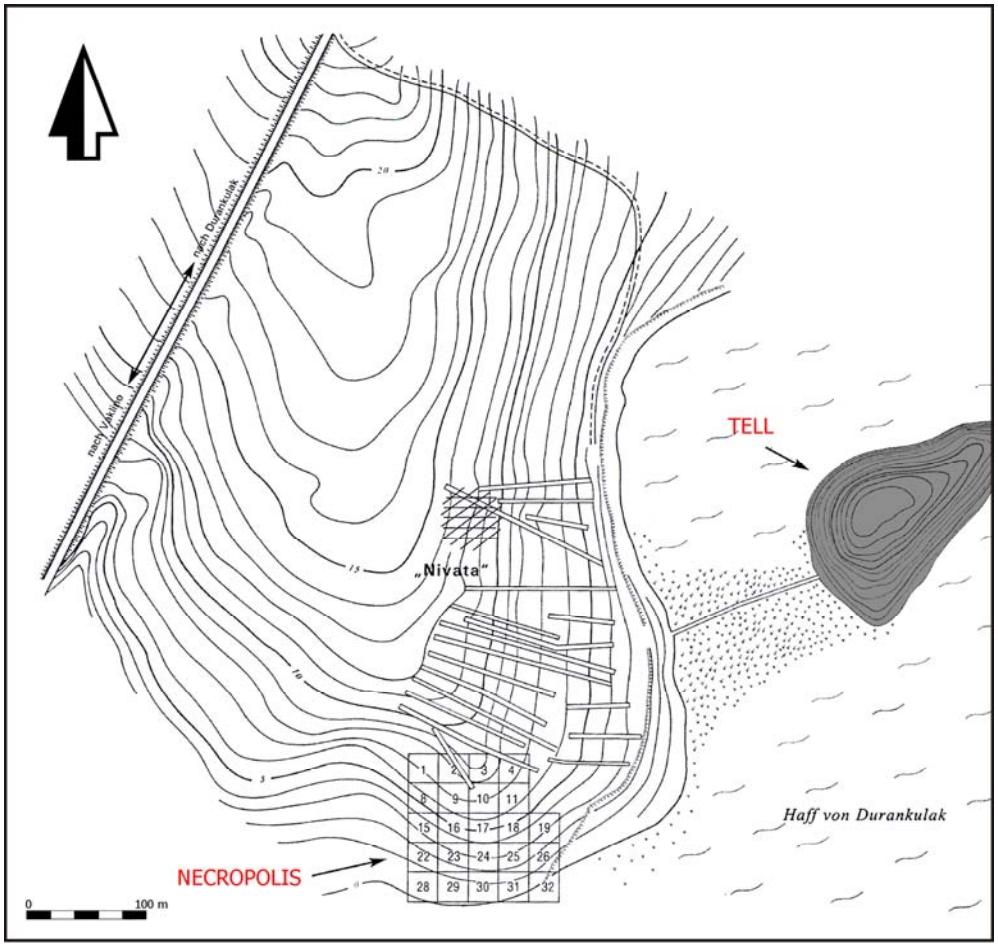


1. Căscioarele; 2. Cetatea Veche-'Grădiştea' (Spanţov); 3. Chirnogi I ('Terasa Rudarilor'); 4. Chirnogi II ('Şuviţa Iorgulescu'); 5. Curcani; 6. Demir Baba Teke-'Sboryanovo'; 7. Devnja; 8. Dridu; 9. Durankulak; 10. Goljamo Delčevo; 11. Gumelniţa I; 12. Gumelniţa II ('Valea Mare'); 13. Hârşova; 14. Kamenovo; 15. Kosharna; 16. Liljak; 17. Măriuţa-'La Movilă'; 18. Omurtag; 19. Ovčarovo; 20. Palazu Mare; 21. Pietrele-'Gorgana'; 22. Poljanita; 23. Pomoštica; 24. Radingrad; 25. Radovanu; 26. Rupkite-'Sinorski grobita'; 27. Sava; 28. Smyadovo-'Gorlomova koria'; 29. Stara Zagora-'Bereketska Mogila'; 30. Sultana-'Malu Roşu I'; 31. Sultana-'Malu Roşu II'; 32. Sushina; 33. Targovište; 34. Varna I; 35. Vărăşti-'Grădiştea Ulmilor'; 36. Vinica.

Figure 1. Map of Kodjadermen-Gumelniţa-Karanovo VI extramural cemeteries from Romania and Bulgaria.



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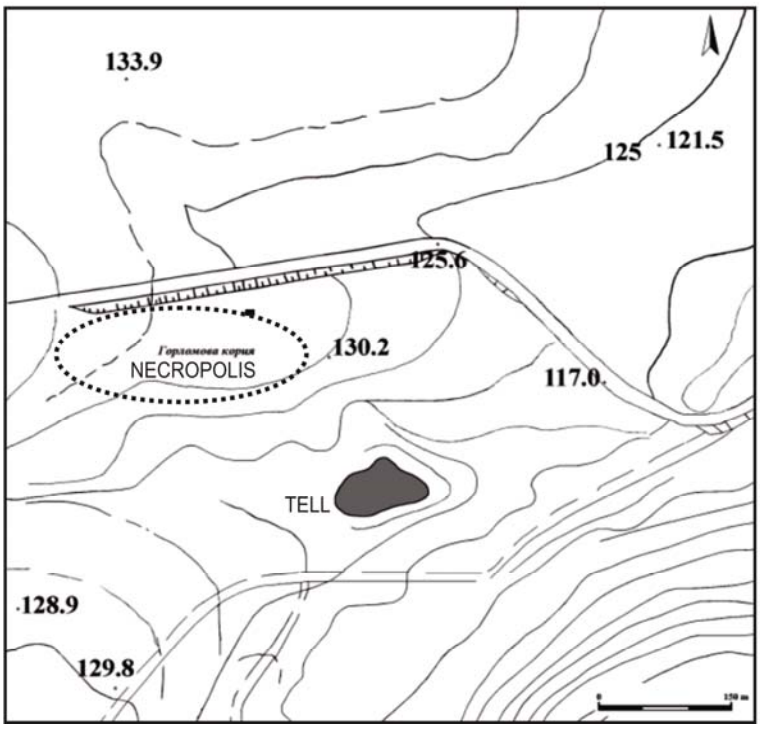
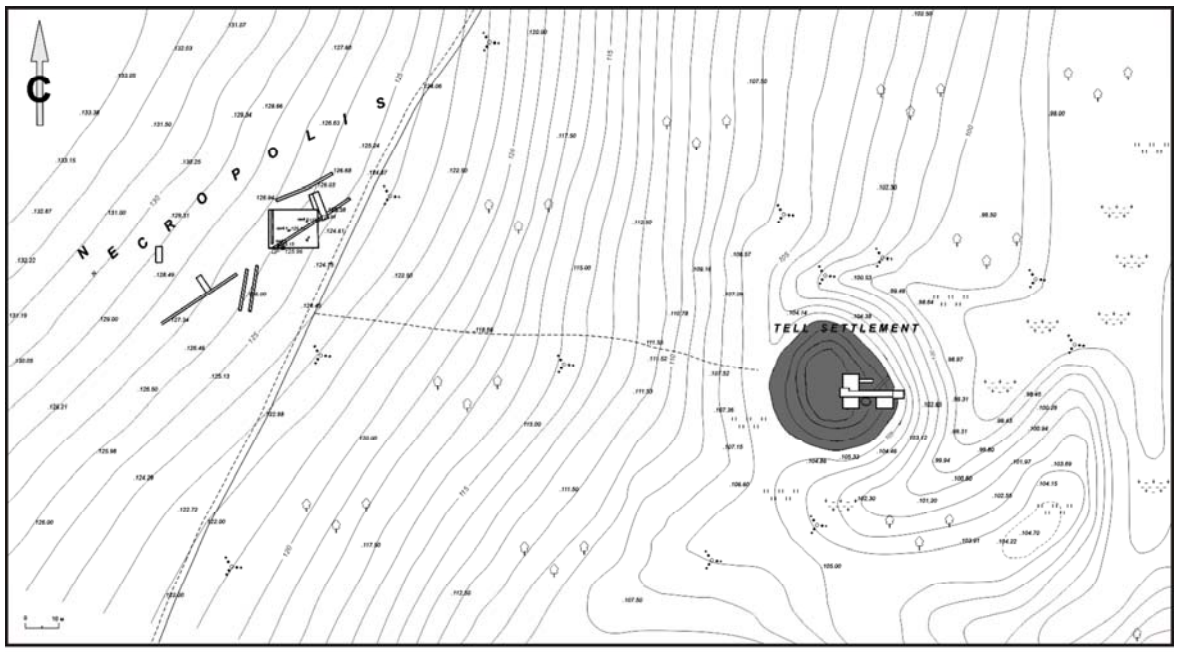


b

Figure 2. a. Plan of Durankulak site, Bulgaria (after Todorova 2002, modified); b. Plan of Smyadovo-'Gorlomova koria' site, Bulgaria (after Chohadzhiev and Venelinova 2008a, modified).



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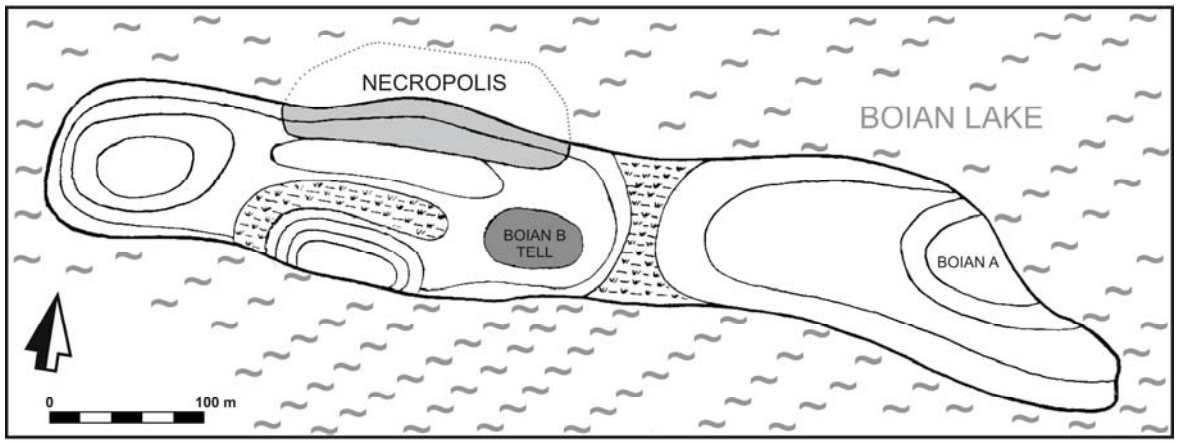

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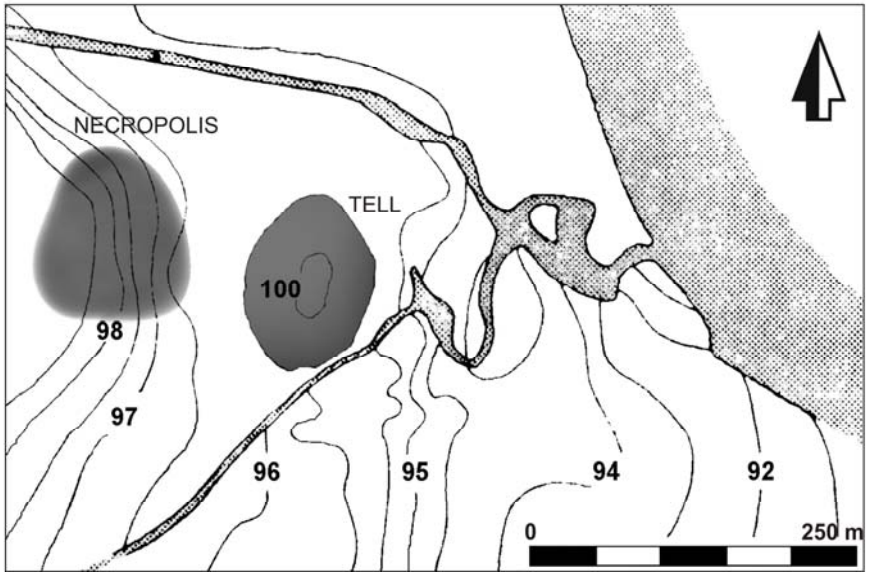

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Figure 3. a. Plan of Kosharna site, Bulgaria (after Chernakov 2011); b. Plan of Vărăşti-'Grădiştea Ulmilor' site, Romania (after Comşa 1983, modified); c. Plan of Goljamo Delčevo site, Bulgaria (after Todorova 1982, modified).

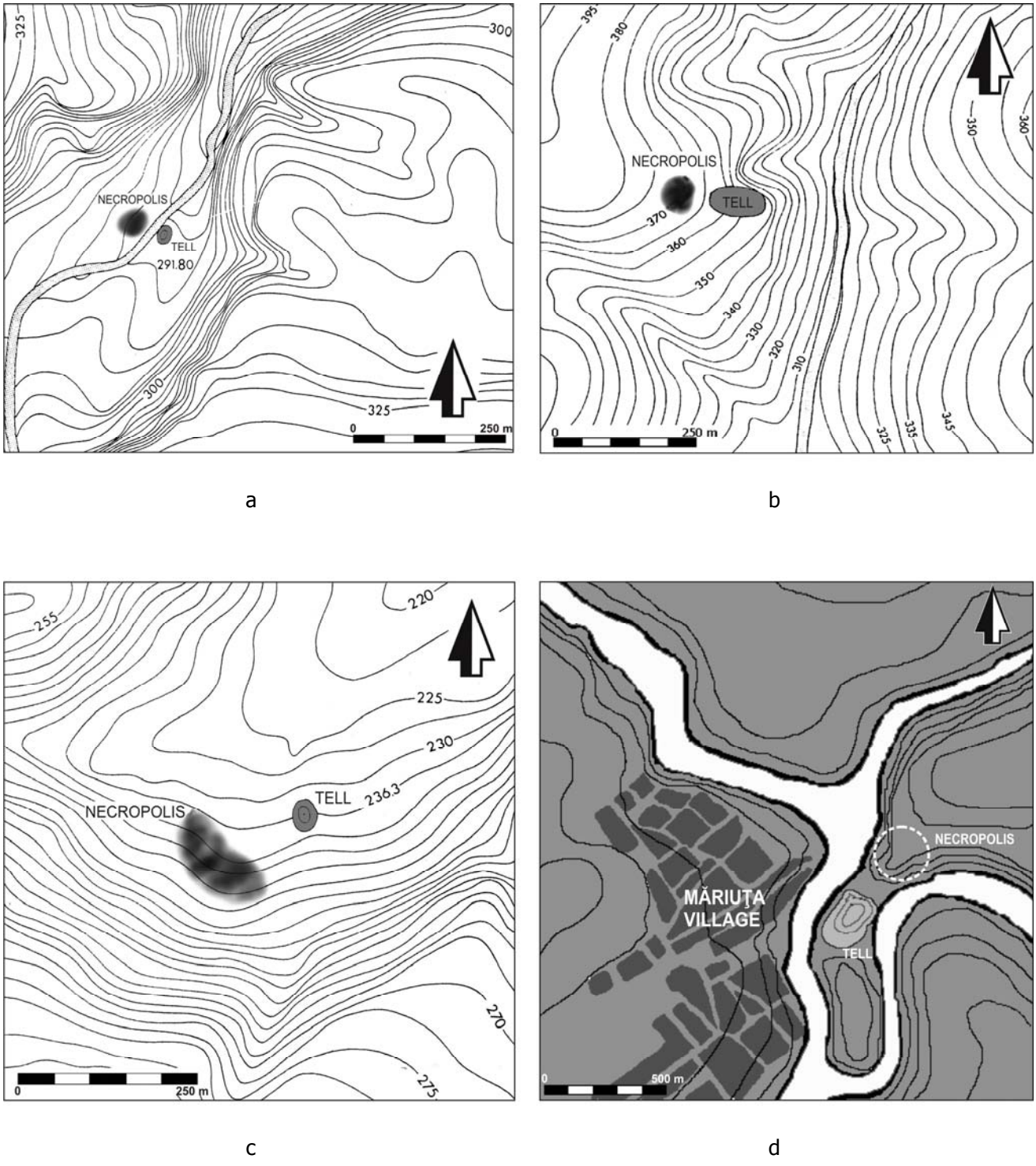
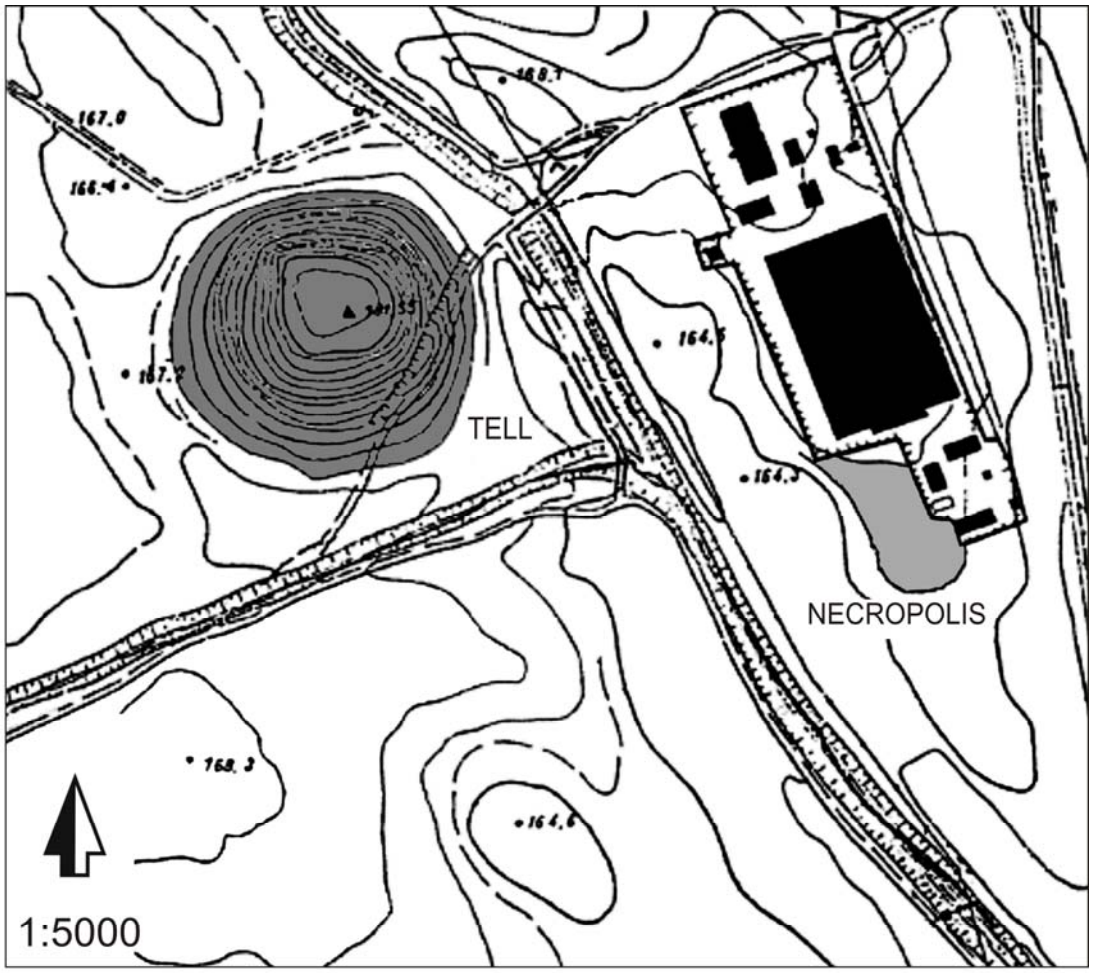


Figure 4. a. Plan of Ovčarovo site, Bulgaria; b. Plan of Radingrad site, Bulgaria; c. Plan of Poljanita site, Bulgaria (after Todorova 1982, modified); d. Plan of Măriuţa-'La Movilă' site, Romania (after Lazăr and Parnic 2007).



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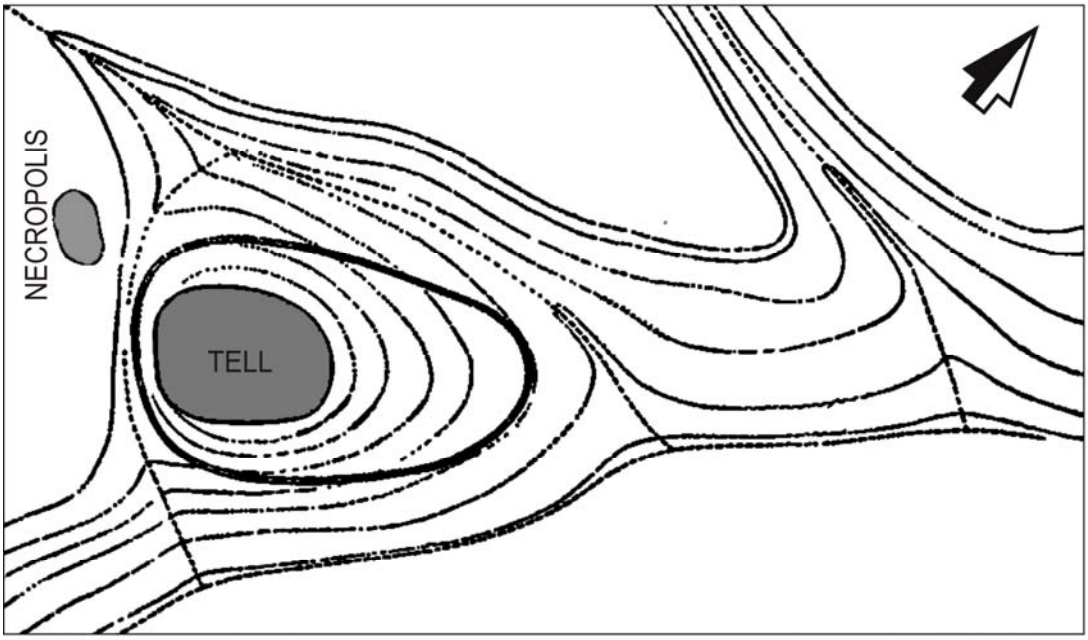

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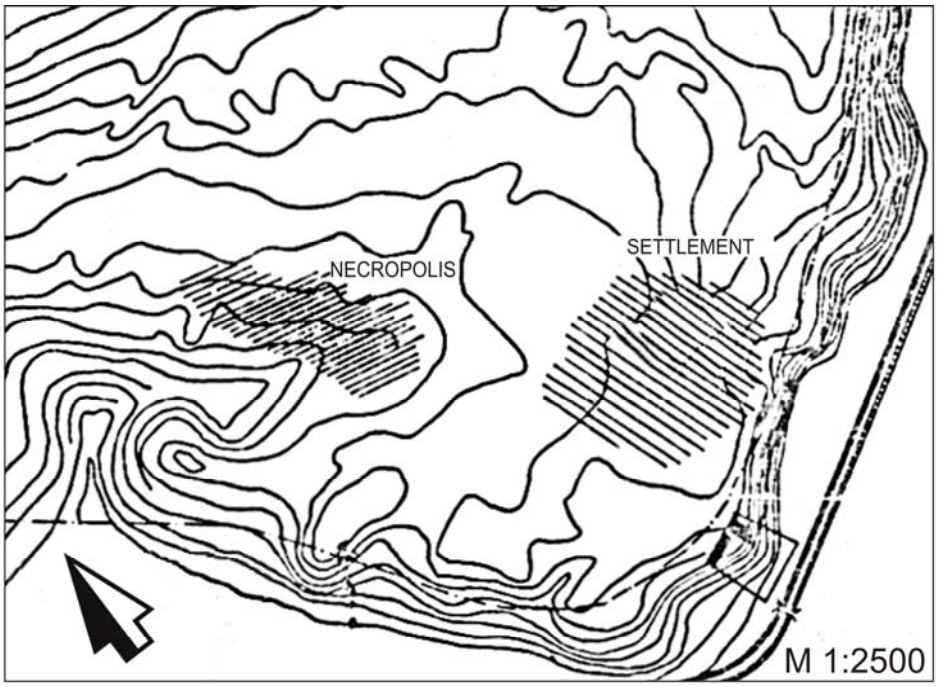
Figure 5. a. Plan of Stara Zagora-'Bereketska Mogila' site, Bulgaria (after Kalčev 2002, modified); b. Plan of Radovanu site, Romania (after Comşa 1990, without scale, modified).



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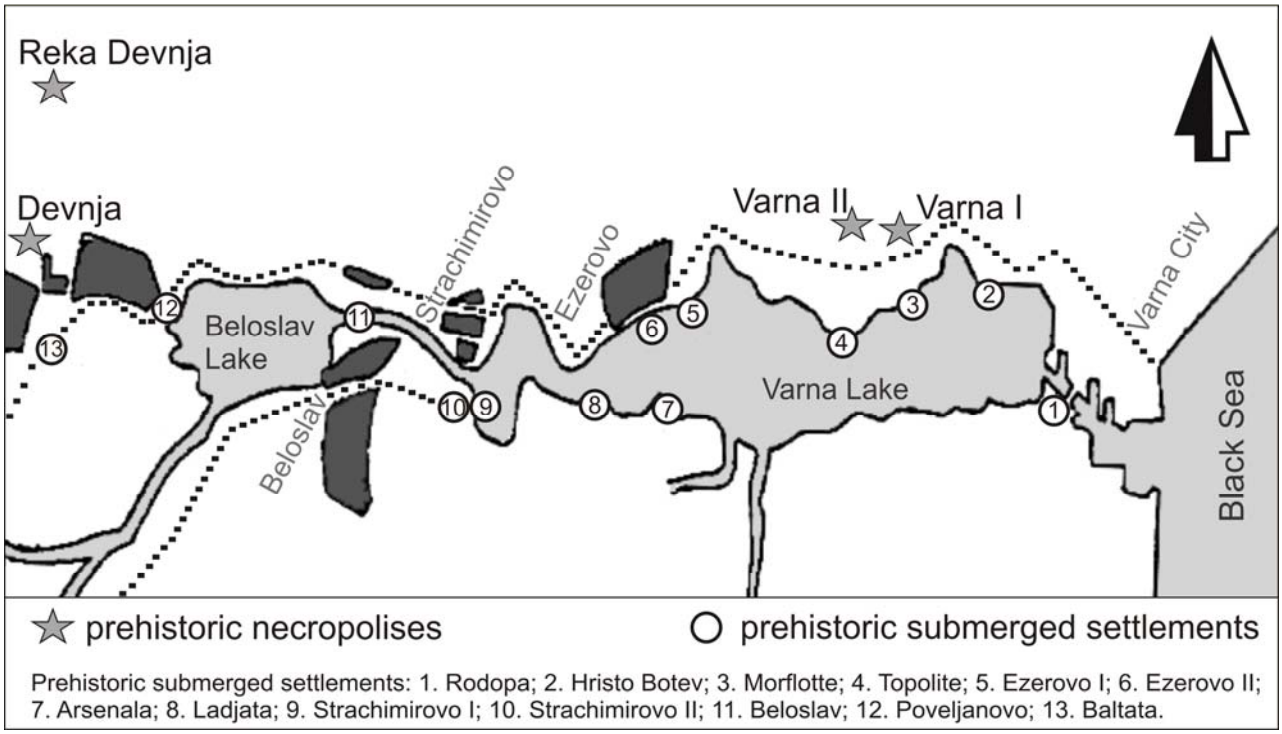

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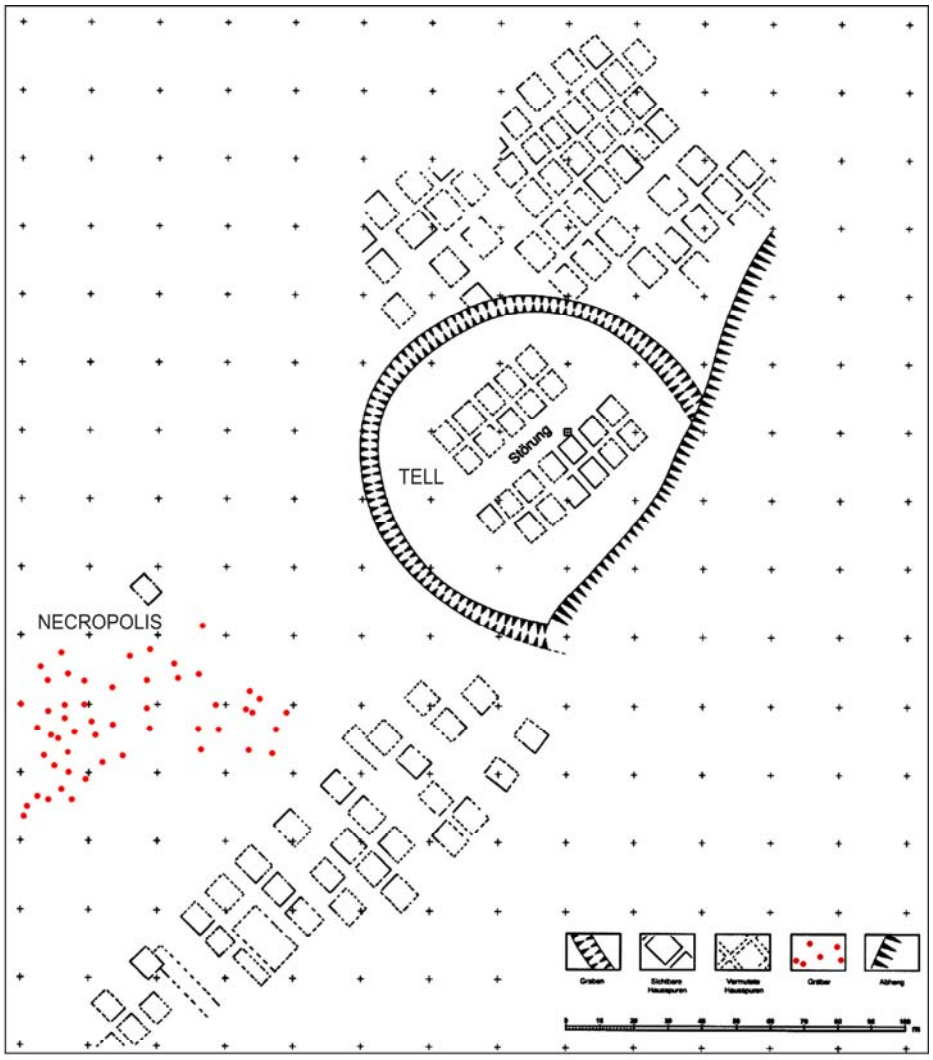
Figure 6. a. Plan of Devnja site, Bulgaria (after Ivanov 1972, modified); b. Plan of prehistoric sites from Varna Lake area, Bulgaria (after Ivanov 1993, without scale, modified).



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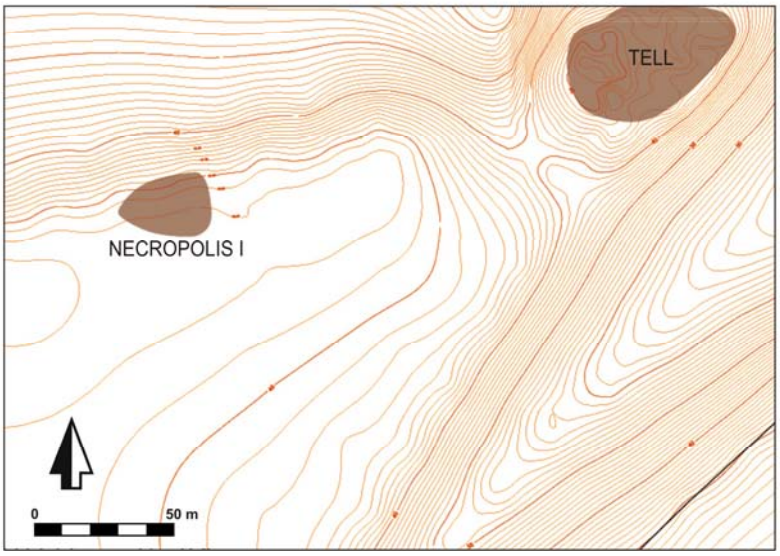

b

Figure 7. a. Plan of Pietrele-Gorgana site, Romania (after Hansen *et al.* 2006); b. Plan of Sultana-Malu Roşu site, Romania (after Lazăr *et al.* 2008).

a

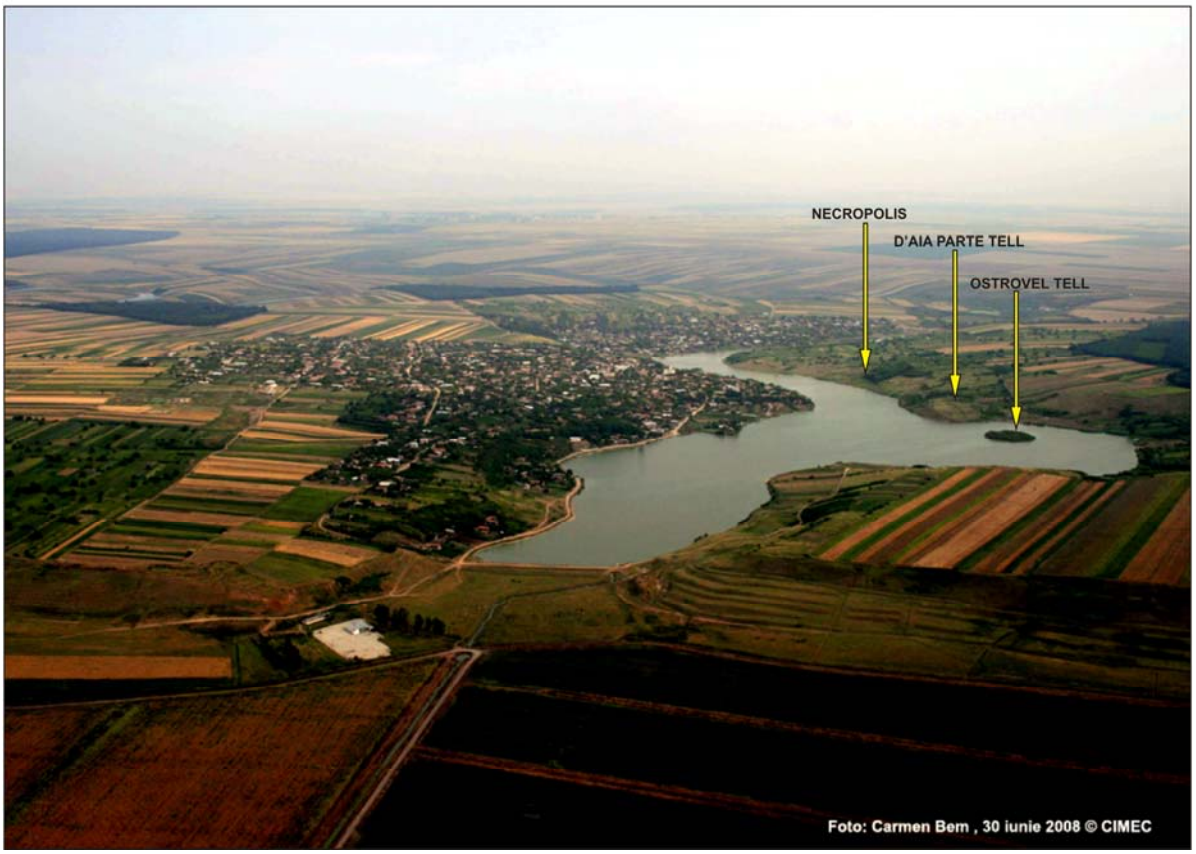

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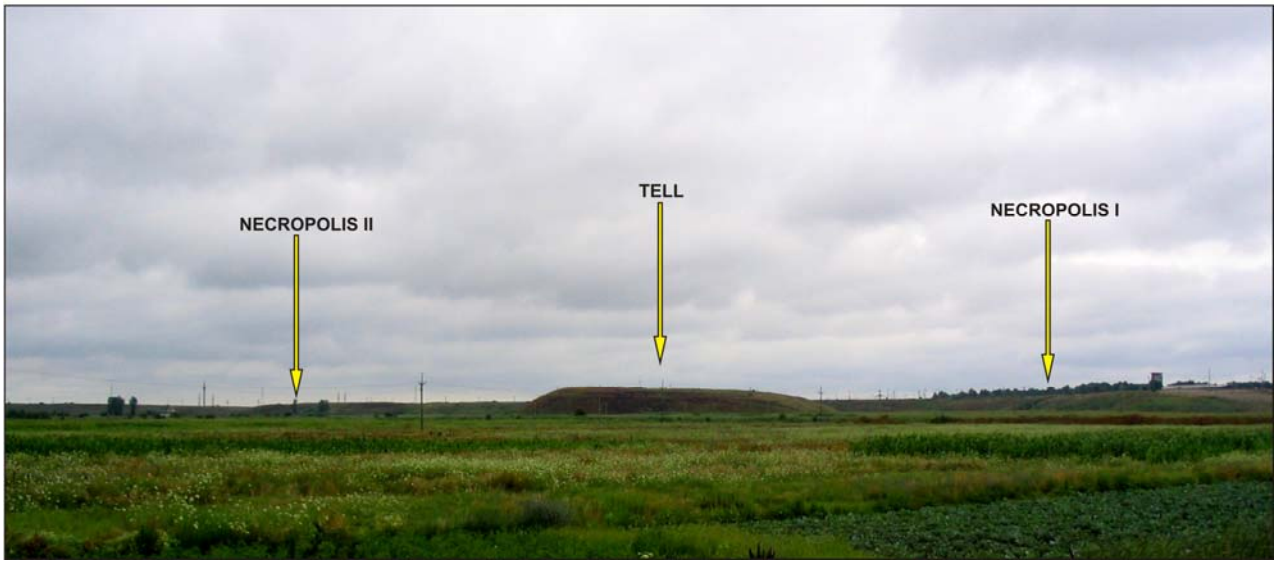
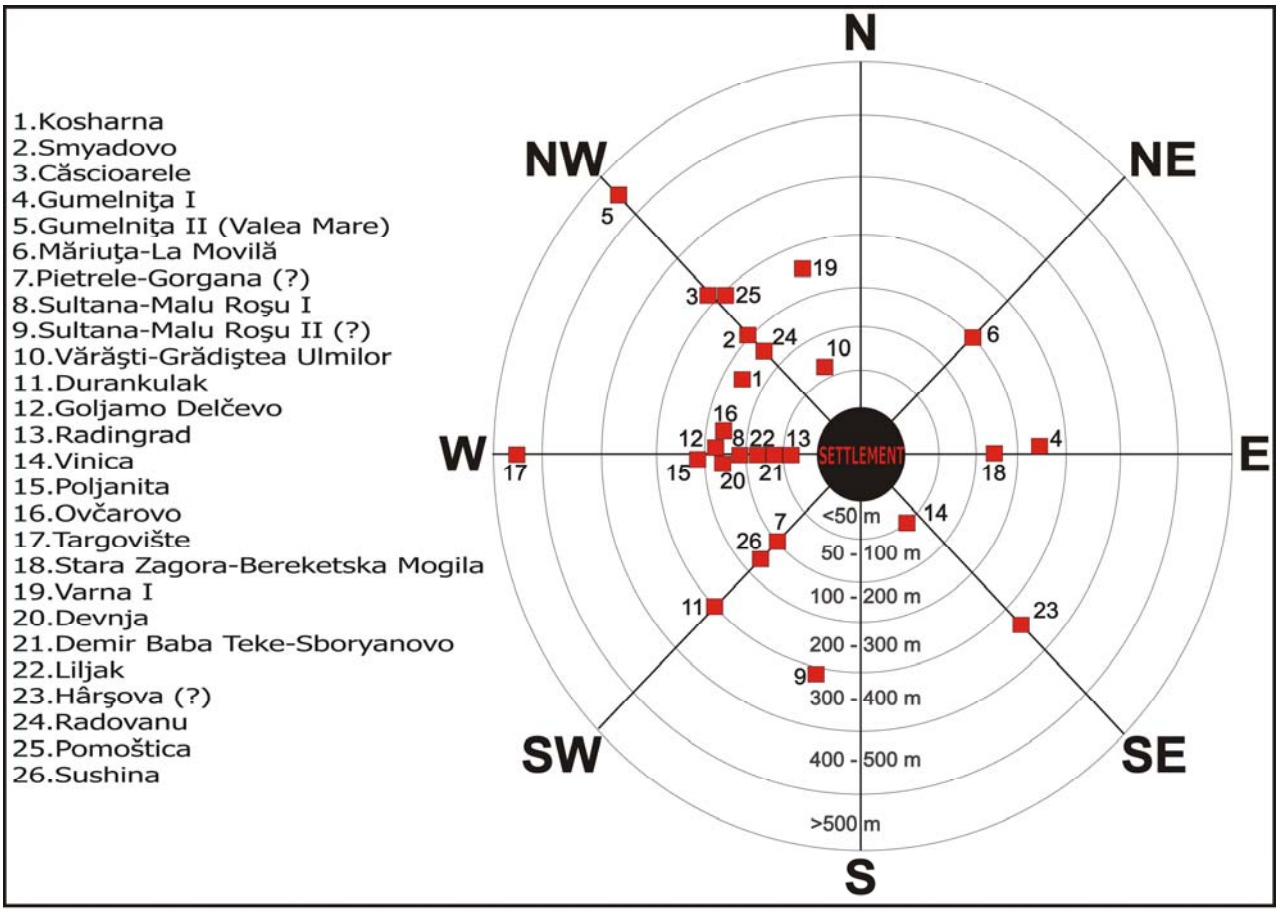
Figure 8. Aerial photos of Sultana-'Malu Roşu' (a) and Căscioarele (b) sites, Romania (photos by Carmen Bem, 2008).

a



b

Figure 9. a. Aerial photo of Gumelnița site area, Romania (photo by Carmen Bem, 2008); b. General view of Gumelnița site, Romania (photo by C. Lazăr, 2005).



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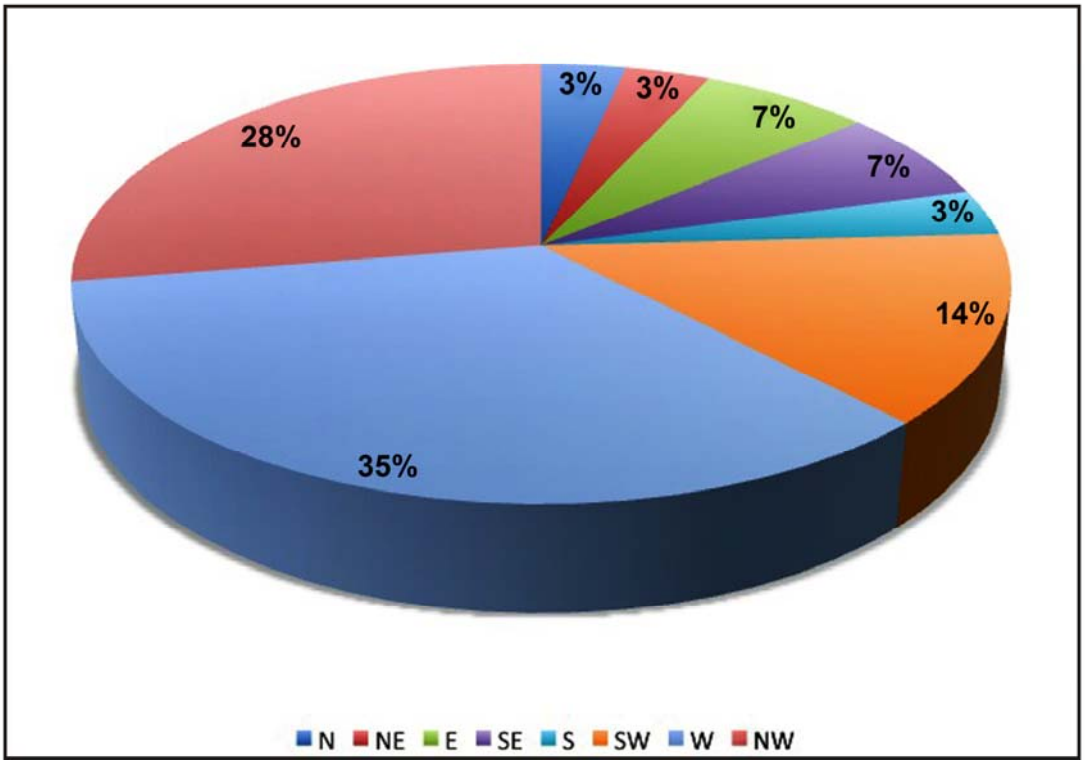

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Figure 10. a. Location of cemeteries in relation to settlements (only cases for which data were available); b. Cemeteries distribution according to cardinal directions of location.

NEWLY DISCOVERED CHALCOLITHIC NECROPOLIS NEAR KOSHARNA TELL

Dimitar CHERNAKOV

Abstract: *The settlement mound is located 3 km south of the village of Kosharna, Slivo pole municipality. The tell resembles a truncated cone with a diameter of 66 m at the base, average height of 5 m and an area of 2.70 decares. It is located on a southeastern facing slope close to a small spring.*

Archaeological investigations, directed by Dimitar Chernakov, began in 2007. To date, four habitation layers, dated to the Late Chalcolithic and the Gumelniţa culture (4500-4100 BC), have been studied through test trenches. Destruction layers of several burnt dwellings have been uncovered, most oriented with their short walls towards North-South. Beams fixed in the ground supported the wattle-and-daub structure. The floor in some dwellings had several renovations of yellow or green clay, periodically fired.

In 2009 we began work on the necropolis associated with the tell 160 m north-west of the tell. Our test trenches located 6 graves, 4 underground structures and 2 surface structures. The skeletons are all placed in a contracted position on the left side with heads to the north-east. With one exception, there is no burial inventory but lumps of red ochre were found on the bones of the skeletons. The first three graves are located some five meters apart and are almost aligned. A clay structure, destroyed by intense fire, was located in close proximity to the three graves. It contained a collection find of 32 ceramic vessels and 2 lids as well as a flat stone (most likely a grinding stone). This collection of finds, of Late Chalcolithic date (Gumelniţa culture), stood on the burnt floor level and partly covered by burnt wall plaster.

Keywords: *Chalcolithic, necropolis, graves, burial structures.*

The tell-settlement is located 3 km south of the village of Kosharna, Slivo pole municipality (Figure 1: 1). The tell resembles a truncated cone with a diameter of 66m at the base, average height of 5 m and an area of 2,70 decares. It is located on a south-eastern facing slope close to a small spring.

Archaeological investigations, directed by Dimitar Chernakov, began in 2007 (Chernakov and Gurova 2008: 68-72; 2009: 90-3; 2010: 73-6; Chernakov 2010: 55-69). To date, four habitation layers, dated to the Late Chalcolithic and the Gumelniţa culture (4500 - 4100 BC) have been studied through test trenches. Destruction layers of several burnt dwellings have been uncovered, most oriented with their short walls towards North-South. Beams fixed in the ground supported the wattle-and-daub structure. The floor in some dwellings had several renovations of yellow or green clay, periodically fired.

In 2009 a sector of a dwelling of the third habitation layer was studied. Oriented in accordance with the rest of the buildings, it is 6 m wide while the entire length has not yet been established. Destruction layers include charcoal, pottery fragments, wall plaster and traces of burnt wooden construction. The eastern wall is marked by an irregular line of ten post holes with outer clay plaster. The western wall is marked by a line of five post holes. The dwelling featured at least two rooms, separated by an internal wall, constructed in a similar manner to the outer wall. Three layers are distinguished on the clay floor. In the southern room two complete vessels were found as well as stones used as grinding stones. In the second room there were three vessels, two of which were fragmented in the destruction of the dwelling. One of those contained a collection of 24 flint blades, two fragments of decorative *Spondylus* artifacts and a river clam shell. Such finds are characteristic of the Late Chalcolithic period.

The skeleton of a child, in a crouched position to the right with head to the south-west, was excavated beneath this dwelling. The skull was crushed under the pressure of the overlying strata, and the bones of one of the hands are found behind it. Animal bones were found dispersed around the skeleton with animal bones and a shell on top of the back of the skull (Chernakov and Gurova 2010: 73-4).

A large pit was discovered in the central part of the mound. It resembles an inverted bell with an oval section and an upper diameter of 1.80m and a bottom diameter of 1.00m. It cuts through habitation layers I to III. The walls of the pit were not plastered. Four stages of accumulation have been distinguished with the fill consisting of pieces of burnt wall plaster of various sizes,

Steve MILLS and Pavel MIREa (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 117-131.

fragments of pottery vessels, animal bones, stones and burnt wood. Four skeletons were found in the pit - a lamb, a doe, a dog and two rabbits. The lamb skeleton is complete while that of the doe lacks a skull; the skeleton of the dog is dismembered in 3 parts. The pottery found in the pit dates its creation to the end of habitation on the tell; the second phase of the Gumelniţa culture. It belongs to a complex of features located in the central part of the settlement. It is possible that the pit was used for ritual purposes, and the several stages of accumulation testify to its numerous uses (Чернаков and Гюрова 2009: 91).

In the 2009 season and continuing to the present work began on the necropolis associated with the tell. It is situated on a slope 160m north-west of the tell (Figure 1: 2). The surface is used for agricultural purposes in the present.

An area of over 1.5 decares was examined with coring - 26 in number. A total of 6 graves and some burial structures were examined (Figure 2).

Graves

Grave № 1 (Figure 3: 1). Depth into loess of 0.40m. The upper part was demolished during the discovery. A burial pit is not detectable. A woman over 30 years old was buried. A *hocker* (crouched position) lying on its left side. Oriented with the head to the NE at 65º. The right arm is flexed at a right angle at the elbow. The left arm is flexed at an acute angle at the elbow. Probably with hands in front of the face. The legs are flexed at an acute angle at the knees. They are located higher than the pelvis. They were probably touching the wall of the burial pit. Length of the preserved part of the skeleton (from the violated part down to the heels) is 0.67m. Lumps of red ochre on the femurs. Small coals at the base (?) of the burial pit. The shell of a snail in front of the chest. No inventory found.

Grave № 2 (Figure 3: 2). A burial pit is not detectable. A *hocker* (crouched position) lying on its left side of a juvenile individual, *infans II* (12-18 years old). The skeleton is in poor condition; the bones are very friable. Orientation to the NE (head) 65º. The skull is destroyed. Its facial parts are oriented to the South. A bone is preserved (an elbow one of an arm) which is almost parallel to the spinal column. Five ribs are preserved (parts of them) and parts of the spinal vertebrae. The left femoral bone forms an acute angle relative to the hip joints. The right femur is over the left one and is at a right angle relative to the pelvis. Neither the tibiae nor bones of the feet are preserved. Lumps of red ochre with a diameter of 0.03cm found in places around the skeleton. A shell of a small snail inside the mouth cavity. No inventory found.

Grave № 3 (Figure 3: 3). A burial pit is not detectable. A *hocker* (crouched position) lying on its left side of a juvenile individual of age between 5-9 years old. Length of the skeleton – 0.36m. Orientation to the NE (head) 65º. The bones are in poor condition. The skull is cracked and was slightly damaged during discovery. The humerus of the right arm is preserved with a length of 0.04m. The arms are flexed with hands to the facial part of the skull. The femur of the right leg is at an acute angle relative to the hip joints. The tibiae have been smoldered. The shell of a small snail under the skull. Red ochre in some places around the skeleton. Small coals at the base of the pit and under the skeleton. No inventory found. A flint plate was discovered 0.80m northeast of the skeleton.

Grave № 4 (Figure 4: 1). A burial pit is not detectable. A *hocker* (crouched position) lying on its left side of a woman, *infans II* (12-18 years old). The skeleton is at a depth of 1.03m from the contemporary surface and 0.40m into the loess. Orientation to the NE (head) 48º. Length of the skeleton is 0.80m. The skull is cracked, relatively well-preserved, the mandible is flattened and some of the teeth of the upper jaw are preserved. The facial part of the skull is oriented to the southeast. The humerus of the right arm is almost parallel to the axis of the body. The radius is fragmented, probably as a result of a later mechanical intervention. The phalanges of the fingers are under the chin. A phalanx behind the skull. The left hand is possibly flexed with a palm under the skull. The legs are strongly flexed and the bones of the pelvis have almost smoldered as well as most of the chest. The right leg is flexed at an acute angle. The feet bones are missing. The left leg is flexed and located underneath the right leg. Part of the feet bones, except for the phalanges of the toes, are preserved. Small coals found scattered level with the skeleton. Lumps of red ochre found near the head and the tibiae. Carbonised white matter in front, and probably below, the skull. No burial inventory was found.

Grave № 5 (Figure 5). A burial pit is not detectable. A *hocker* (crouched position) lying on its left side of a man over 30 years old. The skeleton is located at a depth of 1.20m below the contemporary surface and 0.60m into the loess. Orientation to the NE (head) 85º; the face of the skull is oriented toward the south. Length of the skeleton is 0.74m. The skull is partially preserved, slightly flattened by the weight of earth. The arms are strongly flexed at the elbows. The palm of the

right hand is strongly flexed towards the body and located just below the chin. The palm of the left hand is under the skull. The legs are very strongly flexed at an acute angle at the knees. The feet bones of both legs are preserved; those of the left foot form an obtuse angle in relation to the tibia. The hip joints are in poor condition and the thorax is almost completely rotten. A ceramic vessel (bowl) was found 0.20m above the foot bones of the left leg. Diameter of the vessel mouth is 22. cm, lying with the mouth down, with a small hole drilled in the center of its base (Figure 5: 1). The vessel is badly burnt, cracked by the weight of earth and in some places the surface is burnt. A second biconical form vessel was found at 0.30m above the knees, again badly burnt with its mouth aside (Figure 5: 2). The two vessels are in the embankment of the burial pit.

Grave № 6 (Figure 4: 2). A burial pit is not detectable. A *hocker* (crouched position) lying on its back to the left of a man over 30 years old. The skeleton is located at a depth of 1.10m below the the contemporary surface and 0.60m into the loess. Orientation to the NE (head) 77º with the face of the skull is oriented toward the south. Length of the skeleton is 0.92m. The skull is cracked and oriented with the facial bones down. The right hand is flexed into an acute angle at the elbow; the wrist bones are missing. The humerus of the right hand is parallel to that of the left and lies 0.20m from it. Position suggests a *hocker* (crouched position) lying on its back to the left. The lower limbs are strongly flexed at the knees and probably reached the abdomen. The foot bones of the right leg are preserved while those of the left are partially preserved. The bones of the pelvis and the chest are missing. Fragmented rib bones located next to the humerus of the left hand. A lump of red ochre under the ulna of the right hand. No burial inventory found.

Burial structures

A regular cultural layer of the Chalcolithic period is not present in the area of the necropolis is found. Therefore, all the structures that were found are considered to belong to the Chalcolithic necropolis. Two main types of burial structures in the necropolis at Kosharna are distinguished: I. Underground structures (1. Graves; 2. Pits with commemoration offering); II. Ground structures.

I. Underground structures

1. Pit 1 (Figure 6) - located 6m to the south of Grave 3, diameter of 1.50m, an elliptical section, at 0.90m depth in the loess, filling is of loess. The pit contained crushed animal bones of large ruminants and a fragment of a large shallow vessel towards the supposed bottom with a pestle next to it.

2. Pit 2 (Figure 7: 1)- located 10m to the northeast of Grave 4, diameter of 1.95 m, 1.40m in depth, an elliptical section. The fill of the pit is of loess. The pit contained a few bones of large remnants, pottery fragments and a fragmented hollow anthropomorphous figurine (Figure 7: 1 a). All were found at an approximately similar depth presumed to be the bottom of the pit. The figurine is of the 'rattle' type and some specialists consider it to be a musical instrument. The figurine is made of poorly baked ceramics. If we consider this hypothesis to be reliable then this is a proof that the burial ceremonies in the Chalcolithic Age were likely pursued with a musical accompaniment.

3. Pit 3 (Figure 7: 2)- located 9m to the southeast of Grave 5, diameter of 0.60m, 1.05m in depth. At an approximately similar depth the bones of a large remnant and ceramic fragments of vessels were found.

4. Pit 4 (Figure 8) - probably discredited by later interventions, located 8.50m to the southeast of Grave 5. In an area of 4m 6 fragments of ceramic vessels were found at different depths in the trench, one of them is of a biconical vessel (a bowl), a preserved mouth and a middle part (Figure 8: 3-4). The bone of a large remnant is found beneath them in the loess with a stone, oval in shape, above it (Figure 8: 2).

The pottery is typical for the Late Chalcolithic Age.

II. *Ground structures*

1. A site for sacrifices (Figure 9) - 6.5m southeast of Grave 6. It is a concentration of animal bones, including a mandible of a large remnant, pottery (Figure 9: 3-6) and flints in the border between the loess and the humus. All finds located at the same depth (0.80m from the surface), the supposed ancient terrain in a perimeter of 1.5 m. A preserved ceramic spoon is an object of interest which was used for the consumption of ritual meals (Figure 9: 2). No fragments of plaster or architecture found to help interpret the feature as a building.

2. Pottery vessel depot (Figure 10) - 3m northeast of Grave 3 at a depth of 0.75m from the surface a collection of 32 ceramic vessels and 2 vessel stands. They are positioned one next to another and laid on different sides of the burned floor level. Fragments of broken thick-walled vessels are present among them and a stone with a flat shape (a millstone) is cracked. Burned plaster with

brown color found over the vessels. It is considered to be a structure brought down by fire. The floor level, on which the finds are located, is 10cm above the loess surface. It cannot be considered to be a dwelling because study of the terrain around the feature revealed no archaeological evidence for the existence of a dwelling. The feature can be interpreted as a depot for ceramic vessels with a clay construction that went out of use after the implementation of the corresponding burial or commemoration ritual. The ceramic vessels belong to the Late Chalcolithic Age and the Gumelniţa culture (Chernakov and Gurova 2010: 74; Cholakov and Chukalev 2010: 724). Separated research will produce complete publication of the data.

The overall study of the necropolis is imminent.

Conclusions

Although further study of the necropolis is required, several working conclusions can be made. Concerning topography - it is located 160m due west and northwest of the settlement mound on a slope facing southeast. The main group of graves (5) is situated on the border between the highest part of the slope and its crest. The Necropolis is separated from the settlement mound by a shallow gully. It is possible that in the Chalcolithic period along the gully a creek flowed along the opposite site of the gorge coming from the spring at the foot of the tell-settlement.

The dead were buried with their bodies laid out in burial pits with a form we have not yet determined. They are buried at various depths in the loess (from 0.40 to 0.60m). Graves lay at a depth of between 0.64 to 1.20m from the level of the modern surface. All skeletons found so far are in a bent position (*hokeri*) lying on their left side and oriented with heads to the northeast and faces to the south, except for one with head due east. The skeletons are of two adult men (30 - 35), one adult women (30-35 d), two infant females II (12-18 g) and one child skeleton. The skeletons of the males are heavily compressed which is probably the result of intentional tethering of the bodies. Graves 1-3 form an array with a direction northeast - southwest at average distance of about 5.5m apart. Among the remaining 3 graves there is no pattern to their location. The graves do not overlap indicating that in some way they have been marked on the surface. The relatively large distance between graves 4-6 and our discoveries of fragments of human bones in the spaces between the graves is evidence supporting the idea of a larger number of graves in the area studied; perhaps such graves were destroyed by later interventions. Another explanation is that we may have only explored the western periphery of the necropolis where the concentration of graves is relatively low.

Small coals were discovered in the fill of the burial pits or at the level of the skeletons of graves of the two women and the child. This can be explained as purification of the burial pit / surface of the grave by fire. In grave № 4, below the skull of the skeleton there are traces of carbonized white matter which may also be ash. It is possible that the use of fire in these cases is associated with violent death, death at childbirth or illness. According to Bulgarian folk customs in such circumstances of death the grave is burnt in such way on the second or third day after the funeral (Georgieva 1983: 154-5). Fires on the grave may be linked with the modern belief of Slavic nations to warm the deceased buried in the ground (Vakarelski 1990: 127).

In 5 graves there were lumps of red ochre. Only skeleton (№ 5) has a burial inventory composed of two ceramic vessels. The vessels are placed in the burial pit fill layer. The larger of these vessels has a hole at the bottom and shows signs of secondary burns. Both vessels are poorly baked and brittle indicating that they are made specifically for the funeral itself. The lack of burial inventory with the other skeletons can be explained in two ways: 1. Burial gifts were placed in the fill of pits because of the relatively less depth than that of the skeleton. Following long-term agricultural practices it is normal for such funerary gifts to be destroyed by agricultural machines. Evidence supporting such a conclusion is the fact that in many places on the surface and in the loess there are fragments of pottery and animal bones as well as flint artifacts; 2. Most of the burials discovered in necropolis from northeastern Bulgaria and south Romania were Late Chalcolithic and without inventories: Dridu (Comşa 1980: 23-31), Sultana - Malul Rosu (Lazăr *et al.* 2008: 136-8), Sushina (Chohadzhiev and Venelinova 2008: 98-9) and others. This may have influenced the burial traditions at the necropolis near the village of Kosharna.

The structures discovered in the necropolis are evidence of the existence of burial and commemoration practices most likely before, during and after the burial in the necropolis near the village of Kosharna, during the Chalcolithic period.

Based on the evidence to date, the necropolis may be dated to the Late Stone-Copper Age and the culture Gumelniţa. Based on our study of the mound near the necropolis, the necropolis is

chronologically coherent to the last three construction horizons. There are cultural layers and evidence of digging from later epochs on its surface - Antiquity and the Early Iron Age.

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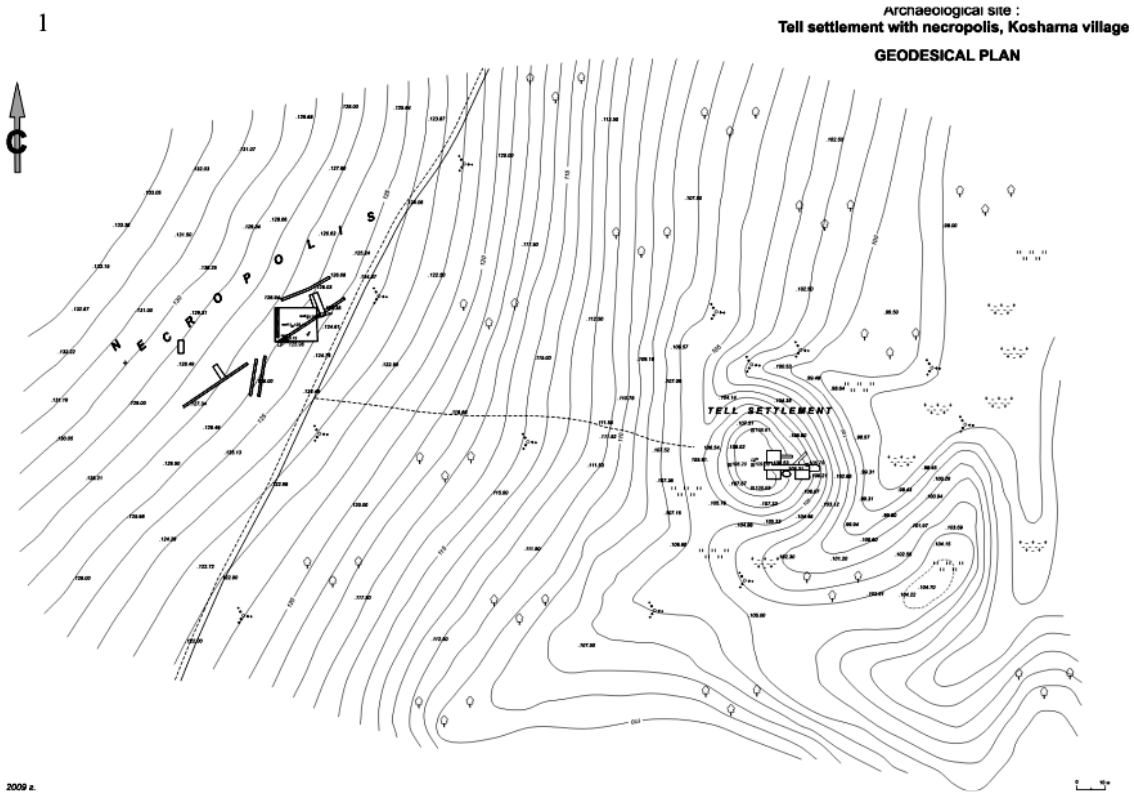
1



2

Figure 1. Locality of Kosharna village (1); Tell-settlement with necropolis at Kosharna village (2) (geodesic plan, author Atanas Kamenarov).

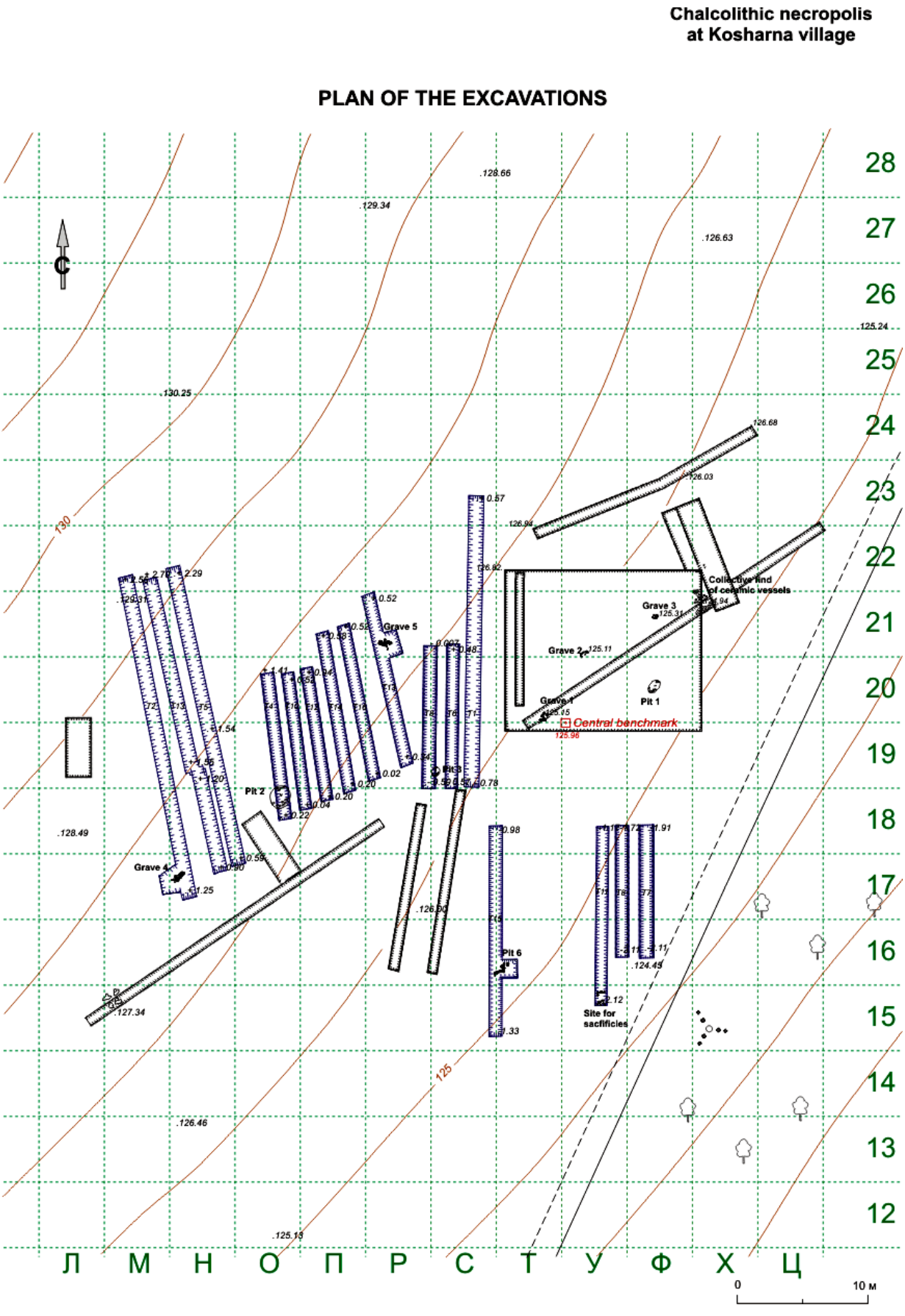


Figure 2. Chalcolithic necropolis at Kosharna village, plan of the excavations.

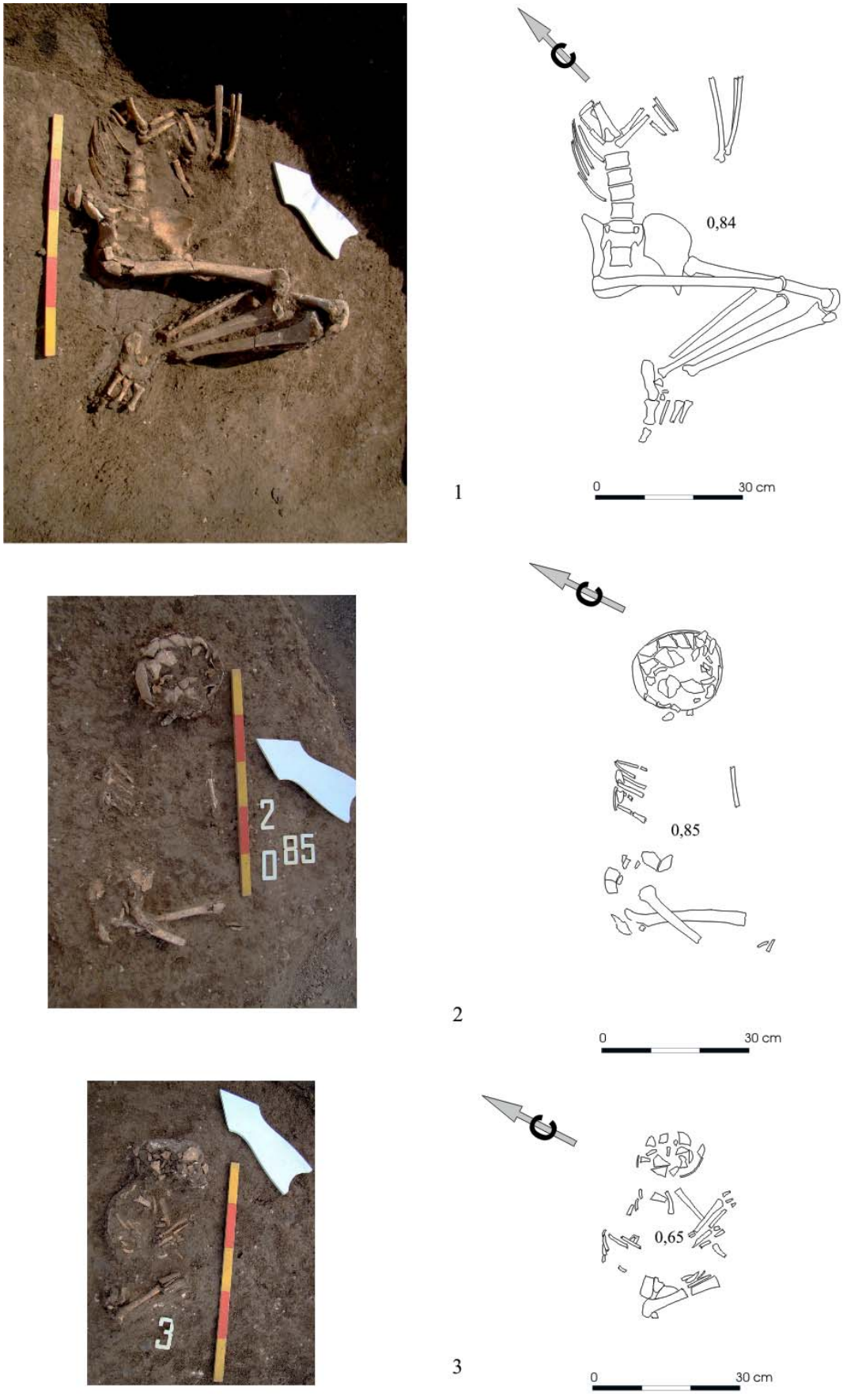


Figure 3. Grave № 1 (1); Grave № 2 (2); Grave № 3 (3).

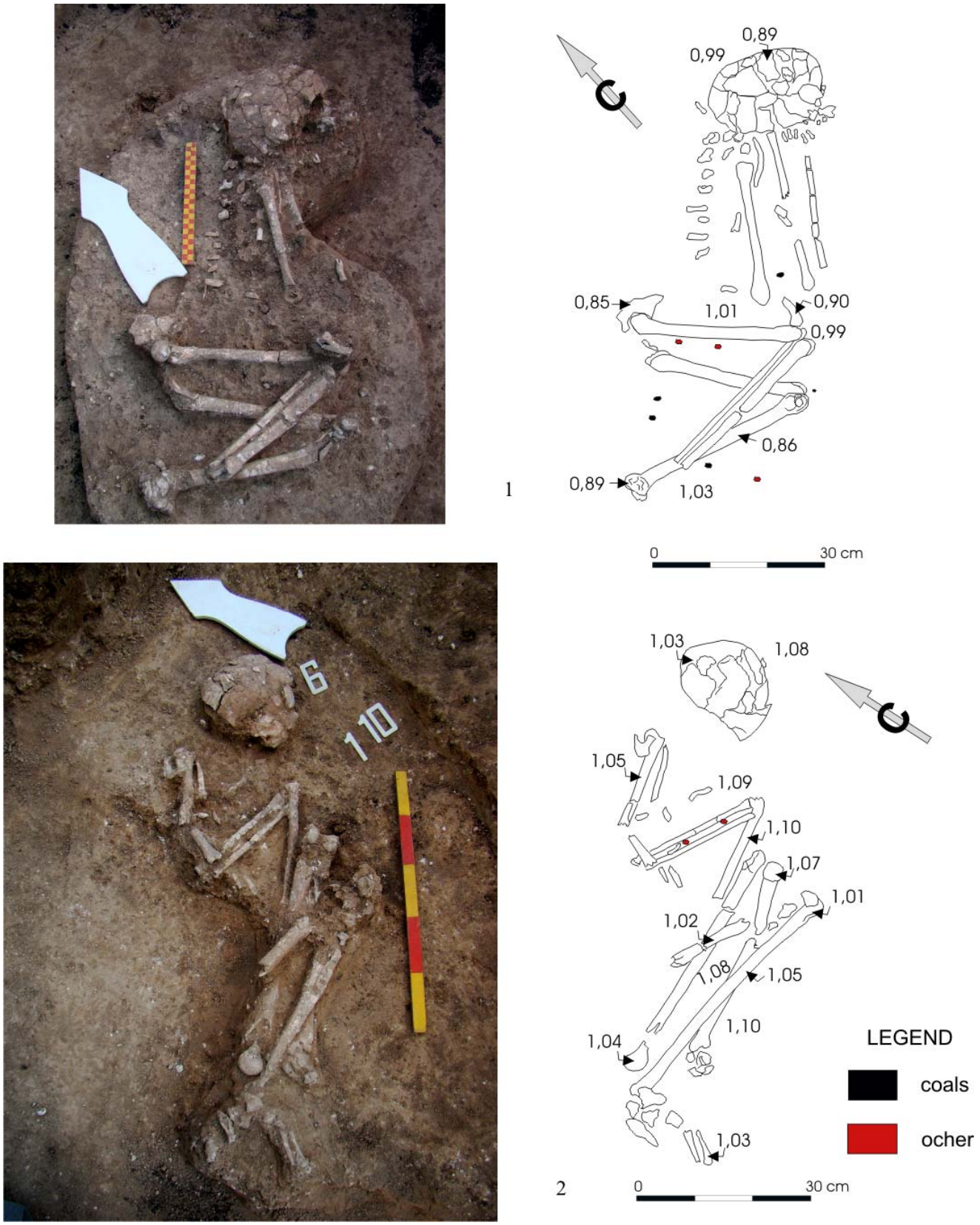


Figure 4. Grave № 4 (1); Grave № 6 (2).

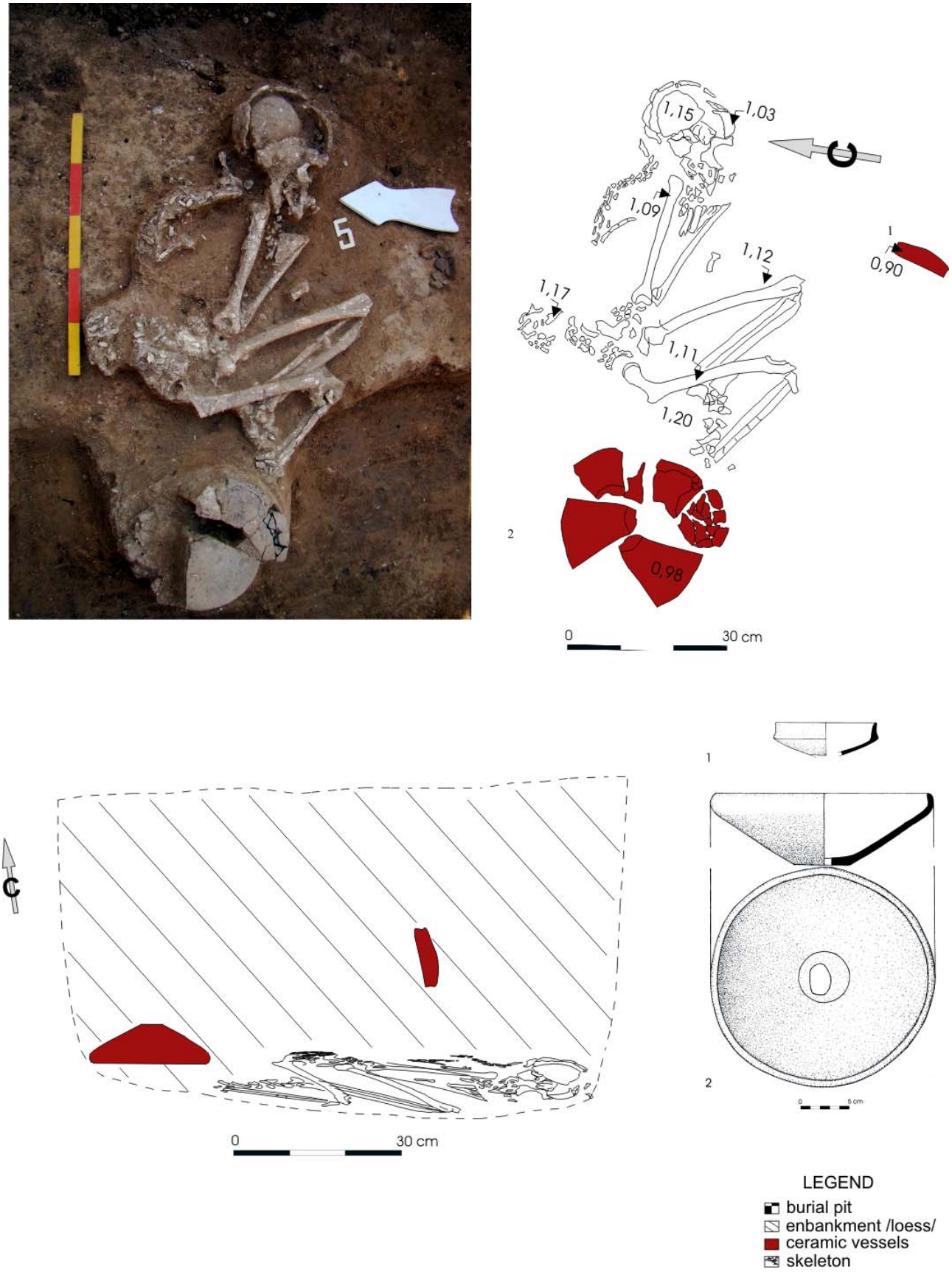


Figure 5. Grave № 5.

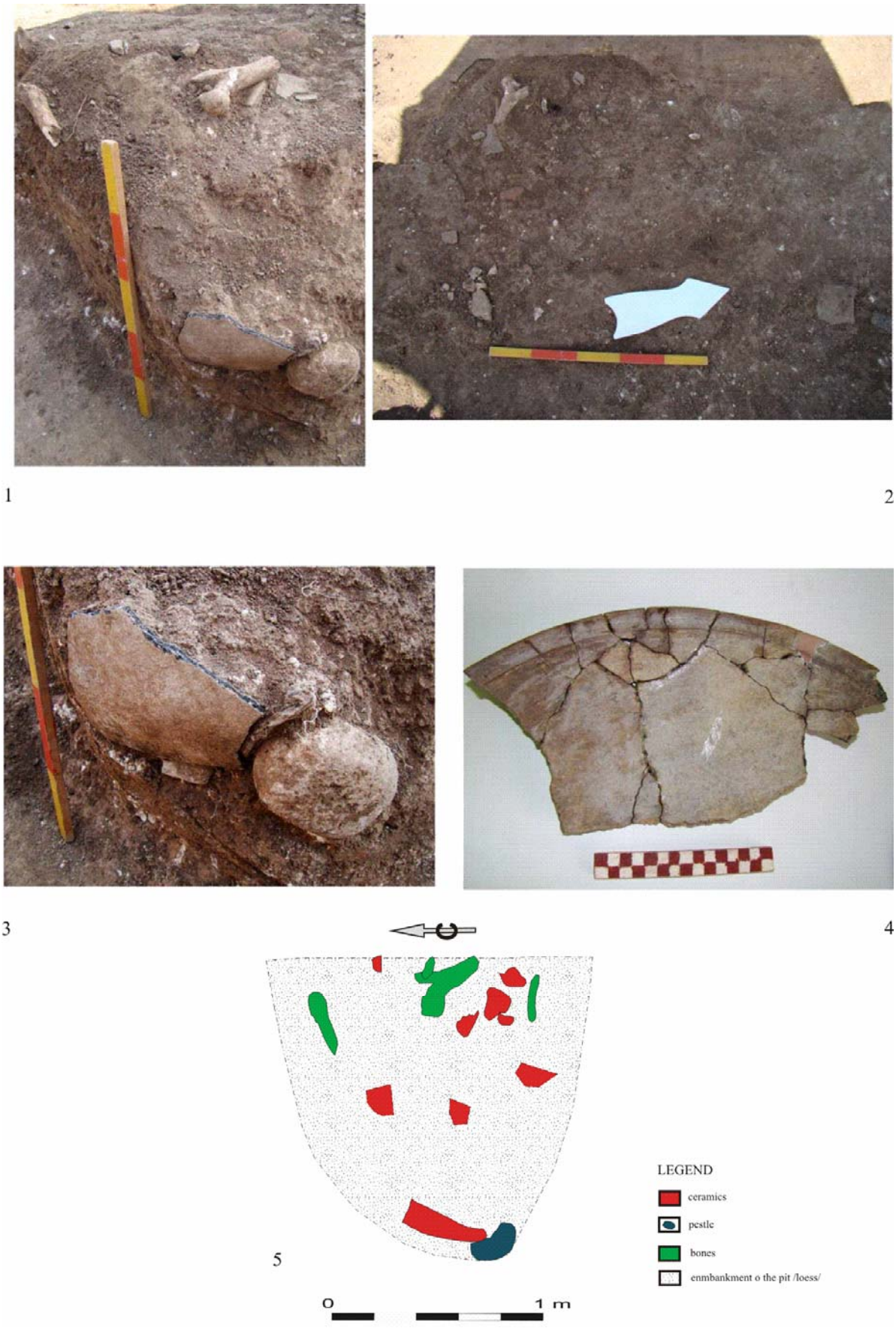


Figure 6. Pit 1. Pictures of the pit (1-3); Plate's fragment in the pit (4); Profile of the pit (5).

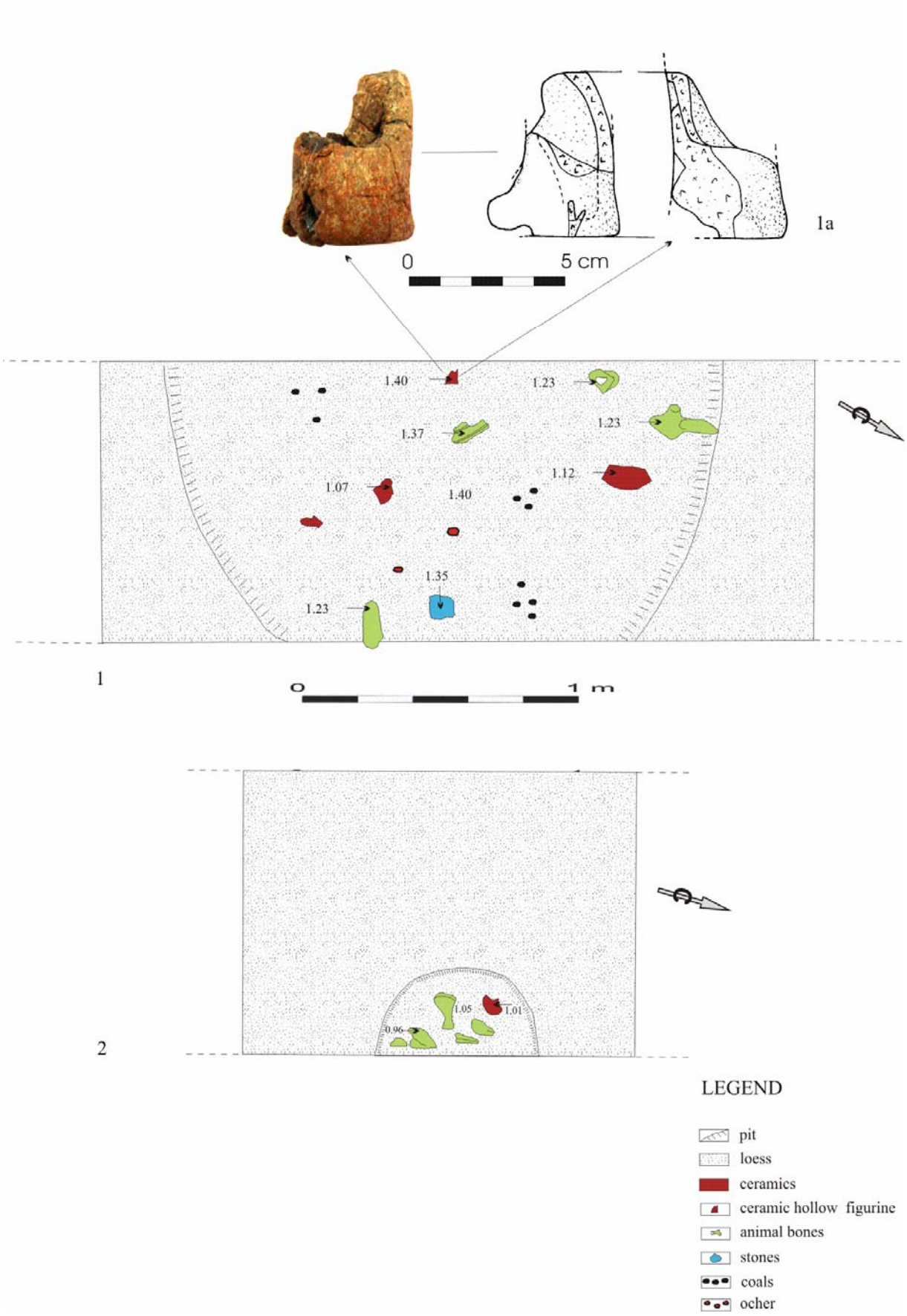


Figure 7. Pit 2 (1); Anthropomorphic figurine (1 a); Pit 3 (2).

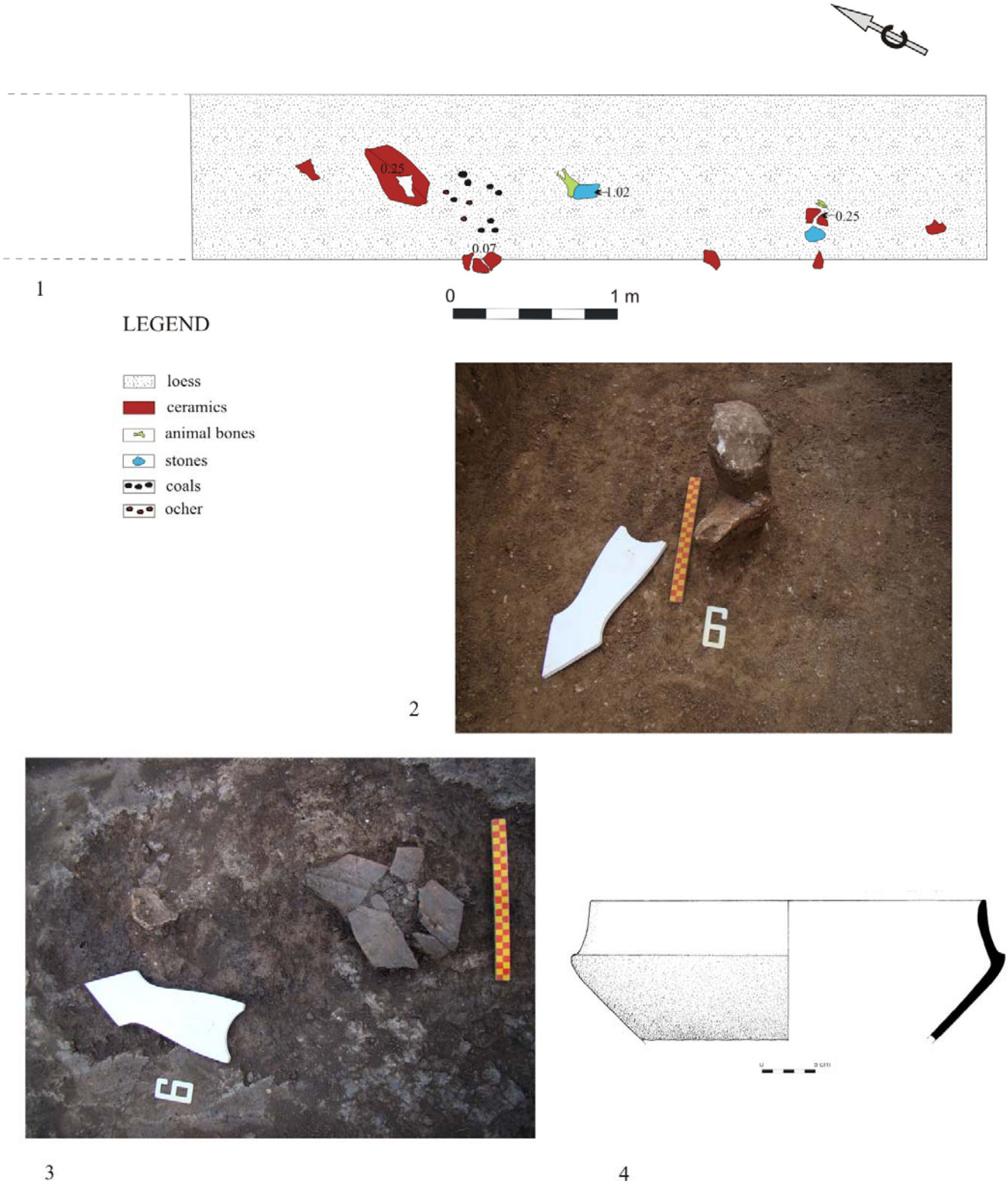


Figure 8. Pit 4 (1, 2); Fragmented vessel from the pit (3, 4).

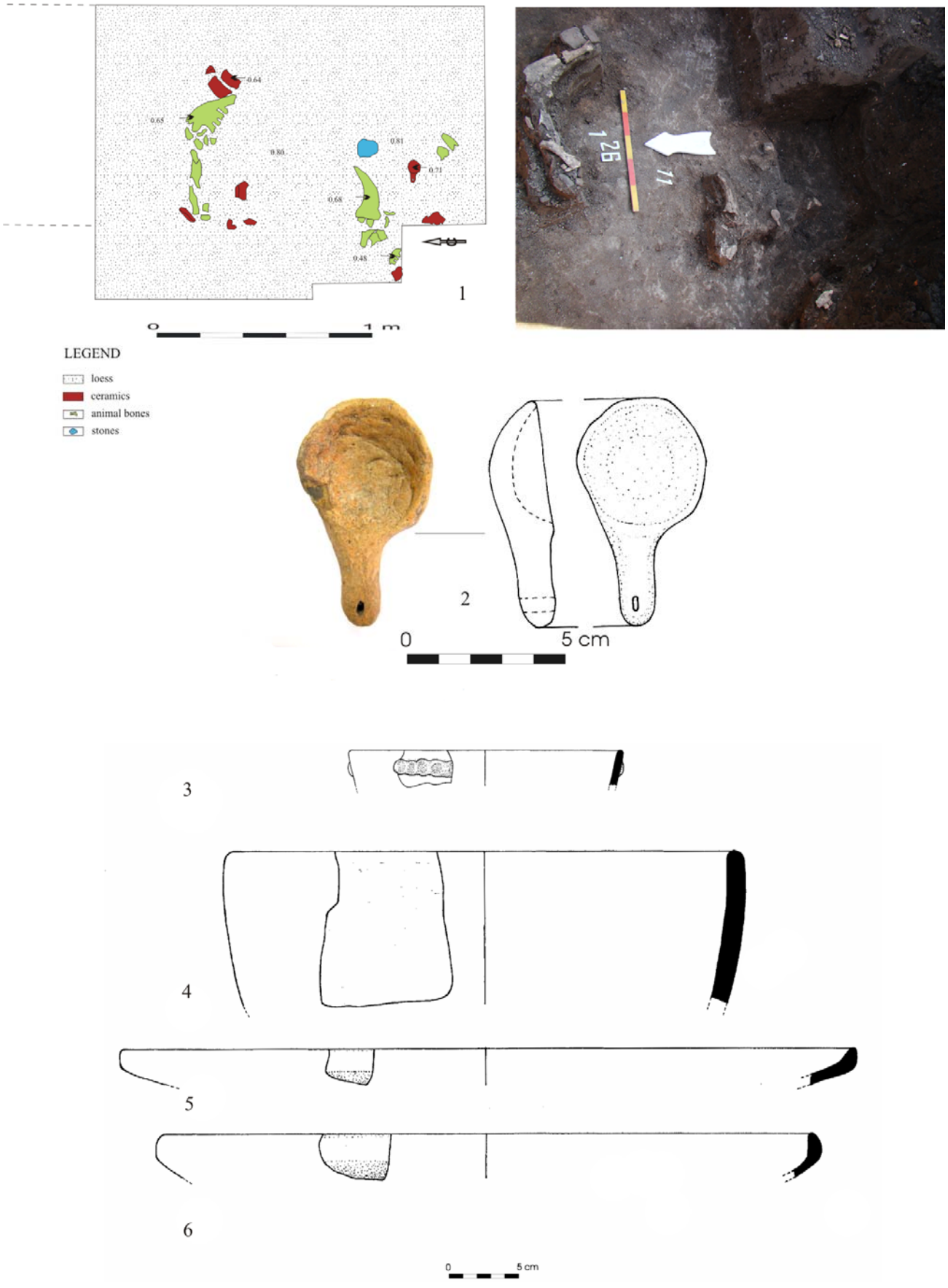


Figure 9. A site for sacrifices (1); Ceramic spoon (2); Ceramics from the site (3-6).

Figure 10. Pottery vessel depot.

LANDSCAPE AND DEMOGRAPHIC DYNAMICS IN SOUTHERN ROMANIAN BRONZE AGE

Cristian SCHUSTER

Abstract: *In this paper we present our analysis of human-environment relationships; Early Bronze Age (mainly the Glina culture) and Middle Bronze Age (Verbicioara, Tei and Gârla Mare cultures from Walachia and Oltenia) periods were considered. Special attention is given to eastern Walachia and Dobrudja because they lack stable Early Bronze Age settlements due to some climatic factors. Stable settlements are known in this area only from the Middle and Late Bronze Age.*

Keywords: *Southern Romania; Bronze Age; landscape and human behavior.*

A careful glance at the distribution of Early Bronze Age sites in Southern Romania, in the southern Carpathians and the Danube area, particularly Oltenia and Walachia and also Dobrudja, reveals major differences within and between provinces. In this paper we analyse some of the cultural manifestations of the period, and advance possible explanations regarding demographic dynamics in the area.

Early Bronze Age sites are the first example. Glina culture communities are present in central and western Walachia and Oltenia (Roman 1976; 1986; Schuster 1997a; Schuster and Fântâneanu 2005: 21 ff.). The eastern border of the Glina culture was the Mostiştea Valley, the western border was the mountain region at the Iron Gates, and the northern border was the southern Carpathians (Roman 1976: 27; Petrescu-Dîmboviţa 1976: 308; 1996: 194 ff.; Schuster 1994a; 1997a, 29 ff.; 1999: 241 ff.; 2000a: 9 ff.; 2000b: 361 ff.; 2005a: 94 ff.; Schuster and Fântâneanu 2005: 47 ff.). The Danube was not an obstacle for some Glina groups. They crossed the river and populated the northern part of Bulgaria and reached Serbia and even Northern Macedonia (Schuster 1997a: 83; Alexandrov 1998: 30; Alexandrov *et al.* 1998; Schuster and Fântâneanu 2005: 49). Contrary to previous thoughts of Early Bronze Age specialists of southern Romania (Machnik 1991: 10 ff.), there are no settlements east of the Mostiştea River (Schuster 2005c: 115 ff.). The situation is the same west of the Iron Gates (Schuster 2003a) where, contrary to older opinions (Lazarovici and Săcărin 1979: 74; Lazarovici 1987: 85; Lazarovici and Sfetcu 1990: 54), there is no clear proof for the presence of Glina communities (Gogâltan 1995: 45; 1998; 1999; 2001: 291; Gumă 1997: 98 ff.; Rogozea 1998; Schuster and Fântâneanu 2005, 50 ff.). The issue regarding the penetration of some Glina groups north of the southern Carpathians is still under debate. In our opinion communities of the first phase could have penetrated from Walachia to Bârsei County contributing to the formation of the Schneckenberg culture (Schuster 1998a; Schuster and Fântâneanu 2005: 52).

There are some Glina culture site concentrations (settlements as only a few funerary monuments have been discovered so far) in the two historical provinces of Oltenia and western and central Walachia. Thus, over 90 locations with vestiges of this culture have been identified so far in Walachia and in the area of Bucharest and its surroundings (southern Dâmboviţa County, northeastern Teleorman County, western Călăraşi County, northern Giurgiu County, Ilfov County) (Schuster and Fântâneanu 2005: 21 ff. and maps 3-5, 7, 9 and 12). Crossed by the Argeş, Dâmboviţa, Colentina and Ialomiţa Rivers and their tributaries, specialists consider this area the origin of this Early Bronze Age cultural manifestation because of the density of sites. From this area some of the communities would have migrated to the north (Bârsei County in Transylvania), west (Oltenia) and south (Northern Bulgaria) (Schuster and Fântâneanu, 2005: 46 ff.).

If we accept the hypothesis above, the next question is why the Glina culture formed there and not elsewhere. What were the factors that led to this phenomenon? The first answer is that there were better living conditions in that area. This assertion seems correct based on interdisciplinary research (Schuster 2005b). The hydrographic network and the environment offer good conditions for settlements. This is confirmed by the fact that at Bucureşti-'Ciurel', for example, traces of the initial and later, classic, phases were identified (Morintz 1959: 769 ff.; Schuster and Fântâneanu 2007: 35). This explanation is not completely satisfactory because good living conditions also existed then in Walachia and immediately close to the Danube, and also between the Argeş and Olt Rivers.

In our opinion a possible explanation that must be included is the state of archaeological investigations. The Bucharest area, following construction works, along rivers that cross the centre of

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 133-143.

the city (Dâmboviţa), its northern side (Colentina) and areas nearby, was the focus of archaeological surveys and excavations during the two World Wars and during the 1950s (Argeş, Ialomiţa etc.; Schuster and Fântâneanu 2005: 14 ff.). Other investigations, some of them systematic, but many of them rescue interventions, added to these (Schuster and Fântâneanu 2005: 16 ff.; Schuster and Negru 2006) increasing the density of Glina sites in the area.

It is clear that the natural environment, and also the interest of archaeologists for Bucharest and its neighboring areas, amplified the data regarding the demographic dynamics of the communities in this area of Central Walachia. The environment, through the facilities it offered, probably contributed to the population growth. An increased number of community members required a larger hinterland rich in natural resources. This, correlated with the type of economy practiced by the Glina communities mostly of animal breeding with little cultivation of plants or hunting (Schuster and Fântâneanu 2007: 33 ff.), resulted in the accentuation to look for new spaces. Strong confirmation of this is that some of the Glina groups from the second phase of the culture moved towards the west crossing the Olt river in Oltenia (Schuster 2000b). The Olt, like the Danube and the Carpathians, did not constitute a real obstacle to human groups (Schuster 2004; 2010).

Another question is if only internal factors generated the mobility of Glina communities across a large area from central Walachia to the Iron Gates. Perhaps an external factor, such intrusion from the east along the Danube of groups of nomadic populations known in the literature under the generic name of Yamnaya, also played a role. Possible proof of this are the steps taken by some communities, such as those from Crivăţ, Orbeasca de Sus, Odaia Turcului and Popeşti-'Cioarinu', to fortify their settlements with trenches and earthen walls (Schuster and Fântâneanu 2005: 57). It cannot be excluded that the activity of some Yamnaya groups, whose presence is confirmed in the central and western part of Walachia by funerary monuments (Schuster 2003b), might have led to the building activity of some Glina communities on one side and led to autochthonous population dislocations towards the west.

The Glina settlements are concentrated on the right bank of the Olt River in the northeast part of the Vâlcea County (Schuster and Fântâneanu 2005: map no. 13). This area does not offer, apparently, good living conditions. There were pastures for animals in the area, but this aspect alone does not explain the density of the sites. Older and more recent investigations (Tuţulescu and Binder 2010: 85 ff.) demonstrate that the respective settlements, of small size and with a thin archaeological layers, were located in areas rich in salt or with salty water (fig. 1). It is thus obvious that the subsoil resources encouraged many communities to settle temporarily in certain areas probably with the aim of exploiting the salt through mining or briquette techniques. Mining type hammers are a proof of the first modality of obtaining salt (Schuster 1998c; Tulugea and Blăjan 2009) while pottery fragments from small and medium sized conical vessels are proof for briquette techniques. These are typical for such an activity and are similar to those used for the same purpose during the Chalcolithic and Transition to the Bronze Age periods (Coţofeni culture).

Ostrovul Corbului is another extremely interesting area for studying the relationship between landscape and demographic dynamics during the Bronze Age Glina culture. Ostrovul Corbului is an island that 'controlled' access to the west, to and from the Iron Gates, and also facilitated connections between the left and right banks of the Danube. Two settlements (fig. 2) were discovered here one in each of the sectors (A and B) (Roman 1985; 1986; 1987; 1988a; 1988b; 1996; 1998; 2010: 31 ff.; Schuster and Fântâneanu 2005: 43 and map no. 10). In the first sector the Glina community built their houses towards the interior viewing the 'Little Danube' and not near the 'Big Danube' as the Coţofeni community did (Roman 1996: 31 and fig. 6). Documented evidence is less clear in the other sector. Unlike the Coţofeni and other Bronze Age communities (Vecina-Bubanj III horizon, Gornea-Orleşti group, Verbicioara, Gârla Mare) (Roman 1996: 31 ff.; 2008: 125-68; Dodd-Opriţescu 2008: 169-78), it is possible that this 'migration' from one sector to the other might be due to the increase and decrease in the water level of the Danube. The hydrologic regime of the river was influenced by climatic conditions upstream of the Iron Gates.

We will further develop the subject of the Verbicioara and Gârla Mare cultures. Archaeological research has revealed a good density of Verbicioara culture sites in Oltenia (Crăciunescu 2004: pl. XCIX; 2005: Maps nos. 24-28). This distribution differs from one phase of the culture to another. Thus, for the first two stages, sites were documented mainly in the western part of the province, in Mehedinţi County, seemingly 'tied' to the Danube (Crăciunescu 1998: pl. I; 2004: 157 and pl. XCVI; 2005: 155). This assertion is confirmed by the group of sites from the right bank of the Danube in Serbia (Tasić 1984; 1998: 34; Uzelac 1996; Crăciunescu 1998: pl. I/117-122; 2004: pl. XCVI/65, 78-79, 82, 84, 103, 142; 2005: 155). Northeast Oltenia is another densely populated area;

more precisely the part with salt resources in Vâlcea County (fig. 3). Consequently, during Verbicioara III the last area remained constantly inhabited, but the concentration moved to the Jiu River (Crăciunescu 1998: pl. II; 2004: pl. XCVII). During the final phases (Verbicioara IV-V) the entirety of Oltenia and the western part of Walachia, more precisely near the left bank of the Olt River, were 'covered' by settlements (Crăciunescu 1998: pl. III-IV; 2004: pl. XCVIII; Neagoe and Neagoe 2006).

The following nuances can be observed following analysis of the distribution of Verbicioara sites. Even though there are gaps in archaeological research, it is obvious that there were two constant areas of habitation: the Ostrovul Corbului area and its surroundings (Roman 1998) and Râmnicu Vâlcea (Petre-Govora 1989; Tulugea 2007). During the Early Bronze Age the first area was a base that assured connection between the two banks of the Danube in the four cardinal directions. The second area was interesting for its salt and salty springs. Another aspect is the fact that some of the Verbicioara communities 'migrated' from west to east reaching Walachia in the final phases where they encountered Tei groups. It is very possible that the conquest of new territories by Verbicioara communities had its origin in a demographic growth: an increase in birth rates and also pressure from Gârla Mare communities that pushed the old inhabitants to the interior of Oltenia during their move from west to east. We do not consider that the climate played any role in this increasing demographic dynamic.

Even a quick glance shows that Gârla Mare culture groups settled exclusively in areas close to both banks of the Danube. They chose to settle in locations not in danger of being flooded from occasional increases in the water level (Şandor-Chicideanu 2003: 35, 40 and pl. 202; Crăciunescu 2006; 2009). What determined this type of relationship with the environment is difficult to understand. The behavior of the communities was most probably dictated by their economy and by a possible tradition of association with the Danube. It is certain that this type of relationship between a culture and the landscape is unique in southern Oltenia.

Almost simultaneous in development but towards the end of their neighboring evolution, the Tei culture was contemporary with the Verbicioara Culture (Leahu 1966; 2003). The Tei culture, according to the most recent research, had a similar relationship with the landscape as the Glina Culture. Tei culture communities permanently inhabited the region of Bucharest (fig. 4) and its neighboring areas (Leahu 2003: 29; Schuster 2005d: 107). The eastern border of its distribution range included the Mostiştea Valley (Schuster 2005c; 2005d: 107 ff.) and, like some Glina communities, Tei groups also crossed the Danube, covering, with a less dense population than in Walachia, the territory between the river and the Stara Planina Mountains (Morintz 1978: 47 ff.; Leahu 1978: 43 ff.; 2003: 27 ff.; Hristova 2002; Zmejkova 2002; Schuster 2000c; 2005d: 110 f.). They also crossed the Carpathian Mountains into the Bârsei Land where they established a series of settlements (Leahu 1997; 2003: 30; Schuster 1997; 2005d: 109 f.; Schuster and Comşa 1997).

Archaeological investigation has not found Early Bronze Age, and almost towards the Middle Bronze Age, settlements east of the Mostiştea valley. The only archaeological evidence is funerary monuments (Yamnaya) (Schuster 2003: 114 ff.). Subsequently, toward the end of the Tei II phase and the beginning of the Tei III phase (Schuster 1997; Leahu 1997) the region started to be gradually inhabited by Coslogeni communities (Morintz and Anghelescu 1970: 375 ff.; Morintz 1978: 121 ff. and fig. 60; Isăcescu and Burlacu 1978: 46 f.; Florescu 1991: 146 ff.; Neagu 1993: pl. I; Cavruc and Cavruc 1995: 90 f.; Conovici and Matei 1999; Schuster and Popa 2000: 146; 2008b: 44 and fig. 62; Petrescu-Dîmboviţa 2001: 285) even crossing the Mostiştea 'border' and mostly moving along the Danube to the west.

In the Late Bronze Age the presence of Coslogeni settlements in the Romanian Plain is a certainty. They are located on the banks of some permanent running waters and lakes, even on islands, avoiding arid zones lacking water resources. An example is the east part of the Ialomiţa River where several sites have been found similar to that on the left bank of the Danube (Morintz and Anghelescu 1970: 379 ff.; Morintz 1978: 122; Trohani 1986: 15, 21; Florescu 1991: 146; Renţa 2008: 24 ff.).

The same situation of the lack of clear settlements and the large number of burials in the Early and Middle Bronze Age (tumular ochre burials, Yamnaya) is documented for the area in Dobrogea between the Danube and the Black Sea (Lăzurcă 1977; 1984; Oberländer and Oberländer-Tîrnoveanu 1979; Haşotti 1985; Munteanu 1991; Vasiliu 1995a; 1995b; 1996; 2004; 2005; 2007; Irimia 2003). We mention here also the existence of some Late Bronze Age Coslogeni culture settlements (Morintz and Angelescu 1970; Morintz 1978: 122 and fig. 60; Florescu 1991: 146 ff.; Simion 2001; 2003). In this region of Romania Coslogeni culture communities chose the terraces of

the Danube as the foundation for their settlements; areas with some running or still water and the valleys that lead to water sources.

Some explanations have been forwarded concerning the lack of settlements in the Early, and partly in the Middle, Bronze Age in east Walachia and in Dobrogea. The most frequent interpretation is connected with the rather unfriendly environment (Leahu 1966: 25 ff.; Schuster 2005d: 107 ff.): a steppic environment, with a rather weak developed hydrological network, in the best case a seasonal one, with a strongly oscillating climate, with frost and abundant snow over the winter and very high temperatures and restrained rainfall over the summer. In fact, conditions rather similar to those of today.

It is obvious that the geographic-climatic was not the only factor that played an important role in the existence of this population *hiatus* in the regions mentioned (Harţuche 1980: 17 ff.). A significant factor was their nomadic way of life: the economic practice and stressed mobility of a large proportion of the population that came from the east from the north-pontic steppe. If the, slightly semi-nomadic, Glina communities were more 'ready' than the Tei communities to move in order to find the economic *Hinterland* they avoided venturing to the east beyond the Mostiştea valley knowing that the region did not provide good living conditions. Because of their way of interacting with the landscape, the nomadic groups of eastern origin (Schuster 2005d: 108) did not leave clear traces of their domestic life or funerary practices.

Toward the middle, and toward the end, of the Middle Bronze Age and also during the Late Bronze Age it seems that there were favorable changes in climatic conditions in east Walachia and Dobrogea, perhaps coinciding with unfavorable conditions east of the Pruth, that created conditions suitable for a significant semi-nomadic population wave. We refer, as already mentioned, to the Coslogeni culture communities, part of the larger Sabatinovka-Noua-Coslogeni complex (Morintz 1977: 23 ff.; 1978: 158; Neagu 1993; Munteanu 1996; Gerškovič 1998; Koppenhöfer 2002) also called by some authors the Valikovaya culture (Černych 1992; Lichardus and Vladár 1996). Vestiges of this culture were also found in Bulgaria (Alexandrov *et al.* 1998: 15 ff.; Lichardus 2002: 18 f.). What is usually called 'Handmade Burnished Ware', 'Coarse Ware' or/and 'Barbarian Pottery' identified in Late Helladic IIIC phase Greece at Athens, Delphi, Aigeira, Perati, Micene, Lefkandi, Tiryns, Sparta-*Menelaion*, Karakou, Pellana, Teichos Dymaeon, Kalopodi and Kastanas-*strata 14b-12*, in Crete at Komnos and Chania, in Cyprus and as far as Anatolia (Troy VIIb$_1$) (Rutter 1975; 1990; Catling and Catling 1981; Hänsel 1982: fig. 1; Hochstetter 1982: fig. 9; French 1989; László 1997: 118 ff.; 1999: 29 f.; Koppenhöfer 1997; 2002: 702 and fig. 1-3; Schuster and Popa 2000: 134) must be considered, in all probability, also as Coslogeni pottery. The occurrence of this kind of ceramics is not accidental, but is a process of 'Balkanising' Greece and some parts of Asia Minor following a population movement from the north, possibly Thracian people - Phrygians, Myses (László 1997: 125; 1999: 44). Although some scholars have only discussed imports (Harding 1984: 222 ff.), today it is evident that there was a population intrusion (Rutter 1975: 17, 29 f.; French and Rutter 1977; Catling and Catling 1981: 74, 82; French 1989: 48). It is possible that some part of the respective communities could have been involved in the 'movement of the Sea Peoples' (Kločko 1990; László 1997: 123).

We provide the following conclusions as possible answers regarding the connections between the landscape and demographic dynamics in the southern Romanian Bronze Age:

- The first, easily detectable, factor is that there are some blank micro-zones in the research. In other words, both surface and rescue surveys are totally missing in some areas. This fact is dictated by the landscape of those regions which is less accessible (mountains, swamps, arid landscapes etc.) and also to the lack of rigorously planned scientific investigation; unitary, indiscriminant, research has dominated.
- The landscape combined with the fluctuating climate have put their mark on the demographic dynamic in the areas discussed here. Thus, local, but also those of larger extent, or even those which occurred sometimes in remote territories from Dobrudja or eastern Walachia, manifestations of the climate influenced these two regions (Božilova and Filipova 1986; 1991; Panin 2001; Schuster 2005b; 2005c). This includes some climate fluctuations in the east-European (north-pontic) area and also in western Asia. For instance, specialised investigation has shown that during the Bronze Age strong winds led to the formation of sand dunes in eastern Romania, especially in eastern Walachia, and also in south Poland, in Belarus, Ukraine and Bulgaria (Cârciumaru 1996: 9 ff.; Todorova 1998: 65 and footnotes nos. 2-6). This phenomenon was in accordance with the situation in Western and Central Europe, in the Aegean, the Near East and even North Africa (Baillie 1998: 49 ff.; Jockenhövel 1998: 27 ff.; Ložek 1998: 57 ff.; Aspes, Baroni and Fasani 1998: 419 ff.). The temperature variation had evidently put its mark on the flora and indirectly on the fauna of the Bronze

Age in the affected areas (Cârciumaru 1996; Tomescu 2000a; Boşcariu 2001). This would partly explain why, for instance, the east part of Romania was not a preferred settlement area in the Early Bronze Age and a good sequence of the Middle Bronze Age.

- We should point out here that the climate of the Bronze Age in southern Romania, according to the specialised investigations, is as follows (Tomescu 2000b; Tufescu 2001: 17): a.) long and hot summers: 5150-4400, 4200-4000 cal. B.P.; b.) short and cold summers: 5600-5200, 4000-3900, 3700-3400, 3300-2100 cal. B.P.; c.) arid summers: 5100-4850, 4600-4500, 3900-3700 cal. B.P.; d.) raining summers: 5350-5150, 4500-4200, 3350-3000 cal. B.P. In prehistory, there were often variations of cold and hot periods (Todorova 1998: 70). In the areas discussed here, especially the coastal and eastern areas, it was cold was around 3100-2800/2600 B.C. and hot around 2800/2600-2400/2100, 1800-1400 B.C. According to ^{14}C determinations the periods lasted for about 400 years (Cârciumaru 1996: 26).
- The relationships between the Glina and Tei communities from Walachia and the Glina and Verbicioara communities from Oltenia, seem to have been similar based on the stage of current research. Thus, the region of Bucharest, as well as its neighboring areas, had been the permanent location of the Glina and Tei communities. This is the area where they seem to have 'migrated' from to the north, south and west. The Mostiştea valley had been the eastern border for both manifestations. In the west Glina communities managed to cross over the Olt going to Oltenia and reaching up to the Iron Gates.
- In this latter province Glina communities established some (seasonal) settlements to exploit the salt resources; salt being vital for both humans and animals. Verbicioara groups acted similarly in their first evolution stage. The late Glina communities, replacing the Coţofeni III communities, had taken over Ostrovul Corbului - a primordial island in the human-landscape relationship in the range of the Iron Gates. Verbicioara communities did the same thing.
- Other reports establish the relationship between the different populations and the landscape in the Bronze Age in the east side of south Romania. Here, as far as we have been able to determine, there was a population 'void' during the Early Bronze Age with the area subsequently becoming attractive for settlement.
- Also, concerning the Glina-Tei and Glina-Verbicioara 'pattern', some Late Bronze manifestations, such as Gârla Mare in Oltenia and Zimnicea-Plovdiv in Walachia, prefer the proximity of the Danube, seemingly avoiding the inner part of the respective provinces. This idea also stands for the lands on the left and right banks of the river.

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Figure 1.

Glina settlements in the Vâlcea Region near the salt sources.

Figure 2.

Glina settlements (A and B) in Ostrovul Corbului.

Figure 3.

Verbicioara settlements in the Vâlcea Region near the salt sources.

Figure 4.

Bucharest ('Morii Lake'): Glina and Tei settlements.

SOME HUMAN - ENVIRONMENTAL INTERACTIONS IN NECROPOLISES OF THE NEOLITHIC AND METAL AGES ON THE TERRITORY OF ROMANIA

Alexandra COMŞA

Abstract: *The paper takes into account the various elements of the environment and how the ancient people had tried to use them in funerary rituals. There are considered the tumuli, the sloped terrains, but also the caves, as shelters of the departed ones. There are also mentioned the stones, plants and other materials used as furnitures for the burial pits. In fact, being very practical, the ancient people had exploited all available resourses of the environment, both in their settlements, for their every day life and in the necropolises.*

Key words: *environment; funerary rituals; Romania; Neolithic; Metal Ages.*

The human being, since very ancient times, was integrated into the nature and interacted with its components. During the Paleolithic, such relations were rather slight, without significant consequences upon the environment, but with more significant ones upon man (de Vos, Reumer, 1997: 45-48). If we refer to this situation, we could say that the climate had surely defined and permanently modelled the building of the human body and this is why, the general features of an individual (the so-called anthropological typology), are strongly determined by such an element, that some scholars are hardly inclined to consider today. This is why, for instance, during the Neolithic time, the Mediterranoid type was adapted to warmer climates, being more gracile and the Alpine, which is more heavily built, had lived more appropriately in mountainous regions. As part of these, we should not forget about the facial massif that we feel the urge to mention here that is was strongly adapted to the food regime, which determined a lesser development of the muscle marks, in time.

As the human civilizations evolved, the influence of humans upon the environment was more evident and had stronger consequences, unlike the reverse situation.

But, as we intend to show the intricate relation between man and his environment, we should stress here that, such a strong relation between man and environment had resulted in interactions, not only concerning the everyday life of the people, but also their way of thinking and mental perceptions about death. In those times, the same like today, the funerary rites and rituals had a strong social compound. The loss of an individual by the community always had a meaning, which was usually interpreted as a departure to the after world. As the deceased had to get adjusted into the new 'society' of the spirits, during his journey and afterwards, he was accompanied by the funerary inventory and sometimes by other individuals, in order to able to take over his own position there, the same one like in the world of the living. Besides, there were remains of the funerary feasts, or offerings, consisting in meat, coming either from domestic or wild animals, that, in some situations, could give us valuable information about the environment where the respective community used to live. We should not forget that the inventory is also often indicative for the social status of the deceased.

Moreover, all the people were usually involved in the funerary rites and rituals of their own group. During the Eneolithic times, for instance, when the bearers of the ochre burials started to intrude into the territory of Romania, they used to raise mounds above the burials of their departed ones. It seems that, in many cases, the dimensions of such a 'structure' were determined by the social position of the dead. The higher the mounds, the more impressive they were and also the more important the personage buried in it. This is why, the entire community was involved in accomplishing such a difficult task as, for a chieftain, everyone should have paid his respects.

As stated by geographer Al. N. Rădulescu, *"the raise of such a mound demanded a great effort. As an average, the volume of a middle sized mound contained 300-1000 m^3 of earth, fact that imply that, when making one, in those technical conditions, it was necessary a large amount of labor force, between 150 and 500 slaves a day. Therefore, the raise of mound in the Romanian Plain, the same like in other regions were created by populations with a considerable density – for those times...."* (Rădulescu 1969: 23).

Yet, we have to pose here a question. Were they slaves the people who worked there, or free ones? We could not offer a certain answer, as we have no writen sources for those times. What we really know for certain is that, those communities had surely had a hierarchy. It is possible that,

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based upon the funerary inventory, a social differentiation could be also noticed but, as goods were not frequently found in burials, excepting the clay vessels that, in some cases came from neigboring communities, we cannot rely very much upon this criteria. Still, it is possible that the inventory could have comprised some series of objects made of perishable materials (skin, wood, fabrics) that are being destroyed during diagenesis of bodies.

Later on, during the Hallstatt and Getic-Dacian periods, the tumuli became more elaborate, some of them with chambers and other settings, usually such sofisticated constructions being prepared for the aristocratic deceased people. In the burials from Peretu (Moscalu 1989: 59-70), and especially from Agighiol (Plate I: 1), there were also horses, dogs and servants, put together in the same burial, as a kind of 'prestige goods', that would emphasize the social status of the dead.

It is also interesting the custom of some populations to put their dead in tumuli belonging to other communities, or in *tells*. It is to be supposed that, in such situations, even if those tribes used to raise mounds for those departed, they had no real possibilities of making them by their own forces (possibly due a restrained number of individuals) and this is why they used structures created by others, just to be sure that the funerary ritual was entirely kept. Such examples we find for the Mnogovalikovaja and Srubnaia Cultures, with their burials existing on the territory of Romania.

In the Bronze Age, the tumulus use in funerary practice is rather extended, being found at the bearers of various communities, like: Monteoru Culture (Cândeşti, Bârseşti, Odobeşti, Mnogovalikovaja Culture (Bogonos, Glăvăneştii vechi, Valea Lupului, Giurcani, Boloteşti, Stoicani, Vânători, Galaţi-Dunărea) Costişa-Komarow (Horodnicu de Jos, probably Hârtop and Şerbeşti), Noua-Sabatinovka Cultural Complex (Găgeşti, Prăjeni-*Ţarna*). Later on, the mentioned practice is to be found until very late, in the Middle Ages (Burtănescu 1997: 38-39). Some of the mounds, created by using stones or slabs, together with the shape of the pit, could have been either indicative for the assignement of a certain community or individual or even for a mixture between the local and alogenous populations.

The burials usually contained one skeleton, but, more seldom, could be also found double (adult-child or adult-adult) or multiple burials (i.e. Cândeşti) (Florescu, 1981: 29).

In the Monteoru Culture, for instance, there were found small mounds, that covered just a single burial (Zaharia 1973: 24; Bârzu 1989: 40; Burtănescu 1997: 39).

As to the materials employed for making the settings of the burials, when we refer to the mounds, we could see that there are tumuli made just of earth, specific to the eastern intrusions, tumuli comprising mixtures of earth and boulders, tumuli made just of rocks, tumuli made of earth with a ring of stones, tumuli made of stone slabs, meaning a diversity of funerary rituals.

Besides, the burial pit itself could be plaqued with stone slabs (cists) (i.e. Schneckenberg Culture), or stones. In some case, boulders had been used as markers of the burials. As for the eastern communities with tumular ochre burials, they had their pit covered with logs, placed either along the long, or short axis of the pit.

When we refer to the dead, we should mention here that, seemingly, there were many situations, beginning with the Neolithic times onwards, when is presumed that the dead had been put into a sack or a textile (mat) before being buried (Comşa 1990). In some other cases, there were found traces of a kind of mat, made of reed or other material, arranged even on the bottom of the pit or going upwards, upon its walls (Comşa 1985: 145-160; Burtănescu 2002).

It is a rather frequent practice that, especially in the necropolises with cremation burials, the urns should be covered with a layer of stones, could be surrounded by them, or even contain them. In some cases, the stones served as lids for the urns (e.g. Ocna Sibiului, Wietenberg Culture) (Andriţoiu 1994: 154). We should not forget that the stone, besides its concrete functionality, had also a symbolism that crossed over the centuries, up to our days. In some burials were also put little stones, sometimes of a red color, in our opinion meaning a symbol of permanent revival and endurance.

But, there are some certain moments in the life of a community, when the location of the cemetery is completely unusual, as compared to the one existing in normal times. The particular behaviour concerning the cemetery location was determined by the permanent movement of the cemeteries from Sărata Monteoru, for each phase of the Monteoru Culture probably having a distinct location. The necropolises of the first phases have not been found. The terrain element should be also taken into account, as the election of the sloped grounds was unappropriate and could be possibly determined also by cultural pressures. Cemetery 4 (Plate I: 2), from the mentioned site was placed upon the 'less accesible and less sunny slope', namely the north one. As an adaptation to this special conditions, the burial pit had to be prevented from sliding down and, this is why, they were battered and covered with a line of stones (Bârzu 1989: 250). Moreover, they had variable depths, adapted to

the conditions of the slope (Bârzu 1989: 251). It is also considered that this conditions must have determined only the use of single burials, or double at the most, while the family ones had been given up. Also, the number of funerary depositions is small, being another consequence of the space restriction (Bârzu 1989: 250), as the Monteoru society was a prosperous one at that moment and thus, the inventory of the dead does not reflect an evolution stage of the community (Bârzu 1989: 252).

In Romania there are also some certain cultural aspects that included environment elements in their funerary rituals. For instance, we could mention the burials excavated in rock, from Năeni (Bronze Age), Hunedoara (Getae-Dacian period) (Sîrbu, Luca, Roman, Purece, Diaconescu, Cerişer, 2007: 19-53). Another special situation isn represented by the necropolis found in the cave from Igriţa, of the Late Bronze Age (Emödi 1980: 229-274). The funerary rite employed for these dead was the one of cremation. This was done somewhere, outside the cave, on a pyre. From there, the cremated remains were brought back into the cave, with ash and charcoals, vessels ritually broken upon the pyre, other objects of the deceased and adornments. In this case, the cave was a supplementary means of protecting the dead, both against the elements and the possible 'aggressors'. Another such example we have in the cave from Românești, where the bones of 11 individuals had been found at random, on the floor of the cave, some being covered with a layer of stones (Munteanu 1995: 145).

We should not neglect here the placement of some necropolises on islands, on the lakes or rivers. We could give here as well known examples the Neolithic funerary finds (cemetries) from Boian, Vărăşti-Grădiştea Ulmilor (Comşa 1960: 9; Comşa 1995: 55) situated in the middle of the former Boian lake and Ostrovul Corbului, on an island on the Danube River. It is also interesting to note, that sometimes, the burials were placed on the bank of some lakes or rivers (i.e. Sultana, Gumelniţa Culture) (Comşa 1960: 10). This location of the cemeteries is connected with a strong belief that was well preserved for a long time in the Romanian prehistory and not only, that the world of the dead should be separated by a natural barrier from the world of the living. We ought to mention here that, due to the climate changes, in some certain time sequences, the location of both settlements and cemeteries had to be moved from the lower terraces to the upper ones, in order to prevent them from being flooded (Girić 1998: 129-136). We are sure that, in ancient times, especially during the Metal Ages, and even later, there were also funerary rituals strictly connected with water (i.e. throwing the cinder of the dead onto the water) but, such situations cannot be documented for now.

We should also mention here an interesting fact, concerning the orientation of the dead, according with the Sun movement on the sky. In fact, the Sun was dedicated a special cult by the Neolithic agriculture and animal breeding communities, as both their life and death depended upon that star. It is certain that, at least in the Neolithic necropolis from Cernica, the interment was done according with such a celestial aspect. So, archaeologist Gheorghe Cantacuzino (Cantacuzino 1965: 45-58), had pointed out that the skeletons were placed into the pits with their head towards the east, with some slight variation to the northeast and southeast. This situation is also to be found in other necropolises of the Boian and Gumelniţa Culture, including the funerary finds of this culture south of the Danube, in Bulgaria. Regarding the burials of the Gumelniţa Culture, Eugen Comşa (Comşa 1960: 23-24) had pointed out that, their orientation is according with the position in which the individuals had been placed. Those on their left were orientated in a direction that varied between NE and SE, therefore with a preference to the east, while those on the right were placed with their head in the direction that varied between SE and SW, therefore with a preference to the south. During the Bronze Age, at least in the Monteoru Culture, the departed ones were placed in their burial when the sun reached the zenith (Florescu 1979: 74). At this moment, some intense studies regarding the archaeoastronomy of the ancient populations had been initiated, with very good results.

If, to all this information we would add the structures raised by man in the settlements, or the other biological samples that were presevered, we could have a more complete image about the interrelation between the ancient humans and their environment.

Conclusions

For their funerary customs, the ancient communities had used compounds of the environment that were either existing or created by nature (i.e. caves), or with anthropic design (i.e. tumuli). Moreover, they had employed all available natural resources, both for creating their settlements and for burying their dead. There were no situations when, let's say 'raw materials' had been brought from far away, in order to fulfill the funerary rituals of the dead.

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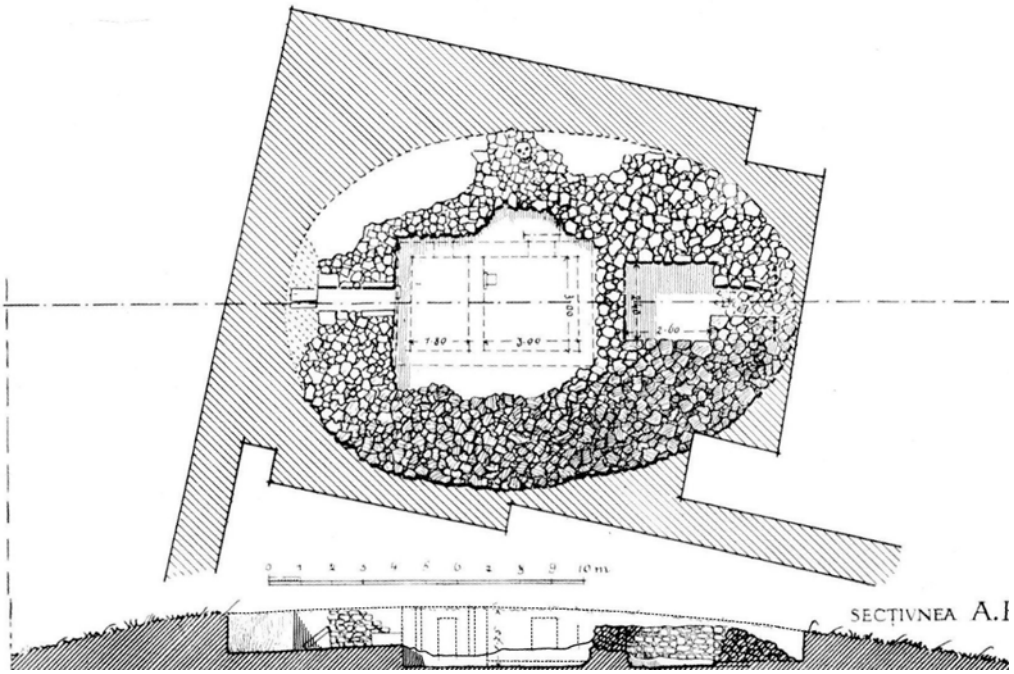

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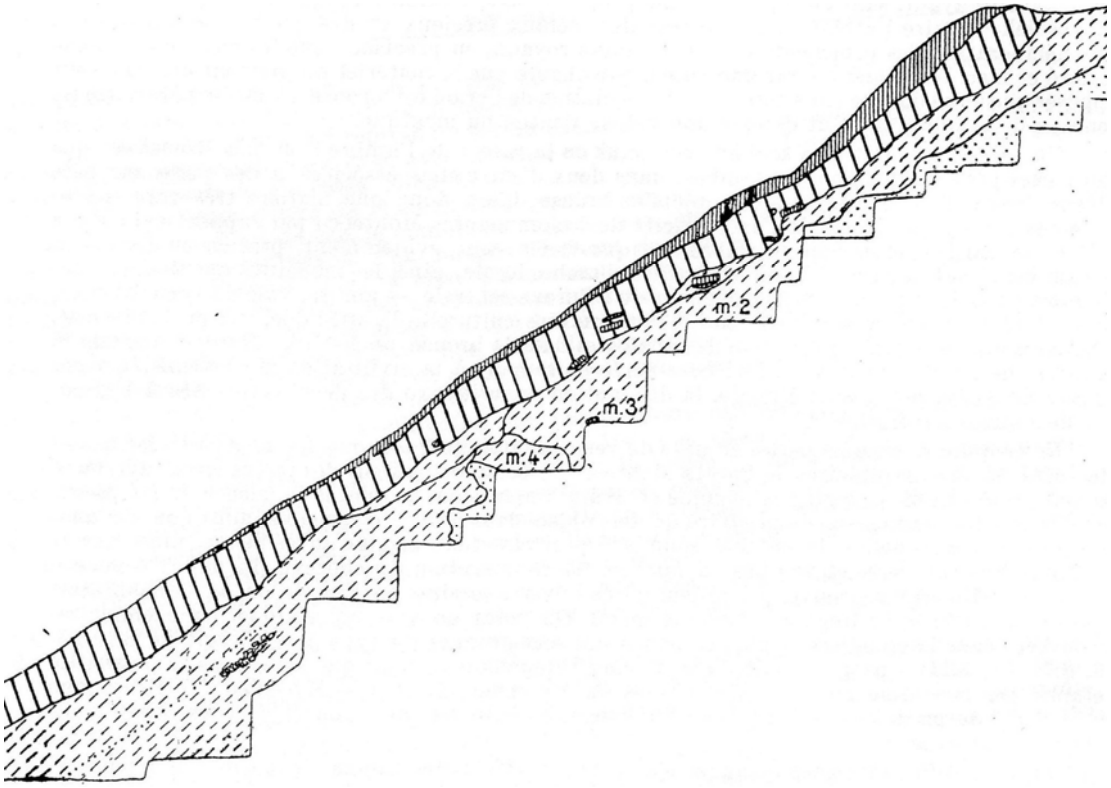

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Plate 1. Burial from Agighiol (after Berciu) (1); Sărata Monteoru, Necropolis no. 4 (after Bârzu) (2).

III. SEASONALITY, SUBSISTENCE, AND RAW MATERIAL SOURCING

PRELIMINARY ARCHAEOBOTANICAL RESULTS FROM TELEOR 003/ MĂGURA 'BUDUIASCA'

Angela WALKER,
Amy BOGAARD

Abstract: *Systematic sampling and flotation to recover charred archaeobotanical remains at Teleor 003 yielded evidence for the use of a range of crops, including hulled wheats, barley and pulses through the sixth millennium cal. BC. The remains of collected wild plants were much more sparse. Potential weed data suggest that cultivation areas were long-lived. In all of these respects, the assemblage from Teleor 003 suggests continuity with adjacent regions of south-east Europe.*

Key words: *Early Neolithic Romania; pit features; crop assemblage; cultivation.*

Introduction

The Southern Romanian Archaeology Project (SRAP), comprising a team of researchers from Cardiff University, the Teleorman County Museum and the National History Museum in Bucureşti, has carried out detailed multidisciplinary investigations relating to early Neolithic occupation of the Teleorman River Valley (Pannett 2009). The overall aim of the research was to collect quantifiable data on material culture, geomorphology, dating and environment in order to critically assess issues such as the relative chronology, form and function of early Neolithic pit features and wider themes of Neolithic social practice and land use (Mills 2009).

The SRAP study area encompassed a 10km x 10km area of the Teleorman River Valley landscape located on the Romanian Plain 85km southwest of Bucureşti and 6km northeast of the modern town of Alexandria (Mills 2009). A number of investigations focused on a 2km reach of the Teleorman River between Lăceni and Măgura. At this particular point the river has incised through approximately 20m of Pleistocene fluvial and loess sediments and has formed a low gradient Holocene valley floor that exhibits a range of Neolithic occupation evidence (Howard *et al*. 2004). The site of Teleor 003 lies within this 2km reach of the Teleorman River (Figure 1).

This paper presents the preliminary archaeobotanical results from samples extracted from a series of early Neolithic 'complexes' or pit features excavated at the site of Teleor 003/ Măgura 'Buduiasca'. The material is of particular interest for two reasons. First, archaeobotanical work in Romania has been limited but can potentially address questions relating to the composition of the Romanian early Neolithic crop assemblage particularly when compared with early Neolithic crop assemblages in other areas of Europe. Secondly, the material can provide useful information on forms of plant use and cultivation practised by the early Neolithic inhabitants of Teleorman River Valley.

Methods

The samples were taken during the 2002-2005 excavation seasons and derive from units of secure Neolithic date, based on ceramic analyses by L. Thissen and P. Mirea. Each prehistoric unit excavated was sampled for processing by flotation. Soil samples were transported to the Teleorman County Museum in Alexandria for processing.

The object of flotation is to retrieve (from excavated soil) macroscopic materials, whether artifactual or not, by means which are practical and economical and by methods which are simple, efficient (i.e. to high level or standard of recovery) and as free as possible from human bias (French, 1971: 59). Conducting this operation by *mechanical* methods and definable standards means that the recovery programme is repeatable either on the same site or at any other site. Flotation combines in a single process the separation and recovery of floatable and non-floatable materials into *clean*, sortable fractions. Efficient machine flotation enables processing of large amounts of soil.

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 151-159.

Of the 158 samples processed, representing over 3700 litres of soil, a total 102 samples deriving from 28 pits were selected for analysis. Soil samples of *c.* 40-50 litres were processed from each excavation unit; smaller units were processed in their entirety. Samples ranged in size from 0.25 litres to 80 litres, averaging *c.* 24 litres. Charred plant material was extracted from the soil matrix by machine flotation using 0.3mm and 1mm sieves to retain the floating material (flot); the heavy residue was retained in a 1mm mesh.

All sample flots were sorted and identified using a low-power stereoscopic microscope. Flots and >4 mm heavy residues were sorted in their entirety. Where the <2mm heavy residue was large, a random subsample of no less than 1/8 was sorted.

The botanical material was identified using modern reference material and reference works such as Jacomet (1987). A low-power (x7–45) stereoscopic incident microscope was used for sorting and identification. Seeds and chaff were quantified by counting the 'minimum number of items' (mni): for cereal grains, embryo or apical ends (whichever was more numerous in a sample) were counted; for chaff, individual glume bases of glume wheats were counted. For wild taxa, mni counts similarly recorded, where possible. Occasional fragments of nutshell were counted as such (no hilar scars were observed permitting 'mni' estimates); occasional finds of charred fruit flesh/skin were quantified by volume (ml). Wood charcoal, which was sorted from the >2 mm portions of the heavy residue and flot, was quantified by volume (ml).

Results

Contextual and chronological range

The 102 samples analysed derive from 28 pits dated to a Neolithic phase of occupation. Table 1 shows the chronological distribution of the features. AMS dating of crop remains from the Starčevo-Criş complex (pit) 13A placed most of the remains in the early 6th millennium cal. BC, with one barley grain dating to the later sixth millennium; details are presented in Table 2. The radiocarbon dating results confirm that most of the seeds are early Neolithic and not residual from later periods.

Composition of the assemblage

The composition of the crop assemblage from the Neolithic pits is summarised in Table 3 and the presence of wild taxa in Table 4. The density of charred plant remains in the samples ranged from <1 item *to c.* 13 items per litre of soil processed (Figure 2). A low-density assemblage such as this is in fact typical of systematically sampled Neolithic sites elsewhere. Although the overall assemblage is of a low density it provides consistent evidence for the use/discard of multiple cereal and pulse crops through the sixth millennium occupation.

Cereal grain constitutes the most frequently occurring category of botanical material overall; it is often too poorly preserved to be identified further, but well preserved grains were predominantly einkorn wheat (mostly from one-seeded spikelets) and barley (including some definitely identifiable as hulled) (Figure 3a and 3b). Cereal grain is more common and abundant than cereal chaff, a contrast that could be an artefact of preservation given that glume bases are more easily destroyed by charring than grain (Boardman and Jones 1990). Glume bases (the bases of the hulls or husks that enclose one or more grains in glume wheat spikelets, which make up the ear) were identified as einkorn or 'new type' (Jones *et al*. 2000), with a few poorly preserved remains most closely resembling emmer. The occurrence of 'new type' glume bases in the assemblage, from at least the Early Dudeşti period (very little chaff was recovered from the Starčevo–Criş pits), adds to growing evidence for this morphological type alongside einkorn and emmer in early farming assemblages in south-east Europe, in continuity with their co-occurrence in earlier Pre-Pottery and Pottery Neolithic assemblages in central and south-east Anatolia (e.g. Jones *et al*. 2000; Bogaard *et al*. 2008).

Pulse seeds are less common and abundant than cereal grain but occur in the majority of pits. Lentil is the most common, followed by bitter vetch in six units and pea in two (Table 3) (Figure 3c).

Overall, the recurrence of cereals and pulses across many pit fills suggests probable cultivation and use of einkorn, [hulled] barley and lentil in particular. Taking into account the chronological distribution of the pits (Table 3), einkorn and barley are well attested across most periods, with the addition of lentil in at least the Early Dudeşti and Vădastra occupations. Pulses identified to species are infrequent in the Starčevo–Criş pits, lentil and bitter vetch occurring in one pit each, though indeterminate large-seeded legumes (too poorly preserved for more specific identification) occur in three of the four pit fills dating to this earliest phase. Taking these

indeterminate pulses into account, a combination of cereals and pulses is well attested more or less throughout the site sequence.

The final crop type attested is broomcorn millet (Figure 3d), a small-seeded cereal of particular interest since, unlike the other crops in the assemblage; it does not belong to the south-west Asian suite of 'founder crops' (Zohary and Hopf 2000). The occurrence of only seven seeds across four pits is hardly convincing evidence for cultivation and use, but added to sporadic evidence elsewhere in south-east and central Europe (e.g. Kreuz *et al*. 2005), it suggests that broomcorn millet occurred widely, potentially as a weed of other crops. In the Teleor 003 sequence it occurs only in the Early and Late Dudeşti pits.

The remains of collected fruits/nuts are much less frequent than cereals and pulses. Collected fruits included sloe and *Rubus* (blackberry, raspberry or dewberry). A single fragment of tuber, not as yet identified more specifically, was also recovered.

Of the other wild taxa, dwarf elder (*Sambucus ebulus*) is the most common, occurring in 10 pits, followed by black nightshade (*Solanum nigrum*), small-seeded legumes (e.g. clover) and black bindweed (*Bilderdykia convolvulus*). All of these taxa have uses but could also represent arable weeds. Both black nightshade and black bindweed are particularly associated with productive and disturbed soil conditions; these and other potential weed taxa co-occur in complex 7 (Early Dudeşti), which contains the highest counts of cereal chaff and one of the highest counts of wild plant seeds in the assemblage; this deposit resembles the weed - and chaff-rich by - products of glume wheat dehusking.

Discussion

The crop assemblage from the Teleor 003 complexes (pits) demonstrates a consistent occurrence of multiple cereal and pulse species throughout the Neolithic sequence. The composition of the assemblage indicates continuity with the adjacent regions of Neolithic Europe.

Comparison of Teleor 003 with other archaeobotanical datasets

Published archaeobotanical data from Starčevo-Criş-Körös sites, in Serbia, southern Romania and southeast Hungary, have tended to be sparse, dominated by impressions in pottery and daub or small hand-collected samples, but include multiple cereals and pulses (Cârciumaru 1996; Borojevič 2006; Gyulai 2001; 2007). Though only four pits of this period were excavated at Teleor 003, the results suggest that use of multiple cereals and pulses was broadly characteristic of Starčevo-Criş-Körös communities, extending to southern Romania.

A large archaeobotanical dataset is available from broadly contemporary early Neolithic sites (early-mid 6th millennium cal BC, Karanovo I-II) in Bulgaria (Marinova 2006, 2007). Of the crop types attested at Starčevo-Criş-Körös sites, einkorn, emmer, hulled barley, lentil, bitter vetch and pea all occur as concentrated 'storage finds' in burnt early Neolithic houses in Bulgaria, while broomcorn millet is known only as occasional seeds. Additional crops (also attested as 'stores') in the early Bulgarian Neolithic are grass pea, chickpea, naked barley and flax.

For the later 6th millennium cal BC, Teleor 003 broadens the range of crops known from Romania (Cârciumaru 1996) to include emmer, lentil, bitter vetch and millet. The occurrence of bitter vetch and high frequency of barley in the Teleor 003 assemblage demonstrate continuity with the south-east European crop spectrum and contrast with the narrower range of crops typical of the early Neolithic in central Europe (Kreuz *et al*. 2005). Of the other crops well attested in the Bulgarian Neolithic and absent at Teleor 003 - free-threshing wheat, grass pea, chickpea and flax - bread wheat is attested at Vinča and Dudeşti sites elsewhere while the earliest occurrence of flax in Romania dates to the Chalcolithic-Bronze Age; grass pea is known only from much later periods and chickpea is absent from the Romanian record (Cârciumaru 1996). The absence of grass pea and chickpea in southern Romanian Neolithic, if confirmed by further investigations, would signal continuity with central Europe.

Implications for crop husbandry

An important inference with regard to the nature of occupation at Teleor 003 is the form of farming practised: were fields abandoned after a brief period or cultivation or relatively permanent, and - if permanent - how intensively were they managed? The permanence of cultivation plots can potentially be inferred from basic ecological characteristics of the weed assemblage (Bogaard 2002): the weeds of cultivation areas newly cleared of woodland tend to be perennial and associated with woodland habitats. At Teleor 003, none of the potential weed taxa identified to species is linked with

woodland habitats; the single taxon definitely identifiable as perennial, *Sambucus ebulus*, is instead associated with disturbed habitats (Ellenberg *et al*. 1992).

The other two reasonably frequent wild taxa identified to species, black nightshade (*Solanum nigrum*) and black bindweed (*Bilderdykia convolvulus*), are annuals associated with productive and disturbed soil conditions; these and other potential weed taxa co-occur in complex 7 (Early Dudeşti), which contains the highest counts of cereal chaff and one of the highest counts of wild plant seeds in the assemblage; this deposit resembles the chaff - (and weed-) rich by - products of glume wheat dehusking.

Conclusions

The Teleor 003 assemblage provides evidence for the use of cereals and pulses through an extended Neolithic sequence in southern Romania. The Early Dudeşti finds of broomcorn millet from the site echo occasional finds from sixth millennium cal BC sites elsewhere in south-east and central Europe. While the low density of remains in the pit fills at Teleor 003 is likely a result of taphonomy, the *recurrence* of cereal and pulse remains provides positive evidence of their use through the major phases of site occupation. Cereals were recovered from all 28 features analysed. Wild plant taxa such as sloe are also attested but were much less frequently charred/discarded. Potential weed evidence is sparse but suggests that cultivation plots were well established and intensively managed. In each of these respects the Teleor 003 assemblage is reminiscent of well documented assemblages from the sixth millennium cal BC in Bulgaria (Marinova 2006; 2007) as well as emerging data from the Hungarian plain (Bogaard *et al*. 2007).

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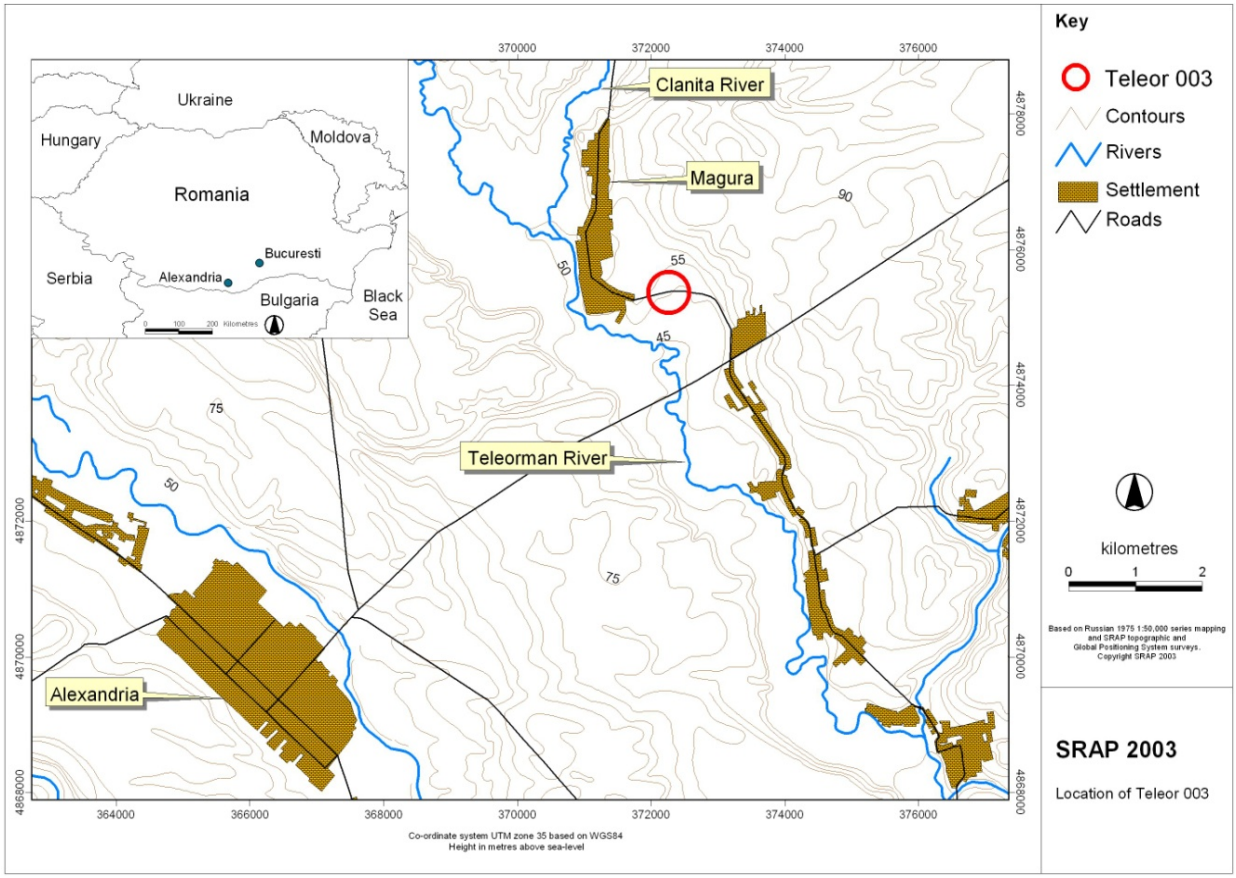


Figure 1. Location of the SRAP study area and Teleor 003.

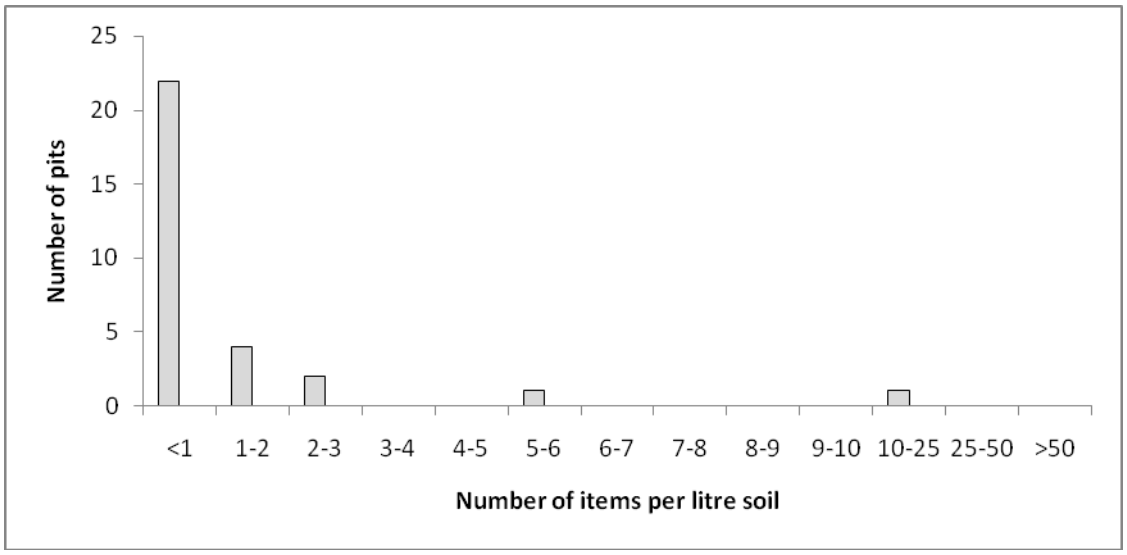
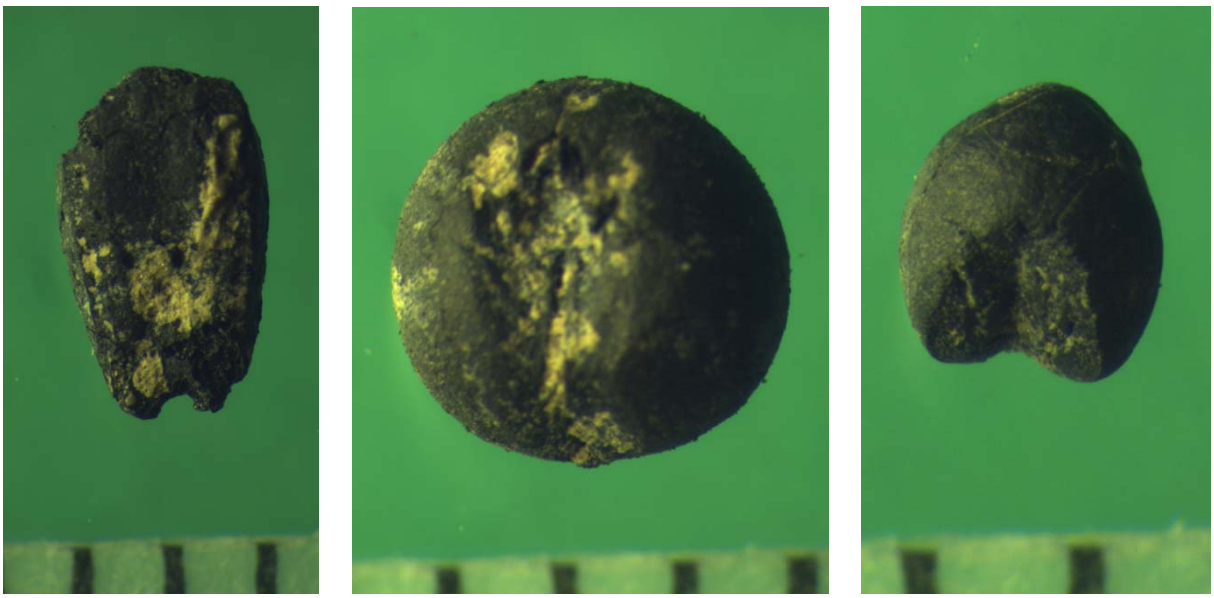


Figure 2. Density of plant material per litre of soil.

(3a)

Einkorn wheat
(Triticum monococcum)



(3b)

Hulled Barley
(Hordeum Vulgare)

(3c)

Pea
(Pisum sativum)

(3d)

Broomcorn millet
(Panicum miliaceum)

Figure 3. Examples of crops present in the assemblage of Teleor 003.

Period	Number of pits
Starčevo-Criş	4
Early Dudeşti	7
Late Dudeşti	6
Vădastra	7
Multi-period	4
Total	28

Table 1. Chronological distribution of the complexes (pits).

SRAP sample code	Lab code	Species	Context	Date cal BC
2003/17	OxA-21405	Hordeum sativum	Complex 13, context 810	5840 – 5671
2003/18	OxA-21406	Hordeum sativum	Complex 13, context 853	5783 – 5641
2003/20	OxA-21407	cf. Triticum monococcum/ dicoccum	Complex 13: context 803	5724 – 5625
2003/14	OxA-21403	Hordeum sativum	Complex 13, context 700	5721 – 5625
2003/15	OxA-21404	Hordeum sativum	Complex 13, context 751	5344 - 5081

calibrated by OxCal 4.1 (Curve IntCal09); 2-sigma ranges shown

Table 2. Teleor 003 AMS radiocarbon dates from 4 barley grains and 1 wheat grain.

	Starčevo–Criş	Early Dudeşti	Late Dudeşti	Vădastra	mixed	Total occurrences
CEREAL GRAIN						
einkorn wheat	2	7	1	5	4	19
barley	2	5	3	4	3	17
other cereal	3	7	5	7	4	26
broomcorn millet		3	1			4
CEREAL CHAFF						
Einkorn wheat	1	3		1		5
Emmer wheat		1				1
New type		3		2		5
Glume wheat indet		4		1	2	7
PULSES						
Bitter vetch	1	2		2	1	6
Lentil	1	5	2	4	3	15
Pisum				1	1	2
Total pits	4	7	6	7	4	28

Table 3. The composition of the crop assemblage in the complexes (pits).

	Number of pits		
FRUITS/NUTS			
Plum stone	1		
Plume stone/Rosaceae fruit/nut	8		
Fruistone/nut shell indet frags	3		
Raspberry/blackberry/dewberry	1		
Tuber fragment	1		
WILD PLANT SEEDS (taxa identifiable as to life history/ecology only are included)		*life history*	*ecology*
Bilderdykia convolvulus	4	annual	disturbed
Sambucus ebulus	10	perennial	disturbed
Setaria viridis/verticillata	1	annual	disturbed
Solanum nigrum	5	annual	disturbed
Scirpus	1	perennial	wetland

Table 4. Wild taxa present in the complexes (pits).

EXPLOITATION DES RESSOURCES ANIMALES AQUATIQUES AUX PÉRIODES NÉO- ET ÉNÉOLITHIQUE DANS LA VALLÉE DE TELEORMAN

Valentin RADU

Résumé: *Le projet anglo-roumain SRAP – Southern Romania Archaeological Project – (1998-2004) a commencé avec des recherches dans la zone Lăceni-Măgura (département de Teleorman) située à la confluence de la rivière Teleorman avec son affluent Clăniţa. Nous présentons le matériel faunique prélevé dans les sites archéologiques. Notre étude concerne principalement les mollusques, les poissons, les tortues et les oiseaux. Grâce à des échantillons provenant de plusieurs niveaux culturels concentrés dans la même région, nous avons dressé un tableau général de l'exploitation des ressources animales aquatiques dans la vallée de Teleorman au cours des périodes néo-et énéolithiques.*

Mots-clés: *vallée de Teleorman, Néo- et Énéolithique, ressources aquatiques.*

Dans le cadre du projet anglo-roumain SRAP – Southern Romania Archaeological Project (1998-2004), une zone située sur le cours inférieur de la rivière Teleorman a été étudiée du point de vue archéologique dans une approche pluridisciplinaire (Andreescu 2005; Andreescu *et al*. 2002; Bailey *et al*. 1999, 2001).

Des études en surface ont été menées pour la reconstitution du paléomilieu (Bailey *et al*. 2000, 2002) et des sondages archéologiques ont été réalisés ponctuellement pour mettre en évidence les différents types d'habitation néo- et énéolithique (Andreescu et Bailey 1999; Bailey *et al*. 1999, 2001).

Le projet a commencé avec des recherches dans la zone Lăceni-Măgura (département de Teleorman) située à la confluence de la rivière Teleorman avec son affluent Clăniţa (Figure 1). Située à 10 km au nord de la ville d'Alexandria, près des villages de Lăceni et Măgura, la zone de recherche s'étend sur environ 3 km et est composée des vallées des rivières Teleorman et Clăniţa, séparées par une basse terrasse. Dans cette zone ont été identifiés plusieurs sites d'habitation préhistorique (du VI^{e} au V^{e} millénaires av. J.-C.) attribués à différentes périodes culturelles: Starčevo-Criş, Vădastra, Dudeşti, Boian et Gumelniţa (Andreescu 2005; Andreescu *et al*. 2003; Bailey *et al*. 1999, 2001). Ils ont reçu l'appellation TEL/TELEOR (pour la vallée de Teleorman) et CLA (pour la vallée de Clăniţa). Ensuite chaque site a reçu un numéro correspondant à l'ordre de découverte.

Matériel

Dans ce qui suit nous présentons le matériel faunique prélevé dans les sites archéologiques. Nous incluons également quelques échantillons provenant du tell de Vităneşti (fouille systématique coordonnée par R. R. Andreescu). Même si nous avons quantifié les restes de mammifères, ils ne sont présentés qu'à titre indicatif. Notre étude concerne en effet principalement les mollusques, les poissons, les tortues et les oiseaux. Les échantillons provenant de plusieurs niveaux culturels concentrés géographiquement, il est en outre possible de dresser un premier tableau général de l'exploitation des ressources animales aquatiques aux périodes néo- et énéolithiques dans la vallée de Teleorman.

L'ensemble du matériel faunique présenté ici est issu des recherches menées dans le cadre du projet SRAP. Plusieurs modalités de prélèvement ont été employées: ramassage à vue, tamisage et flottation du sédiment. La plupart du matériel étudié a été obtenu par tamisage.

Pour certaines périodes, nous avons comparé le matériel inédit présenté ci-dessous à des séries déjà publiées afin d'avoir une image d'ensemble de l'exploitation de ces animaux négligés par les archéologues jusqu'à tout récemment (Bălăşescu *et al*. 2003).

La culture Starčevo-Criş

Le site de Măgura 'Buduiasca' - TELEOR 003 a livré du matériel faunique appartenant à la culture Starčevo-Criş. Il a déjà été signalé dans la littérature (Bălăşescu *et al*. 2005: 37). Il s'agit de 204 restes découverts dans le complexe C1 et dans la hutte B5. Les restes de mammifères (166) sont les plus importants (81,37 %). 22 restes des coquilles (10,78 %) ont été déterminés comme appartenant aux espèces *Unio pictorum* et *Unio tumidus*. Les restes de tortues (6,37 %) sont des

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 161-166.

fragments de carapaces provenant des espèces *Emys orbicularis* et *Tesudo graeca*. Parmi les deux restes de poisson (0,98 %), un est une vertèbre de silure (*Silurus glanis*). On mentionne aussi la présence d'un seul reste d'oiseau (0,41 %).

La culture Dudeşti

Pour cette culture, 1735 restes provenant du même site TELEOR 003 ont été analysés (Bălăşescu *et al*. 2005: 42). Les mammifères dominent (NR=1724). Les bivalves (5 restes), la tortue (1) et les oiseaux (5) ne comptabilisent que 11 restes. S'ajoutent pour ce site 809 restes fauniques provenant de trois autres sondages, 19, 20 et 22 (Mills 2009), appartenant à une phase ancienne de la culture Dudeşti (communication personnelle P. Mirea). Outre les mammifères (834), qui sont là aussi dominants, nous avons identifié (Figure 2):

- 36 fragments de coquilles d'*Unio*;
- 9 restes de poisson, dont 6 vertèbres de Cyprinidés qui ont appartenu à des individus de taille moyenne 300 mm (300-500 g), 2 vertèbres correspondant à un brochet (*Esox lucius*) de 330 mm Lt (220 g) et 1 vertèbre de silure (*Silurus glanis*) de 570 mm Lt (1,28 kg).
- 1 reste de carapace appartenant à la cistude (*Emys orbicularis*).

La culture Vădastra

Le site TELEOR 003 a également livré des restes appartenant à la culture Vădastra (Andreescu et Bailey 1999). Ceux provenant du complexe C6 ont été publiés (Bălăşescu *et al*. 2005: 42). Les mammifères (124 restes) sont majoritaires et ils sont accompagnés par 2 fragments de coquilles d'*Unio pictorum*.

D'autres complexes ont été analysés du point de vue archéozoologique: 22, 27, 32 (Figure 3). Le complexe 22, le plus riche en matériel faunique, compte 439 restes dont 414 de mammifères. Parmi les 13 restes de coquilles, 2 d'*Unio crassus* et d'*Unio pictorum* présentent le bord inférieur usé. Les restes de poissons correspondent à plusieurs taxons: 1 plaque dermique provient d'un esturgeon, 1 fragment d'os pharyngien de brème (*Abramis brama*) de 340 mm de longueur totale (430 g), une vertèbre précaudale de brochet (*Esox lucius*), 3 vertèbres de Cyprinidés d'une taille comprise entre 300 et 500 mm Lt (0,3-1,5 kg) et 1 vertèbre de silure (*Silurus glanis*) d'environ 1 m de longueur (7,1 kg).

La cistude (*Emys orbicularis*) est présente avec un reste de carapace et les oiseaux avec 4 fragments dont 1 appartenant à une grue (*Grus Grus*).

La culture Boian

Plusieurs sites on été identifiés pour cette culture (Andreescu *et al*. 2002; Andreescu et Bailey 1999). Nous avons analysé et publié le matériel faunique pour la culture Boian phase Giuleşti du site TEL008 et pour la phase Boian-Spanţov des sites TELEOR 001, TELEOR 008, TELELEOR 009, TELEOR 010, CLA 002 (Bălăşescu 2001, 2002; Radu 2001, 2002).

Bien que les restes de mammifères soient majoritaires, nous avons identifié des mollusques (*Unio crassus*, *Unio pictorum*, *Unio tumidus*, *Planorbarius corneus* et *Cepaea vindobonensi)* et des cistudes (*Emys orbicularis*) dans les niveaux Boian-Spanţov (30 restes) et Boian-Giuleşti (325 restes).

La culture Gumelniţa

Les établissements de type tell représentent le mieux la culture chalcolithique Gumelniţa (Andreescu *et al*. 2001, 2003). Le tell de Vităneşti est aujourd'hui le mieux connu du point de vue archéozoologique (Bălăşescu et Radu 2003; Bălăşescu *et al*. 2005: 60-1; Kessler et Gál inédit; Moise, Bălăşescu et Radu inédit). Les échantillons prélevés pendant le projet SRAP proviennent des tells Vitaneşti et Măgura 'Bran' (CLA 001). Ainsi, pour la culture Gumelniţa phase A2 nous avons analysé des échantillons provenant des deux tells et pour la culture Gumelniţa phase B1 uniquement pour le tell de Măgura 'Bran' (Figure 4).

Les mollusques.

Les bivalves sont les plus nombreux et les seuls qui ont été collectés volontairement par les hommes du Chalcolithique (Bălăşescu et Radu 2004: 99). Les plus fréquents sont les espèces du genre *Unio* (*Unio crassus*, *Unio tumidus*, *Unio pictorum*) et, dans une moindre mesure, la moule de lac (*Anodonta cygnaea)*. L'espèce dominante (en nombre de restes), *Unio crassus*, est la plus adaptée aux conditions rencontrées dans une rivière. Une comparaison des dimensions pour les individus issus des niveaux Gumelniţa A2 (Figure 5) montre que les individus de Măgura 'Bran' sont plus petits que

ceux de Vităneşti. Plusieurs causes peuvent être envisagées: la sur-collecte, le lieu et la période de la collecte, une sélection intentionnelle etc.

Les poissons.

Le nombre de restes de poissons est trop faible pour réaliser une analyse complète. Il nous permet de dresser une image préliminaire des pratiques de pêche dans les rivières Teleorman et Clăniţa. A Vităneşti, dans le niveau Gumelniţa B1, les premières analyses (Bălăşescu et Radu 2003) ont souligné la présence de vertèbres de silure provenant d'individus de tailles moyenne (1 m et 10 kg) et grande (2 m et 55 kg). Les nouveaux échantillons montrent que les taxons plus petits ont aussi été péchés. C'est le cas d'une vandoise (*Leuciscus leuciscus*) de 160 mm Lt, des Cyprinidés de 150-300 mm Lt (50-450g), d'un brochet (*Esox lucius*) de 440 mm Lt (700 g) et d'un sandre (*Sander lucioperca*) de 400 Lt (1,1 kg). A Măgura 'Bran' la brème (*Abramis brama*) et le barbeau (*Barbus* sp.) s'ajoutent au spectre des Cyprinidés.

Les tortues sont attestées avec quelques restes appartenant à la cistude (*Emys orbicularis*) ainsi que les oiseaux avec 8 restes dans les niveaux du tell de Măgura 'Bran'.

Conclusions

L'exploitation des ressources aquatiques et leur rôle dans l'économie animale des communautés néo- et énéolithiques sont peu connus. Le rapport entre ce type de ressources et l'exploitation des mammifères est globalement bien compris pour chaque période culturelle, mais est encore mal connu à l'échelle de chaque site. Si la présente étude ne permet pas d'avancer sur ce point précis, elle montre néanmoins que les ressources aquatiques de la vallée du Teleorman ont été systématiquement exploitées tout au long de la période néo- et énéolithique. La collecte des mollusques a été pratiquée par toutes les communautés néo- et énéolithiques. Les coquillages d'*Unio crassus* sont les plus recherchés et on observe même, pendant la période Gumelniţa, une diminution de leurs taille qui peut être l'effet saisonnier d'une surcollecte. Les autres espèces d'*Unio* sont également collectées tout comme les moules. Par ailleurs, les coquilles d'*Unio* ont servi comme outils (certains présentent le bord inférieur usé) et comme matière première pour confectionner des parures (Beldiman et Sztancs 2009: 31-53). Enfin, bien que les escargots soient présents dans le matériel, rien n'atteste pour l'instant qu'ils aient été collectés intentionnellement.

La pêche est également attestée mais une évolution de cette activité est difficile à esquisser à l'heure actuelle étant donné le faible nombre de données. Les espèces présentes dans la zone inférieure d'une rivière ont été péchées: esturgeons, brochet, brème, barbue, vandoise, silure, sandre et perche. La présence du Danube à peu de distance explique la découverte des esturgeons et des silures de grande taille (2 m Tl et 50 kg). Leur présence dans la zone de Lăceni-Măgura peut être due aux échanges avec les populations de la vallée du Danube mais leur pêche dans la rivière est également possible, sous certaines conditions (profondeur suffisante pour que l'eau ne gèle pas pendant l'hiver et pour permettre la migration des grands reproducteurs au printemps).

Les reptiles sont représentés par les deux espèces de tortues: la cistude (*Emys orbicularis*) et la tortue grecque (*Testudo graeca*). La cistude est une tortue dépendante du milieu aquatique. Elle est facilement capturée pendant la période de reproduction quand elle sort de l'eau pour pondre ou pendant les campagnes de pêche. La tortue grecque est fréquente dans le niveau Starčevo-Criş puis son nombre de restes diminue et sa présence devient sporadique dans la culture Gumelniţa. Cela peut s'expliquer soit par une chasse intensive soit par un changement climatique: le passage d'étés chauds et secs à des étés chauds et humides (Tomescu 2000).

Les oiseaux sont peu étudiés pour cette zone. Seul le matériel du niveau Gumelniţa B1 de tell de Vităneşti a bénéficié d'analyses détaillées (Kessler et Gál inédit).

Du point de vue strictement alimentaire, il est certain que les mollusques, les poissons et les tortues jouaient un rôle moins important que les mammifères. En ce qui concerne l'exploitation des ressources aquatiques, notre étude a montré que chaque site a ses particularités. Il appartient aux prochaines études de mieux les caractériser.

Remerciements

Je tiens à remercier mon collègue archéologue Pavel Mirea pour toutes les informations archéologiques ainsi que les directeurs du projet Southern Romania Archaeological Project – SRAP Douglass Bailey et Radian Romus Andreescu. Un grand merci à Stephanie Brehard pour ses conseils et pour la correction du français du texte.

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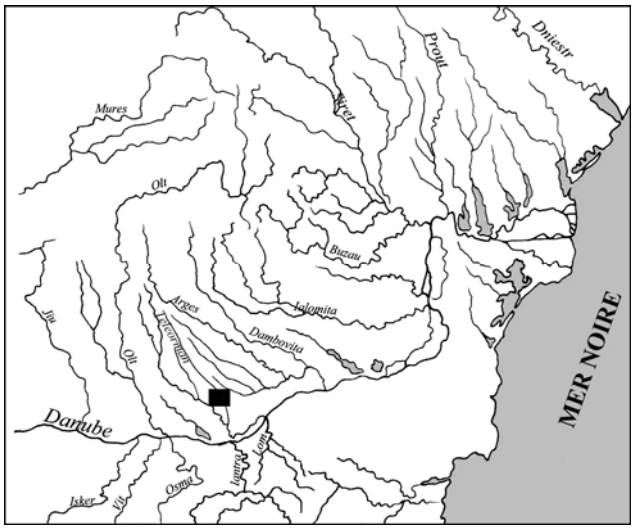

Figure 1. Localisation de la zone Lăceni-Măgura.

Taxon	Sondage 19	Sondage 20	Sondage 22	Total
Mollusca				
Unio sp.	23	13		**36**
Pisces				
Esox lucius			2	**2**
Cyprinidés	4		2	**6**
Silurus glanis			1	**1**
Reptilia				
Emys orbicularis	1			**1**
Mammalia	431	68	335	**834**
Total	**459**	**81**	**340**	**880**

Figure 2. Décompte des restes fauniques analysés pour le site Măgura 'Buduiasca', culture Dudeşti.

Taxon	Sondage 20, complexe 22	Sondage 21, complexe 27	Sondage 21, complexe 32	Total
Mollusca				
Unio crassus	8			**8**
Unio pictorum	2			**2**
Unio sp.	3			**3**
Pisces				
Esturgeons	1			**1**
Esox lucius	1	1		**2**
Abramis brama	1			**1**
Cyprinidés	3		1	**4**
Silurus glanis	1			**1**
Reptilia				
Emys orbicularis	1			**1**
Aves	3			**3**
Grus grus	1			**1**
Mammalia	414	41	137	**592**
Total	**439**	**42**	**138**	**619**

Figure 3. Décompte des restes fauniques analysés pour le site Măgura 'Buduiasca', culture Vădastra.

Taxon	Vităneşti L5	Măgura 'Bran'	Măgura 'Bran'
	Gum A2	**Gum A2**	**Gum B1**
Mollusca			
Unio crassus	344	16	8
Unio tumidus	58	20	11
Unio pictorum	3		
Unio sp.	19	4	32
Anodonta cygnaea	1	2	
Cepaea vindobonensis	1		
Theodoxus sp.		3	
Gasteropoda	4	3	3
Pisces			
Esox lucius	6		1
Cyprinidés	33	6	11
Abramis brama		4	
Barbus sp.		1	
Leuciscus leuciscus	2	1	2
Sander lucioperca	1		
Percidés	2		
Pisces IND	40	4	1
Reptilia			
Emys orbicularis	1	1	
Aves		2	6
Total	**515**	**64**	**78**

Figure 4. Décompte des restes fauniques analysés pour les tells de Vităneşti et Măgura 'Bran', culture Gumelniţa.

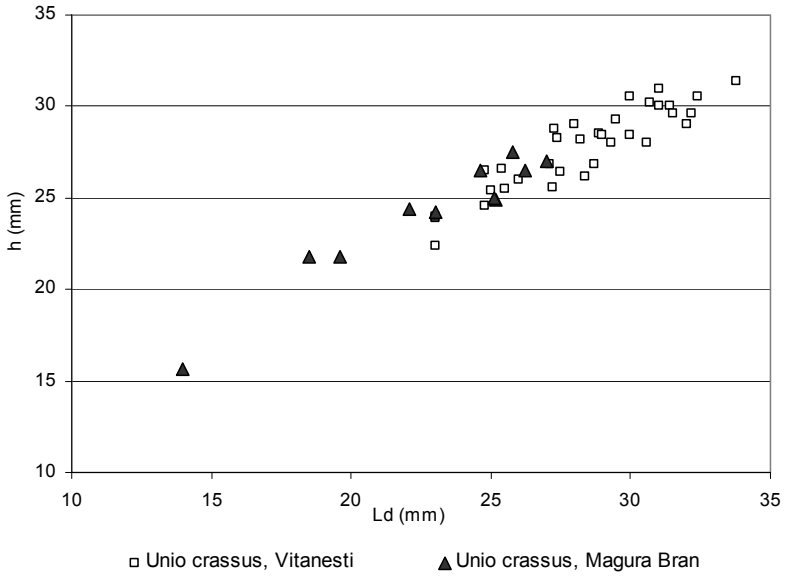

Figure 5. Comparaison des dimensions (hauteur/longueur dent latérale) d'*Unio crassus* provenant des tells de Vităneşti et Măgura 'Bran', culture Gumelniţa A2.

LITHIC EXPLOITATION IN THE NEOLITHIC OF THE TELEORMAN VALLEY, SOUTHERN ROMANIA: PRELIMINARY DISCUSSION OF RESULTS

Amelia PANNETT

Abstract: *This paper presents the results of lithic analysis carried out on assemblages recovered from a series of pit complexes excavated as part of the Southern Romania Archaeological Project in the Teleorman River Valley. The pits are the remains of occupation dating from the earliest Neolithic to the middle Neolithic and contain an array of material culture, including struck flints. Analysis of the lithic assemblages has allowed an understanding of changes in lithic technologies and depositional practices through these Neolithic periods.*

Key words: *Lithics; Neolithic; pits; deposition; complexity.*

Introduction

In this paper, I want to present and discuss the results of the analysis of a small number of lithic assemblages derived from pit features excavated in the Teleorman River Valley by the Southern Romania Archaeological Project (SRAP). This project was jointly run by Cardiff University, the National History Museum in Bucharest and the Teleorman County Museum, and involved the excavation and survey of Neolithic sites along the Teleorman and Clăniţa rivers around the village of Magura. The materials I will discuss today come from two sites to the east of Magura: Teleor 003 and Boldul lui Mos Ivanuş.

The lithic assemblages chosen for analysis derive from a series of closed, stratigraphically secure, complexes identified within pit features. These date from the earliest Neolithic, around 6000 BC to the later early/Middle Neolithic around 5200 BC. All the lithic assemblages were recovered from complexes rich in pottery that also produced animal bone, coarse stone tools and charred plant remains. Full analysis of all the materials recovered and the written archive is underway and will be published in due course. As a result, all discussion I present here is necessarily tentative, in lieu of the final publication of the SRAP sites.

By means of an introduction to the lithic resource in this part of Romania, I want to highlight an aspect of the lithic assemblages that is central to the discussions to follow, namely the distinction between local and non-local or imported flint. The use of both terms is slightly misleading, as even the so-called local flint is brought into the area from around 10 km away - it does not occur naturally in the local geology. Nevertheless, the term is used to differentiate between the relatively local raw materials and the Balkan flints that are thought to originate on the southern side of the Danube, although their provenance is not yet fully established (Biagi and Starnini 2010; Bonsall *et al.* 2010) and possible extraction sites on the Romanian side of the Danube have recently started to come to light (P. Mirea *pers comm.*). These non-local, Balkan flint raw materials comprise variations on a honey or light brown coloured high quality flint, often with white or cream spots but containing very few flaws. In contrast, the local materials are generally grey, dark grey or black and of lesser quality, often with flaws or inclusions. The use of high quality honey-coloured materials is well attested in the early Neolithic throughout the Balkans, and is used specifically for the manufacture of blades and other specific tools that form part of a formal 'tool kit' (Gatsov 2009; Gurova 2008). Gatsov (2009) has suggested that the routines of procurement and use associated with these materials points towards a specialist industry based around the manufacture of blade blanks for distribution around the region, with initial reduction sequences occurring in specific locations, perhaps close to the source. By contrast, he suggests that the locally available materials were used instead in routines of everyday production carried out by individuals or households (Gatsov 2009).

Material Assemblages

Complex 58 - pre-Criş

The first assemblage I want to discuss, Complex 58, derives from the earliest, pre-Criş Neolithic, and as such represents an opportunity to examine the lithic technologies in use at the very start of the Neolithic period in the Teleorman River valley. The material was recovered from a pit on the site of Boldul lui Moş Ivanuş, located on the northern side of the Teleorman River on the shore of a modern lake.

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The lithic assemblage comprised 143 struck lithic pieces. A range of raw materials were used in their manufacture, including both honey-coloured Balkan flint and grey local flint. The assemblage was flake dominated, with around 30% blades all of which were manufactured on Balkan flint. Two cores and small quantities of angular shatter (chunks) and microdebitage, also manufactured on Balkan flint, attest to the on-site knapping of these imported materials. The cores are indeterminate - it is not possible to tell whether they were used in the manufacture of flakes or blades - however, dorsal scar patterns on blanks indicate that a high proportion of struck pieces derived from blade cores.

The tool assemblage includes a range of tool-types, manufactured on both local and imported flint. The dominant tool form is a truncated blade or flake with non-invasive retouch along one edge. One truncated blade retained part of the notch used to snap it, and had gloss extending over the notch and up one edge of the blade. These truncated pieces are generally referred to as sickle inserts and are thought to have been hafted into wooden handles to form composite tools. Three scrapers were identified within the assemblage, including an end and double side scraper manufactured on a Balkan flint blade with a piercer point extending from the scraper edge. This multifunctional tool seems to represent the Swiss army knife of the early Neolithic! A micro-scraper formed on the distal end of a notched blade is an interesting piece, and may represent a continuation from Mesolithic traditions. Another piece that appears to also derive from Mesolithic technologies is a trapezoidal microlith - the deposition of this well stratified piece dates from the Neolithic, but its form is definitely Mesolithic.

Complexes 13 and 35 - Criş

Complexes 13 and 35 date to the Starčevo-Criş period (around 5800 BC) and were excavated on the site of Teleor 003. This site is also located on the northern side of the Teleorman River, around 150m north-west of Boldul lui Moş Ivanuş.

The morphology of the complex 13 and complex 35 assemblages differ from that of complex 58. Complex 13 contained 40 struck pieces, and is characterised by a complete lack of debitage and other knapping debris, only a single core, and a remarkably high proportion of retouched pieces. The assemblage is blade dominated, with flakes present in much smaller numbers. The majority of blades were manufactured on the Balkan flint, with only three produced using local materials. Two blades were complete, with the remainder surviving as (predominantly) medial fragments. Around 40% of the assemblage, predominantly the Balkan flint pieces, had been modified, generally with retouch applied along one lateral edge. Two piercers were also identified, one manufactured on the honey-coloured Balkan material and the other on local grey flint. Both scrapers that were recovered were manufactured on the grey, local material. The single core identified was manufactured on non-local flint, and had undergone at least two different phases of use. The primary reduction sequence involved the manufacture of blades from a single platform. The final phase of working involved the haphazard removal of irregular flakes.

The complex 35 assemblage is comparable, although contains a slightly higher proportion of local lithic materials and more evidence for knapping activities, including a small number of microdebitage pieces, a piece of angular shatter (chunk) and a single bipolar core. All of these pieces are on local, grey, lithic materials. This assemblage contains roughly equal numbers of flakes and blades, although notably, the majority of blades were manufactured on the honey coloured Balkan flint and the flakes on the local materials. Three blades were complete, one of which was crested, and all showed traces of platform preparation. Of the blade fragments, close to half were medial fragments. Only 20% of the assemblage had been retouched, comprising predominantly pieces manufactured on non-local materials. Again, retouch was simple - abrupt working down one or more lateral edge. One piercer was identified, with an abraded point characteristic of use. Interestingly, the single scraper identified was manufactured on Balkan flint, and comprised a distal end scraper with a distinct 'nose'. A denticulated flake was identified, manufactured on local grey flint, and the single core comprised a heavy flake from which flakes had been struck using an anvil technique.

Complex 7 and 40 - Dudeşti

Complexes 7 and 40 also derived from excavations at Teleor 003. They are dated to the Dudeşti period (c. 5500 BC), and provide an interesting contrast to complexes 13 and 35.

The complex 7 assemblage contained around 200 struck pieces and included a greater variety of tools and debitage, representing a broad based utilitarian assemblage. Local flint dominates assemblage, with very few pieces of Balkan flint present.

The assemblage comprised around 50% flakes, with blades also recovered in fairly high numbers (30%). The single core identified in the assemblage was manufactured on mottled grey flint and resembled a cubic chunk rather than a precisely engineered and curated core. Flakes, both regular and irregular, had been struck from three faces. The dorsal scar pattern on the majority of the irregular flakes in the assemblage indicates the use of multiple platform cores, however, the evidence from the regular flakes and blades demonstrates that single platform cores and unidirectional reduction were used in the production of these more precisely engineered pieces.

The tool assemblage contained a high proportion of scrapers, predominantly end scrapers manufactured on regular flakes and blades. Piercers, a micro-borer and regular flakes and blades with abrupt retouch along one or more edges were also present.

Complex 40 is an interesting and significant deposit and one that will be discussed in more detail by Pavel Mirea elsewhere in this volume. I will, therefore, only briefly discuss the main elements of the lithic assemblage. Of particular note is the size of the assemblage - with 529 pieces, it is considerably larger than any of the other assemblages analysed as part of this project. The assemblage is dominated by local flint materials, with only a very small number of pieces manufactured on the imported honey-coloured materials. There are roughly twice the numbers of flakes than blades, with around 30% of the assemblage comprising knapping debris including cores, angular shatter and microdebitage. The dorsal scars on blades indicate that they predominantly derived from single platform blade cores, while the flakes generally have indeterminate dorsal scar patterns indicative of a more expedient method of manufacture. The cores identified are predominantly amorphous or multiple platformed, with only two single platform flake cores. The number of retouched pieces is high, around 30% of the assemblage, with scrapers dominating. Other tool forms are also present, including piercers, edge retouched pieces and a couple of denticulated flakes. Interestingly, a large number of the blades had edge damage along one or more lateral edges, indicating that they were probably used for cutting.

Complex 22 - Vădastra

Complex 22 derives from the Vădastra Neolithic (c. 5200 BC) and was also excavated on Teleor 003. It contained around 200 struck lithic pieces and is broadly comparable with those from complexes 7 and 40, being flake dominated, predominantly manufactured on local lithic materials and containing abundant evidence for knapping activities. This included three cores, one single platform flake core, a multiple platform core and a bipolar core. Around 25% of pieces had been retouched, with scrapers, particularly end scrapers manufactured on regular flakes and blades, dominating. Piercers were also represented in relatively high numbers, together with flakes and blades retouched along one or more edges. Few flakes or blades had been truncated.

Discussion

The assemblages described above allow a picture to be formed of changes to lithic technologies through the Neolithic, which, I suggest reflect broader social change. In the earliest Neolithic, associated with the pre-Criş pottery, there is a clear focus on blade production with the use of imported flint materials evidently becoming a significant aspect of the technology. While little is known about the Mesolithic lithic technologies in this area, a rapid assessment of an assemblage from a site recently discovered by Pavel Mirea close to the town of Turnu-Magurele, close to the Danube in southern Romania suggests that central to the technology was the creation of narrow blades on conical or bullet cores. The materials used were almost exclusively the dark local flints, and the secondary technology involved the use of abrupt, non-invasive retouch to form microliths and other modified pieces. Conical or bullet cores and narrow blades are absent from the earliest Neolithic assemblage analysed for this project, although the presence of a trapezoidal microlith and a microscraper demonstrate the continuation of certain aspects of Mesolithic lithic working practices into the pre-Criş period. The pre-Criş assemblage tends towards a utilitarian collection of materials, including a variety of retouched pieces suitable for a range of tasks, together with the waste pieces from knapping. The tendency to use the imported, honey coloured Balkan flint in a markedly different way to the locally available dark flint is apparent in this earliest Neolithic assemblage, but the distinction is not quite as stark as in the later Criş assemblages.

The Criş period lithics stand apart from all other phases of the Neolithic, and hint at a specific set of social practices. In the two assemblages examined, evidence for knapping events is absent and while both local and non-local materials are being exploited, they are used in very different ways. Tools manufactured on local, dark, flint include scrapers and piercers and represent a

broad-based utilitarian kit that could have been used in the processing of animals and plant materials. In contrast, the non-local materials were used very specifically for the manufacture of retouched truncated blades that were evidently designed to be hafted to create composite tools - although the initial stages of knapping did not occur on site. The composite tools formed using truncated Balkan flint blades could have taken a variety of forms, however they are predominantly thought to have been used to create sickles and other cutting implements suitable for the harvesting of cereals. The later assemblages from Dudeşti and Vădastra contexts display much more emphasis on broad range utilitarian tools and contain large numbers of scrapers, together with piercers, denticulated flakes and complete blades modified to form cutting edges. Abundant evidence for lithic manufacture is found in the deposits, suggesting that knapping is taking place in the vicinity of the pit the material finally ends up being deposited in.

I would like to put forward a picture of the 6th millennium BC in the Teleorman River Valley based on the lithic assemblages. I am aware that building a model based solely on one aspect of material culture is going to be inherently flawed, however I propose it in lieu of the final analyses of the SRAP cultural assemblages with the aim of raising points of future discussion.

I suggest that in the earliest, pre-Criş, Neolithic we are seeing the cross-over of lifestyles from the Mesolithic hunter-gatherers to the Neolithic farmers, with the associated mix of lithic technologies. It is in this earliest phase of the Neolithic that the use of imported Balkan flint takes off and I suggest that its appearance can be linked to the emergence of 'exotic' domesticates, particularly cereals. This association between flint-type and cereals becomes more marked in the Criş phase of the Neolithic, with the Balkan flint used very specifically for the manufacture of blades many of which are truncated to create individual elements of composite tools. As Gatsov (2009) has discussed, in relation to Bulgarian lithic assemblages, the actual manufacture of the blanks appears to take place away from where the finished tools are being used and discarded, leading to theories of specialised routines of production. I suggest that this specialised production functions as a central part of the early Neolithic relationship with cereals. Indeed, I believe that by the Criş period, the imported materials were used predominantly in the manufacture of tools for the processing of cereals – an 'exotic' raw material used to harvest and process an 'exotic' new foodstuff. The lithic assemblages from the pre-Criş, but more particularly the Criş, periods are specialised, containing curated materials that have been imported as knapped blanks rather than as raw materials that have then been deposited within pits along with other, possibly deliberately selected, lithic pieces. What we are seeing are clear choices being made in the creation of the deposits, choices that reflect the significance of new-found exotics to the people of the Teleorman Valley.

By way of complete contrast, the Dudeşti and Vădastra periods are characterised by a more expedient, broad-based lithic technology that evidently reflects a shift in lifestyle. Gone are the specialised tools associated with harvesting cereals, replaced by large quantities of scrapers, together with piercers and cutting tools suitable for processing a range of materials.

So, what does the lithic evidence reveal about the Neolithic in the Teleorman River Valley? On the face of it, the lithic assemblages seem to suggest that the start of the Neolithic is characterised by a focus on specialisation and the exotic, in terms of both materials exploited and foodstuffs produced. This contrasts with the subsequent phases of the Neolithic where people were using local materials in the manufacture of a broad range of tools. In simplistic terms it could be interpreted as an early Neolithic economy based predominantly on cereals and a middle Neolithic economy encompassing a broad range of foodstuffs. However, as the papers by Andreescu *et al* and Bogaard and Walker (this volume) demonstrate, the evidence does not exist in the faunal and botanical assemblages to back this up. Instead, it is perhaps better to consider the context of deposition and suggest that in the early Neolithic pits were understood as exotic in themselves, providing a suitable medium for the deposition of particular materials. If so, then it follows that we are not getting a complete picture of life in the early Neolithic period from these pit deposits, but merely a glimpse of those materials that held some degree of value to the populations. Following on, it can be postulated that by the middle Neolithic, pits had become more mundane repositories for everyday rubbish. Again, this is too simplistic a model, and is flawed almost from the outset, however the point that is important to make, and one that is perhaps forgotten in our desire to understand what pits is that there in unlikely to be one single answer. The lithic assemblages have shown a degree of complexity and change in the choices people made when depositing materials, which undoubtedly reflects shifts in society and economy through the Neolithic.

Acknowledgements

Thanks to Steve Mills, Doug Bailey and Pavel Mirea for inviting me to contribute to the conference and subsequent volume. Particular thanks must go to Pavel Mirea for all his support, advice and constructive criticism over the last five years, and for sharing his lithic finds with me.

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EXPLOITING FLINT DEPOSITS IN NORTHEASTERN BULGARIA IN THE CHALCOLITHIC

Boryana MATEVA

Abstract: *Results of functional analyses and archaeological investigations specify that at early stages of the Neolith in Bulgaria small pieces of flint repositioned in local river troughs were used. Extraction of flint deposits began in the Chalcolithic with development of the macro lamellar industry. Extraction was conducted not by way of deep mines in cretaceous rock as in Belarus, Spienne (Belgium) and Poland (Gurina and Kovnurko 1964) but in superficial holes in the earth without getting into the thickness of the cretaceous rocks. The best flint for manufacture of macro blades occurs from a deposit at Ravno in northeast Bulgaria. At this stage of research of flint production organisation manufacture in the Chalcolith in northeast Bulgaria includes not less than three different types of workshops. This indicates a high degree of development of the craft and advances in the economy and economic relations in the Chalcolithic, especially in its late stages.*

Key words: *flint production, flint workshops*

One of the most important indicators of the advance of a society is the level of its technical development - tools of labour and the manufacturing of these tools. The basic raw material for making them in the prehistoric era in the Balkan Peninsula is flint. Archaeological evidence suggest that the technique of flint knapping continued to develop and improve until the final stages of the Chalcolithic, gradually turning from a domestic practice to craft serial production reaching the top of the technological capabilities of the material. The process was slow and difficult and only in the Late Chalcolithic are workshops documented in the isolated settlements (Skakun 1984, 1987, 1999, 2006; Skakun *et al.* 2005; Mateva 2003, 2007, 2008; Tzvek and Movchan 2005). This development follows a specific path, different from that of other primitive industries, driven by the physical properties of the material and by its presence or absence in a given area.

Although flint is one of the common minerals in our part of the world not every field is a source of flint suitable for technical processing and tools production. Following this, the question of the extraction of flint and the organisation of flint tools production becomes important for the study of economic development and intercultural relations in the past. This report is an attempt to clarify certain aspects of the extraction of flint and the organisation of the production of flint tools chronologically limited to the Chalcolithic and within the area of Ludogorie in northeast Bulgaria.

Following geological and petrographical studies the flint with best physical and technological properties is the Aptian flint (Lower Cretaceous period) enshrined in the limestone layers of Ludogorie, northeastern Bulgaria (Nachev and Kanchev 1984; Kanchev, 1985; Nachev, 2009). Although the name adopted in archaeology is Dobrodjean flint (Comsa 1976), perhaps correctly this type of flint, following Bulgarian geologists, should be called Ludogorian flint, the name based on its deposits.

There are seven geologically registered flint deposits in Ludogorie (Gurova and Nachev 2008; Nachev 2009) (Figure 1):

1. Valley of the river Beli Lom, northeast of Razgrad, where flint is enshrined under a thick layer of loess and limestone.
2. Valriver Cherni Lom and Rusenski lom in the Rousse region
3. Valley of Topchiyska River north of Razgrad, between the villages Topchii Kamenovo, Ravno and Tetovo.
4. Razgdad hills north side of the town named 'Tchukata'
5. South-southwest of the town Isperih, between the villages of Golyam Porovets, Vladimirovtsi and Nojarovo
6. Deposit north of Novi Pazar, between the villages of Kriva Reka and Lisi vryhq named 'Tchakmaclyka'.
7. Most eastern deposits reach the villages Karapelit, Tcherna and Jitnitza, 45km west of Dobrich.

There is evidence of exploitation during the Chalcolithic period at four of them: Ravno - Kamenovo, Chakmaka, Isperih region, Chukata near Razgrad and Kriva Reka, Novi Pazar region (Shkorpil 1892, 1898; Kanchev, Nachev and Kovnurko, 1981; Kanchev 1985, 1988; Mateva 2003,

Steve MILLS and Pavel MIREA (eds.) The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010: 173-178.

2007, 2008) (Figure 2). The latter one was exploited until modern times, at the beginning for threshing-sledge blades, and later for industrial purposes. At issue is the extraction of flint from the extremely rich field near the village Tetovo. Currently there is a limestone quarry which has probably destroyed all traces of ancient exploitation. Extracting Ludogorian flint does not require deep shafts and effort. Flint deposits are enshrined in the shallow surface layers in the weathered limestone and only a thin layer of loess covers them (Figs. 3, 4). Extraction was conducted not by way of deep mines in cretaceous rock as in Belarus, Spienne (Belgium) and Poland (Gurina and Kovnurko 1964) but in superficial holes in the earth without getting into the thickness of the cretaceous rocks. The information for deep wells in Kriva reka, recorded by the brothers Shkorpil (Shkorpil 1892) in the late nineteenth century, has not been confirmed by archaeological investigations.

In 1985 the deposit at Ravno (I and II) was described as a Palaeolithic flint tools workshop by K. Kanchev, probably because of the absence of pottery. Field investigation in the autumn of 2008 revealed a different picture. In fact it is impossible to separate Ravno I and Ravno II; they have an area exceeding 100 hectares. Typical Chalcolithic tools and cores clearly suggest the chronological period in which the people exploited this site. The absence of pottery can be explained by the fact that deposit is located 2-3km from the tell-settlement Kamenovo. It is possible that during summers the flint-knappers from the settlement Kamenovo come in the morning to produce and process flint and returned home for the night. This was common agricultural practice even until the mid-twentieth century. Future excavation will likely reveal temporary dwellings (huts); the space is large and many piles of debris reach a height of up to one metre - one metre and a half. The lay of the land is similar in the deposit Chakmaka, Isperih region (Figure 5). It is located about 2km from the eponymous tell-settlement. The deposit and the workshop for the primary treatment are partially preserved; there is no evidence of permanent or temporary human dwellings around it.

The field-workshops of Ravno I-II and Chakmaka have an exact parallel with the Izbegli and Muselievo deposits in Bulgaria, Grand-Prissigni (France) and Rubany in Ukraine (Stojanova and Kunchev 1984; Pelegrin 2002; Tzvek and Movchan 2005; Sirakova 2006). Probably the deposit in Kriva reka was also this type too before being destroyed by modern mining of flint. The small primary workshop of Ravno I-II is a result of the activities of only one settlement's population, even if the entire population, elders and children included, were knapping flint for many years. It is quite possible that alongside them there were seasonally employed craftsmen flint-knappers from remote villages who took blades and half-finished products when leaving. The large amount of half-finished products, blades, flakes, debris, cores and nodules found in the settlements of Kamenovo and Tchakmaka (Mateva 2003) show that people living nearby were taking raw material away with them, to handle it in more comfortable conditions, and perhaps-using appliances and ways not available in an open field. Among the finds from northeast Bulgaria are artefacts with remarkable dimensions: a flint nodule of 45kg weight from Kamenovo and a pre-nucleus of 18kg from Tchakmaka (Figure 6). It is physically impossible to obtain large regular blades by direct pressure.

Similar facts were noted in Tripolian settlement-workshops at Bodaki (Western Ukraine) and Rubany (east Ukraine), but in these sites flint artefacts as large as in northeast Bulgaria are not found.

The register for the Chalcolithic period in the relatively small area of Ludogorie includes: workshops for primary and secondary treatment in settlements (Chakmaka, Kamenovo), workshops for pre-treatment near deposits but also close to settlements (Ravno I-II and Chakmaka), and workshops for extraction and pre-treatment away from settlements (Kriva reka). Evidence for the presence of seasonal and permanent production was also found. Undoubtedly one of the reasons for such diversity is the search for the best raw material for the macro lamellar industry.

The Shkorpil brothers described the specific sequence of flint processing in a threshing-sledge workshop at Kriva reka in the late nineteenth century. There is some conflict in the descriptions given by these authors in 1892 and 1898 (Shkorpil and Shkorpil 1892, 1898). The first says that workers carried flint nodules in the village where they pursued the whole process of cleavage. The second (1898) suggests that initial processing is done at the mine site. *"Bad lumps were left, and good were carried to the village, where they would break them. The worker would tie leather to his hand first. Underneath he put the buffalo leather… then he would take a nodule and split it with two iron (not steel) hack-hammers"*.

The sequence of operations is very similar to the description of modern experimenters as well as the alleged method of pre-treatment during the Chalcolithic period recovered from archaeological data. There are still many gaps in our current knowledge leaving room for numerous assumptions and hypotheses.

The complex systems of production involving at least three different types of workshops was probably bound by a no less complex system of distribution of finished products and required long training. This is a sign of highly developed flint production, economy and economic relations during the Chalcolithic period in this part of Europe.

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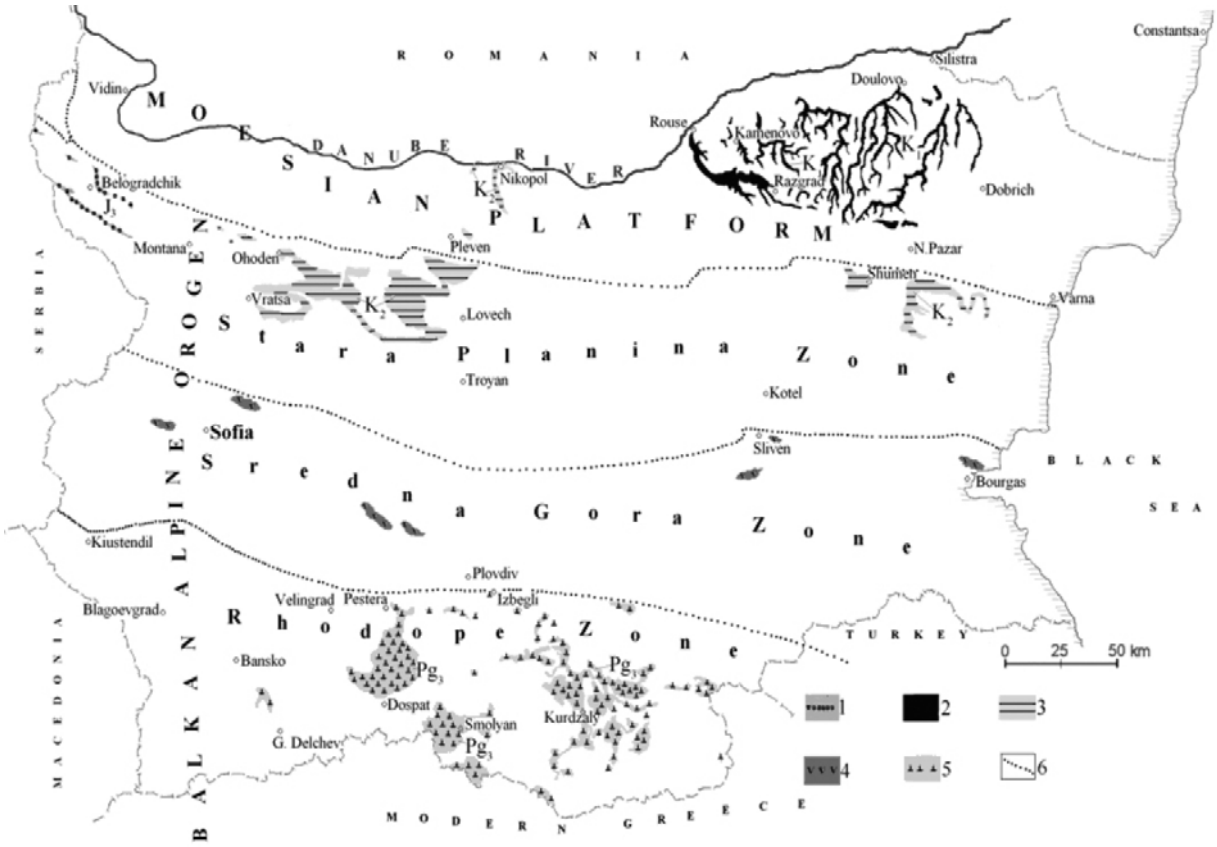

1 - Upper Jurassic limestones (Oxfordian age) with siliceous concretions (J_3^{ox}) - Hemus flint; 2 - Low Cretaceous (Aptian age) limestones with siliceous concretions (K_1^a) - Luda Gora flint (Dobrudzha flint); 3 - Upper Cretaceous chalk and chalk-like limestones (Campanian and Maastrictian ages) with siliceous concretions (K_2^{cp-m}) - Moesia flint; 4 - Upper Cretaceous volcanogenous rocks (Coniacian, Santonian and Campanian ages) in Sredna Gora Zone (K_2^{Cn-Cp}) - Sredna Gora atypical flint; 5 - Chalcedony veins in Oligocene volcanogenous rocks in Rhodope Zone (Pg_3) - Rhodope atypical flint ; 6 - boundary between tectonic zones.

Figure 1. Geological map of the main types of flint-born rocks in Bulgaria (after Gurova and Nachev 2008: 32, fig. 5).

Figure 2. Flint deposits in northeast Bulgaria exploited during the Chalcolithic.

Figure 3. Flint deposit at Tetovo, region Ruse, northwest of Kamenovo, shallow surface layer of flint.

Figure 4. Flint deposit at Chakmaka, region Isperih, flint layers.

Figure 5. Flint deposit Chakmaka region Isperih, debris.

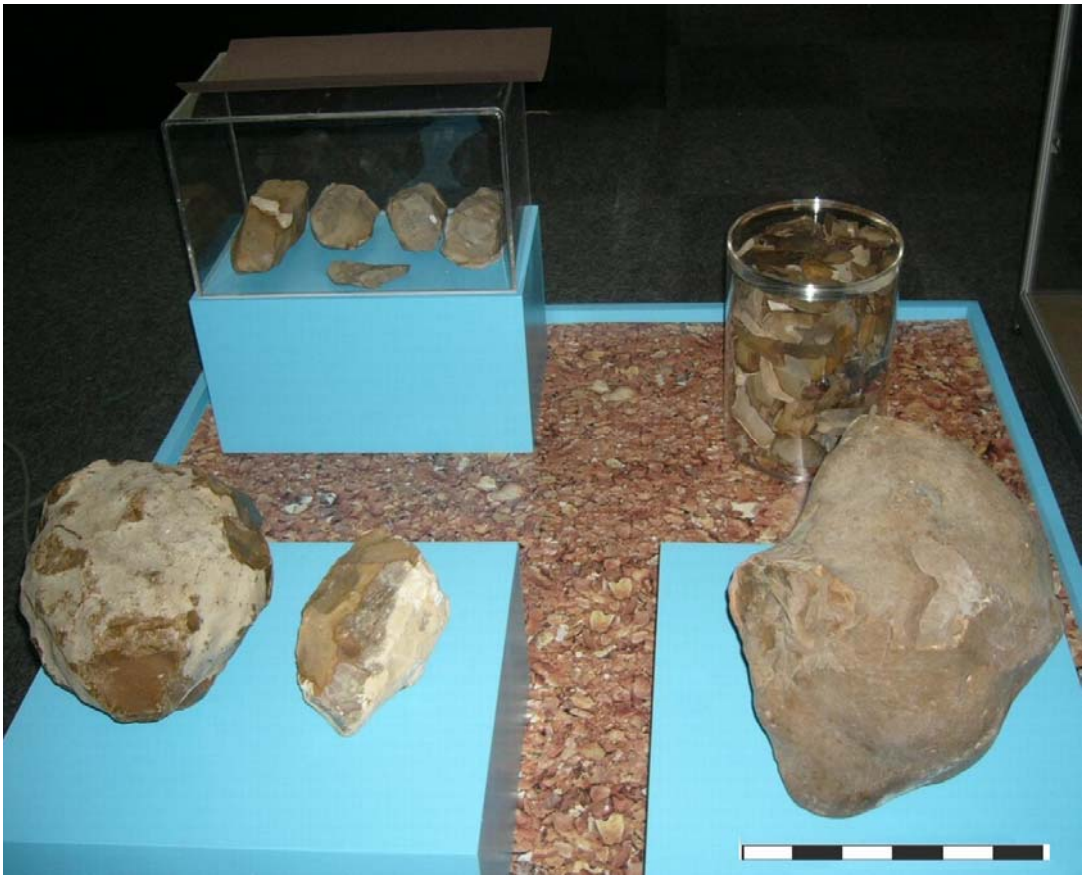

Figure 6. Pre-nucleus from the settlement Chakmaka (left) and large nodule from the settlement Kamenovo (right).

A LATE CHALCOLITHIC FLINT ASSEMBLAGE FROM THE SITE OF KOSHARNA, RUSSE DISTRICT

Maria GUROVA

Abstract: *The site of Kosharna belongs to the Kodžadermen-Gumelniţa-Karanovo VI cultural complex, which belongs to the Late Chalcolithic. The flint assemblage is significant for the final stage of the Chalcolithic period in NE Bulgaria both in terms of raw material evidence and techno-typological features. High quality microcrystalline flints from the Ludogorie region predominate - honey/brownish in colour with very compact homogeneous structure and texture, and excellent knapping properties. Technologically, two main debitage techniques for blade manufacture are attested: indirect percussion by punch and more precise pressure from a standing position. The flint assemblage studied comprises 607 artefacts and provides no opportunity for reconstruction of the 'chaîne opératoire': there are 247 typological tools, 324 debitage pieces - 273 blades, 30 flakes and 21 undetermined fragments (debris), 10 cores, and 26 'divers'. The typological spectrum is characterized by a predominance of endscrapers on massive blades, and various kinds of retouched and truncated blades. Reused and strongly transformed cores are recorded - some specimens re-sharpened as axes, and others reused as hammerstones. Several categories of artefacts show traces of use and a broad range of worked materials is attested: cereals and other plants, and secondary animal products such as hides and bones. Reutilization of sickle inserts as hide scrapers is attested, as well as the resharpening of sickle inserts into splintered pieces.*

Keywords: *Late Chalcolithic; Ludogorie raw material; flint assemblages; techno-typological description; use-wear analysis.*

Introduction

The tell settlement of Kosharna has been excavated by D. Chernakov (Russe Museum) since 2007. Four trenches have been opened, with a combined surface area of c. 80 m^2 (Chernakov and Gurova 2008, 2009, 2010). The cultural affiliation of the site (based on relative chronology of the material cultures remains - mainly pottery) is defined as belonging to the Kodžadermen-Gumelniţa-Karanovo VI cultural complex, which is referred to the Late Chalcolithic over a wide area of the Balkans - Thrace, NE Bulgaria, and SE Romania.

The rich and representative flint assemblage from the site of Kosharna is a good example of the Late Chalcolithic techno-complex, which resulted in various technological innovations and substantial craft specialization. It is well known that the flint assemblages are an inherent part of the technological novelties the development of which reaches a peak in sophistication and variety of knapping techniques during that period. The most convincing manifestation of the high technological skill is the super-blades (>25 cm), found among the grave-goods from the Varna and Durankulak (Varna phase) cemeteries, as well as a small series of such blades in settlements like Goliamo Delchevo, Sava and Smiadovo (Gurova 2010; Manolakakis 2002, 2005). Outside the mortuary domain, the Late Chalcolithic assemblages are interesting primarily for their typological uniformity/diversity and functional connotations, being strongly influenced both by high quality raw material availability and procurement/exchange mechanisms.

For the past decade the present author has been engaged in studying flint assemblages from numerous and interesting settlements with Chalcolithic strata (figure 1). Among the previously studied assemblages, those from tells Karanovo and Drama Merdjumekia[1] are of particular interest: the first because of the possibility of studying in diachronic perspective the flint material of an entire site sequence (from the Early Neolithic to the Bronze Age); the second because of its richness and variety (Gurova 2004, 2005). Recently, new excavations (mostly rescue projects) have produced some very interesting flint assemblages, a significant part of which is being studied by the author, and a preliminary general article is forthcoming (Gurova in press). From this perspective any 'new site' material could supplement (either confirming or changing) the picture and thus affect our interpretations of the Chalcolithic flint industry.

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 179-195.

Chronological framework

There are no ^{14}C dates from the Kosharna site. For that reason a contextual chronological framework of the Chalcolithic in Bulgaria will be offered so that the site can be appreciated in its broader chronological context.

In Bulgarian archaeology it is still very common practice to interpret sites within a relative chronological framework, referring archaeological phenomena to different cultures or to some phase/period of the Chalcolithic. The chronological framework presented below summarizes the currently accepted divisions, but in light of the results of AMS ^{14}C dating of the Varna cemetery (also shown) it is obvious that the concepts surrounding the end of the Chalcolithic require serious reconsideration:

- Chalcolithic period in Bulgaria - V millennium BC (according to Todorova 1986: 27, 38-9)
- Chalcolithic (in general with more recent precisions):

Early - 4900/4850 - 4600/4550;

Middle - 4600/4550 - 4500/4400;

Late - 4500/4400 - 4100/3800 cal BC. (according to Boyadžiev 1995: 179).

- Late Chalcolithic in the Durankulak sequence:

Varna I 4550/4500-4450/4400;

Varna II-III 4450/4400-4250/4150 cal BC. (according to Boyadžiev 2002: 67).

The new AMS dates from the Varna cemetery suggest an overall span of cemetery use of 83-178 years: from ~ 4560 to ~ 4450 cal BC. *"This is a period coeval with the Middle Copper Age on other sites and in other regions, as defined by Boyadzhiev… The Varna dates advance by one or two centuries the beginning of the Late Copper Age in the Black Sea zone"* (Higham *et al.* 2007: 652).

Raw material availability and supply

According to the geological studies of Ch. Nachev, the best quality flint in Bulgaria (among four distinct geological horizons), which was extensively used in prehistoric times, is located in the Ludogorie area, hosted in Lower Cretaceous (Aptian) limestones. It is known in the literature as Dobrudzanski flint (Nachev 2009; Nachev and Kanchev 1984). The Aptian flint-rich limestones are the source for different types of flint-rich secondary (placer) deposits. The most important of them are eluvium-proluvium deposits, where angular pieces of flint are hosted in soft sandy-carbonated masses. Examples occur at Tetovo, Kamenovo, Ravno, Chukata (near Razgrad), and other localities. Other placer deposits in this region are of palaeoalluvial type, as in the Drianovets locality. The Aptian flint has an extensive geographical distribution in northeast Bulgaria, to the north of Novi Pazar and between the meridians of Rouse and Dobrich. The main outcrops are near Vetovo, Koubrat, Razgrad, Isperih, and Novi Pazar. Two microscopic types of Ludogorie flint can be distinguished.

The first, named Ludogorie flint - Type Ravno, occurs in the northwest part of the area - along the Topchii River, near Topchii, Kamenovo, Ravno, Koubrat, Belovets, Tetovo, and Chereshovo. It is characterized by micro- to crypto-crystalline groundmass and single sponge spiculae (Gurova and Nachev 2008: 33-4; Nachev 2009: 10-11).

The excellent petrographic properties of the Ludogorie flint of Ravno type (large concretions of approximately ellipsoidal shape and microscopic homogeneity) determined its use for general large-scale domestic needs in the numerous sites of the Kodžadermen-Gumelniţa-Karanovo VI cultural complex. Only this type of raw material proved suitable for meeting the most sophisticated technical need - production of extra-long blades for ritual purposes in the mortuary domain, particularly in north-eastern Bulgaria.

The Kosharna site possesses a significant advantage in being situated on the periphery of the Ludogorie, slightly northwest of several of the richest Ravno type flint deposits: Topchii, Kamenovo, Ravno, Koubrat, Belovets, Tetovo, and Chereshovo. The distance between the site and the outcrops varies between 10 and 60 km - a distance that could define the deposits as local or meso-local, respectively - completely accessible in terms of the regional network mechanisms of raw material procurement and distribution (figure 1). The chipped stone assemblage from Kosharna is characterized mainly by honey-brown, and more rarely beige-greyish, flint with sporadic linear or spotty inclusions (figure 5).

Flint assemblage: general structure and techno-typological description

The flint assemblage in general comes from 8 squares, including a pit, a hoard found in a jar[2] and 5 artefacts from the recently discovered cemetery of the tell settlement. The whole flint collection shows coherency and easily recognizable characteristics that are typical of the final stage of

the Chalcolithic, both in terms of raw material evidence and techno-typological features. For this reason, in this paper only summary results are presented, leaving detailed analytical descriptions and interpretative issues for the forthcoming exhaustive publication of the site.

The flint collection was subjected to techno-typological and functional analyses and interpretation. The use-wear analysis was undertaken with microscopes MBS 10 (x 100) and Metam P1 (for precisions with x 200). The microphotographs were taken using the technical equipment at NAIM - digital microscope Kayence VHX-100k, Japan, with magnification between x75 and x150.

The collection studied comprises 607 artefacts assigned to the following techno-typological groups:

Cores - 10
Debitage - 324
- blades - 273;
- flakes - 30;
- indeterminate fragments (debris) - 21.

Divers - 26
Tools - 247

The general structure of the assemblage shows a quite disproportionate ratio between different flint categories with a strong predominance of tools and blades (Diagram 1).

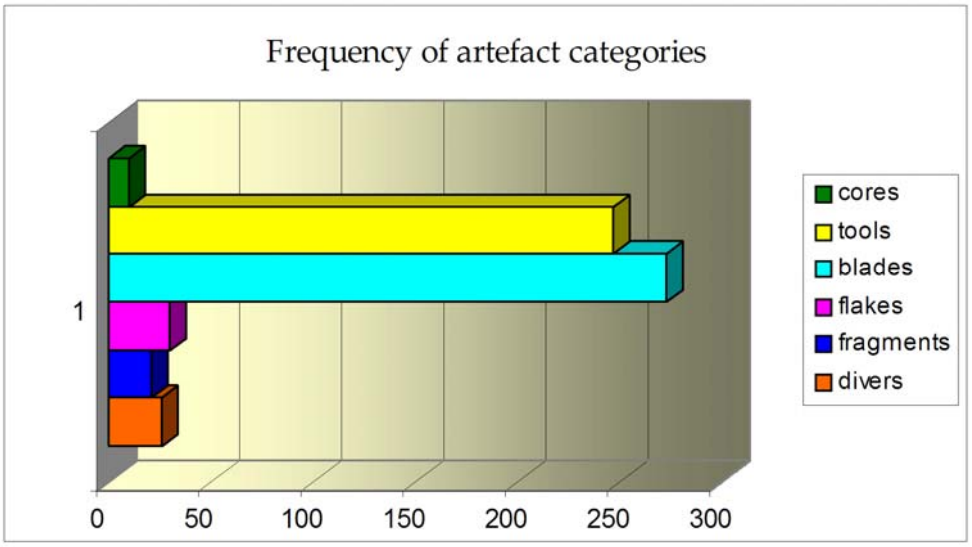

Diagram 1.

The *cores* from the assemblages are too few and too much subsequently transformed to be related to the manufacturing of the blades from the site. There are 6 complete single platform cores (5 for blades and one for flakes) and 4 fragmented specimens. All blade cores (and 2 fragmented items) are reutilized as hammerstones (Figs. 2.2; 3.2; 9.6). The state of preservation of the cores does not allow an adequate reconstruction of their preparation, maintenance, and exploitation. They are all reduced in length owing to their primary (and most likely long term) use for blade removal and secondary use as hammerstones. There are virtually no well-preserved big prismatic cores like the example found near Topcii and published by L. Manolakakis (Manolakakis 2005: Pl. 58).

The *flakes* (30 ex.), are variable in shape and dimensions but as a whole 'amorphous' flakes predominate with metrical parameters mainly between 1.5 and 4 cm with some specimens bigger than 6 cm. The butts are mainly plain, prepared with a single blow, with isolated examples of broken and linear butts. Cortical flakes and other core maintenance products are very few.

The group of *indeterminate fragments* (21 ex.) comprises pieces without clear association with any debitage category as well as debris from artefact manufacturing.

Blades (273 ex.) are the most numerous group from the site. They all have been removed from single platform cores. There are 9 intact blades and the ratio of fragments is as follows: proximal - 107, mesial - 138, distal - 19. The dimensions vary as follows: length 2.5-10.7 cm; width 0.9-3.1 cm, and thickness 0.1-1.5 cm (Figs. 5.2; 6.1). Trapezoidal cross-sections predominate significantly over triangular. The butts are mainly plain (made with single blow), with a recognizable point of percussion, indicating the use of indirect percussion/punch technique (Figure 9.5). Some example of

very regular and elegant blades with small compact and almost punctiform butts suggest pressure technique using a long pressure stick (Figure 7.8, 9). In the case of the latest blades the application of direct percussion with a soft hammerstone is not excluded but the scarcity of this series doesn't allow more precise distinction between these two techniques of blade removal. Single blades have broken or linear butts.

The *divers* group 26 artefacts: flint axes with bifacial preparation as well as axes made by resharpened cores (Figure 3.2); concretions and circular nodules used as grinding/smoothing tools (Figure 4); hammerstones on flint concretions, certain atypical artefacts, etc.

The typological tools are a very representative category of the entire flint assemblage. The typological subdivision is summarized in table 1 and diagram 2.

category	total
Endscrapers	**69**
Burins	**45**
Retouched blades	**57**
Truncated blades	**34**
Splintered pieces	8
Retouched flakes	10
Combined tools	5
Perforator	1
Notches	4
Backed pieces	1
Tool fragments	13
total	**247**

Table 1. Typological repertoire of the flint tools

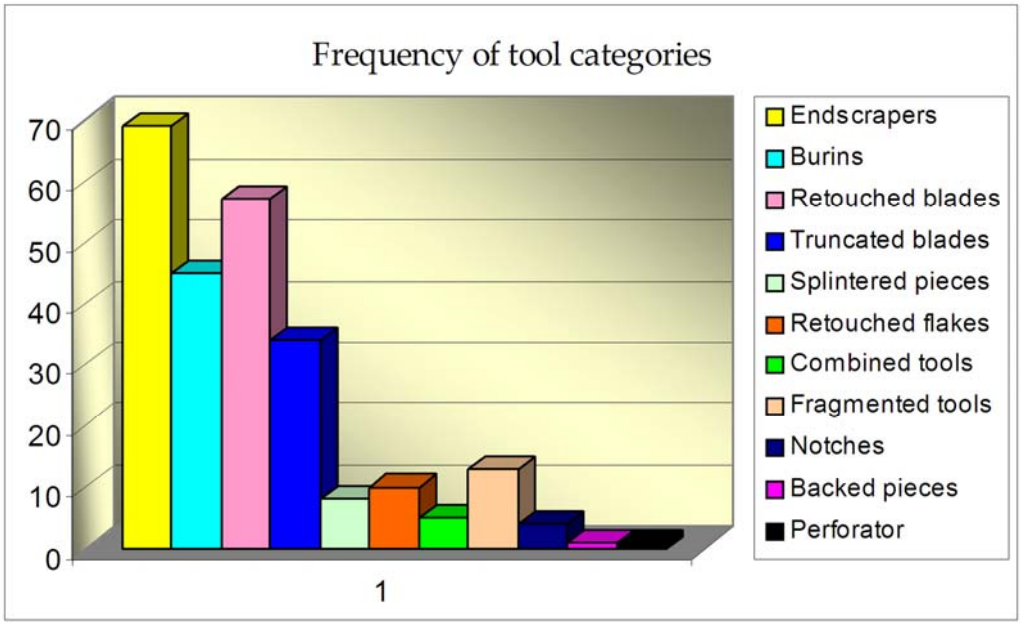

Diagram 2.

The most numerous category are the endscrapers, made exclusively on blades; with a slightly convex front formed by semi-abrupt lamellar retouch (Figs. 8.2; 9.2). Most of the endscrapers were manufactured on broken blades (Figure 5.1), but incidentally one of the longest blades in the assemblages (13 cm) as well as the widest one (3.7 cm) are in fact endscrapers.

Second in importance are retouched blades, which vary significantly in blank dimensions as well as in the retouching. There is almost equal ratio between blades with unilateral and bilateral retouch. There is virtually no high and step retouching; the blades edges are modified by marginal dis-/continuous retouch which in some cases is difficult to be distinguish from retouch resulting of utilisation (Figure 8.8). The longest blade of the assemblage (13, 3 cm length) has such an irregular ambiguous retouch.

The burins (all made on blades) are well represented with three variations: dihedral, angled on a break, and on truncations (Figure 8.4, 6).

The fourth most numerous tools category consists of truncated blades (Figs. 8.1, 3, 5, 7; 9.3). Truncations are straight or oblique with very few cases of truncation on the basal part of the blank (Figure 8.7).

Among the less frequent groups, retouched flakes and splintered pieces are present, especially the latter which becomes a kind of marker for Chalcolithic industries, where exhaustive use of tools often results in their resharpening. Such resharpened tools are splintered pieces whose transformation does not necessarily imply anticipatory decision-making. In some cases they were obtained accidentally.

Combined tools, notched pieces, backed tools, and perforators are present but in small numbers.

Functional analysis

The use-wear analysis undertaken permitted the identification of 149 artefacts with microwear traces of utilisation. The summary results are presented in table 2 and diagram 3. A broad range of worked materials is attested - table 3 and diagram 4. As is evident the number of used tools is slightly greater than the number of unretouched blades with signs of use. There are virtually no other debitage pieces with use-wear, except one flake with traces of utilisation. It is noticeable that endscrapers and truncations were rarely used for hide processing using their retouched fronts; quite often they have been used as sickle inserts (Figure 8.1, 3 and 3a). The burins do not show any use-wear at the burin bits; in cases of utilisation the lateral edges are concerned.spall removal, but if there is utilisation attested the lateral edges have been related with (Figure 8.6). Few tools posses traces of wood, bone and minerals treatment (Figure 9.4 and 4a).

The unretouched blades are, as usual, the most polyfunctional category: they possess traces of predominantly cutting operations related to plant processing (Figs. 7.4, 10 and 4a; 9.1 and 1a) as well as meat/hide (butchering) (Figure 7.6, 8, 9) and hide processing (Figure 7.1, 7). Traditionally, blades have been used for harvesting cereals as sickle inserts with diagonal polishes, indicating oblique insertions in sickles of Karanovo type (Gurova in press) (Figure 7.2 and 2a). It is noteworthy that few of the abundant endscrapers show evidence of hide working, while the lateral edges of simple blades were very often used for hide scraping (Figure 7.1 and 1a); another interesting observation is that some sickle inserts were subsequently re-used in hide scrapers without any resharpening (Figure 7.5 and 5a).

categories	total
tools	76
blades	72
flakes	1
total	**149**

Table 2. Used artefacts by category

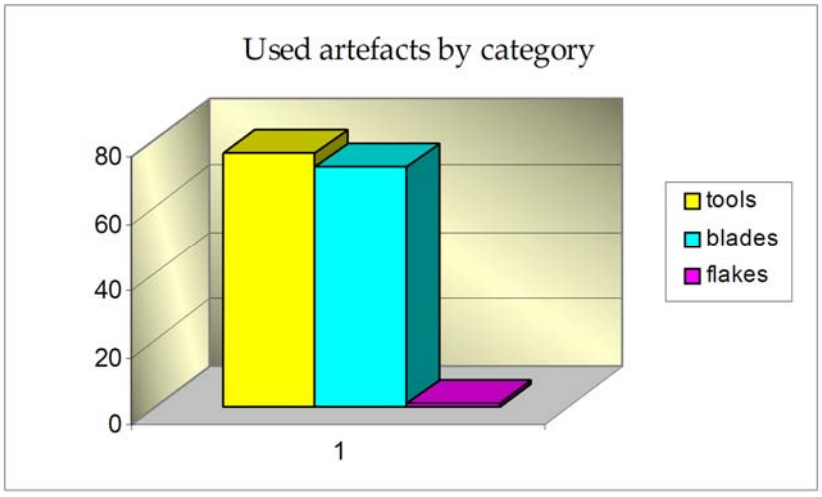

Diagram 3

Worked materials	total
Cereals (sickle inserts)	**42**
Plants/reeds	**17**
Hide	**48**
Meat/hide	6
Wood	8
Bone	11
Si material/mineral	3
Combined tool	3
Undetermined	11
total	**149**

Table 3. Frequency of worked materials

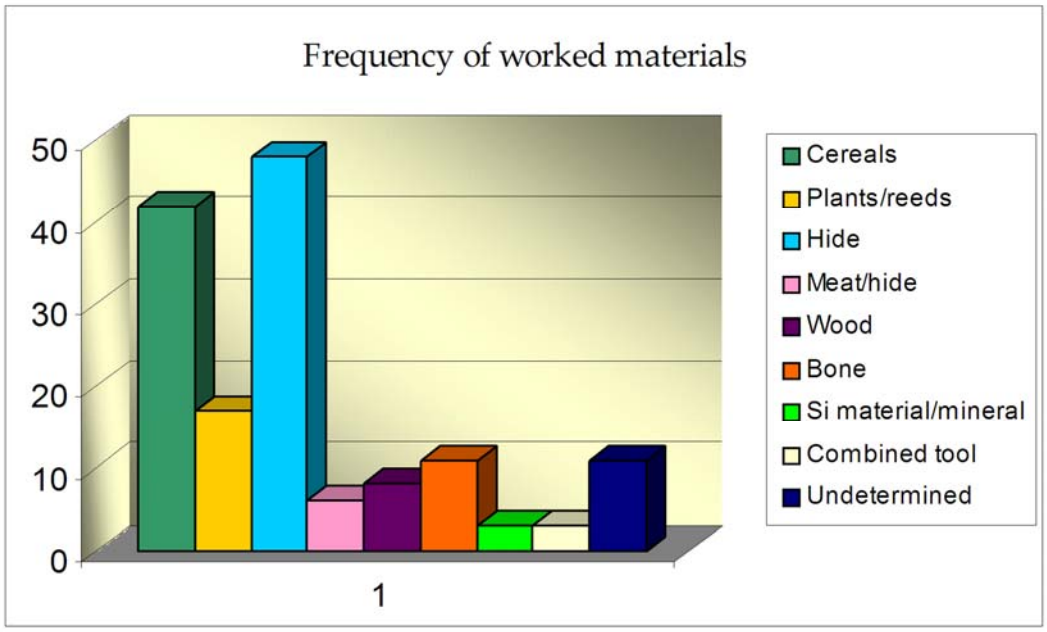

Diagram 4.

Apart from the artefacts presented statistically and described above, there are about a dozen flint pieces that were used as hammerstones and polishers. The first category comprises 5 complete and 2 fragmented cores (Figs. 2.2; 3.1); there are also 2 axes (Figure 2.1), and one broken flint nodule with traces of use as a hammerstone. There are 2 polishers - elongated and rounded flint nodules with smooth working areas and abundant striations resulting from abrasion/friction against some hard material - minerals, pottery (?) (Figure 4).

Concluding remarks

Several observations on the assemblage briefly described above merit emphasis:

- A very extensive regional distribution of high quality Ludogorie flint (Ravno type) is attested among the assemblage, suggesting that important factors for the repertoire of the flint assemblages were raw material availability, the procurement strategy adopted, and the existing exchange network. These conclusions are largely theoretical, because of the lack of evidence for workshop areas for initial flint artefacts production;

- The scarcity of cores, trimming blades (only 3) and cortical pieces does not allow any relevant diacritic reconstruction of the *'chaîne opératoire'*. Seven of the 10 recognizable cores submitted to a reduction sequence are reused and extensively transformed - specimens resharpened as axes and others reutilized as stone hammers.

- Technologically, based on the blades' metrical parameters and butt morphology, two main debitage techniques are represented: indirect percussion and more sophisticated pressure by standing position/or eventually direct percussion by soft stone hammer (difficult to prove!). In fact, according to J. Pelegrin the most sophisticated lever pressure (attested at the Late Chalcolithic cemetery of

Varna) could eventually result from a local development of standing pressure (Pelegrin 2006: 50; see also Manolakakis 2002, 2005).

- The typological spectrum is quite typical for Late Chalcolithic assemblages already studied (Gurova 2004 in press; Sirakov and Tsonev 2001) and is characterized by a predominance of endscrapers on large and regular blades and mainly blade fragments, burins (often with accidentally removed spalls), retouched and truncated blades, followed by scarce retouched flakes, splintered pieces (remains of re-sharpening and aggressive use), and some single tools including a backed piece and a perforator.

- The appearance of a hoard containing flints in domestic context. During the 2009 season an interesting hoard was discovered, comprising 23 flint artefacts, shells, *Spondylus* fragments, etc. (Figure 6.2). This find will be studied and published separately in detail in order to be compared with the exhaustively studied and published hoard from the Tell of Omurtag in NE Bulgaria (Gaydarska *et al*. 2004).

- The ratio of hide to cereal processing is rather surprising, but nevertheless there is a significant quantity of sickle inserts: evidence for agricultural practices and sickles, a tradition dating back to the very early Neolithic.

Hopefully, the continuing excavations will produce more assemblages throwing further light on the problem of typological *versus* functional determination in general, as well as on the rationale for the manufacture of burins and splintered pieces which so far are without a reliable interpretation from functional point of view.

Acknowledgements

I would like to thank Pavel Mirea for the kind invitation to attend this interesting conference. Many thanks also to Professor Clive Bonsall (Edinburgh University) for his reading of the first draft of my paper, and for suggesting improvements to the English.

Notes

[1.] The material from this site unfortunately still remains unpublished.

[2.] This hoard of 23 flint artefacts and several *Spondylus* shell fragments will be the subject of a more detailed publication.

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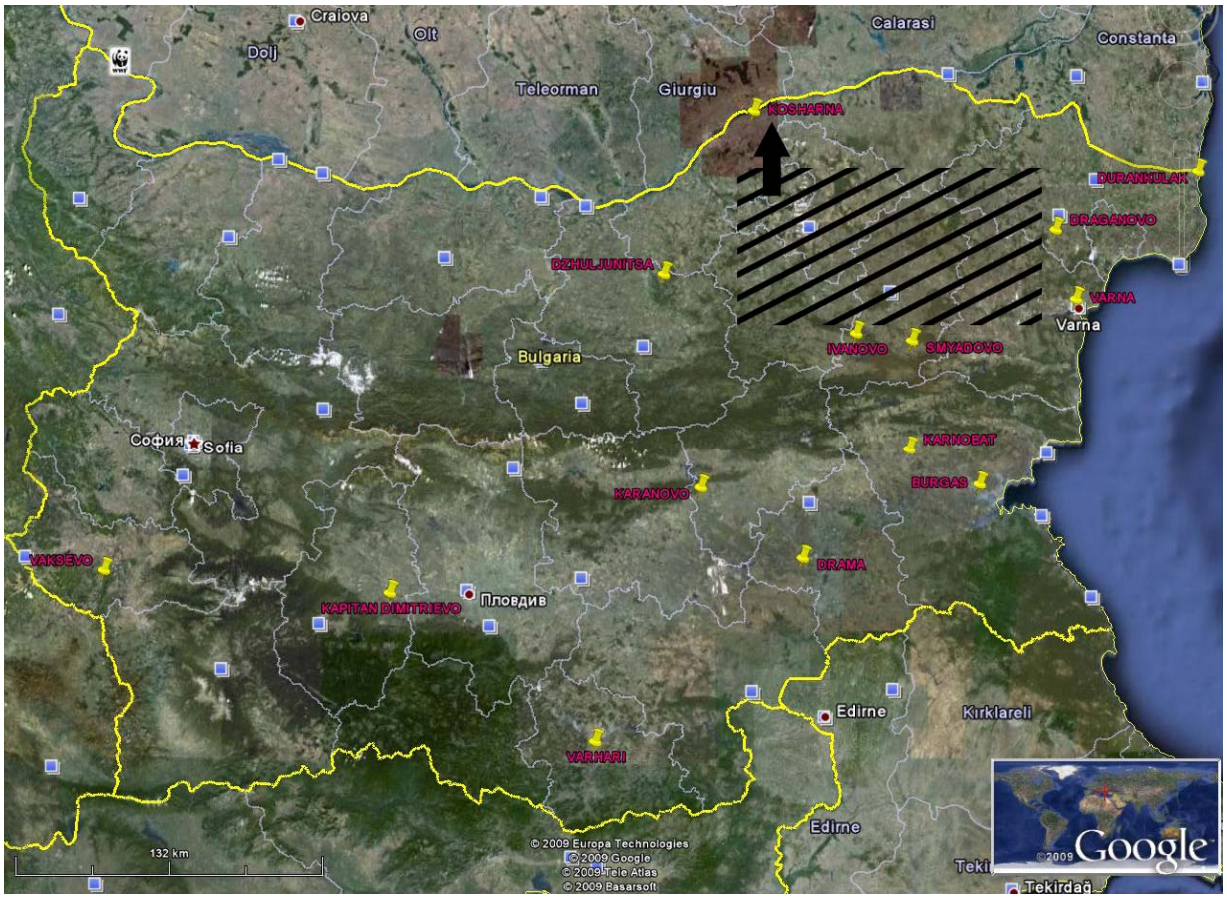

Figure 1. Map with locations of Chalcolithic settlements studied by the author. The black arrow points to the site of Kosharna, and the hatched zone represents the Ludogorie region with raw material outcrops.

Figure 2. 1 - Unfinished bifacial axe, reused as hammer stone; 2 - single platform core reused as hammerstone (photos - M. Gurova).

Figure 3. Transformed/resharpened and reused cores: 1 - core reused as hammerstone; 2 - two cores modified as axes (photos - M. Gurova).

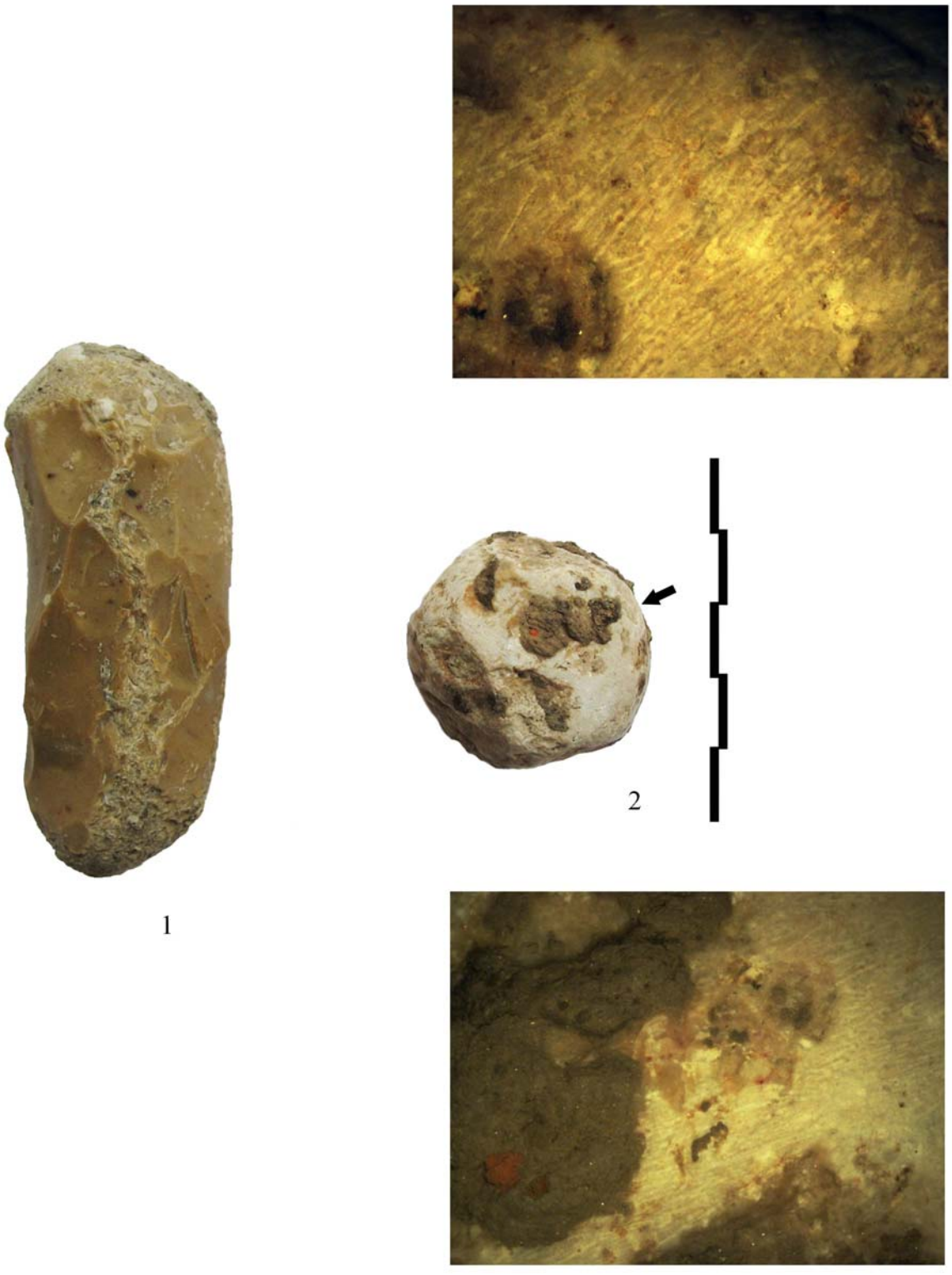

Figure 4. Flint nodules used as polishers/smoothing tools for hard abrasive material (pottery?). Microphotographs (x 25) of the working parts of tool no. 2 (photos - M. Gurova).

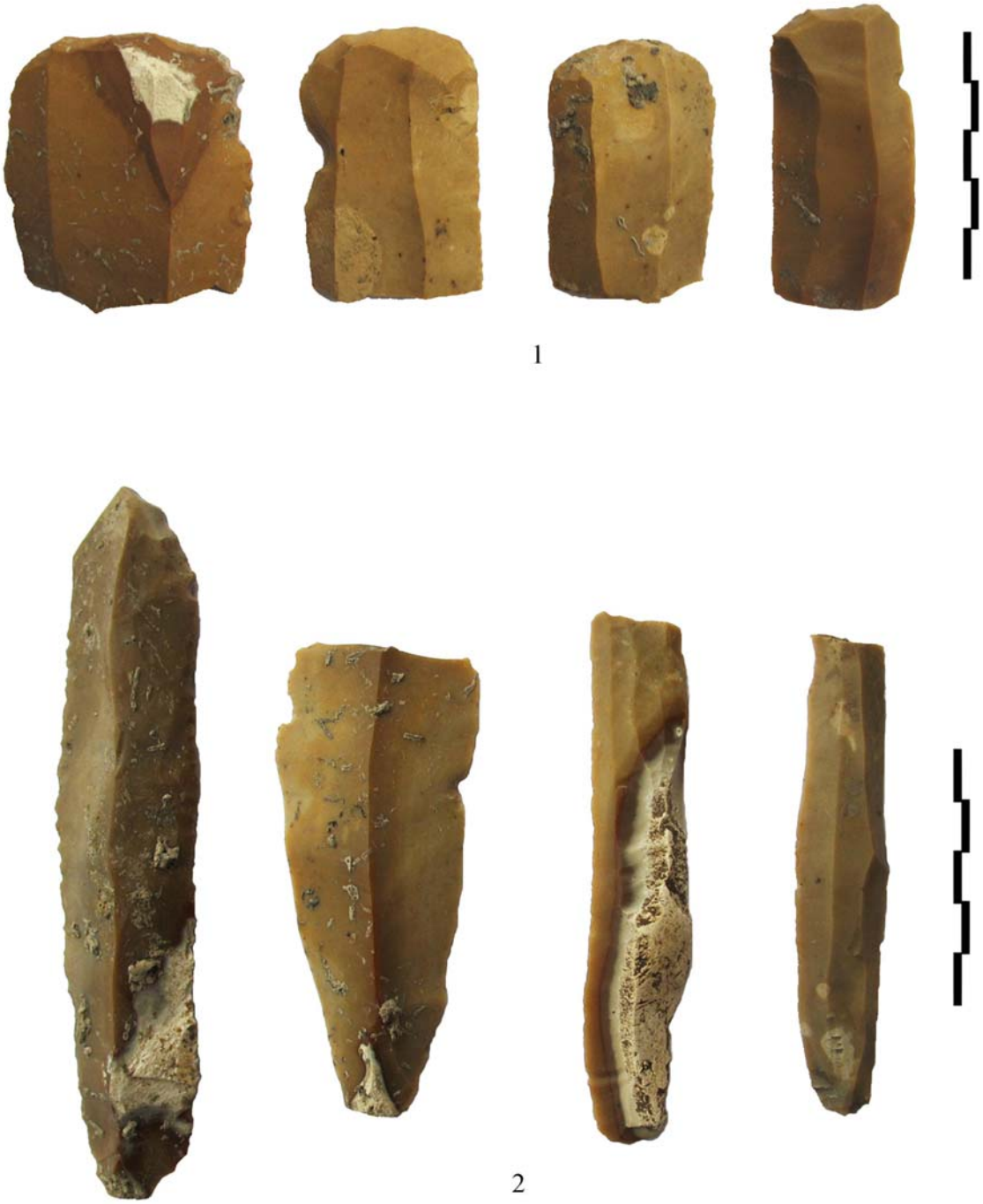

Figure 5. Raw material varieties and morpho-typological grouping: 1 - endscrapers on fragmented blades; 2 - retouched blade (extreme left) and virgin blades (photos - M. Gurova).

Figure 6. Blades with different morphometrical parameters (no. 2 is a crested blade) - 1; blades from the 'hoard' - 2.

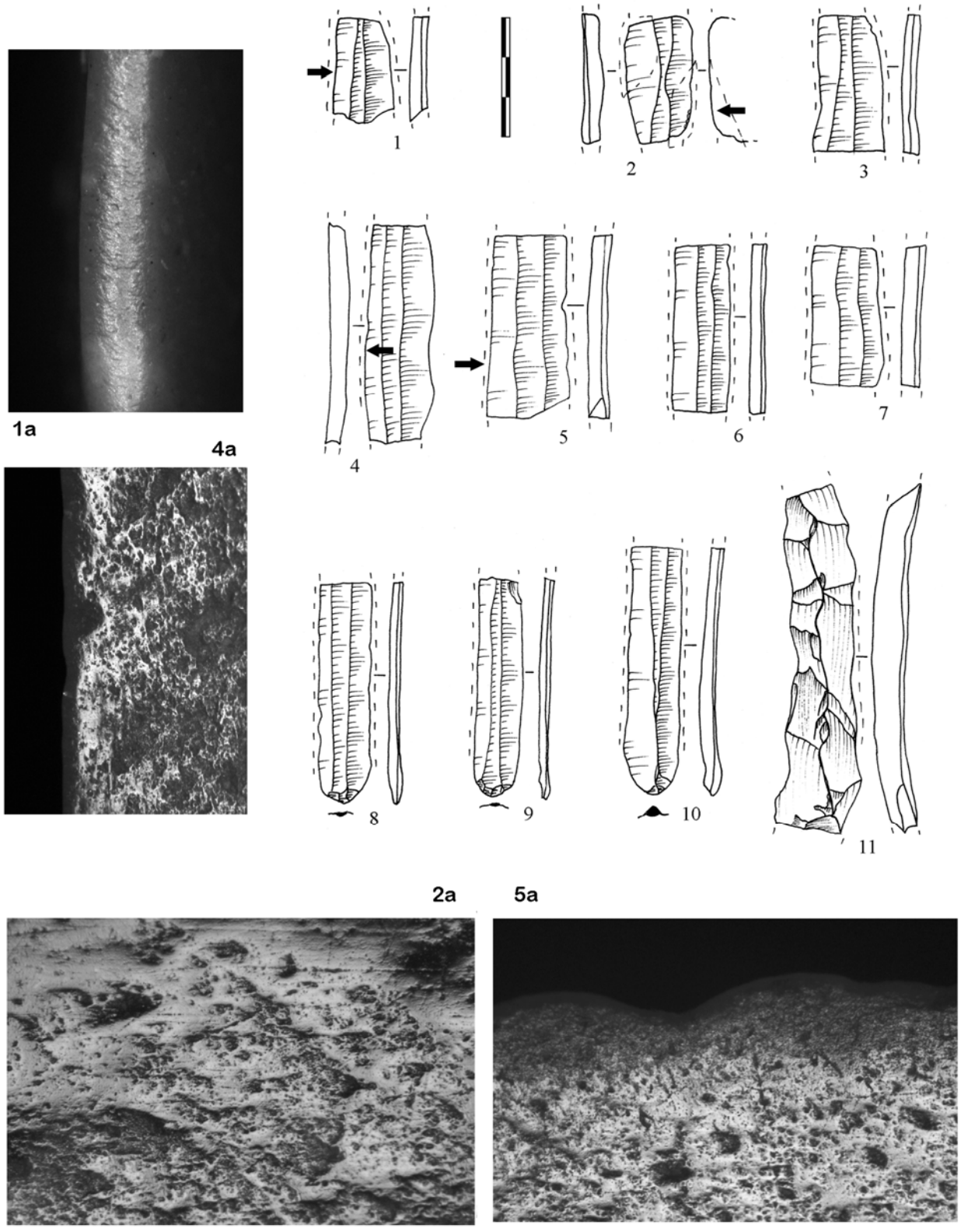

Figure 7. Unretouched blades with utilization traces. The arrows mark the points of taking microphotographs: 1a - scraping hide (x 100); 2a - cereal polish of sickle insert (x 150); 4a - silica-rich plant (reed) processing (x100); 5a - cereal polish of sickle insert reused for hide scraping (x 150) (drawings and photos - M. Gurova).

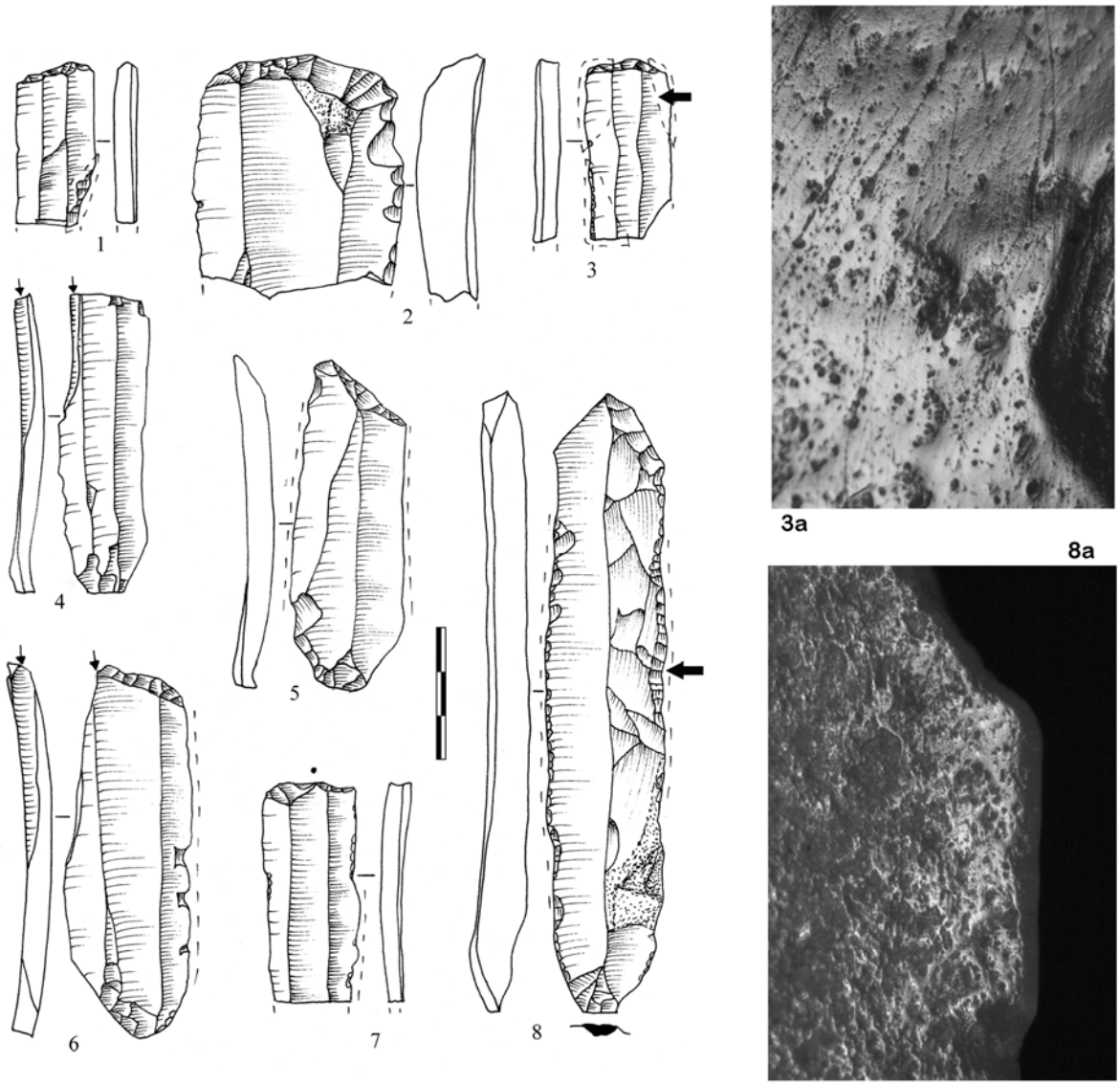

Figure 8. Typological tools: endscraper - 2; truncations - 1, 3, 5, 7; burins - 4 and 6; retouched blade - 8. The arrows mark the points of taking microphotographs: 3a - cereal polish of sickle insert (x 150); 8a - sawing fresh wood (drawings and photos - M. Gurova).

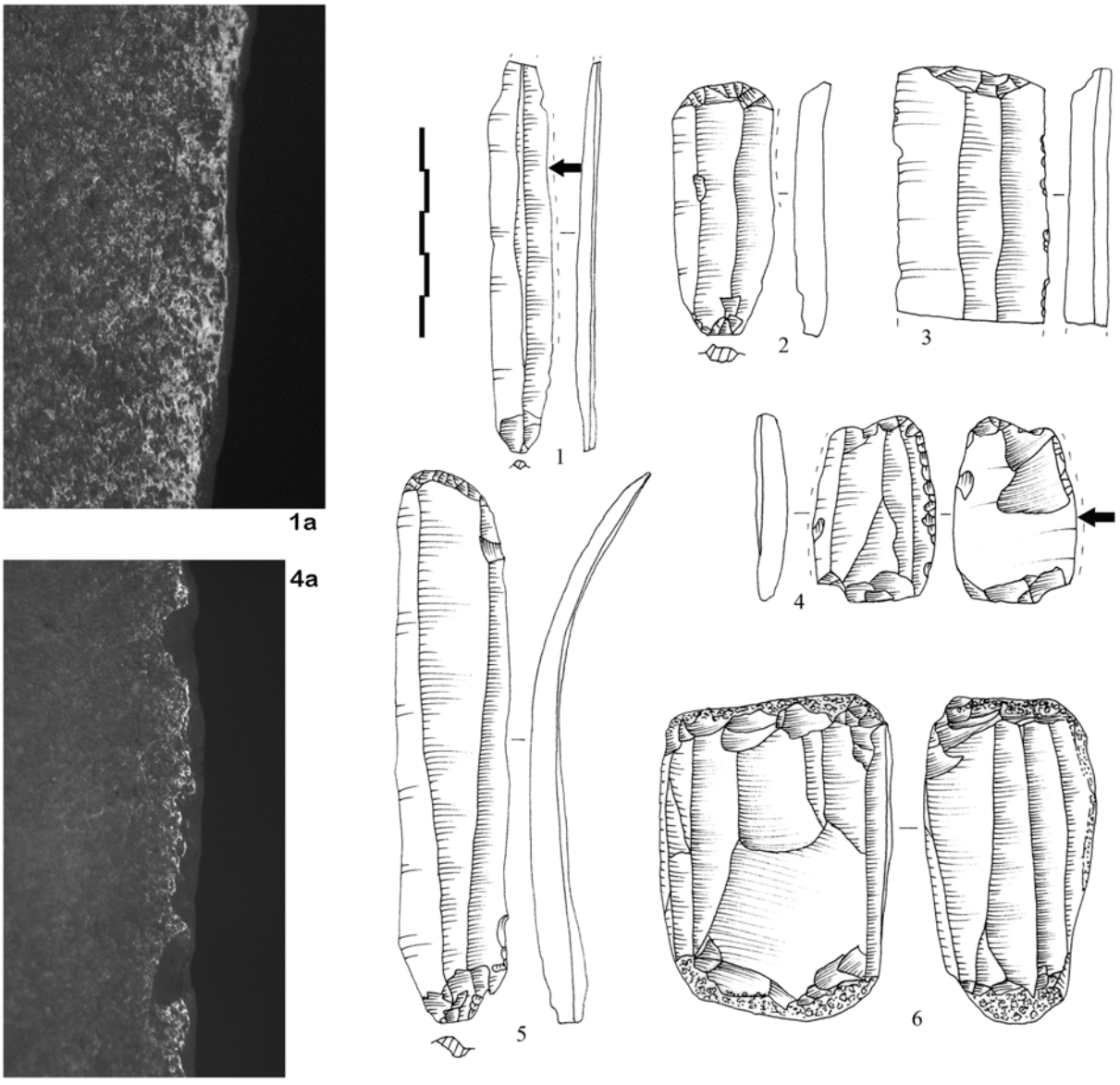

Figure 9. Unretouched blade (1), typological tools (2-5) and core (6). The arrows mark the points of taking microphotographs: 1a - cutting plants (x 100); 4a - sawing bone (drawings and photos - M. Gurova).

IV. NEW APPROACHES TO PREHISTORIC LANDSCAPE RESEARCH

TOWARDS AN ARCHAEOLOGY OF PIT - HUTS: A PROPOSITION FROM CONTEMPORARY ART

Doug BAILEY

Abstract: *The standard interpretation of Neolithic pit-huts is that they were used primarily for habitation or for the disposal of rubbish. Other, recent, work (e.g., by John Chapman) has argued that the pits were part of processes of object deposition which played important roles in the social constructions of relationships and identities. The present paper pushes the discussion in a different direction and asks that we do not focus our attention on the function of the pits and the possible meanings of their contents. The paper challenges us to consider Neolithic pit-huts in terms of the main processes by which pits were created: cutting, dissecting, breaking the surface of the land. To make this argument, examples are drawn from the land art of the late 1960s and the 1970s.*

Keywords: *pit-huts; architecture; sedentism; contemporary art; land art; Michael Heizer; archaeological interpretation.*

Archaeologists have long accepted that early Neolithic people lived in simple pit-huts made by digging a broad hole into the ground (perhaps a meter deep and two or three meters across) and then using wood from saplings and young trees to form a roof which was covered with thatch or hides. These were the first farmers of much of temperate Europe; they grew wheat and barley and domesticated sheep and goats, cattle and pig. They made pottery vessels and figurines.

The standard interpretation runs that these small communities of pit-dwelling, pottery-making, animal-breeding, plant cultivators, developed into long-lasting villages which consisted of more substantial and larger buildings of many-roomed structures built on top of the ground surface. Indeed, while some qualifications have been made to this general architectural interpretation of the settling down of early agricultural Europe, the main story remains as it was proposed in the first quarter of the twentieth century: the first early agricultural peoples lived in semi-subterranean pit-huts.

The qualifications have been for the most part minor, for example suggestions (and proof through excavation and dating) that people exploited this type of pit-based, architectural arrangement over much longer periods of time. Thus, it is now clear that the supposedly earlier pit-huts didn't in fact go out of use over time (that is to say to be replaced completely by the more substantial surface-level houses during the later stages of the Neolithic period). In fact, pit-houses have a very long history and are evident not only throughout the European Neolithic but also in many other times and places. Indeed, archaeologists of Medieval Europe spend a lot of their time digging Medieval pit-houses. The larger reality is that it is difficult to find prehistoric cultures that do not have some variant of pit-structures; the archaeology of North America is no exception. The other qualification is the work of John Chapman who has argued that pits (their digging and filling with objects) played a significant role in the creation of personhood and of enchained relations (Chapman 2000).

As someone interested in prehistoric architecture, I had studied the, larger, more substantial, surface-level buildings of later Neolithic European villages and had paid little attention to the smaller, more ephemeral pit-huts. I had assumed (as it turned out quite naively) that these early emergent forms of architecture were nothing more than that: simple attempts to provide shelter for early, perhaps semi-sedentary or semi-mobile, agricultural communities. It was not until a friend and colleague of mine, John Chapman, 'called me out' on this during a conference or in a review of a book, that I stopped to think again.

The questions I want to address in this article are these. What if we step away from the standard archaeological approach to pit-huts (by standard I include my own earlier ones, existing ones within archaeology, and the provocative work of Chapman)? What if we think about them not in terms

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 197-201.

of shelter, wheat and barley, pottery makers, or animal breeders? What if we look at them from a completely different perspective? What if we try to think of pit-huts in terms of the processes with which people created them and the effects that those processes had on the people who dug these structures, used them, perhaps lived in them, buried their rubbish in them, and eventually filled them and in covered them over? In brief, my suggestion is that we think of these Neolithic pit-features not in terms of houses or architecture or even of early agricultural communities. My suggestion is that we think of them in terms of cutting, of dissection, and of breaking the surface of the ground.

The art of Gordon Matta-Clark

To follow my suggestion, I want to work through the efforts of Gordon Matta-Clark, an artist of the late 20th century (Diserens 2006; Moure 2006; Sussman 2007; Walker 2009). We could start with any one of Matta-Clark's many works. I would like to introduce him to you through a piece of work that he called *Conical Intersect* (Figure 1). In 1975, Matta-Clark created an extraordinary work in Paris. As some of you will remember, the mid-1970s witnessed major several major building projects Paris. One of these was the re-development of the Beaubourg district of the city. The development included the building of the Centre Pompidou. To build this new cultural space (and now a classic of late 20th cent. Parisian architecture) as well as new luxury apartment complexes, a vast neighborhood was knocked down, redesigned and rebuilt. Matta-Clark took the opportunity to create a piece of work in two of the buildings that were scheduled to be torn-down next to the emerging Centre Pompidou: numbers 27 and 29 Rue Beaubourg, which had been built in 1699 as the properties of an Officer of the Paris Court of Appeals and his wife (Monsieur and Madame Leiseville).

Matta-Clark's work was both simple and fantastically complex. Using hammers, chisels, and saws, Matta-Clark and a collaborator cut a large conical space through the interior of the buildings. In Matta-Clark's words, it was as if he had thrown a gigantic ball through the surfaces of the houses' insides, cutting through walls and floors and ceilings. It was as if Matta-Clark had hurled a sphere four meters in diameter, up through the houses, and as the ball ascended it twisted through plaster walls, floors, lath and plaster, and as it did so, it became smaller and smaller, so that the hole that it left behind (as it finally emerged through the attic roof) was the point of a cone.

Attached to the cone-shaped violence of cutting through the interior surfaces of the house were a series of rich contexts, proposals and provocations. For example, the view that was provided by the conical dissection up and through the houses offered a neatly triangulated perspective not only of the interiors of the two buildings, and not only the still under-construction Centre Pompidou (if one looked one way), but also (if one looked the other way) of one of the other great public monuments of Paris, the Tour Eiffel. Thus, within the space of the artistic cut (with its play on the state-determined destruction of one part of Paris' past), Matta-Clark focused additional reference on the newest declaration of modern French identity (the Centre Pompidou) as well as on another reference to the past, particularly to nineteenth century French industrial progress.

If we had more space to devote to the artist, we could look at other works in which Matta-Clark used cutting and dissection to equally great effect. We could look at *Splitting*, perhaps his best known work. Carried out in 1974, in *Splitting* Matta-Clark, literally (and physically) cut-in-half, a run-down, soon to be demolished house in northern New Jersey. Or, we could look at *Day's End*. In *Day's End* Matta-Clark occupied an abandoned pier-side warehouse on Manhattans' west side. Matta-Clark cut a huge lunate shape out of one of the ends of the pier-warehouse and a large section out of the floor. Or we could look at any of a series of other major works in which Matta-Clark worked through the practice and consequences of cutting, of dissection, and breaking continuous surfaces.

In all of these works the process of cutting engaged the visitor or the spectator at deep, multiple levels of emotion and evoked subtle, perhaps subconscious reactions. For example, Matta-Clark's cuts were dangerous. On one level they were physically dangerous to both Matta-Clark, his collaborators, and to the people who visited the work: this was not the territory for Health and Safety procedures and inspectors. It was just as easy for a visitor to fall down through a hole in a floor, or out of a gap in a second-floor wall, or into the Hudson River through the cut in the floor of a pier warehouse. At a second level, these works were dangerous to the architectural structures through which they cut: the dissections removed structurally critical elements in the buildings. Indeed, these works were not meant to last and it is not a coincidence that Matta-Clark carried them out in condemned or abandoned buildings. At a third level, these works (like so much other work created at the time) presented dangers to standard, institutional, understandings that art is a constructive process that creates tangible objects which can be curated, collected and preserved. Matta-Clark's cuts were the antithesis of this; their creations were in fact destructions and removals. These works

created by taking away and they were destined to be destroyed almost as soon as they were completed. Finally, at a fourth, and perhaps most intriguing level, Matta-Clark's cut-works were dangerous to the vary basis by which we understand our place in the world: they all forced interruptions in the otherwise continuous and normally stable surface of wall, floor and ceiling - they altered our relationships with the world and our perceptions of our attachment to it.

By thinking with Matta-Clark's cut work, we are forced to approach our archaeological work (and, in fact, our perspectives on many things) in provocatively refreshing ways. We begin to focus on surfaces and the power that the act of cutting a surface can have. We begin to feel the potential for removing part of a surface continuum. In turn we begin to understand how perspective is altered through dissection and the cutting of surface, through the interruption of what is accepted as the norm. We begin to sense the power that Matta-Clark deployed when he removed parts of surfaces, when he inverted the normal relationships between viewer and visitor to structure, floor and wall. We begin to feel that collapse and removal have consequences that work very deep below the surface of how we live and experience the world.

Much of this is summed up in Matta-Clark's concept of An-architecture. In his words, Anarchitecture is *"A response to cosmetic design / completion through removal completion through collapse / completion through emptiness*" (Matta-Clark n.d.). In Anarchitecture, Matta-Clark was forcing our attention to the gaps, voids and interruptions that affect our daily movements.

We do not have to limit ourselves to Matta-Clark and his work. Other artists, working at the same time as Matta-Clark (but also those who have worked since his death) have probed and provoked us with these same issues of cutting, surface, dissection. We could look at Michael Heizer and his negative sculptures, such as the massive *Double Negative*, created in the late 1960s at the edge of the Virgin Mesa, near Overton, Nevada (Brown 1984; Whitney 1990; Heizer 1991; Taylor 1991; Celant 1997) (Figure 2). In *Double Negative*, Heizer used dynamite, high-intensity corers, and heavy machinery to shift a quarter of a million tons of sand, stones and dirt to create a vast cut 500 meters long, 10 meters wide and 15 meters deep. Indeed, we could look at any of a range of works that Heizer created investigating the power of breaking a surface. Or we could look at the performance art of Orlan who used surgery as the method of cutting, and who used her own body as the medium in a series of overwhelming works that challenge our perceptions of identity and appearance (Ince 2000; Flammarion 2004; O'Brien 2005). All of these works, and many others besides, reach deep down into us, below our conscious surfaces to affect our understandings of ourselves, our references to others, and most fundamentally, our engagement with the physical world in which we live and think.

How does this help us to understand our Neolithic pit-huts? One answer is that it does not help at all. It tells us nothing more about how any pit-hut was used, or how it was constructed. It doesn't even help us to answer the questions that John Chapman (and I) were trying to wrestle with in our disagreements (Bailey 2000; Chapman 2000). Perhaps we are misguided in pouring over site-reports to determine whether a pit-hut from one of our Neolithic sites is really a hut, or in our attempts to reconstruct degrees of sedentism 7000 years ago. In fact, these are not the questions that I think we should be asking.

Another type of understanding may follow if we look at the work of people such as Matta-Clark, Heizer, Orlan, and others, if we come to think about the potentially subconscious worlds of prehistoric people in central and Eastern Europe. What is the real value of these semi-subterranean pits, of the processes of digging them out, or placing objects in them, of stepping down into them and looking up and out, of stepping out of them and looking at the objects and people still within, and of filling in these breaks in the surfaces of the everyday world? What is the significance for cutting the surface of the ground for these people? Perhaps the value (if even 'value' is an appropriate term or concept) is that these actions, processes, perspectives, and body movements were one (of the many) components that contributed to what it meant to be alive and engaged with the world, engaged with people, with things, with the ground, and with ways in which that ground is continuous or perforated, solid or cut, dissected or whole. Perhaps in thinking in terms of surface and the consequences of cutting we will find greater satisfaction in our broader attempts to understand the human condition, not only in the Neolithic but also in the late 1960s and even in our behaviour today.

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Figure 1. Gordon Matta-Clark's *Conical Intersect* (1975).

Figure 2. Michael Heizer's *Double Negative* (1969-70), earth and air, The Museum of Contemporary Art, Los Angeles.

THE POTENTIAL OF HISTORIC LANDSCAPE CHARACTERISATION FOR THE LOWER DANUBE AREA

Steve MILLS

Abstract: *This paper introduces and promotes Historic Landscape Characterisation (HLC) as a valuable research approach for adoption and adaptation in the Lower Danube area. HLC is a set of principles and flexible methodologies for integrating the historic dimension (time-depth) of landscape into strategies for the protection, management and planning of the European landscape. The approach is forward-looking to ensure archaeological and historic components are part of long-term sustainable development within the landscape and has at its core the principles of the European Landscape Convention (ELC). I outline the principles and benefits of HLC and the ELC, discuss the application and outputs of HLC and end by promoting the potential of future related research in the Lower Danube area using the example of the Teleorman River Valley.*

Keywords: *Landscape; Characterisation; European Landscape Convention; CORINE; GIS*

What is Historic Landscape Characterisation?

Historic Landscape Characterisation (HLC) is an approach for studying and representing the (pre)historic development and surviving features in the present day landscape. It aims to understand how the present day landscape came into being by focussing on the significant contribution of past human activity. In terms of application, it provides an archaeological method to define and map the historic and archaeological components that survive and contribute to the form of the present day landscape. Furthermore, HLC provides data and knowledge that ensure that the (pre)historic dimension of landscape is fully integrated in national and international strategies for the protection, management and planning of the landscape. HLC methodologies are purposefully diverse and flexible contributing to the wider move towards more integrated and holistic modes of managing and understanding the landscape. Importantly, the approach acknowledges landscape as a matter of interpretation and not of record, encouraging researchers to understand landscape as an idea rather than as a commodity. HLC therefore provides wide-ranging data and helps to establish research agendas.

HLC developed in the UK through collaboration between English Heritage and regional heritage agencies and County Councils during the 1990s (Clark *et al*. 2004; English Heritage HLC website; Fairclough 2001; Fairclough *et al*. 1999; Herring 1998; Rippon 2004). The HLC programme now provides two-thirds coverage in England with similar frameworks applied in Scotland and Wales. The approach continues to be refined with advances in technologies, principally GIS, and through methodological reviews (Aldred and Fairclough 2003; Fairclough 2002a). More recently, the principles and methodologies of HLC have been successfully adopted and adapted in other European countries including Denmark, Ireland, Germany, the Netherlands, and Latvia (Clark *et al*. 2003; Fairclough and Rippon 2002).

Landscape requires an holistic approach to encourage its many cultural and natural attributes to be studied, integrated and managed to the same standard and so that all are perceived as contributing value. Landscape can be characterised (described and represented) using one physical attribute or combinations of physical attributes. These can include: geology; geomorphology; soils; hydrology; distributions of flora and fauna; climate; and current land-use. Landscape can also be characterised in terms of perceptions and aesthetics and include less-tangible attributes such as tranquillity, sound, noise and smell (Bell 1999; Campaign to Protect Rural England tranquillity website; DEFRA noise mapping website; European Parliament noise directive website; Mills 2005a). The purpose of HLC is to compliment and enhance other forms of landscape characterisation by ensuring the integration of the historic and archaeological record - collectively termed the historic landscape. The principles, methods and applications of HLC are fully described elsewhere (Clark *et al*. 2004; Fairclough *et al*. 1999; Rippon 2004), in the next section I provide a summary of the key elements.

Key elements of HLC

The historic landscape is a descriptive term used when referring to the historic dimension of the whole landscape, in other words, that aspect, or character, of landscape based on an appreciation

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 203-219.

and understanding of its past (Fairclough *et al*. 1999: 55). The term historic landscape is used in the singular thereby ensuring that the landscape is always considered as an integral whole and that it is not divisible into discrete areas. This is deliberate to avoid the possibility that some areas may be considered historic while others may not be (Fairclough *et al*. 1999: 10). Furthermore, by using the term historic landscape as a collective noun, the aim is to avoid situations where sites are considered in isolation of their wider landscape contexts and thus lose some of their significance and value in the process.

As well as the more traditional individual features classified as ancient monuments or historic buildings, the historic landscape must include all historic elements such as tracks and paths, field boundaries, common land and ancient woodland (Fairclough *et al*. 1999: 2). Thus the more commonplace historic elements are also included and considered significant in contributing to the overall integrity of the historic landscape. This encourages research that acknowledges that all landscape has a history, a time-depth, however recent or old changes or features might be, and that it is the articulation between different elements that give landscape its historic character and which varies from area to area. Following this, a key guiding principle of HLC is that the landscape, as a whole, is an historic artefact which is culturally shaped everywhere to a greater or lesser extent (Fairclough *et al*. 1999: 8).

The landscape as historic artefact emphasises the point that there are very few areas (if any in some countries) that can be considered completely natural. Most of the landscape has been influenced by human activity of various kinds for thousands of years, from the digging of pits, to farming, to building houses, villages and towns. The historic landscape, with material remains visible at surface or excavated, represents a very long sequence of human decisions, activities and land use and archaeology is therefore the appropriate discipline to study this aspect of its time depth (Fairclough *et al*. 1999: 8-9).

As well as being an historic artefact, it must be acknowledged that landscape is also a living, dynamic, artefact, continuously changing and evolving as a result of cultural and natural processes. As well as activities and material remains visible from, for example, prehistory or the medieval period, those of the very recent past and of the present, contribute variously to the historic landscape of the future. Fairclough *et al*. 1999 highlight this point in the title of their book - *Yesterday's world, tomorrow's landscape*. As a living artefact, the landscape will continue to be modified and changed in the future. This provides the basis of another of the guiding principles of HLC: further change is inevitable and landscape approaches must accommodate this through proper management and conservation strategies rather than by aiming to prevent change altogether (Fairclough *et al*. 1999: 8). The purpose of HLC is, therefore, principally to provide evidence and supporting documentation of the historic dimension of landscape to help manage future change and not to reconstruct the past landscape or to identify and study any ancient or 'relict' landscape. With improved understanding, documentation and education, the archaeological community is better positioned to ensure the historic dimension of landscape is properly managed and conserved in the face of inevitable future change including new and modified utilities and transport networks, changing farming regimes and new build (both urban and rural).

Following from the previous point that the aim is not to reconstruct the past landscape - the idea of 'relict' landscape is dismissed as flawed; landscape is never relict (Fairclough *et al.* 1999: 14) -, HLC is concerned with the study of the present landscape and the physical remains of landscape development. The HLC approach has been described as retrogressive in that it starts with the present landscape and works back to identify the period from which the dominant surviving features of the historic landscape originate (Rippon 2004: 3). Research may involve studying and reconstructing past landscape horizons and disused components but they are part of the present landscape; there is no tangible Neolithic landscape out there to study for example. It is within the present landscape, either visible at surface or buried beneath, that (pre)historic features and components are located, discovered, experienced, studied and managed. The primary object of study and presentation is understanding the complex relationship between the present, developed, landscape and the physical remains of episodes of past human activities and land use contained and visible within it (Fairclough *et al*. 1999: 14-16). Studying this complex relationship includes identifying causality; understanding the historical processes that formed the historic landscape as it appears today in the present landscape. So the emphasis of HLC is always on understanding the origins and development of the modern landscape (Rippon 2004: 3).

Recognising that the whole landscape has an historic dimension helps ensure that future management is not limited to selective protection where only the best archaeological and/or historic

examples within the landscape are considered. While protection of archaeological and historic sites and buildings is essential, the surrounding landscape is critical in providing context and must also be appropriately managed so that protected sites and buildings are not devalued. To avoid situations where designated sites and buildings become preserved islands in the landscape, the quality of the landscape context must be included in sustainable development strategies (Fairclough *et al*. 1999: 11). Furthermore, by studying the complex multi-period evolution of landscape, HLC also helps avoid situations where only particular single (pre)historic periods within the landscape are represented and thus potentially isolated from the broader chronological context (Fairclough *et al*. 1999: 16). Approaches that only highlight and manage certain time-slices within the landscape risk devaluing earlier and later episodes of change that are integral to the landscape's time-depth. This is in no way intended to reduce the importance and significance of lists and records of archaeological and historic monuments and buildings, rather HLC aims to complement and enhance them through the inclusion of time-depth (archaeological and historic succession) of the whole landscape. This ensures that local and regional distinctiveness, complexity and diversity in the historic landscape are recognised and studied alongside components that are of national and international importance.

Thus the importance of individual archaeological and historic sites and buildings is their contribution to wider landscape patterns. To study landscape patterning requires the key HLC concepts of coherence and articulation that aid in understanding the integrity of the whole historic landscape (Fairclough *et al*. 1999: 12-13). Coherence refers to the visibility of, and our ability to understand, identifiable systems of historic features/components in the landscape (e.g. buildings, settlements and their related boundaries and field patterns). Articulation is how well related such historic features are in the present landscape (e.g. is a settlement still closely related to its associated field pattern?). These concepts, measured using criteria including rarity, representivity and survival, can be considered at a range of spatial scales from local to regional to help identify and represent the physical extent of site and landscape patterns and relationships.

Bloemers (2002) argues there are essentially two approaches to archaeological research: past-oriented and future-oriented. Past-oriented approaches aim to understand how the present landscape came into being through studying (principally cultural) processes of landscape change through time. Future-oriented approaches focus on planning and management by including archaeological values in the present and future development of qualities of human life and the environment. While the two approaches are complementary, their practitioners, aims, methodologies and results are often different. By providing a flexible, intermediate set of principles and methodologies that bridge differences in theory and practice, HLC can help integrate these two approaches.

A key element to further emphasise is that, in terms of HLC, landscape is considered an idea rather than as a physical commodity. Landscape exists only when people, from any period in time (as hunter-gatherers, farmers or archaeologists), experience or think about it; landscape is always culturally determined and historically conditioned (Fairclough *et al*. 1999: 9). The historic landscape only exists because different communities perceive and value it in different ways and as a consequence it becomes something to enjoy, study, manage and protect. This demands that HLC approaches are not rigid in their definition, study and representation of the historic landscape but are flexible to accommodate the varying perceptions and requirements of different interest groups.

From the outset, ensuring the transparency of HLC methods and data and the accessibility of HLC results has been central to the approach and its development. Full documentation of the data used and the methods of analysis and interpretation are essential for critical evaluation and application and the procedures used by different agencies are subject to review and improvement (e.g. Aldred and Fairclough 2003; Fairclough 2002a). To be of best use, the results and outputs of HLC (maps, reports, books and online resources) must be accessible to a wide range of interest groups including: local authorities; landscape managers; planners; developers; academics; schools; local societies and other interested community groups. It is essential therefore that HLC outputs are flexible and easy to understand to meet the requirements of different interest groups but reflect the rigour of the methodologies used.

In summary the key principles of HLC are (after Aldred and Fairclough 2003: 21; 40-41 and Clark *et al*. 2004: 6):

- Present not past - the object of study is the present landscape with the most important characteristic being its time-depth;
- Landscape not sites - area not point data;

- All aspects of landscape - not just special areas and including the recent past;
- Human landscape - landscape diversity is largely a cultural phenomenon;
- Interpretation not record - landscape as an idea;
- People's views - include collective and public perceptions;
- Management of change not preservation - landscape is dynamic;
- Transparent - clear records of data and methods;
- Accessible - HLC text and maps should be easily accessible to users;
- Integration - HLC results should be integrated into other management records.

The objectives of any HLC approach should aim to include all, or many, of the following (after Fairclough *et al*. 1999: 55):

- To promote an awareness of local identity and regional diversity;
- To recognise past interactions between people and environment through time revealed by the surviving landscape;
- To promote understanding, appreciation and conservation of the physical evidence for the development of human society within the landscape;
- To identify, characterise and evaluate the historic dimension of landscape to facilitate conservation policies and practice;
- To promote appreciation and understanding of the landscape context of archaeological and historic sites.

HLC methodologies

HLC methodologies are deliberately diverse and flexible to accommodate local and regional diversity and distinctiveness but adhere to core strategies in respect of objectives, data collection, analysis and application. Full details of methodologies applied and recommendations for best practice for future HLC projects are available elsewhere (e.g. Aldred and Fairclough 2003; Fairclough 2002a; Fairclough *et al*. 1999; Herring 1998; 1999; Lancashire County Council 2000; Turner 2005; Rippon 2004). I provide a brief summary here of the core elements common to all approaches.

HLC is a two-stage process (after Clark *et al*. 2004: 6):

1) Mapping, describing and interpreting, 'this is what we have';
2) Judgements and application, 'this is what we wish to do with it'.

These two stages are divided into a number of tasks carried out sequentially or simultaneously depending on the complexity and size of the project (after Fairclough *et al*. 1999: 56-59):

1) Study objectives (defining the study area, methodology, users and outputs);
2) Data collection (identifying data sources used to determine time-depth and (pre)historic features in the landscape);
3) Data analysis and characterisation (mapping time-depth and features and identifying relationships and patterns upon which to base characterisation);
4) Evaluation and grading (if required, comparison of the relative value of different areas of landscape following characterisation);
5) Policy implications and recommendations (dissemination and integration of results into landscape management, planning and protection strategies).

Mapping, originally paper-based but now exclusively using GIS, is fundamental for providing the general spatial and environmental background, for identifying time-depth and (pre)historic features, for subsequent characterisation of the landscape and for the presentation of the results in the form of maps.

The principal source of data for HLC is the landscape itself which provides the spatial and temporal framework for all subsequent data collection, integration and analysis (Rippon 2004: 3). Initial data collection and incorporation into a GIS provides the general spatial and environmental background for a given study area. In addition to existing archaeology and historic data sets (see below), this may include any or all of the following (after Fairclough *et al*. 1999: 56):

- Geology
- Landform (geomorphology)
- Hydrology and drainage
- Climate
- Environmental evidence (flora/fauna)
- Vegetation cover

- Current and recent land use

Sources of data used and the formats available (whether electronic or paper-based) to identify and map archaeological and historic features and time-depth to enable characterisation vary according to location and study objectives. As a general list, any or all of the following might be used:

- Modern maps (topography, geology, hydrology, soils, vegetation)
- Historic maps
- Registers of archaeological and historic sites and designations
- Documentary sources (place names, historic records, travel diaries)
- Aerial/satellite photographs
- Current land use
- Boundaries
- Field morphology (shape and size)
- Distribution of other resources (woodland, water, minerals)
- Settlement types and patterns
- Communication types and patterns (roads, rail, canals, airfields)

Alongside the knowledge and expertise of local archaeologists and historians, data sources integrated in a GIS can be used to identify and map the physical evidence for archaeological and historic features. The range of physical evidence will vary according to location and may include: palaeo-environmental deposits; archaeological remains; buildings and structures; boundaries; tracks and paths; ponds; and semi-natural features such as woodland, common land and grassland (Fairclough *et al*. 1999: 54).

The process of characterisation is based on identifying the density, predominance, patterning and interrelationships between identified and mapped archaeological and historic features. While specific procedures for characterisation vary, in general it is the predominance of (pre)historic components or systems of a certain age that survive in the present landscape that are used to characterise a given area. For example, an area with a predominant and surviving medieval field system that has not been significantly changed since the medieval period may be characterised as *medieval enclosure*. Alternatively, an area dominated by recent but disused industrial features (perhaps following mining), may be characterised as *industrial (disused)*. In addition to predominance, the process may also include identifying features of a similar age producing landscape maps of different (pre)historic periods. The versatility of GIS allows the same data to be managed, manipulated and represented in a range of different ways depending on requirements.

To characterise the historic landscape, the spatial arrangement of (pre)historic features can be considered as elements that combine to form components (Rippon 2004: 19-24). Elements are individual features such as a house/farmstead, a river, a track or a field. Components are a group of elements that have the same function such as a village (made up of farmsteads) or a field system (made up of fields). The articulation of different components into distinctive and repeated combinations defines a historic landscape type such as a settlement pattern (medieval/modern) or a form of farmland based on field systems (prehistoric/medieval/post-medieval). HLC types are the core for characterising the historic landscape but can be generalised further into HLC zones or areas consisting of recurring, associated HLC types that reflect common landscape processes of development (e.g. anciently enclosed land, urban or industrial). The approach to identifying HLC types is most commonly a bottom-up approach within a GIS using mapping (and other data sources mentioned above) to ascribe parcels of land to predetermined HLC types.

Using GIS, polygons of HLC types, zones and areas are thus created providing an electronic resource mapping the historic landscape. Attribute data can be associated with the polygons within a GIS and in supporting texts providing further information about each polygon and HLC type, zone or area. Alongside the visual presentation of HLC mapping, the attribute data and supporting texts provide users with a valuable resource for management, evaluation and interpretation. Additional supporting data may include (after Herring 1999):

- Definitions and distinguishing attributes
- Principal historic processes
- Typical historic/archaeological components
- Rarity
- Typical survival of historic/archaeological components
- Surviving coherence
- Visibility of evidence for time-depth

- Contribution of historic character to present character
- Extent and quality of archaeological research
- Potential for archaeological research
- Potential for amenity and education
- Condition of components
- Vulnerability of components
- Forces for change (preservation and damage)
- Importance
- Principal location
- Extent and nature of variability within study area
- Recommended landscape management

The GIS-based electronic data and maps and accompanying written texts are the key outputs of HLC providing a valuable resource for a diverse range of users.

Applications of HLC

Clark *et al*. (2004) detail the wide range of applications, benefits and uses of HLC and its outputs; these fall into four main categories:

1) Landscape management. Providing HLC data to landowners, estate managers, farmers and other landscape organisations and advisory groups encourages positive landscape management and helps to foster good working relations. Integrating HLC data with that of the natural environment is invaluable for advising agri-environment schemes.
2) Landscape character assessment and strategies. These are holistic and wide-reaching approaches and documents for landscape management (including geology, soils, vegetation and land use). HLC contributions ensure the historic aspects of landscape are included in the development and implementation of broader landscape strategies and policies.
3) Spatial planning. By providing landscape-based assessment and recommendations for sustainable management beyond that focussed on individual sites and monuments, HLC helps to inform new planning policy and development and planning applications. This is particularly important for identifying the archaeological potential of landscape locations where there is limited information in the form of lists, records and designations of archaeological and historic sites and buildings.
4) Partnership, learning and outreach. HLC provides support for other aspects of environmental management including: Conservations Areas; village design statements and plans; and historic buildings and property management plans. The dissemination of HLC results through talks to local societies and professional and other interest groups and with online resources helps to raise awareness of the historic landscape. HLC can also inform academic research and learning by identifying areas of archaeological potential beyond known sites and monuments and by increasing knowledge of the patterning and articulation of components of the historic landscape.

The applications of HLC are therefore wide-ranging and have the potential to benefit a broad range of users including local, regional and national authorities, farmers, commercial and academic archaeologists and the wider community. The next section provides a summary of the HLC approach as applied in Cornwall, UK, as an example of its applications and benefits.

HLC in Cornwall

The author was first introduced to HLC while in employment with the Historic Environment Service, Cornwall County Council (2001-2003) contributing to the GIS mapping of HLC for the Cornish Mining World Heritage Site Bid and the Cornwall and Scilly Urban Survey (see the respective web sites for further details). HLC in Cornwall started in 1994 with support from English Heritage, Landscape Design Associates and the county and district councils (see the Historic Environment Service Cornwall Characterisation web page and Herring 1998; 1999). The present day landscape provided the source framework for study and, using modern Ordnance Survey 1:25,000 paper maps, every parcel of land down to the scale of individual fields was systematically assessed. Based on the archaeologists' knowledge of the county and study of modern and historic maps, seventeen HLC types were identified and every parcel of land in the county ascribed to one of them. The Cornwall HLC types are:

- Rough Ground
- Prehistoric enclosures

- Medieval enclosures
- Post-medieval enclosures (C17th - C18th)
- Modern enclosures
- Ancient woodland
- Plantations and scrub
- Settlements (pre- C20th)
- Settlements (C20th)
- Industrial (active)
- Industrial (disused)
- Communications (roads, rail, airfields)
- Recreation
- Military
- Ornamental
- Reservoirs
- Natural water-bodies

The HLC types were subsequently generalised and simplified into HLC zones as these were considered more useful for end users: Upland rough ground; Coastal rough ground; Dunes; Anciently enclosed land (AEL); AEL altered in C18th & C19th; AEL altered in C20th; recently enclosed land; Navigable rivers; Steep-sided valleys; Urban development; Ornamental; Recreation; Industrial; Military; Airfields; Upland woods (plantations); Reservoirs; Inter-tidal. In addition to the mapping, detailed documentation and attribute data, as discussed above, support the HLC types and zones. The approach was originally paper-based but is now fully digital using GIS and continues to be refined. Figure 1 provides an example of HLC mapping in Cornwall.

The Cornwall HLC has had, and continues to have, many applications and has been highly influential in the development of HLC throughout the UK and further afield within Europe. Cornwall HLC reports have been distributed across the county to planning and landscape officers, to surveyors, to landscape management agencies and are available for public use in county libraries. Based on the HLC, staff in the Historic Environment Service can coherently and consistently provide advice concerning proposed developments and to landscape decision-making bodies. It has been successfully used to target areas requiring evaluation and mitigation in advance of new development and to identify those with archaeological research potential beyond that already known. Through regular presentations, HLC has been well received by broader community interest groups particularly as it acknowledges the historic/heritage value of non-designated areas where most people live. In addition, and as already mentioned, HLC mapping and documentation contributed to the successful bid for World Heritage status for Cornish Mining (inscribed 2007).

The European Landscape Convention

Having introduced and summarised HLC, it is important to briefly mention how it contributes to wider European initiatives by discussing how it dovetails with the principles of the European Landscape Convention (ELC). The Council of Europe opened the ELC for signature in Florence in 2000 and it came into force on 1st March 2004 following ratification by ten member states (see the Council of Europe European Landscape Convention web pages; Council of Europe Treaty Series no. 76 web pages; Déjeant-Pons 2002; Fairclough 2002b). As of January 2011, 33 member states have ratified the convention including: Bulgaria; Hungary; Moldova; Romania; Serbia; Ukraine; and the United Kingdom. By promoting landscape as an aspect of common heritage essential for individual and community well-being, the ELC complements other existing conventions which aim to preserve natural and cultural heritage: Conservation of European Wildlife and Natural Habitats; Protection of the Architectural Heritage of Europe; and Protection of the Archaeological Heritage.

The purpose of the convention is to provide the general principles for, and help promote and organise, European co-operation for the understanding, protection and sustainable management of the European landscape. It advocates that landscape issues must be democratic with active participation of the public as well as input from state, local and regional authorities and scientific and technical bodies. Importantly, the convention recognises that all landscape contributes to the common European heritage whether it be urban or rural, commonplace or outstanding, on land or in water.

The definition of landscape in the convention has important implications for the historic landscape and HLC:

> *"Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"* (Council of Europe Treaty Series no. 76, Article 1).

First, the definition highlights landscape as a matter of perception, meaning it is more than just a commodity, an environment; it is to do with interpretation, memory and understanding. This is in keeping with the HLC notion that landscape is first and foremost an idea. Second, the definition emphasises that landscape is, in part, a product of human interaction through time and that landscape history demands study and incorporation. Finally, by acknowledging both natural and human factors, the definition is inclusive of commonplace, ordinary areas created by human action and that such areas contribute diversity and value to the European landscape.

All of the principles of HLC have been endorsed by the European Landscape Convention and the Convention's philosophy now provides the core for HLC aims and objectives. The Convention has provided impetus for the uptake of HLC approaches across Europe through, for example, the *European Pathways to the Cultural Landscape* project, and to the development of *A Strategy for the Heritage Management of Europe's Landscape* promoted by the *Europae Archaeologiae Consilium* (Clark *et al*. 2003; European Union European Pathways website; Fairclough and Rippon 2002). Combined, and if adopted, the ELC and HLC provide a guiding philosophy, set of principles and flexible methodologies to ensure the historic landscape is fully integrated in future landscape management strategies at a European scale.

Implementation of the Convention is aided and organised through conferences, workshops, seminars and working groups; the sixth set of workshops took place in Sibiu, Romania in 2007 (Council of Europe 2009). In addition, interdisciplinary research, education and outreach are supported by UNISCAPE, a network of universities dedicated to the implementation of the Convention (see UNISCAPE web site) and by the Landscape Character Network (see Landscape Character Network website).

The potential for the Lower Danube Area

The discussion above has introduced HLC, its principles, methodologies and applications; the following section discusses its potential and application in the Lower Danube area. At the time of writing, and to the best of the author's knowledge, HLC has not yet been applied in the area.

The closest example of related research is the Ethnographic Atlas of Romania - EAR (Ghinoiu 2009). This provides a classification/characterisation of the rural landscape in Dobrogea combined with data from questionnaires of 18,000 subjects in 600 villages. The EAR is available on the Romanian Institute for Cultural Memory (cIMeC) website with an online interactive map (cIMeC 2006). Based on soil classification and four ethnographic categories (settlement, occupation, arts and crafts and religion), the project identified five rural landscapes in Dobrogea: Forestry, Fishery, Pastoral, Agricultural and Viticultural. The EAR also provides some time-depth with land use information from prehistory to the present for the five rural landscapes. The EAR thus provides a valuable, accessible, resource for the study of the rural landscape and land use through time and the researchers advocate extending the approach more widely within Romania and further afield along the Danube.

The EAR provides an example of landscape characterisation in the Lower Danube area; research that specifically studies the historic dimension of landscape is required to compliment and enhance this existing body of data. The historic dimension is included in point-data location mapping of registers of archaeological and historic sites and buildings and archaeological excavations. The online Mapserver for National Cultural Heritage in Romania for example, provides an accessible, interactive and searchable resource for archaeological and historic sites (cIMeC 2011a). Further details about archaeological sites are available online through the National Archaeological Record of Romania (cIMeC 2011b). To be more inclusive of the wider historic landscape, and to move towards historic characterisation, these point data sets need to be combined with area-based landscape mapping.

Base mapping, both modern and historic as discussed above, produced by national mapping agencies provides the starting point for determining historic landscape characterisation and for producing supporting maps. These are now readily available as digital resources suitable for use in GIS as well as aerial photographs and satellite imagery. Florea and Ştefan discuss historic and modern mapping resources available for Romania (Florea and Ştefan this volume).

Much area-based historic landscape (GIS) mapping in the UK is determined from existing stone, fence or hedge lined field boundaries shown on Ordnance Survey maps. In the absence of permanent field boundaries in the Lower Danube area, and consequently their survey and mapping by National mapping agencies, an alternative form of base mapping is required from which land use can

be determined. The best candidate resource for this currently publicly available is the *Co-ordination of Information on the Environment* (CORINE) land cover mapping (for details see European Environment Agency 1999; Kleeschulte and Büttner 2006). CORNIE mapping, based on computer assisted visual interpretation of ortho-rectified satellite images (Landsat 7 ETM), provides qualitative and quantitative land cover information which is consistent and comparable across Europe. The mapping is available for download as raster or vector datasets from the European Environment Agency with separate versions showing land cover at 1990, 2000 and 2006 (European Environment Agency CORINE website). The vector database is available at a scale of 1:100,000 with a minimum mapping unit of 25ha and includes 44 classess of land cover divided into five categories: Artifical surfaces; Agricultural areas; Forests and seminatural areas; Wetlands; and Waterbodies. The land cover mapping has been validated with the help of the European Land Use/Cover Area (LUCAS) statistical survey and the reliability of the 2000 dateset is 87.0 +- 0.8%. Figure 2 shows the CORINE land cover 2000 mapping for Romania.

As a digital resource available for direct input to GIS, CORINE land cover mapping provides an ideal starting point for creating area-based historic landscape mapping. Using hard copy maps produced from a GIS, together with local knowledge, the land cover mapping can then be verified through ground truthing and the GIS database updated and refined accordingly. Additional complementary datasets of value for refining land cover and for determing HLC, particularly soils and rivers, are available from the European Commission, Joint Research Centre Institute for Environment and Sustainability (see European Commission Institute for Environment and Sustainability website; European Commission European Soil Portal website).

Teleorman Valley example

Archaeological and geomorphological survey and GIS-based mapping, centred on the village of Măgura in the Teleorman Valley, have been ongoing since 1998 as part of the Southern Romania Archaeological Project - SRAP (Bailey *et al*. 2003; Howard *et al*. 2004; Mills 2001; 2009). Additional, complementary, land cover mapping was conducted as part of the author's doctoral research between 1998 and 2001 (Mills 2005b) and in collaboration with Bryn Tapper in 2004, a HLC and GIS specialist from the Historic Environment Service, Cornwall County Council. Combined, this mapping provides spatial and chronological detail of prehistoric (principally Neolithic) archaeology and of Holocene river sequences together with a first attempt at mapping modern land cover (Figure 3).

The collaboration of Mills and Tapper in 2004 specifically aimed at assessing the potential of, and logistics involved in producing, HLC in the Teleorman Valley study area. In particular, the focus was on developing a methodology suitable for mapping land use in an area without stone, fence or hedge lined field boundaries as discussed above. The procedure adopted was an enhancement of Mills' doctoral research and involved fieldwalking combined with GPS survey to identify and map modern land cover. Experience and understanding of the landscape gained through previous SRAP and doctoral fieldwork considerably aided this approach; it was still, however, a very time-consuming process. During a four-week period a 10 x 10km study area was mapped and attributed to a land cover type. While the approach provided good resolution for this small area, without significant additional financial and time investment, it would not be practical to follow this procedure over a larger area. Figure 4 provides detail of the proto HLC mapping produced in 2004.

The practical solution to this, as discussed above, is to use and adapt the already available CORINE data set. CORINE 2006 raster data for the Teleorman Valley study area has been acquired and input to the existing SRAP GIS (Figure 5). To assess the reliability of the CORINE land cover mapping and if the resolution is sufficiently high to be of use for HLC purposes, this data set is now being compared in the GIS with aerial photography of the study area and existing landscape mapping produced as part of SRAP. This can be further refined, and the GIS updated accordingly, following future ground truthing fieldwork in the Teleorman Valley.

The mapping completed thus far in the Teleorman Valley requires refinement based on further fieldwork to identify and survey all land cover types in the study area and GIS-based enhancement to include supporting attribute data. While not qualifying as a fully operational HLC at this stage, the work completed to date provides a valuable resource for further understanding the distribution of prehistoric archaeology, and the influence of river dynamics and modern land use on the location and preservation of archaeological and palaeo-environmental data. Furthermore, the improving capabilities and availability of digital applications such as GIS and Earth browsers (e.g. Google Earth), provide new opportunities to disseminate the ideas and outputs of archaeological and landscape research, including HLC, more widely to interested audiences. Commitment to the

accessibility of archaeological and other forms of landscape research in the Teleorman Valley lie at the heart of the collaboration developed as part of the Art-Landscape Transformations Project (Bailey and Mills forthcoming; Mills forthcoming).

A better understanding and mapping of the interplay between Holocene river dynamics, modern land use and the prehistoric archaeological record has been an important output of the research to date in the Teleorman Valley (see also Macklin this volume). This kind of research, to which HLC mapping can provide a valuable input, needs to be further extended within the Lower Danube area to better identify and interpret spatial patterning of prehistoric (and later) archaeology. Acquiring the necessary resources and expertise for such research will require considerable collaboration between individuals and institutions in the Lower Danube area and further afield within Europe. As the success of the conference in Alexandria in November 2010 and the contributions to this volume demonstrate, the willingness for this kind of collaboration is very much present and enthusiastic.

Conclusions

Historic Landscape Characterisation provides a set of guiding principles and flexible methodologies for studying and representing (pre)historic development and surviving features in the present day landscape. By emphasising the importance and value of the historic dimension of landscape, and through integration with the initiatives of the European Landscape Convention, HLC provides a valuable contribution towards the protection, management and planning of the European landscape. To date HLC has been successfully applied and developed in a number of European countries including Denmark, Ireland, Germany, the Netherlands, Latvia and the UK. The benefits of HLC are many including: identifying where more research is required and developing new research agendas; better understanding the archaeological potential of the landscape; refining understanding of spatial distribution and patterning in the archaeological record; and providing new ways to disseminate archaeological and historic research to a wide range of interested audiences. With digital data sets and software and hardware more readily available and the fostering of stronger institutional collaborations in the Lower Danube area, the resource implications for applying HLC and related research are not insurmountable. By introducing the principles, methods and applications of HLC, and preliminary research in the Teleorman Valley, it is hoped the potential of HLC will be recognised and similar approaches adopted more widely in the Lower Danube area.

Acknowledgements

The author greatly acknowledges the support and assistance of staff at the Muzeul Judeţean Teleorman and team members of the Southern Romania Archaeological Project. For support, advice and fruitful discussions on HLC I would like to thank the following: Peter Herring, Bryn Tapper and Nick Johnson (Historic Environment Service, Cornwall County Council); and John Schofield and Graham Fairclough (English Heritage).

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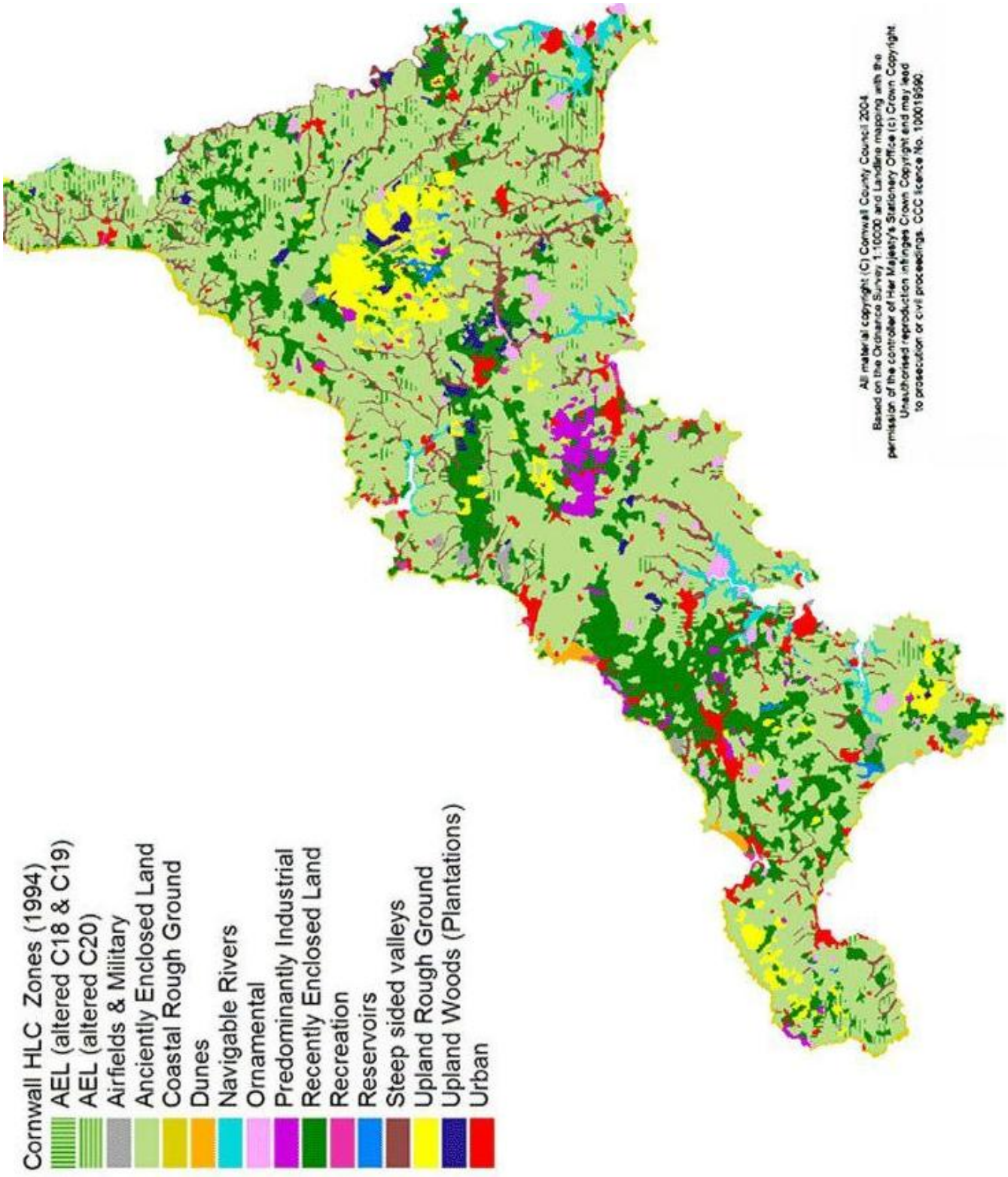

Figure 1. HLC mapping in Cornwall (source and copyright: Historic Environment Service, Cornwall County Council).

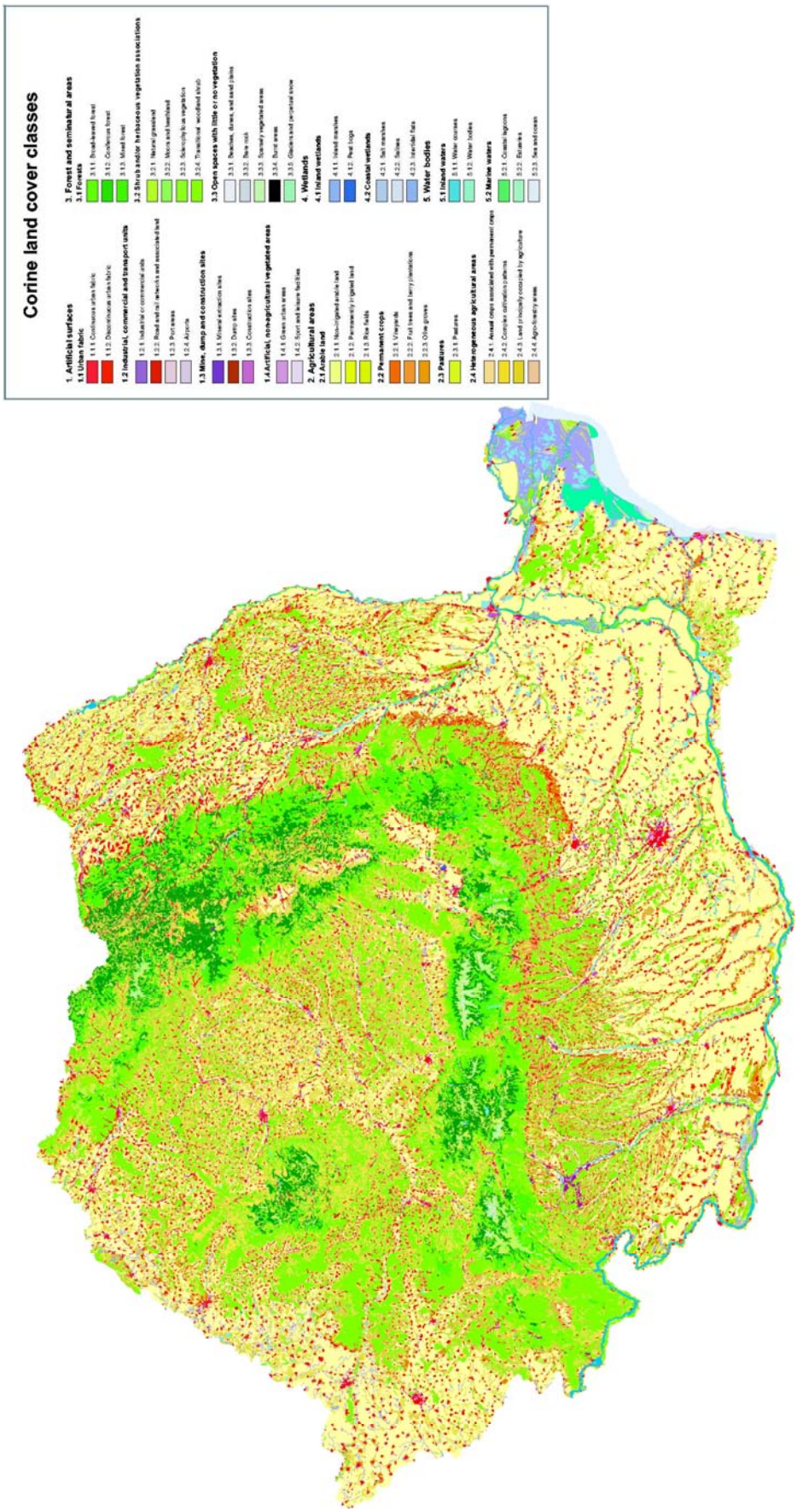

Figure 2. CORINE land cover 2000 mapping for Romania (source and copyright: European Environment Agency).

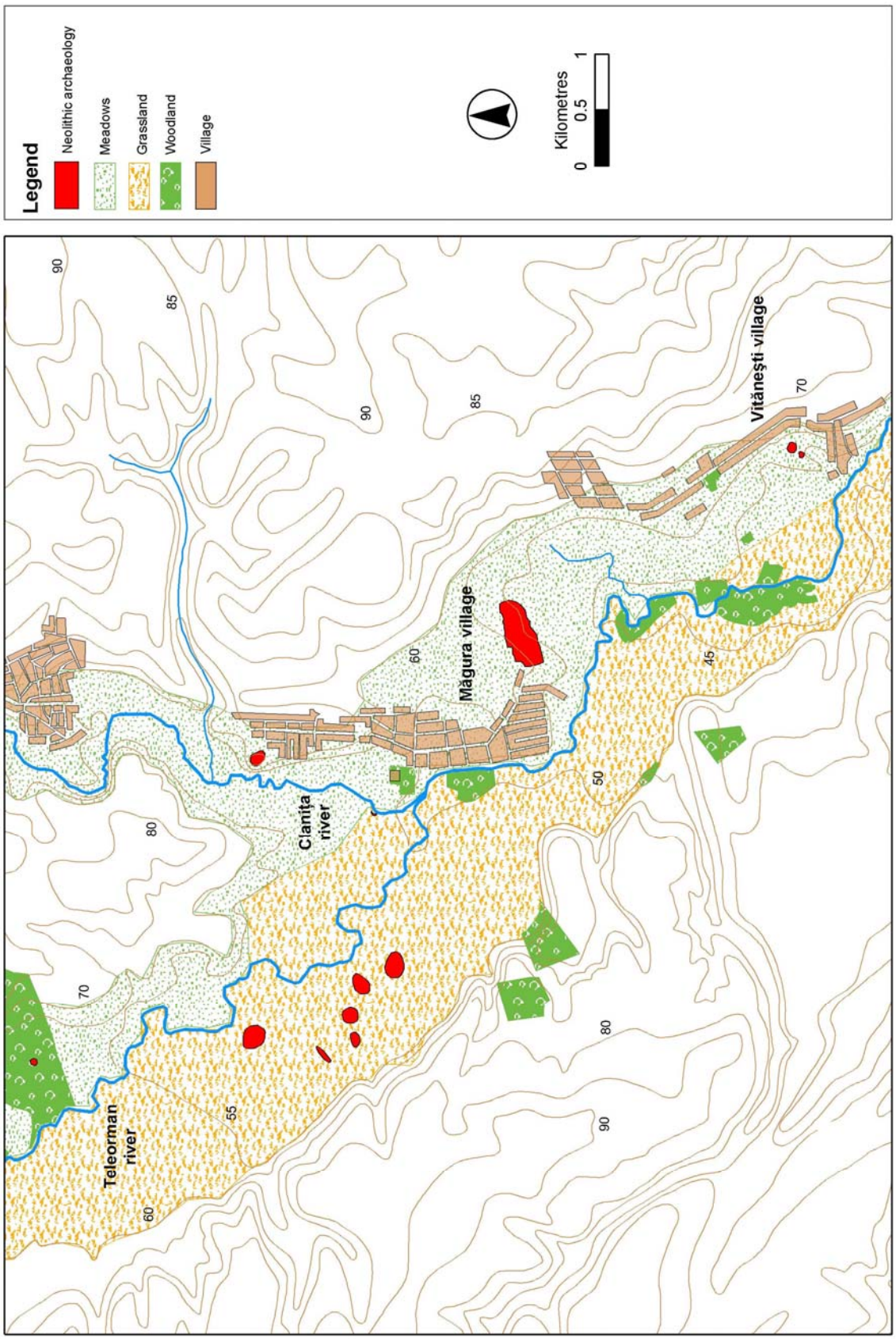

Figure 3. Distribution of Neolithic archaeology and modern land cover in the Teleorman Valley study area (source and copyright: SRAP and Mills).

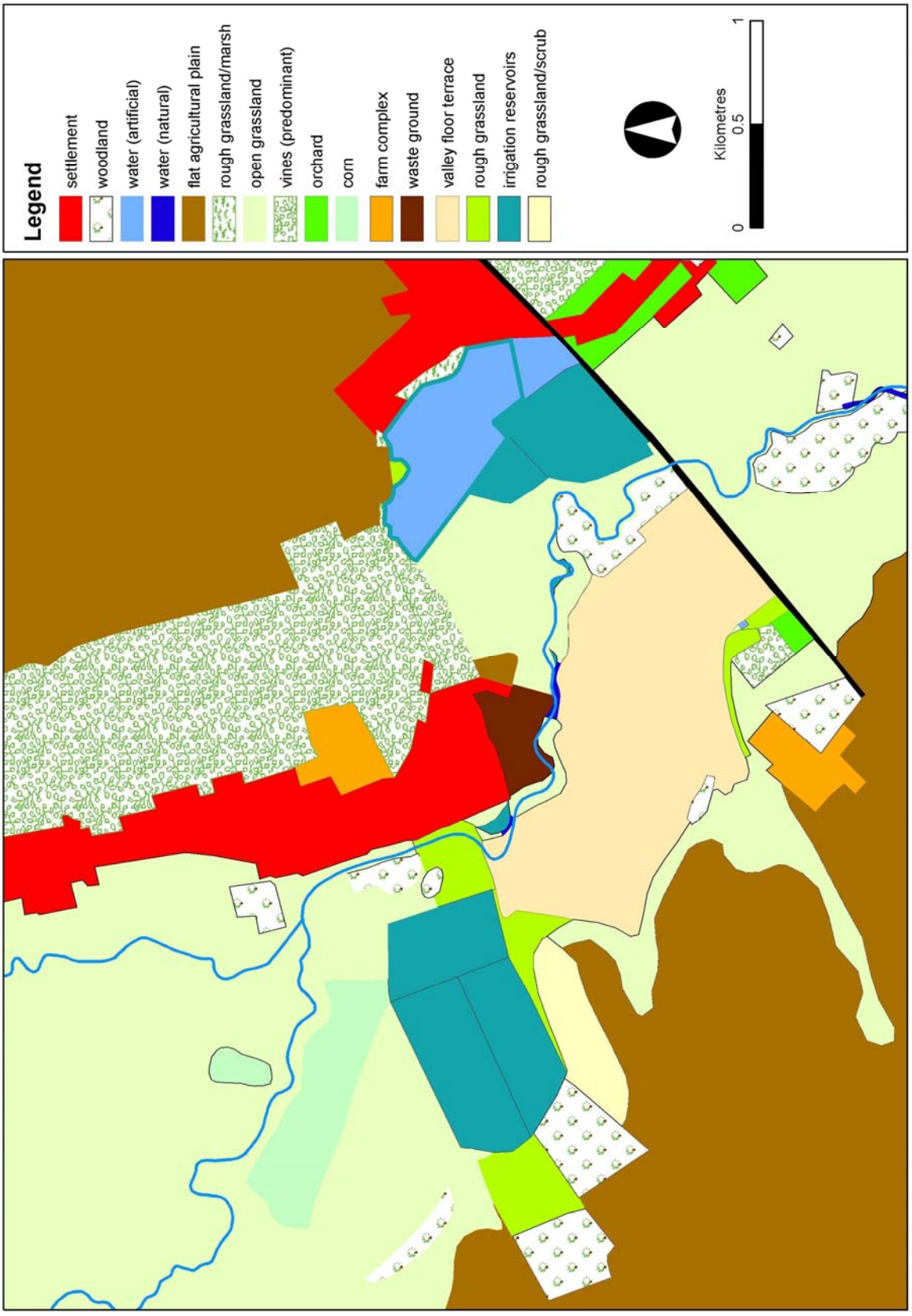

Figure 4. Detail of the proto HLC mapping centred on Măgura produced in 2004 (source and copyright: SRAP, Mills and Tapper).

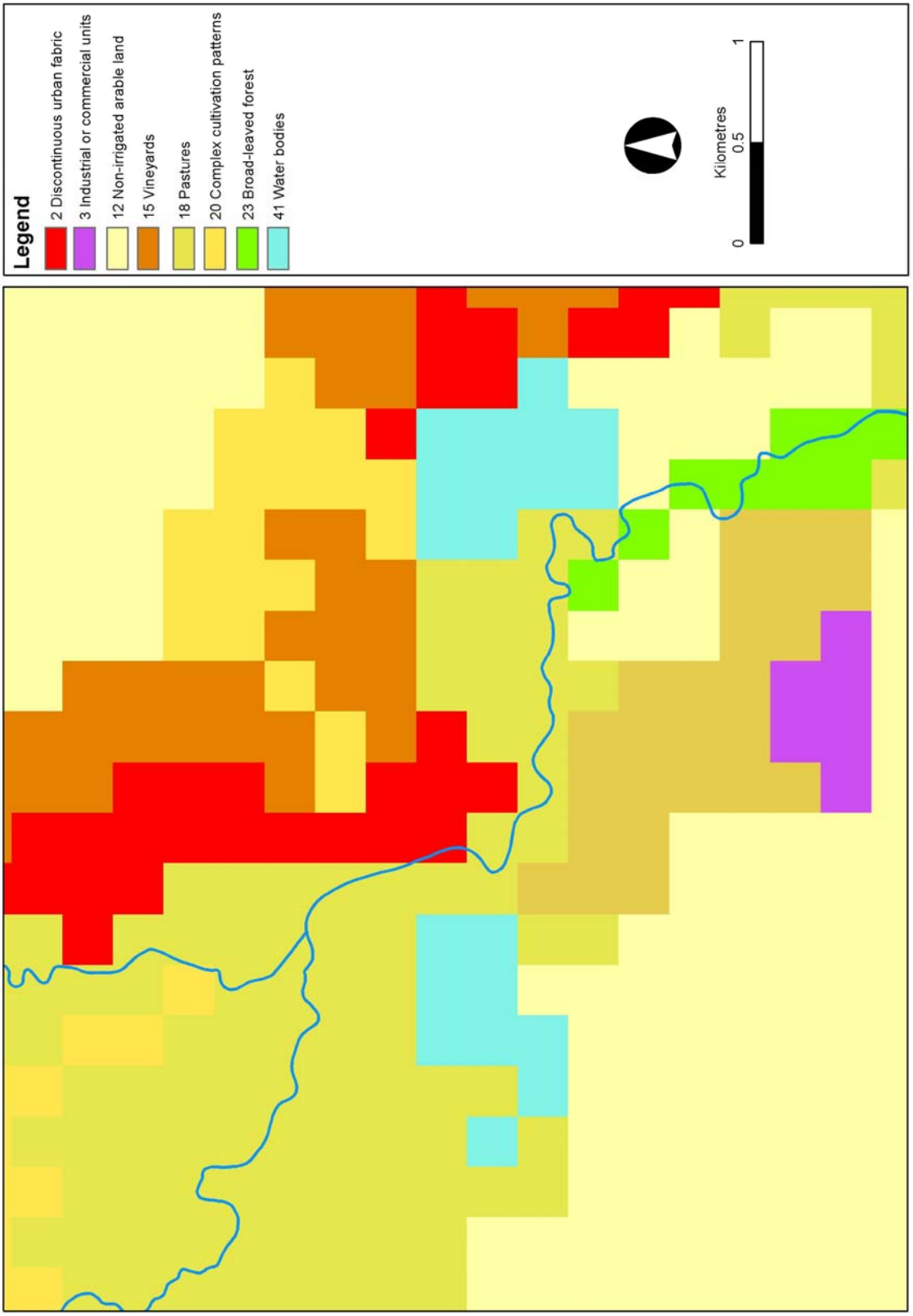

Figure 5. CORINE 2006 raster data centred on Măgura in the Teleorman Valley study area (source and copyright: European Environment Agency and SRAP).

BRINGING THE PAST INTO THE PRESENT. RESTORING LANDSCAPE AROUND ARCHAEOLOGICAL SITES WITH THE HELP OF OLD MAPS

Mihai Ştefan FLOREA,
Cristian Eduard ŞTEFAN

Abstract: *The use of cartographic documents and descriptive data related to the landscape surrounding archaeological sites can be an efficient method to show how human interventions alter the configuration of the environment. With the help of increasingly more accessible modern methods and equipment (such as GPS, GIS, Total Station), cartographic documents can be connected to field data and used in more specialised analyses for archeological research and for the protection of archaeological monuments.*

Key words: *tell settlements; GIS; mapping; digital terrain model; landscape.*

Introduction

How can we reconstruct the landscape of a small region if the available published information no longer conforms to the present day situation? This was the question to which we needed to find an answer when the results of a campaign to register a number of *tell* type settlements located in Argeș and Dâmbovița Counties turned out to be discouraging (only 15 of 32 settlements mentioned in the technical literature for the study area were identified in the field during our expedition - see Plate I). It is well known that the effects of human communities on the environment are brought about by means of technology and knowledge (Dincauze 2000 p. xvii). Human activities (e.g., massive deforestation, gravel mines in riverbeds, intensive land works for agriculture, industry, and demographic 'explosions') and also natural phenomena (e.g., floods, droughts, landslides and earthquakes) brought about significant landscape changes. The study area has certain particularities with respect to human intervention on the environment. If we consider only the last four decades, we can observe that after aggressive land work activities to transform most of the area into land suitable for agricultural or industrial purposes (1970-1990), the land changed rapidly. Thus, after 1990, on the one hand agricultural land was used for large real-estate projects, and, on the other hand, agricultural properties were fragmented (Plates II, III). Such changes caused by human activity can be very harmful for archaeological monuments, with some being totally lost although still mentioned in recent technical literature (Olteanu 2002; Olteanu *et al.* 2003).

Method

At the preliminary stage we tried to identify *tell* type settlements on military topographic maps from the 1970's (1:25000 scale, Gauss-Krüger projection, Krasovski-1942 ellipsoid, the Baltic Sea altimetrical reference system) for four case-studies: Gumelnița-'Măgura Calomfirescu', Vișina-'La Măgură', Ionești-'Pe Ioneasca'/'Palade' and Corbii Mari-'Măgura'.

The second stage consisted of identification of the sites in the field using landscape details described in the technical literature that we compared with the above mentioned maps. We observed from the very beginning major changes in the landscape surrounding the settlements. Bibliographic descriptions as well as map details overlap only partially with the actual configuration of the terrain. This observation encouraged us to extend landscape data collection by means of GPS and Total Station.

A precise investigation of the cartographic and bibliographic archives was necessary to enable us to reconfigure (as far as we can) the landscape because several settlements have completely disappeared. The data obtained was digitized and the maps were standardised in the Stereo 1970 reference system, Datum Dealul Piscului 1970, to allow layering in a GIS. The superposition of data sets was necessary to observe possible landscape changes through time. All data was analysed using various GIS[1] programs which helped us to geographically reference the raster data, to vector the digitized maps and to obtain the digital terrain model.

Sources

I. Cartographic sources used in our work are as follows:

a) 3rd Military Mapping Survey of Austro-Hungary. This set belongs to the Austro-Hungarian Empire territories mapping carried out in three stages. The third surveying campaign (Neue

Steve MILLS and Pavel MIREa (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 221-232.

b) Artillery firing plans. Before World War I Romania did not have a unified mapping system. From 1916 standardisation of earlier projection and nomenclature systems was used to ensure uniformity. In this context, maps were made with the Cholensky variant of the Lambert conical projection. Shortly after they were published in 1:20000 scale maps in this projection and known as artillery firing plans. These sheets were updated continuously until 1959 when the Gauss-Kruger projection was imposed;

c) Military Topographic Department maps edited until 1962: Gauss-Kruger projection, 1:25,000 scale maps; Department of Military Topography maps edited in the 1970s and 1980s: Gauss-Kruger projection, 1:25000 scale maps;

d) Maps edited by the Ministry of Agriculture: in the 1960s and 1970s Gauss-Kruger projection, 1:5,000 scale maps.

II. Ortophotoplans realised by the ANCPI (National Agency for Cadastre and Land Registration) edition 2005-2006, stereographic 1970, Datum Dealul Piscului 70.

III. Oblique aerial photography 2007-2008.

IV. CORINE (Coordination of Information on the Environment) - http://www.eea.europa.eu/publications/COR0-landcover/page001.html[2].

V. Specific bibliographic sources:

a) Lahovari, G.I., Brătianu, I.C. and Tocilescu, G.G., 1898-1902. *Marele dicţionar geografic al României alcătuit şi prelucrat după dicţionarele parţiale pe judeţe* (I-V), Bucureşti: Stabilimentul grafic J. V. Socec.

b) *** *Atlas de semne convenţionale pentru hărţile topografice la scările 1:10000 şi 1:5000*. Direcţia topografică militară, Ministerul Forţelor Armate ale R.P.R. ed. 1961.

Case sudies

I. Gumelnița-'Măgura Calomfirescu', Călărași County, LMI code: CL-I-s-B-14563. A *tell* type settlement located on an erosion bank with dimensions 283x235m, situated 5km east of Oltenița. It was systematically researched in the 1920s and in 1960 Vladimir Dumitrescu made a sondage. After a comparative analysis of the maps we observe that the landscape remains relatively unchanged, the only major modification being represented by the animal farm located on the active terrace during the socialist period, now destroyed. Paradoxically, the settlement was rescued because for a long period of time a vineyard was planted on the terrace. The only mention of the 'Gumelnița' micro toponym was found in the artillery firing plan with the code 4540 made after a topographic plan dating from 1898 (Pl. IV, Pl. V).

II. Vișina-'La Măgură', Dâmbovița County, LMI code: DB-I-s-B-20223. A *tell* type settlement, now totally destroyed, about 100m in diameter and 3-4m in height, identified after field research in 1980. The situation is similar to that at Gumelnița. The available maps provided the data for the Vișina settlement reconstruction plan materialised in a digital terrain model (Pl. VIII, Pl. IX).

III. Ionești-'Pe Ioneasca'/'Palade', Dâmbovița County, LMI code: DB-I-m-B-17061.03. A *tell* type settlement, with dimensions 52x44m and 1m height; researched in the 1930s by Dumitru Berciu. For this settlement we also made a digital terrain model that pointed to the existence of a Neajlov River palaeochannel that can not be observed in the field or in the ortophotoplan (Pl. VI).

IV. Corbii Mari-'Măgură', Dâmbovița County, LMI code: DB-I-s-B-17011. A *tell* type settlement, with dimensions 48x44m, located in the Neajlov meadow, researched in 1989 by Valentin Drob. The *tell* is affected by agricultural works in the present. Again the digital terrain model pointed to the existence of Neajlov palaeochannels that are also visible in the field. The permanent cultivation of the land on which the settlement is located led to its flattening. Traces of the sondages made in 1989 are still visible today in the field. (Pl. III, Pl. VII).

Conclusions

Our analysis may prove to be very useful in highlighting the advanced degradation of the *tell* type settlements. In spite of the existing legislation which places them on the Historical Monuments List, many of these settlement types were partially or totally destroyed as a consequence of human interventions, especially after the Second World War. The only solution for reconstructing the settlements and their surrounding landscape remains the use of data provided by the cartographic

and bibliographic documents mentioned above. These types of documents are more accessible today because the data are no longer held secret by the Military Topographic Department making our work easier.

Our analysis is preliminary and with great potential for future projects of larger extent with interdisciplinary teams which may lead to a more balanced research of *tell* type settlements. The present map of *tell* type settlements in Romania shows us small areas in which the sites are concentrated (Teleorman, Bucșani, Argeș-Dâmbovița, Mostiștea) and areas in which *tell* settlements are few or missing altogether (Giurgiu, Călărași) (Andreescu and Mirea 2008; Ștefan 2010).

Acknowledgements
Many thanks are due to Monica Constantin for translating the text into English.

Notes

[1.] For the GIS analyses see also Chapman and Van de Noort 2001:366-8

[2.] EEA grants free access to all its data/applications provided that the user agrees: - to acknowledge the source as follows: Copyright EEA, Copenhagen, 2007 - to display a link to the EEA web site http://www.eea.europa.eu - not to use the data/applications for commercial purposes unless the Agency has expressly granted the right to do so; Ministry of Environment and Sustainable Development: http://www.mmediu.ro; The *Danube Delta* National Institute for Research and Development : http://www.indd.tim.ro.

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*** *Atlas de semne convenţionale pentru hărţile topografice la scările 1:10000 şi 1:5000*. Direcţia topografică militară, Ministerul Forţelor Armate ale R.P.R. ed. 1961.

Chapman, H.P. and Van de Noort, R. (2001) 'High-Resolution Wetland Prospection, using GPS and GIS: Landscape Studies at Sutton Common (South Yorkshire), and Meare Village East (Somerset)', *Journal of Archaeological Science* 28(4): 365-75.

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Lahovari, G.I., Brătianu, I.C. and Tocilescu, G.G. (1898) *Marele dicţionar geografic al României alcătuit şi prelucrat după dicţionarele parţiale pe judeţe* (I), Bucureşti: Stabilimentul grafic J.V. Socec.

—— (1899) *Marele dicţionar geografic al României alcătuit şi prelucrat după dicţionarele parţiale pe judeţe* (II), Bucureşti: Stabilimentul grafic J.V. Socec.

—— (1900) *Marele dicţionar geografic al României alcătuit şi prelucrat după dicţionarele parţiale pe judeţe* (III), Bucureşti: Stabilimentul grafic J.V. Socec.

—— (1901) *Marele dicţionar geografic al României alcătuit şi prelucrat după dicţionarele parţiale pe judeţe* (IV), Bucureşti: Stabilimentul grafic J.V. Socec.

—— (1902) *Marele dicţionar geografic al României alcătuit şi prelucrat după dicţionarele parţiale pe judeţe* (V), Bucureşti: Stabilimentul grafic J.V. Socec.

Olteanu, G. 2002. *Repertoriul arheologic al județului Dâmbovița*. Târgoviște: Cetatea de Scaun.

Olteanu, G., Cârstina, O. and Căprăroiu, D. (2003) *Repertoriul arheologic al județului Dâmbovița*. Târgovişte: Cetatea de Scaun.

Ștefan, C.E. (2010) *Settlement types and enclosures in the Gumelnita culture*. Târgovişte: Cetatea de Scaun.

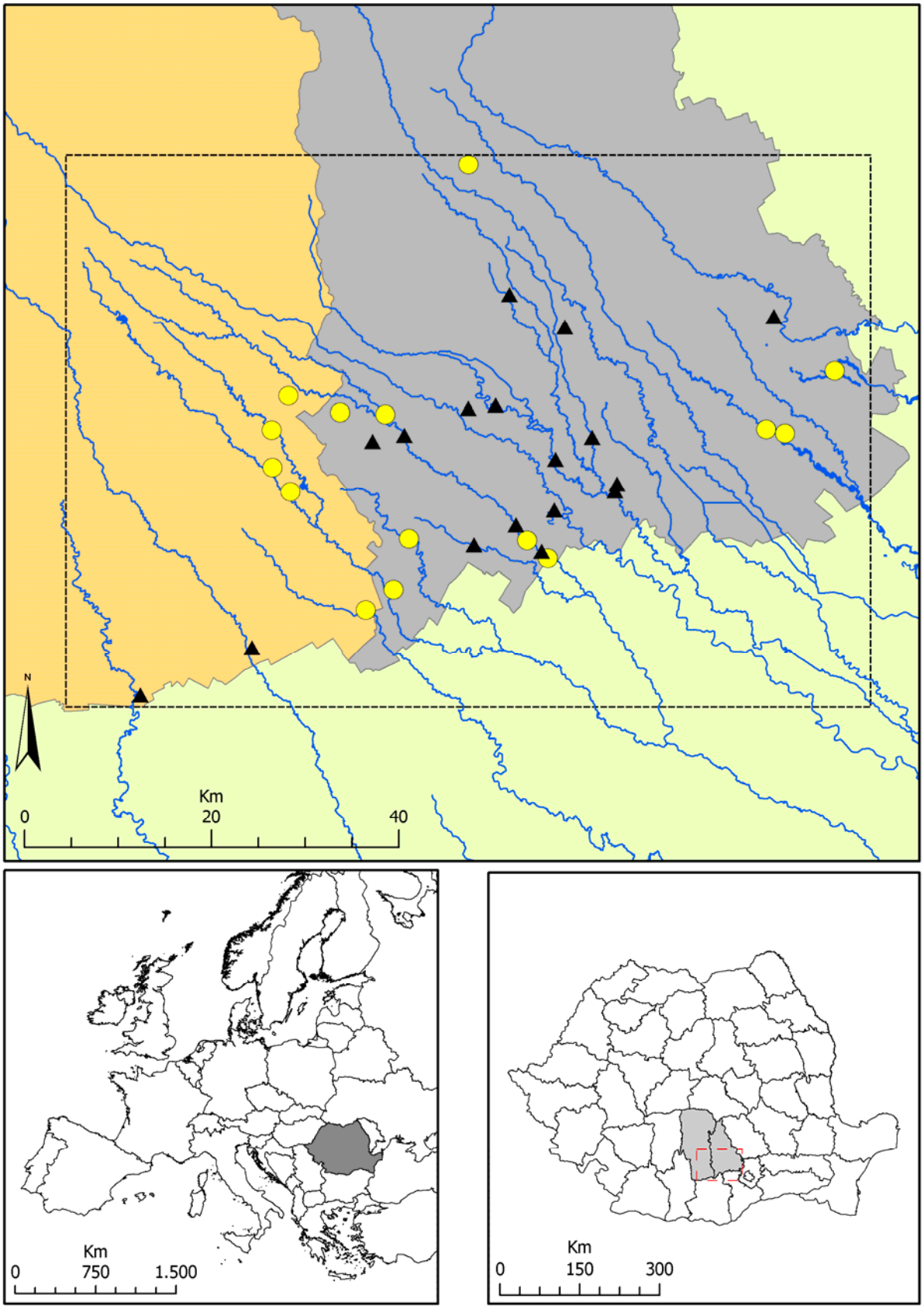


Plate I. Argeş-Dâmboviţa research area.

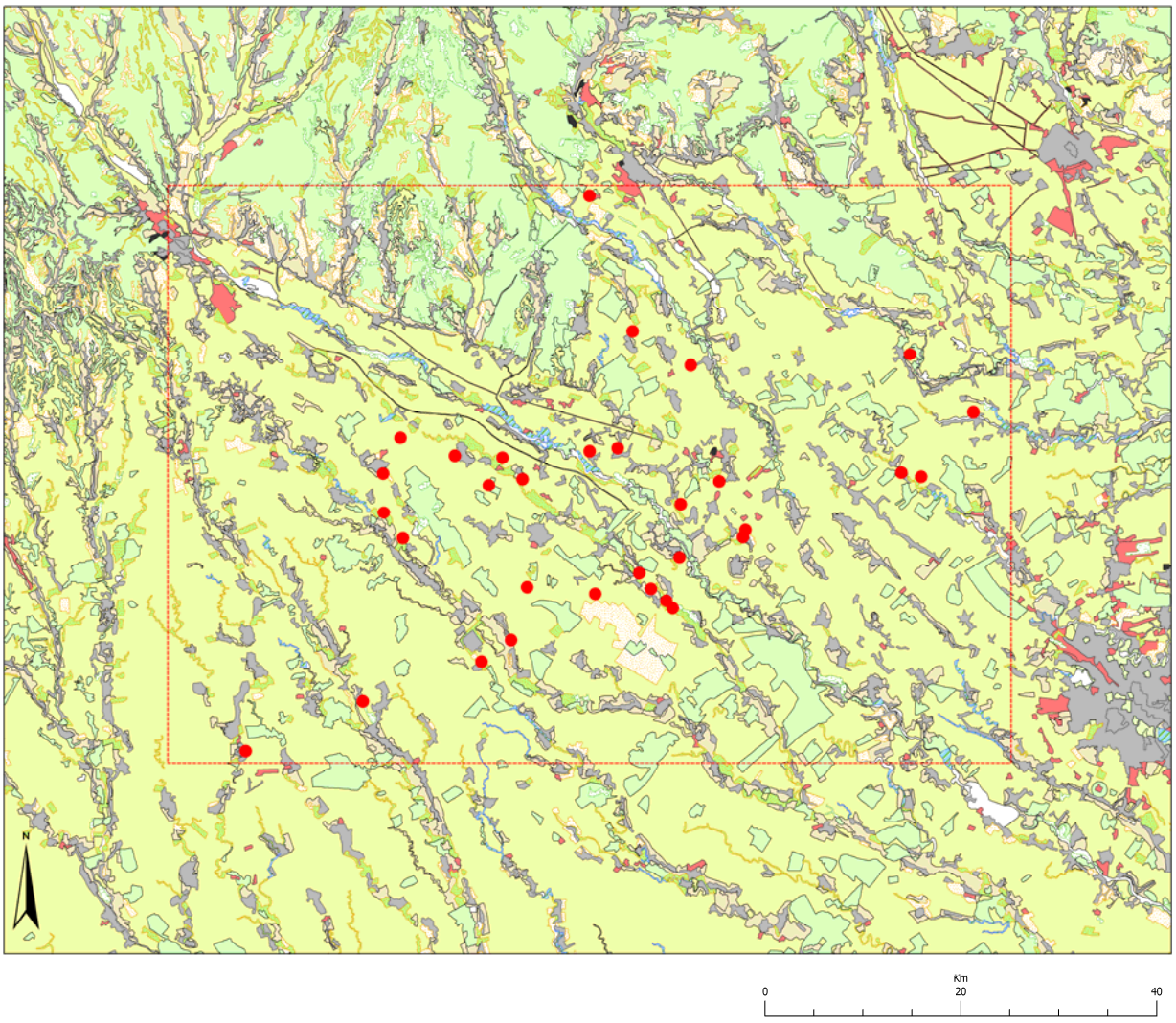


Plate II. The projection of settlements on Corine Landcover 2000.

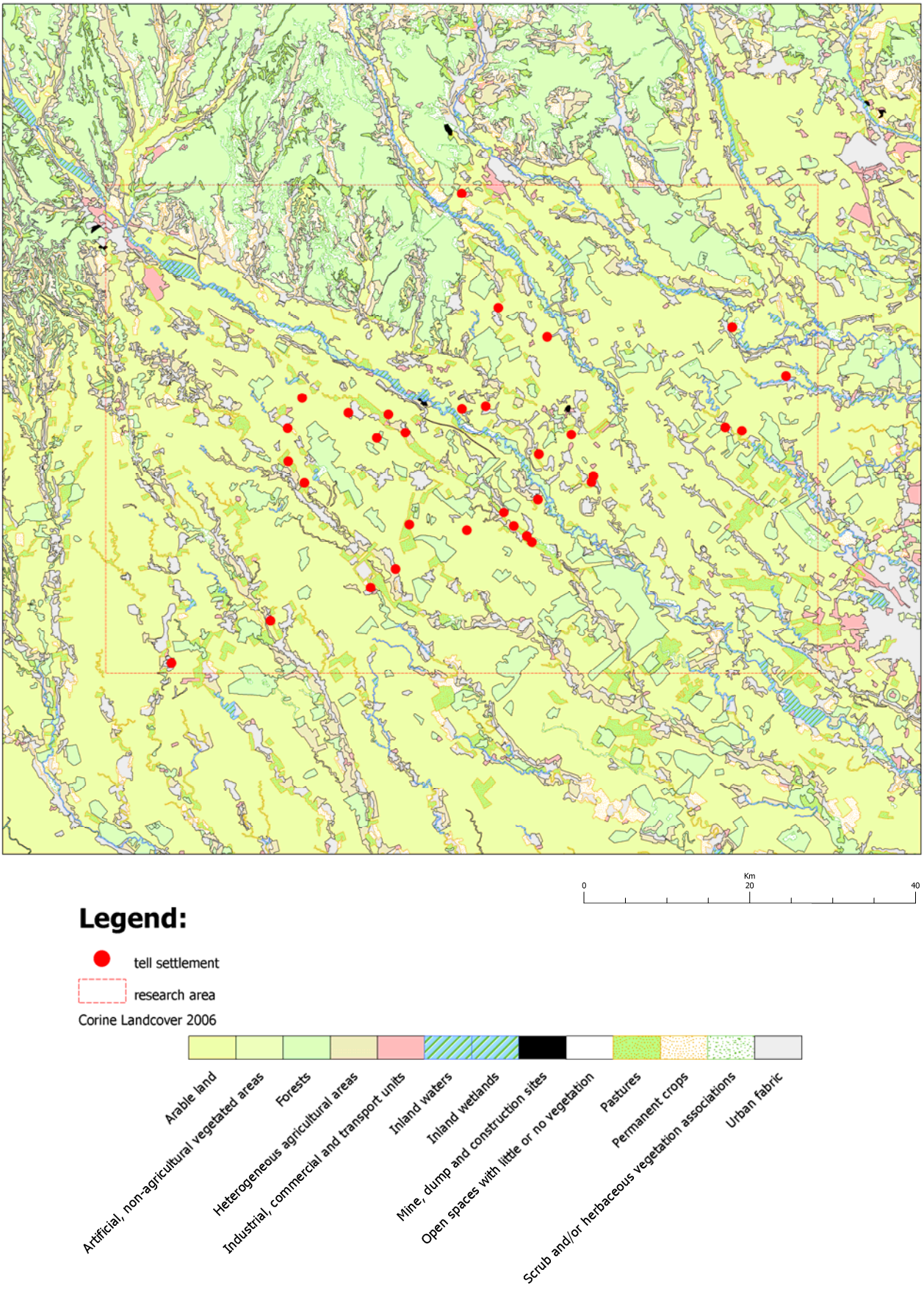
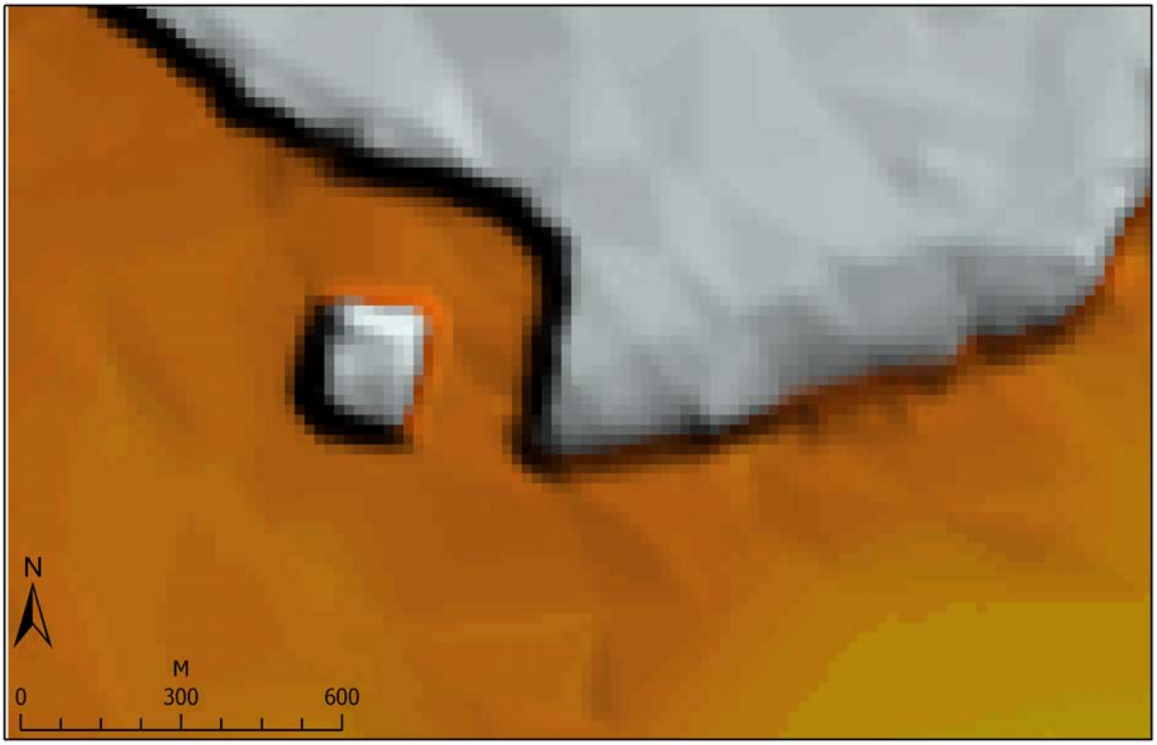


Plate III. The projection of settlements on Corine Landcover 2006.



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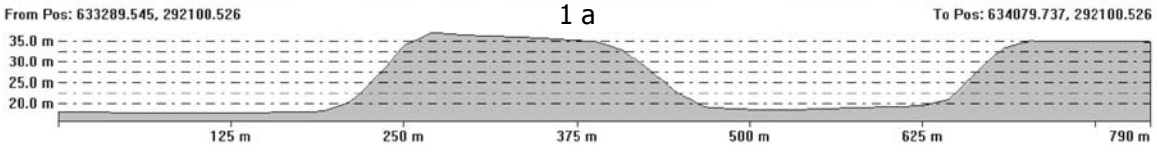

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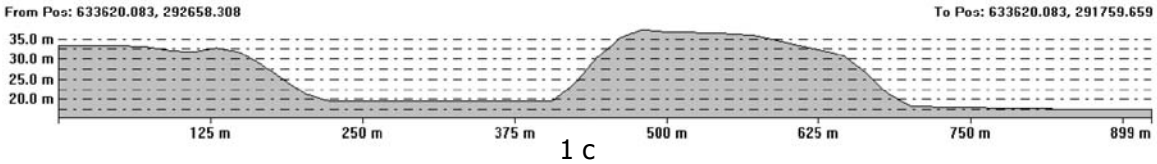

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Plate IV. 1a - Digital terrain model of the Gumelniţa settlement; 1b - Gumelniţa. N-S altimetrical profile; 1c - Gumelniţa. E-V altimetrical profile; 2 - Gumelniţa. Oblique aerial photography.

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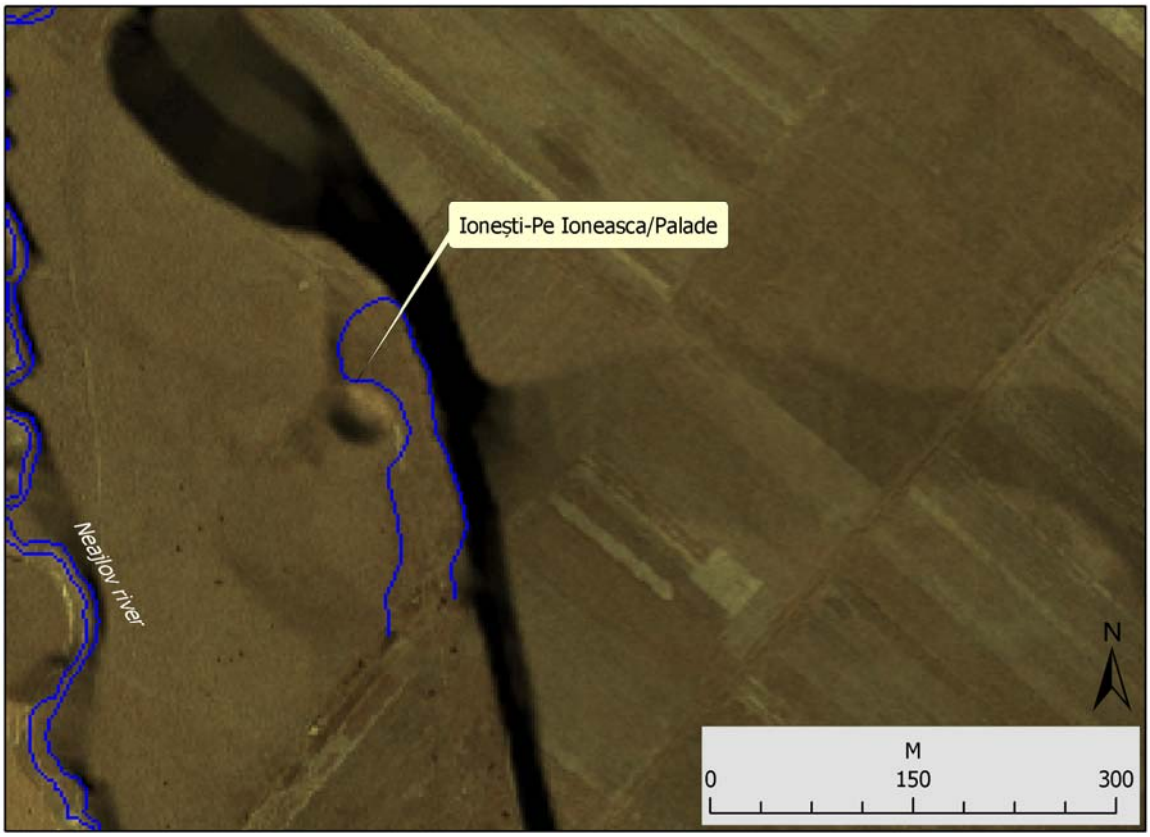
Plate V. 1 - Gumelniţa. Artillery firing plan, scale 1:20000; 2 - Gumelniţa. Ortophotoplan.



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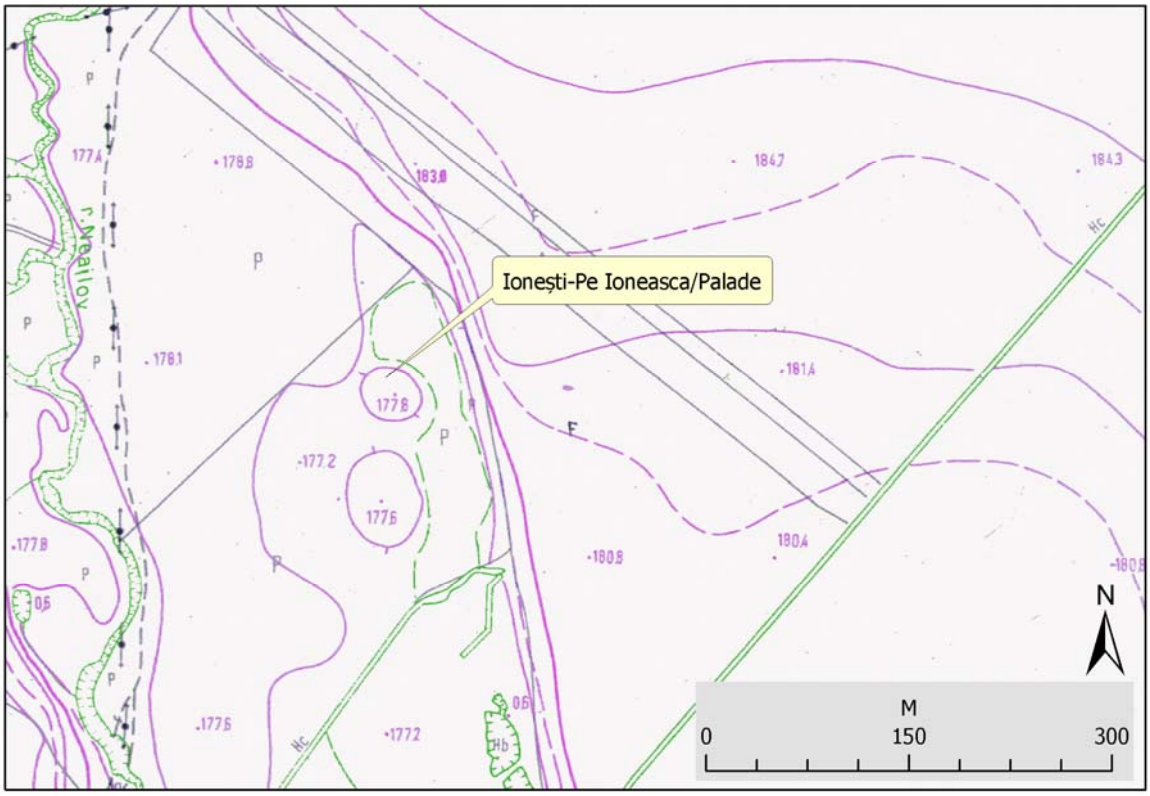

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Plate VI. 1 - Ioneşti-'Pe Ioneasca'/'Palade'. Digital terrain model with ortophotoplan; 2 - Topographical plan - scale 1:5000.

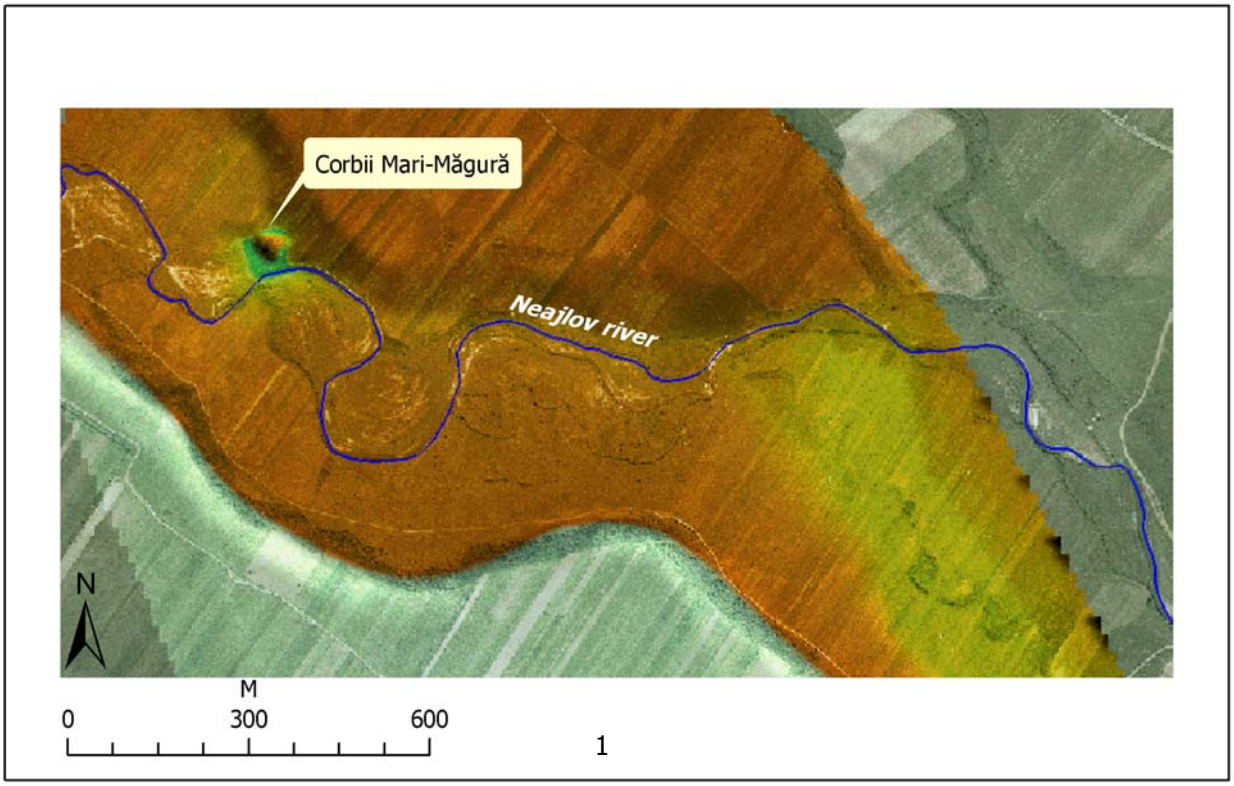

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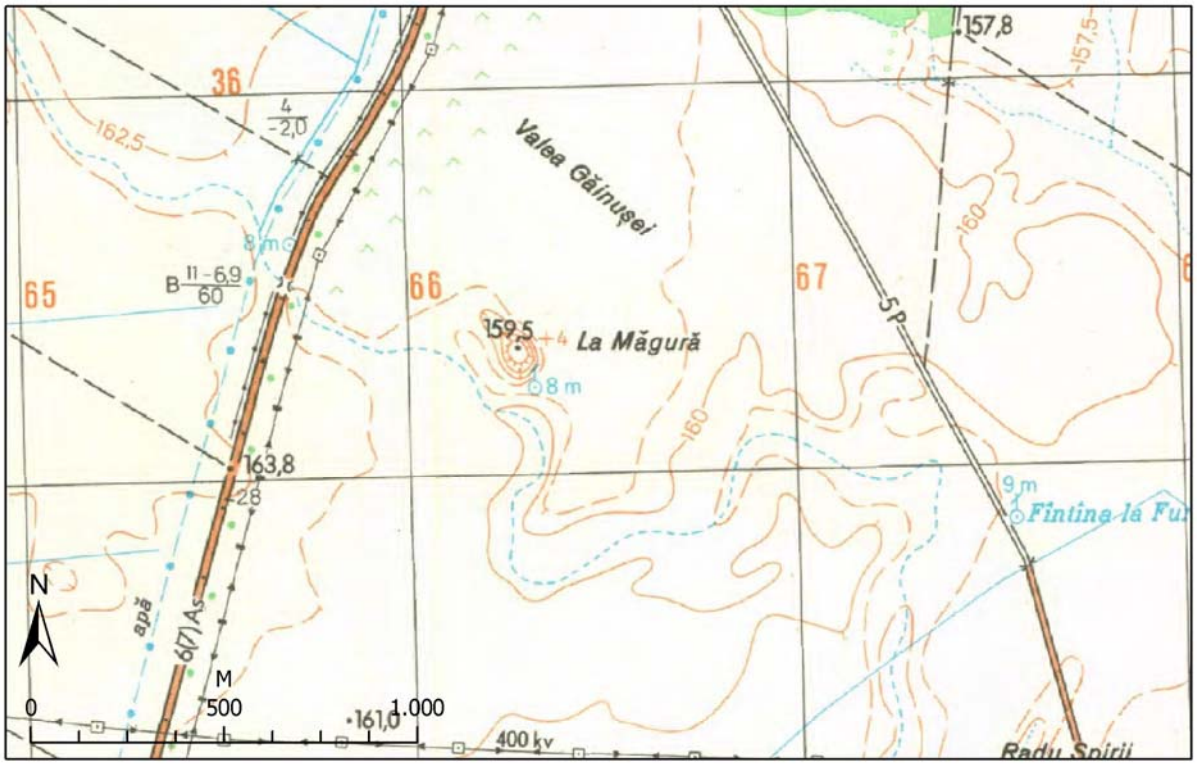
Plate VII. 1 - Corbii Mari-'Măgură'. Digital terrain model with ortophotoplan;
2 - Corbii Mari-'Măgură'. The *tell* settlement.



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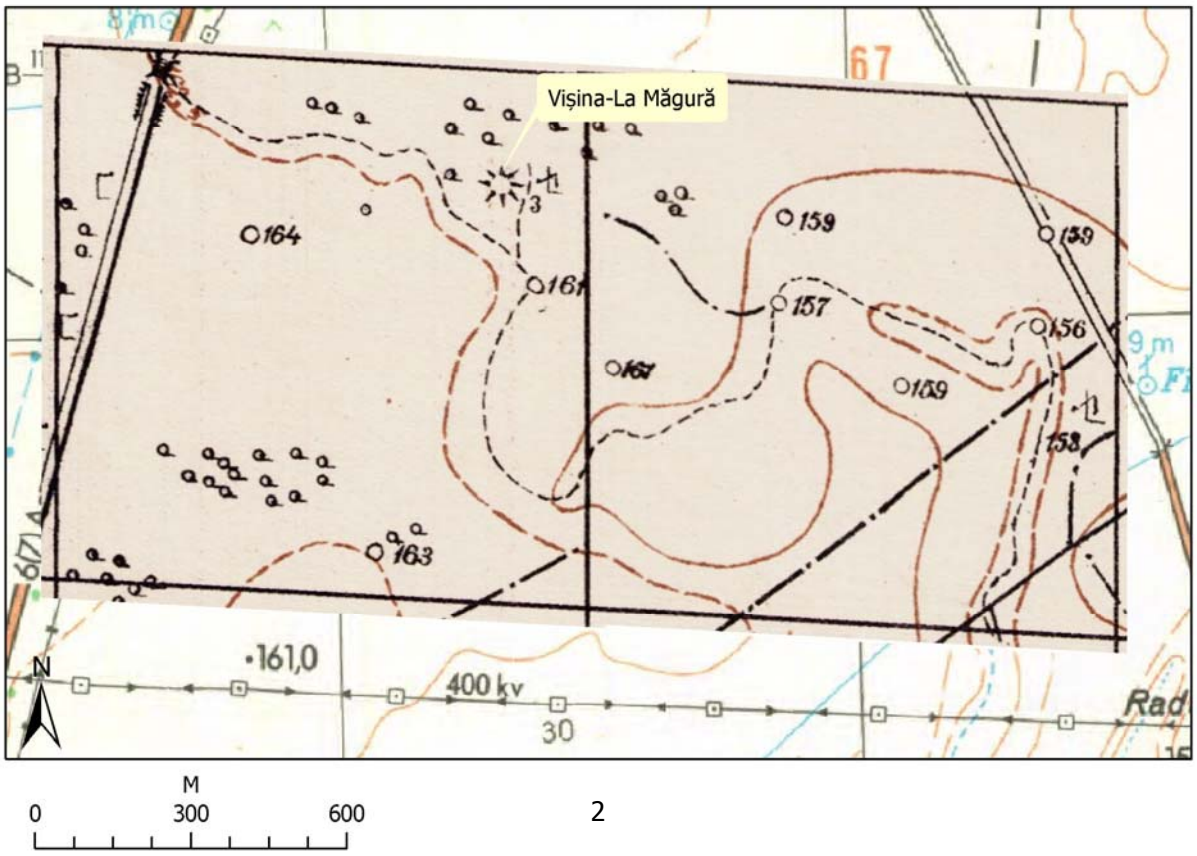

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Plate VIII. 1 - Vișina-'La Măgură'. Topographical map, scale 1:25000;
2 - Vișina-'La Măgură'. Artillery firing plan, scale 1:20000.

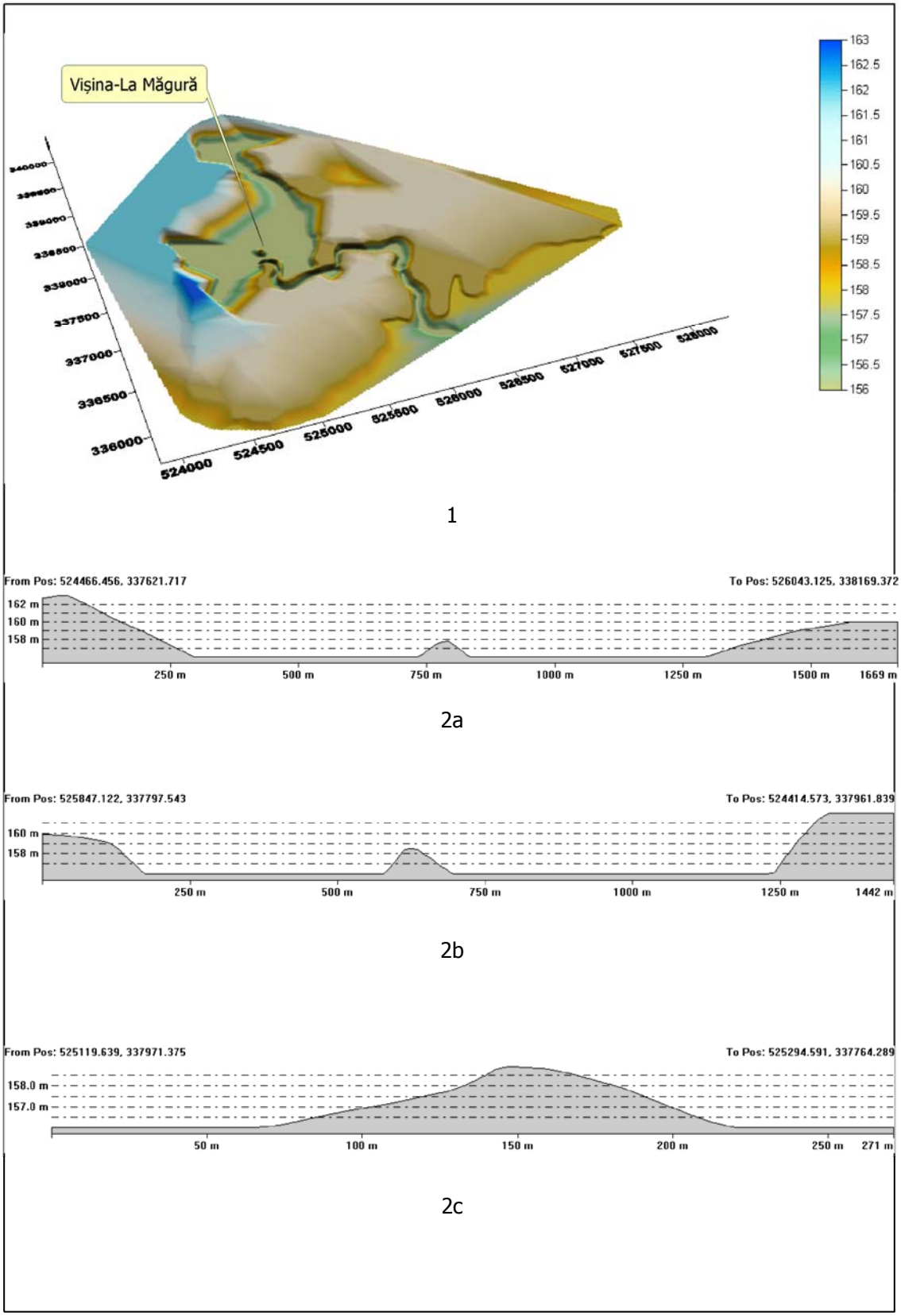

Plate IX. 1 - Vişina-'La Măgură'. Digital terrain model; 2a - Vişina-'La Măgură'. NE-SV altimetrical profile; 2b - Vişina-'La Măgură'. NV-SE altimetrical profile; 2c - Vişina-'La Măgură'. Altimetrical profile of the *tell* settlement (NE-SV).

TOPOGRAPHIC CONSIDERATIONS REGARDING THE ARCHAEOLOGICAL SITE FROM IEPUREŞTI, LOCATION 'LA IZLAZ' (GIURGIU COUNTY)

Alexandru S. MORINTZ

Abstract: *This paper analyses the topographic configuration of a flood plain area where an archaeological site is located. The first step was to study land level photography and satellite imagery. The analysis continued with the collection of topographic measurements of the area. The research results highlight some of the landscape changes that took place over time and allow for the formulation of a hypothesis concerning the appearance of the area during the functioning of the prehistoric settlements.*

Keywords: *landscape; topographic measurements; DEM (Digital Elevation Model).*

1. Introduction

The archaeological site at Iepureşti was discovered in 2004 by Ovidiu Coca, a geography and history teacher at the local school. His passion for local history materialised in the creation of an impressive school museum and included numerous surface archaeological investigations in the area of the Iepureşti village.

The archaeological site at Iepureşti - 'La Izlaz' is located in Neajlov Valley north of the county road DJ 411 between the villages of Stâlpu and Iepureşti (Figure 1). It is a flood risk area used as village grazing land.

The scientific interest generated by the identification of the site led to three field research campaigns that took place during the years 2007, 2008 (Schuster *et al.* 2008; Schuster *et al.* 2009: 311) and 2009. The last research campaign developed an interdisciplinary approach gathering together specialists from the 'Vasile Pârvan' Institute of Archaeology from Bucharest, 'Teohari Antonescu' County Museum from Giurgiu, 'Valahia' University from Târgovişte and EnviroSystems Inc. (USA).

This study will focus on some of the research from 2009 that focused on the analysis of the topographic configuration of the area of the site. As discussed elsewhere (Morintz and Schuster 2004: 7-8; Morintz 2006: 112), the collection of topographic measurements prior to the excavation is extremely important because additional excavation will irreversibly alter the existing configuration and therefore prior measurements must be accurately recorded.

The investigation methods proposed and used can be categorized as non-destructive methods and are described below.

2. Methods

The non-destructive methods used in the archaeological research are numerous and include a range of techniques including: aerial photography, satellite imagery and geophysical studies. The techniques used will not be described in this paper. Our aim is to raise awareness of the existence of a rich bibliography concerning both the methodology and its application in archaeological contexts.

Later, we will refer only to methods used by us during the research and strictly connected to the purpose of the paper. For our research we divided these methods in two categories.

The first category consists of methods that offer *clues* regarding the area of the archaeological site. This includes the observations made during the field survey activities such as field sketches and land level photography. This was followed by the identification of the site on satellite imagery. The combination of the data sets allowed the formulation of a research strategy by delimiting the areas of possible archaeological interest.

The second category consists of methods that offer *proof* to verify the hypothesis formulated based on the sketches, the aerial photos and satellite imagery. They also determine the exact shape and size of the archaeological sites and features. This category includes topographic measurements and a resulting topographic map and the Digital Elevation Model (DEM) covering of the area of interest.

The information gathered from the nearby residence regarding the behaviour of the landscape in the area of the site during the changing seasons added an important contribution to our analysis.

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3. The Analysis

During the first field survey we observed the very discreet position of the site in the landscape (Figure 2). It is visible as a very small mound surrounded by an almost flat terrain. This height is best observed from the southwest, especially at sunrise and sunset, when the rays of the sun fall tangent to the surface of the soil.

Two additional characteristics of the site were noticed during this field investigation. First, the site has the form of a rectangular plateau with slightly rounded corners. The sides are approximately 50m long and orientated on a north-south and east-west axis. The maximum height of the plateau from the surrounding ground is approximately 1m. The second characteristic is a small depression surrounding the entire site. This depression is barely visible due to the high (approximately 50cm) and dense vegetation, and is best identified by walking across it. The depth of this depression is variable and in certain portions is almost imperceptible.

The study of satellite images of the area confirmed the shape of the site identified by us during the field investigations (Figure 3). The present-day courses of the Neajlov River, as well as two older riverbeds, are visible northeast of the site. One of these older riverbeds is located immediately north of the site. This riverbed, probably the oldest of the three, makes an inlet and surrounds the site giving it an island aspect. This phenomenon might be connected with the depression that surrounds the site.

In order to determine more precisely the shape and size of the above described elements we produced topographic measurements on a surface of approximately 4 hectares. With the purpose of an optimum registration of the terrain's configuration the points of the topographic measurements were arranged in two ways: *parallel stripes*, in order to cover the entire area in a uniform manner, and *radial*, with the centre in the middle of the site, in order to provide a supplementary density in the interest area (Figure 4).

A topographic plan with contours was made on the basis of the measurements (Figure 5). We chose to use 10cm equidistance between the contour lines because the topographic variation was often quite small and we wanted to highlight the topography with accuracy. The contours show a form of relief with an almost square shape and slightly rounded corners. The height of the superior part of the plateau measured from the surrounding ground varies between 0.95 and 1.10m. The depression around the site has an opening at the superior part that varies between 15 and 25m in width and a depth ranging between 0.70 to 1.50m. The biggest depths were measured on the south, east, and northern sides.

Our analysis continued by creating a DEM of the area using the topography. For an effective highlight of the topographic configuration we made six versions of DEM with a progressive exaggeration of the altitude scale (Figure 6). The real scale, 1:1, is illustrated in the first version (Figure 6.a). Although the model is deprived of vegetation (which usually prevents the observations regarding the slope change), the area of the site is almost imperceptible. The higher position of the site on the landscape becomes more defined when exaggerating progressively to an altitude scale of two times (Figure 6.b) and four times (Figure 6.c). Another visible feature in the last plan of the image is the high terrace. When we increase the altitude scale eight times (Figure 6.d) we can see that the depression that surrounds the site is interrupted in the southwest, on a portion of 10-12m. Finally, at a 16 times (Figure 6.e) and 32 times exaggeration (Figure 6.f) it can be noticed how the area south of the site (the close plan) is higher compared with the northern and western areas.

By limiting the DEM to the site area we highlighted even better the observations made above (Figure 7). In order to better suggest the dynamics of the terrain we made two topographic profiles by 'cutting' the DEM on the north-south (Figs. 7.a, b, c) and east-west (Figs. 7.d, e, f) axes. Both topographic profiles confirm the observation that the most pronounced depression was on the southern and on the eastern sides.

As we mentioned above, the area we investigated is located in the flood plain of the Neajlov River. On the maps dating from the end of the XIXth Century the entire area is marked with the conventional sign for a swamp (Figure 8). The teacher Ovidiu Coca, as well as other residents of the village, told us that often, during the spring, the rapid melt of the snow led to flooding of the entire area confirming the site's island appearance (Figure 9). The same phenomenon was also observed during the floods that occurred during the last four decades.

4. Conclusions

At the end of this study we can conclude that this is a preliminary investigation and further research will be conducted using the hypothesis gained during this initial exploration. Our proposal for

the digital reconstruction of the landscape from the period of the prehistoric habitation (Figure 10) must be viewed as an early stage of the research.

It is a certainty that the prehistoric settlement is choked today by the alluvial deposits made by the Neajlov River in the past. This aspect is proven by the thickness of the archaeological deposit that goes below the present day level of the flood plain. It is very possible that during its functioning the settlement was considerably higher compared to the surrounding terrain, as represented in Figure 6.

It is difficult to say with certainty if this represents an island settlement, although there are a series of arguments in favour of this hypothesis. One of these arguments is the presence of the low terrain around the settlement, a terrain which is even today predisposed to periodic annual flooding. Future field research will clarify whether or not the depression surrounding the settlement was a man-made ditch created for protection against the water. The area southwest of the site, where the depression is interrupted, will also be the focus of research in order to indicate the purpose of the high ground.

In order to better understand the topographic issues at Iepureşti the topography of the site must be correlated in the future with that of other contemporaneous sites from the Neajlov River area. For comparison purposes we are considering known sites, such as that at Bucşani (Bem *et al.* 2002) and the identification of new sites. A starting point for the identification of new sites should be the topographic characteristics of the Iepureşti site that are valid for other flood plain settlements (Andreescu *et al.* 2001: 31): the choosing of a location in the flood plain of a river, but simultaneously in the immediate vicinity of a high terrace, where the inhabitants could find refuge in the eventuality of big floods.

Obviously, conclusions are far from complete. This study involved the registration of the topography for the area prior to the beginning of the excavations, the analysis of the data and the formulation of a working hypothesis. An overall image of the prehistoric habitation at Iepureşti will be better defined with supplementary geophysical data gathered in 2009, future scheduling of geologic soundings on the site, and, of course, the on-going excavations identifying the prehistoric use of the area.

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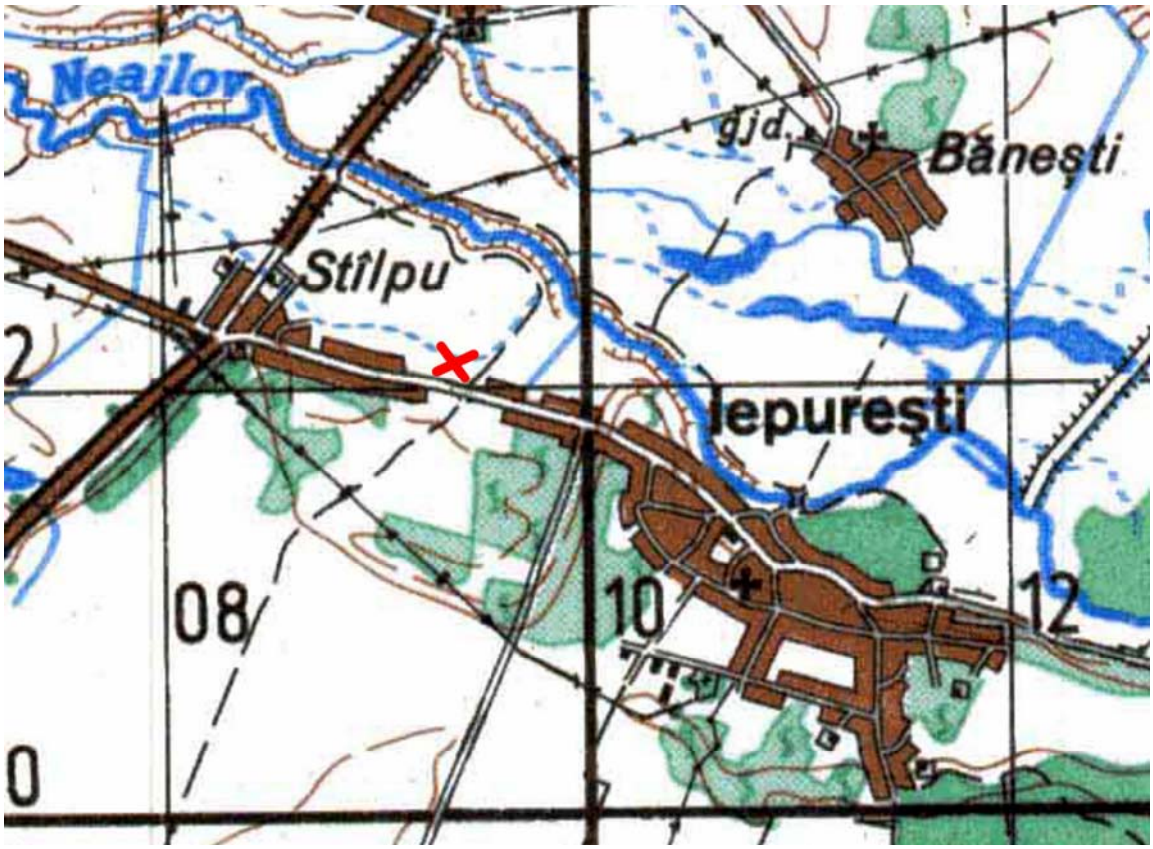

Figure 1. Detail of topographic plan, scale 1:100,000, with the area of the archaeological site at Iepureşti, location 'La Izlaz'. The following features are represented on the plan: the topographic configuration (by contours), the hydrographic network (Neajlov River and the surrounding floodable area) and the present day villages in the area. The approximate position of the site was marked by us with an 'X'.

Figure 2. Overall view of the site on which we marked: with dotted line - the superior part, with 'V' the circular depression that surrounds the site. In left side of the image we sketched the profile.

Figure 3. Satellite image of the area. The site, circled, is located in the central-southern part of the image and the present day course of the Neajlov River is visible in the northeastern part. Two dried riverbeds are visible in between the two features mentioned above. One of these old riverbeds is located immediately north of the site.

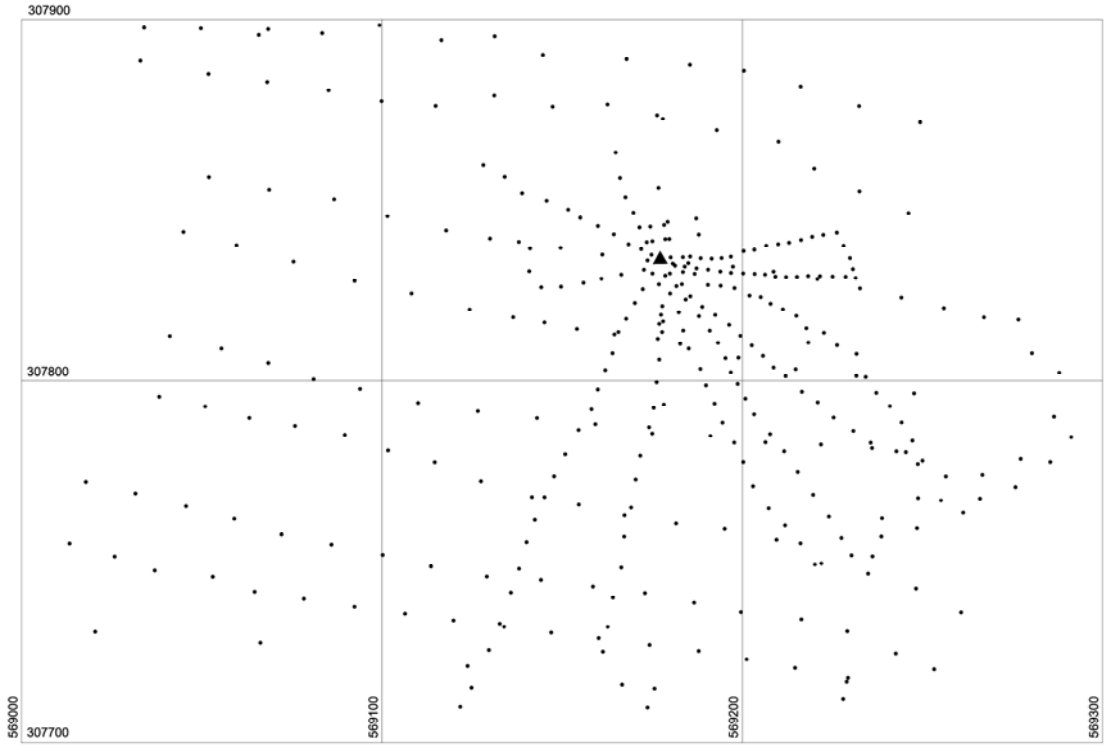

Figure 4. The dispersion of the points used for topographic measurements in *parallel stripes* (to cover uniformly the entire area) and *radial* (to provide a supplementary density in the area of the site).

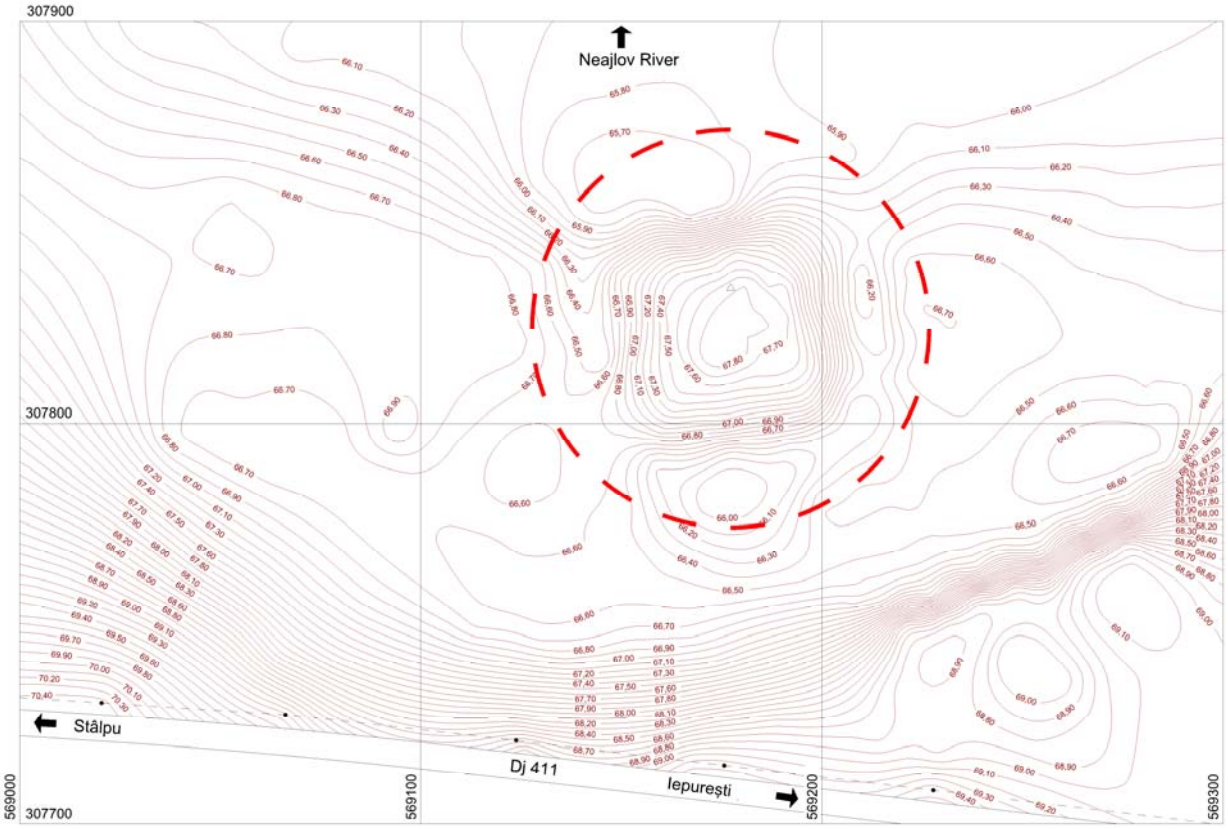

Figure 5. The topographic plan of the area with the delimitation of the site. We opted for a 10cm equidistance of the contours in order to intercept with fidelity the topographic configuration of the area.

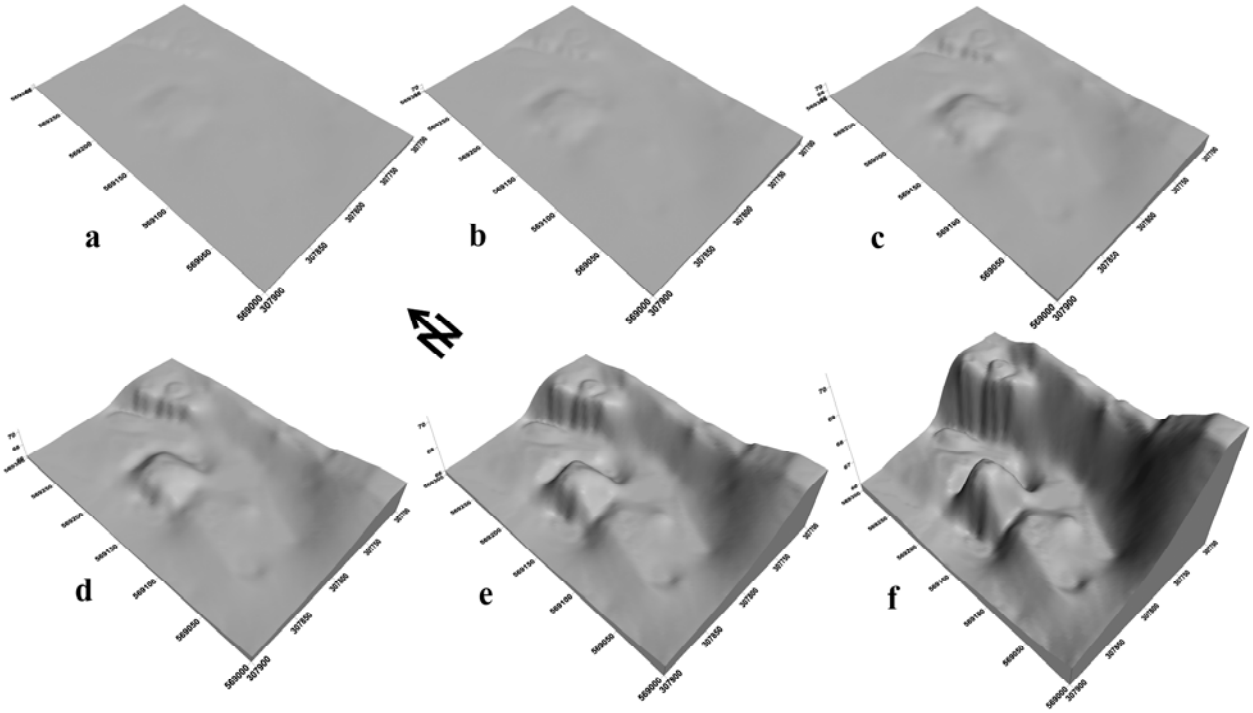

Figure 6. The representation of the area of the site as a DEM (Digital Elevation Model). For a suggestive highlighting of the topographic configuration we made six versions, enhancing progressively the scale of altitudes: 1:1 (a), 2:1 (b); 4:1 (c); 8:1 (d), 16:1 (e) and 32:1 (f).

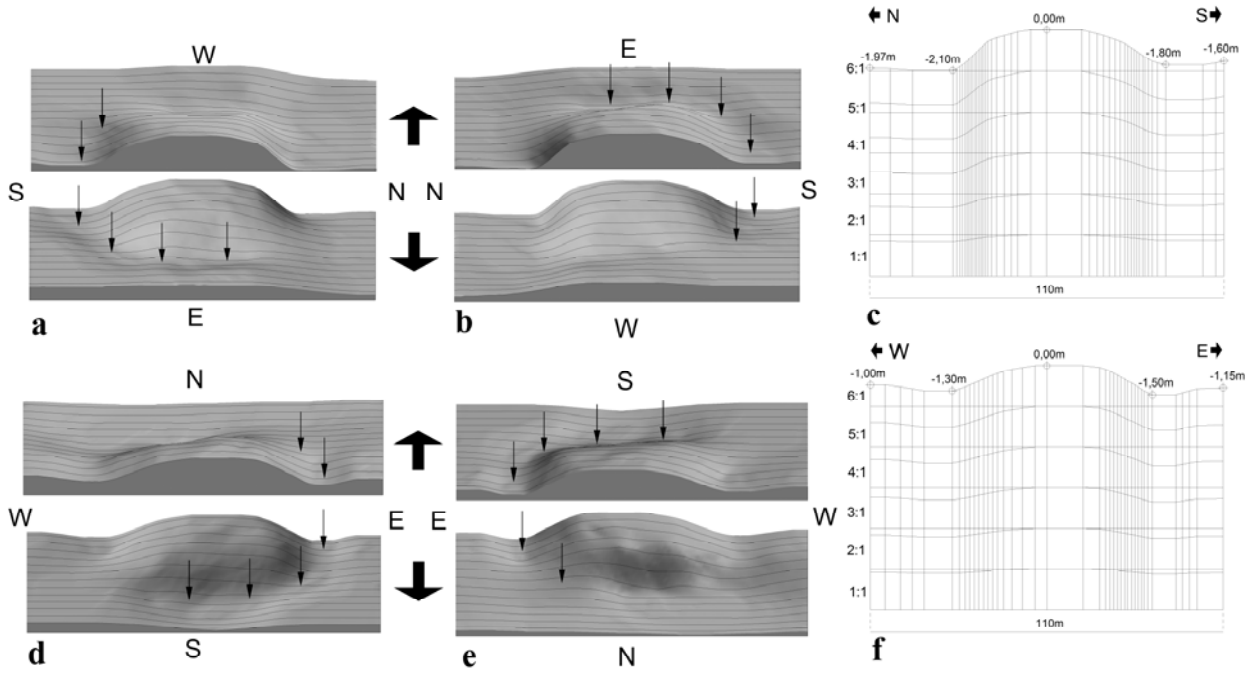

Figure 7. The representation of the site as a DEM and the 'cutting' of the model in north-south (a, b, c) and east-west (d, e, f) directions.

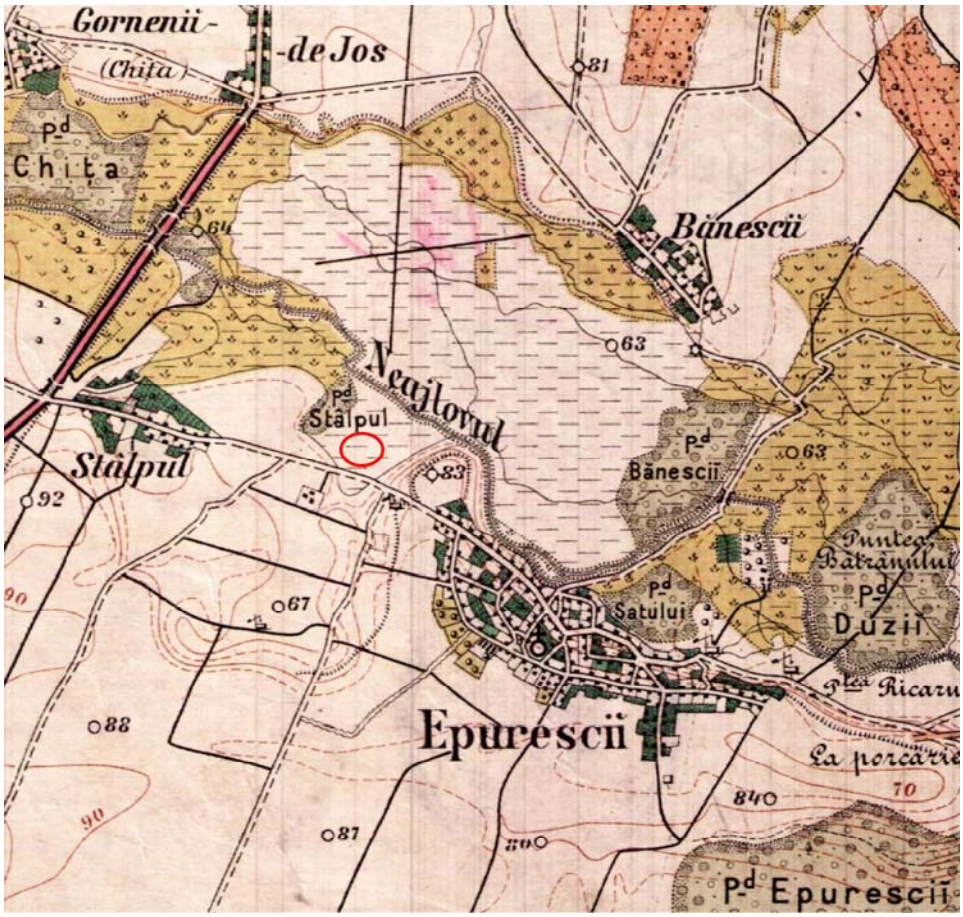

Figure 8. Detail from a topographic plan dating from the end of the XIXth Century. The area of the site, marked by us on the plan, is located in a swamp area.

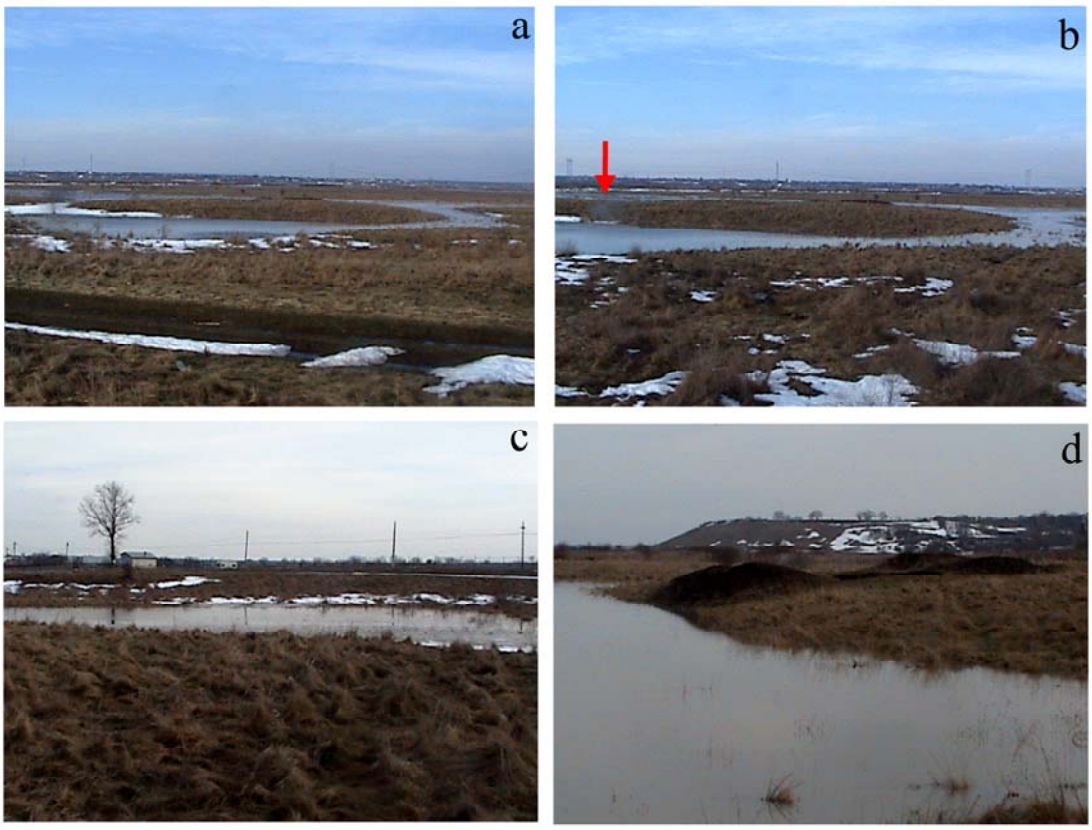

Figure 9. Photos made by Ovidiu Coca in February 2010 which capture the moment of snow melting. Initially the site has an island aspect (Figure 9.a). As the waters retract a connection with the western area becomes visible (Figure 9.b). Images in Figs. 9.c and 9.d represent details from the north and from the west.

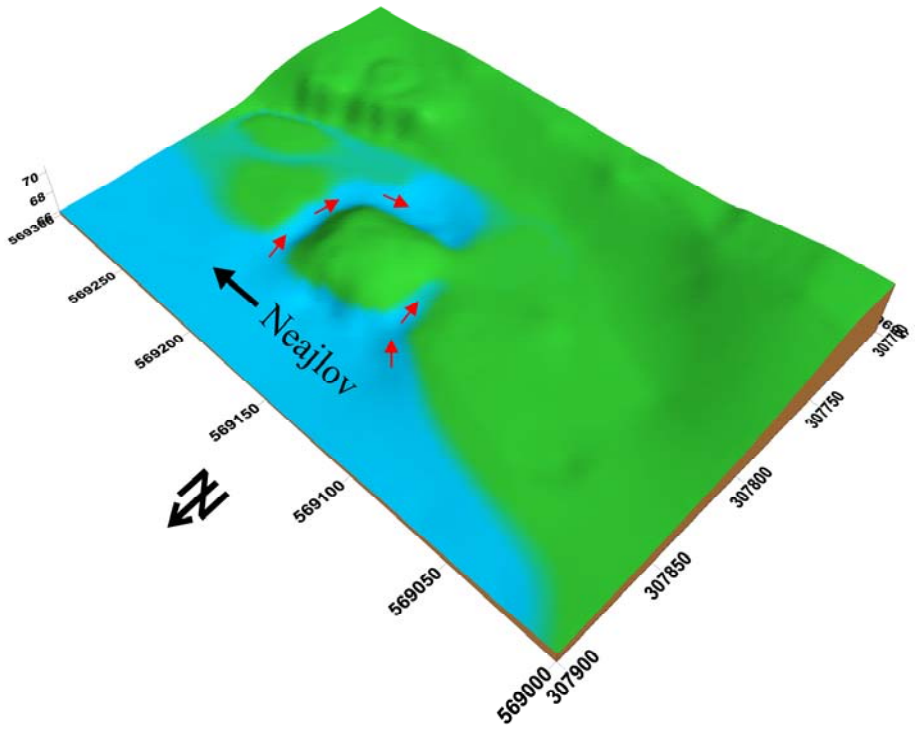

Figure 10. Proposal for the digital reconstruction of the landscape surrounding the site from the period of prehistoric habitation.

A NEOLITHIC MICROLANDSCAPE - THE STORY OF COMPLEX 40 FROM MĂGURA-BUDUIASCA (TELEOR 003), TELEORMAN COUNTY, SOUTHERN ROMANIA

Pavel MIREA

Abstract: *This paper presents the preliminary results of the depositional analyses carried out on assemblages recovered in a developed Neolithic pit - complex (5500-5400 cal BC, early Dudeşti period) excavated as part of the Southern Romania Archaeological Project in the Teleorman River Valley. The analyses aimed to determine if there are several phases of pit fill and to provide a chronological sequence. In addition, correlation between the filling of the pit and the types and functionality of the vessels was investigated. The variable condition of individual vessels before deposition in the pit was also studied.*

Keywords: *developed Neolithic; pit; Complex 40; deposition; vessels; potsherds.*

General background

The key-site of Magura 'Buduiasca', discovered in 2001, is located on the lower eastern terrace of the Teleorman River to the east of Alexandria town and 45 km north from the Danube River (Figs. 1, 2). Excavation of the site was part of the Southern Romania Archaeological Project (SRAP)[1] focused around Măgura village in the Teleorman River Valley (Figure 3). Archaeological research took place between 2001 and 2008 and led to the discovery of both pits and surface structures. Based on the C^{14} data, these features date from the earliest Neolithic (Sterčevo-Criş - c. 6100-6000 BC) to the developed Neolithic (Dudeşti and Vădastra - c. 5500-5200 BC)[2].

The archaeological complexes investigated comprise of pits of various shapes (the predominant category), simple shallow pits, concentrations of fragmentary archaeological material, and, rarely, surface structures. They cover a surface area of approximately 900m east-west and 350m north-south. The inventory is generally represented by ceramic fragments and/or complete vessels, stone and bone tools, and anthropomorphic and zoomorphic figurines. Other different material artefacts include building material, hearth fragments, animal bones and some human bones.

The typology of the complexes appears to follow a common chronological and cultural 'pattern'. Thus the entire sequence of the early and developed Neolithic is of pits with different concentrations of archaeological remains. Traditionally, through study of the structures, the material inventory and the relationships between the two, these archaeological complexes have been interpreted as houses, refuse pits and waste areas, or even ritual deposits. A working hypothesis assumes that these are external to houses where different vessels, tools and household objects were stored and discarded, and part of the inventory left in place following abandonment of seasonal occupation.

Elsewhere in the Lower Danube area pits show a relative impermanence of building technologies and materials suggestive of temporary, or repeated short-lived, occupation (Bailey 2000: 58, 62). Some of the pit features were the subject of a high-resolution spatial survey interpolated to a raster surface and integrated into a GIS to aid the collation of quantifiable data and interpretation of the archaeology (Mills 2009). Advanced analyses, including soil micromorphology, has not produced a clear explanation of the 'pit' complexes from Măgura (whether they are 'storage pits', 'quarry pits' and/or 'pit houses') and therefore their original function and re-use remains enigmatic (Macphail *et al.* 2008).

Complex 40 - case study

Complex 40 (C40), a pit excavated in 2005 in sounding 28 (Figure 4), was selected for analyses based on the composition of its inventory (Andreescu *et al.* 2006). The complex is attributed to the developed Neolithic period and dated c. 5500-5400 cal BC (early Dudeşti). The archaeological material shows strong parallels with material known from the south Danube area belonging to the Ovcharovo-Samovodene group and Karanovo III (Popov 1996: 94).

Identified at a depth of -1.10 m below surface, the pit was originally dug in a figure eight shape as a result of the joining of two almost round holes. Only the east side of the pit was completely excavated because of constraints imposed by present agricultural land ownership. The dimensions of the pit are approximately 4.40 x 2.80 m with a maximum depth of -1.00 m (Figs. 6-8).

Steve MILLS and Pavel MIREA (eds.) *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions - Proceedings of the International Conference, Alexandria 3-5 November 2010*: 241-256.

Two steps were found on the south side. Inconsistent burnt clay fragments outline the pit and likely represent a kind of wall plastering (Figure 5), but no evidence of postholes or other traces of construction features are present. The major part of the inventory was concentrated at the bottom of the pit and includes 106 vessels in different proportions of completeness. In addition to the ceramics, the inventory includes lithics, bone and other clay objects, fragments of burnt and unburnt daub, hearth fragments and animal bones. It seems likely that the pit was originally associated with housing or shelter, a pit-house type, with subsequent reuse for another purpose. Elements that could best define its functions are missing.

Methodology

The pit was excavated using the following archaeological methodology: the working area was divided into 16 areas of 1m square and each was excavated in vertical levels (archaeological units) of 10cm to maintain spatial control down to the maximal depth of -2.11 m (Figure 11).

The sherds of the 106 vessels appeared in vertically consecutive and horizontally parallel levels giving the impression of different stages in their accumulation (Figs. 9, 10). To explain this distribution, I developed a model to analyse the deposition, first based on the complete vessels then to other categories of artefacts: flint, stone and bone tools, clay objects, daub and hearth fragments and various other lithic fragments.

The analyses attempted to determine if there are several phases of pit fill and to provide a chronological sequence. In addition, research investigated if there is any correlation between the filling of the pit and the types and functionality of the vessels. There can be a range of processes that affect individual vessels before deposition in the pit: secondary firing after breakage, surface degradation indicating a long time-exposure to environmental factors, and reuse.

Description of the depositional analysis of vessels

Each ceramic vessel fragment was represented by a conventional sign according to the components: lip, body, base. A graph was then created showing the depth and position of each fragment.

The assessment of the pit starts at -1.20m where Early Dudeşti potsherds are dominant (> 85%): in the first spit (-1.10 to -1.20 m) the Early Dudeşti pottery is mixed with Vădastra pottery (approximately 50% each).

However, to verify the possible disturbance within the pit fill, at least for the ceramic fragments of complete vessels, the depositional analysis also focused above the upper limit of the pit in the depth interval 0 to -1.20 m. This Preliminary analysis was applied to 21 vessels (Figure 15).

By registering the position of fragments that comprised a vessel, this procedure may be able to determine a vessel's initial position when it was abandoned. The analysis is also able to highlight where the maximum concentration of pottery occurs in archaeological units and at which depths. At this preliminary stage of analysis, the maximum number of vessels was found at the depth -1.60 to 2.00 m (13 vessels).

The analysis identified other important aspects in the data. For example, vessel no. 6, composed of 56 fully joining pieces and 95% complete, was initially located at a depth of -1.30 to -1.50 m in a shallow area of the pit. Here 77% of component fragments were found 'in situ': 29 fragments from the body, 12 base fragments and 5 rim potsherds. A single fragment from the body is located at -1.20 to -1.30 m. The interesting point is the location of the rim fragments: these were at horizontal distances ranging from 0.6 to 1.8m and depth intervals of -0.90 to -1.20 and -1.50 to -2.00 m from the presumed original position of the vessel (Figure 14). This spread suggests either that the vessel was thrown in, or that it entered following the collapse of a superstructure (perhaps a kind of roof), and that the top (rim) was the first to hit.

A further aspect of the 'history' of this vessel is that it is a reused ceramic container. The vessel (Ovcharovo-Samovodene group), of 18.5 cm height, 17 cm mouth diameter and 25 cm maximal diameter, initially had four legs and a cylindrical handle (most likely a 'horn handle' type). The legs were broken at some point in its use and the places where the legs had been, and the initially, slightly curved, vessel base, were carefully polished. This polishing created a flat stable surface[3]. There is no evidence of what happened to the handle; it was probably lost in use. That the edges of the holes where the handle was originally located show signs of abrasion is proof of use of the vessel after breakage. Despite the presence of the two holes, located 7 cm from the rim and 7.5 cm from the base, at least the lower part of the vessel could still be used to contain solid products.

Another case study is that of a large, probably storage, vessel with dimensions of 37 cm height, 33 cm mouth diameter, 17 cm maximal diameter and 48 cm base diameter and a capacity estimated at 30 litres (vessel no. 1). This vessel is 95% complete, consisting of a 92 potsherds representing the whole vessel. Almost half of the fragments (46.7%) were concentrated in the northern half of the pit at a depth of -1.80 to 1.90 m; this is most likely the initial position of the vessel. Almost one third of the fragments (31.5%) are above the -1.30 to -1.50 m depth interval, while isolated fragments appear at depths of 0 to 0.60 m. As an example, three fragments of the vessel are split as follows: a fragment from -1.50 to -1.60 m, a fragment from -1.00 to -1.10 m and another at -0.90 to -1.00 m. This distribution suggests post depositional disturbance (Figure 13).

Studying the 'history' of some of the ceramics permits other statements to be made. There are vessels composed of different colored fragments providing clear proof of their subjection to various conditions related to an additional firing. That many fragments can be re-joined suggests that vessels were broken somewhere other than in C40 and were subjected to different treatment before being thrown into the pit. In the case of five such vessels, the analysis found that they had a low degree of completeness, lacking, in general, one of the components such as the rim or the base. The evidence of secondary burnt potsherds found throughout the pit at different depth intervals, together with fragments that retain the original appearance of the vessels, suggests their further accumulation in C40.

Other finds

Along with vessels and ceramic fragments, other whole and fragmented clay made objects were discovered: 4 loom weights (unburnt clay), 9 spindle whorls, 6 clay discs, 3 smoothing/blank sherds, 3 'small altar' (or 'cult tables') fragments and an anthropomorphic figurine fragment. The following remarks concern the way these objects are composed from different fragments. Thus, one spindle whorl is made of a perforated potsherd composed of two fragments one of which is secondary fired. The fragments were located at about 0.5m apart horizontally and at about 0.30cm apart in depth. Another issue concerns one of the clay discs which has a specifically early Neolithic (Starcevo-Criş) fabric: chaff tempered and red ware surface. It is not clear if this is an early Neolithic object that 'reused' an early Neolithic potsherd and that came to be in C40 because of a stratigraphic disturbance (illustrated by the close presence of Vădastra Neolithic potsherds), or that it is a later Neolithic object whose manufacture 'reused' a ceramic piece from the previous chronological sequence.

The depositional analysis was also extended to the burnt and unburnt daub fragments and to the hearth remains (the so-called 'hearth pads'). Preliminary study has determined the depths where the maximum concentrations occur: -1.60 to -1.90 m for the burnt daub, -1.40 to -1.80 m for the unburnt daub and -1.20 to -1.90 m for the hearth fragments.

The presence of at least three hearths was determined by measuring the thickness, composition and degree of burning of the hearth fragments using preliminary macroscopic analysis. Combined, the fragments did not represent a complete hearth and they were found in normal, oblique or upside-down positions in the pit.

The stone and bone tools were similarly analysed. The flint assemblage (tools and flint chips) consists of 521 pieces with a maximum concentration (82) at -1.60 to -1.70 m.[4] Another 33 stone tools, all fragmented (grinding stones, chisels, sharpeners and whetstones), have the highest concentration (7 pieces) at the same depth level (-1.60 to -1.70 m). Surprisingly, for the bone objects, 57 artefacts (17 whole and 40 fragmentary), the maximum concentration (13 objects) was also -1.60 to -1.70 m. A range of tool-types are represented: perforators, points, needles, spatulas, spoons, smoothing tools, chisels, rings and waste processing debris. A hairpin is a unique piece which has its nearest counterparts to the south of the Danube in contemporary settlements (Detev 1960: 11, fig. 9). The active part of the hairpin is cylindrically shaped with a conical tip and is separated from the body by two discs. The body is composed of two ellipsoid projections separated by another two discs and the proximal ends have three similar shapes. The object was found at a depth of -1.80 to 1.90 m.

The category of 'exotic' objects is represented by a fragment of a *Mytilus* shell valve[5]. Fossilised wood is rarely found in archaeological contexts but is present in C40 in the form of a bracelet fragment[6]. Both objects, broken in prehistory, appear to have been discarded in the pit.

In place of conclusions

At this preliminary stage of analyses, there are few answers concerning the functionality of C40 and the contents and sequence of pit fills. However, several important questions have arisen including the following:

- If whole vessels are found broken 'in situ', were they originally stored in the pit?
- Were vessels broken elsewhere and then discarded in the pit?
- How do we explain the combinations of different tool assemblages produced from various materials (ceramics, flint, bone and clay)?
- How do we explain the presence of complete and functional bone tools along with certain broken tools?
- How do we explain the presence of only fragmentary stone tools together with complete flint pieces (some of which are unused, some which could be remounted), and debris suggesting knapping in place?

For answers to these questions the following approaches are recommended:

- Completion of the depositional analyses of vessels and ceramic fragments including the degree of fragmentation and a fabric analysis of potsherds and ceramic vessels to identify different aspects, for example the occurrence of so-called imports.
- A detailed fabric analysis of the daub and hearth fragments.
- Analysis of seasonality on the mammals bones and determinations of all the faunal remains including the degree of fragmentation. Alongside the archaeobotanical studies, this might reveal the existence of a pattern of pit fill in C40.
- Studies of micromorphology, sedimentology and radiocarbon dating.

Acknowledgements

My special thanks must go to Professor Douglass Bailey (San Francisco State University) and Dr. Steve Mills (Cardiff University) for all their trust and friendship and for the invitation to be a part of the 'Magura Past and Present' Project.

For advice and fruitful discussions over the years on different topics and particularly on C40, I would like to thank to my friend Dr. Laurens Thissen (TACB Amsterdam).

Additional thanks to Steve Mills for reading this paper and for help with the English translation.

Notes

[1.] The project has been funded by the British Academy, the Society of Antiquaries of London, Cardiff University, the Romanian Ministry of Culture, and the Teleorman County Council and has been directed by Dr. Douglass W. Bailey, Head of Archaeology and Conservation, Cardiff University (curently Chair of Anthropology, San Francisco State University) and Dr. Radian R. Andreescu, researcher with the National History Museum, Bucharest.

[2.] A chronological sequence of the Neolithic occupation in the Teleorman Valley and more generally for the Walachia region is provided by a large series of 22 radiocarbon data.

[3.] This aspect has been observed for several 4 or 5 legged vessels (Karanovo III type). In other instances, the adjustment and the polishing was done at the top to restore the functionality of a vessel whose rim has been broken. Reuse was also observed for bone or stone tools.

[4.] A complete typological and functional study is being finalised by Dr. Amelia Pannett (Freelance Lithic Analyst, Cardiff, Wales, UK).

[5.] Thanks for the determinations to Dr. Valentin Radu (Romanian National History Museum - National Center for Pluridisciplinary Research).

[6.] Wood vessels and fragments of adornment objects have been identified at Măgura especially in the earliest Neolithic stage (Andreescu and Mirea 2008).

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Figure 1. Magura 'Buduiasca'. View from the eastern terrace.

Figure 2. Magura 'Buduiasca'. View from the western terrace.

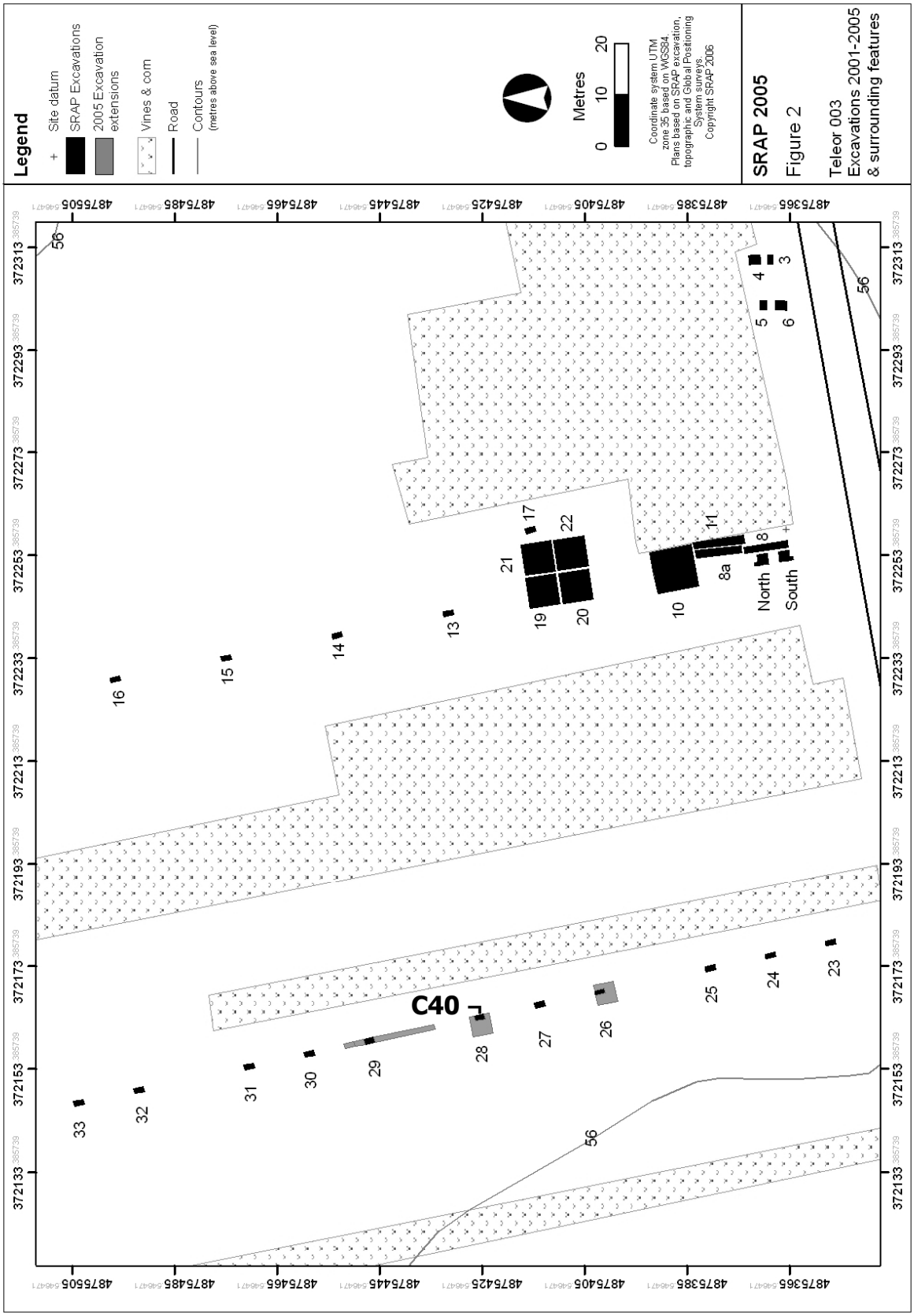


Figure 3. Magura 'Buduiasca'. General plan of excavations (2005) with the location of C40 (SRAP archive).

Figure 4. Magura 'Buduiasca'. A general view of Sounding 28/2005.

Figure 5. Magura 'Buduiasca'. Sounding 28/2005 and the top of C40.

Figure 6. Magura 'Buduiasca'. Sounding 28/2005 and bottom of C40.

Figure 7. Magura 'Buduiasca'. A general view of C40.

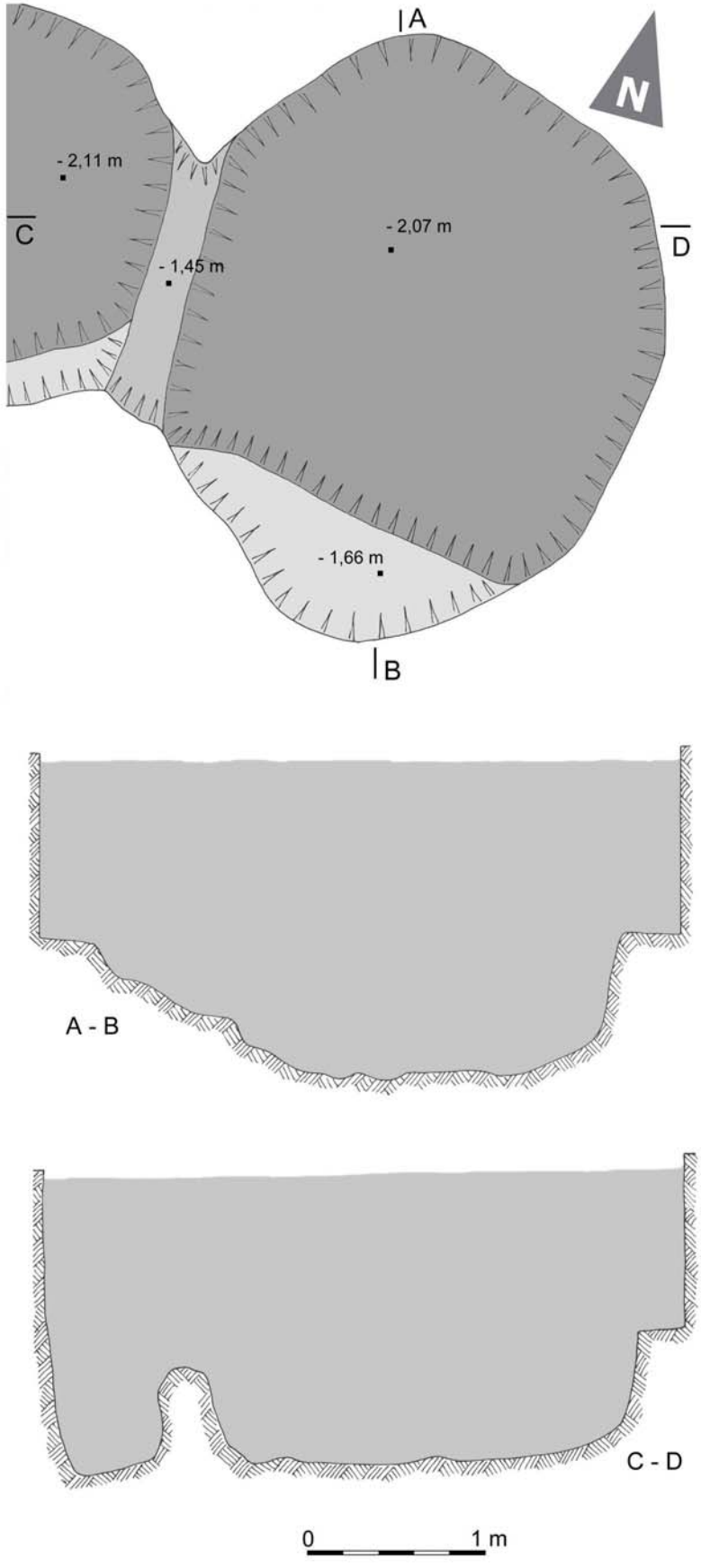


Figure 8. C40, *Grundiss* and profiles.

Figure 9. C40, broken vessels *in situ*.

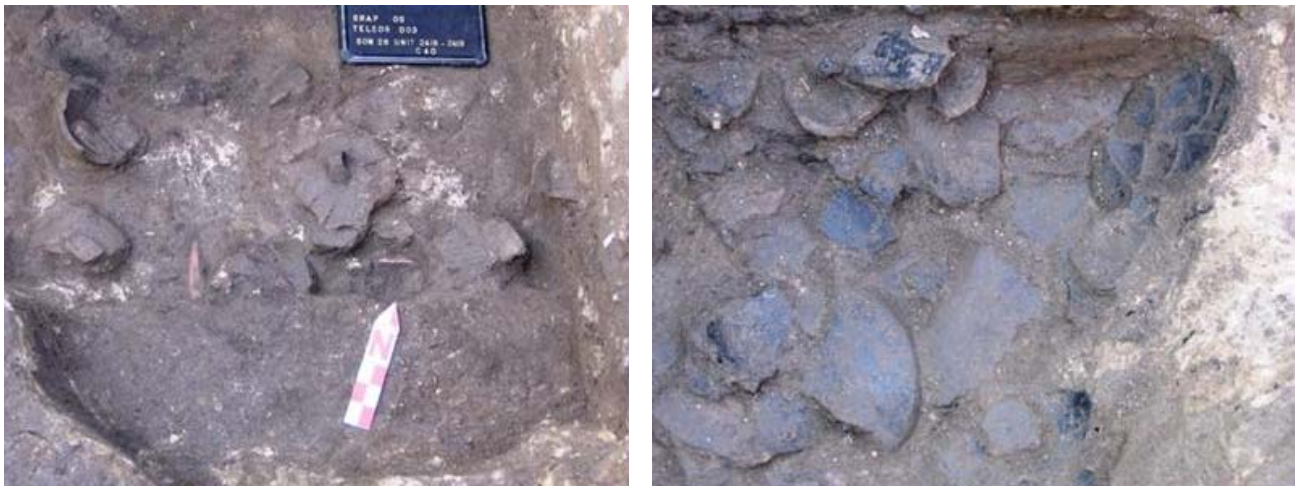


Figure 10. Broken vessels (details).

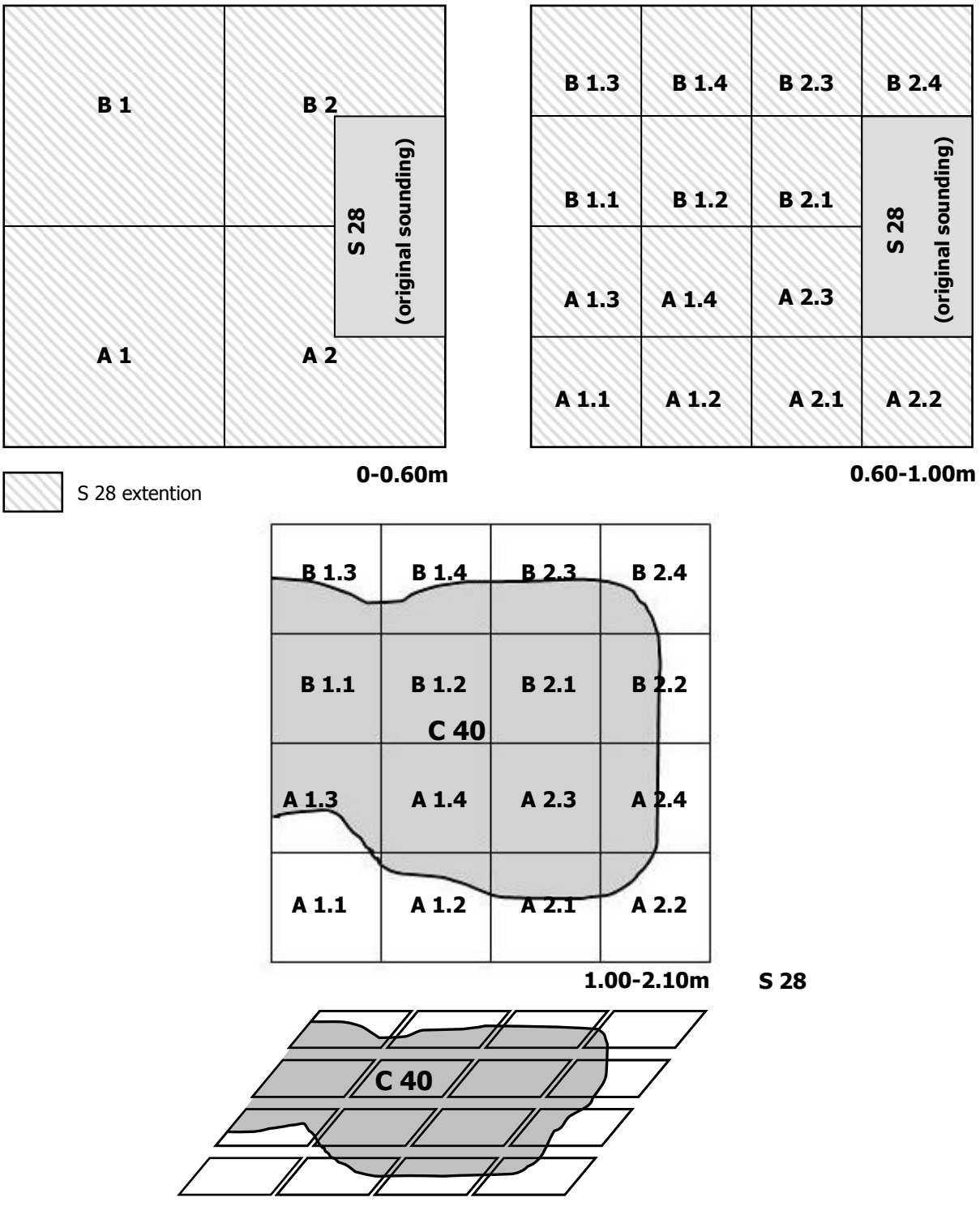
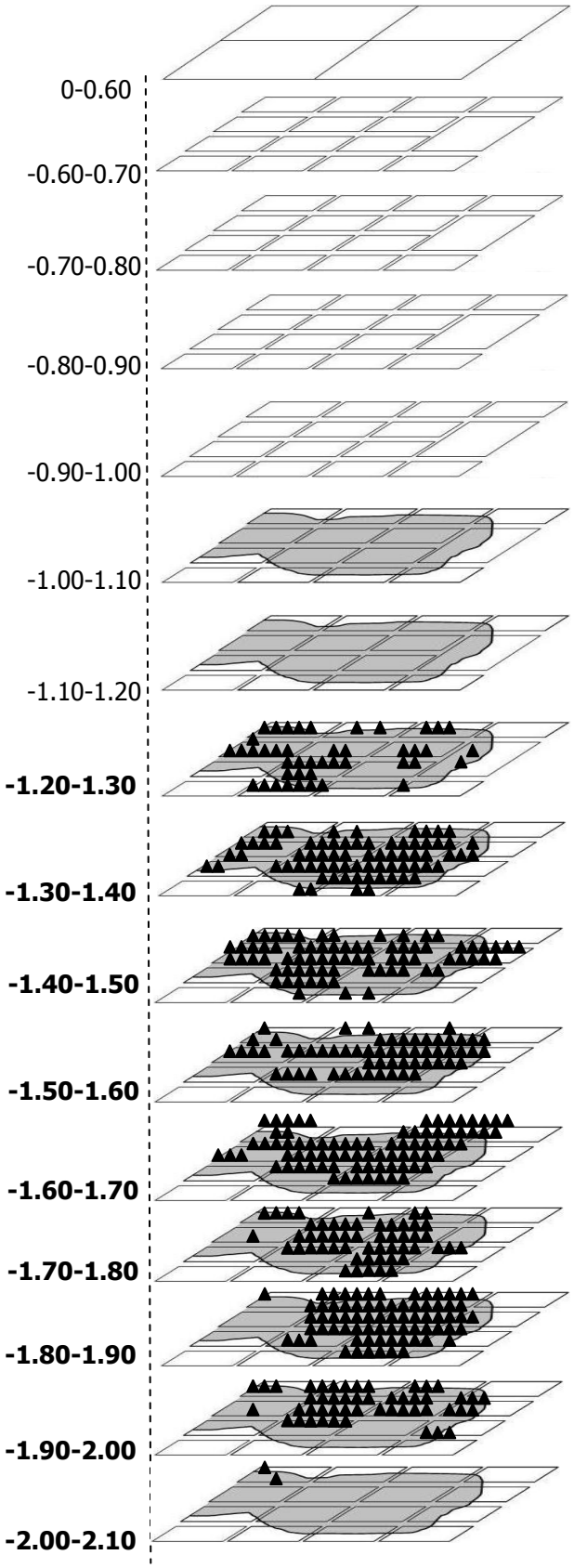
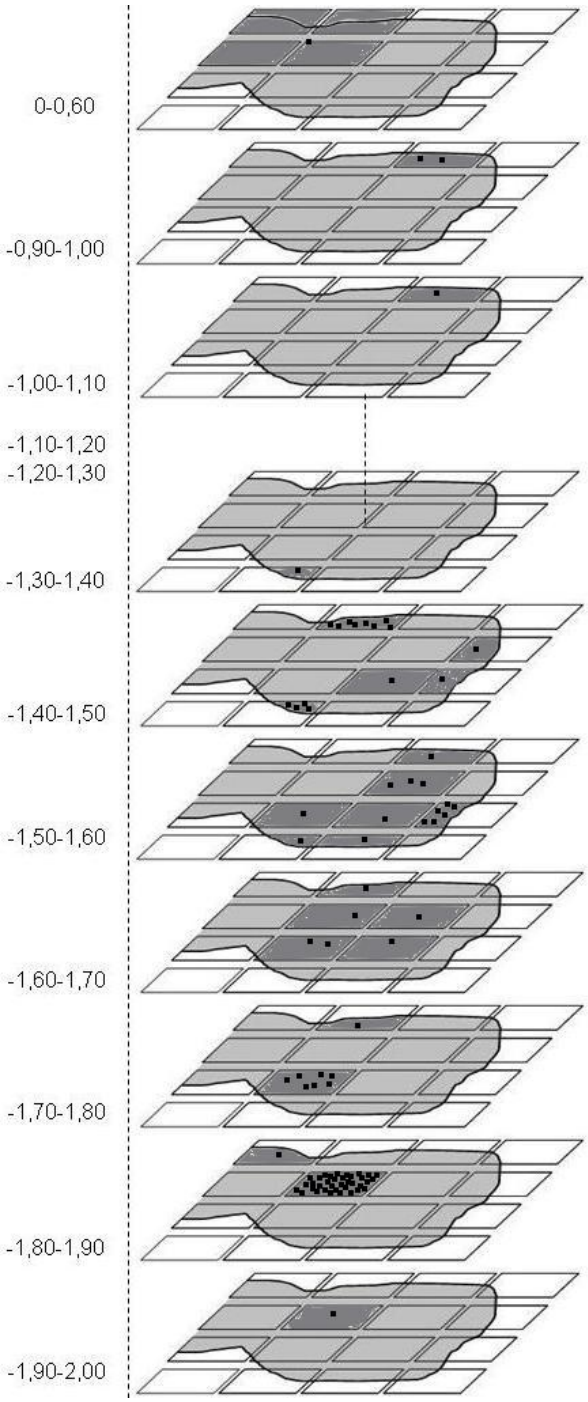


Figure 11. Plan showing the working area in C40.



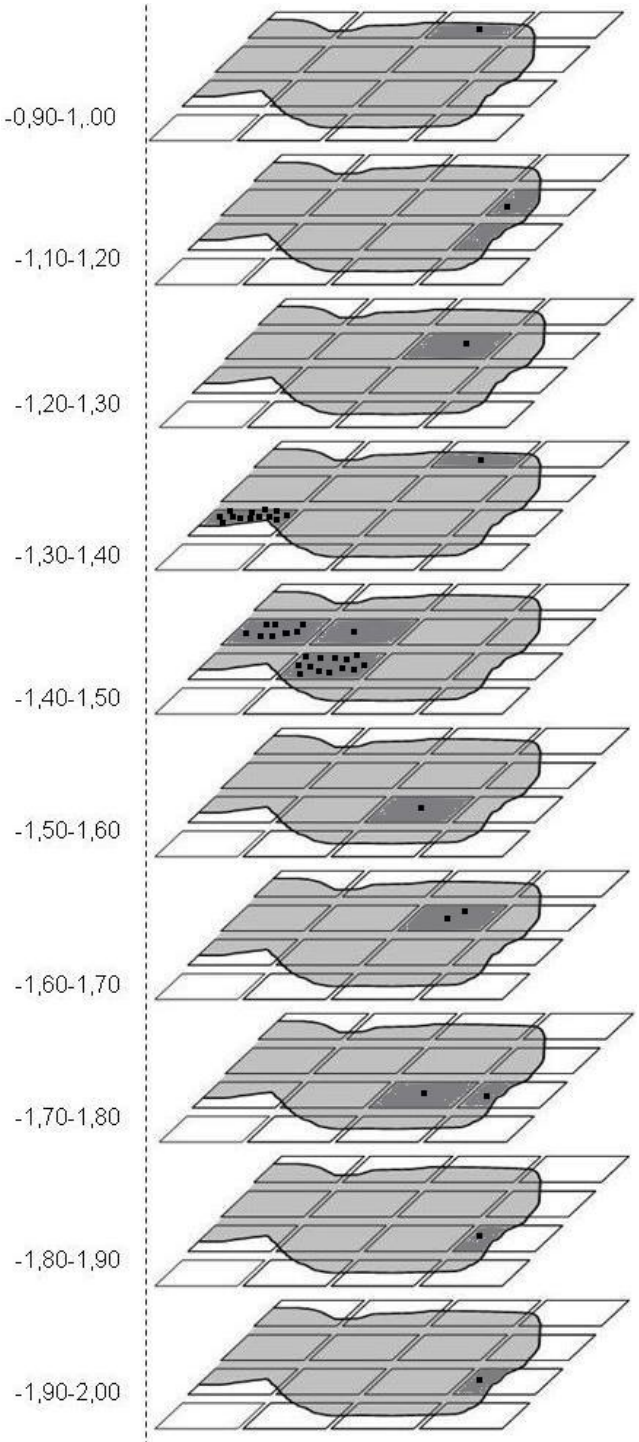
Depth (m)	Pieces
0-0.60	MIXED
-0.60-0.70	
-0.70-0.80	
-0.80-0.90	
-0.90-1.00	
-1.00-1.10	
-1.10-1.20	
-1.20-1.30	44
-1.30-1.40	72
-1.40-1.50	74
-1.50-1.60	66
-1.60-1.70	82
-1.70-1.80	53
-1.80-1.90	79
-1.90-2.00	49
-2.00-2.10	2
TOTAL	**521**

Figure 12. C40, flint depositional analyze.



Depth (m)	Fragments				
	Body	Base	Rim	TOTAL	%
0-0.60	1			**1**	1.10
-0.60-0.70					
-0.70-0.80					
-0.80-0.90					
-0.90-1.00	1	1		**2**	2.20
-1.00-1.10		1		**1**	1.10
-1.10-1.20					
-1.20-1.30					
-1.30-1.40	1			**1**	1.10
-1.40-1.50	14		1	**15**	16.30
-1.50-1.60	10	1	3	**14**	15.20
-1.60-1.70	6			**6**	6.50
-1.70-1.80	5		3	**8**	8.70
-1.80-1.90	36	2	5	**43**	46.70
-1.90-2.00			1	**1**	1.10
-2.00-2.10					
TOTAL	**74**	**5**	**13**	**92**	
percentage of assemblage - 100% (92 fragments)					
vessel no. 1					

Figure 13. C40, vessel no. 1 depositional analyze.



Depth (m)	Fragments				
	Body	Base	Rim	TOTAL	%
0-0.60					
-0.60-0.70					
-0.70-0.80					
-0.80-0.90					
-0.90-1.00					
-1.00-1.10			1	**1**	1.80
-1.10-1.20			1	**1**	1.80
-1.20-1.30	1			**1**	1.80
-1.30-1.40	7	4	3	**14**	25.00
-1.40-1.50	22	8	2	**32**	57.00
-1.50-1.60			1	**1**	1.80
-1.60-1.70			2	**2**	3.60
-1.70-1.80			2	**2**	3.60
-1.80-1.90			1	**1**	1.80
-1.90-2.00			1	**1**	1.80
-2.00-2.10					
TOTAL	**30**	**12**	**14**	**56**	
percentage of assemblage - 100 % (56 fragments)					
vessel no. 6					

Figure 14. C40, vessel no. 6 depositional analyze.

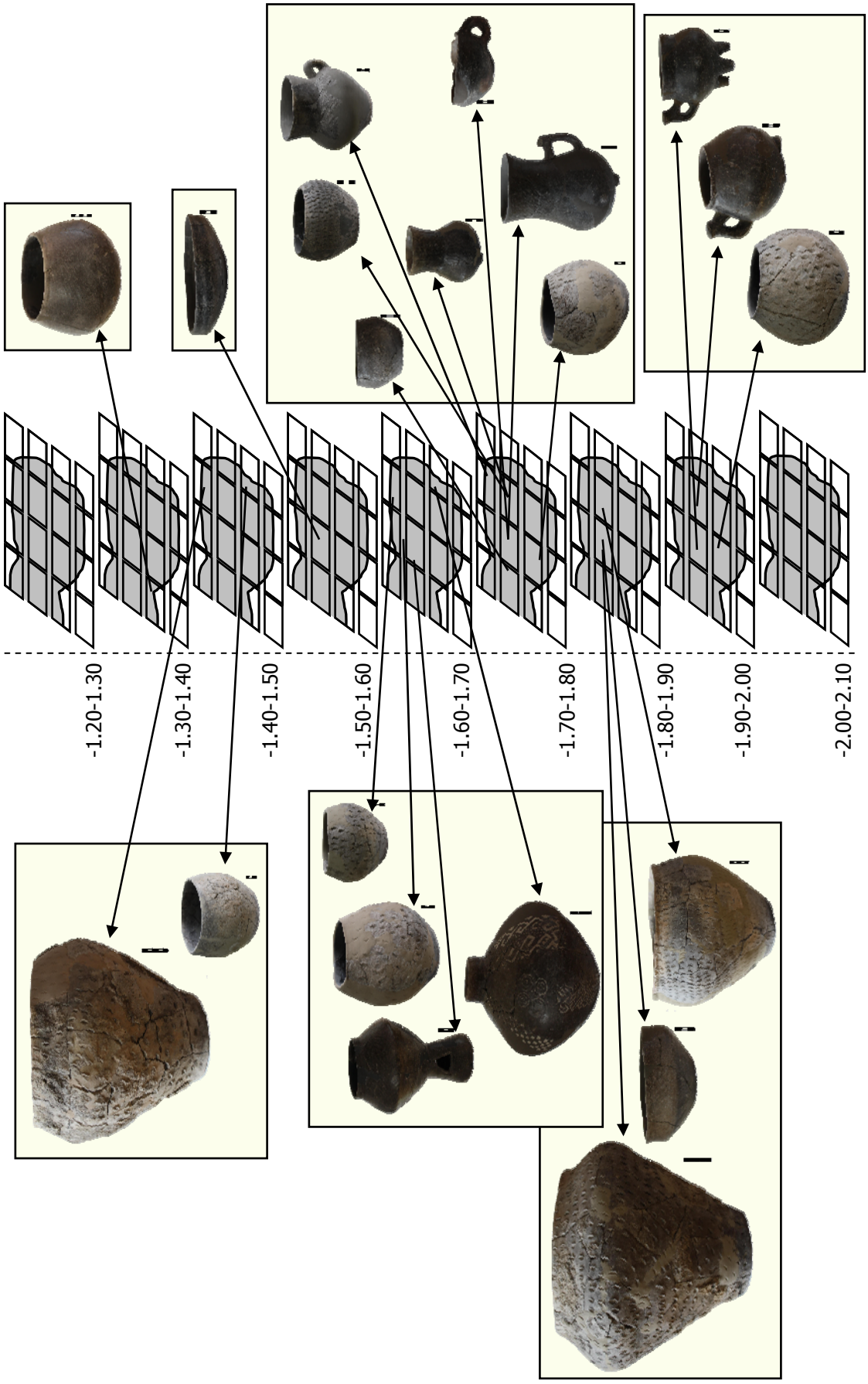


Figure 15. C40, probably location of certain vessels.

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PUBLICATIILE MUZEULUI JUDETEAN TELEORMAN

ISBN 978-606-8321-01-1