



26th Neolithic Seminar

Eurasian Neolithics: How Cultures and Societies Evolve and Why It Matters

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Department of Archaeology, Faculty of Arts, University of Ljubljana

Abstracts book



Mehmet Özdoğan

Istanbul University, Istanbul, Turkey

Reassessing the Dispersal of Neolithic Way of Living or Social and Cultural Patterns in Change, What Matters?

In recent decades, our knowledge of the processes that led to the establishment of food-producing communities in regions on the periphery or outside the core areas of primary Neolithisation has expanded considerably, making it possible to reconsider earlier theories of Neolithic dispersal, most of which were based on overly simplistic explanatory scenarios for individual areas. It is now more than evident that expansion of the Neolithic way of life was a far more complex and diverse event than was ever thought. Importantly, we are also now much better informed about the sociocultural patterns of the regions from which the emigrating farmers came, allowing inferences not only about the crafts they knew but also about the social memory they brought with them. Ordinarily generalized terms such as "*dispersal*" can now be considered under a variety of aspects, ranging from singular pioneer movements to collective or chain migrations to segregated infiltrations, merging and coalescence with local communities, acculturation, and several others. Moreover, it became clear that, with the exception of isolated cases, the "*highly placed*" (clergy/elite) had not joined the migration groups, nor had some master craftsmen; thus, it was more of a simple popular movement. That is, certain social values were carried forward through social memory, but their manifestations, such as monumentality, imposing structures, complex technologies, remained behind. Consequently, living conditions in the newly settled areas were not determined by the management of surplus values, but by various other factors, such as the demographic composition of the newcomers, interaction with local indigenous communities, environmental conditions, etc. On the other hand, in the regions that could not be reached directly by the immigrant farmers, various other models developed, depending on the modalities of acculturation and selected adaptations. The paper gives an overview of the processes that took place in the Balkans and Caucasia.

Detlef Gronenborn

Leibniz Zentrum für Archäologie, Mainz, Germany

Understanding Neolithic Dynamics and What it Means for us Today

With the advent of farming and pastoralism human societies around the world and in Eurasia as well, underwent significant changes. After initial periods of experimentation, the largely continuous supply of more and more stable food led to population growth and eventually to more politically complex societies.

At the same time, this increase in dynamism also led to an increase in internal social dynamics. Following a simple and seemingly repetitive pattern, societies formed, achieved a certain level of prosperity and stabilization, which in turn led to an increase in internal conflict, further violence, and eventual disintegration. These simple socio-political cycles have been documented and described since antiquity, but for state-level societies. Recent regional case studies and cross-regional data-driven research on mid-Holocene agrarian societies show that the same patterns apply to pre-state entities, while hunter-gatherer societies do not exhibit such pronounced patterns.

Therefore, such boom-and-bust patterns and their socio-political forcing became an important factor from the Neolithic onward. Indeed, Neolithic societies can serve as a template for understanding the underlying social and political dynamics in all sedentary and manufacturing societies to the present day.

Eszter Bánffy¹ and Alasdair Whittle²

¹Romano-Germanic Commission, German Archaeological Institute, Frankfurt, Germany; ²School of History, Archaeology and Religion, Cardiff University, United Kingdom

Steps Along the Road: Successes, Delays and Failures in Processes of Neolithisation

The traditional archaeological view, based mainly on pottery, was that the conversion to Neolithic lifeways in south eastern and central Europe was based on the immigration of new populations, with further northward dispersal delayed. This model has received solid confirmation from the bioarchaeological results of the last two decades; the grand narrative based on the aDNA and isotope results is certainly that of a major arrival of new populations. In contrast, the ongoing study of several regions at the turn of sedentarisation and food-producing subsistence reveals a more diverse and complicated set of stories.

In addition to rapid migrations and successfully occupied regions, there were also instances of early pioneering, delays and slow transitions, and short-term (and even longer-term) failures within an overall irreversible trend. These different processes depended on the specific interactions between native and immigrant groups with different subsistence strategies and values. All participants had to adapt to changing social, environmental, and cognitive conditions.

In this paper, we discuss different contexts and scenarios across Europe, from the northern Balkans to the Carpathian Basin, central and north-central Europe, and the northwestern Atlantic coast to Britain and Ireland. We consider these individual and diverse situations together with the grand narrative created by the new DNA and stable isotope results, and seek explanations for the delayed but distinct emergence of hunter-gatherer haplotypes in early and middle Neolithic European communities.

Marek Nowak

Institute of Archaeology, Jagiellonian University, Krakow, Poland

From the Archaeological site of Miechów to Central Europe During the Neolithic. Different scales of the Prehistoric Narrative

The presentation will show that different spatial and temporal scales of the prehistoric narrative have a significant impact on our perception of trajectories and interdependencies of archaeological phenomena, both cultural and biological. The boundary points are, on the one hand, the multi-period archaeological site No. 3 at Miechów in western Lesser Poland, inhabited by various Neolithic communities from the late 6th to the early 3rd millennium BC, and, on the other hand, the area of Central Europe in the same period. In between, there are microregional (Miechów microregion), regional (western Lesser Poland) and supraregional (Upper Vistula and Odra river basins) approaches. The considerations based on the current state of practical and theoretical knowledge related to the above-mentioned space and time lead to the conclusion that the narratives conducted at the level of a multicultural archaeological site, i.e. at a strictly local level, tend to represent archaeological phenomena as real, discrete entities. Past reality is seen as a series of distinct cultural-historical phases, especially when the available chronological evidence supports such a view. It is to be expected that this will be reflected in other areas of study of past human societies, such as archaeobiology, including archaeogenetics. In short, sociocultural systems and archaeological units or different archaeobiological facts (e.g., archaeogenetic facts) are equated. On the other hand, at the supra-regional level of Central Europe, the representation tends to widely overlap and mix archaeological units and archaeobiological phenomena. The degree of their inconspicuousness is either extremely low or even zero. This would mean that the sociocultural systems of the real past included a variety of archaeological units and archaeobiological phenomena. Clearly, narratives conducted on scales between these extremes take on intermediate tones. It may not be revolutionary, but it is useful to conclude that in order to obtain a picture of prehistory that is as close as possible to past reality, it is necessary to include all narrative

scales and the resulting boundaries, in both configurations, from bottom to top and vice versa. We will try to do this in relation to the space and time mentioned above. The lecture is part of the project of the National Science Centre of Poland No. 2016/23/B/HS3/00387, 'Cultural changes in the environment of loess uplands. Settlement, Economy and Society from the Neolithic to the Middle Ages at Site No. 3 in Miechów'.

Pere Gelabert

Department of Evolutionary Anthropology, University of Vienna, Wien, Austria

Social Genomics for Understanding Neolithic Social Structures

In recent years, genomics has been widely applied to Neolithic cemeteries and sites. These large data sets, sometimes corresponding to entire communities, have been used to investigate archaeological questions about cultural attribution, social structure, and population structure. Here we present the application of such a methodology to decipher the social structures of Linear Pottery (LBK) Neolithic communities, the first to spread in the second half of the 6th millennium BC. The LBK exhibited a high degree of uniformity in material culture, albeit with regional differences in settlement patterns, subsistence, and burial practices. To date, ancient DNA data from LBK individuals have been generated for only a limited number of sites and often in small samples, making it difficult to examine variation within and between sites. We report genome-wide data from 178 LBK individuals from the eastern LBK site of the Alföld Linear Pottery Culture (ALPC) at Polgár-Ferenci-hát in Hungary, the western LBK site of Nitra in Slovakia, and the included western LBK settlement and massacre site of Schletz in Austria. We observe a higher percentage of western hunter-gatherers (WHG) among individuals in the eastern LBK than in the much more widespread western LBK, indicating that these two archaeologically distinct cultures also had different genetic developments. Most intermixing between WHG and farmers occurred just before the onset of LBK culture, and there is no evidence that WHG ancestors were systematically more male- or female-descended. However, we find strong genetic evidence of patrilocality among LBK that extends previous results based on isotopic analyses, with stronger genetic structure among sites on the male than on the female lineage and a higher rate of within-site kin for males. At Schletz, we find almost no first-degree relatives, although we have data from almost every skeleton at the site, indicating that this massacre involved people from a large population rather than a small community.

Alasdair Whittle

School of History, Archaeology and Religion, Cardiff University, United Kingdom

On the Nature and Tempo of Social Change: Three Studies from the Neolithic of Britain and Ireland

In this paper, I want to contrast traditional models for the steady development of social change through the course of the Neolithic in Britain and Ireland with the more complicated picture that has emerged from more recent research, involving not least more detailed regional studies, aDNA analysis and the construction of more precise chronologies through Bayesian modelling. These all raise questions of diversity and competing strands within Neolithic society, cycles of change, and the nature and duration of power. I will briefly look at three questions in particular: the potential role of lineages in the Early Neolithic (roughly late 5th to mid-4th millennia cal BC); the emergence and then decline of prominent constructions in parts of Britain and Ireland in the middle Neolithic (late 4th and early 3rd millennia cal BC); and the final flourish (27th to 25th centuries cal BC) of the late Neolithic. That was the

context for extraordinary undertakings such as Stonehenge and Silbury Hill, but what was the state of the wider setting to which they belonged?

Çiler Çilingiroğlu

Department of Archaeology, Faculty of Letters, Ege University Izmir, Turkey

Social Stratification of PPN Communities in SE Anatolia

One of the most discussed topics in Anatolian Neolithic studies is the social organisation of southeastern Anatolian PPN communities. One of the predominant arguments in these discussions is that these groups possessed a vertical hierarchy. More specifically, the monumental architecture known from Urfa is associated with a so-called “religious clergy” that exercised control over labour and production. These arguments seem to rely on a linear and teleological conception of modern thought that has not been adequately informed by the anthropological literature nor systematically tested by the archaeological record. In this presentation, I will attempt to reevaluate this problem by drawing on hunter ideology, anthropological case studies, and archaeological records. I argue that these groups had achievement-oriented social structures with male-centred cosmic views. Collective labour may have been coordinated through feasts and recurring rituals that reinforced social and cosmic order.

Lee Clare

German Archaeological Institute, Istanbul Department, Istanbul, Turkey

Upper Mesopotamia in the Early Holocene: Establishing an Absolute Chronology for the Taş Tepeler (Sanliurfa, SE- Türkiye) and Investigating the Hunter-Gatherer-Crisis (HGC)

The Şanlıurfa region of Türkiye (SE- Türkiye) is the site of a new international and multidisciplinary archaeological research project dedicated to the study of human settlement in an area surrounding the Harran Plain at the transition from a hunter-gatherer economy to a food-producing subsistence economy in the early Holocene. The Taş Tepeler (Stone Mound) Project focuses on the two major Early Neolithic sites of Göbekli Tepe and Karahantepe, but also includes the recently initiated excavations at Sefertepe, Sayburç, and Çakmak Tepe. The aim of this paper is to shed light on the absolute chronological and sociocultural context of these sites in the broader geographical setting of Upper Mesopotamia.

Observations related to settlement spread, subsistence, trade networks, and material culture, in conjunction with available radiocarbon dates from the Taş Tepeler and from sites in neighbouring regions (Upper Euphrates and Tigris Valleys), suggest a period of sociocultural disruption that began in the late 10th century. This period is referred to here as the hunter-gatherer crisis (HGC). It is believed that the challenges faced by prehistoric people during this period, such as increasing sedentarisation, more pronounced social hierarchisation, and the beginning domestication of animals and plants, ultimately triggered the construction of the monumental structures with T-shaped monoliths found at many of the Taş Tepeler sites. However, these particular structures and the associated boom in artistic expression are not interpreted as "*Neolithic innovation*", but rather as the result of the hunter-gatherers' attempt to preserve their traditional lifestyles and narratives. It was only with the disappearance of these monuments in the second half of the 9th millennium cal BC that the Palaeolithic mindset finally ended and the true Neolithic arrived.

Dušan Borčić^{1,2,3}, Alessia Nava⁷, Beatrice Peripoli¹, Theron Douglas Price⁵, Luca Bondioli⁴, Wolfgang Müller⁶

¹Department of Environmental Biology, Sapienza University of Rome, Roma, Italy; ²The Italian Academy for Advanced Studies in America, Columbia University, New York, USA; ³Department of Anthropology, New York University, New York, USA; ⁴School of Human and Social Sciences and Cultural Heritage, University of Padova, Padova, Italy; ⁵University of Wisconsin, Madison, USA; ⁶The Institute of Geosciences, Goethe University, Frankfurt am Main, Germany; ⁷Department of Oral and Maxillo-Facial Sciences, Sapienza University of Rome, Roma, Italy

Mesolithic and Neolithic Mobility Patterns in the Balkans Revealed Via Time-Resolved Records in Teeth

Bioarchaeological studies of agricultural transitions have shown cross-culturally how major changes in dietary practices, mobility, and everyday corporeal conduct between foraging and farming groups can be detected in human skeletal remains. The study reported here uses histological analysis applied to a sample of Mesolithic and Neolithic teeth from the central Balkans in order to establish the temporal patterns of enamel growth following the method outlined in Birch and Dean (2014) and Guatelli-Steinberg et al. (2012). We further identify the variation of stress prevalence based on accentuated lines (ALs), correlating these to previously established individual chronologies of enamel growth to discern any patterning of incidences of stress during early life in foragers vs. early farmers. We utilize the same histological sections to obtain time-resolved mobility records from continuous strontium isotope (⁸⁷Sr/⁸⁶Sr) profiles along the enamel-dentine junction (EDJ) using laser ablation inductively coupled multi-collector mass spectrometry (LA-MC-ICPMS). These (sub-)seasonally-resolved strontium isotope signals are then directly correlated to the established chronology of enamel growth, thus serving as a proxy for determining seasonal/annual mobility during early life. Finally, the strontium isotope profiles are compared to the existing bulk strontium isotopic data on the same pool of individuals and the local geographic strontium isotopic variability.

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*Birch W., Dean M. C. 2014. A method of calculating human deciduous crown formation times and of estimating the chronological ages of stressful events occurring during deciduous enamel formation, *Journal of Forensic and Legal Medicine* 22: 127-144.*

*Debbie Guatelli-Steinberg et al 2012. Enamel extension rate patterns in modern human teeth: Two approaches designed to establish an integrated comparative context for fossil primates. *Journal of Human Evolution* 63(3):475-486.*

Dushka Urem-Kotsou¹, Apostolos Sarris², Nikos Papadopoulos³, Konstantinos Vouvalidis⁴, Yannis Maniatis⁵, Chrissa Karadima⁶, Maria Chrysafi⁷, Dimitris Matsas⁶, Anna Mousioni⁶, Matheos Koutsoumanis⁶, Stavros Kotsos⁸, Despoina Skoulariki⁷, Kyriakos Sgouropoulos⁹, Periklis Chrysafakoglou⁹, Dimitris Oikonomou³, Sofia Doani⁴, Ioannis Chronis⁴ and Georgios Polymeris⁵

¹Democritus University of Thrace, ²University of Cyprus, ³Foundation for Research and Technology, ⁴Aristotle University of Thessaloniki, ⁵NCSR "Demokritos", ⁶Ephorate of Antiquities of Rhodope, ⁷Ephorate of Antiquities of Xanthe, ⁸Ephorate of Antiquities of Thessaloniki City, ⁹Democritus University of Thrace

Early Farmers in Aegean Thrace

Recent archaeological investigations in western and central Macedonia attest to the presence of the first farmers in northern Greece as early as the middle of the 7th millennium BC, perhaps even somewhat earlier. Compared to this region, the first farmers in Aegean Thrace seem to have settled

somewhat later. According to a single radiocarbon dating from the settlement of Makri, their presence is confirmed in the late 7th millennium BCE.

The number of settlements identified so far in Aegean Thrace is 27, all located in the plain enclosed by the Rhodope Mountains to the north and the sea to the south. Most of them are known only through surface finds. Five sites are an exception, of which only the Makri settlement has been systematically excavated. According to the available archaeological data, most of the Neolithic settlements seem to have been established in the middle of the 6th millennium BC, several centuries after the appearance of the first farmers in the region. It is possible that the lack of data for the earlier phases of the Neolithic in Aegean Thrace is due to the limited archaeological exploration of the Neolithic in conjunction with the complex paleoenvironmental history of the region, which has affected the visibility of the archaeological record. Sea level rise during the Holocene covered much of the plain in the coastal area with water, while rivers and numerous streams of the Rhodope Mountains formed alluvial deposits in the lowlands, which contributed significantly to the continuous environmental changes and the formation of lagoons, lakes, and marshes. An ongoing interdisciplinary project combining archaeological, geological, and geophysical methods, together with radiocarbon dating of samples from cores, is providing new evidence for settlement in the early phases of the Neolithic in Aegean Thrace and rich data for settlement patterns in the later Neolithic phases.

Goce Naumov

Center for Prehistoric Research, Museum of Macedonia, Skopje, Republic of North Macedonia

The First Farming Communities of Pelagonia and the Balkan Neolithic Wetlands

Pelagonia is an elongated valley in southeastern Europe that has been intensively studied in the last decade by the Center for Prehistoric Research. The multidisciplinary studies in this region have broadened the perspective on the Early Neolithic in the Balkans and on the modalities of wetland neolithization in the second half of the 7th millennium BC. It was a process of about 400 years when the first agricultural settlements were established on the mountain slopes and in the plains. From the beginning, these societies had a complete so-called “*Neolithic package*”, which was gradually modified in the structuring of identities manifested in architecture, pottery, house models, tablets, figurative representations and burials. They were essentially associated with the construction of tells around wetlands and their continuous occupation during the first 300-400 years of their settlement.

Therefore, this paper will focus on the recent research of the 3V project, which investigates the tells of Vlaho, Vrbjanska Čuka and Veluška Tumba in Pelagonia. The Vlaho site is located on the mountain slopes of Nidje and was founded around 6400 calBC as a large settlement EN consisting of numerous stave buildings and dozens of semicircular and rectangular ditches. The tells of Vrbjanska and Veluška were settled in the lowlands of Pelagonia around 6050 cal BC i.e. at the time when the site of Vlaho was abandoned. In these tells there were only one or two ditches and a number of large adobe buildings with massive adobe structures (ovens, tanks, granaries, etc.). The material culture and architecture undoubtedly point to the common identities of these tell societies, but recent studies also emphasize the myriad differences that highlight distinctive social characteristics. They will be reconsidered in comparison with earlier observations of neolithisation in southeastern Europe and especially with wetland societies in the region.

Dušan Mihailović¹, Steven Kuhn², Sofija Dragosavac¹, Vesna Dimitrijević¹, Ivana Živaljević³, Anđa Petrović¹, Danilo Pajović¹, Mirela Đurović¹, Mirjana Roksandić⁴

¹Department of Archaeology, Faculty of Philosophy, University of Beograd, Beograd, Serbia; ²School of Anthropology, University of Arizona, Tucson, United States; ³Department of History, Faculty of Philosophy, University of Novi Sad, Novi Sad, Serbia; ⁴Department of Anthropology, University of Winnipeg, Winnipeg, Canada

First Insights into the Late Upper Paleolithic and Mesolithic Settlement of Southern Serbia

Despite intensive explorations and excavations in the interior of the Central Balkans, sites from the late Pleistocene and early Holocene have so far been confirmed only in the Iron Gates, while they have not been reliably proven anywhere outside this area. There are several explanations for this. Some authors believe that the lack of sites from this period is a consequence of insufficient research in the entire region, while others believe that the Balkans at that time did not have favorable ecological conditions for the existence of hunter-gatherer communities. New research in southern Serbia supports the first assumption. At several sites (Meča dupka, Pešturina, Pećina kod stene, Velika Vranovica, Potpeč) remains from the period before, during and after the Last Glacial Maximum were detected, while stone artefacts and animal bones were discovered in the Pešterija rock cave south of Pirot. The finds from this site, dated to 7 ka cal BC, are the first evidence for the presence of Mesolithic groups in Serbia outside the Iron Gates.

Marko Porčić

Department of Archaeology, Faculty of Philosophy, University of Beograd, Beograd, Serbia

The Beginning of the Neolithic in the Central Balkans: Knowns and Unknowns

In recent years, a relatively large amount of new archaeological data on the beginning of the Neolithic period in the Central Balkans has been obtained. This burst of research enabled researchers to examine more closely the process of the establishment of the farming way of life in the region in more detail and to test various hypotheses about this process, especially about its demographic aspects. The picture that emerged from the new data is broadly consistent with the Advance Wave model, according to which the first farmers arrived in the region around 6200 BC and gradually spread northward. However, on closer examination, this picture is not so clear and unambiguous. Moreover, some of the results, such as the sudden drop in the population proxy curve after 6000 BC, as well as the relatively high estimates for the rate of expansion, the high fertility rate, and the high population growth rate, are puzzling. In this presentation, I will first provide an overview of the currently available evidence and interpretations. In a second step, I will focus on the weak spots of current interpretations, models, and methods regarding the timing, speed, and nature of the Neolithic expansion in the Balkans. Finally, I will formulate additional hypotheses to explain the puzzling patterns and propose means to test them.

Maxime Brami

Palaeogenetics Group, Institute of Organismic and Molecular Evolution, Faculty of Biology, Johannes Gutenberg University, Mainz, Germany

The Lepenski Vir Conundrum Revisited

Lepenski Vir in the Iron Gates of the Danube has puzzled archaeologists since its discovery in 1960. The village, with trapezoidal houses and hybrid fish statues, has been described over the years as "*Protoneolithic*", "*Mesolithic*," and even "*Neolithic*" over the years. In this paper I propose that the old debate on the interpretation of the site between Dragoslav Srejović, the excavator of Lepenski Vir, and Borislav Jovanović, the excavator of Padina - far from being settled - has been reignited by recent discoveries in the field of ancient DNA. The work carried out by the Mainz paleogenetics group shows that a large proportion of the people buried at Lepenski Vir, including adult men, women and children, were descended from Aegean-Anatolian early farmers. While the newcomers undoubtedly intermingled with the hunter-gatherers who had lived at the Iron Gate since the Mesolithic, resulting in complex mixing patterns during the so-called "*Mesolithic-Neolithic transitional phase*" I caution against interaction models that attempt to reduce Lepenski Vir to a Mesolithic village joined by a few Neolithic immigrants. Any attempt to de-essentialize Mesolithic-Neolithic interactions in the Iron Gate is inevitably confronted with the legacy of immigrant Aegean-Anatolian early farmers, who can hardly be called "*friends*" or "*enemies*" in Lepenski Vir, given their stratigraphic association with trapezoidal houses, their proportional increase over time, and their local adaptation to fish diets. What is behind the perceived "*hybridity*" of the site, if it was in fact founded by people of different origins and cultural traditions? Was Lepenski Vir the first true "*melting pot*" of European prehistory, or rather a deeply structured society in which burial location and diet were largely determined by ancestry?

Barbara Horejs

Austrian Archaeological Institute, Austrian Academy of Sciences and Human Evolution and Archaeological Sciences, University Vienna, Wien, Austria

Multi-scalar and Multispecies Mobility in the Neolithisation of the Balkans

Interdisciplinary research, bioarchaeological analyses, and new fieldwork in the last decade have revealed a new complexity related to the Neolithisation process between Western Asia and Europe that goes far beyond our earlier models of diffusion and migration. This paper focuses on the central Balkans and the socio-cultural process associated with Neolithization that began around 6200-6000 cal BC. Active movement at various levels currently seems to be the most appropriate and likely explanation for Neolithic expansion based on the scientific data, but it also challenges us with unsatisfactory gaps and unanswered questions as we zoom into the details of the first farming communities in the Starčevo-Balkans. Nonetheless, mobility seems crucial not only for understanding the beginnings of the Neolithic transformation, but also for the broader long-term process of adaptation, modification, and development of new and local cultural expressions summarised as the Starčevo horizon. aDNA and isotope studies reveal the strong links between West Asian and European people, livestock, crops, and legumes. Recent bioarchaeological data also indicate the emergence and spread of human-adapted bacterial pathogens and viruses during this multi-faceted cultural transformation process. Aside from the anthropocentric perspective, this paper discusses multispecies mobility and the various scales of movement in the context of communication clusters and networks, material sourcing and niche economies, seasonal subsistence and pastoralism, with the "*lack of villages*". New data from the case study of Svinjarička Čuka in southern Serbia, located on the main communication route of the Vardar-Morava valley, are presented in the broader context of Neolithic dispersal between the Aegean and the Danube corridor. Multiscale and multispecies mobility are proposed as key components for understanding the Neolithisation of the central Balkans, providing a

new perspective for contextualising the data in the bigger picture of social, cultural, and economic aspects.

Raiko Krauß¹ and Dan Ciobotaru²

¹Institute of Prehistory, Early History and Medieval Archaeology, Faculty of Humanities, Eberhard Karls University, Tübingen, Germany; ²National Museum of Banat, Timișoara, Romania

The Early Neolithic Settlement of Movila lui Deciov in Romanian Banat

Since 2018, excavation work at the well-known Movila lui Deciov site has been resumed by an international excavation team from the University of Tübingen together with the National Museum of Banat in Timișoara. The site was discovered at the beginning of the 20th century by Kisléghi Nagy Gyula, who also carried out the first excavations. Further excavations were carried out between 2001 and 2004 by a Canadian-Romanian team.

The Early Neolithic settlement is bounded by a circular ditch, which was made visible by geophysical measurements and confirmed by sounding excavations. So far, two successive Early Neolithic settlement horizons from the beginning of the 6th millennium BCE could be proven. The archaeological findings from Movila lui Deciov give a good insight into the specific character of the oldest Neolithic in the eastern part of the Carpathian Basin. A large series of radiocarbon dates makes it possible to reconstruct the settlement sequence at this site particularly well. The evaluation of the organic remains allows to understand very well the adaptation of the Neolithic immigrants to the natural conditions. The evaluation of the archaeobiological finds from a large settlement pit is particularly informative about the economy of the earliest farmers and stock breeders in the Banat. In addition to the usual breeding animals such as sheep, goats and cattle, as well as cultivated plants such as emmer, einkorn and legumes, hunting, fishing and gathering wild plants still played a very important role in the diet of the Early Neolithic settlers.

Mario Bodružić, Kristina Horvat and Maja Grgurić

Department of Archaeology, University of Zadar, Zadar, Croatia

Early Neolithic Herders of Northern Dalmatia: New Insight from Cave in Ždrilo

The economy of the Early Neolithic communities in northern Dalmatia is predominantly attributed to the pastoralism of ovicaprids and agriculture based on emmer, einkorn and barley. The data on which these postulates are based were collected at field sites (Crno Vrilo, Smilčić, Tinj, etc.). Cave finds, on the other hand, are rare in this area (Vaganačka Cave) and, based on their preserved sequences, are usually discussed primarily from the point of view of providing evidence for chronological schemes. Even in a broader context of the eastern Adriatic, cave sites are rarely excavated over a larger area and, consequently, are less often interpreted in terms of function, organization, and general position in the settlement system.

Recent excavations in the Ždrilo cave, located in an inhospitable karst area in a steep canyon of the former mouth of the (now flooded) Zrmanja River, yielded extensive finds of human settlement from the early Neolithic period. The records are characterized by so-called “cake layers” and show numerous references to sheep breeding and livestock keeping. At the same time, layers of shell-pit-like deposits interpolated in this sequence show evidence of intensive maritime feeding as well as fishing.

Based on the finds examined in two test trenches and another area excavated in 2023, a basic pattern of the use of different areas of the cave during the Early Neolithic phase is established and discussed, particularly with regard to determining their function as grotto bergerie or habitat bergerie. The spatial distribution of finds and objects such as postholes, together with the general morphology of the cave,

provides information about the human use of the space and its adaptation to the needs of its inhabitants. The presence of larger open-air sites within a 20-40 km radius of the cave provides an opportunity to compare them and draw conclusions about their possible role within the early agricultural landscape.

Dimitrij Mlekuž Vrhovnik

Department of Archaeology, Faculty of Arts, University of Ljubljana and The Institute for the Protection of the Cultural Heritage of Slovenia, Ljubljana, Slovenia

Active Periphery. The Place of the Southeastern Alps in the Neolithic World System

World systems connect societies in a common historical process. World systems are thus inter-societal; they link societies together; they are also systemic and share general features of development. The Neolitisation of Europe can be viewed as the emergence of a world system that begins with the core in SW Asia and unfolds many interesting core-periphery dynamics over time.

The paper discusses the history of the Neolithic of the SE Alps and its relation to the European Neolithic world system.

The maritime voyages and expansion of the Early Neolithic along the Adriatic coast only touched the Mediterranean watersheds of the Eastern Alps; the Early Neolithic expansion into the Carpathian Basin came to a halt when it reached the Alpine foothills. This resulted in a stable frontier where there was little evidence of interaction with local foraging groups.

Around 4700 BC, settlement systems in the Carpathian Basin changed significantly, with the emergence of stratified tell settlements, large nucleated settlements, and extensive cemeteries.

This process coincides with the rapid Neolithic expansion in the SE Alps, especially in present-day Slovenia, which reached its peak around 4700 BC. It is characterised by a rapid expansion along the Sava River and the establishment of settlements in the river valleys and plains. This was followed by expansion along the river valleys of the Drava and the Mura deep into the Alps. The same pattern of overcoming long-standing boundaries can be observed elsewhere in the Eastern Alps.

The transition from the Late Neolithic to the Copper Age in the Carpathian Basin is characterised by a change from core settlement to scattered settlement. Earlier nucleated settlements were replaced by smaller, shallow settlements, characterised mainly by shallow, single-layered settlement deposits. This process can also be observed in the SE Alps, but in the form of an expansion from the lowlands into the drier karst hinterland and the formation of closed hilltop settlements and hill forts.

The social dynamics in the core area led to an expansion into the hill country of the SE Alps, creating a separate periphery. The development of the SE Alps in the seventh millennium BP is related to the broader social, demographic, and cultural changes in the core areas during the Neolithic and Copper Ages, but these responses are local.

Guram Chkhatarashvili¹ and Valery Manko²

¹Department of Archaeology, Batumi Shota Rustaveli State University, Batumi, Georgia; ²Institute of Archaeology, National Academy of Sciences of Ukraine, Kyiv, Ukraine

Evolution Patterns of Final Pleistocene, Early and Middle Holocene Cultures in Southern Eastern Europe and the Caucasus

The southern areas of Eastern Europe and the Caucasus in the Early Holocene were characterized by similar archaeological cultures with a common origin. The populations of these areas showed migratory activity, the vector of which could be westward as well as eastward. Not surprisingly, the development of archaeological cultures in these areas followed the same patterns. This circumstance has made it possible to assign some models of the evolution of cultures.

- The model of evolution without evolution. This model is characterized by the Shan-Kobian culture of the Final Pleistocene and Early Holocene. The main sites of this culture are Shan-Koba, Skalisty Grotto, Fatma-Koba (Crimea) and Mezmai, Dvoynaya, Chigai (Caucasus). The analysis of the development of the stone industry shows the complete absence of significant changes in the early and late complexes.
- The evolution is associated with the emergence of significant technological innovations. This type of evolution characterizes the development of the Shpan-Kobian and Trialetian cultures, which have a common origin. Both cultures occur in the Final Pleistocene and evolved under the first model until the end of the Early Holocene. At the turn from the Early to the Middle Holocene, the complexes of these cultures are characterized by the appearance of the pressing flaking. This technological innovation correlates with the emergence of pottery. We can call this evolutionary model indirect, related to cultural contacts with more developed neighbours. The result of the evolution of the Shpan-Koba and Trialetian cultures was the emergence of the Murzak-Kobian and Chokh cultures.
- Evolution is accompanied by the emergence of synthetic cultures. We trace this model on the basis of the material of the Kukrekian and Matviyiv Kurgan cultures of Eastern Europe and their analogy, the Kobuletian and Darkvetian cultures of the Caucasus. All the above cultures appear in the early Holocene, but at the beginning of the Middle Holocene they show the formation of synthetic cultures: the Donetsk culture in eastern Ukraine and the Odishi culture in western Georgia. The time of transformation is also connected with the appearance of pottery. This model is also associated with the fact that two neighbouring cultures simultaneously fall under the influence of the third source of innovation.

Our analysis shows that the evolutionary process was not progressive. The development of cultures took the form of rapid transformation, some cultures did not evolve at all. The patterns associated with transformation are related to the cultural influence of more progressive neighbours. We cannot always identify the source of cultural influence, but we note that the evolution of Models 2 and 3 correlates with the spread of the so-called trapezoids with dorsal invasive retouch. This arrowhead type occurs at the turn of the early to mid-Holocene in northern Syria and southwestern Turkey. Not surprisingly, the spread of this innovation is accompanied by the appearance of pottery, polished implements, and a manufacturing economy.

Also noteworthy is the fact that the nodes of development are related to a phenomenon known as an event, i.e., dramatic warming in Atlantic times. Thus, the positive evolution at the turn of the Early and Middle Holocene is associated with the end of the Neolithization process.

Giedrė Motuzaite Matuzevičiūtė

Bioarchaeology Research centre, Archaeology Department, History Faculty, Vilnius University, Vilnius, Lithuania

Forest Neolithic, Subneolithic or no-Neolithic – The Beginning of Food Production in the East Basics

The beginning of food production in Europe marks the beginning of significant economic, social, and environmental changes in regional human societies and populations. Between 5500–4500 BCE, the LBK culture of early farmers expanded across much of Europe, with the northern limit of this culture extending into Mozuria and Pomerania in northern Poland. Further north, however, in the eastern Baltic region, was a buffer zone where agricultural development came to a halt for nearly 4000 years. Direct finds of charred *Hordeum vulgare* grains from the Bronze Age settlement of Kvietiniai in western Lithuania are currently the oldest evidence of agriculture in the eastern Baltic and are dated to 1392–1123 cal BCE. Macroremains of domesticated plants and pollen of cereal species previously reported from Neolithic settlements in the eastern Baltic have been shown to be either misidentified or intruded from younger cultural horizons, so there is no evidence for the existence of agriculture during the Neolithic in this region. In light of macrobotanical research and direct dating of cereal remains, as well as recent reports on biomolecular data, my presentation will outline the current state of research on the rise of food-producing economies in the eastern Baltic region. I will also discuss the possible reasons for the relative delay in agricultural adoption and present new models for past food-producing economies in the Eastern Baltic.

Natalia Tsydenova

Institute for Mongolian, Buddhist and Tibetan Studies of the Siberian Branch of the Russian Academy of Sciences, Ulan-Ude, Republic of Buryatia, Russia

Origin of the Late Pleistocene Early Ceramic Transbaikalia Complexes

In Western Transbaikalia, two main Late Paleolithic cultures are distinguished - Chikoi with bifacial production and Selenga without it. There are still debates about the cultural classification of some finds, such as Studenoye I, Ust'-Menza I and II. According to the presence of bifaces in the assemblage of Ust'-Menza-2, layer 4, it can hardly be assigned to Selenga culture. On the basis of the technical and typological characteristics of the lithic assemblages from complexes with early pottery, their relations with the local Chikoi culture and Yubetsu technology can be assumed.

New absolute dates and the pollen data from Studenoye I, layers 8-9, and Ust'-Menza I, layers 5-6, change their chronology to the Pleistocene-Holocene boundary. This is in contradiction with the old data for these sites. The chronology of other regional complexes with early ceramics (Ust'-Karenga and Krasnaya Gorka) overlaps with the new data for Studenoye I and Ust'-Menza I.

Agathe Reingruber

Institute for Prehistoric Archaeology, Freie Universität Berlin, Berlin, Germany

The flat sites Elateia 1 and Sesklo B in Context: Settlement Patterns of the Thessalian Early and Middle Neolithic

Despite centuries of investigation in Thessaly, the discovery of the earliest settlement layers EN proves to be a challenge. The period 6500–6300/6200 cal BC is elusive, and not a single complete and unambiguous plan of a rectangular, aboveground dwelling has become known, since the shapeless, shallow pits discovered in the virgin soil are hardly suitable for habitation. Overestimation of the size

and population density of the two important EN tell-sites, Sesklo A and Argissa Magoula, has contributed to a distorted perception of EN I in this region. It is only from EN II–III that dwellings are better preserved and/or documented, and from the early MN that we have complete settlement plans obtained through both geophysical surveys and excavations.

As the German-Greek cooperation project carried out between 2016 and 2021 in Thessaly has shown, tells (magoules) are not the only settlement type, as systematic and intensive surface surveys have also revealed flat sites of EN and MN. This paper discusses settlement patterns encountered at two flat sites, one prospected by our team (Elateia 1) and the other excavated in the late 1970s (Sesklo B). Evidence for horizontal displacement is shown and the settlement patterns are compared with those of Magoula known as Sesklo A.

Dragana Rajković¹ and Selena Vitezović²

¹Archaeological museum Osijek, Croatia; ²Institute of Archaeology, Beograd, Serbia

Neolithic Multiculturalism: Zones of Contact of Various Communities

Although the term “*archaeological culture*” has been criticised from different viewpoints in recent decades, it remains a useful analytical tool (to be used with caution, however) for identifying and labelling prehistoric communities with similar or identical material culture. Microregions where traces of communities attributed to different contemporaneous cultures are found are particularly interesting for studying cultural contacts and cultural change in the past. One such region is the southeastern Baranja region in present-day eastern Croatia, where communities of the Vinča, Sopot, and Lengyel cultures lived in the 5th millennium BC. This is the area where communities of the Vinča, Sopot and Lengyel cultures lived in the 5th millennium BC. Although this area was long considered to be populated by communities of the Sopot culture, recent archaeological research has shown a significant presence of communities of the Lengyel culture in this area. In this paper, two Late Neolithic sites near Beli Manastir are presented: Kneževi Vinogradi, with archaeological remains attributed to the Sopot and Vinča cultures, and Kotlina, with archaeological remains attributed to the Lengyel culture. At the Kneževi Vinogradi site, several structures from the Late Neolithic and the material culture with features of the Sopot and Vinča cultures were discovered during smaller rescue excavations. Recent systematic investigations at the Kotlina site revealed a large site of the Lengyel culture with settlement structures, burials and a rich material culture. Of particular interest is the presence of artefacts made of exotic raw materials such as obsidian and shells, showing that Kotlina was part of a large trade and exchange network. The settlement patterns, subsistence, economy, and material culture of these two sites are analysed, as well as their possible position within a larger network of Late Neolithic communities in the region.

Katarina Botić

Institute of Archaeology, Zagreb, Croatia

8.2–6 ka BP Human-Environment Interaction in the Southwestern Carpathian Basin: A Past Narrative for Future Adaptation

The relationship between man and the environment and adaptation to the ever-increasing environmental pressures associated with global climate change is a very current issue. However, such problems also existed in the past. Climatic conditions in the period from 8.2 ka to 6 ka BP posed challenges for Neolithic populations, both for those who came from the southeast (regional Early

Neolithic) and for those who lived in central Europe (regional Middle and Late Neolithic). Research on these changes is not new, but recent studies of past environments show the importance of a microregional approach, because even during globally recorded periods of change, certain microgeographic areas were affected more mildly or differently. Consequently, populations found microspaces where they could survive prolonged periods of unfavourable climatic conditions, or they perfected their survival methods in areas less affected by these changes.

The present work is primarily concerned with the study of environmental conditions in the southwestern part of the Carpathian Basin, especially in the marginal zones, i.e. the subalpine regions, and the adaptations of the Neolithic populations to the changed conditions by migrations or by adaptation of various aspects of life. Special attention is given to those interdisciplinary studies that are not archaeological in nature (vegetation history, geological and hydrological changes), but whose results can contribute to the understanding of the past of archaeological populations. Because of their sensitivity to moisture, subalpine areas have not always been attractive for settlement in the past and may have formed barriers along certain corridors used by populations on their migrations, such as during the initial phase of the regional Early Neolithic. In other periods, such as the regional Late Neolithic, these areas were suitable and populated. The collected paleodata will be evaluated by comparison with modern data.

Alexandra Anders

Institute of Archaeological Sciences, Eötvös Loránd University, Budapest, Hungary

Neolithic People and their Artefacts. Burials of the Polgár Microregion (NE Hungary) from the Perspective of Biosocial Archaeology

Excavations prior to highway construction in the 1990s on the outskirts of Polgár brought to light more than 300 burials from the Middle and Late Neolithic (5500–4550 cal BC) at eight different sites. In 2017, a project was launched to study these burials using multidisciplinary methods to better understand the lives of Neolithic people. This presentation will be the first to summarise the main results of this ongoing project, focusing on two known sites, Polgár-Ferenci-hát and Polgár-Csőszhalom.

The Middle Neolithic (Alfoeld Linear Pottery) site of Polgár-Ferenci-hát shows two distinct occupation phases. The first phase is ALP I, and the second, more intensive occupation corresponds to the phases II-IV of ALP. A total of 113 graves were excavated, with radiocarbon dates ranging from 5300 to 5070 cal BC. The graves were distributed in small groups over the settlement features.

Polgár-Csőszhalom is one of the most important Late Neolithic sites (Tisza-Herpály-Csőszhalom cultural complex) in northeastern Hungary. The settlement complex consists of a tell, a multiple fortification system enclosing the mound, a single-layer settlement and another double fortification system. During almost 100 years of archaeological investigations at this site, a total of 147 burials were uncovered in the settlement features.

The multidisciplinary methods of the project include traditional archaeological and bioarchaeological investigations and analyses, such as physical anthropology and pathology, stable isotope chemistry ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$) and ^{14}C measurements, microarchaeobotany on dental calculus, and palaeogenetic data for kinship patterns. The various artefacts (personal jewellery made of Spondylus or red deer canines, lithics, and ochres) found in the burials were also analysed by microscopic wear analysis and provenance studies (petrography, SEM-EDX, PGA).

The results of these complex but fundamentally archaeological methods complement each other, enabling us to trace the possible changes in lifestyle through space and time. These results can be used to trace microhistories of specific communities as well as personal life histories of individuals. The individuals and their artefacts have different biographies, and by weaving together the strands of these different biographies and interpreting them in the context of the tomb, we gain insight into the lives of Neolithic people in Polgár.

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Ivana Pandzić

Department of History, Faculty of Philosophy University of Banja Luka; Museum of Republic of Srpska; Banja Luka, Bosnia and Herzegovina Republic of Bosnia and Herzegovina

Unearthing the Role of Salt Exploitation in Transforming Neolithic Bosnia and Herzegovina

The Eurasian Neolithic witnessed profound transformations in human societies and marked a pivotal moment in prehistory. This paper examines the dynamics of cultural and social development during this period in Bosnia and Herzegovina, highlighting the importance of salt exploitation as one of the most important factors that influenced the cultural and social development of the region. It played a role in food preservation, nutrition, economy, and may have had cultural and ritual significance as well. Understanding the importance of salt exploitation offers valuable insights into the dynamics of this transformative period in the region's prehistory and provides insight into how this important resource contributed to the development of early societies and cultures.

Vidan Dimić and Dragana Antonović

Institute of Archaeology, Beograd, Serbia

Born Again: Multiple Biographies of Ground and Abrasive Stone Tools in the Neolithic of Serbia

Stone has always been a highly valued commodity due to its natural properties. It is practically indestructible, being incombustible and very difficult to dissolve. The only imperfection is its fragility, but even after breaking it does not disappear, and the remaining pieces can be used for a long time, either as building blocks, tools or decorations. Therefore, man's attachment to stone as a raw material is very deep and remains unchanged even after the advent of metal. Although stone was used primarily as a utilitarian object in prehistory, stone objects often had symbolic value as well. Because of their hardness, toughness, and durability, stone tools had a long, dynamic, and complex life in which they could pass through different segments of the operating chain again and again until their final disposal. The way stone tools are made, used, and discarded is primarily a consequence of social traditions and practices. Various aspects of the use of rocks and minerals as raw materials were particularly emphasized during the Neolithic period, when the technology of stone working reached its peak. Stone tools wore out slowly and could be used for a long time with constant renewal. Even after being damaged, they started a new life cycle through various recycling processes or in a secondary context. Although very interesting for research, these specific ways in which stone objects were redirected to a secondary or recycling function, usually after damage in their original function, are often neglected in archaeological studies. The spectrum of repeated functions of such stone tools is broad, ranging from utilitarian to symbolic purposes, and provides important information about the cultural practices of the communities that made and used them. The aim of this paper is to clarify the use of the terms for repeated, extended, secondary, and reused use within the lithic industry and to present the most common examples of the use of ground and polished tools in secondary contexts in the Neolithic of Serbia, focusing primarily on tools for everyday use and the ways in which their function was redirected through different segments of the operational chain.

Matija Turk

Institute of Archaeology, Scientific Research Centre of the Slovenian Academy of Sciences and Arts (ZRC SAZU), Ljubljana, Slovenia

Mesolithic Site Viktorjev spodmol: A Lithic Perspective

The rock shelter Viktorjev spodmol (southwest Slovenia) is located at the foot of the mountain Vremščica near Divača. After the discovery of the first archaeological findings by local amateurs, a small archaeological survey was carried out in 1999. Stone and bone artefacts were collected, as well as abundant faunal and paleobotanical remains. Finds of pottery sherds from the Neolithic and Bronze Age indicate that the shelter was also inhabited in later periods. The typological and technological analysis of the stone artefacts, especially the microlithic armatures, shows that the Mesolithic finds belong to the Sauveterrian and Castelnovian traditions. However, the boundary between the two Mesolithic phases is not clear, since the excavated Holocene sediments, followed by a rockfall, are only 1 m thick and do not show clear stratification. Nevertheless, Viktorjev spodmol can be considered one of the richest Mesolithic sites in the northern Adriatic due to the abundance and diversity of finds, especially microlithic armatures. In 2017, new archaeological excavations began at Viktorjev spodmol. In this paper, we present the old and new finds, focusing on the lithic industry and placing it in the wider context of Mesolithic sites in the Karst and Istria.

Alenka Tomaž

Department & Institute of archaeology and Heritage, Faculty of Humanities, University of Primorska, Koper, Slovenia

Tracing Standardization in Early Eneolithic Pottery Production. Case Study: Prekmurje Region

“For over twenty years, archaeologists have been concerned with the identification of the early appearance of specialized production and the implications of such a mode of production made for understanding the rise of complex forms of social and political organization” wrote William A. Longacre more than twenty years ago. Since then, numerous studies have been conducted worldwide on these questions, but in Slovenia, not a single in-depth study has been published to date.

In the last two decades, many new Early Neolithic sites have been excavated in the Prekmurje region with confirmed contextual data, providing us with many new data on ceramic material culture. In most of these sites, the archaeological remains are generally attributed to the cultural context of Lasinja and Retz Gajary. Of particular interest appears to be a cluster of sites located just outside the village of Turnišče and dating to the end of the 5th millennium BC and the beginning of the 4th millennium BC. In our presentation, we focus on tracing the standardization features within Lasinja pottery production from several sites in the Prekmurje region around Turnišče, tracing the elements both within the pottery production of a single site and across the region. The parameters of standardization of pottery production can be considered from different aspects, such as raw material and technique, dimension and shape, and decoration, etc. In our study, we focus primarily on pottery shapes and dimensions, and to some extent on production technique, to determine if there are indicators of standardization within the studied pottery production.

Bine Kramberger¹, Borut Toškan² and Tjaša Tolar²

¹Institute for the Protection of Cultural Heritage of Slovenia, Ljubljana, Slovenia; ²Institute of Archaeology, Scientific Research Centre of the Slovenian Academy of Sciences and Arts (ZRC SAZU), Ljubljana, Slovenia

Reassessment of the Neolithic Sava Group in Slovenia after 20 Years: New Data on the Chronology, Settlement Features, Ceramic style(s) and Economy from Dolsko – Spodnje Škovce

The term Sava group of the Lengyel culture was introduced into Slovenian archaeology 20 years ago. It was used to describe the oldest known sites along the Sava River and its hinterland with their specific ceramic assemblages, polished stone tools and agriculture, originally associated with the Lengyel phase II. However, in contrast to the Lengyel phase settlements, no post houses are (yet) known from the Sava group sites; instead, most of the sites consist only of pits, which are thought to be the remains of pit houses; moreover, there is very little information on paleoeconomy and chronology, as mainly samples of long-lived materials have been dated and no cemeteries have yet been discovered.

New data on chronology, settlement features, pottery style and economy of the Sava Group were provided by the Dolsko – Spodnje Škovce site northeast of Ljubljana, excavated in 2008. In the large pits, Pit 1 and Pit 2, most of the Late Neolithic finds of the site were discovered. Among them, pottery fragments predominate, but there are also some stone tools, splinters, charcoal fragments, some seeds and a relatively large amount of animal bones. A comparative analysis of the pottery revealed a relationship with part of the sites of the Sava group and, in the wider Central European context, a similarity with the sites of the Lengyel phase III according to P. Raczky and N. Kalicz. Four samples of bovine teeth (apatite) were radiocarbon dated between 4500 and 4350 cal BC, while the two charcoal samples were significantly older. In this context, therefore, the possibility of an old wood effect is discussed, especially since the dates of all four apatite samples overlap almost completely and the pottery is homogeneous in all observed parameters. The results of the archaeozoological analysis are also interesting: it turned out that the collection of animal bones from Dolsko is strongly dominated by cattle, which could indicate that the animal husbandry of the inhabitants here was focused on cattle breeding or the selective deposition of animal bones. Among the preserved remains of seeds/fruits, no remains of cultivated plants (wheat or barley) were found, but only the uncharred seeds of the genus *Plantago* (plantain). The charcoal fragments were dominated by ring-porous tree species, mainly oak (*Quercus* sp.).