

METHODOLOGY & ARCHAEOMETRY

7agreb 3rd - 4th December 2020

O S THOMAL S C I E N T I F I C

METHODOLOGY & ARCHAEOMETRY

Zagreb, 2<sup>nd</sup> - 3<sup>rd</sup> December 2021











# PROCEEDINGS

FROM THE 8<sup>TH</sup> AND 9<sup>TH</sup> SCIENTIFIC CONFERENCE METHODOLOGY AND ARCHAEOMETRY

## **IMPRESSUM**

#### **PUBLISHER**

Faculty of Humanities and Social Sciences, University of Zagreb

## FOR THE PUBLISHER

Domagoj Tončinić

#### **EDITOR**

Ina Miloglav

Faculty of Humanities and Social Sciences, University of Zagreb

#### **EDITORIAL BOARD**

Predrag Novaković

Faculty of Arts, University of Ljubljana, Slovenia

Dimitrij Mlekuž

Faculty of Arts, University of Ljubljana

& Centre for preventive archaeology, Ljubljana, Slovenia

Michela Spataro

The British Museum, London, United Kingdom

Duska Urem-Kotsou

Democritus University of Thrace, Komotini, Greece

Jasna Vuković

Faculty of Philosophy, University of Belgrade, Serbia

Rajna Šošić Klindžić

Faculty of Humanities and Social Sciences, University of Zagreb, Croatia

Jacqueline Balen

Archaeological Museum in Zagreb, Croatia

Michael Doneus

Department of Prehistoric and Historical Archaeology, University of Vienna,

& LBI for Archaeological Prospection and Virtual Archaeology, Vienna, Austria

Marta Čović Mileusnić

Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb, Croatia

## **DESIGN & DTP**

Srećko Škrinjarić

All papers were reviewed in the peer review process in which the identity of both reviewers and authors, as well as their institutions, are respectfully concealed from both parties.

### DOI

https://doi.org/10.17234/METARH.2022

# ISSN 2718-2916

Faculty of Humanities and Social Sciences of the University of Zagreb

### URL

https://openbooks.ffzg.unizg.hr/index.php/FFpress/catalog/series/MetArh http://www.ffzg.unizg.hr/metarh/

# Publishing of this e-book is supported by

Ministry of Science and Education of the Republic of Croatia



This publication is licensed under Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International licence (https://creativecommons.org/licenses/by-nc-nd/4.0/) which allows others to share, copy and redistribute the publication in any medium or format, as long as they give appropriate credit, provide a link to the license, and indicate if changes were made. The content of this publication may not be used for commercial purposes. If the publication is remixed, transformed, or built upon, the modified material may not be distributed.

METHODOLOGY & ARCHAEOMETRY

Zagreb, 3<sup>rd</sup> – 4<sup>th</sup> December 2020

THE CONFERENCE

METHODOLOGY & ARCHAEOMETRY

Zagreb, 2<sup>nd</sup> – 3<sup>rd</sup> December 2021











# PROCEEDINGS

FROM THE 8<sup>TH</sup> AND 9<sup>TH</sup> SCIENTIFIC CONFERENCE METHODOLOGY AND ARCHAEOMETRY

Ina Miloglav

# Content

07	Preface
09	Ivor Kranjec, Jelena Behaim  New Considerations on Spatial Analysis in the Research of Early Medieval Landscape: the Case Study of Bale region in Istria (Croatia)
25	Andrej Janeš The use of archaeological structural survey and the analysis of standing structures on mediaeval castles
37	Miroslav Vuković, Mirjana Sanader, Ina Miloglav, Domagoj Tončinić, Joško Zaninović, Vinka Matijević, Mirna Cvetko, Domagoj Bužanić Archaeological surveying in karstic fields: the site of Balina Glavica
47	Igor Medarić Project MagIstra – magnetic mapping of archaeological structures in soils on flysch: case studies from Slovenian Istria
65	Dinko Tresić Pavičić, Željka Bedić, Filomena Sirovica Skeletor: system for recording and analysing articulated human skeletal remains
75	Miroslav Marić, Nemanja Marković, Jelena Bulatović, Ivana Pantović, Regional Absolute Chronologies of the Late Neolithic in Serbia. The case study of At near Vršac
93	Mario Novak, Dragana Rajković The Late Neolithic human burials from Kotlina – Szuzai Hegy, Baranja: the first results of the anthropological analysis
107	Rajna Šošić Klindžić "If its quacks like a duck" – interpretation of Late Neolithic site Gorjani Kremenjača, Eastern Croatia
121	Katarina Šprem, Uroš Barudžija Micropetrographic analysis as a tool for the determination of limestone sources in Istria - applications and limitations
131	Petra Nikšić Volume density and spatial analysis of a Late Antique settlement – preliminary results
143	Mykhailo Klymovych Few experiments of log-boats making
153	Bojana Plemić, Jelena Anđelković Grašar We do need an education: youth participation programmes as a method in archaeology dissemination

# "If its quacks like a duck" – interpretation of Late Neolithic site Gorjani Kremenjača, Eastern Croatia

Rajna Šošić Klindžić

https://doi.org/10.17234/METARH.2022.09

Department of Archaeology Faculty of Humanities and Social Sciences University of Zagreb Ivana Lučića 3 HR – 10000 Zagreb rsosic@ffzg.hr

This paper examines the role of perception and traditional knowledge in archaeology, using the site of Gorjani Kremenjača in Eastern Croatia as an example. It is argued that traditional typologies are deeply rooted in the production of archaeological knowledge, leaving little room for unbiased site evaluation. The focus is on two main elements that are under a strong influence of perception and traditional knowledge: size and shape, age and "cultural" affiliation. Recent research using satellite imagery and cyclical aerial photography has shown that large late Neolithic settlements are much more frequent than previously thought, changing our understanding of average Neolithic settlements. Another focus of the text is the classification of the post-Starčevo period in the area between the Sava and Drava rivers, traditionally referred to as the Sopot culture. The classification is based on the presence of black burnished pottery, biconical shapes and footed vessels at a site, and the division is conveniently placed along the Danube, following the borders of Croatia and Serbia. The authors argue that the division between the Sopot and Vinča cultures is based on convenience and the dominant scientific narrative of the period and region. The text also notes that the origin and demise of the Sopot culture are closely intertwined with Vinča culture and the overall proportion of ornamented pottery is very low, making it difficult to define specific site affiliation. I will argue that the process of creating and transforming archaeological knowledge is slow and static, and the site of Gorjani Kremenjača was attributed to the Sopot culture without much reconsideration. Overall, the paper highlights the importance of reflection and challenging traditional knowledge in archaeology.

**Keywords:** Late Neolithic, Sopot, Vinča, settlement layout, pottery ornaments, production of archaeological knowledge, interpretation

# Introduction & background

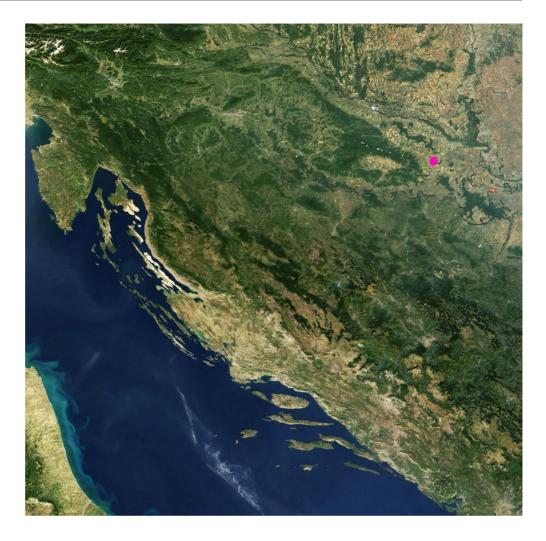
In archaeology, perception plays a vital role in any segment of research. However, when it comes to a particular site or research question, we researchers often do not take that aspects into account, and the need for reflection becomes a neglected and overlooked factor. That is why we often dwell on old knowledge and interpretation without proper reflection, and rather fit

our data within existing frames. In this paper, the site of Gorjani Kremenjača will be used (Fig.1) as an example of the "logical" interpretation based on existing traditional knowledge. We will try to show how traditional typologies are deeply rooted in the production of archaeological knowledge, leaving little space for unbiased site evaluation. The site in question is situated in Eastern

author).

Figure 1. Position of the sites of Gorjani Kremenjača on a satellite image of Croatia and surrounding areas. Satellite image of Croatia in September 2003. Cropped image, original taken from NASA's Visible Earth.

Obtained from Wikimedia Commons (Modified by the



Croatia, between the rivers of Sava, Drava and Danube. Being part of SE Europe and the Balkans, this area is in particular up to this day very closely related in the local perception as the crucial one in the great division between East and West, which influence stretches to Stone Age as well.

With regards to this site, there are several basic elements that are under the strong influence of perception and traditional knowledge:

- Size and shape
- Age and affiliation

# Size and shape

Late Neolithic settlement sites are generally divided between tells and flat settlements. The most important criteria when it comes to defining a site as a tell is a thickness of "cultural layers". Those sites are often observed only as more distinctly elevated areas, while other surround-

ing areas, if containing any archaeological finds, are explained as a "periphery", or can even be overlooked. If a site extends over an area considered "average" for sites of the respective period (10 ha, or even 5ha), it is often declared as a "special site" and consequently falls into the category above "normal" settlements and becomes a subject of global debate regarding the organization of life in the Neolithic (for example Hodder 2006; Tripković 2014; Bernardini and Schachner 2018).

In the Croatian publications, ditches and palisades are associated with tells, while other sites are described as flat and open (Balen and Čataj 2014: 65). At the local level, tells are dated to the middle phase of the Sopot culture (Balen and Čataj 2014: 65 and references). The size of a Sopot tell is between 80 and 150 m in diameter in general, with a thickness between 2-4 m, and sometimes up to 15 m (Balen and Čataj 2014: 65). Not much attention is paid to areas around tells, and finds in the vicinity can be attributed to "other sites".

The work by H. Kalafatić and B. Šiljeg (Šiljeg and Kalafatić 2015; 2016; 2017; Kalafatić and Šiljeg 2016; 2018) using satellite imagery and cyclical aerial photography showed without a doubt that large late Neolithic settlements are much more frequent than traditional archaeological knowledge is ready to accept, and is changing our knowledge about the Late Neolithic settlements. Most of the sites consist of several enclosure and ditch systems. Already around 50 large enclosed sites of the Sopot culture have been published in the area between Sava and Drava (Kalafatić and Šiljeg 2016; 2018; Šiljeg and Kalafatić 2015; 2016; 2017; Šošić Klindžić et al. 2019). New sites have been confirmed by field survey and collections of late Neolithic pottery. This research changes the perception of average (late) Neolithic settlements being small and compact.

Gorjani Kremenjača site was not visible from air, but fits into the pattern of large multi-component late Neo-lithic settlements' layout provided by Kalafatić and Šiljeg based on the results of magnetic survey and excavations (Šošić Klindžić et al. 2019; Kalafatić et al. 2020).

# Age and Affiliation

Traditionally, the post-Starčevo in the area between Sava and Drava is called the Sopot culture (Dimitrijević 1968; 1979: Balen and Čataj 2014 etc.). If black burnished pottery, biconical shapes and footed vessels are found at a site, it is attributed to the Sopot culture. Only a few sites in a narrow and localized stretch along the Danube between Vukovar and Bapska and possibly Baranja have been recognized as Vinča sites (Botić 2020b; Burić 2014). V. Milojčić distinguished Sopot as a separate entity in 1949, naming it the "Slavonian-Syrmian culture", which was later confirmed by S. Dimitrijević, subsequently renaming it the Sopot culture (Dimitrijević 1968; 1979). The division was conveniently placed along the Danube and followed the borders of Croatia and Serbia, that at that time were both parts of the Socialist Federation Republic of Yugoslavia. Even in the synthesis of Yugoslavian prehistory, the Croatian-Serbian border is declared as the dividing line between the Sopot and Vinča cultures (Dimitrijević 1979: 266) It seems very convenient that the two late Neolithic cultures were divided exactly by the lines (federation borders) initially separating the realms of scholars from Croatian and Serbian universities and their respective territories.

The idea of Vinča world stopping somewhere in Srijem is very strongly embedded in the archaeological nar-

rative of the region. The presence of Vinča here is still described as problematic or enigmatic, and more often explained as import (Ervenica, Samatovci) or influence (Sopot) and imitation (Samatovci, Bapska), or coexistence of the two populations (Bršadin) (e.g. Dimitrijević 1979; Botić, 2020a). Parts of Slavonia where Vinča has not been detected are perceived as very far, completely out of the Vinča reach, even though sometimes the distances are less than 100 km. Nevertheless, both origin and demise of the Sopot culture is the subject of relations to Vinča and closely intertwined with it. Another major obstacle in defining specific site affiliation is very low overall proportion of ornamented pottery and big scale of fragmentation. The pottery assemblages from various sites in the region, the most important, if not only factor of site attribution to specific culture were not the subject of comparative analysis to establish key similarities and differences. Each new assemblage was rather assigned to specific culture and sub-type by incorporating it according to eminent publications by esteemed scholars. All of this is the result of scholarly work based on available material and common practices in accordance with a dominant scientific narrative of a period and region. All these divisions of prehistoric assemblages were also very convenient on a larger global scale considering contemporary trends and assumptions about the role of Eastern Croatia in time, space, and relations to neighbouring areas.

The site of Gorjani Kremenjača was also attributed to the Sopot culture in old and recent publications without much reconsideration (Dimitrijević 1968; Minichreiter 1992; Šošić Klindžić et al. 2019). It reflects how the process of creating and transforming archaeological knowledge is rather slow and static. To explain the main characteristic of the Sopot culture I present here quote from its founder, Stojan Dimitrijević:

"The ceramic production of the Sopot culture, deprived of the Vinča imports and fashionable Vinča trends, is in itself an immensely simple and static production category. The Sopot culture, although a member of a group of cultures comprising the Balkan-Anatolian culture complex and consequently a close relative of the Vinča culture, almost completely lacks that Vinča decorative sheen—with the exception of brilliantly polished external surface of its simple pottery vessels. In terms of fine pottery assortment, the culture expresses itself with unvarying biconical designs from its beginning to its end, with only an occasional occurrence of a modest novelty. The decoration is represented in a small percentage range; it is,

however, authentic (deep incising and notching), but it is too simple to be attractive, let alone fascinating – unlike objects from Vinča, Danilo and Butmir cultures. There is no attractive plasticity, nothing which would stimulate the mind of an art historian. Nevertheless, this modest simplicity, the smooth lines of biconical bowls and pots, the fine profile curves of cups on foot speak to the fact that this ceramography is not a result of a lack of imagination, but of a certain will.

In a number of previous texts, it has been stated that the Sopot culture originated from the Starčevo substrate; that it is, summarily speaking, a result of the Vinča-Starčevo cultural symbiosis, but the new culture's basic direction, its spirit comes from Starčevo. The Starčevo culture gave the Sopot successor its sense of simplicity, its adherence to traditional accomplishments. If the Starčevo culture is stripped of painted ornamentation, if it is monochromised, it becomes a very basic ceramographic creation. Its development line moves slowly from the beginning to the end. One should constantly be aware that towards the end the Starčevo culture almost completely lost the category of painted pottery - it fell from ca. 20 % to 2,36 % and 1 % (Vinkovci-Tržnica, Gornja Tuzla VI-a); therefore, it was monochromised. During that time, when painted ceramics lost its meaning, when it became fully outdated, the Sopot culture arose from the Starčevo substrate.

Hence, the Starčevo culture, from which the Sopot culture emerged, was no longer exclusively traditional Starčevo manifestation, because it too experienced the impacts and tremors brought by Vinča population, not only in socio-political but also cultural sense. The Vinča culture was an unusually vital and penetrative cultural factor, as all new cultures are – new under local conditions, naturally. The vitality of Vinča population is already attested by the act of the great migration itself: only the vigorous and powerful organisms, when absolutely threatened in a physical sense (i.e. biologically and culturally), venture into the unknown, in order to preserve their cultural and ethnical integrity at all costs. Less vital populations remain where they are and surrender to destiny. The Starčevo population was only partially affected by the Vinča migration, and outside of Šumadija it could continue to exist on its own terms. But the presence of something new and powerful has an enchanting effect and this conservative Starčevo population nevertheless adopts some innovations – what we can observe today from the preserved legacy are only the fine pottery biconisation and the decline of painted decoration. But

even that is sufficient. The transformed Starčevo ceramography in itself represents an introduction into the Sopot culture – it possesses an indisputably proto-Sopot spirit, because the Sopot culture would take over all those Starčevo biconical forms. However, it should not be forgotten that such biconical modelling is a result of the Vinča pressure. Following the chronological sequence of events, the spiraloid B horizon of the transformed Starčevo culture should be determined as consequential to the initial Vinča thrust. This form of Starčevo culture, regardless of the vast area on which it existed, was nonetheless doomed to extinction. It was biologically worn out and did not possess enough power to resist the impending changes. The recurrent Vinča pressure which followed at the transition from phase A-2 to phase B-1, i.e. the enormous Vinča expansion commencing at that time and aimed in every possible direction, with starting point in Vinča's primary territorial core, reached Srijem as well. But the Vinča invasion was halted approximately at the line Ilok – Sremska Rača, though its presence in the interfluve had a much stronger impact than the plain physical manifestation. This second Vinča thrust, experienced by the Starčevo individuality in the interfluve, did not leave any possibility for further continuation of the Starčevo culture – besides, it could not preserve its cultural physiognomy anywhere. The result of the second Vinča impact was the creation of the Sopot culture. To what extent it was merely a cultural pressure and whether it was possibly even a population diffusion is difficult to determine specifically, though it was more probably only a cultural pressure because it is reasonable to assume that even a small population invasion would have integrated this part of the interfluve into the Vinča cultural sphere. The Sopot culture is, therefore, the result of the cultural symbiosis of the late Starčevo and early Vinča cultures."

This poetical description of the birth of the Sopot culture under the strike of force by the dominant and imaginative Vinča population became deeply rooted in the archaeological narrative as a strong foundation for the perception and interpretation of every single find and site ever since. It also bears the reflection of the "clash of the civilization concept", of conquer, of dominant population overwriting and subduing new territories and their inhabitants.

It is clear that the Sopot culture is defined by a *lack of* rather than presence and acknowledgement of simplicity. Little is known about the immediate post-Starčevo period in the area between Drava and Danube. Accord-

ing to some researchers, the post-Starčevo period in the area between Sava and Drava is characterized by the local manifestation Ražište, which predates the Sopot culture and is a "result of Starčevo-LBK-Vinča meeting point in the Drava river valley" (Botić 2020b).

So, the Vinča and Sopot cultures were (and are) declared as separate, clearly divided entities, and as such lived comfortably for several decades. Obvious finds of significant Vinča types are regarded as imports or imitations of the style. It was acknowledged, however, that the Vinča penetrated into the Sopot territory for a brief period of time during its later and final phases (Dimitrijević 1979; Burić 2014).

On the other hand, the absence of some Vinča types and slightly different typology at some sites argues for the division of Sopot and Vinča or seeing Sopot as some local cultural variant on the northwest fringes of the Vinča orbit in present day Croatia (Jakucs et al. 2016).

On the recent maps, made according to the available published papers and archaeological material, the western "borders" of the Vinča culture appear as the open jaws of a dragon around the territory between Drava and Sava (e.g. Whittle et al 2016, maps). Of course, it is only the result of current publications and the consequences of tradition and long-term divisions in scholarly practices. The disintegration of Yugoslavia and the subsequent wars only strengthened this division of cultures for two reasons — for a while it was impossible to compare material, and politically it was also suitable for each side and each Republic's most important researchers to have "their own culture" which expands to the territory of another republic only marginally.

The most western site of the Vinča culture is the site of Kalošević in Tešanj, known as an (earlier) Vinča site from the 1960s. But as Bosnia has always been regarded as a land of the mixture, not much attention was paid to that site. It is also conveniently located next to a big river, so its position is logical. In the last several years, research in Hungary revealed remains of the early phases of Vinča on several sites, moving the Vinča boundary to the north and the west even in its earliest phases (Jakucs and Voicsek 2015; Jakucs et al. 2016).

Aside from the borders, a part of the local identity is also the belief that this is the area where the west and the east are divided, which makes a perfect scenery for the clash of the West and the East in prehistory as well (LBK and Vinča "realms"). The idea of strict boundaries in this area of European prehistory has been recognized

and challenged by the researchers recently, for example (Jakucs et al. 2016).

I will argue here that the site of Kremenjača-Gorjani, based on archaeological evidence is no different than typical Vinča sites on its "main territory", dating from earlier phases till the final phases and that we need to search for the answers for different attribution elsewhere. Our arguments are based on radiocarbon dates, pottery and geomagnetic survey.

# Archaeological data on the Gorjani Kremenjača site Site Layout

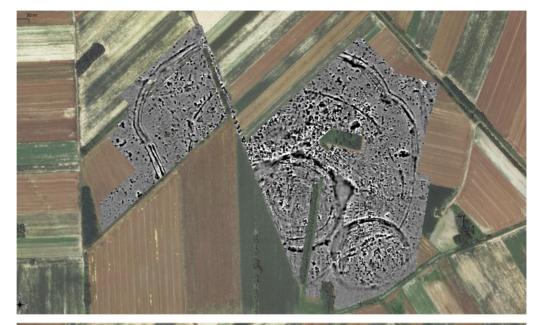
The site is located on a slope that extends two kilometers to the east from the village of Gorjani, at the altitude of 108 to 115 meters above sea level. The topographic name of the site, Kremenjača, in lowland areas with Quaternary deposits mainly refers to an archaeological site, due to surface findings of lithic artefacts (Croatian *kremen – flint*). The surface is abundant with lithics, pottery and daub fragments.

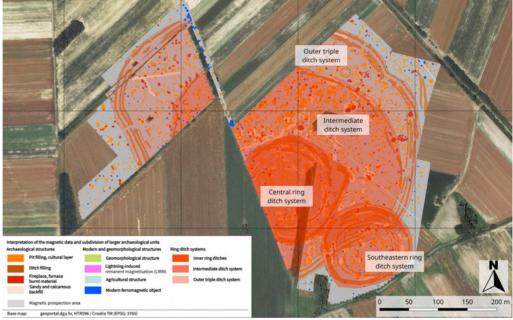
# Magnetic survey

The magnetic survey was conducted in 2018 and 2019 by the Eastern Atlas company. During 2018 Eastern Atlas surveyed an area of 6.3 ha with seven Förster fluxgate gradiometer sensors. During 2019, the survey continued recoding an area of 9 h with 10 Förster fluxgate gradiometer sensors. The probes were mounted on a light and foldable cart. This gradiometer array is a component of the convertible LEA MAX system. The Förster FEREX CON650 fluxgate gradiometer probes register the gradient of the vertical component of the Earth's magnetic field with an accuracy of 0.1 nT (Nanotesla). The measured gradient (the difference between two vertically arranged sensors in the gradiometer probe) is insensitive to the typically large fluctuations of the Earth's magnetic field and is determined only by the magnetization of local subsurface objects (Meyer and Hypiak 2018; Meyer and Zöllner 2019).

The results of the geomagnetic survey showed that the Neolithic settlement had a centripetal layout (Fig. 2). All enclosures extend radially from each other suggesting the simultaneity of most of the ditches. Outer parts are marked by a triple outer enclosure which is comprised of ditches and palisades. The visible dimensions of the outer enclosure are 430 x approx. 400 m, enclosing an

Figure 2. Magnetic survey and the interpretation of Gorjani Kremenjača. (Author: Cornelius Meyer).





area of around 20 ha. The ditch is 7 m wide. Further towards the center is the intermediate ditch system enclosing an area of c. 10 ha. The length of the recorded part of the enclosure is 240 m and the width of the ditch is 4.5 m. In the middle, slightly towards SE is the central ring ditch system on an area of 2.4 ha. The dimensions of the outer ditch are 180 m in diameter and the ditch is 7.3 m wide. The inner ditch diameter is 138 m and the ditch is 3 m wide. Next to it is the southeastern ring ditch system comprised of seven circular ditches. According to the geomagnetic survey results, this circle is probably the youngest as it intersects outer and intermediate

ditch systems. In the center of it are recorded remains of lighting strike. The majority of the features is oriented SW-NE. Some of the features are oriented in the opposite direction, but they are adjacent to the remains of lightning-induced remanent magnetization (LIRM), which seems to be the central point of the second circular enclosure, so the initial interpretation would be that the lightning strike occurred during the late Neolithic period. Marking the areas of a lighting strike is recorded during the Neolithic period, see (Bates et al. 2019), and this will be a part of our future research.



## Small scale excavation

So far, four small trenches of 5x5 m have been excavated in the area between the central and intermediate ditch systems. All but one contained only Neolithic pottery, and one contained Neolithic and Bronze Age pottery. The pottery published in this paper originates from the area just north of the central ditch system. Radiocarbon dates also originate from this trench, with the exception of samples from the coring of the central ditch itself. The features unearthed during the excavation follow the same orientation as recorded with the geomagnetic survey.

Archaeological feature containing layers of burnt daub, compacted yellow loess and post holes extends over al-

most the entire excavated surface. The layers of compacted loess, burnt daub and layers of charcoal occur on several levels, suggesting that the structure has been renewed several times. The feature is rectangular in shape, extending in the southwest – northeast direction.

# 14C dates

So far, 12 samples have been dated from the Gorjani – Kremenjača site by <sup>14</sup>C AMS dating method (Table 1). Four samples were dated in BETA laboratory and another eight in Debrecen ATOMKI. Eleven samples are from bones and one is a charcoal sample. Six of the samples were taken from the NE corner of the same trench

lab no	<sup>14</sup> C date	cal BC	SU	material	Element	species
DeA-26042	6201 ± 51	5310-5000	137	bone	metacarpus	cattle
DeA-26043	6152 ± 34	5210-5000	78	bone	tibia	roe deer
DeA-26050	6100 ± 35	5210-4850	137	bone	tibia	domestic cattle
DeA-26041	6088 ± 34	5210-5170, 5080-4850	76	bone	tibia	cattle
DeA-26049	6085 ± 36	5210-5170, 5080-4840	121	bone	metacarpus	size V - large ungulate size (domestic cattle/ red deer)
DeA-26048	6078 ± 35	5210-5170, 5070-4840	52	bone	long bone fragment	size III - small ungu- late size (sheep/goat/ roe deer)
Beta - 515335	6040 +/- 30 BP	5016 - 4844	27	bone	astragalus	cattle
DeA-26051	6029 ± 33	5020-4800	126	bone	long bone fragment	size V - large ungulate size (domestic cattle/ red deer)
DeA-26044	6007 ± 33	5000-4790	78	bone	radius and ulna (fused)	cattle
Beta - 515332	5980 +/- 30 BP	4946 - 4787	central ditch	charcoal		
	5920 +/- 30 BP	4849 - 4717 (93.8%)	38	tooth	upper canine	pig
Beta - 515333		(1.6%) 4881 - 4870				
D.1. 545224	5720 +/- 30 BP	4622 - 4486 (84,5%)	30	tooth	lower molar	cattle
Beta - 515334		4682 - 4633 (10,9%)				

Table 1. 14C dates from Gorjani Kremenjača.



Figure 3. The so-called altar with decorations from the Gorjani Kremenjača. (Photo by: B. Jobst).

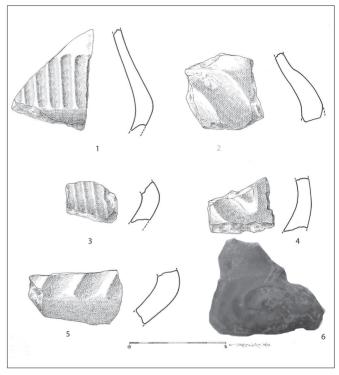


Figure 4. Channelled decorations on pottery fragments. No 6 not to scale. (Made by: M. Rončević).

where concentrations of burnt daub debris were found overlying each other. One date originates from the geological core from the central ditch. Other samples are from layers surrounding the burned debris features.

The nearby Starčevo site of Tomašanci Palača, located less than 1,5 km from Gorjani Kremenjača, is dated 5680 – 5320 BCE (Đukić 2020: 44), almost overlapping with the so far oldest dates at Gorjani Kremenjača.

The youngest date is from a posthole dug into the daub debris, while a sample from upper daub debris (Beta-5153335) is younger than the sample from a thin layer between two burnt daub debris (DeA-26041). The sample from the geological core from the central ditch falls in the range between 4946 – 4787 cal BCE (Beta-515332). Other samples are from layers surrounding the burnt debris feature and cover the period between 5310 – 4486 BCE. Additional samples will be dated and a more detailed analysis of the chronology will be provided, but considering the size of the settlement and the number of features and pottery finds from various phases of the Late Neolithic, I argue that such a long chronological sequence is plausible and probable.

# Pottery

The pottery assemblage presented in this paper was excavated from the above described features, but also some were collected as surface finds in the area surrounding the trench. Overall, the entire pottery assemblage is very fragmented. It can be divided into coarse pottery and fine pottery. Fine pottery has black and red burnished/polished surfaces in typical Vinča style. Most numerous vessel types are biconical bowls. The surface is burnished or polished, displaying a glossy effect also typical of the Vinča style (Figs 4, 5, 6). The most common decoration type is channeling (Figs 4, 5, Fig. 6: 8, 9) followed by incised bands with dots. The latter type of decoration is most common of earlier phases of Vinča (Fig. 6: 7, Fig. 7). Remains of white incrustation are present on one fragment (Fig. 6: 7). Detailed pottery analysis is undergoing, while here will be presented most typical and characteristic ornament types. Even though much more information about pottery will be available upon detailed analysis, since almost all of the attribution to the culture and phase of the previously published sites are based on the characteristic pottery ornaments, I would argue that for the initial attribution of the site most typi-



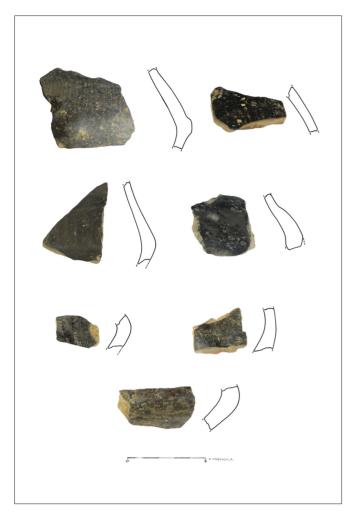


Figure 5. Channelled decorations on pottery fragments.

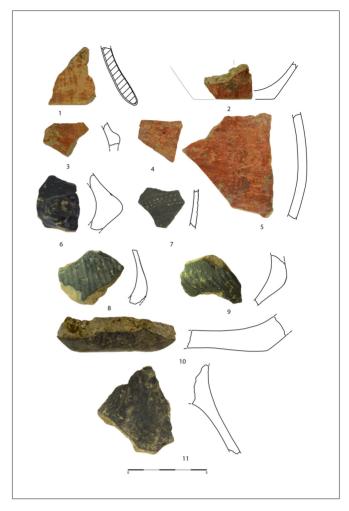


Figure 6. Red (1-5) and black (6, 8-11) burnished/polished surfaces. Fragment with incised bands and dots with remains of white incrustation (7). Channelled decorations (8 and 9).

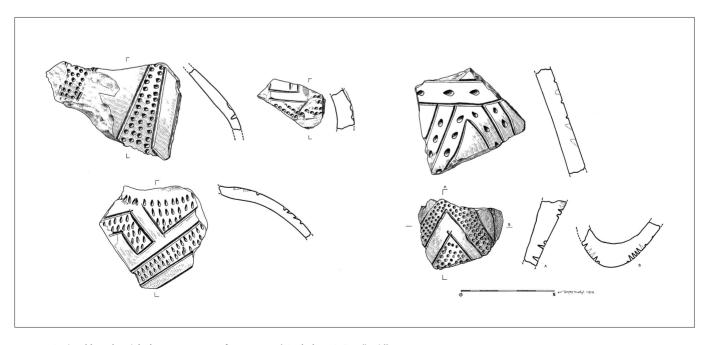


Figure 7. Incised bands with dots on pottery fragments. (Made by: M. Rončević).

cal pottery is still always used and therefore I am using that level of interpretation now. I am aware that this can be regarded as falling into the same trap, but this paper aim is to present the need for a different approach in comparing data from the sites even from the most obvious aspect, that is ornamented pottery. Among other objects made of clay, presented here, is the surface find of the so-called altar (Fig. 3). Geometrically incised, with zoomorphic (and anthropomorphic) protomes it can also be attributed to the earlier phases of Vinča.

# Discussion and concluding remarks

I argue here that there is enough archaeological evidence to mark the site of Gorjani Kremenjača as a Vinča site. Black polished pottery, decoration with channelling and incised bands and dots predominate in the pottery assemblage. The type and amount of decorations and types of pottery are typical of the Vinča culture, and despite its absence in the area thus far, they argue in favour of the attribution of the site as belonging to Vinča. In this case we cannot discuss this site as a Sopot site with strong Vinča influence, but rather a Vinča site. Main arguments for this are:

- 14C dates place it among previously dated post-Starčevo sites in the region between Sava and Drava, but also up to the final dates of Late Neolithic.
- The decoration types support a long sequence of Vinča presence at the site.
- Distinctive decorations of earlier phases of the Vinča culture are present geometric incisions with punched stripes
- Geometrically incised so-called altars with zoomorphic protomas are typical of early Vinča
- Channelling is a dominant decoration technique and appears on various types of pots, channelled ornaments on bowls are present in early Vinča.

Earlier phases are represented by the most typical feature of the earlier Vinča – geometrical incisions with dots and channelled ornaments on bowls (Garašanin and Garašanin 1979).

This type of ornament is common on early Vinča sites, contrary to the suggestion made by Stojan Dimitrijević that it is limited to the later phases of Sopot and associated only with a specific type of vessels and only as an influence, not in the typical Vinča performance. On

Gorjani Kremenjača it appears on various types of vessels (Fig. 7).

Channelled spirals on larger pots belong to the later phases of Vinča (Garašanin 1979). Incised bands with dots appear on the larger pots, mainly amphorae. Channelling in the Sopot culture S. Dimitrijević limits only to types of pots on which they do not appear in Vinča, and points that it is very rare in general (Dimitrijević1979: 280). On Gorjani Kremenjača this is not the case.

Geometrically incised *altars* with zoomorphic (and anthropomorphic) protomes can also be attributed to the earlier phases of Vinča (Jakusc et al. 2015: Fig. 21; Borić et al. 2018: 341; Marić 2017).

Furthermore, Gorjani Kremenjača follows the spatial organization pattern observed on the Vinča sites of various sizes (Borić et al. 2018). Multicomponent sites are well known and documented in the area (Hofmann et al. 2019, references therein). Most similar structure is located at the, albeit larger, Vinča site of Drenovac (Perić 2017: 1).

At Gorjani Kremenjača, as well as on the site of Oreškovica-Selište we can observe preconceived pattern for a village-type settlement in the early phases of the Vinča culture (Borić et al. 2018). Circular layout of a settlement and possible enclosures can be observed from the period of Starčevo culture, at sites such as Kneževac, a site of approximately 6ha (Kočić et al. 2020). Similar layout is also reported at the Starčevo site of Svinjarička Čuka, also with incisions with punched stripes on typical Starčevo pottery (Horejs et al. 2018).

Considering the size of the settlement and the thickness of anthropogenic layers, I argue that the longevity of the site is reasonable as a hypothesis, also confirmed by radiocarbon dates. However, pottery finds so far suggest earlier phases, but it is important to keep in mind that all of them originate from the excavation area of just 50 square meters.

In wider perspective, this does not change much, since the western edge of the Vinča is defined by the sites in Bosnia and Hungary (Jakusc et al. 2016) and Gorjani Kremenjača falls in between. In Bosnia, Vinča presence can be documented from the phase B, and in Hungary from its earliest period (A). According to the available 14C dates, Gorjani Kremenjača falls in the time period of phase B, although the pottery finds suggest possibly an even earlier presence.

After several years of research on this site, I feel that the initial interpretation of this site as a Sopot culture site reflects scholarly tradition, boundaries of academic realms and perception in archaeological work rather than conclusions based on a comparison of archaeological evidence.

In the "real" world, distances seem the longest at the borders; that is why in this area several dozen kilometres present unbearable stretches of land between two worlds. As noted in the introduction, this is a consequence of a strong tradition of establishing the territory in question as the area that divides east and west.

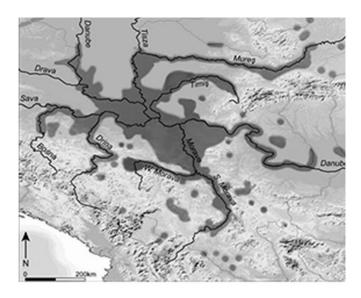
Instead of the conclusion, for future work one can only agree with the paper by Jakucs and colleagues from 2016:

"Rather than explaining the mixture of things, practices and perhaps people at Szederke'ny with reference to problematic notions such as hybridity, we propose instead a more fluid and varied vocabulary, encompassing combination and amalgamation, relationships and performance in the flow of social life, and networks; this makes greater allowance for diversity and interleaving in a context of rapid change." (Jakucs et al. 2016).

Placing Gorjani Kremenjača on the Late Neolithic map does not change it significantly, as the western border has already been marked, but rather just closes the dragon's mouth and opens the discussion regarding the nature and structure of Neolithic assemblages in the area (Fig. 8). I hope, though, that this research will contribute to the discussion on the social interaction and its reflection on material culture during the Neolithic in SE Europe. The important part of the discussion is the awareness of the limits that the reliance on traditional divisions has on the production of archaeological knowledge. Only when we observe through comparative analysis the similarities between the archaeological record we can start to focus on the differences. And by that time, it really will be of much less significance if something is called Sopot or Vinča. As for the present, one could not help but argue that if this assemblage was found on the territory of Serbia it would be without question regarded to Vinča culture.

# **Acknowledgments**

Research presented in this paper is supported in part by research project MOPRENS IP-2019-04-5344 financed by Croatian Science Foundation. Drawings and images



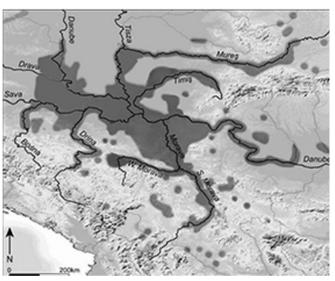


Figure 8. Map of the maximum extent of the occurrence of Vinča ceramics across south-east Europe in Whittle et al 2016, Figure 1. (Modified by the author).

of pottery are made by Martina Rončević. I would like to express gratitude to; Ivan Lović and county Gorjani for their continuous support without which this research would not be possible; Tomislav Hršak from Archaeological Museum in Osijek for his support and participation in the research; Slobodan Miko and Nikolina Ilijanić from Croatian Geological survey for coring, Hrvoje Kalafatić, Bartul Šiljeg, Goran Tomac, Ina Miloglav, Katarina Gerometta, Giovanni Boschian, Jacqueline Balen, Dragana Rajković and Boban Tripković for participation in the project and to Miroslav Vuković, Marin Mađerić, VeljkoDravec, Antonio Burilo, Goran Saiti and numerous archaeology students and scholars for participating in the fieldwork.

# References

Balen, J. and Čataj, L. 2014. Sopotska kultura, In: J. Balen, T. Hršak, and R. Šošić Klindžić (eds.), *Gifts of Earth - The Neolithic between the Sava, Drava and Danube*, Arheološki muzej u Zagrebu, Muzej Slavonije Osijek, Sveučilište u Zagrebu Filozofski fakultet, Zagreb, 59-73.

Bates, C. R., Bates, M., Gaffney, C., Gaffney, V. and Raub, T. D. 2019. Geophysical Investigation of the Neolithic Calanais Landscape, *Remote Sensing* 11 (24), 2975.

Bernardini, W. and Schachner, G. 2018. Comparing Near Eastern Neolithic Megasites and Southwestern Pueblos: Population Size, Exceptionalism, and Historical Trajectories, *Cambridge Archaeological Journal* 28 (4), 647-663. doi:10.1017/S0959774318000276

Borić, D., Hanks, B., Šljivar, D., Kočić, M., Bulatović, Griffiths, S., Doonan, R. and Jacanović, D. 2018. Enclosing the Neolithic World: A Vinča Culture Enclosed and Fortified Settlement in the Balkans, *Current Anthropology* 59 (3), 336-346.

Botić, K. 2020a. Kasnoneolitičko naselje Bršadin – Pašnjak pod selom, kronostratigrafski prikaz tri sezone arheoloških istraživanja, *Annales Instituti Archaeologici* XVI (1), 54-70.

Botić, K. 2020b. Middle Neolithic trasformation: Starčevo–LBK–Vinča meeting point and the emergence of Ražište style in Drava river valley, *Quaternary International* 560-561, 197-207. doi:https://doi.org/10.1016/j. quaint.2020.03.032

Burić, M. 2014. Vinčanska kultura, In: J. Balen, T. Hršak, and R. Šošić Klindžić (eds.), *Gifts of Earth - The Neolithic between the Sava, Drava and Danube*, Arheološki muzej u Zagrebu, Muzej Slavonije Osijek, Sveučilište u Zagrebu Filozofski fakultet, Zagreb, 40-58.

Dimitrijević, S. 1968. *Sopotsko-lenđelska kultura*, Filozofski fakultet Sveučilišta u Zagrebu, Zagreb.

Dimitrijević, S. 1979. Sjeverna zona, In: M. Garašanin (ed.), *Praistorija jugoslavenskih zemalja II -Neolit*, Svjetlost, Sarajevo, 229-363.

Đukić, A. 2020. Starčevo culture settlements, In: J. Balen (ed.), *Tomašanci-Palača - Settlements of the Late Stone, Copper and Bronze Age*, Archaeological Museum in Zagreb, Zagreb, 19-110.

Garašanin, D. and Garašanin, M. 1979. Supska "Stublina" - praistorijsko naselje vinčanske grupe, Narodni muzej, Beograd.

Garašanin, M. 1979. Centralnobalkanska zona, In: M. Garašanin (ed.), *Praistorija jugoslavenskih zemalja II -Ne-olit*, Svjetlost, Sarajevo, 79-213.

Hodder, I. 2006. *The Leopard's Tale: Revealing the Mysteries of Çatalhöyük*, Thames and Hudson, London.

Hofmann, R., Medović, A., Furholt, M., Medović, I., Stanković Pešterac, T., Dreibrodt, S., Martini, S. and Hofmann, A. 2019. Late Neolithic multicomponent sites of the Tisza region and the emergence of centripetal settlement layouts, *Praehistorische Zeitschrift* 94 (2), 1-28. doi:https://doi.org/10.1515/pz-2019-0003

Horejs, B., Bulatović, A., Meyer, C., Milić, B., Schneider, S., Schlöffel, M. and Stevanović, V. 2018. Prehistoric Landscapes of the Pusta Reka Region (Leskovac). New Investigations along the Southern Morava River, *Journal of Serbian Archaeological Society* 34, 23-51.

Jakucs, J. and Voicsek, V. 2015. The northernmost distribution of the early Vinča Culture in the Danube valley: a preliminary study from Szederkény-Kukorica-dűlő (Baranya County, southern Hungary), *Antaeus* 33, 13-54.

Jakucs, J., Bánffy, E., Orros, K., Voicsek, V., Bronk Ramsey, C., Dunbar, E., Kromer, B., Bayliss, A., Hofmann, D., Marshall, P. and Whittle, A. 2016. Between the Vinča and Linearbandkeramik Worlds: The Diversity of Practices and Identities in the 54<sup>th</sup>–53<sup>rd</sup> Centuries cal BC in Southwest Hungary and Beyond, *Journal of World Prehistory* 29 (3), 267-336. doi:10.1007/s10963-016-9096-x

Kalafatić, H. and Šiljeg, B. 2016. Everything fears time, but time fears the circles: 7 thousand years old prehistoric enclosures in landscape of the southern Carpathian basin, In: P. Kołodziejczyk, and B. Kwiatkowska-Kopka (eds.), Cracow Landscape Conference, Landscape as impulsion for culture: research, perception and protection, Kraków: Institute of Archeology Jagiellonian university in Krakow – Institute of Landscape Architecture Cracow university of technology, Krakow, 111-121.

Kalafatić, H. and Šiljeg, B. 2018. Twin Circles: new insights in the Neolithic settlement pattern, *Prilozi Instituta za arheologiju u Zagrebu* 35, 71-111.

Kalafatić, H., Šošić Klindžić, R. and Šiljeg, B. 2020. Being Enclosed as a Lifestyle: Complex Neolithic Settlements of Eastern Croatia Re-Evaluated through Aerial and Magnetic Survey, *Geosciences* 10, 384, 2-19. doi:https://doi.org/10.3390/geosciences10100384

Kočić, M., Hanks, B., Kaličanin Krstić, M., Brennan, M., Basar, P. and Mlyniec, M. 2020. Identifying Early Neolithic Settlements in the Šumadija Region of Serbia Through Combined Pedestrian Survey and Archaeological Geophysical Prospection, *Interdisciplinaria Archaeologica*, 11 (1), 9-19.

Marić, M. 2017. Encircled in water: Modelling watercourses of the late Neolithic – early Copper Age Vinča culture sites in the Danube region (c. 5300 – 4500 BC), *Quaternary International* 429 (A), 54-63.

Meyer, C. and Hypiak, V. 2018. *Magnetic prospection at the Neolithic site of Kremenjača in Gorjani (Đakovo, Osijek-Baranja County, Croatia*), Report, Berlin.

Meyer, C. and Zöllner, H. 2019. Magnetic prospection at the Neolithic site of Kremenjača in Gorjani (Đakovo, Osijek-Baranja County, Croatia), Campaign of 2019, Report, Berlin.

Minichreiter, K. 1992. *Starčevačka kultura u sjevernoj Hrvatskoj*, Arheološki zavod Filozofskog fakulteta sveučilišta u Zagrebu, Zagreb.

Perić, S. 2017. Drenovac: a Neolithic settlement in the Middle Morava Valley, Serbia, *Antiquity* 91 (357), 1-4.

Šiljeg, B. and Kalafatić, H. 2015. Zračna arheologija u istočnoj slavoniji 2014. godine, *Annales Instituti Archaeologici* 11, 135-141.

Šiljeg, B. and Kalafatić, H. 2016. Zračno rekognosciranje, osječko baranjska županija 2015, godine, *Annales Instituti Archaeologici* 12, 1-2.

Šiljeg, B., and Kalafatić, H. 2017. Zračno rekognosciranje u istočnoj Slavoniji 2016. godine, *Annales Instituti Archaeologici* 13, 168-173.

Šošić Klindžić, R., Kalafatić, H., Šiljeg, B. and Hršak, T. 2019. Circles and ceramics through the centuries: Characteristics of Neolithic Sopot culture settlements, *Prilozi Instituta za arheologiju u Zagrebu* 36, 41-48. doi:https://doi.org/10.33254/piaz.36.2

Tripković, B. 2014. Housing and the organizaton of settlements, In: J. Balen, T. Hršak, and R. Šošić Klindžić (eds.), *Gifts of Earth - The Neolithic between the Sava, Drava and Danube*, Arheološki muzej u Zagrebu, Muzej Slavonije Osijek, Sveučilište u Zagrebu Filozofski fakultet, Zagreb, 129-155.

Whittle, A., Bayliss, A., Barclay, A., Gaydarska, B., Bánffy, E., Borić, D., Vander Linden, M. 2016. A Vinča potscape: formal chronological models for the use and development of Vinča ceramics in south-east Europe, *Documenta* Praehistorica XLIII, 1-60. doi:10.4312/dp.43.1