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Content

Regional Absolute Chronologies of the Late Neolithic in Serbia. The case study of At near Vršac

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The paper presents the concept, methodology and preliminary results of the project Regional Absolute Chronologies of the Late Neolithic in Serbia that started in 2020 using a case study from the site of At near Vršac in northeast Serbia. The aim of the project is to create multiple new regional chronological strands consisting of Bayesian modelled radiocarbon dates from sites with material culture belonging to the tradition of the Late Neolithic period Vinča culture. Combining statistical seriation of pottery assemblages and the Bayesian statistical modelling framework of several case studies from various regions of Serbia, new regional chronological anchor points will be created, thus avoiding constant comparison with the assemblage and dating of the eponymous site of Belo Brdo in Vinča. This approach will overcome the effects of the regionalization of material culture evident in most ceramic assemblages located further than 100 kilometres away from the type site. Using archival archaeological records from previous excavations will enable an establishment of a geography of chronological reference points which would then provide new insights into the dynamics of the evolution of the Late Neolithic Vinča societies and changes that occurred throughout its territory during the late sixth and the larger part of the fifth millennia BCE.

Keywords: *Late Neolithic, Vinča Culture, Correspondence analysis, Bayesian modelling, Radiocarbon dating*

Introduction

The Late Neolithic Vinča phenomenon of the central Balkans area is well-known in archaeological literature not only in the region where it manifests, but also well beyond. The question of the chronological placement of Vinča material has been debated almost since the first excavations of the late nineteenth century and early twentieth century (e.g. Jovanović 1892; Vassits 1902; Vasić 1906). The work of Miloje Vasić on the site of Belo

Brdo in the village of Vinča, located on the right bank of Danube, 13 kilometres downstream of Belgrade, Serbia would become essential towards solving this problem. Starting in 1908 (Vasić 1910), upon receiving multiple surface finds from the inhabitants of the village in the previous years, Vasić undertook a series of excavations that would eventually span four decades, with interruptions caused by the first World war and the lack of funds following it. These excavations, still largest in size until modern period, revealed the existence of 10 meters thick archaeological evidence of continued occupation on the site of Belo Brdo, from the period of the Early Neolithic until the Late Medieval period. However, despite such abundant evidence of prolonged human occupation on this location, just one particular section would bring this site world fame; the fabled eight meters thick deposits of the Late Neolithic period, that was to become known as the period of Vinča culture.

Vasić, after decades of diligent work on the excavation of the site, duly published his findings in the four volume *Preistoriska Vinča* (Vasić 1932; 1936a; 1936b; 1936c), and explored multiple subjects including the chronology of the site. Although his relative dating of the Vinča chronology with respect to the Bronze Age of the Aegean presented in the first part of his chronology chapter did not stand the test of time, prophetically, at the end of the chapter, Vasić stated 'Cultural layer in Vinča will, in this aspect, be a chronological ladder for dating culture occurrences in settlements and areas, with whom Vinča was in connection and communication' (Vasić 1932: 97).

Although Vasić published a detailed account of the type site inventory he never attempted to analyse it in detail, even stating in his monograph that the sheer numbers of the finds prevented him from publishing and analysing it in detail (Vasić 1936c: 1). Thus, he made no attempt at phasing the Vinča phenomenon he diligently toiled on for more than three decades. However, very soon after the publication of the finds, other authors attempted to phase the material (Holste 1939) and to present a relative chronology of the period. This early, basic phasing, although re-examined and refined over time by other authors, remains the backbone of most later periodisations, like the one of Milojčić (1949) who was the first to incorporate the Vinča relative chronological scheme into the wider central Balkans one.

The seminal work came with Milutin Garašanin (1951), the first author to publish the entire inventory of the Vasić excavations in Vinča, systematised and divided into major and sub phases named Vinča-Tordoš and Vinča-Pločnik respectively. Over the decades, on several occasions (Garašanin 1979; 1993) he further fine-tuned the relative chronology of the Vinča period. This included the important Gradac phase, the turning point in the use of copper metallurgy on Vinča settlements, defined in further detail by Borislav Jovanović (Jovanović 1971; 1978; 1980; Jovanović and Ottaway 1976). Garašanin's chronological periodisation also influenced authors from the fringe areas of Vinča distribution, like Dumitru Berciu (Berciu 1961), Stojan Dimitrijević (1968) and Gheorghe Lazarovici (Lazarovici 1979; 1981) who also tried to incorporate the Vinča material into the relationships and correlations with neighbouring societies of different pottery traditions. In their attempts the authors always referenced pottery sequences to Belo Brdo finds, some disregarding the distance and possible local variations that may not always have been present on the type site, with others (Lazarovici 1979) including detailed accounts for it. The chronological sequencing continued in the 1990's both on pure relative chronology phasing based on pottery finds (Parzinger 1993; Jovanović 1994) or on the combination of relative and absolute chronologies (Schier 1996). The availability of larger quantities of radiocarbon dates, combined with the developments in computer use of statistical seriation methods, made it possible to investigate chronological relations to a greater detail, giving rise to new studies that suggested the existence of more phases than originally thought (Schier 1996; 2000). At the end of the first decade of the 21st century, one paper (Borić 2009) provided a host of new radiocarbon dates for Vinča period from sites found throughout Serbia. However, it was focused on the emergence of metallic Vinča, a rather narrow period within the Late Neolithic chronology of the region, and it did not particularly concern the entirely of this period or the broader periodisation. The past few years saw another surge of interest in the further refinement of existing chronologies, this time heavily relying on robust statistical models backed by numerous radiocarbon dates of both secure contexts and excavation layers (e.g. Jakucs et al. 2016; Tasić et al. 2016a; Tasić et al. 2016b; Whittle et al. 2016). However, there is still plenty unknowns in the realm of the chronology of the Late Neolithic of the Central Balkans area, and more studies in the coming years will surely try to fill these gaps with new data and interpretations.

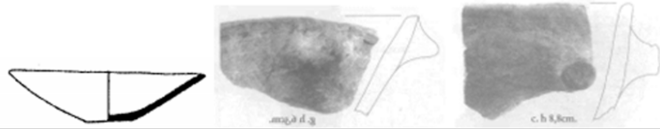
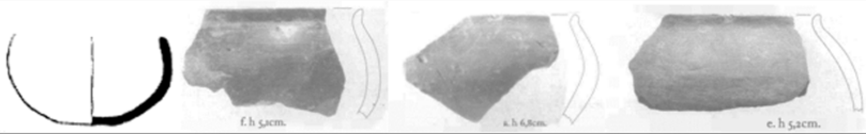
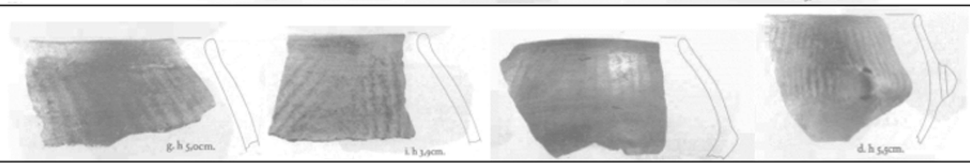
Bowl Type	Illustration	
100 Conical bowl with straight walls		
101 Conical bowl with mildly curved walls		
102 Conical bowl with rim handles		
103 Enclosed conical bowl		
104		
105 Spherical bowl	a) Short ringlike neck and longer rorunded shoulder	
	b) Longer ringlike neck and longer shoulder. Cone break sometimes sharp	

Figure 1. Illustration of the first five types of bowls in the pottery typology used for Correspondence Analysis. (Made by: M. Marić).

Material and Methods

The paper presented, containing first Bayesian modelling of radiocarbon dates from the site of At near Vršac, is a part of a larger project, started in late 2020, called *Regional Chronologies of the Late Neolithic in Serbia.* The project launched, amidst the ongoing COVID-19 pandemic, a two-year odyssey of examining Vinča period collections from different museum collections in Serbia. It sought good pottery sequences and adequate organic remains to date and produce chronological sequences in under researched areas occupied by this Late Neolithic phenomenon. The project was envisaged as an attempt to create precise regional chronologies through the use of radiocarbon dating of the selected Late Neolithic period sites in Serbia, combined with statistical seriation of pottery inventory using correspondence analysis (CA) from chosen sites. A series of case studies from various regions would result in a number of relative chronological sequences that could be merged with absolute chronological measurements into a Bayesian statistical framework to produce a strict chronological scale of higher precision. This approach would rely strictly on archival records in existence, created during archaeological excavations, in order to provide a notion of early-late relationships between excavated features.

In order to have comparable results, the pottery sequencing had to be based on a unique pottery typology, one applicable to both the core and the fringe areas of the Vinča period ceramics. Over the years, multiple typological attempts on site assemblages were made by numerous authors (e.g. Garašanin 1951; Madas 1988; Vukmanović and Radojčić 1990; Jovanović 1994; Nikolić

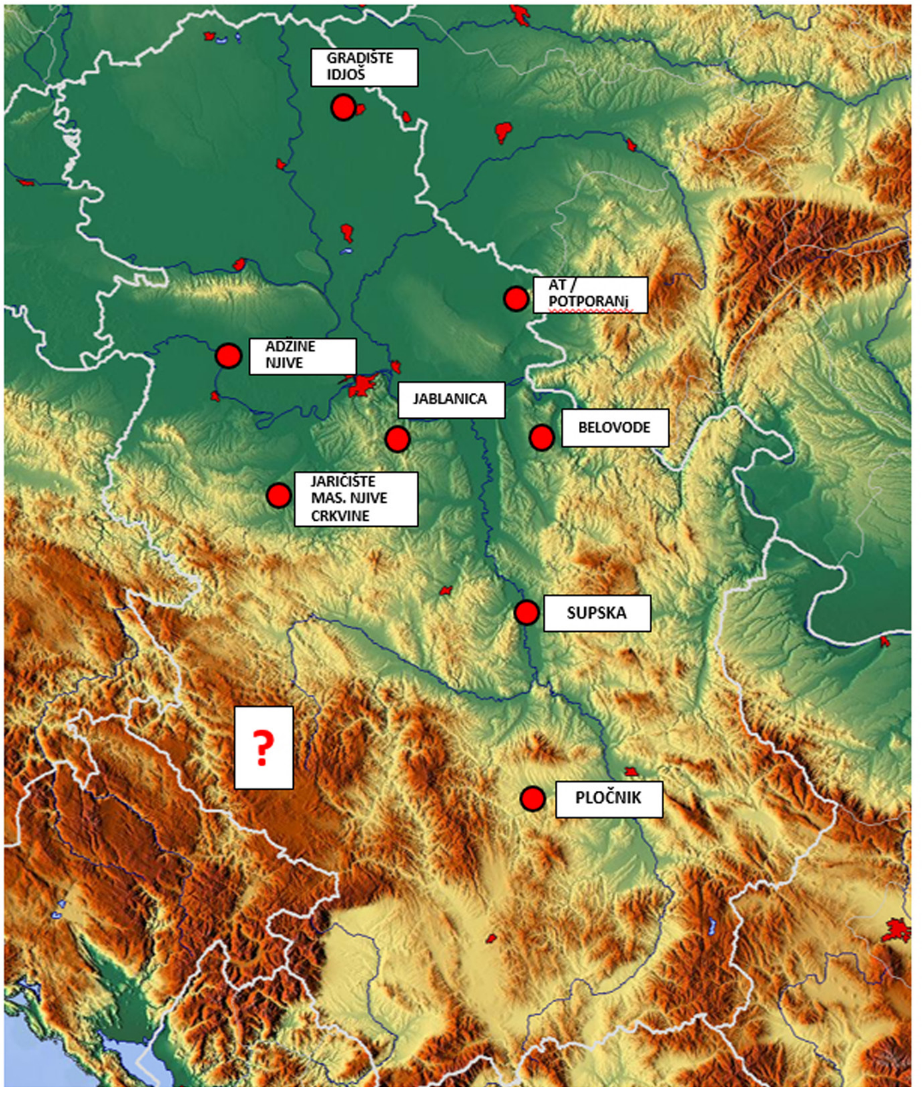


Figure 2. Vinča period sites to be analysed in the project. (Made by: M. Marić).

2004), but usually none proved completely useful beyond a certain distance from the published site. This issue had been identified by earlier authors as well (Chapman 1981: 22-31, Figs. 12-13), indicating a need for the creation of a more complete typology, that would include both the type site (i.e. Vinča Belo Brdo site) vessel forms as well as local variations from the vast area inhabited by communities of Vinča tradition pottery and influences from contemporary neighbouring communities of different pottery traditions. Drawing from the experience of recent archaeological research on the sites of Belovode and Pločnik (Mirković-Marić et al. 2021a; 2021b) and in concord with the proposed universal Vinča style pottery typology of Garašanin and Stanković (1985), a new typology was created for the purpose of the project with ten principle categories of vessels, each consisting of multiple subtype entries (Fig. 1). Within the principal category, each vessel type was defined according to its function (or proposed function) and then within that type, further sub-divided according to variations in vessel morphology. For instance, the most commonly referred vessel type in the study of Vinča tradition pottery, the bowl, in our typology consists of 24 principal types, many including multiple sub-type varieties based on the variation of individual morphological characteristics on a certain part of the vessel profile. The bowls range from simple conical and spherical bowls to more complex types - carinated, biconical, funnel shape, everted rim type and others derived solely from the morphology of the vessel profile. It must be noted that the finite number of bowl types is not set and can be easily amended if new, regional variants occur in site inventories by the simple addition of a new vessel type or sub-type to the list. Because we used the whole of the vessel profile as its morphological characteristic in defining the type, simple reverse engineering is also possible on previous typologies to make the material universally comparable. The more intricate details of the typology go beyond the scope of this paper and will be discussed elsewhere.

Having defined the typology to be used, the statistical analysis is the next step in the process. Correspondence analysis (CA) of pottery types was chosen, as it already showed great potential on Vinča style pottery for determining evolutionary phases and trends (Schier 1996; Diaconescu et al. 2020), both on the type site and in the peripheral areas. Correspondence analysis of archaeological material is not a novelty, it has been around for the better part of a half a century already (Baxter 1994: 101), but its popularity grew with the rapid development of personal computing in the 1990's. In principle, it is a 'technique for displaying rows and columns of a two-way contingency table as points in corresponding low-dimensional vector spaces' (Greenacre 1981: 119). Correspondence analysis is most appropriately used in analysing tables containing counted data, such as the number (or frequency) of pot types per stratigraphical unit, context or site. It's most positive feature for archaeologists is the ability to simultaneously represent both rows and columns of a data matrix as points of a single plot (Baxter 1994: 100). Superimposition of row and column data can then identify clustering (if one exists) of analysed data to reveal a pattern of unusual values in the data that stand out from the *average* data profile.

One of the most common uses of CA is seriation, to test whether certain types of finds can identify relative chronology of contexts or entire archaeological sites (Baxter 1994: 118). The hope is that for instance row orders reflect the relative chronology of contexts and the column reflects the chronological development of material type being examined. However, since archaeological data is rarely perfect, the *outliers* will often introduce noise in this ordering, so the need to identify them is the first step in the process of CA. When done properly, the CA will produce a 'horseshoe' pattern of the plot, also known as the 'Guttman' effect (Schier 1996: Fig. 2). This demonstrates that the contexts or sites at the end of the horseshoe shape will have nothing in common and the data in-between will have shared similarities indicating that the finds examined come in and out of fashion, and are, based on their abundance, more or less popular through time or are shorter or longer lived. However, CA is not guaranteed to seriate an abundance matrix correctly. Thus, it is sometimes complemented with the radiocarbon data to confirm or question the seriation.

The choice of sites to be included in the study presented a different set of problems. The geographical position of the site was one of the primary factors to be taken into account, as having sites grouped too close to one another could lead to decreased regionality in the site inventory. Being forced to rely on archival excavation data made the choice even more difficult, especially for older excavations, where often the pre-selection of finds to be kept in the inventory was made immediately on-site during excavations, thus robbing us of the true quantities and qualities involved. Furthermore, up until recently, animal remains were commonly not collected and stored permanently. Rather, if collected in the first place, they were processed on site and returned to backfill of the excavated trenches or disposed of in the years after the excavation to free up space in museum storage. A similar story can be told for macrobotanical samples, the collection of which has only recently become a standard practice on archaeological excavations in Serbia, thus older excavations are void of such potential short-lived material for radiocarbon sampling. The team had to also look for sites with the longest possible occupation on record, in order to illustrate the extent of the Vinča period to its fullest potential in the area being examined. This realisation led to the need of having to select more than one site in several regions, as there were no excavated multi-phase Vinča sites available, even though they must exist in almost every region occupied in Vinča period. The selection of sites was thus born out of many necessities and is less than ideal (Fig. 2), with certain regions, like southwest Serbia, being underrepresented, due to the lack of excavated sites or preserved organic material for radiocarbon analyses. It is our belief that future research will alter this image and present more options for regional chronological assessment projects like ours.

In choosing adequate samples for radiocarbon dating, the entirety of the existent archaeozoological collection was examined and processed to the level of identification of individual species (where possible). The sampling strategy of animal remains followed vertical (and/or horizontal) stratigraphy in order to obtain the absolute chronology duration in each Late Neolithic settlement. An identical protocol was applied to all faunal assemblages from archaeological sites included in the project. At least two samples (main and control) belonging to different animals were taken from each archaeological context. The main criteria for selecting and sampling of animal remains for radiocarbon dating were the following: good surface preservation and skeletal elements without any traces of taphonomic changes such as burning and weathering. Small fragments from the selected specimens, approximately 10g in weight, were cut using a small circular diamond saw. Before cutting, each specimen was analysed in detail and photographed. Data were recorded in the RACOLNS faunal database. The following information was recorded: taxon, element, element party, symmetry, diagnostic zones (Dobney and Reilly 1988), epiphyseal fusion, tooth eruption and wear, sex, surface condition, taphonomic and pathological changes. For specimens with butchery marks and pathological changes, the location and description were provided. Taxonomic identification was carried out using standard guides of morphological criteria and comparative animal anatomy (Boessneck 1969; Schmid 1972; Prummel 1988; Helmer and Rocheteau 1994). Measurements were taken following Driesh (1976). It must be stated that, due to the lack of adequate documentation, often it was not possible to establish whether a total collection of zooarchaeological material was implemented during the excavations. The examined collection suggests that this was not the practice during excavations, so the samples had to be chosen from the available material.

The radiocarbon dating for creation of sequences was, from the outset, envisioned within the framework of the Bayesian chronological modelling (Buck et al. 1996). This approach was chosen in order to date the succession of Neolithic phases from the complete sequence of the sites being examined, using primarily depth and the ceramic seriation of finds combined with series of AMS radiocarbon dates made on zooarchaeological samples gathered during these excavations. Our sampling strategy aimed at obtaining multiple measurements on finds at specific vertical spacings (spits or relative depths depending on the site). In order to cover the complete sequence of the excavated trenches all spits were covered if enough samples survived. However, occasionally it was not possible to retrieve quality bone for sampling, leaving us with underrepresented sampling. All measurements are given in conventional radiocarbon ages, corrected for fractionation (Stuiver and Polach 1977).

Selected samples for radiocarbon dating were analysed in two separate laboratories, The BRAMS facility of the University of Bristol, UK and the HEKAL AMS laboratory in Debrecen, Hungary where they were prepared in concordance with the procedures described in Knowles et al. (2019) and Molnar et al. (2013) respectively. These particular laboratories were chosen because of the identical equipment in use, the MIDACAS (MIni CArbon DAting System) AMS developed and built by the Laboratory of Ion Beam Physics at the ETH in Zürich. This decision made it possible to compare directly measurements provided replicate measurement data are statistically consistent using the method of Ward and Wilson (1978).

In our modelling approach, which consisted of several steps and which is summarily presented here, we applied the R statistical software, because of its open software license and the fact that it contains multiple pre-made packages for various statistical analysis, including CA, which was applicable for the particular needs of the project. We choose to implement one of the relatively more common packages; the Factoshiny statistical package (https://cran.r-project.org/web/packages/Factoshiny/index.html) which, through a web browser graphical interface, facilitates the analysis and reduces the need for complex coding sequences, typically entered manually in the R Studio software (or similar GUI software). However, other possibilities exist, like the CAinterprTools package developed by Gianmarco Alberti (2015) or one can even manually enter the command lines (Baxter and Cool 2010; Carlson 2017: Chapter 13) or use scripts with commands listed in order of execution.

The chronological part of the modelling which will be described in detail in the next section has been undertaken using OxCal v4.4 (Bronk Ramsey 1995; 2009a; 2009b). The models described in images are defined by OxCal CQL2 keywords. The calibrated ^{14}C date spans are represented in grey outlines, whilst the posterior density estimates created through the Bayesian chronological modelling are given in solid dark grey colour overlaid over the light grey outlines of the posterior density estimates (see Fig. 6).

In conclusion, we must once again stress that our study is based on the combined use of relative chronological data as supplied by the excavator during the research and the statistical sequencing using CA on pottery types found, to produce the relative chronological sequence of the site. This is then paired with the ^{14}C measurement data to create a strong absolute chronological sequence that can reduce measured probability distributions of individual samples significantly, thus facilitating a more precise chronological estimate of site/context duration.

The archaeological site of At

The Late Neolithic site of At is located near Vršac, in south Banat (Fig. 3). It is nested on an elevated loess plateau squeezed between Mali and Veliki Rit, marshy areas

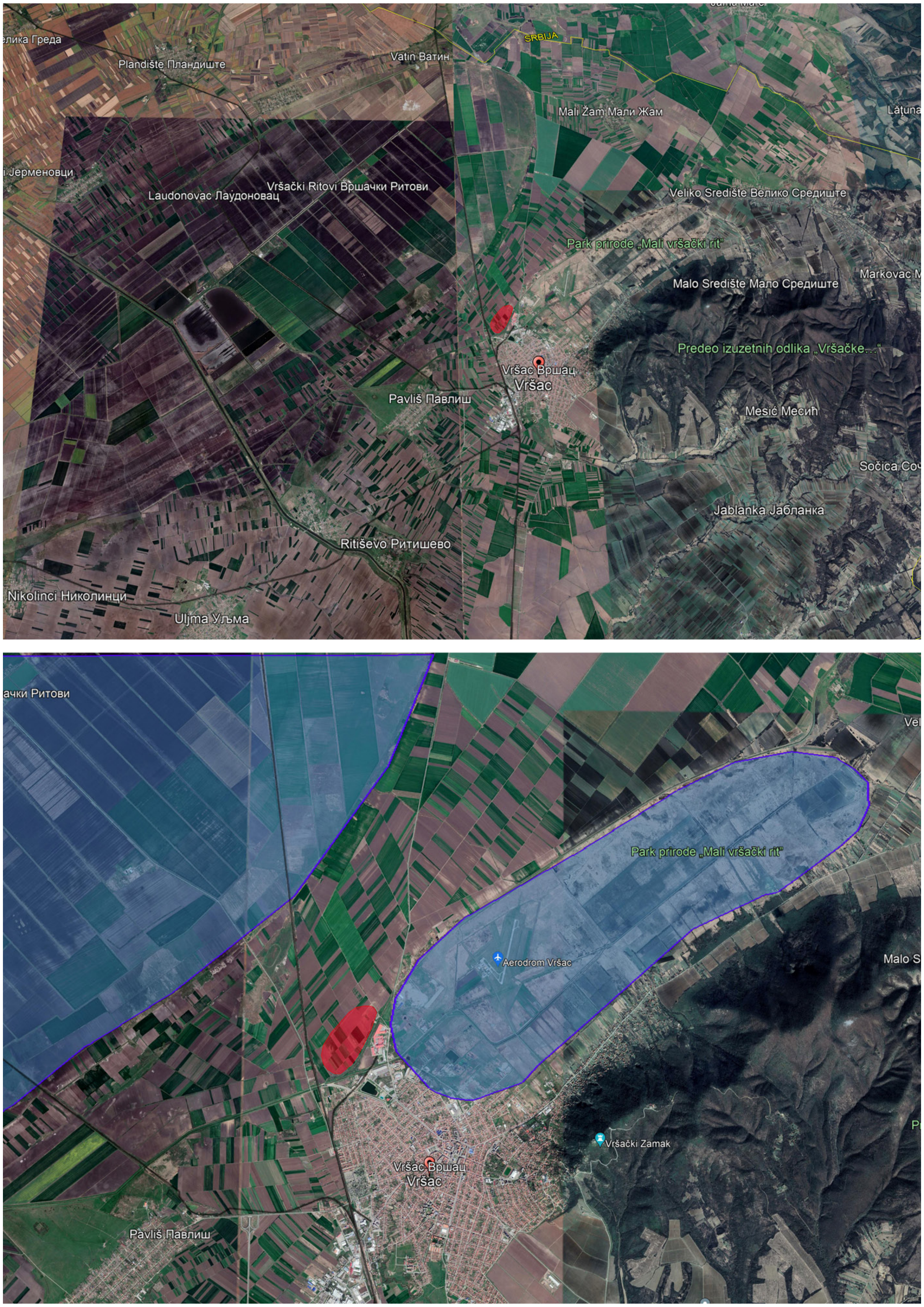


Figure 3. Location of the site of At-Vršac; regional context (up), detail (down). Approximate site area given in red, transparent blue major geological formations Mali and Veliki Rit.
(Made by: M. Marić).

(even possibly shallow lakes) formed in early Pleistocene, against the backdrop of the Vršac mountains. The site is located opposite another Early Vinča period settlement, the site of Kanal Mesić, known only from small-scale rescue excavations undertaken during the construction of an artificial lake in 1954 (Prikić and Joanovič 1978: 24). At was discovered at the end of the 19th century by Felix Mileker, the first archaeological custodian of the Vršac City Museum (Rašajski 1976). It was first excavated in 1959 when sand quarrying started on the location. The

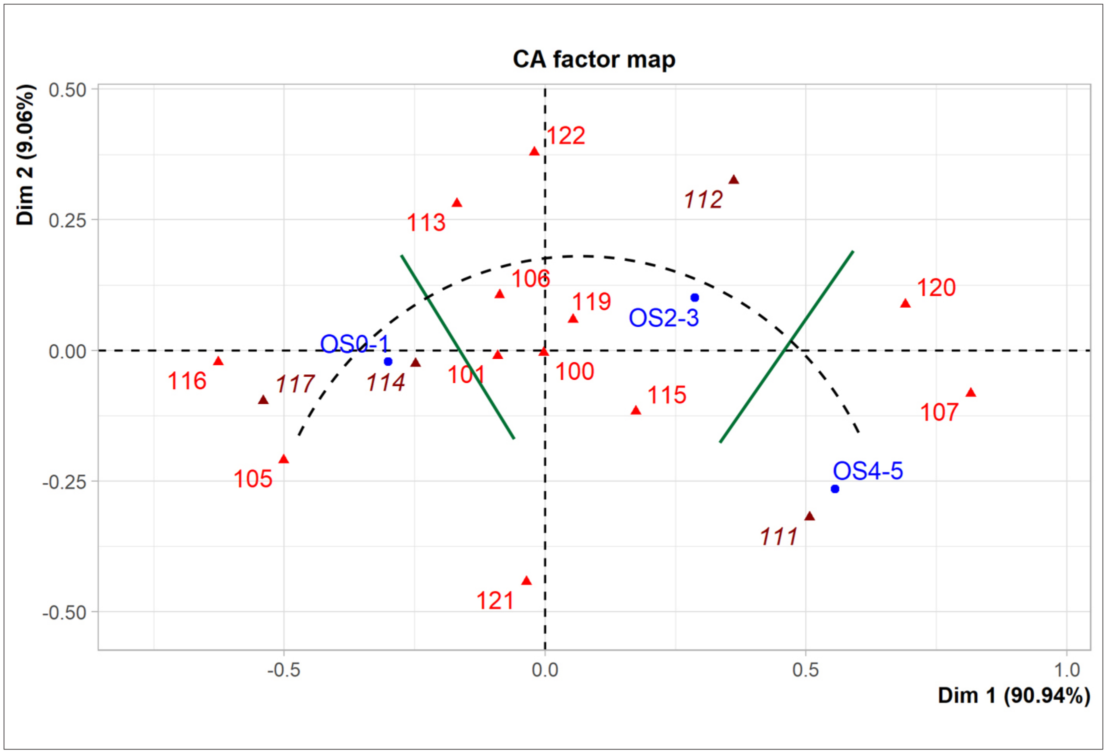


Figure 4. Factor map of Correspondence Analysis performed on 16 bowl types found on At. (Made by: M. Marić).

excavations were always associated with the opening of new sand pits and lasted several decades with pauses between individual campaigns. The recovered archaeological finds and a few available radiocarbon dates put the Late Neolithic site at the end of the Vinča period, in the Vinča D phase (Chu et al. 2016), but the limited amount of radiocarbon dates prevented us from a more detailed phasing. Here we present the Bayesian model created from excavation results of trenches 4 and 5, excavated in early October 1976, consisting of a total area of 200 m^2. The trenches were located in the eastern part of the site, where two different sand quarrying pits were made and exploited over the years. The surviving excavation documentation suggests that the archaeological layers were not deep, only about 1-1.2 meters, indicating a relatively short occupation period. Even though spaced apart by some distance, the characteristics of excavated layers in the trenches suggest a similar stratigraphic sequence. Both trenches were excavated using the same excavation methodology and system of documentation, using arbitrary mechanical spits of 20 cm, unless a structure or feature was detected in the process. Although there is no direct contact between the trenches, available surviving evidence shows no major differences between the two. A coarse overview of the material retrieved from trenches 4 and 5 suggested that the relative dating can be placed in the latter part of the Vinča period, namely Vinča D, easily identifiable by lack of specific pottery types (e.g. pedestal bowls) and decorations (incised encrusted bands and figures with pricks, black topped vessels and similar).

Results and Discussion

In total, slightly over 2000 identifiable fragments of pottery were available for the CA analysis from the ceramic fragments' assemblage of the excavations covering all pot types of the Vinča style production present in the assemblage. Their morphological features were recorded according to the typology created for the project in a database file. For this occasion, we selected only the most typical pot type in the Vinča ceramic production; the bowls (Plates 1-3). The raw data used in the analysis is presented in Table 1.

Bowls in the Vinča ceramic typology are a core vessel type when establishing relative chronology and phasing of period sites. All existing divisions (e.g. Garašanin 1951; Schier 2000) are heavily influenced by the morphological characteristics and frequencies of bowls found on Vinča sites. In our analysis we focused on 695 individual fragments of bowls divided among 16 bowl types, spread

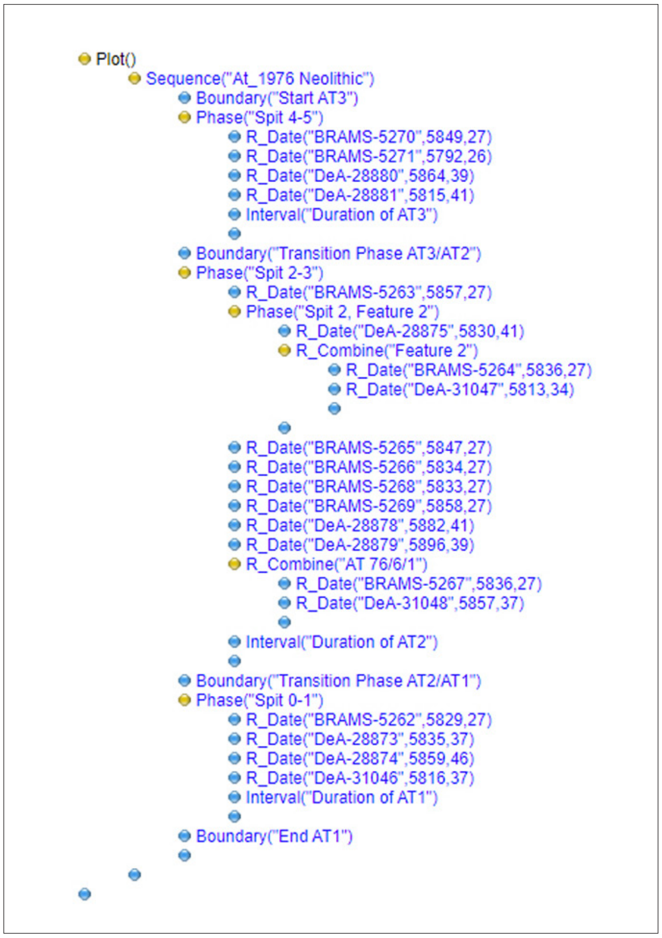


Figure 5. Structure of the Oxcal model used for the Bayesian chronological modelling.

across five excavation spits. The spits (marked in the CA as OS, standing for *otkopni sloj*, i.e. *excavation layer*) contained an uneven number of sherds with excavation layers closer to the bottom of the trenches having a significantly smaller number of fragments than the upper layers. Aside from the partially excavated burnt wattle and daub structures (features 1 and 2) in the second and third spits of both trenches no other Neolithic structures such as pits were found, so the majority of finds were solely examined as a part of the spits they were found in. The results of the CA (Fig. 4) illustrate spits 0 and 1 (the surface layer was marked sometimes 0) representing a single phase, while spits 2 and 3 (the ones containing burnt wattle and daub structure) were a separate, second phase. Spits 4 and 5 (OS4-5) can also be bundled together into a single phase, the earliest recorded on the site. The Factor map clearly identifies a horseshoe effect between the spits, thus allowing for a correct chronological sequencing of layers. The pottery types are given in red numbers with triangular points, whilst the spits are given in blue lettering with a round point next to them. Green lines present the break lines between individual groups of pots typical for each phase.

If we examine the results of the analysis, the χ^2 value of 99.8898 (p-value=1.932682e-09) indicates a significant relationship between analysed variables (Drennan 2009: 182-188). Eigen values of 90.94% for dimension 1 and 9.06% for dimension 2 show that the variance of data is completely explained in two dimensions.

Looking further (Table 2, rows section) we can easily see that OS0-1 contributes (ctr) with 45.856% to the construction of the first dimension, and is adequately represented (cos2=0.994 on a scale of 0 to 1). It is similar for OS2-3 which contributes with 30.312% (cos2=0.846) and OS4-5 (contribution=23.832%, cos2=0.676) to the same dimension. The second dimension of data analysed shows clearly that OS2-3 (ctr=31.99%, cos2=0.154) and OS4-5(ctr=66.384%, cos2=0.324) are the only contributors to its construction.

The same can be applied for the column (i.e. bowl type) data (Table 2, columns section). Not all bowl types are equally involved in the construction of dimensions that explain variance. Types 105, 107, 116 and 117 contribute 68.73% to dimension 1, whilst types 105, 111, 112 and 122 contribute the most (73.136%) to dimension 2. Other types are involved as well, but these are the most influential bowl types that explain the largest percentage of variation between spits.

Having established the stratigraphic connections between spits and their relative chronological relations with respect to the bowl type variation within them, we can now add the absolute chronological aspect to produce the Bayesian chronological model of the site. During the course of the project 26 samples of animal bones from all spits of trenches 4 and 5 were sent for radiocarbon dating analysis (Table 3). Only one sample yielded <1% collagen and could not produce measurements, whilst 25 samples produced a range of radiocarbon dates. Of the 26 samples, 3 pairs of samples were pre-selected as replicate measurement data, to ensure statistical consistency for the direct comparison of measurements. The majority (2 of 3) pairs proved statistically consistent, whilst the third pair failed (DeA-31045 and BRAMS-5261) and was not used as it suggests that the bone was most likely insufficiently calcined to provide reliable dating. One further radiocarbon sample (DeA-31046) was eliminated from the modelling, as its exact

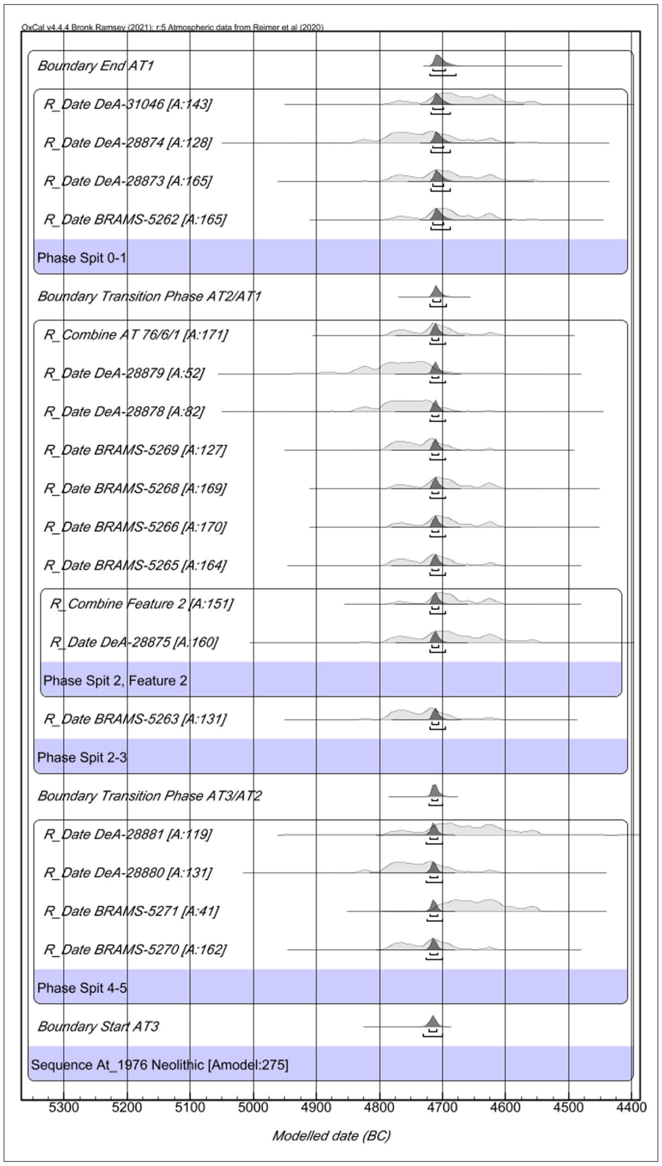


Figure 6. Final appearance of the Oxcal model for the site of At-Vršac.

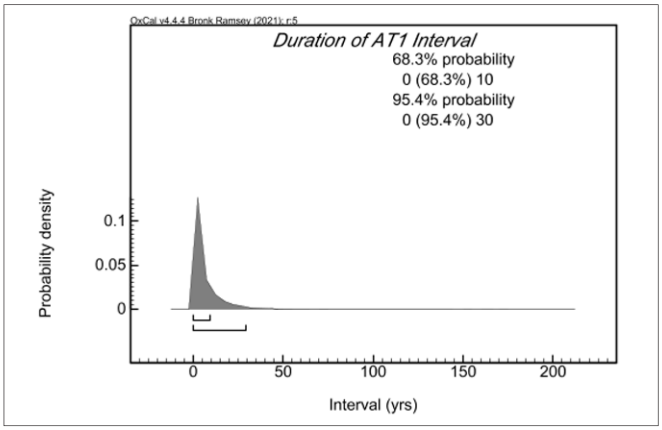


Figure 7. Duration period of AT 1 phase derived from At 1976 Oxcal model.

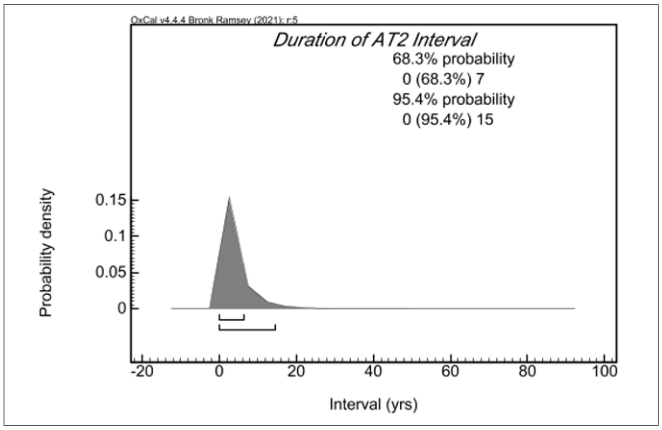


Figure 8. Duration period of AT 2 phase derived from At 1976 Oxcal model.

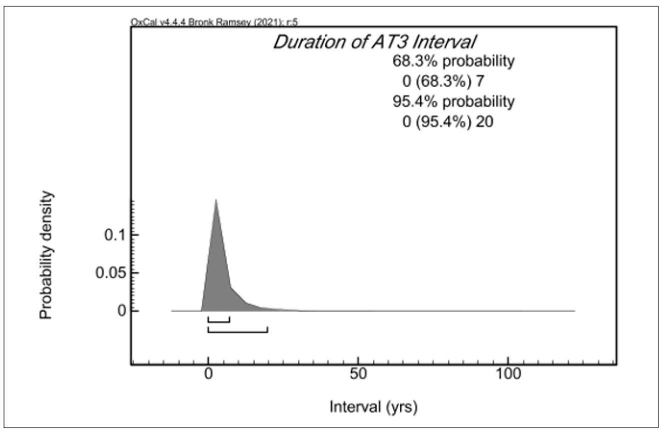


Figure 9. Duration period of AT 3 phase derived from At 1976 Oxcal model.

relative stratigraphy could not be established. An interesting physical marking on the bone, indicative of certain pathologies, led to it being chosen for radiocarbon dating (Marković et al. in prep) despite this shortcoming. The remaining radiocarbon measurements were used to construct a Bayesian model given in Figure 5. The model, shown in Figure 6 interprets the sequence from trenches 4 and 5 as continuous habitation of this part of the site, as suggested by excavation documentation, showing no signs of temporary abandonment of the site. The probability distribution of one sample (DeA-28876) in relation to its stratigraphic position identifies it as a *terminus post quem* for that context and this sample was omitted from the final model. However, other samples from the same context provided enough data for a secure determination.

The model has excellent overall agreement (Amodel: 273.6, Fig. 6), which firmly corroborates the interpretation of relative phasing of the site based on the CA results of bowl types found in trenches. It suggests that the occupation of the site in this area occurred 4732–4701 cal BC (*95% probability; Start AT3;* Fig. 6*),* probably

4722–4710 cal BC (*68.3% probability*). The first phase of occupation did not last long - up to 20 years (*95.4% probability*), but likely just 7 (68.3% probability) which can be seen using the *Interval* command in Oxcal (Fig 7.)

The second phase of At occupation (*Transition phase AT3/AT2;* Fig. 6) started at 4723–4701 cal BC (*95.4% probability*), possibly 4718–4709 cal BC (68.3%), and again lasted a relatively short period of time – 15 years (*95.4% probability;* Fig. 8), and possibly just 6 (*68.3% probability;* Fig. 8). This puts it well within one generation's life span. The final phase of the Late Neolithic occupation of At in trenches 4 and 5 (*Transition phase AT2/AT1)* began at around 4721–4695 cal BC (*95.4% probability*; Fig. 6), possibly 4716–4705 cal BC (*68.3% prob.*), lasted up to 30 years (*95.4% prob.*), and possibly just 9 (*68.3% prob.* Fig. 9). According to the model, the end of late Neolithic occupation in the area of the site where trenches 4 and 5 were located is modelled at 4720–4679 cal BC (*95.4% prob.;* Fig. 6), possibly 4716–4696 cal BC (*68.3% prob.*).

In terms of relative chronology, the Late Neolithic Vinča occupation of trenches 4 and 5 at At coincides with the early period of Vinča D phase (Whittle et al. 2016: 31), which can be somewhat corroborated by the typology of bowls found in the trenches. Some of the very typical finds, like the biconical bowl with inverted rim (type 117 in our typology), a very typical Vinča D phase bowl in central Serbia (Mirković-Marić et al. 2021a, 2021b), only appears in limited numbers in trenches 4 and 5 (31 examples in total, most from spit 1) and is not as prevalent as this type is in the later part of Vinča D phase (e.g. Garašanin and Garašanin 1979: TI/1, TIII/3, TIV/4, TVI/2).

Conclusion

The first results of the *Regional Absolute Chronologies in Late Neolithic Serbia* presented in this volume are just a hint of what carefully constructed Bayesian model combining relative and absolute chronological data can yield even from partially preserved archival data from an excavation undertaken almost over half a century ago. The creation of regional chronological *beacons* based on such an approach can greatly improve our knowledge of locally occurring phenomena, and need not be directly linked with the remainder of the vast territory covered by identical or similar material culture. It can also provide us with new insights into developments that may have, gradually, over time, led to bigger events that triggered large scale transformations. The approach presented illustrates the need to access and evaluate the existing corpus of archaeological data sitting in the storage rooms of regional museums often for decades on end. Combing the data mined from dusty old boxes, long forgotten on shelves, can indeed present new data and open new areas of research in what otherwise appears to be a limited opportunity for modern archaeological research.

Finally, the At Late Neolithic Bayesian chronological model presented, demonstrates a rather dynamic set of events taking place in the extremely short time span of just one generation. It confirms that the site was created and abandoned possibly very quickly, but also leaves us with a question of causalities that led to such events. From the available corpus of archaeological records in the Vršac area, there are no later Vinča period sites known, with one possible site, Cerovica being of a similar period. However, this latter site is dated from material gathered solely during surface prospection (the site is only partially published in the form of short reports, e.g. Joanovič 1976). The quantity of known sites in the Vršac area (over 40 sites are currently on register) indicates the importance of the region during the Late Neolithic Vinča period. However, the rather early abandonment of sites in respect to the span of the Vinča period, as shown on the At examples presented in this paper, especially in comparison to the type site of Belo Brdo located mere 70 kilometres southwest of the region may be an indication of the onset of a larger phenomenon would engulf the Danubian Vinča a century and a half later. This phenomenon would bring about its fiery demise around 4545–4480 cal BC (95% probability) when Belo Brdo was abandoned for good (Borić 2009; Tasić et al. 2015).

It is our hope, that in the immediate future, we start seeing more Bayesian chronological models appearing in the region, making it possible to study Late Neolithic period transformation on a generation or even a household level, contributing more to the many still unanswered questions of the period.

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Plate 1.

17
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Rd=x

43
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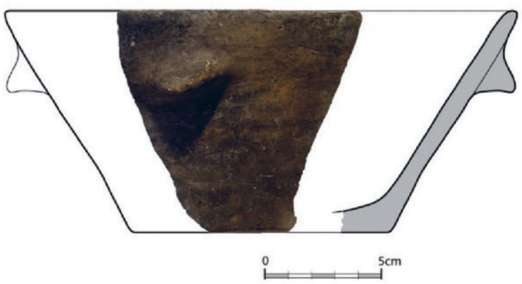
Rd=x

39
Ro=22cm
Rd=x



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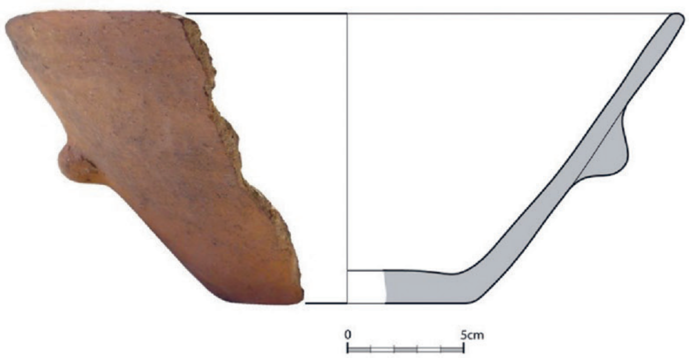

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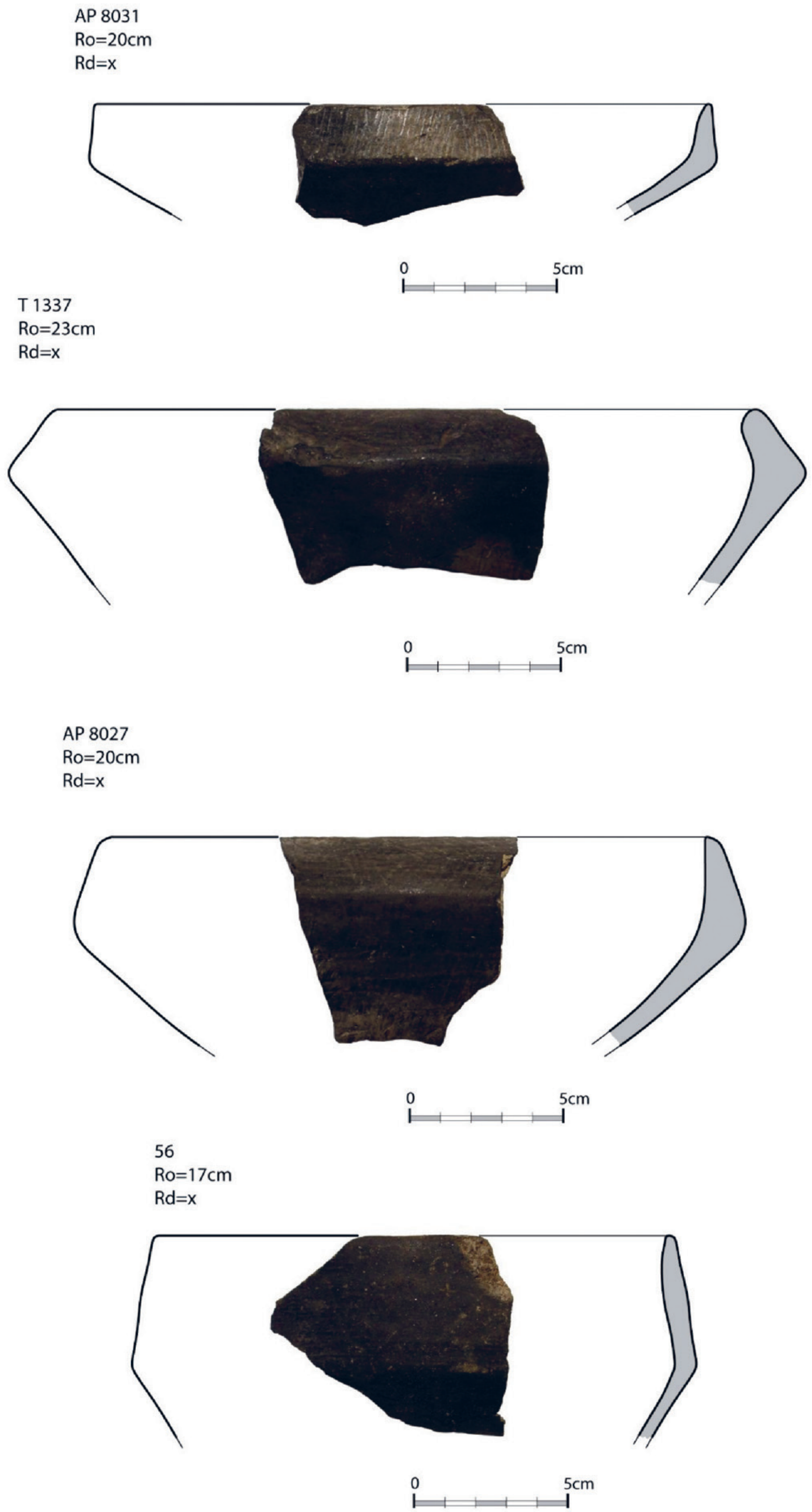
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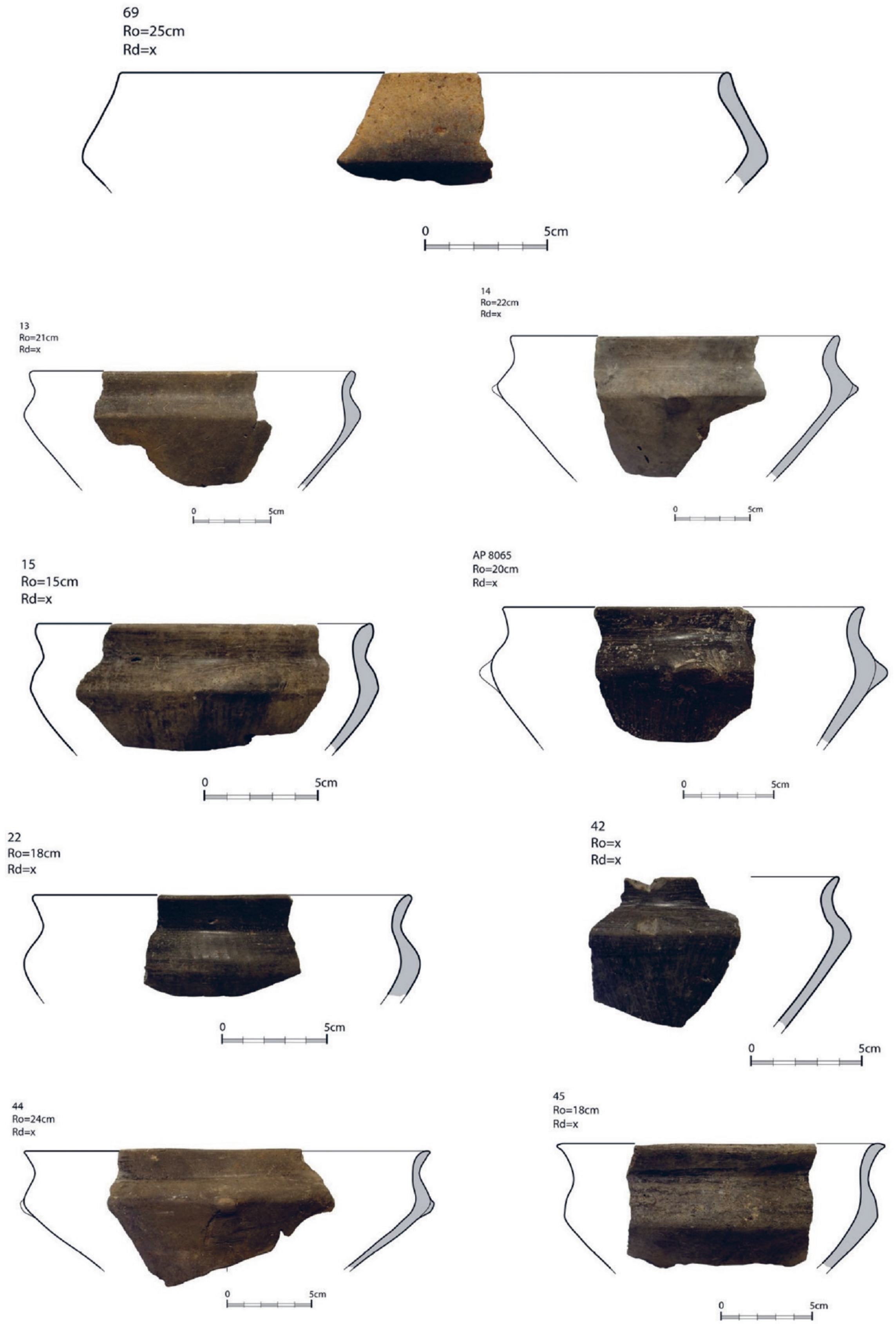
Plate 3.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