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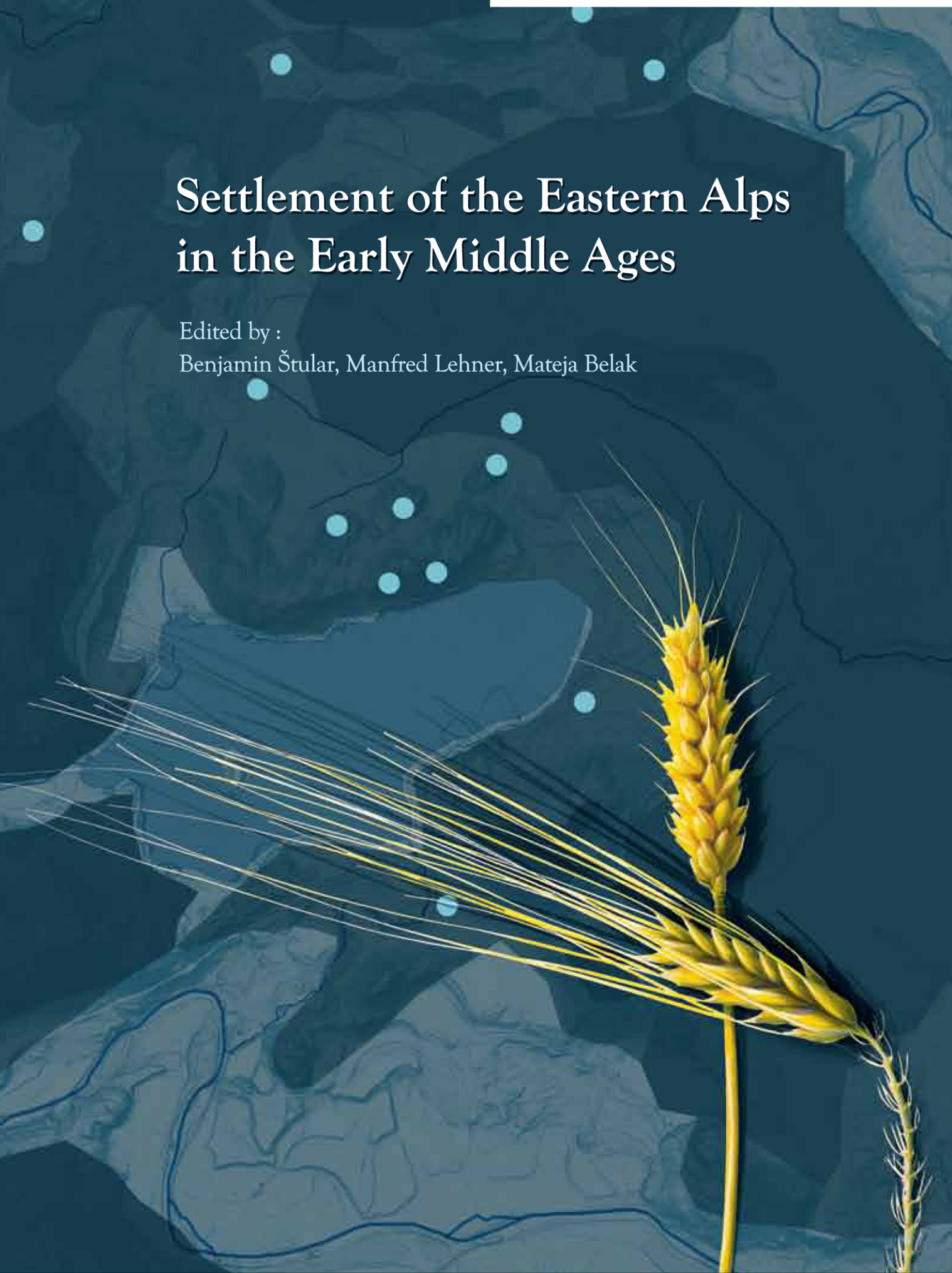
Settlement of the Eastern Alps in the Early Middle Ages

Edited by :
Benjamin Štular, Manfred Lehner, Mateja Belak



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Naslovnica / Front cover Bled microregion, landform classification (after Lozić, Fig. 7 in this volume), barley cob and wheat (Archive of the Archaeobotanical laboratory, Institute of Archaeology ZRC SAZU

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Založba ZRC

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INTRODUCTION TO THE SETTLEMENT OF THE EASTERN ALPS IN EARLY MIDDLE AGES

Benjamin ŠTULAR, Manfred LEHNER

Settlement of Eastern Alps in the Early Middle Ages is an edited volume with eight authors contributing nine chapters in total, each covering different aspects of the subject. It is the culmination of extensive research endeavours into the Early Medieval archaeology of the Eastern Alps, synthesising the collaborative efforts of four research projects[1] with scholars from two countries over several years.

The focus is on an area on the eastern fringes of the Alps, which lies in present-day Slovenia and parts of Austria. The three micro-regional studies are located near Bled (Slovenia), in the Drava Plain (Slovenia) and in the Leibnitzer Feld (Austria). The case study chapters focus on Upper Styria, also known as Austrian Styria (*Fig. 1*).

This collective endeavour represents, we trust, a significant contribution to the scientific community, reflecting a judicious investment in the advancement of knowledge. However, there is also a downside to such collective endeavours. As the authors are at different stages of their careers and come from various academic backgrounds, the content may lack the coherence one might ideally desire. Therefore, the volume is best described as an edited volume rather than a monograph, which is also reflected in its design. Nevertheless, we believe that the versatility in approaches is an enriching factor rather than a limiting one.

Early Medieval archaeology – sixth to eleventh century in the Central European context – historically focussed on the analysis of cemeteries, settlements, and hoards. A review of the literature pertaining to the Eastern Alpine region reveals a predominant emphasis on cemetery studies. However, the past two decades have witnessed a paradigm shift towards settlement archaeology. Building on this trend, the objective of this volume is to offer a comprehensive synthesis of settlement patterns in the Eastern Alps during the Early Medieval period, incorporating cutting-edge digital tools and landscape analyses. In so doing, the book draws several conclusions that are important for the wider field of Slavic studies and Early Medieval archaeology, for example with regard to the processes of transition from Late Antiquity to Early Middle Ages and the Slavicisation.

To contextualize the thematic focus of this book, first an introductory overview of the historical trajectory and current state of Early Medieval archaeology in the Eastern Alps is needed. As mentioned, in the Central European archaeology and in particular in the archaeology of the Eastern Alps the Early Medieval Period is largely understood as a period between the sixth and eleventh centuries AD. The archaeology of this period commenced with the discovery of "unusual enamelled jewellery" unearthed in 1853 at Köttlach in Lower Austria and documented by Franck (1854). He posited a query concerning the identity and era of the individuals associated with these artefacts and thus set the research agenda for the subsequent century and a half. The proliferation of analogous discoveries expanded the scope of this phenomenon, necessitating elucidation. Prior to and following the Second World War, the principal research challenge was the classification of the archaeological culture these objects presumably represented, including its chronological and ethnocultural dimen-

[1] This research was funded by Slovenian Research and Innovation Agency (ARIS) grants number P6-0064, J6-9450 and N6-0317 and by Austrian Science Fund (FWF) grant number I 3992.

sions. Gradually it became evident that these artefacts originated from the Early Medieval period. Nonetheless, in alignment with the cultural-historical perspective on archaeological finds prevailing at the time (for a historical overview see e.g. Štular 2025), a debate emerged concerning the ethnicity of the individuals to whom this enamelled jewellery was attributed. Some academics posited that these artefacts were Slavic in origin, while others contested this exclusive attribution, and further researchers interpreted the same items as indicative of an Early Medieval Germanic presence in the Eastern Alps. This scholarly discourse spanned various periods and a markedly dichotomous interpretation during and subsequent to the Second World War (an overview of the period up to the First World War: Pleterski 2001; distinctively dichotomous understanding during and after the Second World War: Dinklage 1941a; 1941b; 1941c; 1943; Korošec 1947).

Over the course of time, specific terminologies have been established, such as *Carantanian* referencing the Early Medieval Duchy of Carantania (Schmid 1910–1911), *Köttlach* denoting the site bearing this name, and the *Carantanian-Köttlach* culture. Within historiographical discourse, the associated populace was designated as Alpine Slavs (Grafenauer 1954; *cf.* Kahl 2002). The compendium of the Carantanian-Köttlach archaeological culture as it was understood at the time, encompassing its sites and artefacts, was meticulously compiled by Paola Korošec (1979). In her analysis Korošec highlighted inherent chronological and cultural variances, i.e., two main subphases were elucidated. In a nearly concurrent timeframe, J. Giesler presented the essays (1980; 1997) on the identical subject matter, proposing a significantly divergent chronological assessment, i.e., he proposed around one century later dating.

This divergence in chronological interpretations exacerbated the rift among scholars, indicating a necessity to reconstruct the discourse from its foundational elements. In response to this need, the ZBIVA archaeological database was established at ZRC SAZU in 1980s, designed to encompass a comprehensive array of data pertaining to literature, sites, graves, and artefacts relevant to the Early Medieval archaeology of the Eastern Alps. Currently ZBIVA encompasses information on 3,900 sites (Štular, Belak 2022), marking a substantial increase from the 242 sites described by Korošec in 1979. This expansion is attributed not only to the discovery of new sites but also, and more significantly, to a prolonged and systematic approach towards data aggregation. Utilizing this dataset, for instance, facilitated an analysis of Early Medieval church groupings (Pleterski, Belak 1995) and recently to elucidate the Slavic migration into the Eastern Alps (Štular et al. 2022).

In recent times, a significant paradigm shift has taken place regarding the conceptual tools available to archaeologists, notably concerning the association of archaeological cultures with ethnic identities. This traditional expectation has been critically reassessed and largely debunked, with scholars like Brather (2000) and Härke (2007) leading the discourse. An archaeological culture is perceived as a construct that broadly categorizes material culture based on various, potentially unrelated characteristics such as chronology, technology, economy, social structures, and religious practices (e.g. Klejn 1988; Jones 2003; Barceló et al. 2019; Štular 2025).

This shift in perspective renders a century-long debate over the ethnic affiliations of the Carantanian-Köttlach material culture — whether it was Slavic, Germanic, or indigenous — as methodologically flawed and outdated. The emancipation from the erstwhile ethnic imperative enables researchers to pose new inquiries, such as exploring the nature of people's lives and their self-identification mechanisms (e.g. Losert, Pleterski 2003; Brather 2008; Pleterski 2010a; Pohl, Mehofer 2010).

Addressing these novel research questions has led to the adoption of methodologies such as the archaeology of micro-regions. Taylor (1974), in his foundational work, advocated for a "total archaeology" approach that aims for a comprehensive understanding of landscapes and their origins, treating the landscape itself as an historical artefact. Following this approach, the Bled region has been the focus of intensive study as a micro-region since 1978. This sustained research effort, involving several generations of Slovenian Early Medieval archaeologists, has yielded a rich body of work. Notably, it facilitated the development of methods such as retrograde land-cadastre analysis (Pleterski 1995) and provided insights into the dynamics of an ancient Slavic *župa*, including its development and decline (Pleterski 2013a).

The realm of digital methodologies, commonly referred to as digital archaeology, represents another notable area of advancement within the field, as evidenced by works such as those by Lock (2003), Siart et al. (2013), and Benardou et al. (2017). In the context of the imminent prospects for Early Medieval archaeology in Central Europe, the application of Geographic Information Systems (GIS) stands out prominently. During the 1990s and 2000s, GIS facilitated unprecedented insights into the interplay between cultural phenomena (for instance, settlements) and their surrounding environments, whether natural or economic, in terms of both depth and scope (Stančič, Gaffney 1991; Štular 2006; for a list of tools with references, see Štular, Eichert 2020). It is crucial to acknowledge, however, that the efficacy of GIS is intrinsically linked to the quality and quantity of the underlying data.

Fortuitously, this domain has experienced significant advancements over the last decade. A pivotal development in data acquisition, particularly within the densely wooded regions of the Eastern Alps, is the employment of airborne Light Detection and Ranging (LiDAR) technology, as detailed by Lozić and Štular

(2021 with references). Excellent examples of implementing LiDAR data in Early Medieval archaeology is work by Lozić (2021; 2024 in this volume)

Furthermore, the significance of typo-chronological dating in archaeology must be underscored. Despite the contemporary emphasis on direct dating methodologies such as radiocarbon dating (C14) and dendrochronology, the reality remains that the majority of archaeological sites and assemblages under investigation lack such direct dating evidence (*cf.* Guštin 2002 for an attempt to establish a sequence of C14 dated sites). Nevertheless, recent advancements in Early Medieval archaeology within the south-eastern Alpine region have facilitated the establishment of a C14-dating-based typo-chronology, specifically for pottery (Pleterski 2010b with references) and certain types of jewellery (Pleterski 2013b with references; Rihter 2023).

As mentioned above, the Central European Early Medieval archaeology has historically focused on the analysis of cemeteries, settlements, and hoards with a predominant emphasis on the former.

The study of Early Medieval cemeteries in Eastern Alps, as documented by a range of scholars including Franck (1854), Reinecke (1899), Šmid (1908), with comprehensive overviews provided by Friesinger (1971–1974), Friesinger et al. (1975–1977), Korošec (1979), Szameit (2000), Eichert (2010), and Obenaus (2010), reveals a classification into three size categories: small, medium, and large.

The majority of cemeteries (323), are small, typically comprising up to several dozen burials, as highlighted in studies such as those by Nowotny (2005) and Karpf, Meyer (2010). In contrast, only three medium-sized cemeteries, each with over 300 burials, have been identified: Krungl in Austria (Breibert 2022), Ptujski grad (Korošec 1999), and Pristava at Bled in Slovenia (Korošec 1999; Kastelic, Škerlj 1950; Kastelic 1960; Knific 1983; Leskovar et al. 2024). The largest, by a significant margin, is the Župna cerkev cemetery in Kranj, with over 1000 Early Medieval burials (Štular et al. 2013; Pleterski et al. 2016; Pleterski et al. 2017; Rihter 2023). This is a notable deviation from the neighbouring Pannonia where large cemeteries are more commonplace during this era (e.g. Garam 1995; Kiss et al. 1996; Kiss 2001; Bardos, Garam 2009).

Traditionally, cemetery research has predominantly focused on the analysis of grave goods, leading to typo-chronological classifications of jewellery (e.g. Korošec 1979; Giesler 1980; Eichert 2010; Obenaus 2010; Pleterski 2013b) or very precise chronology of a cemetery (Štular 2022) with ever more advanced analytical tools (Achino et al. 2019). On occasion, this research has also yielded insights into social structures (Pleterski 2002; Eichert 2011; 2012), expansive Europe-wide exchange networks (e.g. Knific, Mlinar 2014), facets of religious beliefs (Pleterski 2014; Štular 2022), and the ecclesiastical network (Sagadin 2008).

Although hoards from this period are less prevalent, their documentation is relatively comprehensive, as illustrated by works such as Pleterski (1987), Giesler and Kohoutek (2014), and Bitenc, Knific (2015), with Štular (2020) providing a brief overview. The study of these hoards has facilitated typo-chronological classifications of weapons (for instance, Karo, Knific 2015), elucidated the composition of weapon and tool assemblages (Pleterski 1987; Curta 2011; Müllerová 2014), and offered insights into the patterns of monetary circulation during the period (Curta, Gândilă 2012).

Settlements are increasingly recognized as pivotal for advancing future research in Early Medieval archaeology. However, until quite recently, knowledge was limited and comprehensive publications of such sites were rare (e.g. Gutjahr 2006; Pleterski 2008). The primary obstacle to the systematic discovery of Early Medieval settlements in the Eastern Alpine region has been their low archaeological visibility, largely due to the sparse archaeological record: there are all but no architectural remains, pottery is scarce, especially when compared to sites from other periods such as the Roman or late medieval eras, and metal finds are exceedingly rare.

The presence of above-ground building floors and surface-floor structures (i.e., those not featuring sunken floors) constitutes a primary distinguishing characteristic of settlement archaeology within the Eastern Alpine region, in contrast to its counterparts, such as contemporaneous settlements in Slovakia. In the latter, sunken-floor buildings, known in German as *Grubenhäuser*, are prevalent, leaving a more pronounced archaeological footprint. While similar structures resembling sunken-floor buildings have been identified at the eastern peripheries of this region (e.g. Pavlovič 2017), they are not characteristic (in the sense of Šalkovský 2001) and defy straightforward classification (following the criteria of Donat 1980; Milo 2014).

An additional challenge in uncovering settlements in the region is their continuous occupation, a phenomenon observed in both urban centres — such as Kranj (Sagadin 2008), Ljubljana (Leghissa 2018), Ptuj (Korošec 1999), and Graz (Gutjahr 2007) — and rural locales, including Bled (Pleterski 2013a) and Virgen (Tischer 2018). Modern infrastructure development in these locations significantly impedes archaeological exploration, rendering the detection of above-ground building remnants nearly impossible. Furthermore, the construction of high medieval castles atop Early Medieval settlements has obliterated much of the evidence of the latter, with only a few fortunate exceptions (e.g. Ptujski grad, Schwanberg, Frauenburg/Unzmarkt, and recently Wildoner Schlossberg, see Koch in this volume). Detached Early Medieval settlements, removed from

current habitation zones, have frequently been compromised by agricultural ploughing (e.g. Pavlovič 2013).

Owing to these factors, the identification of settlements in substantial numbers has long remained elusive, even with the application of advanced prospection methodologies such as systematic archaeological surveys, geophysical techniques, or aerial photography.

Over the last three decades, however, there has been a notable increase in the number of recognized settlement sites within the Eastern Alpine region, with 47 documented in Slovenia and 53 in Austria. This surge in discoveries has been facilitated foremost by advancements in heritage management practices insisting on extensive excavations undertaken as precursors to subsequent construction projects. Among these findings, some have yielded exceptional insights. For instance, comprehensive radiocarbon dating conducted on a substantial settlement in Nova tabla (Slovenia) unveiled the remarkable presence of the earliest wave of new settlers, identified with Slavic origins, during the initial third of the sixth century (Pavlovič 2017). This singular discovery prompted a revaluation of the dynamics occurring in the sixth and seventh centuries. Furthermore, several recent studies analysing selected micro-regions were able to draw primarily from such settlement data (Bekić 2018; Guštin 2018; Kerman 2018; Mason 2018; Udovč 2018; Gutjahr 2020; Pavlovič 2023).

Concluding this state-of-the-art overview, it is evident that the field of Early Medieval archaeology in the Eastern Alpine region is poised at a pivotal juncture. With a comprehensive database, radiocarbon-dating-based typo-chronology, sophisticated tools for data management and analysis, and a refined methodology at our disposal, the groundwork has been laid for an inaugural comprehensive synthetic study that will elucidate the development and dynamics of Early Medieval settlement in this area.

Our book was an attempt of such study. It encompasses a comprehensive examination of Early Medieval settlement dynamics, agricultural practices, and socio-cultural transformations across the Eastern Alps, as delineated through seven meticulously researched chapters. Each chapter, contributed by experts in the field, employs innovative methodologies such as LiDAR data analysis, GIS tools, and archaeological expertise in material culture to elucidate the complex interplay between human settlements and their environmental contexts.

The archaeological data were examined either in microregional or regional contexts (*Fig. 1*). The scope of the region to be analysed was determined by the dataset contained in ZBIVA. As mentioned, ZBIVA's inception in 1987 was deeply rooted in the scientific context of the time. It's spatial and temporal content was conceived for the study of the so-called *Carantanian-Köttlach* archaeological culture. This means that its chronological focus was on the period from the settlement of the Slavs (as perceived in the 1980s) in the sixth century to the end of the habitual deposition of grave goods in the eleventh century. It mainly contained data from the settlement area of the Alpine Slavs (as perceived in the 1980s), which includes present-day Slovenia, Austria, north-west Croatia, and a small part in north-east Italy (Štular, Belak 2022 ; see Pleterski in this volume).

In addition, three microregions were selected that best represent the different landscape types and historical conditions in the Eastern Alps (*Fig. 1*). The Bled microregion (Slovenia), located at the foot of the Julian Alps, was chosen because it covers the entire territory of *župa*, which was the smallest administrative entity of the Early Medieval Slavs. In addition, Bled possibly has the most complete archaeological record in the region. The Leibnitzer Feld microregion (Austria) is located in the valley of the Mur/Mura river. It includes the site Schlossberg of Wildon, which is the most convincing Early Medieval hillfort of the entire region. The Drava plain (Slovenia) is the presumed territory of an Early Medieval principality with the central hillfort settlement and its medium-sized cemetery, hoards and several lowland settlements.

Thematically, the book is divided into three parts. While the length of individual chapters varies, the three parts are as balanced as possible given the subject matter.

The first part consists of a relevant methodological introduction followed by three microregional studies and a chapter that looks for common features of these studies and builds on the results.

The second part consists of an extensive contribution by a single author who analyses the Eastern Alps as an archaeological region, again with the methodological introduction.

The third part presents an extremely detailed analysis of Austrian Styria in Late Antiquity and Early Medieval period.

PART 1: MICRO-REGIONAL ANALYSES

This part begins with a brief methodological introduction titled *Methodology: Archaeological LiDAR and GIS Analysis of the Early Medieval Settlements* authored by Edisa Lozić in which methods used in more then one chapter are described to avoid repetition.

In the second chapter discussing a microregion, titled *Location Preference Analysis of Early Medieval Sites on Leibnitzer Feld (Austria)*, authors Edisa Lozić and Iris Koch delve into a critical role of spatial data in contextualizing archaeological findings within specific environmental settings. They highlight how the examination of soils, vegetation, geology, and physiographic characteristics of landscapes can offer fresh interpretive frameworks for understanding archaeological sites and artifacts. Through the generation of maps and interpre-

Fig. 1: Locations of the regional (red line) and micro-regional analyses (black squares) presented in this book.

tive visuals, the study provides a bird's-eye perspective that enhances the recognition of patterns across the distribution of sites within the study area.

Utilizing LiDAR data, Lozić and Koch were able to analyze the microenvironmental characteristics surrounding Early Medieval sites, facilitating the identification of settlement patterns. The use of tools from the Geographic Information System allowed the placement of archaeological sites within their spatial context, the delineation of economic zones, and the pinpointing of associated environmental variables. The outcomes of this research offer insights into the societies of the time, their interaction with the physical environment, and the underlying factors that influence their choice of settlement locations. The successful validation of these results underscores the adaptability of this methodologi-

cal approach, suggesting its applicability to the analysis of different regions and historical epochs.

In the chapter titled *Agricultural Dynamics of Bled Microregion (Slovenia),* Edisa Lozić explores the transformative role of topographic airborne LiDAR data in the field of archaeological prospection. This chapter is an abridged version of the article published in 2021, but it is reprinted here because of its integral importance to the book as a whole. Lozić argues that while LiDAR data is conventionally employed to detect archaeological features within landscapes, its potential in landscape reconstruction and situating archaeological sites within their environmental context remains largely unexplored. By adopting an innovative methodology, Lozić utilizes LiDAR data to uncover, document, and interpret patterns of agricultural land use, specifically by identifying significant environmental variations within a microregion. This is achieved through the integration of LiDAR-derived Digital Elevation Model (DEM) derivatives with archaeological, geological, and soil data. The chapter introduces two methodological advancements: a modified wetness index that enhances soil quality prediction by combining LiDAR-derived precision with the accuracy of soil's effective field capacity, and a revised landform classification that merges topographic position index with visual geomorphological analysis to predict plant species distribution effectively.

Lozić's investigation is exemplified through a case study of Early Medieval settlements in the Bled microregion of Slovenia, focussing on agricultural land use. The findings suggest that Early Medieval communities prefered areas with light and high water retention soils, conducive to barley cultivation, a key staple crop in the subalpine climate of the period. The chapter also notes a significant shift in the eleventh century towards the colonization of soils with lower water retention capacities, possibly indicating a move towards more advanced agricultural organization and the adoption of wheat as a primary cereal.

In the chapter titled *The Dynamics of the Early Medieval Settlement Development in the Drava Plain in Connection with the Pedological Analysis of Arable Land*, Andrej Magdič examines the evolution of Early Medieval settlements in the Drava Plain, emphasizing the relationship between the spatial and temporal development of these settlements and the pedological characteristics of their potential arable lands, as determined through archaeological dating. Magdič traced the origins of Early Medieval settlement in the Drava Plain to the late sixth or early seventh century, noting that the initial settlers were not constrained by the choice between previously cleared and subsequently re-forested lands, since the agricultural fields from the Roman era had been abandoned and overtaken by forests for more than two centuries.

The study reveals that the dynamics of settlement during this period were closely tied to environmental factors, with the pedological makeup of the soil in relation to the landscape being of particular significance. A key finding of Magdič's research is that the Early Medieval inhabitants selected settlement locations that were optimally suited to their agricultural technologies and practices. Initially, settlements were established in dry areas on the lower slopes of the hills, where loose sandy soils could be easily tilled with basic tools such as hoes or simple ploughs, with rainwater from the hills providing the necessary moisture for crops. By the end of the seventh century, settlements expanded into more humid areas with clayey soils, necessitating the adoption of more sophisticated agricultural techniques and the use of a plough that not only cut and crushed the soil, but also turned it, enabling the effective cultivation of the expansive river plains of the Pannonian Basin. We may add that this is likely to be the Alpine plough mentioned in the following chapter.

In the chapter concluding the microregional studies, titled *Becoming Slav (Archaeological Evidence): Agricultural Anti-Revolution and Acculturation in the Eastern Alps*, authors Benjamin Štular and Edisa Lozić delve into the complex phenomenon of Slavicisation in the Eastern Alps from the sixth to the eighth century by building on the results of the previous three microregional studies. The study characterizes the Slavs as a secondary, relational in-group, distinguished by their language, housing culture, dress, sustenance, and a web of social relations, including genetic lineage, specifically focusing on Alpine Slavs who spoke Slavic and shared a common ancestry, migrating to the Eastern Alps during the sixth and seventh centuries.

Štular and Lozić argue that while migration contributed to the Slavicisation of the Eastern Alps, the more critical factor was the ensuing acculturation process. The chapter aims to shed light on the sustained success of Slavicisation by exploring the dynamics of acculturation through a proposed four-stage model. Initially, Slavic colonisation of marginally used Late Antique fields facilitated peaceful coexistence. The superiority of the Slavic agricultural system then led the Late Antique inhabitants to adopt this new approach, albeit at the cost of their social status. This adoption, alongside shared resources, knowledge, and living spaces, precipitated an intensive acculturation phase termed inverse integration, where the host community assimilated the dominant immigrant culture's norms while maintaining their cultural identity, leading to biculturalism or the coexistence of two initially distinct cultures.

PART 2: REGIONAL ANALYSIS

In the chapter titled *Images behind the Archaeological Curtain: Vlachs, Slavs, župas, principalities, Carantania*, Andrej Pleterski embarks on an explora-

tion to decipher the historical and cultural dynamics of the Eastern Alps from the fifth to the eleventh century through archaeological site analysis. Analysing a selection of 1105 relevant sites from the Zbiva database, Pleterski offers an exhaustive survey of the Early Medieval Eastern Alps. The chapter commences with a succinct presentation of the methodology employed, followed by an overview of the evolutionary trajectory of the archaeological landscape, encapsulated in phases the author describes as the decline of the Roman world, the arrival of the Slavs, and their westward expansion.

Pleterski then delves into selected thematic areas, including the examination of burial sites within a geomorphological framework, the interplay of cemeteries and geomorphology, and the process of Christianization, with a particular focus on the relationship between burial sites and churches, especially in the Klagenfurter Becken/Celovška kotlina area which is relevant for the historical extent of Carantania. The author also scrutinizes the local communities or *župas* of the Early Middle Ages, specifically Bled and *Dežela*, introducing a model to comprehend the evolving interactions between the Slavs and the Vlachs and the sacralization of spaces, exemplified by the Gorjanci Mountains and Krško-Brežice polje.

A pivotal section of the chapter addresses the strategic placement of power centres within the landscape, shedding light on the intricate socio-political and cultural fabric of the period. Through this comprehensive analysis, Pleterski aims to reconstruct a vivid tableau of the Early Medieval socio-political landscape in the Eastern Alps, highlighting the significant roles of Vlachs, Slavs, *župas*, duches, and the principality of Carantania.

PART 3: CASE STUDIES

The in depth analysis of the Upper and Central or Austrian Styria begins with the chapter titled *From Late Antiquity to the Early Middle Ages: The 'Dark Centuries' in Styria (400–650 AD) and the 'New Beginning' of Settlement in the 7th Century,* The authors Christoph Gutjahr, Stephan Karl, and Christian Greiner examine the transformative period from Late Antiquity (circa 380 AD) to the initial phase of Early Medieval settlement in what is now the province of Austrian Styria. The scarcity of archaeological finds from this era, particularly between 450 and 650 AD, underscores the transitional nature of the period. The chapter presents an analysis based on select categories of artifacts, such as Late Antique lead-glazed and burnished pottery, coins, and jewellery and dress accessories, to illustrate the near-disappearance of Roman rural structures after the fourth century.

Furthermore, the chapter notes the minimal impact of movements by the Lombards, Ostrogoths, early Avars, and other ancient groups on the Styrian landscape during this time. The focus then shifts to the onset of Slavic settlements in Styria in seventh and first half of the eighth century, with archaeological evidence becoming more discernible around 700 AD. These early Slavic settlements, characterised by pit finds from locations such as Komberg, St. Ruprecht an der Raab, and Enzelsdorf, are highlighted for their limited material culture and geographical confinement to western and central parts of Austrian Styria. The findings from Komberg and St. Ruprecht suggest a settlement timeline in the mid to late seventh century, while ongoing excavations in Enzelsdorf point to a continuous settlement from the seventh to the early eleventh century, offering new insights into the region's transition from Late Antiquity to the Early Medieval period.

The final chapter of the book is titled *Early Medieval Settlement in Styria: Considerations on Settlement Patterns and Land Use*. The author Iris Koch delves into the settlement dynamics of the Early Medieval period within the Austrian province of Styria. Using archaeological data, the analysis aims to discern patterns and concentrations of settlements, as well as to evaluate the strategic placement of these settlements within the landscape. Koch emphasises the importance of considering a broad spectrum of parameters for a comprehensive site assessment, including terrain features, altitude, proximity to water bodies, historical settlement patterns, available resources, and inter-settlement relations.

The chapter successfully identifies regions with increased site density, indicative of settlement clusters and potential local or regional hubs. A notable pattern observed is the strategic selection of elevated terrains, such as hilltops and crags, for settlement sites, a practice that dates back to at least the eighth century. Furthermore, the chapter reveals a tendency for Early Medieval communities to reoccupy sites that were significant during prehistoric and Roman times, attributed to the enduring appeal of these locations and possibly deliberate choices for reoccupation.

Koch enhances the archaeological perspective with findings from related fields such as archaeozoology, archaeobotany, and anthropology, revealing a multifaceted approach to land use that includes agriculture, animal husbandry, hunting, and the exploitation of other natural resources. This comprehensive examination sheds light on the complex interplay between Early Medieval settlers in Styria and their environment, illustrating how they adapted to and transformed their landscape to suit their needs.

We are confident that the above announced content of the book promises to be an indispensable resource for scholars and enthusiasts alike, offering fresh perspectives on the Early Medieval period through a blend of archaeological evidence and environmental analysis.

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METHODOLOGY: ARCHAEOLOGICAL LIDAR AND GIS ANALYSIS OF THE EARLY MEDIEVAL SETTLEMENTS

Edisa LOZIĆ

Abstract

This introductory chapter explores the application of Light Detection and Ranging (LiDAR) and selected relevant aspects of Geographic Information Systems (GIS) in archaeological research.

Archaeological LiDAR is typically used as a tool to visualise and analyse the morphological aspects of archaeological landscapes, greatly enhancing the detection of archaeological features and sites. However, here we address the use of LiDAR for the reconstruction of landscapes, which offers new avenues for research, such as palaeogeographic analysis and the study of agricultural land use in historical contexts.

The second part focuses on GIS analysis of the landscape context, especially in relation to Early Medieval settlements in the Eastern Alpine region. An overview is given of previous studies analysing settlements based on environmental factors such as soil type and topography, highlighting the influence of agricultural potential on settlement patterns. It also discusses the theories of central land cores and site-catchment analysis, and illustrates how modern GIS methods enhance the understanding of settlement landscapes by providing realistic estimates of land use areas based on DEMs and time-distance computations.

Keywords: archaeology, LiDAR, airborne laser scanning (ALS), geographic information systems (GIS), site-catchment.

1. ARCHAEOLOGICAL LIDAR

This chapter presents the methodological background shared by the Leibnitzer Feld (Lozić, Koch 2024 in this volume) and Bled (Lozić 2024 in this volume) studies.

Light Detection and Ranging data (hereafter LiDAR) is used in archaeology for the visualisation and detailed morphological analysis of the archaeological landscape. First and foremost, LiDAR has become an essential component of archaeological prospection as a tool for detecting archaeological features (Devereux et al. 2005; Thompson 2005; Chase et al. 2011; Evans 2013; von Schwerin et al. 2016; Canuto et al. 2018; Inomata et al. 2018; Menéndez Blanco et al. 2020; Stanton et al. 2020; Swieder 2021). The free availability of LiDAR data in Slovenia since 2015 (Triglav Čekada, Bric 2015), for example, has led to the discovery of numerous archaeological sites and features – such as prehistoric settlements, prehistoric and Roman field systems, Roman military camps, and Late Antique settlements (Štular 2011; Laharnar et al. 2015; Bernardini et al. 2015; Bernardini, Vinci 2020; Mlekuž 2018; 2013) – especially in densely forested areas. In addition, LiDAR data allows the observation of any site or feature at different scales (Crutchley 2009; Crow 2010; Doneus, Kühteiber 2013). From the large "human" scale, which provides overwhelming detail at the intra-site level, to the small landscape scale, where patterns of site distribution can be easily observed, they have enhanced our understanding of archaeological

and historical landscapes. However, LiDAR data is only suitable for detecting those archaeological features that are visible in the terrain morphology (Štular et al. 2021). Therefore, the impact of LiDAR data on archaeology as a discipline has been uneven. One area of limited impact has been the detection of Early Medieval settlements in the Eastern Alpine region (hereafter EMS). EMS are preserved almost exclusively as scarce remains of wooden structures in the form of minute post holes, while the remains of larger buildings, stone architecture, and larger earthworks are almost non-existent (e.g., Pleterski 2010). Therefore, EMS are not discernible in the terrain morphology and thus cannot be detected directly with LiDAR data or any other type of archaeological prospection.

However, in addition to the archaeological prospection, LiDAR data can also be used for landscape reconstruction (e.g. De Boer et al. 2008; Coluzzi et al. 2010; Prufer, Thompson 2016), in a process known as deep interpretation (Doneus, Kühteiber 2013; Lozić, Štular 2021). Such applications open up a wide range of research opportunities and approaches, for example the reconstruction of historical geographical elements, paleogeographical analysis (De Boer et al. 2008; Pierik, Lanen 2019), and the archaeology of agricultural land use. We follow this approach and are particularly interested in understanding archaeological sites in their land use context. This is possible because LiDAR provides the landscape configuration in the form of a high-resolution digital elevation model (hereafter DEM). The DEM allows us to provide measurable parameters and qualitative and quantitative characterisations of the landscape configuration and thus objectively define physiographic regions. When these are correlated with other environmental factors such as soil type, hydrology, and geological data, sites can be accurately characterised.

The focus of the use of LiDAR in this volume is on agricultural land use and its direct or indirect influence on settlement location choice. Landscape configuration undoubtedly had an influence on the potential for agricultural land use in the archaeological past, and LiDAR data have recently been used for this purpose (e.g. Weishampel et al. 2013; Ringle et al. 2021; Schroder et al. 2021). And under conditions of agricultural subsistence economy, agricultural land use in turn has an important influence on the choice of settlement location (e.g. Kos 1970; Zeman 1976; Wawruschka 2009; Pleterski 2013). This is not to say that there are not many other factors that can significantly influence settlement patterns in different areas and at different times, for example cultural (Hamilton et al. 2018), historical (Casana 2007), social (Carboni 2015; Duncan-Jones 2004; Mensing et al. 2018; Tuan 1980) or climate (Huebner 2020; Lawrence et al. 2021). However, like most of the studies cited, we focus on one that we consider to be the most important in this particular context.

2.1. GIS ANALYSIS OF THE LANDSCAPE CONTEXT

Archaeological GIS is a broad topic which is relatively well known and published (e.g., Gillings et al. 2020; Štular, Eichert 2020). The aim here merely to provide a brief overview of the scientific background on the topic of GIS analysis of the landscape context in Early Medieval archaeology relevant to our case studies Leibnitzer Feld (Lozić, Koch 2024 in this volume), Bled (Lozić 2024 in this volume), and the Drava plain (Dravsko polje; Magdič 2024 in this volume).

Previous attempts to understand the landscape context of Early Medieval settlements in the Eastern Alpine region (hereafter EMS) often reduced observations to height above sea level and soil type. One early analysis found that Slavs in Slovenia settled mainly in upland areas with dry soils and tended to avoid plains, narrow valleys, and wet soils (Kos 1970). In a preceding analysis of the Bled microregion the reconstruction of the field system located the most suitable areas for Early Medieval agriculture and concluded that local topography had a direct influence on the EMS location choice model (Pleterski 1986; 1987; 2013). A similar attempt to define the landscape type and soil type in which EMS occurs was made in Lower Austria. Under the term mesoregion, 36 EMS were analysed within their respective 5 km radii. Soil type and geomorphological context, which provided a description of the predominant landform types, were considered. The results showed that the EMS occur in two landscape types: (flood) plains and mountainous regions. Approximately half of EMS were located on alluvial river terraces, at least some of them within coeval floodplains on naturally elevated land. The other half of EMS was located in upland and hilly areas above 300 m a.s.l. In these areas, loess and brown earth soils were clearly preferred (Wawruschka 2009).

In the archaeologically relevant neighbourhood, river terraces and hills were also recognized as the predominant locations for EMS in Bohemia (Zeman 1976). Similar conclusions regarding landscape preference, habitat description, and soil conditions were also drawn for Great Moravia in Czech Republic (Měřínský 2002), Slovakia (Fusek 1994), and for several microregions in Slovenia (Krško polje: Rihter 2019; Prekmurje and Podravje: Magdič 2017; 2021; 2024 in this volume), and Bled (Knific 1984; Pleterski, Belak 1995). Somewhat different situation was detected for the sixth-century Slavs in the Northern Danube region (present-day Slovakia, Moravia, Czech Republic, and Upper Austria), who settled the lowlands in strategic locations along roads and at river fords, while mountainous terrain was avoided (Kazanski 2020).

Perhaps the most detailed study to date combined archaeology, written sources, and retrograde analysis of historical cadastres (Pleterski 1986; 2013a). It re-

constructed the arable areas, which occurred in small patches scattered in the valley plains. Settlements were located adjacent to soils suitable for agriculture. The study was able to infer where and when the settlement took place with a great level of confidence, but not why and how.

These studies confirmed the theory of central land cores put forward for the Medieval settlement of present-day Slovenia by Ilešič (1950). He noted that each Medieval settlement initially had relatively little cultivated land on particularly favourable soils in the immediate vicinity of the settlement. As the settlement grew, the existing fields were divided up and new ones further from the village were asserted. Thus, the central land core became increasingly fragmented and the total area of cultivated land increased.

The theory of central land cores has good parallels with the site-catchment analysis proposed in the 1970s (Vita-Finzi, Higgs 1970). The similarities are not coincidental, as both are based on mid twentieth century human geography. The site catchment was defined as an area within which the exploitation of natural resources is economically justified. The area was proposed as 5 kilometres or an hour's walk for sedentary farming communities and the share of arable land was estimated to be between 5% and 10%. Flannery (1976b), Rossmann (1976), and Zarky (1976) empirically tested the model on Mesoamerican villages and found that the site catchment area was at least half and the share of arable land up to ten times smaller than in the original theoretical estimates. They concluded that the distance between villages was determined by social rather than ecological factors.

Similar conclusion was reached for the Early Medieval Bled microregion, where the site catchment for the field was estimated to be 7 minutes walking distance (Štular 2006, 200). Modern studies of the site catchment reinforce the distinction between the exploitation area and its social status, i.e., direct exploitation is not the same as the area that is claimed to define the political status of a settlement (Seubers 2016). The key advantage of modern studies is that the catchment area is no longer forcefully simplified into circles, but is much more realistically estimated in terms of time of walking or energy expended. This is achieved in GIS by computing the time distance based on DEM and realistic formulas obtained through experiments (Langmuir 1984; Tobler 1993; Štular 2006; Richards-Rissetto, Landau 2014; Field et al. 2019).

The data for the Bled case study (Lozić 2024 in this volume) and Drava Plain allowed (Magdič 2024 in this volume) to implicitly implement the theory of central land cores, whereas in most archaeological case studies only the site catchment theory can be applied. The latter was the case for the Leibnitzer Feld (Lozić, Koch 2024 in this volume).

As a note, it should be mentioned that EMS within floodplains would have severely restricted access to agricultural land. This suggests that the exploitation of riparian vegetation and other resources must have played an important and hitherto neglected role in Early Medieval economic life. The riparian zone was able to provide for fish, freshwater crabs, various edible plants; wild vines and similar could be gathered without having to invest in cultivation. Reeds for covering houses, but possibly also for making vessels, and willow twigs for building wattle walls in house construction could be gathered in the floodplain forests, as well as wood for timber construction (Wawruschka 2009; Rihter 2019).

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SOIL, WATER, AND TOPOGRAPHY: DECODING SETTLEMENT LOCATION PREFERENCES IN EARLY MEDIEVAL LEIBNITZER FELD (AUSTRIA)

Edisa LOZIĆ, Iris KOCH

Abstract

The study investigates settlement location preferences during the Early Medieval period in the Leibnitzer Feld microregion of southeastern Austria, focusing on soil, terrain, and hydrological characteristics. Utilizing LiDAR data and Digital Elevation Models, the research examines the spatial distribution of settlements relative to agricultural potential and non-agricultural activities. The analysis reveals a distinct pattern of settlement locations influenced by soil quality including its ability to retain water. Settlements with access to high-fertility soils, primarily eutric brown soils, suggest an agricultural focus. Conversely, settlements on high ridges or with no access to fertile soils indicate non-agricultural functions. Some of those have been identified as potential mining settlements, highlighting the region's economic diversity. This study underscores the importance of integrating geospatial technologies with archaeological data to enhance our understanding of historical settlement dynamics.

Keywords: archaeology, Early Medieval settlements, site location analysis, landscape archaeology, LiDAR data, DEM analysis.

1. INTRODUCTION

The purpose of this chapter was to spatially analyse Early Medieval sites in the Leibnitzer Feld microregion (see Štular, Lehner 2024, Fig. 1 in this volume) by observing soil and terrain characteristics within site catchments for each archaeological site. The approach is based on the well established assumption that predominantly agricultural societies made their living primarily within the site's hinterland known in archaeology as site catchment (Lozić 2024b in this volume). This method enables us to discern, in a given region and time period, between the sites that have an easy access to the fields, and those that don't. In the case of the latter, non-agricultural motives can be assumed for their choice of location. Another goal of this method is to analyse the environmental variables that were crucial to the choice of settlement location.

The Early Medieval economy in the region was predominantly based on agriculture and animal husbandry, which has recently been illustrated by a meticulous analysis of two Early Medieval refuse pits containing archaeozoological and archaeobotanical assemblages discovered in Kleinklein, just outside our study area. Meat consumption was based on domestic animals (pigs, cattle, chickens, sheep, and goats) and to a lesser extent on game (deer and wild boar) (Toškan 2019). The diet was based on a rather limited selection of crops, consisting of barley (*Hordeum vulgare*), broom millet (*Panicum miliaceum*) and probably rye (*Secale cereale*) (Kiszter et al. 2019). Recent research elsewhere has also demonstrated the importance of rivers for the supply of proteins related to fishing and gathering activities (Rihter 2019; Wawruschka 2009; evidence for fishing: Nowotny 2016).

Previous research efforts conducted in the Leibnitzer Feld and its surroundings have provided important contributions and valuable insight regarding Early Medieval populations that inhabited Austrian Styria (Gutjahr 2018c; Gutjahr et al. 2024 in this volume; Koch 2024 in this volume).

However, if the sites are analysed in isolation, the microregional settlement model is difficult to discern. Thus, in this chapter, we have observed Early Medieval settlements in the Leibnitzer Feld in the landscape context. Given the dynamic relationship between the many environmental variables and the scarce archaeological data, this was a formidable task. Fortunately, geographic information systems (GIS) technology provides mechanisms to manage the data and study correlations between the various components of a complex environment and archaeological sites.

2. MATERIALS AND METHODS

2.1 STUDY AREA

The study area, the so-called Leibnitzer Feld, is located in the Mur/Mura valley in Styria in southeastern Austria (*Fig. 1*). The area covers approximately 280 km^2. To the north, the mountain formation of the Buchkogel, including the elongated range of the Wildoner Schlossberg and the Bockberg, separates the Grazer Feld from the Leibnitzer Feld. It is known collectively in the Middle Ages as 'Hengist'. This area has been the subject of considerable research interest (Gutjahr et al. 2018), as shown by the impressive bibliography compiled on the subject (e.g. Gutjahr 2013; 2014; 2015; Gutjahr, Trausner 2009; Roscher 2001). It ends in the south on the west bank of the Mur, with clearly discernible remains of the Roman town *Flavia Solva,* in present day Wagna (Groh 1996; Hinker et al. 2014; Groh 2021). This particular study area was chosen because of the relatively high number of Early Medieval sites compared to the rest of Styria. An important aspect of the choice was the fact that some of them were discovered during rescue excavations (Komberg, Weitendorf, Rohr bei Haslach) and provided organic material for the radiocarbon dating.

2.2 ARCHAEOLOGICAL DATA

Scarce data are problematic in Early Medieval archaeology in this region in general, and even more so in Leibnitzer Feld. Due to the perishable building material used for such settlements, the Early Medieval settlements can only be detected by archaeological excavations (Štular, Lehner 2024 in this volume). Furthermore, in this particular area, an additional factor for poor preservation of the archaeological remains is intensive modern farming. This is especially true for the eastern part of the study area, where remains associated with dwelling sites seem to be largely absent. For these reasons, we cannot overstate the archaeological significance of the few known settlement sites. These are starting points for "reading" and understanding the natural parameters that were decisive for the choice of the location of the settlement.

To select the relevant archaeological sites for this study first the data quality was re-evaluated (see *Appendix 1* for description of sites with references). The final selection was comprised of settlements (*Table 1:* A–F) and cemeteries (*Table 1:* G–J). However, because of their paucity we also included the artefacts classified as so-called stray finds, that is, artefacts found outside of a distinct archaeological context (Darvill 2008). In our case, the stray finds are pottery fragments (*Table 1:* L–N), as well as jewellery (*Table 1:* K, O, P) and dress accessories (*Table 1:* R). We argue, that stray finds are indirect indicators of occupation, signalling either possible dwellings or burial sites in the vicinity (see Dzieńkowski 2018). However, in the analysis confirmed settlements were considered as a separate category.

2.3 LiDAR AND DEM DATA

Prior to archaeological interpretation, the original Lidar dataset (1000 km^2 point cloud in "*.las" file format with accompanying orthophotos) was obtained from the Provincial Government of Styria (Das Land Steiermark) for the *Hengist Best-of* project (Gutjahr et al. 2018). The original data set was processed and filtered according to the archaeology-specific method (Lozić, Štular 2021; Štular, Lozić 2016). The test of the data processing method was performed on a smaller area (4 km^2), in case adjustments of the methodological approach would be necessary. The real value of the re-processed point cloud and re-interpolated digital elevation model (DEM) was revealed by the use of different visualization types (hillshade, openness, difference from mean elevation, sky view factor). It resulted in improved quality and "sharpness" of data and thus in better visibility of the possible archaeological features (Štular, Lozić 2020). The use of different visualization techniques is necessary to obtain the maximum information about possible archaeological sites visible on the surface (Lozić, Štular 2021).

One of the key products of LiDAR data for archaeology and geosciences is DEM (Štular et al. 2021). The DEM dataset is provided as gridded elevation data in a raster structure that represents the surface of the terrain. It contains x-, y-, and z-values, which represent x- and y-coordinates and elevation information, respectively. Digital Terrain Analysis can be used to

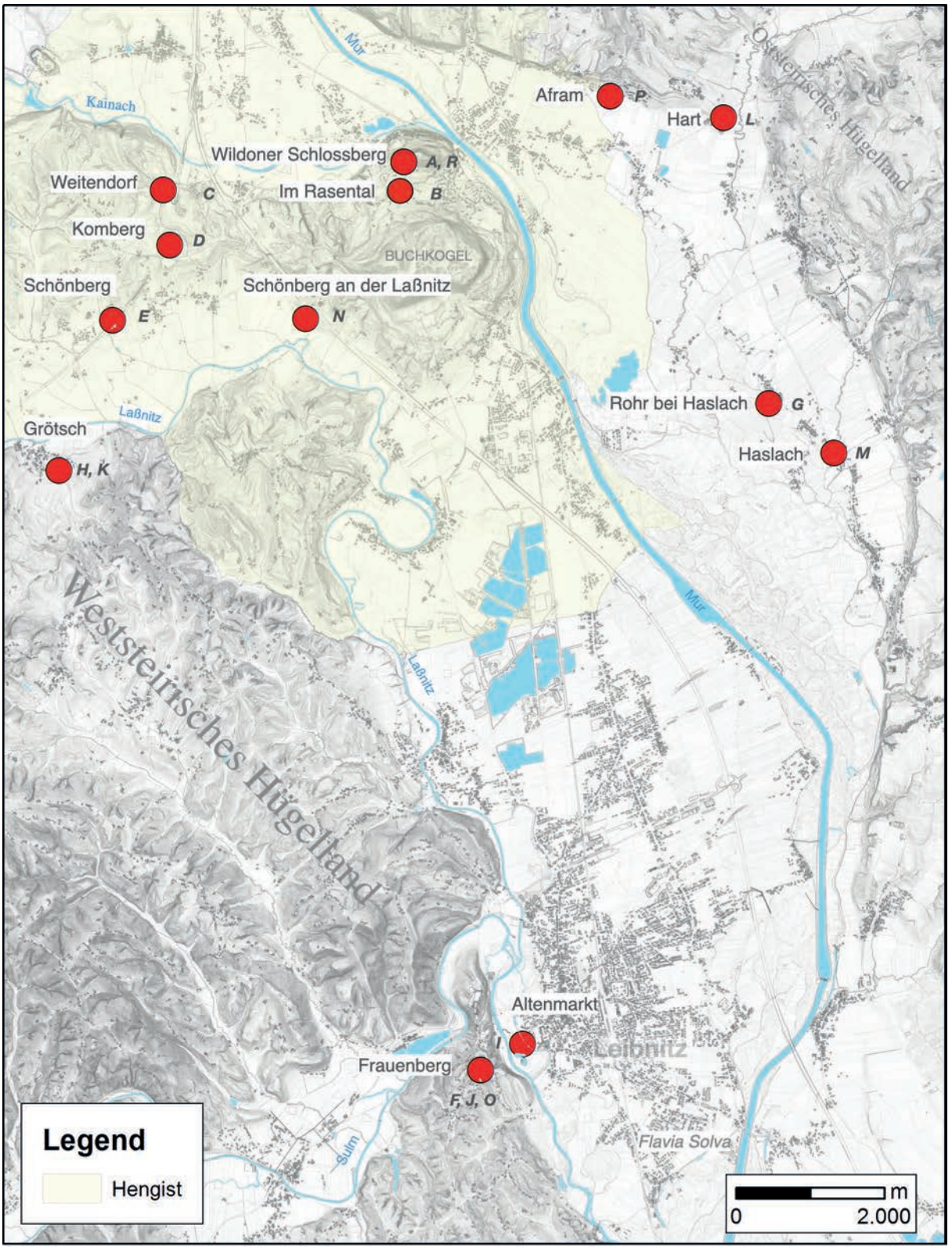

Fig. 1: Leibnitzer Feld study area with Early Medieval sites. Yellow is the approximate area of Hengist (sources: Zbiva; Gutjahr et al. 2018), defined by today´s borders of five municipalities organized in the "Kulturpark Hengist". The proper borders of the medieval Hengist county are unknown in detail.

ID	Name*	Type	Chronology (AD)**	Chronology Confidence Level***	Zbiva ID
A	Wildoner Schlossberg[1]	Settlement	750–1000	2	10001857
B	Im Rasental[1]	Settlement	700–1000	3	10002886
C	Weitendorf	Settlement	750–860	3	10002796
D	Komberg	Settlement	625–675	3	10002344
E	Schönberg	Settlement	600–800	3	10003649
F	Frauenberg[2]	Settlement	600–1100	1	10001862
G	Rohr bei Haslach	Cemetery	665–1035	2	10002488
H	Grötsch[3]	Cemetery	750–850	2	10001838
I	Altenmarkt, Leibnitz	Cemetery	800–1600	3	10001830
J	Frauenberg[2]	Cemetery	900–1000	2	10001851
K	Grötsch[3]	Undefined	670–700	1	10004069
L	Hart	Undefined	700–800	1	10002605
M	Haslach	Undefined	600–850	1	10002442
N	Schönberg/Freybühel	Undefined	600–1000	1	10003648
O	Frauenberg[2]	Undefined	900–1000	1	10003647
P	Afram	Undefined	900–1000	1	10001822
R	Wildoner Schlossberg[1]	Undefined	400–700	1	10004056

[1] Wildoner Schlossberg, Im Rasental; [2] Frauenberg; [3] Grötsch: for the purpose of site catchment analysis the location of sites and stray finds located nearby have been treated as a single location.
** See online Zbiva database (https://zbiva4.zrc-sazu.si) for further details on how the chronology was determined for each site.
*** 1 – poor; 2 – good (e.g., diagnostic artefacts); 3 – excellent (e.g., stratigraphy and C14 dates).

Table 1: Early medieval sites in the Leibnitzer Feld micro-region. ID refer to *Fig.* 1 (source: Zbiva database). Note: The year 1100 indicates an arbitrary end of the Early Medieval period, but the site in question continues to exist after this date.

perform information extraction that derives terrain parameter computation and feature extraction from DEMs (Zhou 2017). Attributes computed with DEMs can be derived directly, as single or primary attributes, or compound/secondary attributes, which are functions of two or more single attributes.

From DEM primary topographic attributes, such as slope, specific catchment area, aspect, and plan and profile curvature, can be derived for each cell as a function of its surroundings. The secondary attributes, which are computed from two or more primary attributes, are important because they offer an opportunity to describe pattern as a function of process. Those attributes that quantify the role of topography in the redistributing of water in the landscape and in modifying the amount of solar radiation received at the surface have important hydrological, geomorphological, and ecological consequences in many landscapes. These attributes may affect soil characteristics (because the pedogenesis of the soil catena is affected by the way water moves through the environment in many landscapes), distribution and abundance of soil water, the susceptibility of landscapes to water erosion, and the distribution and abundance of flora and fauna. Among the secondary topographic attributes we have used landform classification and soil moisture (see below).

2.4 TOPOGRAPHIC AND GEOLOGICAL CHARACTERISTICS OF THE STUDY AREA

The Liebnitzer Feld is enclosed in the west by the uplands of the Weststeirisches Hügelland, which are cut by wide valleys of the rivers Sulm, Laßnitz and Kainach. From the Wildoner Buchkkogel the Leibnitzer Feld extends in a north-south direction and reaches the modern Austrian-Slovenian border in the south (*Fig.* 1). In the east, the study area is bordered by the edge of the Oststeirisches Hügelland. Today, the entire region is characterized by intensive agricultural use.

The western part of the study area is part of the Central Styrian high geologic formation also known as Middle Styrian Swell (subdividing the Styrian Basin), which is a geologic formation of Paleozoic (Middle Miocene) metamorphic rocks containing phyllite (Flügel 1960; Flügel, Neubauer 1984a; 1984b). The eastern margins belong to the Miocene formations (mainly sandstone) and Neogene carbonates (Leitha Limestone), which occur in a narrow and isolated area from Wildon in the north almost down to Spielfeld/Šentilj. The outcrops of Karstified Neogene carbonates (Leitha Limestone) are important, especially the area of Wildoner Buchkogel and Sukdull, because they were probably sourced for stone building material in Roman times (Bauer, Weissinger 2020). The Mur valley was

Interval (Penck, Brückner 1901/1909)	Type Unit of Glacial Stages	Type Locality
Würm	Niederterrasse (Lower Terrace, NT)	
Riss	Hochterrase (High Terrace, HT)	Helfbrunner Terrasse
Mindel	Jüngerer Deckenschotter (Younger Cover Gravel, IDS)	Schweinsbachwaldterrasse
Günz	Alterer Deckenschotter (Older Cover Gravel, ADS)	

Table 2: The Alpine Glacial Stages. The four classical glacial stages, Würm (W), Riss (R) Mindel (M), and Günz (G), and the three interglacials Riss-Würm (RW), Mindel-Riss (MR), and Günz-Mindel (GM) were named by Penck after the four Bavarian tributaries of the Danube (Donau) and Isar (Penck and Brückner, 1901). The system was later extended by adding two earlier glacial stages – Donau and Biber, and two corresponding interglacials – Donau-Günz (DG) and Biber-Donau (BD)(Eberl, 1930; Schaefer, 1953).

formed through fluvial incision and terrace development by the Middle Pleistocene to Holocene (Rabensteiner et al. 2019). Well-developed stepped fluvial terrace systems connected to terminal moraines of Quaternary glaciations formed from four individual Alpine glacial events (Penck, Brückner 1901) are characteristic also for this area (Winkler von Hermaden 1955). The geological subsoil in the Mur valley consists of early Tertiary sediments overlain by a series of stepped Quaternary gravel terraces (Suette 1986) (*Table* 2, *Fig. 2*).[1]

The system of three gravel terraces can be observed throughout the valley (*Fig. 3*). First from the eastern edges is an active flood plain of the Laßnitz river, extending to a maximum of 1 km in width to the Upper Pleistocene terrace (Würm). At its northern edge, just south of the Wildoner Buchkogel, part of the Middle Pleistocene (Riss) terrace occurs. The Middle Pleistocene (Riss) terrace extends about 5200 m to the east, where it reaches the edge of an active floodplain of the Mur River (about 3 km wide). Within the study area, the Middle Pleistocene (Riss) terrace emerges in a relatively narrow strip (1.5 km wide) again in the eastern part of the Mur floodplain, where it reaches the margins of Mindel terraces, and in the southern part also the Middle Pleistocene Terrace (Riss). A characteristic distinguishing feature between the Würm terraces, and the older ones (Riss, Mindel), is the clay layer over the gravel on the latter. On the Lower Terrace (Würm) and the present double (Mur/ Laßnitz) floodplain the clay layer is missing, which is an important fact affecting soil formation (Suette 1986). The vertical distance between the Upper Pleistocene (Würm) and the Middle Pleistocene (Riss) terraces in the study area is 5–10 m, and the vertical distance between the Middle Pleistocene Riss and Mindel terraces is especially large, reaching 23 m. The two sub-corridors of the Würm terrace (A, B) differ in water regime and soil cover. The sub-corridor A lacks perennial water and permanent water streams, its soil cover with a thickness between 0.2 and 2.5 m consists primarily of loamy sands with high field capacities and high permeability under saturated conditions (Eisenhut et al. 1992). The sub corridor B is covered with proluvial deposits, with permanent water streams coming from the East Styrian hills. In general, it has a fine sediment cover up to approx. 1 m thick, from which brown earth could often form (Untersweg 1984; 1985).

[1] Digital geological maps in a scale 1: 50.000, additionally the explanatory table necessary for the interpretation were used for the data source (https://gis.stmk.gv.at/).

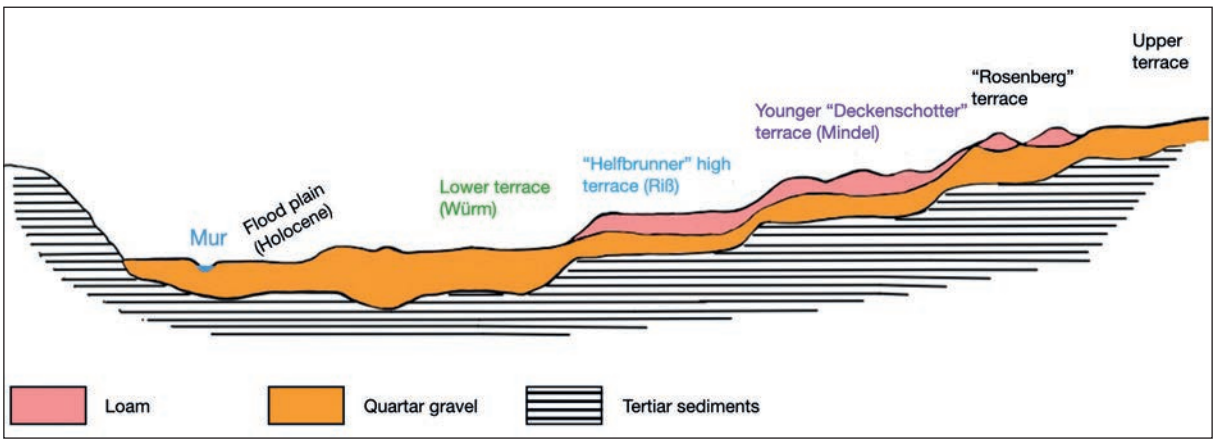

Fig. 3: A schematic section through the terraces of the Leibnitzer Feld. The Quaternary deposits comprise a series of terraces that rise in steps (modified and redrawn by E. Lozić after the Lower Mur valley terrace sequence by Fabiani (1978 Abb. 4)).

Fig. 2: Leibnitzer Feld study area, terraces from the Quaternary era.

2.5 SOIL CHARACTERISTICS

The quality of the soil is of key importance for the possibilities of agricultural production. Agriculture played an important role in the organization of economy and society in the Early Medieval period. As all sedentary farmers they were interested in occupying the best land for crop production. For this reason, we have focused on the observation of the soil characteristics of a selected region to observe the preference of the location of the settlement site. Since there is no direct evidence of the Early Medieval fields in the study area, we are drawing on the closest analogy from the Bled microregion, where it has been shown that fields were probably located within 7 min radius from the settlements (see below).

Soil data were obtained from the digital soil map[2] based on the Austrian System of Soil Classification (Fink 1969). The data are vector-based thematic representations starting at a scale of 1: 30,000. The eBOD web GIS application[3] represents the web version of the digital soil map and allows all the location properties of agriculturally usable and mapped soils.

For the purpose of this analysis, we mapped and plotted the most common soil types in the study area. According to the data three main types of soil occur within the study area (*Fig. 4*). First type are Alluvial soils (fluvisols; in the cited source marked as soil unit: *Auboden: ID 31001*), which are relatively young and undeveloped soils that were formed in frequently flooded areas by repeated deposition of sediments on alluvial deposits along the river and stream channels. These areas are usually part of the active floodplain and are vegetated by riparian forest or wetland habitat containing a combination of trees, shrubs, and/or other perennial plants (Suette 1986, 8). If the areas of parent material are loamy and silty-loam deposits that form on Early and Middle Pleistocene glaciofluvial conglomerates, they may be used as cropland or meadow.

The second type are Pseudogley soils (planosols; soil unit: *Pseudogley: ID 31013*). Their parent materials are the Pleistocene and Pliocene deposits. Due to their low infiltration capacity, they are only suitable for arable farming if they are deeply tilled and raised in the middle of the field to allow meteoric water runoff. In archaeology this type of soils are often referred to as heavy soils and the tilling as ridge and furrow. Where the water level is high (near the rivers Mur, Sulm, Laßnitz), the pseudogleyic soils are abundant. The main agricultural use is grass cultivation as meadows, forest, or arable land.

The third type are eutric brown soils (cambisols; soil unit: *Lockersediment – Braunerde: ID 20016*). In the study area, they form on sandy gravels of glacial-fluvial carbonate that cover the bottoms of the river valley and on Quaternary gravel terraces. They are used for intensive croplands because they are the most fertile soils in the area, which are well drained, sufficiently deep, and have favourable physical and chemical properties. The downsides are high stone content and low water retention capacity. We can conclude that within the study area these are most suitable soils for agricultural production.

2.6 SITE CATCHMENT ANALYSIS

The Early Medieval period is known for its self-sufficient economic model, based on agriculture and animal husbandry. Choosing a location for a settlement must have therefore been governed by physical settings important for agriculture. This means that determining (natural) factors, such as arable and grazing land, and perennial source of water, had a great effect on the settlement pattern in the landscape. Some resources, such as water, are so basic and so vital that the distance to obtain them must be minimized. In other words, those where important attributes for the selection of the location of the settlement.

The locations of known settlements are therefore a good starting point for detecting ("reading") the natural parameters that were decisive in choosing the location of the settlement. To this end, based on analogy from Bled, the time-distance parameter of 7 minutes was used for site catchment calculation sites within the Leibnitz region (Lozić 2024a in this volume with references). After establishing the site catchment area for each site (*Fig. 5*), these areas were further analysed for soil characteristics and all other available environmental variables.

2.7 DEM ANALYSIS AND TERRAIN MORPHOLOGY (Ger. Landschaftskategorien)

The morphology of the study area has been analysed using the Topographic Position Index (TPI) based Landform Classification (SAGA GIS v8). The analysis has been conducted on DEM with a resolution of 10 m, which was obtained by aggregation from the original LiDAR data. The same method has been used in the Bled microregion case study, where it is described in more detail (Lozić 2024b in this volume).

From a geomorphological point of view, the study area is characterized by the presence of two macro-topographical units (*Fig. 6*, *Table* 3): the hilly landscape (an appendix of the south-western hills that extend up to the uplands between the rivers Laßnitz and Sulm called Sausal) and the plateau landscape (naturally connected to the plain south of Graz district through the Mur river).

The Early Medieval sites tend to concentrate in the *Plain* class (altitude band 260–320m a.s.l). This is the

[2] http://bfw.ac.at.

[3] Digitale Bodenkarte, https://www.data.gv.at/anwendungen/digitale-bodenkarte-ebod/.

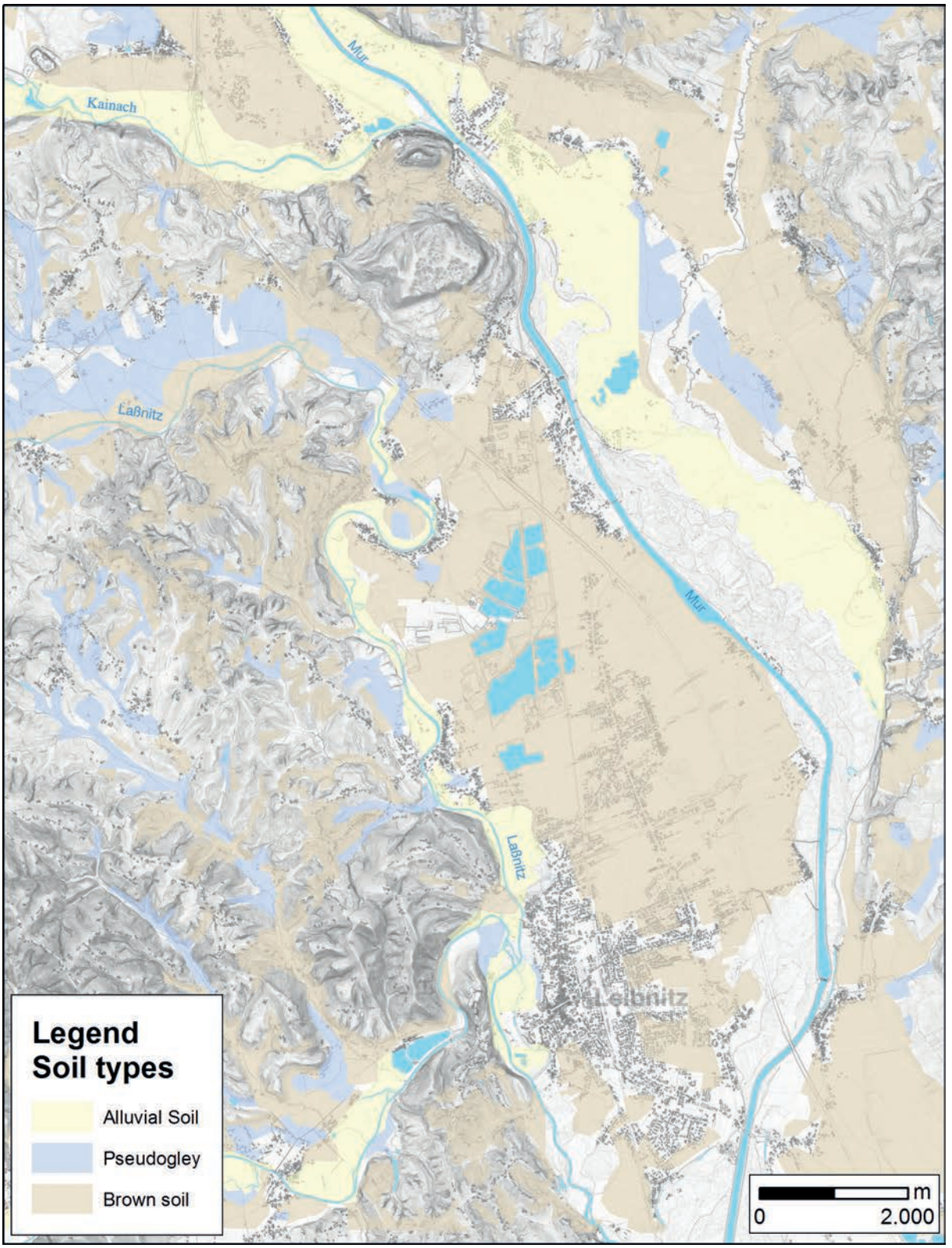

Fig. 4: Leibnitzer Feld study area, soil types relevant for archaeological analysis of the study area (source: http://bfw.ac.at).

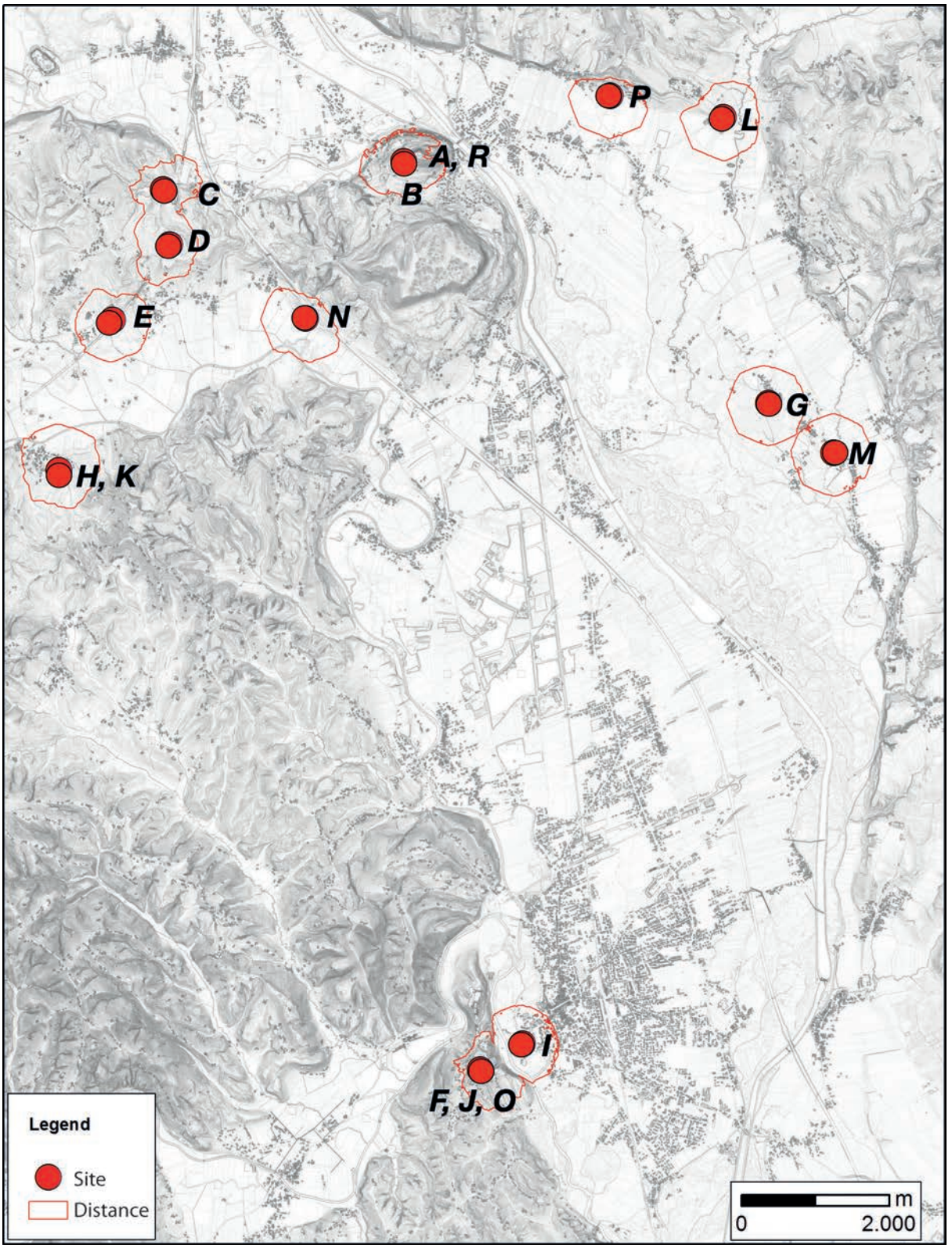

Fig. 5: Leibnitzer Feld study area, site catchment of Early Medieval locations defined as 7 min walking distance. Locations with several sites at the same location (Wildon, Frauenberg, Grötsch) are considered as a single site point (see *Table 1*).

Site	Landform analysis	m a.s.l.
Wildoner Schlossberg (A, R)	High Ridges to Local Ridges	380–420
Im Rasental (B)	High Ridges to Local Ridges	380–420
Weitendorf (C)	Open Slopes	330–370
Komberg (D)	Open Slopes	330–370
Schönberg (E)	Plains	260–320
Frauenberg (F, J, O)	High Ridges to Local Ridges	380–420
Rohr bei Haslach (G)	Plains	260–320
Grötsch (H, K)	Open Slopes to Plains	330–370
Altenmarkt, Leibnitz (I)	Plains	260–320
Hart (L)	Plains	260–320
Haslach (M)	Plains	260–320
Schönberg an der Laßnitz (N)	Plains	260–320
Afram (P)	Plains	260–320

Table 3: Landform classes, height above sea level and prevailing soil conditions for each site.

case with Schönberg (*Fig. 1:* E), Schönberg/Freybühel (*Fig. 1:* N), Altenmarkt bei Leibnitz (*Fig. 1:* I), Rohr bei Haslach (*Fig. 1:* G), Haslach (*Fig. 1:* M), Afram (*Fig. 1:* P). Several sites are found within the *Open slopes* class (altitude band 330–370 m a.s.l): Weitendorf (*Fig. 1:* C), Komberg (*Fig. 1:* D) and Grötsch (*Fig. 1:* H, K). Only two sites can be found in the class *High Ridges* (altitude band 380–420 m a.s.l): the well-known Wildoner Schlossberg (*Fig. 1:* A) and Frauenberg (*Fig. 1:* J).

The most striking result is, that the largest plain in the area between the area of the Laßnitz and Mur rivers is void of sites, which suggest it was not intensively used by Early Medieval communities (*Fig. 7*). The problem we want to tackle here is whether this difference in preference was possibly dictated by the more favourable soil types (see below).

2.8 HYDROLOGICAL PROPERTIES OF THE SOILS

As detailed above, the soils in the area differ due to the underlying lithology, which affects the hydrologic properties of the soils. More specific soil parameters can be obtained by measuring some of the parameters. One of the most important factors for agriculture are hydrological properties of the soils. The plants growing in soil with a high capacity to store the water are less likely to be exposed to water stress during summer droughts or similar events, since such soils have a larger reservoir and can supply water over time when plants need it.

Data on the hydrological properties of soil in the study area has been obtained from the eBOD application.[4] The parameters available to measure hydrologic properties are *soil permeability* and *soil water content* (Basile, Coppola 2019).

Soil permeability measures the ability of the soil to allow water to pass through it. The coefficient of permeability (k) is measured as the volume of water (m^3) that can flow through an area (m^2) per second (m/s) (Carter, Bentley 2016). The soils in the study area fell predominantly into the category of high, medium and low water permeability. For the purpose of this analysis, we have mapped all three classes of permeability that occur within the study area (*Fig. 8*).[5]

Soil water content or soil water holding capacity also known as soil's effective field capacity (hereafter FC) is the amount of water the soil can hold after gravity has drained the soil and until the permanent wilting point, when the soil is so dry that plants die. Sandy soils, for example, which cannot store much water for crops between rains, have low available FC and can be described as dry. Soils with a high FC can be either waterlogged, wet, moderately moist, or well supplied. Data on FC were also obtained from the eBOD application (*Fig.* 9).[6] The soil content categories (high, medium, and low) were also used as weighting parameters for soil moisture (see below).

[4] Digitale Bodenkarte, https://www.data.gv.at/anwendungen/digitale-bodenkarte-ebod/.

[5] The data are available on digital soil map of Austria (categories: 6 categories were joining three: low (Ger. Sehr gerig, gering, gering bis mäßig), medium (Ger. mäßig bis hoch), high (Ger. hoch, sehr hoch).

[6] The data are available on the digital soil map of Austria (categories were joint in to three polygons: moist (Ger. feucht, feucht bis nass, nass)), well supplied (Ger. gut versorgt, gut versorgt bis mäßig feucht, mäßig feucht), dry (Ger. trocken, trocken bis mäßig trocken, mäßig trocken).

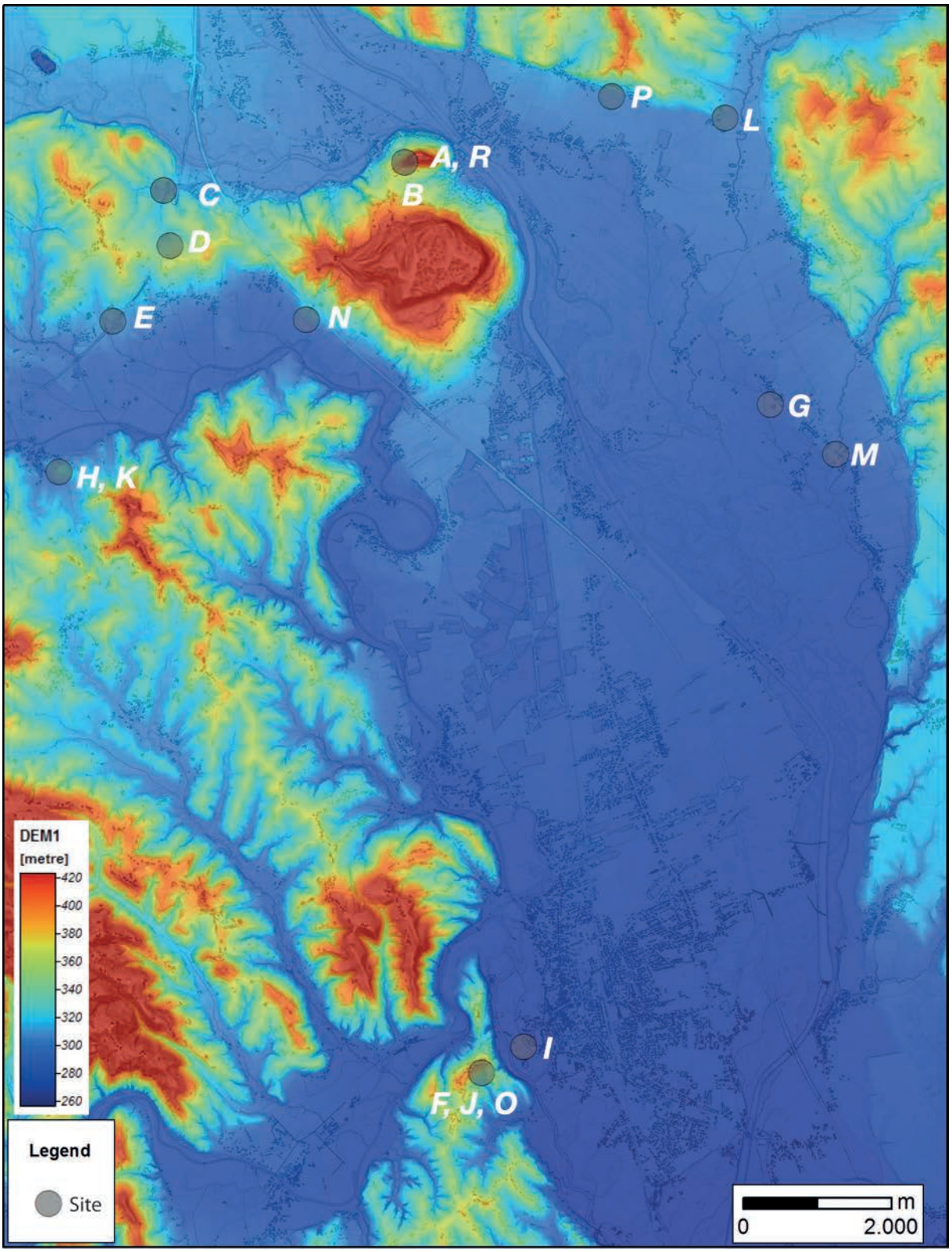

Fig. 6: Leibnitzer Feld study area, two macro-topographical units: plateau landscape (blue) and hilly landscape (other colours). The map depicts height above valley floor, calculated as height above river Mur and its tributaries, as a proxy for macro-topographical units.

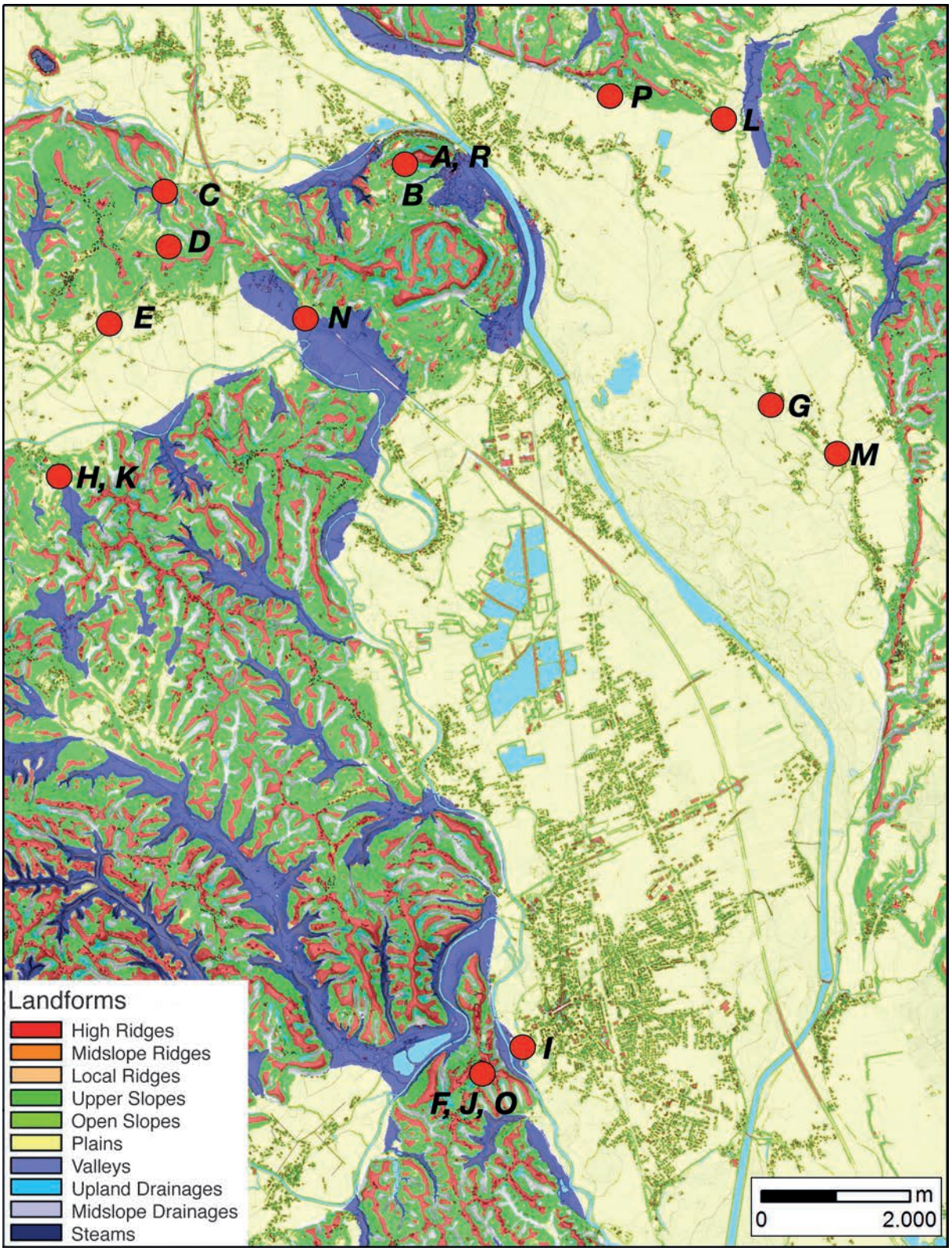

Fig. 7: Leibnitzer Feld study area, topographic position index (TPI) based landform classification (calculated with SAGA GIS v8 from 10 m DEM).

Special conditions that lead to seasonal alternation from wet to dry can be found in some small areas, resulting in a change of the soil's capacity. In this case alternation in soil moisture condition levels can be observed in winter and spring, as well as after longer periods of rain. The result is that the backwater floor or level is high, and consequently such areas are particularly damp. However, in summer and autumn it can completely dry out. The usability of arable land in such areas is limited as it is usually too wet in spring and extensive drainage measures are necessary. Soils in such areas are pseudogley and are only suitable for grasslands or forests.

2.9 TOPOGRAPHIC WETNESS INDEX

As mentioned above, secondary topographic attributes affect soil characteristics, and wetness index is such an attribute. For the present study, a distinction between dry and waterlogged areas was calculated using, as a proxy, the topographic wetness index (hereafter TWI) derived from the digital elevation model. TWI calculates the areas where water potentially accumulates and which are seasonally or permanently wet (Różycka et al. 2017). Regions within a catchment with similar TWI values are assumed to have a similar hydrological response to rainfall if other environmental conditions (such as land cover, soil) are or can be treated as the same (Qin et al. 2011). Whereas most algorithms don't consider the enhancement or impedance of local drainage, the SAGA wetness index which we used does. It is based on a modified catchment area calculation, which does not consider the flow as a very thin film. As a result of this, it predicts for cells situated in valley floors with a small vertical distance to a channel a more realistic, higher potential soil moisture (Böhner et al. 2002).

In this case study only one segment of SAGA wetness index was used: modified catchment area. This parameter reflects the amount of incoming surface water, i.e., it tells how much water flows into each raster cell during the rain (Lozić 2024b in this volume, Fig. 6). The result is represented as a hydrological attribute, that is, as a map of the modified catchment area that is represented as a highly saturated area (value from 24,000 to 16,000 pixels) or an unsaturated area (value from 2,000 to 14,000 pixels) (*Fig. 10*).

The resulting map has clearly exposed a large lowland unsaturated area between the Laßnitz and Mur rivers, i.e., geological colluvial deposits and Würm gravel terraces. By receiving little incoming surface water this area could expose plants to drought stress or water stress, which can cause substantial decline in crop yield through negative impacts on plant growth (Grewal et al. 1984). Regardless, nowadays this area is under intensive arable farming due the high quality brown soil and the favourable lowland terrain.

This was not the case in Early Medieval period, when the avoidance of this area is clearly visible. The proportion of saturated area (values between 24,000–16,000) within the catchment area of sites is very revealing. The sites such as Wildon (*Fig. 1:* A, R), Im Rasental (*Fig. 1:* B), Weitendorf (*Fig. 1:* C), and Komberg (*Fig. 1:* D), Altenmarkt (*Fig. 1:* I), Frauenberg (*Fig. 1:* F), Schönberg (*Fig. 1:* E) seem to be located in less saturated areas (*Table* 4).

3. RESULTS

Due to the complex methodology with many different types of analyses, the results of each method have been presented above for clarity. Here we only comment on the results as a whole.

Data presented above indicates that the preferred soils for agriculture in the study region are brown soils. The analysis of the presented variables within the catchment areas of investigated sites provides clues to the farmland potential (*Fig. 11*) and, indirectly, to the function of the site. It appears that there are three types of sites (*Table* 5). The first type are sites, where brown soil with high FC represents between 67% and 85% of the catchment area (Rohr bei Haslach, Grötsch, Hart, Haslach, Schönberg an der Laßnitz, Afram). The second type has only small patches, about 20% of the catchment area, covered with high FC soil (Wildoner Schlossberg and Frauenberg). The third type are the sites with less than 2% of the catchment area covered with brown soil (Weitendorf, Komberg, Schönberg, Altenmarkt). The latter are mainly covered with soils that are not suitable for cultivation of crops, predominantly pseudogley.

4. DISCUSSION

The sites of Rohr bei Haslach (*Fig. 11:* G), Grötsch (*Fig. 11:* K), Hart (*Fig. 11:* L), Schönberg an der Laßnitz (*Fig. 11:* N), and Afram (*Fig. 11:* P) are located on areas with high FC brown soil (*Fig. 11*), and they seem to belong to an agricultural settlement type. Among those, it should be noted, that the sites Rohr bei Haslach and Grötsch are cemeteries, but their location in the landscape and the abundance of arable land strongly suggest the existence of associated nearby settlements. Similarly, the sites Hart, Afram and Schönberg an der Laßnitz are only known through stray finds, but the above analysis suggest a high potential, that they are indicators of a nearby settlements (*Table* 6).

However, several sites do not have a favourable agricultural hinterland. The first group are the sites that are positioned on hilltops, i.e., landform analysis classes high ridges or local ridges. As a result, they exhibit shortage of soils suitable for arable agriculture within

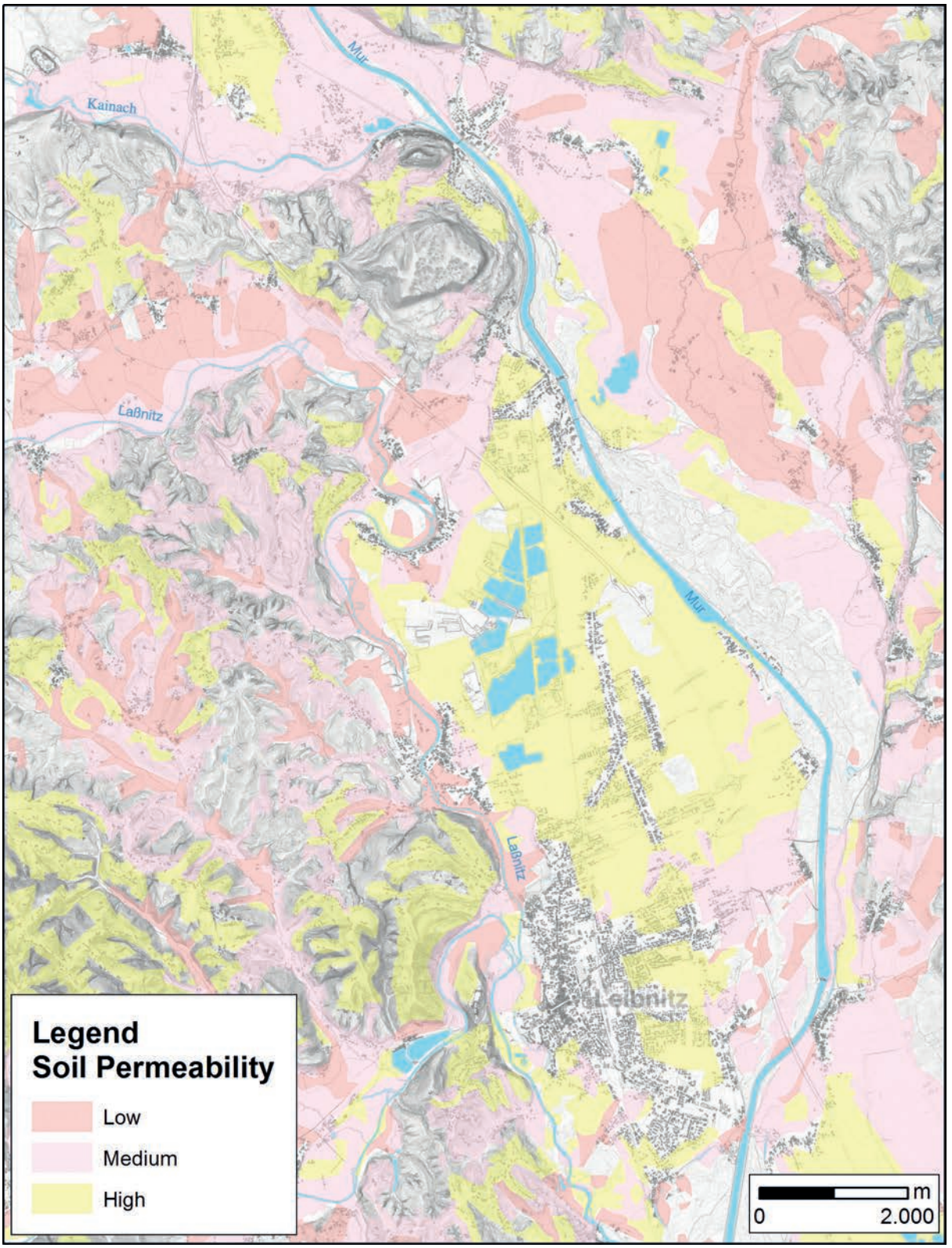

Fig. 8: Leibnitzer Feld study area, soil permeability (the ability of the soil to allow water to pass through it) classified as high, medium and low water permeability (calculated with SAGA GIS v8 from 10 m DEM).

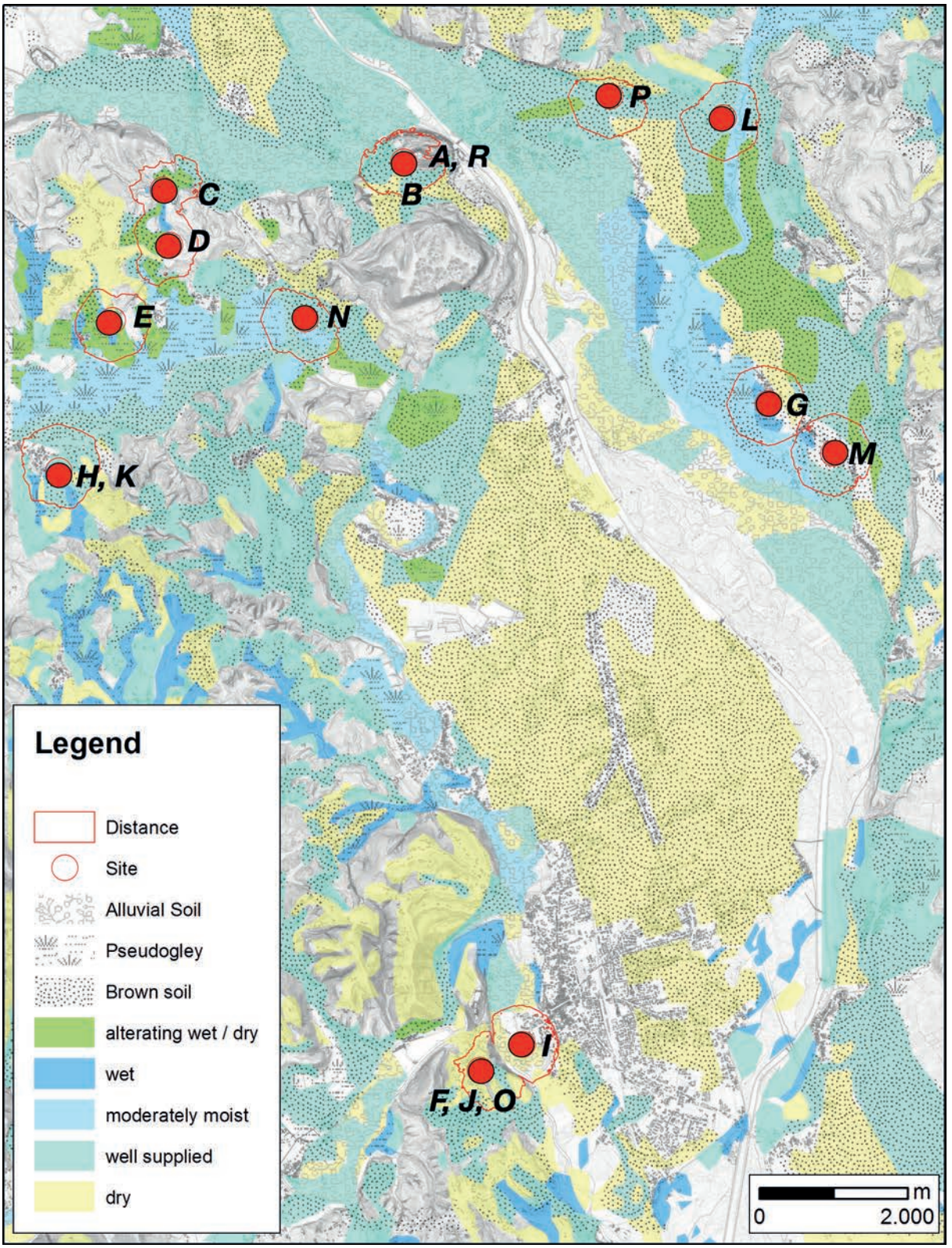

Fig. 9: Leibnitzer Feld study area, soil water content also known as field capacity (FC) classified as alterating wet / dry, wet, moderately moist, well supplied, and dry. Also represented are soil types and site catchment areas (calculated from source data obtained from the eBOD application and from LiDAR-derived 10 m DEM).

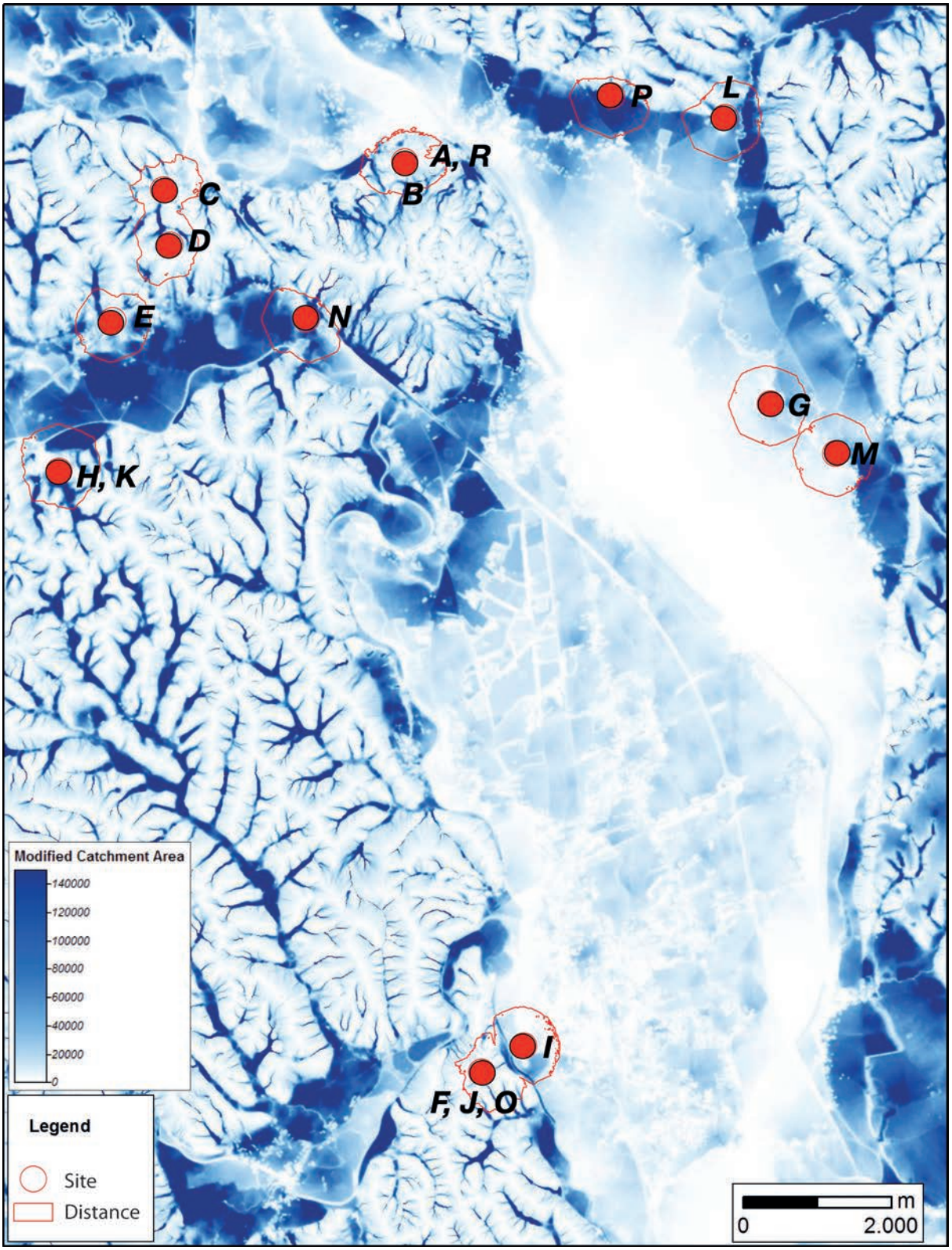

Fig. 10: Leibnitzer Feld study area, modified catchment area as calculated by the topographic wetness index (TWI).

Site	Area (km^2)	Area (ha)	% of saturated within SCA
Wildoner Schlossberg (A, R) / Im Rasental (B)	0.7	72	4%
Weitendorf (C)	0.5	51	1.9%
Komberg (D)	0.6	62	8%
Schönberg (E)	0.7	74	42%
Frauenberg (F, J, O)	0.5	56	1.6%
Rohr bei Haslach (G)	0.8	87	37%
Grötsch (H, K)	0.9	92	43%
Altenmarkt, Leibnitz (I)	0.6	65	7.6%
Hart (L)	0.8	82	73%
Haslach (M)	0.8	89	51%
Schönberg an der Laßnitz (N)	0.7	74	47%
Afram (P)	0.6	64	78%

Table 4: Percentage of saturated area within the site catchment area for Early Medieval sites.

Site	Area km^2	ha	Brown (wet) km^2	Brown (dry) km^2	Brown (wet/dry) km^2	Alluvial (dry)	Pseudogley (wet/dry)	Quality soil with in SCA
Wildoner Schlossberg (A, R) / Im Rasental (B)	0.7	72	0.15 (21%)			0.1 (14%)		21 %
Weitendorf (C)	0.5	51	0.01 (1.4%)		0.06 (12%)		0.3 (60%)	1.4%
Komberg (D)	0.6	62			0.2 (33%)		0.3 (48%)	0%
Schönberg (E)	0.7	74			0.4 (54%)		0.2 (27%)	0%
Frauenberg (F, J, O)	0.5	56	0.1 (20%)	0.02 (4%)				20%
Rohr bei Haslach (G)	0.8	87	0.6 (69%)	0.18 (20.6%)	0.013			69%
Grötsch (H, K)	0.9	92	0.7 (76%)	0.03 (3.2%)				76%
Altenmarkt, Leibnitz (I)	0.6	65		0.02 (3 %)		0.3 (46%)		0%
Hart (L)	0.8	82	0.7 (85%)		0.1 (12%)			85%
Haslach (M)	0.8	89	0.6 (67%)		0.1 (11%)			67%
Schönberg an der Laßnitz (N)	0.7	74	0.5 (67%)				0.2 (27%)	67%
Afram (P)	0.6	64	0.5 (78%)	0.1 (16%)				78%

Table 5: Percentage of soil types within the catchment boundaries.

the site catchment. This is the case for the settlements at the Willdoner Schlossberg (*Fig. 11:* A), the nearby settlement Im Rasental (*Fig. 11:* B) at the southern foot of Wildoner Schlossberg, and the Frauenberg hilltop settlement (*Fig. 11:* F). Therefore, we can suppose that these settlements were not predominantly engaged in agriculture production. Activities such as trade, religious ceremonies, legal proceedings and burying the dead were often undertaken on such sites due to their controllability and arguably, liminal nature. In the Bled microregion this type of settlements was recognised on the Castle hill in Bled (Lozić 2024b in this volume,

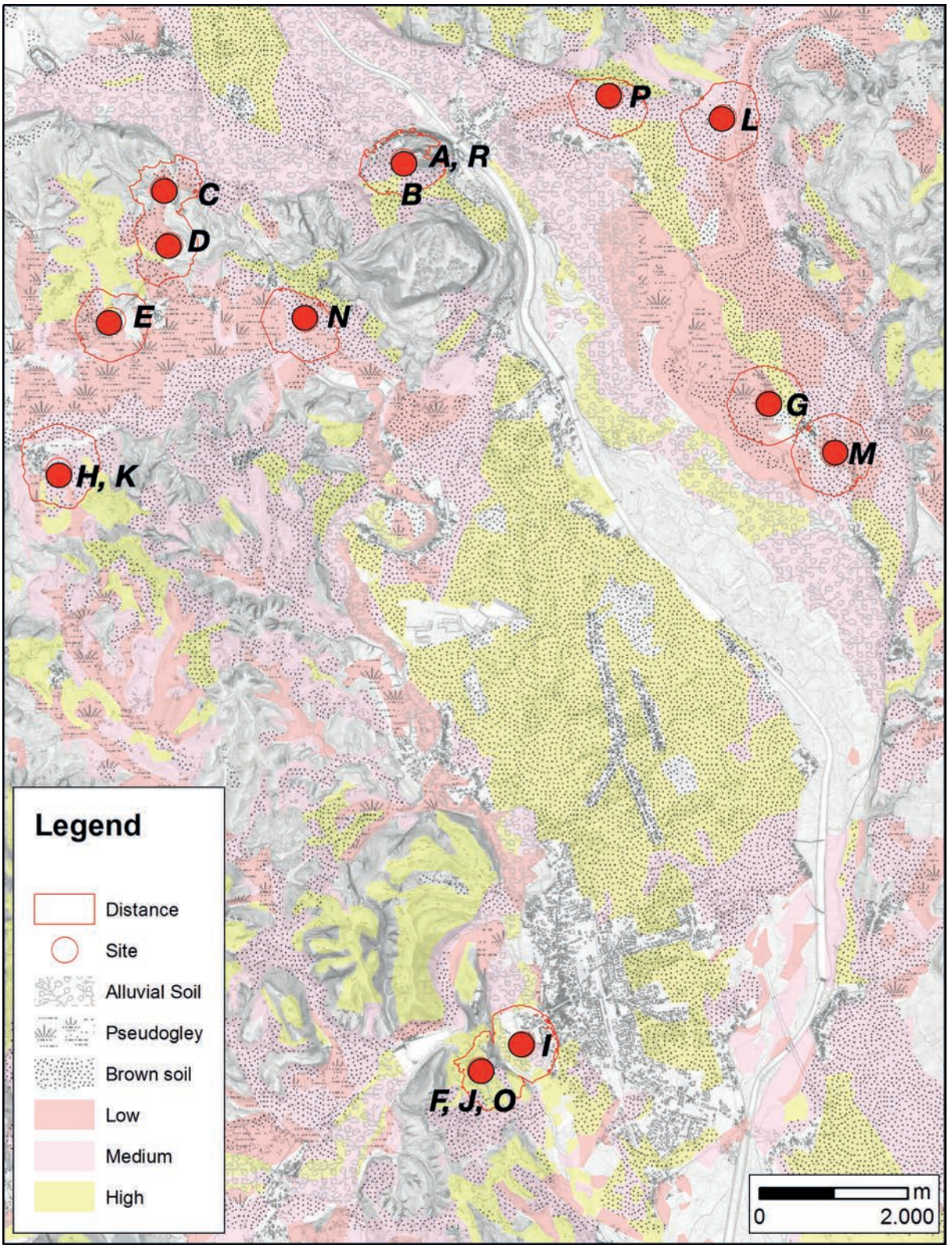

Fig. 11: Leibnitzer Feld study area, soil potential classified as low, medium and high (calculated from source data obtained from the eBOD application).

	Non-Agrarian	Mining settlement	Agrarian Settlement
Wildon Schlossberg (A)	•		
Im Rasental (B)	•		
Frauenberg (F)	•		
Altenmarkt (I)			•
Schönberg (E)		•	
Weitendorf (C)		•	
Komberg (D)		•	
Rohr bei Haslach (G)			•
Grötsch (K)			•
Hart (L)			•
Afram (P)			•
Schönberg an der Laßnitz (N)			•

Table 6: Types of Early Medieval settlements, interpretation according to hydrological properties of the soil in the study area.

Fig. 3: Grad 2). These settlements can be defined as **non-agricultural** settlement type. Possibly, they can be considered as central places that provided administrative and commercial functions.

The second group of sites without favourable agricultural hinterland include Weitendorf (*Fig. 11:* C), Komberg (*Fig. 11:* D) and probably Schönberg (*Fig. 11:* E). Characteristic of this group of sites is the fact that there is no arable land with high quality soils in their catchment area. This is partly due to the location of the Weitendorf and Komberg sites in small depressions separated by hills, and partly due to the fact that almost the entire catchment area is on soils whose water levels can fluctuate greatly during the season, so that agricultural use is severely restricted (*Fig. 8*). This strongly suggests that these sites must have been fully engaged in non-agricultural activities.

The latter fits very well with the fact that the archaeological finds from the Weitendorf site, including limonite concretions (see *Appendix*), indicate the existence of a settlement with a workshop area for iron ore processing (Fuchs 2008; Gutjahr 2011b; 2018c; Hellmuth Kramberger et al. 2019). In addition, adjacent to the site mining activities in the form of a pit field, so called Pingenfeld, have been documented with the analysis of LiDAR data (*Fig. 12*). It is therefore our interpretation, that Weitendorf is probably a mining settlement, where iron ore mined in the vicinity has been processed.

A similar location preference and soil characteristic at the Komberg site possibly suggests the same settlement type. The same is also possible for the Schönberg site – where an Early Medieval pit and pottery sherds were found on the location of a Roman settlement – which is almost entirely surrounded by unfavourable soils (*Fig. 8*). However, direct archaeological evidence for mining activities at these two sites is currently lacking.

The interpretation of a "mining microregion" is further supported by two specifics. First, the ratio between non-agrarian and agrarian settlements is disproportionately skewed in favour of non-agrarian compared to the micro-regions of Bled (Lozić 2024b in this volume) and the Drava Plain (Dravsko polje; Magdič 2024 in this volume). Second, the study area is a metalliferous region of Styria, which means that iron ore was accessible through an open pit mining.

Contemporary "mining" settlements are scattered throughout Eastern Alps: Pržanj near Ljubljana (Pavlovič 2023), Gorice-Turnišče (Plestenjak 2010, 2007), Rosenburg site in Lower Austria (Wawruschka 2009); in Styria Kirchberg-Deutschfeistritz (Gutjahr 2006) with the only probable Early Medieval blacksmith's forge known so far, and in Tyrol Virgen (Tischer, 2018). Furthermore, the recently discovered burnt layer with iron working debris in the Roman quarry Spitzelofen in Carinthia was dated to the Early Middle Ages with the C14 method (Karl 2021).

Based on the above evidence, it can be assumed that iron production and iron smelting had an important role in Early Medieval Eastern Alps. Iron ore was mined on a small scale, i.e. at a local level. Only in exceptional cases, did it play such an important role in the local economy that a notable proportion of the settlements (and thus the population) were primarily engaged in non-agrarian activities, and this may well apply to the Leibnitzer Feld. The discussion as to whether this was organised by an authority and, if so, whether it involved ecclesiastical, aristocratic or even royal landowners, goes beyond this text. It is likely that the activities related to iron extraction were organised on a seasonal basis, with preparations such as ore extraction, drying and roasting the ore, chopping wood and digging pits taking place in winter, spring and early summer, while the actual production was concentrated in the autumn, as attested for the Medieval Hedmark region in Norway (Rundberget 2015).

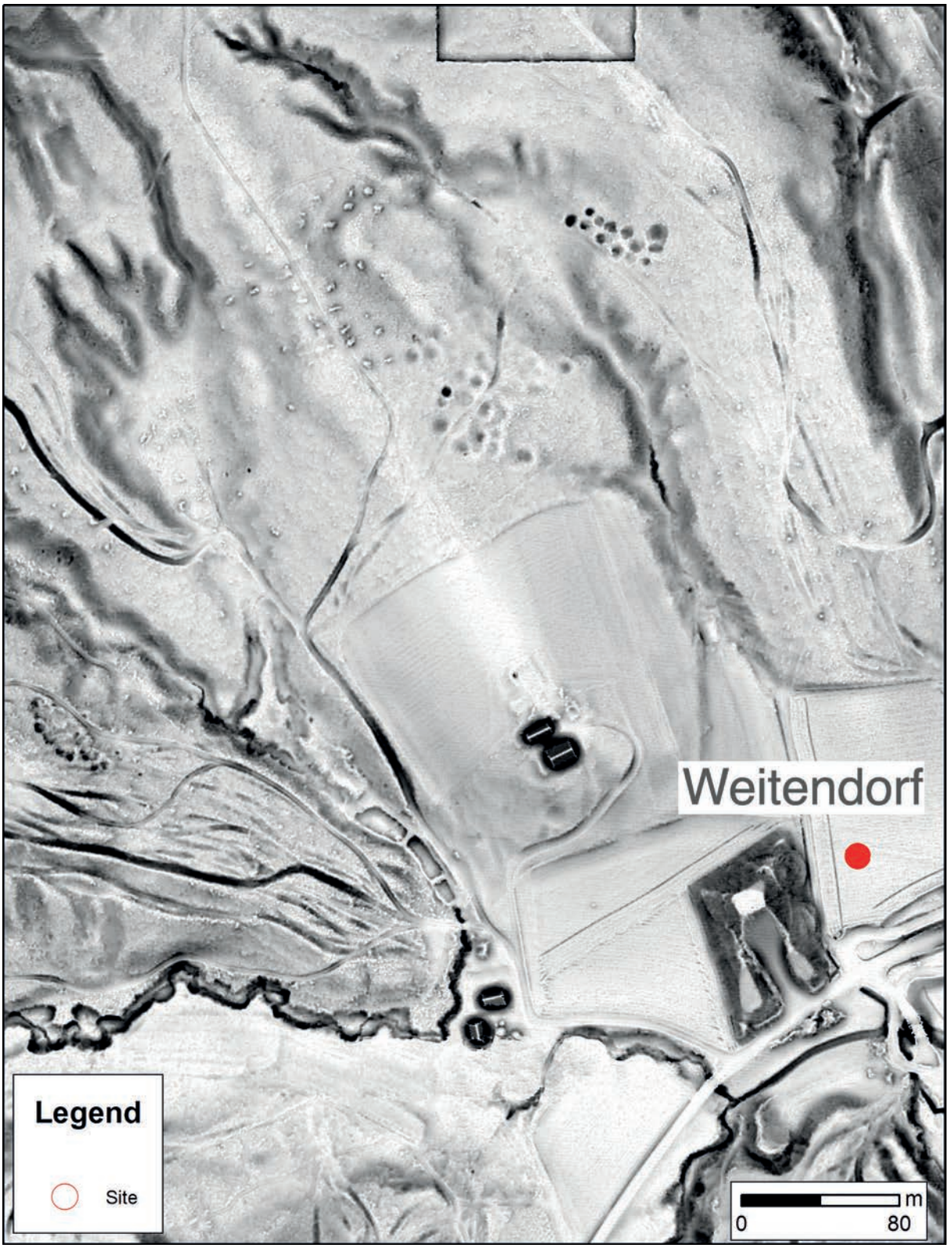

Fig. 12: Area north of the site Weitendorf, SVF visualisation of LiDAR-derived 0.5 m DEM (see text for details on data processing). A mining-pit-field or Pingenfeld is clearly detectable in the upper third of the figure (dark circular features).

At the end, the case of the Altenmarkt cemetery must be discussed. This is the only site in this case study whose entire catchment area lies on brown soil with low FC (*Fig. 9:* I). The associated settlement has not yet been archaeologically recognized. Most of the Early Medieval finds from the Altenmarkt cemetery can be dated to the last third of ninth and to the tenth century. More importantly, though, the relatively small size of the Early Medieval part of the cemetery and proportionally high quantity of prestigious grave goods, including a gold-plated disc brooch, suggest that this cemetery was used to bury people with above average social status. In the context of the Early Medieval period, such people are expected to have resided in a separate, primarily non-agrarian settlement. Indeed, such interpretation is in line with the possible connection of this site to the *curtis* (Ger. Hof) *ad Sulpam* that was donated in 860 A.D by Louis the German to the archbishopric of Salzburg (Koch 2024 in this volume, 225–228).

If this interpretation is accepted, it has additional importance for our analysis. If a *curtis* has been established, it signifies a different type of agricultural settlement that introduced different type of agriculture, as was the case in the Bled microregion study (Štular, Lozić 2024 in this volume). There the emergence of new settlements in the 11th century on brown soil with low FC was accompanied by a changing historical context, specifically the donation of land to the bishops of Brixen. The new landlords had the capacity to introduce a new organization of agricultural labour leading to a shift in agricultural practices. Perhaps a similar process was afoot in the case of yet unknown settlement of the *curtis* type associated with the Altenmarkt cemetery. According to the presented analysis, 46% of arable land with low FC is available within the catchment area of Altenmarkt (*Table 5*), which means that it would enable the existence of a wheat-based agricultural subsistence system.

5. CONCLUSIONS

To understand the settlement development of the Leibnitz area and to investigate how the settlement patterns evolved over time, we have carried out various spatial analyses of the available data: Site catchment analysis, DEM analysis and terrain morphology, hydrological properties of soils and TWI. Based on the results, we were able to distinguish between the agrarian and non-agrarian settlements. Among the latter the "mining" settlements are the most important discovery. If we consider the Leibnitzer Feld as a whole, it can be hypothesised to be a "mining microregion", because the proportion of the presumed "mining" settlements is relatively high. In the context of the currently known archaeological data, which only attests to solitary "mining" settlements scattered throughout the Eastern Alps, the Leibnitzer Feld stands out in this respect. However, further archaeological investigations need to be carried out to confirm the mining activities adjacent to the Schönberg and Komberg sites.

The second important result of this analysis is an indication of the evolution of the archaeological landscape during the Early Medieval period. Again, current data are scarce, but they point to a similar development as in the Bled microregion: a gradual transition from the exclusive cultivation of soils with high FC to the inclusion of soils with low FC, indicating a different type of agricultural system.

Overall, we believe that this study has demonstrated the usefulness of our approach, which combines available data on geology and soils with LiDAR data and an archaeological database.

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APPENDIX

Site	Zbiva ID	Early Medieval Feature, Findings	References
Wildoner Schlossberg (A)	10001857	Displaced finds on the top of the Schlossberg can be dated to the Early Middle Ages ("Horizont XX"). The pottery can be dated to the 8th -10th century.	Bauer 1998; Ebner 1974; Fuchs 1994; Gleirscher 2019; Gutjahr 2018a; 2018b; 2011a; Gutjahr, Roscher 2003; Kramer, Obersteiner 1985; Mader 1986; Roscher 2001; Tiefengraber 2018
(R)	10004056	Enamel disc brooch with eagle motif; cast headdress ring.	Bauer 1998; Ebner 1974; Fuchs 1994; Gleirscher 2019; Gutjahr 2018a; 2018b; 2011a; Gutjahr, Roscher 2003; Kramer, Obersteiner 1985; Mader 1986; Roscher 2001; Tiefengraber 2018
Frauenberg (F)	10001862	"*Carantanian wall*", observed during excavations inside the existing church, it is not possible to verify the dating.	Modrijan 1963; Staudinger 1961; Steinklauber 2013
(J)	10001851	1. An enamel disc fibula and the remains of three human skeletons. 2. In a pit two headdress rings (lunula-shaped temple ring and headdress ring made of non-ferrous metal wire) and a skull were recovered.	Bauer 1998; Ebner 1974; Fuchs 1994; Gleirscher 2019; Gutjahr 2018b; 2018a; 2011a; Gutjahr, Roscher 2003; Kramer, Obersteiner 1985; Mader 1986; Roscher 2001; Tiefengraber 2018
(O)	10003647	Lunula-shaped headdress ring	
Schönberg (E)	10003649	An Early Medieval pit and an Early Medieval pottery fragment.	Gutjahr 2018b; Oberhofer 2012
(N)	10003648	An Early Medieval pottery shard.	unpublished; on the history of the area: Arneitz 2012
Im Rasental (B)	10002886	Several Early Medieval pits, and a post holes, and the small stove. Numerous animal bones (mainly cattle and horses), an iron arrowhead and a large number of Early Medieval pottery fragments.	Bekić 2018; 2016; Gutjahr 2018b; 2018c; Gutjahr, Trausner 2009
Weitendorf (C)	10002796	A total of 34 settlement objects could be assigned to the Early Middle Ages. These were mainly pits, post holes, and two fireplaces. Iron ore concretions with traces of strong heat effects were also found in some pits. Fragments of pottery, a fragment of an iron tangle knife, three ceramic spindle whorls, a stone spindle whorl and a lead spindle whorl, as well as fragments of two small purple pearls with a squat spherical shape made of opaque glass.	Fuchs 2008; Gutjahr 2018c; 2011b
Komberg (D)	10002344	An Early Medieval settlement pit with charcoal, the backfill contained pottery fragments of a few pots and a disc-shaped spindle whorl fragment.	Gutjahr 2018b; Hebert 1996; Pleterski 2010
Rohr bei Haslach (G)	10002488	Two skeletons.	Hebert 2001
Grötsch (H)	10001838	54 documented graves. Pottery vessels, belt buckles, glass beads, finger rings, combs, fire irons and flint stones, headdress rings, spurs, fibulae, animal bones, knives.	Gutjahr 2020; 2018b; Kramer 1981a; Menghin 1985; Vida 2011
(K)	10004069	Disc brooch with an inscribed cross and circular eye decoration made of non-ferrous metal from grave 8 in the Early Medieval graveyard of Grötsch.	Gutjahr 2020; 2018b; Kramer 1981a; Menghin 1985; Vida 2011

Site	Zbiva ID	Early Medieval Feature, Findings	References
Altenmarkt (I)	10001830	Two enamel disc brooches, pottery vessels, headdress ring made of non-ferrous metal, two lunula-shaped headdress rings and a spur. A bangle made of braided non-ferrous metal wires probably belonged to a burial with "mixed inventory" (Ger. "gemischtes Inventar") dated to the 2nd half of the 10th century. A total of about 60–70 burials were found, but only a part of them can be dated to the Early Middle Ages.	Christian 1981–1982; Giesler 1997; Kramer 1988; 1983a; 1983b; 1981b; Modrijan 1963; Staudinger 1961
Hart (L)	10002605	Two Early Medieval ceramic fragments.	Gutjahr 2003
Haslach (M)	10002442	Two Early Medieval ceramic fragments.	Gutjahr 2000
Afram (P)	10001822	A lunula-shaped headdress ring.	Gutjahr 2010; Korošec 1979; Modrijan 1963; Šribar, Stare 1978; 1975; 1974; Steiermärkischer Landesausschuss 1885

Appendix 1: Early Medieval sites in the Leibnitzer microregion. (Source: Zbiva database.)
(Letters in brackets refer to *Fig. 1* and *Table 1*.)

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AGRICULTURAL DYNAMICS OF BLED MICROREGION (SLOVENIA)

Edisa LOZIĆ

Abstract

The study examines Early Medieval agricultural land use in the Bled microregion of Slovenia using LiDAR data combined with archaeological, geological, and soil data. The research employs LiDAR-derived digital elevation models to analyse landscape variables influencing land use. Four geomorphological zones were identified, demonstrating that Early Medieval settlements predominantly occupied areas with moderately steep slopes and soils with high capacity to retain water. The results indicate a preference for agricultural settlements with limited diversification. This approach highlights the utility of LiDAR in archaeological landscape analysis and underscores the potential of integrating open-access environmental data with traditional archaeological methods.

Keywords: airborne LiDAR, airborne laser scanning, GIS analysis, Early Medieval archaeology, geoarchaeology

1. INTRODUCTION[1]

This chapter presents an innovative approach to using LiDAR data as a means of discovering, documenting, and interpreting agricultural land use systems (Lozić 2024 in this volume). We searched for variables – significant environmental differences within the landscape – that have influenced land use. In doing so, we combined information from LiDAR-derived digital elevation models (hereafter DEM) with archaeological, geological, and soil data. Whereas this study shared the approach with the previous chapter (Lozić, Koch 2024 in this volume), the specific methods used were different.

The aim was to demonstrate the Early Medieval land use system in the Bled (Slovenia) microregion. The Bled microregion is uniquely suited for such research due to the simultaneous availability of high quality archaeological and historical records for the Early Medieval period as well as LiDAR data, which is a rare combination in the region (*Figs. 1, 2*).

[1] This chapter is an abridged version of the previously published article by Lozić (2021). We have reproduced sections describing materials, methods and results as these are essential to the integrity and flow of this volume.

2. MATERIALS, METHODS AND RESULTS

2.1. ARCHAEOLOGICAL CONTEXT OF THE BLED MICROREGION

The Bled microregion (80 km^2) is located in the northwest of Slovenia, in the subalpine area of Julian Alps. The microregion is bounded by the confluence of the rivers Sava Bohinjka and Sava Dolinka in the east, and by the high mountain plateaus of Pokljuka and Mežakla in the west and north (*Fig.* 3). The area is notable for its intensive fluvio-glacial geomorphology. The archaeological significance of this microregion lies in the fact that it encompasses the entire territory of

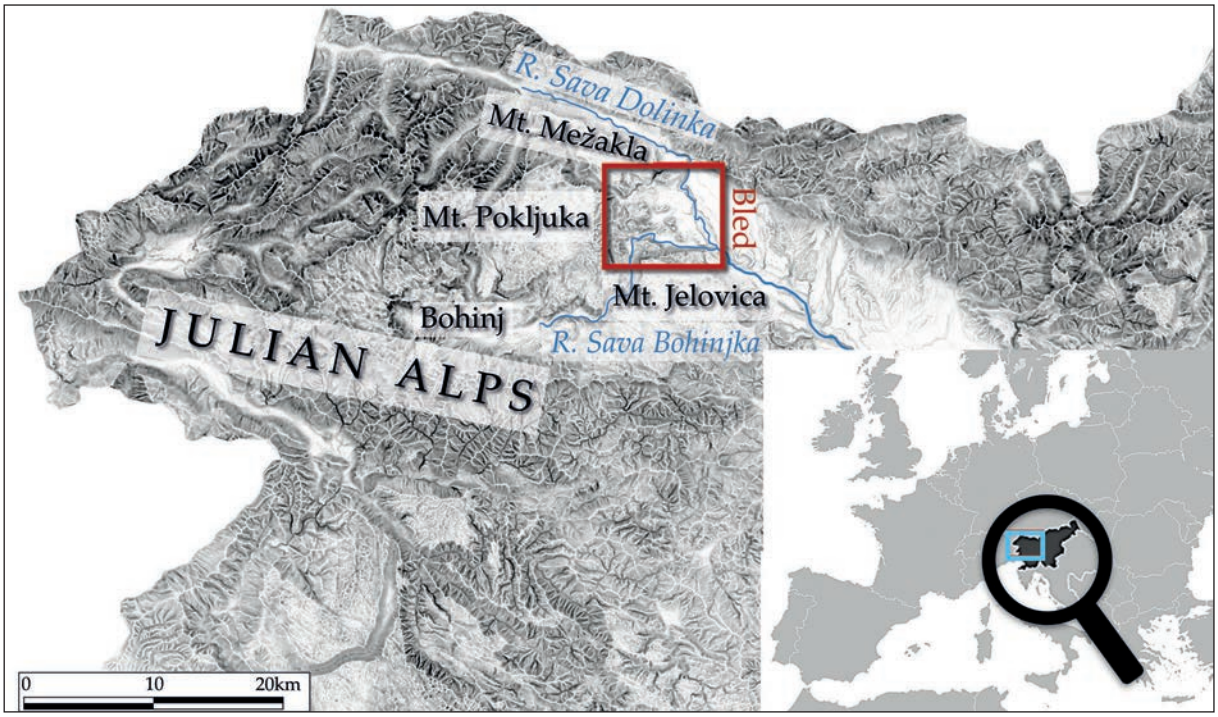

Fig. 1: Location of the study area with the most relevant topographic features mentioned in the text (decimal longitude and latitude coordinates of the map centre: 14.1949; 46.1168).

Fig. 2: Regional map of locations and sites mentioned in the comparative studies (decimal longitude and latitude coordinates of the map centre: 17.8173; 47.8235).

No.	Name	Type	Chronology	Zbiva ID
1	Pri Turku	Cemetery	750–970	10000779
2	Omruževa hiša	Settlement	790–1100	10002357
3	U hribeh	Hoard	820–820	10000981
4	Na Žalah	Cemetery	800–960	10000953
5	Pristavski grič	Communication	676–1100	10000950
6	Pristava at Bled	Communication	676–1100	10000770
7	Pristava at Bled	Cemetery	500–960	10003456
8	Pristava at Bled	Settlement	620–960	10003538
9	Grad (Bled Castle)	Settlement	780–1100	10002452
10	Sedlo on B. Castle	Cemetery	800–960	10000769
11	Sv. Martin in Bled	Cemetery	960–1100	10000801
12	Brdo	Cemetery	640–800	10000771
13	Bled Island	Cemetery	920–990	10000767
14	Bled Island	Church	1004–1100	10004042
15	Vadiše	Cemetery	700–870	10000774
16	Dlesc	Cemetery	820–960	10000911
17	Došca	Cemetery	769–901	10003275

Table 1: Early Medieval sites in the Bled microregion; numbering refers to *Fig. 3*. The year 1100 indicates an arbitrary end of the Early Medieval period, but the site in question continues to exist after this date (source: Pleterski 2016).

župa, which was the smallest administrative entity of the Early Medieval Slavs (Pleterski 2013a; 2013b). Bled has long been the focus of both archaeological and historical research and from the point of view of Early Medieval archaeology, it is the best researched microregion in Slovenia. Since the 1880s, and most intensively in the 1970s and 1980s, 17 noteworthy Early Medieval archaeological sites have been documented by archaeological excavations (Kastelic 1960; Kastelic, Škerlj 1950; Knific 2004a; 2004b; 1983; Pleterski 2008a, 2008b;2010; 2013a; Pleterski, Belak 1995) (*Table 1; Fig. 3*).

Only one settlement in the Bled area has been fully excavated (Pristava at Bled) and further two (Grad and Omruževa hiša) have been confirmed by excavations, but the chronology of several others could be inferred from their respective cemeteries. Remaining settlements were dated by a date before provided in written sources or inferred indirectly from the landscape analysis and retrograde analysis of the historical cadastre (*Table 2; Fig. 3*). However, no detailed and systematic archaeobotanical research has been carried out in the Bled microregion to date, and there are no published palynological results dealing with the Early Medieval vegetation in this area yet. Similarly, extensive underwater archaeological investigations of the Lake Bled yielded minor Early Medieval finds (Gaspari 2008; Gaspari et al. 2022), but as yet no significant findings of relevance to this study. Similar can be said for the most recent analysis of the cemetery on the Bled island (Štular 2022).

Three decades have passed since the last comprehensive analysis of the Bled microregion, in which A. Pleterski combined archaeology, written sources, and retrograde analysis of historical cadastres (Pleterski 1986; 2013a). He reconstructed the arable areas, which occurred in small patches scattered in the valley plains (*Appendix: Map 1*). His key conclusions were that most settlements were continuously inhabited from the Early Medieval period to the present time; the economic model was dominated by agriculture, with little developed crafts (Pleterski 2008b). Therefore, each settlement was located adjacent to soils suitable for agriculture. Moreover, most settlements had a cemetery nearby. The validity of the original study was subsequently confirmed with archaeological excavations on three separate locations in Žale near Zasip (Knific, Pleterski 1993), Zasip and Došca (Modrijan 2020). Pleterski was therefore able to infer where and when the settlement took place with a great level of confidence, but not why and how.

2.2. LiDAR DATA

The airborne LiDAR data used in this study was acquired in 2014. These data have a nominal density of 5 points/m² and an estimated horizontal and vertical root mean square error of 0.09 m and are distributed via the eVode webservice (Triglav Čekada, Bric 2015; Štular, Lozić 2020; for correlation between point cloud density and DEM quality see Štular et al. 2021b). The data were processed using an algorithm developed specifically for archaeology (Štular et al. 2021b). The relevant metadata and paradata have been presented elsewhere (Lozić, Štular 2021). The main product used in this study is 0.5 m DEM with archaeology-specific off-terrain features included.

ID	Name†	Established (approx.)	Dating source‡
A	Višelnica	830	Indirect
B	Zg. Gorje	830	Indirect
C	Poljšica	10th c.	Inferred
D	Sp. Gorje	750	Cemetery
E	Podhom	10th c.	Inferred
F	Zasip	800	Cemetery
G	Mužje	920	Cemetery
H	Grmišče/Rečica	960	Direct
I	Pristava at Bled	620	Excavation
J	Grad 1	640	Cemetery
K	Grad 2	800	Cemetery
L	Grad 3	before 1050/60	Written sources
M	Želeče	9th c.	Inferred
N	Zagorice	before 1070/90	Written sources
O	Mlino/Zazer	8th c.	Cemetery
P	Koritno	before 1065/75	Written sources
R	Zg. Bodešče	820	Cemetery
S	Sp. Bodešče	960	Cemetery
T	Sp. Bohinjska Bela	10th c.	Inferred

Table 2: Early Medieval settlements in the Bled microregion; ID refers to *Fig.* 3. Modern names of the villages are used that have been recorded in similar form in medieval written sources. Dating sources: cemetery – based on the adjacent cemetery (after Pleterski 2013a, Modrijan 2020); indirect – inferred indirectly, based on the landscape analysis (after Pleterski 2013a); written sources – terminus ante quem from written sources (after Pleterski 2013a).

As already mentioned, in archaeology, processed LiDAR data are mostly used for interpretative mapping of archaeological features, i.e. feature detection. In this case study, however, we have used the data for what is termed integrated multi-scale 'deep' interpretation, which aims to deepen the understanding of archaeological features in their landscape context (Lozić, Štular 2021). In this case, the digital terrain model is treated not just as a set of elevation values, but as an important habitat descriptor. The specific tools to achieve this are described below in more detail.

2.3. GEOLOGICAL DATA

The Bled area is divided in four geomorphological areas: the high alpine karst plateaus, the intramountain area, the till plain, and the marshy area. The high alpine karst plateaus of Pokljuka (852–1630 m), Mežakla (776–1593 m), and Jelovica (900–1411 m) were formed by glaciers in the Pleistocene (*Appendix: Map 2*). The area is composed of Middle Triassic dolomites and limestones. Sedimentary deposits on the Quaternary slope cover the intramountain area between Poljšica and Podhom, which slopes gently towards the alpine Radovna River valley and the glacial Lake Bled (lithostratigraphic unit al. – alluvium). The Bohinj and Radovna glaciers had a particularly strong influence on the geomorphology and postglacial fluvial processes, with strong glacial activity leading to the deposition of a till plain with up to several 10 m of Quaternary sediments, and with a small marsh basin in the northeast part of Lake Bled (lithostratigraphic unit, pr. – till; b – marsh deposits). The marshy area between Lake Bled and the stream Rečica was formed during the last glaciation.

A characteristic feature of the Bled landform is the frontal moraine on the northeast edge of the lake and the dome-shaped monadnocks rising above the general level of glacial deposits (Bavec, Verbič 2004; Serianz 2016; Serianz et al. 2020). Bled Castle is located on one such cliff-like dome-shaped monadnocks (Ogorelec 1978). The Pleistocene fluvioglacial sediments formed the terraces of Sava Dolinka and Sava Bohinjka Rivers (lithostratigraphic unit al. – alluvium and pr. –till). An important aftereffect of the underlying geological conditions in the study area is the lack of perennial water and permanent water streams (see *Fig. 1* and *Fig. 3 f*or the locations mentioned in the text).

Of particular relevance to our case study is the overall glacial nature of the area, which is clear evidence that the geomorphology has not changed significantly since the Pleistocene, let alone since the beginning of the Early Medieval period.

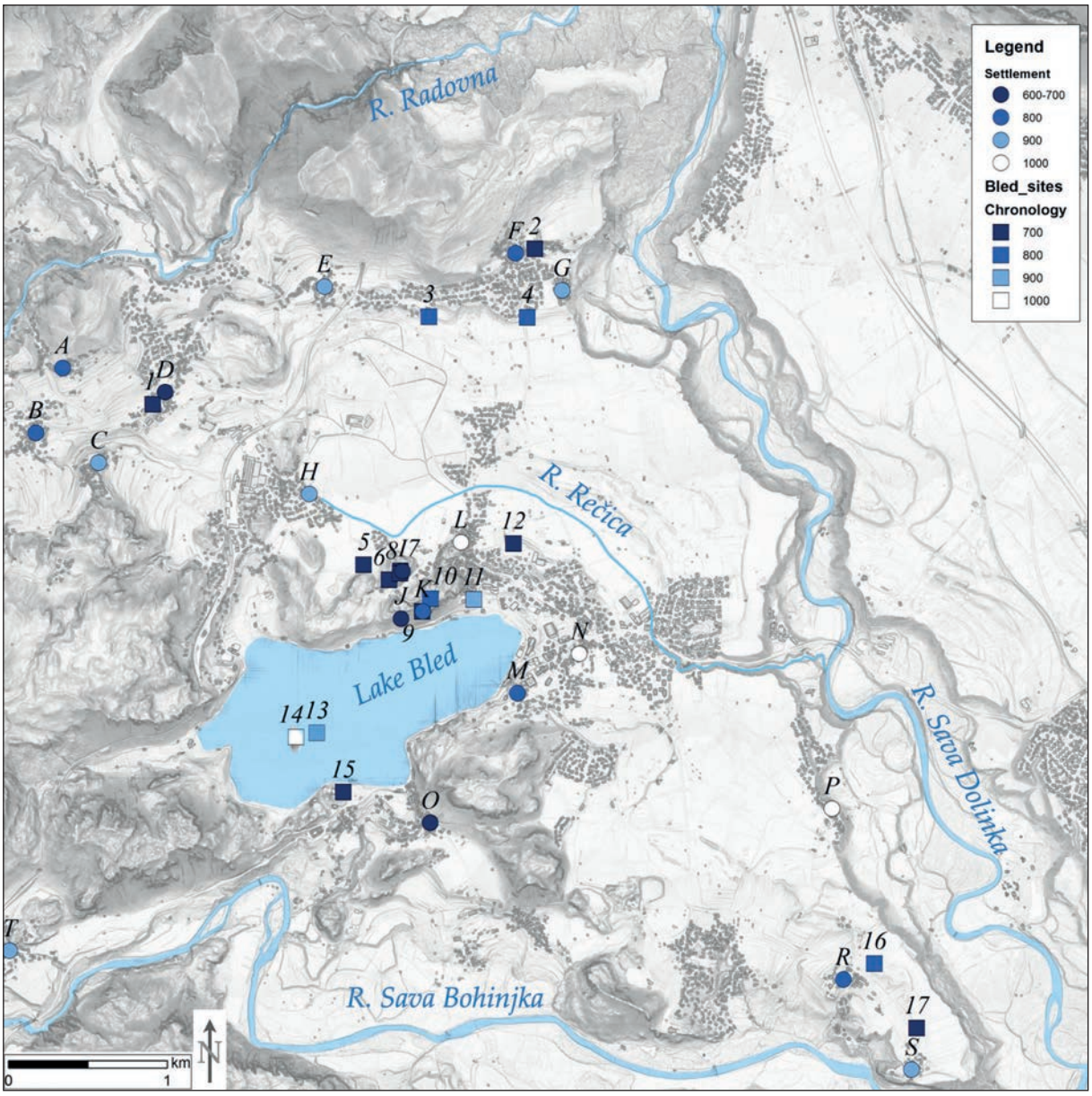

Fig. 3: Bled microregion (decimal longitude and latitude coordinates of the map centre: 14.1139; 46.3752), the Early Medieval sites (numbers refer to *Table 1*) and settlements (letters refer to *Table 2*) in the Bled microregion. The colours refer to the century of foundation (labelled as year AD in the legend).

2.4. SOIL CONDITIONS

The underlying lithology (bedrock) described above is one of the diagnostic criteria for the variety of soil types in the study area, which are briefly summarized here. Rendzinas formed on limestone, dolomite, moraines, and talus deposits. Dystric brown soils formed on carbonate and siliciclastic rocks. All are mostly suitable for forest and alpine pastures. Eutric brown soils formed on moraine and talus deposits and on fluvioglacial sandy gravel sediments. Small patches of rendzinas that formed on limestone mostly support forests and meadows. Brown soils on fluvioglacial sandy gravel sediments are among the most fertile soils in subalpine areas. They occur in the plains, are well drained, sufficiently deep, and have favourable physical and chemical properties for intensive cropland. However, the brown soils formed on moraine and talus deposits are of limited use as arable land for modern agriculture, as the soil skeleton consists of moraine loam and stones. A notable depression with hydromorphic soils (hypogley) formed on a Pleistocene clay and loam northeast of the Lake Bled; it is mostly suitable for grassland. The areas adjacent to the riverbeds of Sava Bohinjka and Sava Dolinka are dominated by

FC class	mm-mm	Description
1	< 30	Very low
2	30-80	Low
3	80–150	Medium
4	150-230	High
5	> 230	Very high

Table 3: Classes of soil's effective field capacity (FC) used in the Soil map of Slovenia.

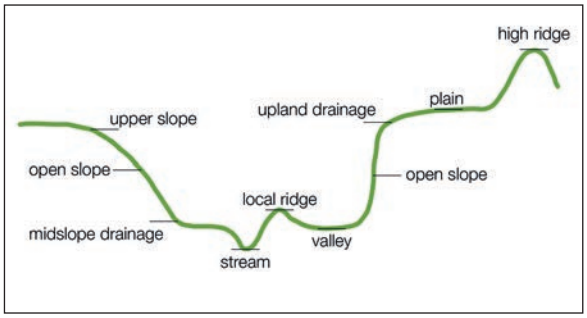

Fig. 4: A schematic depiction of the morphological classes detected by the SAGA GIS module Topographic position index based landform classification.

undeveloped soils on alluvial river deposits that have been frequently flooded in the past. Suitable land uses here are riparian forests and grassland (Vidic et al. 2015) (*Appendix: Map 3*).

2.5 EFFECTIVE FIELD CAPACITY OF SOIL

For agricultural use, arguably the most important soil property is its ability to retain water. This quality is defined as the soil's effective field capacity (hereafter FC). FC depends on soil texture, depth, and organic matter content, and is measured as the water content of a soil after gravity has drained as much water from the soil as possible (Bleam 2012). The higher the FC value of a soil, the more water it is able to retain and the less susceptible it is to drought.

For mapping purposes, soil types are defined as discrete pedocartographic units and FC is one of the criteria used. In the Soil map of Slovenia (Vidic et al. 2015), which holds the best available data for the Bled microregion, FC is part of the description of pedocartographic units and is presented in 5 classes (*Table 3; Appendix: Map 4*). From the perspective of archaeology, the problem with soil maps is that they are produced on a small or medium scale. This is also the case with the Soil map of Slovenia, which is designed for use at 1:25,000 scale, which is somewhat coarse for our purposes. To improve this, further analyses can be undertaken, such as the wetness index described below.

2.6. MODIFIED LANDFORM CLASSIFICATION METHOD

The landform or morphological classification of DEM, also termed geomorphology or morphometry, provides an objective and quantitative description of landform shapes, defined as specific geomorphic features, for example, plains, mountain ranges, hills, and valleys. The available methods have mostly been developed for geomorphological analysis of the terrain and are based on advanced spatial statistics (Pike 1988; Wood 1996; Tagil, Jenness 2008). We applied an automated landform classification method, topographic position index based landform classification (hereafter TPI), implemented as a module in SAGA GIS (Gallant, Wilson 2000; Böhner, Selige 2006). TPI provides a simple and powerful means of classifying the landscape into morphological classes. It is calculated as the difference between the elevation of a cell and the average elevation in large- and small-scale neighbourhoods. Positive values indicate that the cell is higher than its neighbours, while negative values indicate that the cell is lower (*Fig.* 4) (Guisan et al. 1999; Weiss 2001; Tagil, Jenness 2008).

TPI has proven to be one of the most important predictive variables for vegetation species distribution. For example, in a study of plant distribution in the Spring Mountains of Nevada (USA), TPI was second only to elevation as the most important predictive variable (Guisan et al. 1999). In other words, in a typical landscape, TPI classes are informative not only of landform classes but indirectly also of plant communities. This demonstrates the importance of TPI for all landscape-aware human decisions, including the choice of Early Medieval settlements in the Eastern Alpine region (hereafter EMS) location.

In our application to archaeology, the results of TPI have presented significant challenges to analysis (*Fig. 5*). The areas of moderately steep slopes and till plain were clearly defined, but the mountainous plateau and river terraces were not. Therefore, an additional visual geomorphological analysis was carried out. For this purpose, hypsometric tinting of DEM, transparently (60%) superimposed on a hillshade visualisation of the same DEM, was used to improve terrain classification and visualise relief differences more clearly. The most important criterion was the height above sea level. Applying this additional analytical step we were able to precisely describe the mountainous plateau and the Holocene river terraces (*Appendix: Map 5*).

Our modified landform classification is thus a combination of TPI and visual geomorphological analysis that incorporates height above sea level. It allowed us to define quantified catchment descriptors of landscape

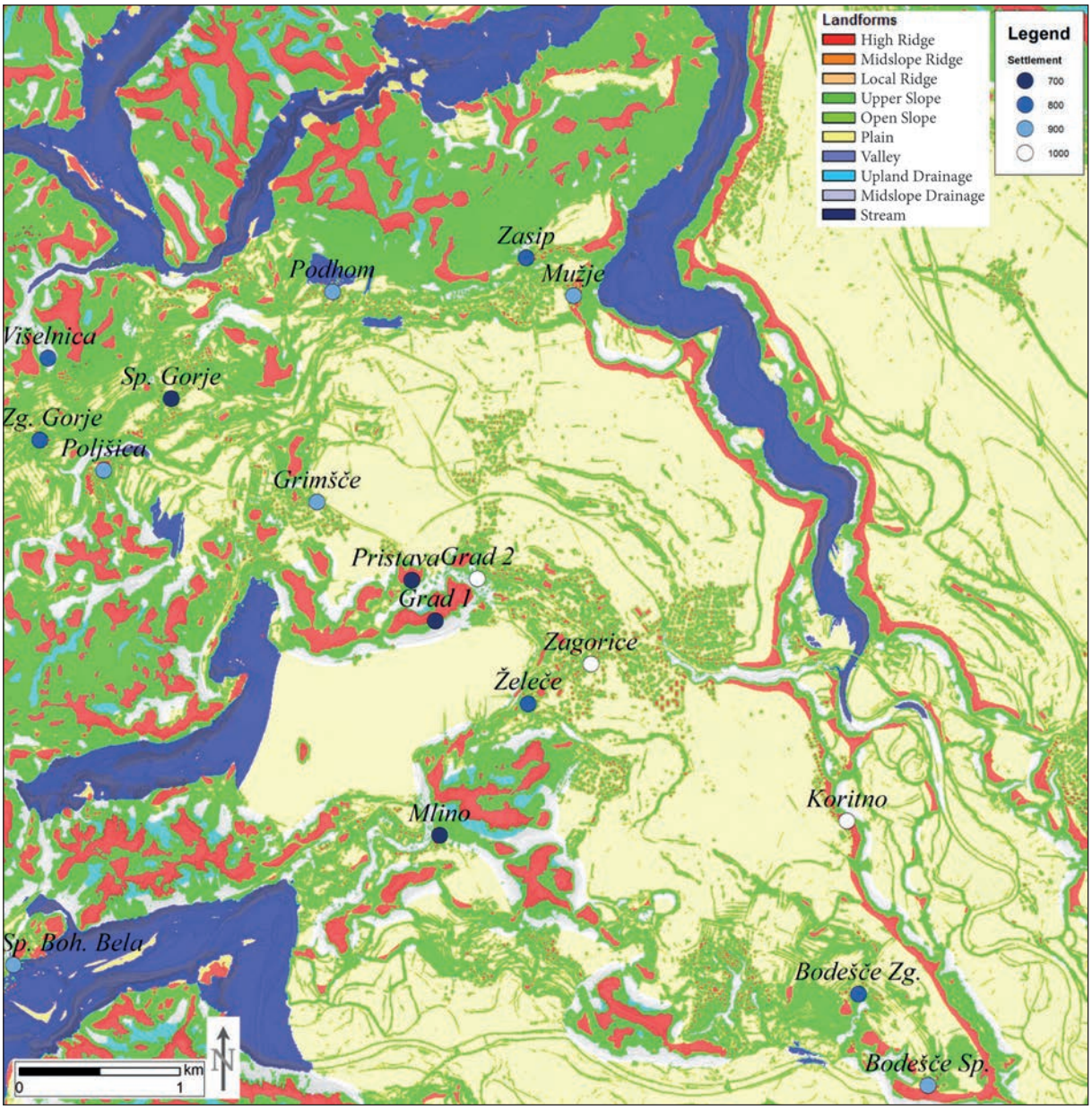

Fig. 5: Bled microregion (decimal longitude and latitude coordinates of the map centre: 14.1139; 46.3752), topographic position index based landform classification.

morphology, which we termed Zones. Defined in this way, Zones represent two of the most important predictive variables of plant species distribution: TPI and height above sea level (Guisan et al. 1999).

2.7. MODIFIED WETNESS INDEX METHOD

Topographic modelling of soil moisture conditions can help alleviate the scale limitations of standard soil maps. Such modelling based on DEM is possible as water tends to flow and accumulate in response to gradients in gravitational potential energy (Murphy et al. 2009). The algorithms, commonly referred to as topographic wetness index, describe how susceptible specific areas in a study region are to become saturated (Murphy et al. 2009; Olaya, Conrad 2009). They calculate for each cell of the grid the relationship between the specific upstream catchment area and the slope (Böhner et al. 2002; Mattivi et al. 2019). The first defines the potential of water intake (rainfall) and the latter the ability to discharge the water downslope (runoff; formula: TWI = ln [Catchment Area/Slope]). One can think of these as a rainfall-runoff model (*Fig. 6 a–c)*.

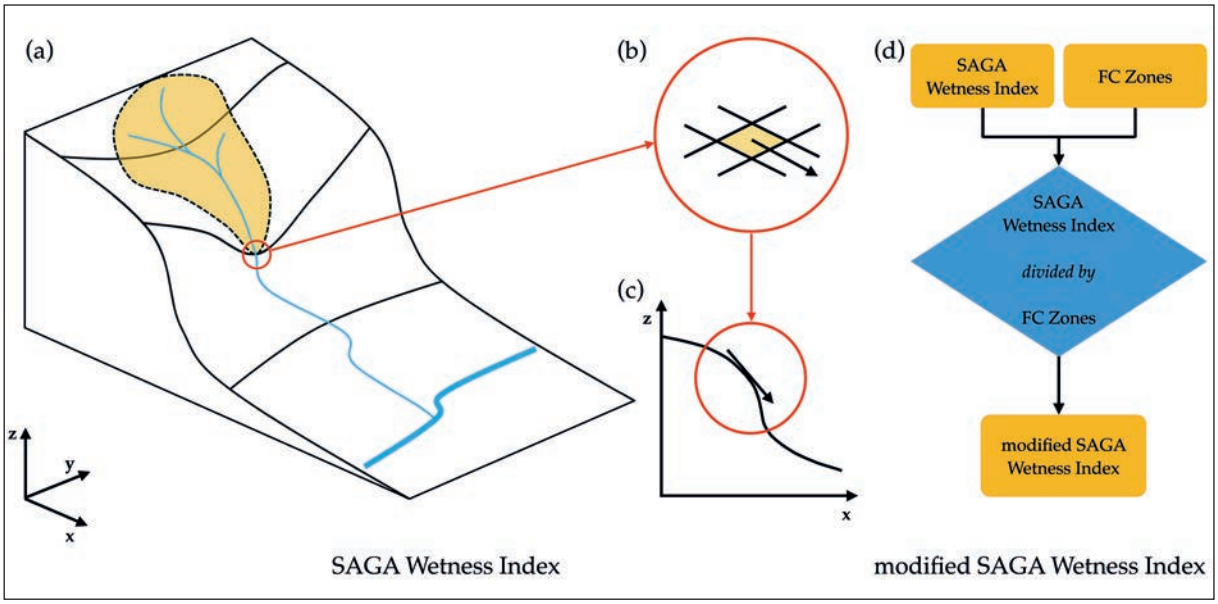

Fig. 6: Topographic wetness index: a – flow accumulation area; b – flow direction, and the corresponding flow width for a DEM cell; c – tangent of slope angle; d – custom algorithm for modified SAGA wetness index (a–c adopted from Mattivi et al. 2019, Fig. 1, published under CC-BY 4.0 licence).

Methods differ primarily in the way the upslope contributing area is calculated (Sørensen et al. 2005). We used the SAGA wetness index (hereafter SWI), because it does not think of the flow as a very thin film and hence it predicts more realistic (higher) potential soil moisture for valley floors (Böhner et al. 2002). The field tests demonstrated that SWI in combination with LiDAR derived DEM is the best existing predictor of soil wetness (Kienzle 2003; Murphy et al. 2009; Kemppinen et al. 2017).

Another advantage of the SWI is that it can be refined by setting the suction index (Bock et al. 2007). Unfortunately, the suction index function is poorly documented in the SAGA GIS software used and the best available description is in the source code (Conrad et al. 2015). In addition, the suction cannot be adjusted locally. Therefore, we developed custom modified SWI (hereafter mSWI) by using the FC value extracted from the Soil map of Slovenia (Vidic et al. 2015) as weighting index (*Fig. 6d*). mSWI was calculated with map algebra using SWI and FC classes as an input.

In this way, we obtained mSWI (*Appendix: Map 6*) which combines the accuracy of the FC with the precision of the fine relief resolution of the SWI and is a very realistic predictor of soil quality. This method is similar to the topographic wetness index used in the Leibnitzer Feld case study (Lozić, Koch 2024 in this volume), but the two methods differ in details.

2.8. GENERAL METHODOLOGICAL REMARKS

There are three general methodological remarks to be made. First, our method of combining soil data with TPI and mSWI analysis is based on the premise that soil conditions in the Early Medieval period were similar to those of the modern period. This is justified in this particular case study by the fact that hydrological and surface conditions were subject to similar geomorphological processes throughout the Holocene and that the relationship between land surface properties (e.g., soil, vegetation, and lithology) was not very different in the Early Medieval period. In this particular case study, the stability is the result of the underlying lithology described above. Consequently, this method is only suitable for areas where either soil conditions have not changed significantly between the archaeological period under investigation and the time of soil data collection, or relevant soil data have been obtained through palaeoenvironmental analysis. This is not always the case, for example, in urban areas soil properties changed significantly (*Fig. 1:* Zagorice, Želeče, Sp. Bohinjska Bela, Pristava). However, in our case study the urban areas are relatively small and did not have significant influence on the results.

Second, the selection of methods used in this case study is indicative, but by no means exhaustive. For example, slope and aspect can also be used as predictor variables for plant species distribution. In addition, climate (temperature, precipitation) and human impact are also very important for the distribution of plant species,

Zone	m a.s.l	TPI	Lithostratigraphic Units	Soil type	Land Use	EFC [1]	No. EMS
1	580–931	High Ridges, Midslope Ridges, Local Ridges	T2/1; T2/2-Middle Triassic dolomites and limestones	Rendzinas on limestone and dolomite, and on moraines and talus deposits; Dystric brown soils on pyroclastic rocks, and on mixed basic and non- carbonate rocks	forest, alpine pasture	3	0
2	511–570	Upper Slopes, Open Slopes	al-holocene alluvial deposit	Eutric brown soil on moraine and talus deposits	meadow, arable land	3	16
3	480–510	Plains	pr-holocene alluvial deposits	Eutric brown soil on glaciofluvial sand gravel deposits or alluvial fans	intensive arable land	2	3
				Hydromorphic Soils (Alluvial soils, Hypogley, Amphigley)	grassland	4	
4	450–470	Upland Drainages, Midslope Drainages, Streams	pr, al-holocene alluvial deposits	Undeveloped soil on alluvial deposits	riparian forests.	1	0

Table 4: A habitat descriptor for the defined zones within the Bled case study area.

as are many other factors. Alternative types of similar predictor variables include airborne LiDAR-derived feature detection used to identify landslides (Li et al. 2015), spectral parameters of airborne LiDAR data applied for detection of glacial landforms (Janowski et al. 2021), and object-based image analysis applied for volcanic and glacial landforms mapping (Feizizadeh et al. 2021). Furthermore, TPI and mSWI methods in no way intend to compete with verified and established methods of environmental archaeology, such as archaeopalynology, archaeobotany, or archaeozoology (e.g. (Dincauze 2000; Jones 2002; Evans 2003; Reitz et al. 2008; Reitz, Shackley 2012; Andrič et al. 2016). Rather, the aim is to introduce and test additional methods and, perhaps more importantly, to add LiDAR as a new data source for the archaeological analysis of past human land use. The suggested good practice would be to use TPI and mSWI in combination with other methods. However, in this case study, on the one hand, LiDAR and soil data are the only data currently available to the author, and on the other hand, TPI and mSWI were sufficient to provide new insights into the archaeological landscape in general and EMS in the context of agricultural land use in particular.

Third, the theory of central land cores has been applied implicitly to this study. That is, we know from previous studies that all relevant settlements in the Bled area are within a 7-minute walk of the field cores (Lozić 2024 in this volume with references).

3. RESULTS

Our modified landform classification is, as mentioned, the combination of TPI and visual geomorphological analysis, which resulted in the definition of four Zones. Below, each Zone is described (*Fig. 7; Table 4)*.

Zone 1 is defined as a mountainous plateau with steep and very steep slopes (TPI classes: High Ridges, Midslope Ridges, Local Ridges; 931–580 m a.s.l.). Middle Triassic dolomite and limestone bedrock prevail (*Table 4:* T2/1; T2/2) and two soil types occur. The first are rendzinas and the second dystric brown soils. The latter have a higher FC (FC index 3; mSWI index: 0, -5). Nowadays the area is forested and suitable for alpine pasture. There are no EMS in Zone 1.

Zone 2 consists of gently sloping terrain at the foothills. It occurs mostly in the western part of the study area, on the low hills surrounding the Lake Bled and above the river terraces (TPI classes: Upper Slopes, Open Slope; 580–510 m a.s.l.). The bedrock are mostly Holocene alluvial fan deposits. Prevailing eutric brown soils were formed on talus slopes mixed with moraine material and deposited directly on inactive alluvial fans (Novak et al. 2018). These soils have high FC (FC index 3; mSWI index: 0, -5). The area is mostly suitable for arable land and meadows. 16 out of 19 EMS are located within Zone 2.

Zone 3 represents a large till plain formed in postglacial fluvial processes that deposited up to several tens

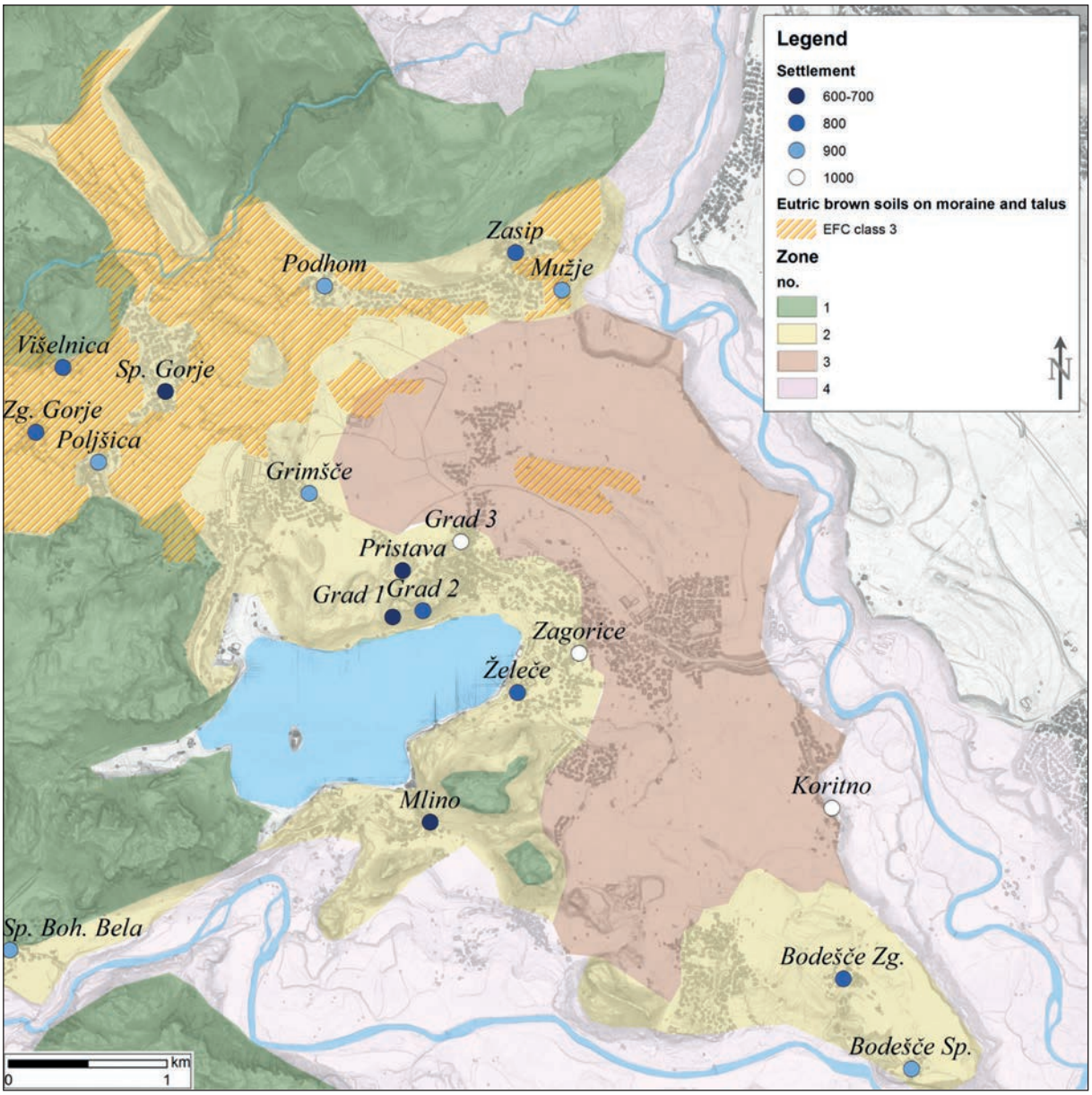

Fig. 7: Bled microregion (decimal longitude and latitude coordinates of the map centre: 14.1139; 46.3752), brown soils with high capacity to retain water (marked with dashed lines) and physiographic zones. The areas most suitable for Early Medieval agriculture are located at the intersection of the dashed lines and yellow Zone 2.

of metres of Quaternary sediments. It is limited by the riverbeds of Sava Dolinka and Sava Bohinjka (TPI class Plains; 510–480 m a.s.l). Over the glaciofluvial sand gravel deposits (*Table 4:* pr), fertile deposits of brown soils developed. However, due to the high porosity of Holocene sediments, the FC is low (FC index 2; mSWI: 0.7), which means that the entire area is exposed to drought. This is exacerbated by the absence of permanent surface water. Nevertheless, there are small patches of hydromorphic soils (Alluvial soils, Hypogley, Amphigley) with high FC (FC index 4; mSWI: 0,-5). Their formation was possible due the glacial activity and postglacial fluvial processes, which have resulted in deposition of clayed sediments north of the Lake Bled (Serianz et al. 2020). The brown soils in the Zone 3 are the most suitable soils for modern agriculture in the area (Vidic et al. 2015), providing that drought effect can be mitigated (for example, by irrigation or drought-resistant crops). Only three EMS, all established only in the eleventh century, are located in Zone 3.

Zone 4 is an area of multiple alluvial terraces covered by Quaternary sediment (till, fluvio-glacial sediment, and slope sediment) deposits rising above adjacent active floodplains (TPI class Upland Drainage,

Midslope Drainage, Streams; 480-450 m a.s.l). The area is characterized by undeveloped soils formed on alluvial deposits with very low FC (FC index 1; mSWI: 0, -11). It is overgrown with riparian vegetation. There are no EMS in Zone 4.

It can be concluded that the preferred landscape type for EMS was moderately steep slopes and brown soils with high FC, defined here as Zone 2 (*Fig. 7:* Zone 2). This is the case for most EMS in our case study (*Fig 3:* Višelnica, Zgornje in Spodnje Gorje, Poljšica, Grmišče, Zasip and Mužje). The location of two other EMSs (*Fig. 3:* Zg. Bodešče and Sp. Bodešče) fits the landform classification criteria, but not the soil conditions as depicted on the pedological map. We explain this by the fact that the existing soil map is not detailed enough to show the microlevel differences. Indeed, the area is full of glacial moraines and micro valleys, and under such conditions water-rich and marshy soils tend to develop. Their presence in this particular area is confirmed by the historical field names ("V blateh", "Curkovca", "Pretaka", "Nad potokam", which means "In the mud", "Stream", "Flow", "Above the stream" respectively; after Pleterski 2013a, 45–54).

The only other landscape context where three EMS exist is large till plain with fertile brown soils with low FC, defined here as Zone 3. However, all three (*Fig. 3:* Zagorice, Grad 3, Koritno) have only been established in the eleventh century.

The above presented focus of EMS on a landscape characterised by moderately steep slopes and brown soils with high FC is consistent with previous research on EMS in similar landscape conditions by Wawruschka (2009). Her mountainous or hilly areas fit well with the description of our Zone 2, although some of the data (e.g., m a.s.l.) cannot be directly compared.

The most important result of this analysis is the definition of the ecological niche that was preferred by the EMS and is based on the agricultural land use. The importance of this lies in the scalability, i.e., this result can be directly applied to regional studies of the Early Medieval settlement in Eastern Alpine region and possibly other regions with subalpine climate.

The results also enable new insights into the Early Medieval Bled microregion by characterizing the individual EMS. Exclusive preference for Zone 2 prior to the eleventh century strongly suggests two key points. First, these are primarily agricultural settlements. There are two exceptions (*Fig. 3:* Grad 2, Mlino) where the landscape morphology does not allow for the presence of significant arable land and non-agricultural function seems probable (Pleterski 2013a, 72–78 and 94–98). Second, the relatively narrow scope of agricultural land use, as can be inferred from the exclusive occupancy of Zone 2, suggests a not overly diversified agricultural land use system, possibly based on a single staple crop.

4. CONCLUSIONS

The chapter utilized an existing corpus of open access archaeological database Zbiva (Štular 2019; Štular, Belak 2022), open access remote sensing data and environmental data (geology and soils), as well as open source software tools (e.g., QGIS, SAGA) to reassess existing knowledge on the Early Medieval archaeological landscapes, specifically on agricultural land use. While the importance of free and open source software in science in general (e.g. Pearce 2012), and in the field of airborne LiDAR data for archaeology in particular (e.g. Štular et al. 2021a), is well recognised, we believe that the importance of the increasingly abundant and easily accessible free environmental and archaeological data (e.g. Richards, Niccolucci 2019), is too often overlooked. Hopefully, this chapter is a step towards recognizing the importance that these data sources can have for archaeology.

A novel objective method and, perhaps more importantly, LiDAR as a new data source for the archaeological analysis of agricultural land use systems were presented. The suggested good practice would be to use the method we proposed in combination with existing complementary methods, such as archaeobotanical analyses. However, in this case study, the analysis of LiDAR data was sufficient to provide new insights into the archaeological landscape in general and EMS in the context of agricultural land use in particular.

We used the LiDAR data for what is termed integrated multi-scale 'deep' interpretation, which aims to deepen the understanding of archaeological features in their landscape context. It should be reiterated that, in our opinion, such a use of these data in archaeology remains underexploited despite some promising early studies (e.g. De Boer et al. 2008; Štular 2011; Doneus, Kühteiber 2013). The Bled case study illustrates such potential contribution of LiDAR data to explore landscape gradients that have influenced human activities. We have clearly demonstrated a preference of Early Medieval agriculture for terrain on moderately steep slopes with brown soils that have a high capacity to retain water. Further archaeological implications of this will be discussed in Štular and Lozić (2024 in this volume).

One of the most important methodological contributions of this chapter is the discussion of scale issues. Since the scale of many soil maps is inadequate for archaeological analysis, a method to overcome this challenge is presented using various indices. The solution presented is scalable to other types of landscape and other archaeological periods, as well as to other types of soil data.

In the wider context of LiDAR methodology in archaeology, we have focused on the potential of LiDAR data to provide a source for very detailed landscape description and observe environmental components using GIS analysis, specifically modified landform classification and mSWI. This approach leads to a more detailed

and objective analysis of the environment and spatial context of any observed archaeological phenomena. Given the rise of open access data and open access tools there is huge potential for this and similar methods in geocomputational archaeology of the near future.

Data Availability Statement: Airborne LiDAR data used are publicly available at http://gis.arso.gov.si/evode/profile.aspx?id=atlas_voda_Lidar@Arso. Geology data are publicly available at https://ogk100.geo-zs.si. Soil data are publicly available at http://gis.arso.gov.si/atlasokolja/profile.aspx?id=Atlas_Okolja_AXL@Arso.

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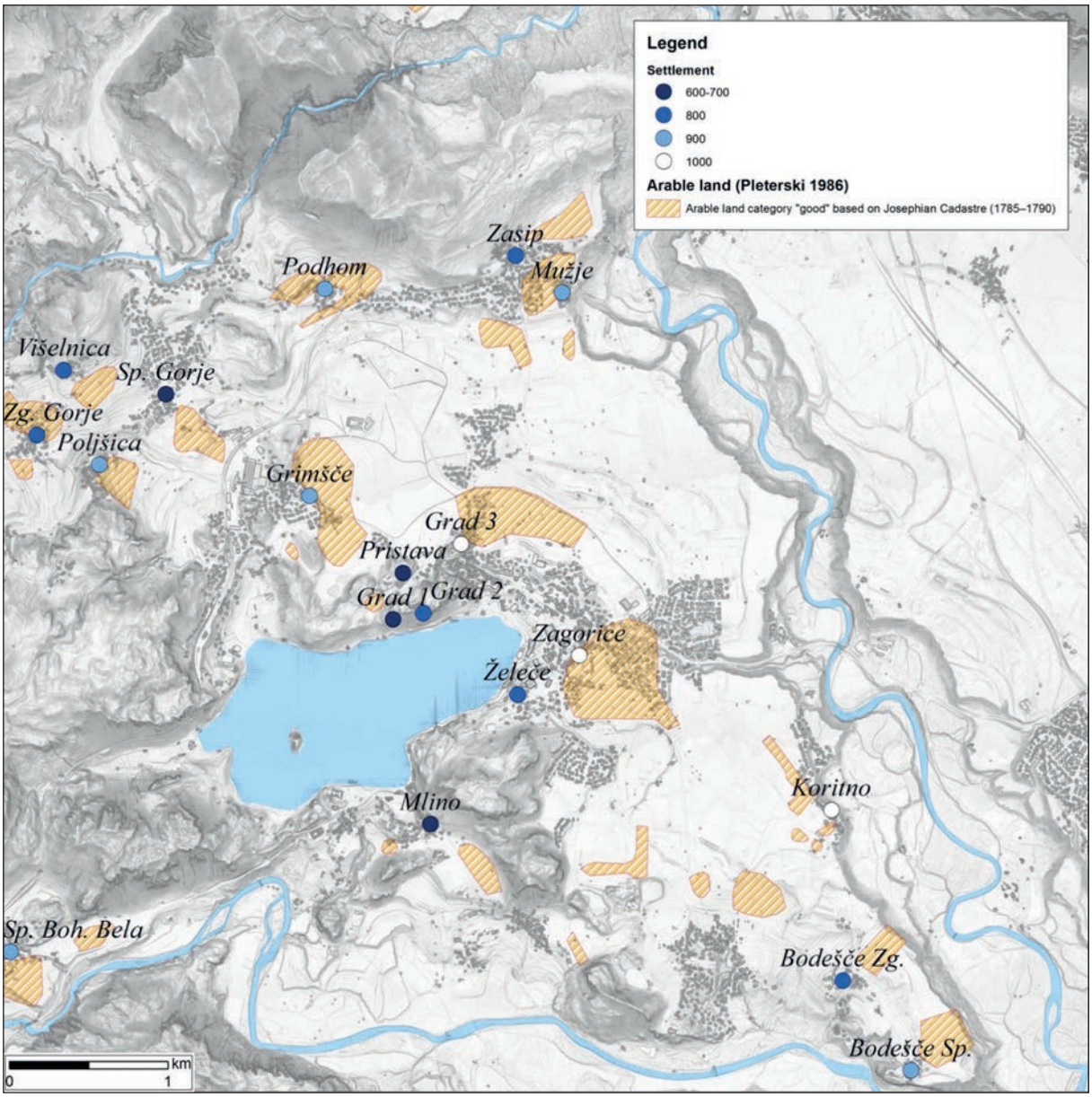
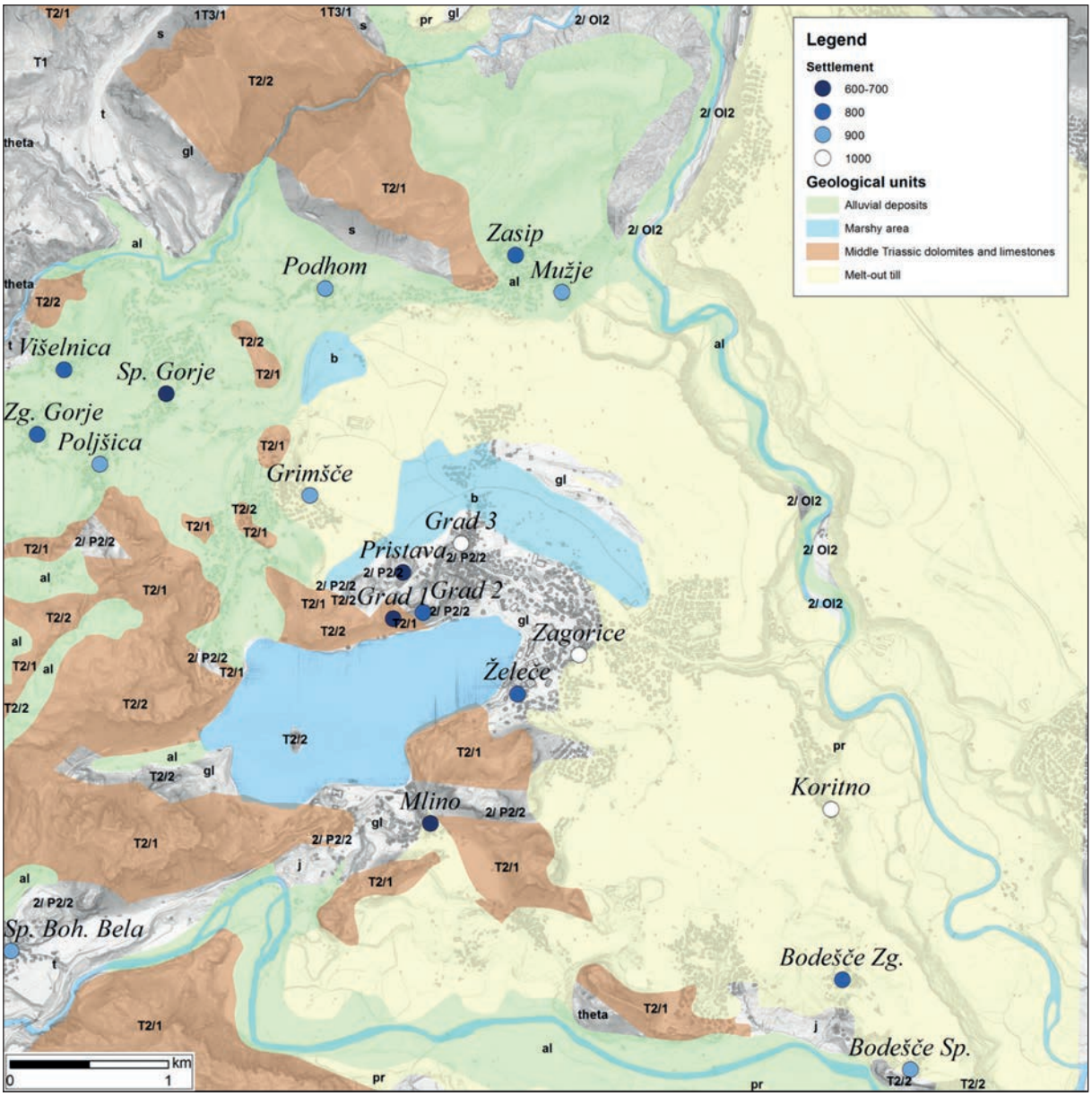
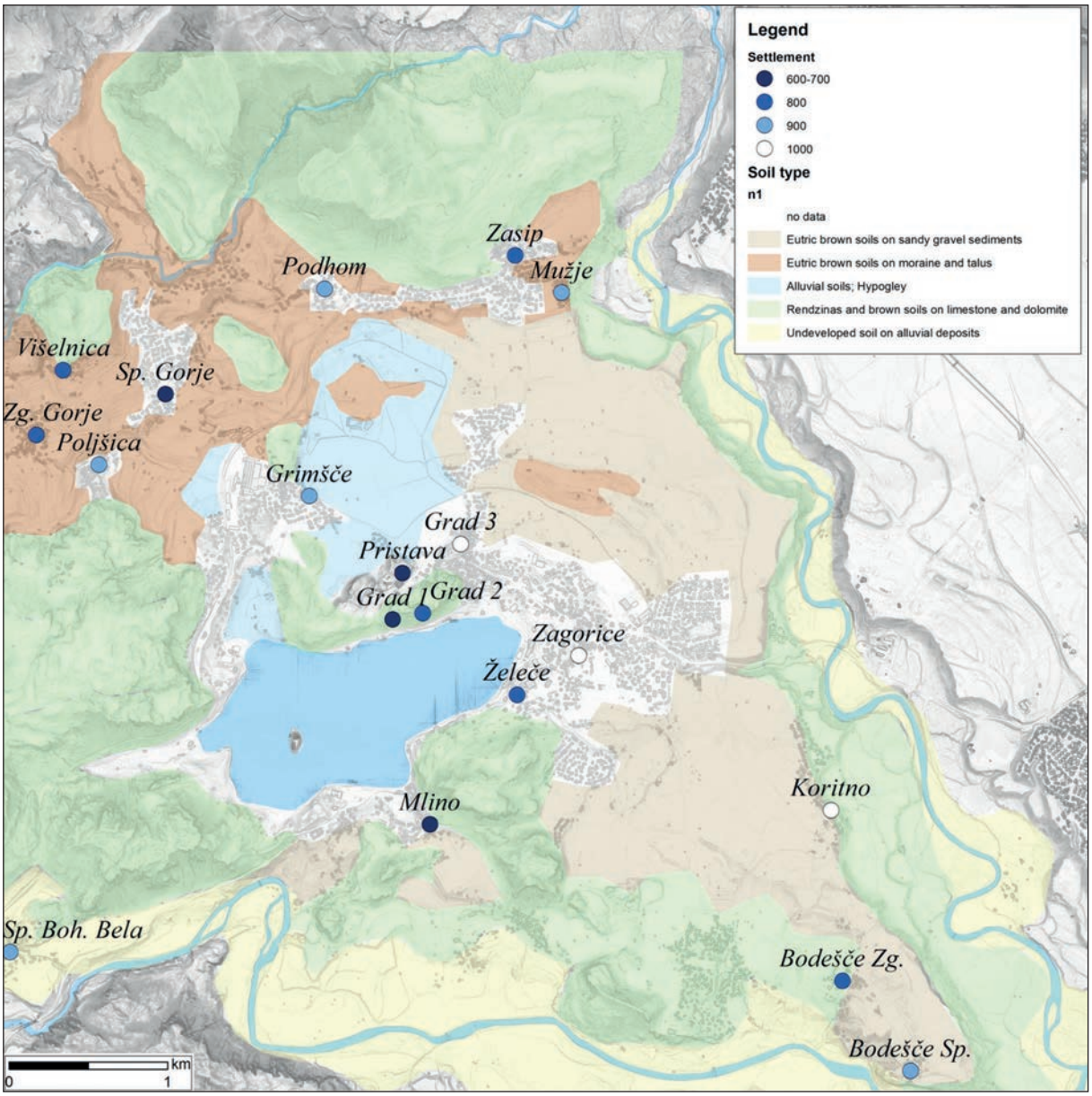
APPENDICES



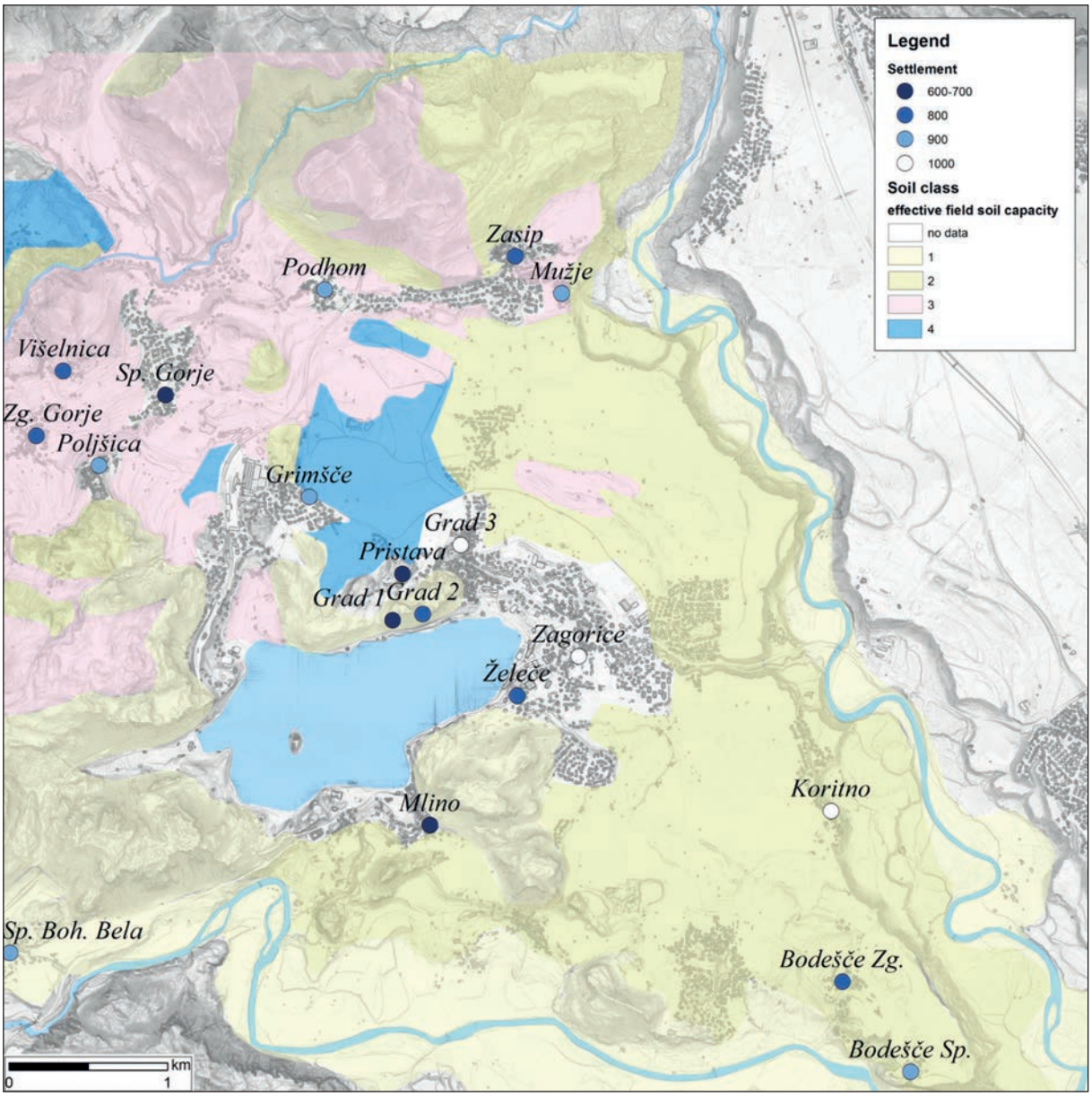
Map 1: Bled microregion (decimal longitude and latitude coordinates of the map centre: 14.1139; 46.3752), Early Medieval settlements (letters refer to *Table 2* in the text) and arable land category "good" based on the retrograde analysis of the 19th century Franciscan Cadastre (source data adopted from (Pleterski 2013a).



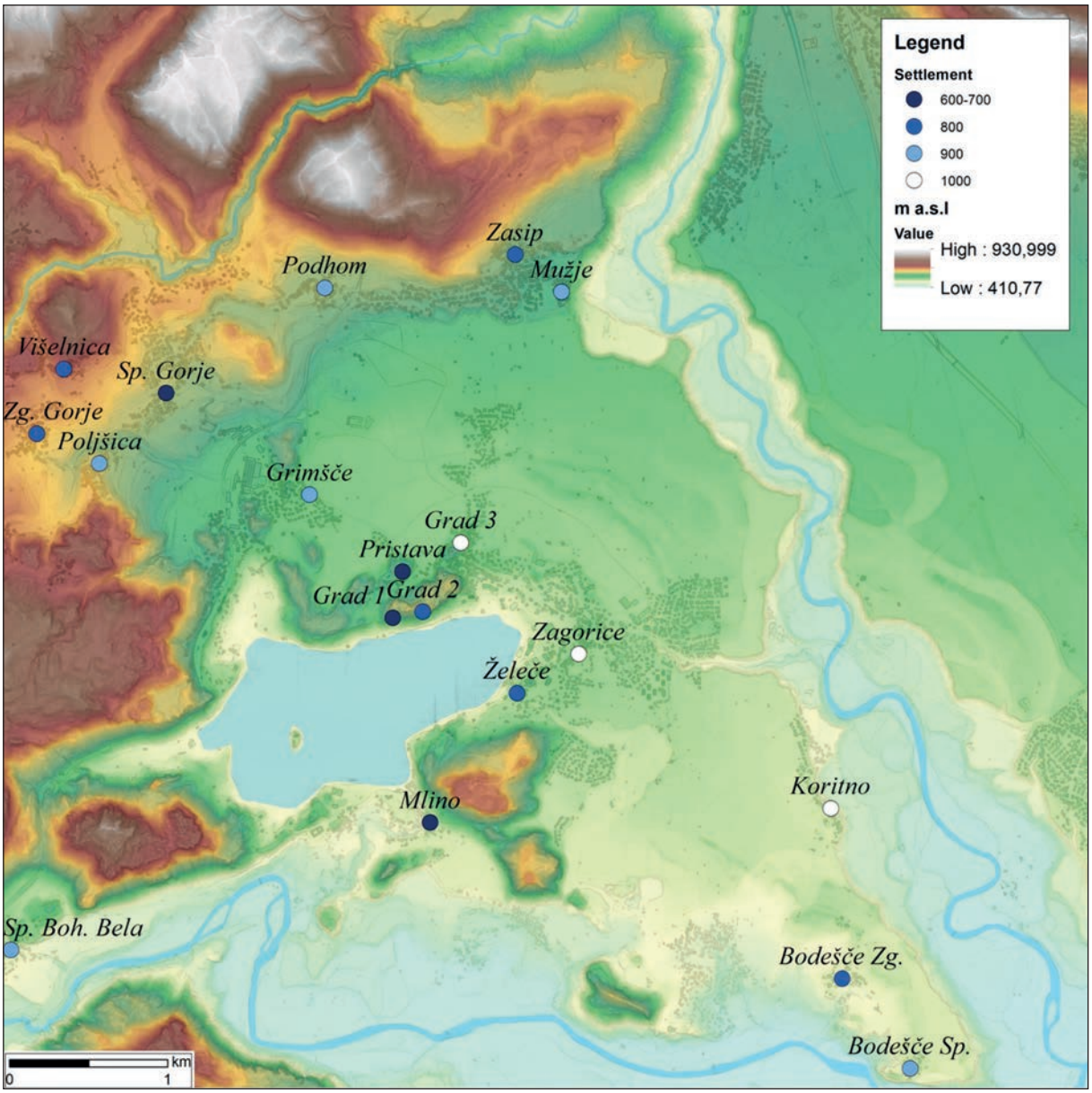
Map 2: Bled microregion (decimal longitude and latitude coordinates of the map centre: 14.1139; 46.3752), geological background. The most main geological units prevailing in the study area are presented (source data adopted from Bavec, Verbič 2004; Serianz 2016; Serianz et al. 2020).



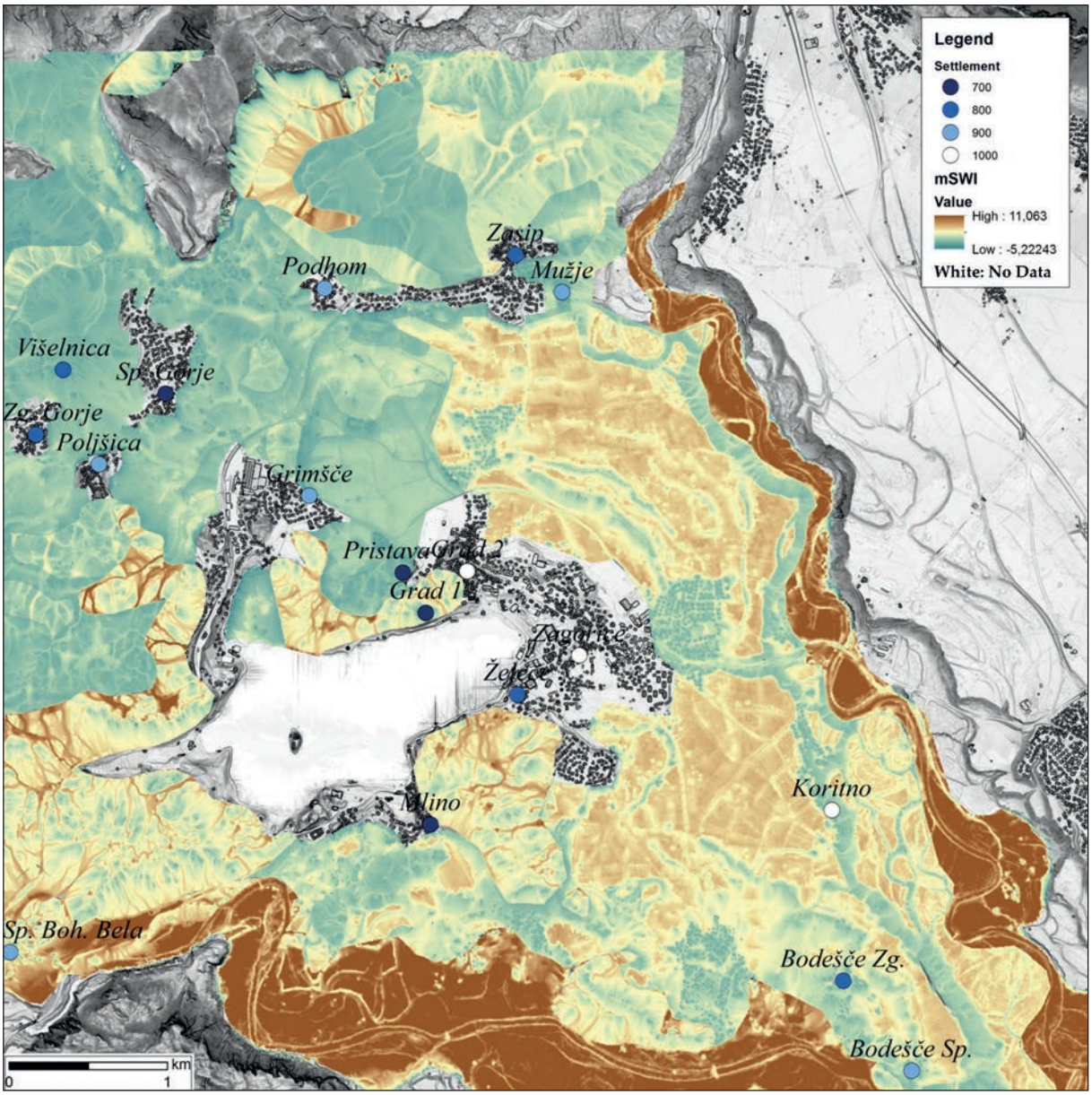
Map 3: Bled microregion (decimal longitude and latitude coordinates of the map centre: 14.1139; 46.3752), soil map (source data adopted from Pleterski 2013a).



Map 4: Bled microregion (decimal longitude and latitude coordinates of the map centre: 14.1139; 46.3752), effective field soil capacity (FC) classes (source data adopted from Pleterski 2013a).



Map 5: Bled microregion (decimal longitude and latitude coordinates of the map centre: 14.1139; 46.3752), visualisation created for visual geomorphological analysis (hypsometric tinting of high-resolution DEM, transparently (60%) superimposed over a hillshaded surface). The highest elevation zone is white, brown represents the mountainous plateau, a darker green for the upper slopes, and light green for the verdant valleys. EMS are represented with points.



Map 6: Bled microregion (decimal longitude and latitude coordinates of the map centre: 14.1139; 46.3752), modified SAGA wetness index (mSWI). The area with modified values between 11 and 0 has a (very) low capacity to retain water (map in yellow and brown), and the area with high capacity to retain water (values 0 to-5, green).

Settlement of the Eastern Alps in the Early Middle Ages, Opera Instituti Archaeologici Sloveniae 48, 2024, 73–83. doi: https://doi.org/10.3986/9789610508786_05

THE DYNAMICS OF THE EARLY MEDIEVAL SETTLEMENT DEVELOPMENT IN THE DRAVA PLAIN IN CONNECTION WITH THE PEDOLOGICAL ANALYSIS OF ARABLE LAND

Andrej MAGDIČ

Abstract

This study investigates the Early Medieval settlement dynamics of the Drava Plain through a comparative analysis of settlement patterns and pedological data on arable land. Utilizing a dataset of 18 rural archaeological sites, the research examines the spatial and temporal distribution of settlements, soil classifications, and their suitability for agriculture. The findings reveal that initial settlers from the late 6th century prefered locations with automorphic soils at the base of hills, which were fertile and easily cultivated with simple tools. By the late 7th century, settlements expanded to hydromorphic soils, necessitating advanced plough technology. This shift enabled efficient use of the Drava River's alluvial plains. The study concludes that the choice of settlement sites was closely linked to the agricultural potential of the land, demonstrating a significant adaptation to environmental conditions and technological capabilities.

Keywords: landscape archaeology, Early Medieval archaeology, GIS, site catchment, agriculture, soil analysis

1. INTRODUCTION

The article deals with the settlement dynamics of the Drava Plain (Dravsko polje) in the Early Middle Ages, focusing on the comparison between the spatio-temporal development of the Early Medieval settlement and the results of the pedological analysis of the potential arable land of the individual settlements, dated by the archaeological method.

The beginnings of the Early Medieval settlement of the Drava Plain date back to the end of the 6th or the beginning of the 7th century (Magdič 2021, 136). The previous Roman settlement ended in the course of the first half of the 5th century, when most of the population left the area (Horvat 1999, 255). This was confirmed by the recent analysis of 1105 relevant sites, which validated that the newcomers colonised an all but completely abandoned landscape (Štular et al. 2022). In temperate climates, the overgrowth of abandoned arable land is usually completed after a maximum of 150–200 years, when a dynamic equilibrium is reached and one can speak of a fully formed forest (Cojzer 2011, 12–14). Therefore, the first Early Medieval communities settling the Drava Plain area were not limited by the choice between cleared and overgrown space when selecting the location for their settlements, as the area was predominantly covered with mature forest.

The results of the comparative analysis of spatio-temporal settlement dynamics and pedological analysis of potential arable land were confronted in the discussion with the generally accepted conclusion, further substantiated by Pleterski (2008, 17), that the primary economic activity of the Early Medieval inhabitants of the present-day Slovenian territory was agriculture, with emphasis on arable farming. The most important result of the research is the conclusion that the first Early Medieval settlers of the Drava Plain chose for their settlement the environments that best suited their specific, technology- and culture-determined farming practices.

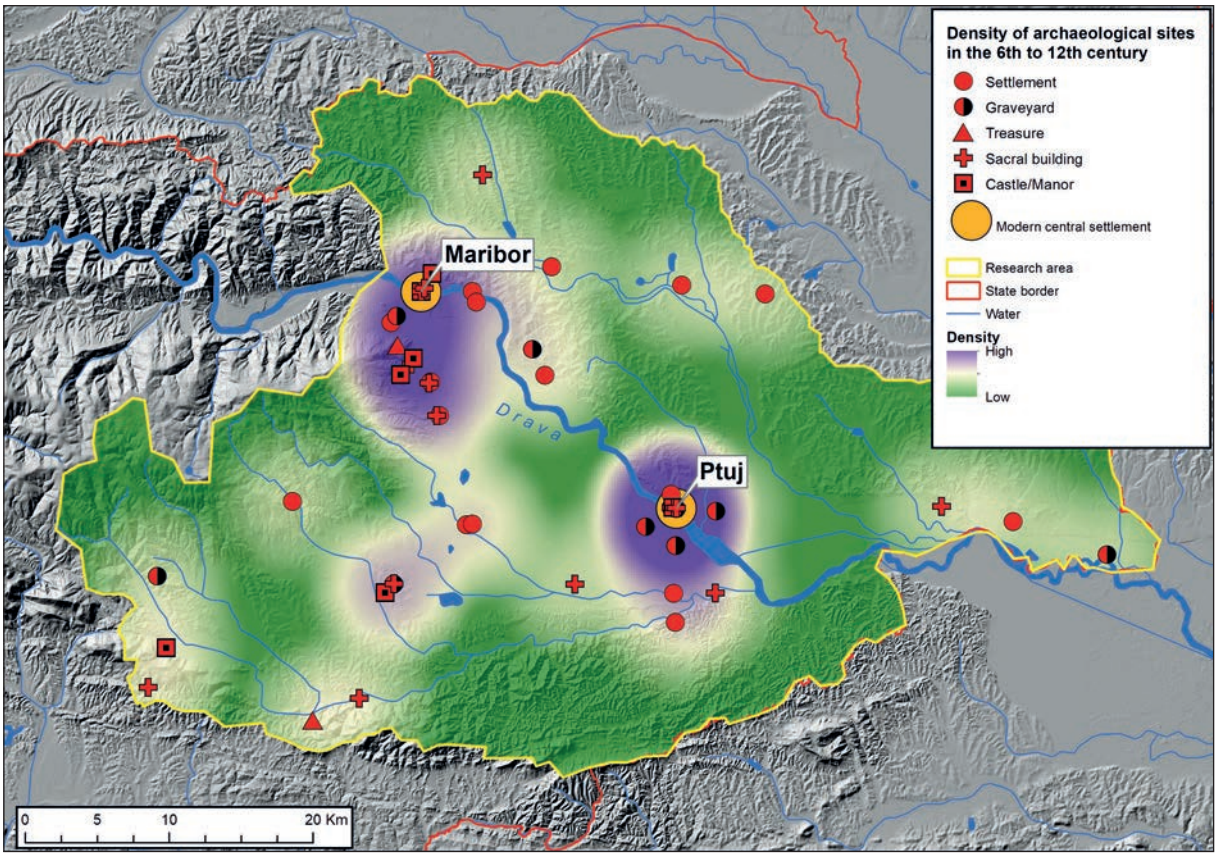


Fig. 1: Density of archaeological sites in the 6th–12th centuries period. Site density is interpreted from point data using the ArcGIS tool Kernel Density, whereas each point is representing an individual archaeological site.

One of the goals of the analysis of potential arable land is to determine whether the area of arable land in the Early Middle Ages was a factor that people took into account when choosing where to settle.

2. MATERIALS, METHODS AND RESULTS

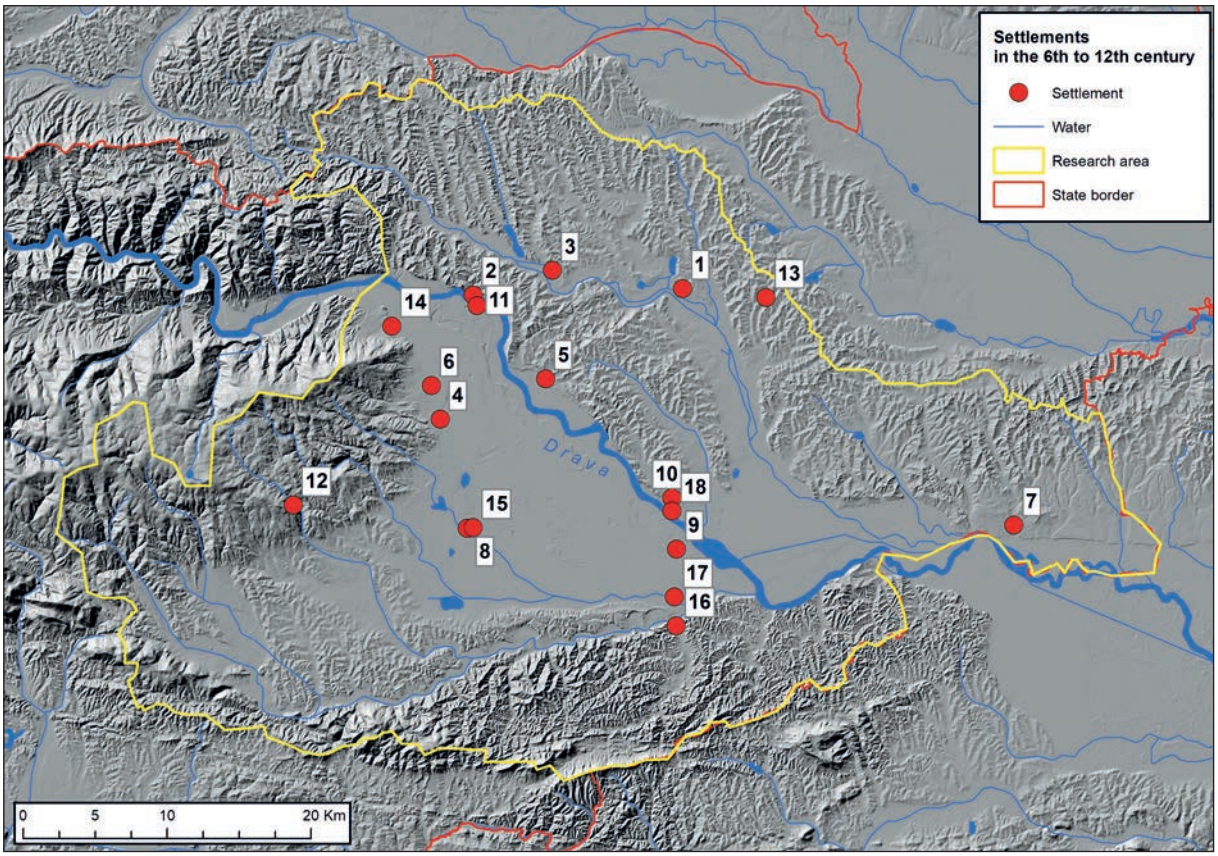
2.1 ARCHAEOLOGICAL DATA SET

The data basis for the present study is a comprehensive study of the Early Mediaeval archaeological data of the Drava Plain and the surrounding hills (Magdič 2021), in conjunction with the Zbiva database (relevant here: Štular 2019; Štular et al. 2021; 2023; Štular, Belak 2022). The most important result of the study of the archaeological data of the considered area is the finding that the Early Mediaeval settlement took place in two distinct concentrations, one in the wider area of today's Maribor, the other in the wider area of today's Ptuj (*Fig. 1*).

The present study focuses on archaeological sites identified as rural settlements on the basis of material remains found during archaeological excavations. Spatial and chronological data from 18 settlements were included in the study. The time span and formation moment, listed in *Fig. 2*, were determined by a combination of analytical methods based on a typo-chronological analysis of pottery and C14 dating of individual settlements (Magdič 2021, 65–137). The time span represents the time frame within which a settlement certainly existed, but not necessarily during the entire period. The formation moment represents the moment when an individual settlement existed with certainty, but it is also possible that it existed some time earlier as well.

The earliest Early Medieval settlement in the area is Spodnja Senarska, which dates back to before the end of the 6th century. According to the found pottery, the settlement is a remnant of the original settlement, which in the observed area was abandoned before the middle of the 7th century. At the same time as the settlement in Spodnja Senarska, or directly after its decline, new settlements appeared in the area, the first harbingers of a new settlement. The earliest of these settlements, established before 658, are Malečnik – Pod Meljskim hribom, Močna – Vaški trg, Slivnica – Srednji travniki, Spodnji Duplek – Srednje polje and Spodnje Hoče – Pod cerkvijo.

The settlement of the area continues in the second half of the 7th century and the first half of the 8th cen-



No.	ZBIVA ID	Settlement – site name	Time span	Formation (at the latest)
1	10002902	Spodnja Senarska – Zgornje polje	550–650	600
2	10002669	Malečnik – Pod Meljskim hribom	542–764	634
3	10002840	Močna – Vaški trg	630–1050	634
4	10003694	Slivnica – Srednji travniki	640–888	640
5	10002904	Spodnji Duplek – Srednje polje	630–642	642
6	10002298	Spodnje Hoče – Pod cerkvijo	630–1050	658
7	10003693	Pušenci – Cerkvišče	630–1300	764
8	10003280	Spodnja Gorica – Cediljeki	630–764	764
9	10003692	Ptuj – Turnišče	630–925	764
10	10000052	Ptuj – Štuki-Marof	640–800	764
11	10002535	Maribor – Pobrežje	642–764	764
12	10002536	Jurišna vas – Ančnikovo gradišče	630–833	833
13	10002371	Andrenci – Police	630–880	860
14	10003687	Maribor – Zgornje Radvanje	630–880	860
15	10002670	Spodnja Gorica – Gmajna	630–888	875
16	10003276	Podlehnik – Murko	764–1025	888
17	10003684	Lancova vas – Na pukli	764–888	888
18	10003690	Ptuj – Grad*	660–800	800

Fig. 2: Farming settlements in the Drava Plain, dated between the 6th and 12th centuries, based on archaeological evidence.

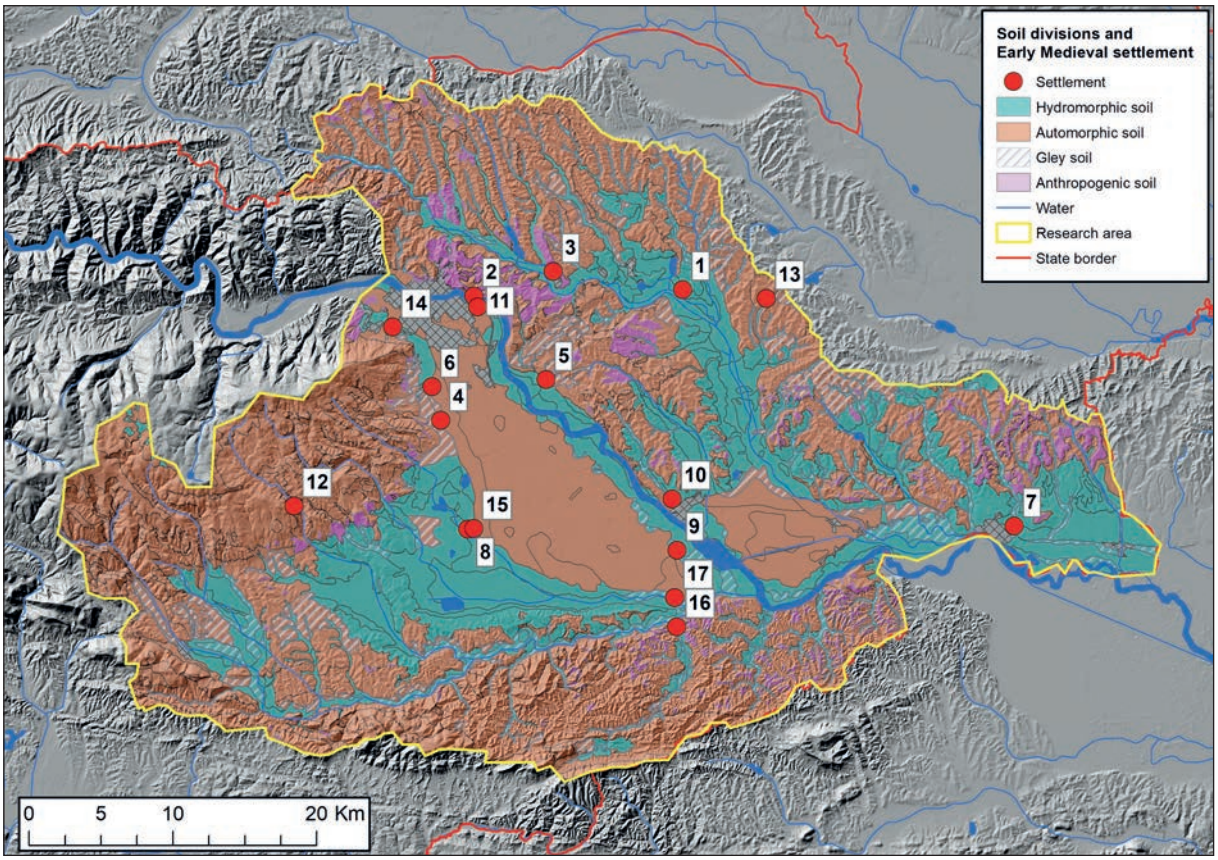


Fig. 3: Pedological map of the Early Medieval settlement, based on soil divisions.

tury. The settlements of Ptuj - Štuki-Marof and Ptuj - Turnišče, Maribor – Pobrežje, Pušenci – Cerkvišče, Jurišna vas – Ančnikovo gradišče and Spodnja Gorica – Cediljeki can be dated to the period before 764. So far, no settlement remains have been discovered in Ptuj that could provide a "link" between the decline of the Roman town in the 5th century and Slavic settlement in the 7th century. However, there are traces that indicate the presence of an indigenous population even in the 6th century. These include a deer-shaped clasp discovered in one of the local inhabitants' graves on the top of Panorama Hill, which, according to Slavko Ciglenečki, belongs to the group of the latest animal brooches, with good comparisons in the 6th and 7th centuries (Ciglenečki 1993, 512, Pl. 2: 9).

The latest phase of Early Medieval settlement begins after 764, with the settlements of Ptuj – Grad, Spodnja Gorica – Gmajna, Lancova vas – Na pukli and Podlehnik – Murko founded towards the end of the 8th or in the 9th century. The settlement Andrenci – Police can also be dated to this period at the latest, although it cannot be excluded that it was founded as early as in the 7th century.

2.2 PEDOLOGICAL DATA SET

The pedological data for the study were taken from the 1:25,000 scale pedological map of the Republic of Slovenia (Repe 2010). An in-depth analysis of the soil (Magdič 2021, 245–253) revealed that the classification of soils, of primary importance for landscape archaeology, is the classification of soil divisions. The soils in the study area can be classified into two basic divisions: automorphic and hydromorphic soils (*Fig. 3*). The automorphic soils of the area include undeveloped soils, humus-accumulating soils and cambic soils. The most important common characteristic of automorphic soils is that they do not retain rainwater permanently or temporarily in any part of the profile, making flooding extremely rare. The water table is deep, so it never rises to the surface. Hydromorphic soils in the area studied include riverine soils, pseudogley soils and gley soils. The most important common characteristic of the hydromorphic soils is that they are directly and visibly influenced by at least one form of water, that is temporarily or permanently stagnant in at least part of the profile. The profile is either heavily soaked or contains water itself. Flooding is common in this type of soil.

During the analysis, I observed the distribution of soil types in the potential fields of each settlement. From a quality-of-life perspective, soil characteristics related to the ability to drain water are of particular importance. Automorphic soils form a drier space, while hydromorphic soils form a wetter space. In addition to the soil division, I have also observed other characteristics such as the gleying factor of the horizon, which is an indicator of water retention (Vidic et al. 2015, 30). As it turns out, gleying can also be present in cambic soils, which can have a very positive effect on yields per hectare.

2.3 EARLY MEDIEVAL FIELDS (SITE CATCHMENT ANALYSIS)

2.3.1 IDENTIFICATION AND AREA OF ARABLE LAND

The identification of potential Early Medieval arable land is based on the theory of central land cores, according to which the farming settlements of the period had their arable land in close proximity, usually on particularly favourable soils (Lozić 2024a in this volume with references). The input data of 'arable land' come from early 19th century cadastral maps, the so called Franciscean Cadastre, which are a reliable representation of the agricultural landscape not only in the pre-industrial period, but also before the land expropriation of 1848. They maps depict the last phase of the development of the feudal landscape, which by definition is feudal in origin and whose origins must be traced back to the Early Middle Ages (Štular 2011, 123). For the situation as depicted on the maps of the Franciscean Cadastre, we can speak of the achieved carrying capacity of the economic hinterland of a given village parcel (e.g., Zimmermann et al. 2009, 11). Thus, all land that was suitable for plowing and growing crops with the technical means available at that time is marked as fields. Land that is not marked as arable land is therefore generally not suitable as arable land. It follows that land not marked as arable land was not used as arable land in the Early Middle Ages either. The opposite is not the case (Lozić 2024b in this volume).

Štular (2006, 202–203, 207–209), in his study of the economic hinterland of the Early Medieval settlement of the Bled area, reviewed the results of previously established models for determining the economic hinterland of settlements. He compared them with his own measurements of the time it takes a person to walk from an Early Medieval settlement to the adjacent field. The reconstruction of the Early Medieval landscape of the Bled area with the field locations of each Early Medieval settlement was based on a multidisciplinary historical study by Pleterski (2013). He found that the field of each Early Medieval settlement in the Bled area was no more than a 6–7 minutes' walk away (Štular 2006, 207–209).

The similarity of contemporary agricultural implements in Central Europe suggests very similar basic agricultural practices, which were merely adapted to the specific physiographic characteristics. On this basis, we can assume that the distance from the settlement to the arable land was not more than 7 minutes even in the fertile Drava Plain.

To illustrate the arable areas of each of the Early Medieval settlements studied, polygons with a perimeter that can be reached within a seven-minute walk. The 'within a seven-minute walk' area were created using the Path Distance tool.[1] The basis for using this tool is a DEM, which is used to simulate the relief of the considered spaces. The DEM was created from a georeferenced ground point cloud, based on publicly available data (public data from the Slovenian Environment Agency: http://gis.arso.gov.si/evode/profile.aspx?id=atlas_voda_Lidar@Arso).

The interpolation of the points used to create the digital elevation model (hereafter DEM) was performed using the Natural Neighbour algorithm, which has proven to be very suitable for interpolating data points with irregular spacing. The DEM with a resolution of 10 × 10 meters proved to be the most efficient.

The slope walk exponent function (Tobler 1993) was used to calculate the difficulty of walking up and down the slope. The polygons generated reflect the distances from the centre of gravity of each of the Early Medieval settlements that can be reached within a seven-minute walk. The intersection of the arable areas on the Franciscean Cadastre maps and the areas within the '7-minutes' walk polygons' represents the potential arable areas of each of the Early Medieval settlements.

In the case of the settlements Malečnik – Pod Meljskim hribom, Maribor – Pobrežje, Močna – Vaški trg, Ptuj – Štuki-Marof and Pušenci – Cerkvišče, where the soils are now altered due to intensive human activities, The original soil divisions were reconstructed based on an analogy in the geology of the surroundings and relief. The numerical values of the analysis correspond to the corrected situations. The pedological map could not be reconstructed in the case of the settlement Ptuj – Grad, because the area is highly urbanised and extends over different geological substrates. Therefore, the settlement was excluded from the study.

The results of the analysis of the potential arable areas of the Early Mediaeval settlements showed significant differences (*Fig. 4*). From the smallest arable areas with only 7.6 ha (Malečnik – Pod Meljskim hribom), to 66.8 ha (Lancova vas – Na Pukli). In order to facilitate the analysis and evaluation of the data, The values for the arable area of each settlement were devided into

[1] All GIS operations in the study where performed with ArcGIS 10.6, ESRI, Redlands CA, USA.

No.	Settlement – site nane	Area of arable land (ha)
2	Malečnik – Pod Meljskim hribom	7.6
12	Jurišna vas – Ančnikovo gradišče	13.2
4	Slivnica – Srednji travniki	13.4
9	Ptuj – Turnišče	22.8
3	Močna – Vaški trg	23.3
16	Podlehnik – Murko	23.8
8	Spodnja Gorica – Cediljeki	24.3
13	Andrenci – Police	26.3
5	Spodnji Duplek – Srednje polje	30.5
15	Spodnja Gorica – Gmajna	35.5
7	Pušenci – Cerkvišče	38.4
6	Spodnje Hoče – Pod cerkvijo	44.7
1	Spodnja Senarska – Zgornje polje	46.6
10	Ptuj – Štuki-Marof	48.9
14	Maribor – Zgornje Radvanje	49
11	Maribor – Pobrežje	59.5
17	Lancova vas – Na pukli	66.8
	Average	**29.6**
	Median	**30.5**

Fig. 4: Arable land of the Early Medieval settlements, listed by area of arable land, from the smallest to the largest.

classes of 10 hectares. The result of this classification is shown in *Fig. 5*.

The study also examined the possible relationship between the size of arable land and the formation time of each settlement. The comparative graph shows that the differences in the size of arable land are not related to the time of the formation of each settlement (*Fig. 6*).

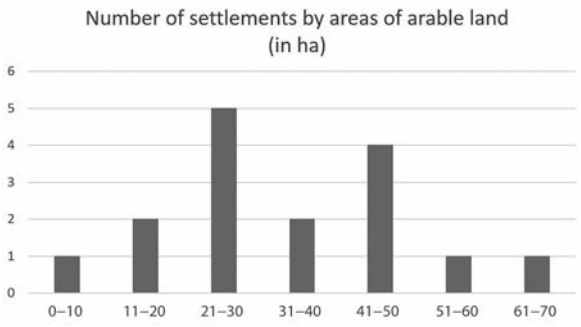


Fig. 5: Number of Early Medieval settlements and areas of belonging arable land, in classes of 10 ha.

2.3.2 THE SOILS OF THE SETTLEMENT AREAS

An analysis of the relationship between settlement sites and local soils showed that Early Medieval settlements were located on both automorphic and hydromorphic soils (*Fig. 7*). The study also focused on the possible relationship between the soil substrate and the dating of each settlement. It was found that, with the exception of Spodnja Senarska – Zgornje polje, all four settlements, which certainly date back to before the middle of the 7th century, were located on automorphic soils. However, the automorphic soils in the arable areas of Spodnje Hoče – Pod Cerkvijo, Slivnica – Srednji travniki and Spodnji Duplek – Srednje polje are partially gleyed, which has a positive effect on their fertility. It is only towards the end of the 7th century that settlements also appear more frequently on hydromorphic soils.

It can be seen that most of the settlements are located in the border area of pedological divisions: automorphic and hydromorphic soils (*Fig. 8*).

Considering the positioning of the fields in relation to the presence/absence of soils of a particular division, the following picture emerges: 15 of the 17 settlements are positioned in such a way that at least part of their

No.	Settlement – site name	Area of arable land (ha)	Formation (at the latest)
1	Spodnja Senarska – Zgornje polje	46.6	600
2	Malečnik – Pod Meljskim hribom	7.6	634
3	Močna – Vaški trg	23.3	634
4	Slivnica – Srednji travniki	13.4	640
5	Spodnji Duplek – Srednje polje	30.5	642
6	Spodnje Hoče – Pod cerkvijo	44.7	658
7	Pušenci – Cerkvišče	38.4	764
8	Spodnja Gorica – Cediljeki	24.3	764
9	Ptuj – Turnišče	22.8	764
10	Ptuj – Štuki-Marof	48.9	764
11	Maribor – Pobrežje	59.5	764
12	Jurišna vas – Ančnikovo gradišče	13.2	833
13	Andrenci – Police	26.3	860
14	Maribor – Zgornje Radvanje	49	860
15	Spodnja Gorica – Gmajna	35.5	875
16	Podlehnik – Murko	23.8	888
17	Lancova vas – Na pukli	66.8	888
	AVG	**29.6**	
	Median	**30.5**	

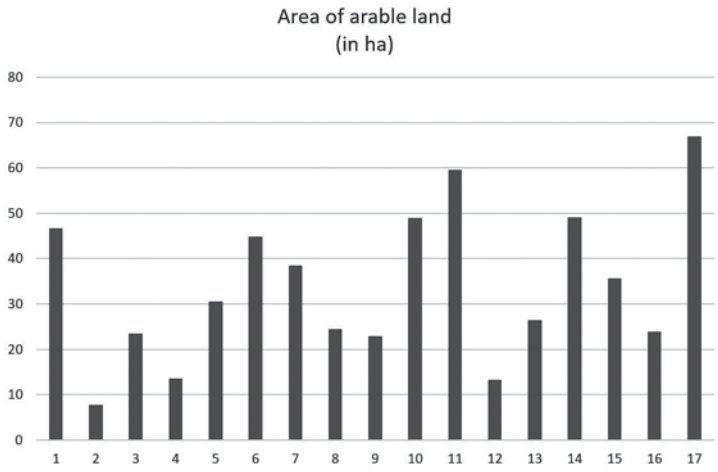


Fig. 6: Arable land size, compared to the time of the foundation of the settlement. In the graph, the size of the arable land is shown on the y-axis, the settlements are sorted from left to right, according to the time of the settlement formation time.

fields are located on hydromorphic soils. However, it should be noted that although all the arable areas of Slivnica – Srednji travniki are located on cambic soil, i.e., automorphic soil, a large part of the area is heavily gleyed (up to 50%) at least in part of the profile. Thus, it is a soil type that is a mixture of automorphic and hydromorphic soils. As for the soil type, the settlement Jurišna vas – Ančnikovo gradišče with fields on automorphic soils is an exception among the Early Mediaeval settlements of the considered area. It is located within the walls of a Late Roman fortress on the fringe of the Pohorje Mountains, at an altitude of 750 m above sea level. The choice of the location for this settlement was obviously not due to the selection of the most suitable soils for agriculture, but to other characteristics, where the factor of safety played a predominant role. It is likely that it was a settlement of indigenous people who moved to the Pohorje Mountains at the time of the collapse of the Roman state organisation and built their own self-sufficient economy, probably based mainly on animal breeding.

3. DISCUSSION

Paul the Deacon (c. 720–c. 799) notes in his writings that the area between Avaria (i.e., Pannonia) and Italy, where the Slavs lived, was still largely covered with "impenetrable forests" in the first half of the 7th century and the settlements were several days' march apart. According to Štih, the use of the term *saltus* suggests that Paul the Deacon is referring to an uncultivated forest (Štih 2015, 127). It is certainly worth taking a closer look at this statement of Pavel Diakon that the area of present-day Slovenia, including the considered area of the Drava Plain, was still mostly forested in the first half of the 7th century, because the statement also coincides with the results of archaeological research. As far as can be deduced from the analysis of archaeological sources, the area in question was most densely populated in the Roman period. Archaeological sites from this period account for about half of all known archaeological sites in the area (Magdič 2014, Fig. 5). The highest settlement density dates from the 2nd and 3rd centuries. For various reasons that historians have not yet been able to satisfactorily determine, people began to leave the area during the 3rd century, so most rural settlements were abandoned by the 3rd century (Horvat 1999, 255). The urban centre of the region, Colonia Ulpia Traiana Poetovio, also underwent far-reaching demographic changes during this period. The extensive urban settlement, which in the 2nd and 3rd centuries encompassed almost the entire area of present-day Ptuj and beyond, was transformed into a collection of small hamlets during the 4th century, undoubtedly losing its urban character. Before the middle of the 5th century, the town was practically abandoned (Horvat et al. 2003, 182–183).

It can be concluded that most of the considered area was forested from the end of the 3rd century. In temperate climates, the forestation of abandoned arable land is usually completed after a maximum of 150–200 years, when a dynamic equilibrium is reached and one can speak of a fully formed forest (Cojzer 2011, 12–14). Thus, the communities that began to settle the area in question towards the end of the 6th or beginning of the 7th century encountered a fully overgrown, forested landscape. From this we conclude that the former fields (dating back to the Roman period) were covered by a mature forest at that time. Thus, the first Early Medieval communities that settled the Drava Plain were not limited by the choice between cleared and forested areas when selecting the location for their settlements. An analysis of the potential fields of the Early Medieval settlements revealed that the majority of the studied settlements had available land, suitable for arable cultivation, ranging in size from 21 to 30 hectares (*Fig. 4*).

Settlement – site name	Formation (At the lastest)	Soil division
Spodnja Senarska – Zgornje polje	600	Hydromorphic soil
Malečnik – Pod Meljskim hribom	634	Automorphic soil
Močna – Vaški trg	634	Automorphic soil
Slivnica – Srednji travniki	640	Automorphic soil
Spodnji Duplek – Srednje polje	642	Automorphic soil
Spodnje Hoče – Pod cerkvijo	658	Hydromorphic soil
Pušenci – Cerkvišče	764	Hydromorphic soil
Spodnja Gorica – Cediljeki	764	Hydromorphic soil
Ptuj – Turnišče	764	Hydromorphic soil
Ptuj – Štuki-Marof	764	Hydromorphic soil
Maribor – Pobrežje	764	Automorphic soil
Jurišna vas – Ančnikovo gradišče	833	Automorphic soil
Andrenci – Police	860	Automorphic soil
Maribor – Zgornje Radvanje	860	Hydromorphic soil
Spodnja Gorica – Gmajna	875	Hydromorphic soil
Podlehnik – Murko	888	Hydromorphic soil
Lancova vas – Na pukli	888	Automorphic soil

Fig. 7: Soils at the individual settlement sites, according to pedological divisions. The settlements are arranged according to the time of their formation, from the oldest to the youngest.

No.	Settlement – site name	Formation (at the latest)	Automorphic soil	Hydromorphic soil	SUM (ha)
1	Spodnja Senarska – Zgornje polje	600	0	59.5	**59.5**
2	Malečnik – Pod Meljskim hribom	634	5.1	2.5	**7.6**
3	Močna – Vaški trg	634	19.4	3.8	**23.2**
4	Slivnica – Srednji travniki	640	13.4	0	**13.4**
5	Spodnji Duplek – Srednje polje	642	22.5	12.5	**35**
6	Spodnje Hoče – Pod cerkvijo	658	44.4	0.3	**44.7**
7	Pušenci – Cerkvišče	764	0	38.4	**38.4**
8	Spodnja Gorica – Cediljeki	764	0	7.5	**7.5**
9	Ptuj – Turnišče	764	22.4	0.5	**22.9**
10	Ptuj – Štuki-Marof	764	5.7	43.1	**48.8**
11	Maribor – Pobrežje	764	47.3	12.2	**59.5**
12	Jurišna vas – Ančnikovo gradišče	833	13.2	0	**13.2**
13	Andrenci – Police	860	23.7	2.6	**26.3**
14	Maribor – Zgornje Radvanje	860	25.7	23.3	**49**
15	Spodnja Gorica – Gmajna	875	17.1	26.2	**43.3**
16	Podlehnik – Murko	888	6.3	17.5	**23.8**
17	Lancova vas – Na pukli	888	48.9	17.9	**66.8**
	SUM (ha		315.1	267.8	582.9

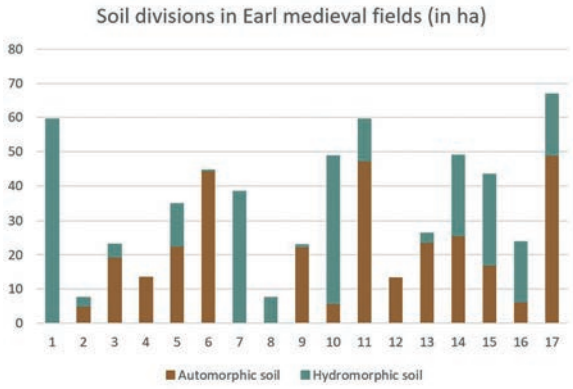


Fig. 8: Table and graph on the areas of the soil divisions in the fields of the Early Medieval settlements. The settlements are arranged according to the time of their formation.

This indicates that the average Early Mediaeval community living in a single settlement did not need more than 30 ha of land for its agriculture. However, with the method used, it was not possible to determine more precisely how large the actual fields of each community were. If we compare the size of the arable land of each settlement with the time of its formation, we can see that the size of the arable land did not depend on the time of the formation of each settlement (*Fig. 6*).

The soil characteristics of the potential fields were analysed to evaluate its arable potential. It was found that the Early Medieval inhabitants of the considered area settled on both drier and wetter soils. However, the factors that influenced the choice of settlement areas clearly varied over time. In the first phase, before the middle of the 7th century, sites with very specific environmental characteristics were selected for settlement. All of the settlements found in the first phase of occupation were located at the base of hills with loose, sandy, automorphic soils that were partially gleyed. With the sufficiently high moisture provided by the gleyed soils just below the slopes of the hills, from which rain water drained, the farmlands of the first Early Mediaeval farmers were among the most fertile arable lands in the area (see Repe 2010, 148). The first settlers therefore chose loose sandy soils for their fields, which could be cultivated by simple

agricultural tools, taking care to choose micro-locations where plants had sufficient moisture to grow.

The locations of the settlements from the late 7th century onwards indicate the introduction of a different agricultural tactic, in which the hydromorphic soils of the alluvial plains of the Drava River were also cultivated. These soils tend to be clayed and therefore can only be effectively cultivated with a plough, which not only cuts and crushes the soil but also turns it (on the use of the plough in the Early Middle Ages, see Pleterski 1987). Ploughshares with signs of wear (disproportionate wear), that occur in this type of use were found in treasure finds at the Razvanje – Poštela (Pahič 1985, 295–296) and Zbelovska gora – Gradišče (Bitenc, Knific 2015, fig. 17) sites. This type of ploughshares with enlarged leaf is typical for the area of western Pannonia between the 8th and 10th centuries (Henning 1987, 51, Fig. 21). Thus, the above-mentioned data can be interpreted as the introduction of a new cultivation technique in the second half of the 7th century, which includes the use of the plough, with which not only cuts and crushes the soil but also turns it. So to speak, an early example of the heavy plough. However, it is characteristic for the entire Early Middle Ages that the sites chosen for the settlements were located near the border between automorphic and hydromorphic soils, i.e., near the border between the dry and the wet world. This choice of settlement location made it possible to adapt agriculture to changing weather conditions, cultivating drier or wetter fields, depending on weather conditions. This tactic minimised the risk of total crop failure that could be caused by extreme drought or extreme humidity.

CONCLUSION

The first Early Medieval communities that began to settle in the area around the end of the 6th or the beginning of the 7th century were not limited by the choice between cleared and overgrown space when selecting the location for their settlements, because the arable land from the Roman period had been abandoned for more than two centuries and completely overgrown by mature forest. The present study has shown that settlement dynamics in the Drava Plain in the Early Middle Ages was significantly related to environmental factors, among which the pedological substrate in relation to the relief played a primary role. The main result of the study is the conclusion that the Early Medieval settlers of the Drava Plain chose as settlement sites the environments that best suited their specific technological and cultural agricultural practises at that time. In the first phase of settlement, they chose for their settlements dry areas at the foot of lower hills with loose sandy soils that could be cultivated by hand with a hoe or with a simple plough. Rainwater flowing down from the hills provided sufficient moisture for crops to grow. Before the end of the 7th century, however, people settled also wetter areas with clay soils, the cultivation of which required the use of more advanced agricultural technology, especially a type of plough, which as well as cutting and crushing the soil also turned it over. Only the introduction of this type of plough made it possible to use the vast river plains of the Pannonian world, now known as the 'granary of Slovenia', in an economically efficient way.

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BECOMING SLAV (ARCHAEOLOGICAL EVIDENCE). AGRICULTURAL ANTI-REVOLUTION AND ACCULTURATION IN THE EASTERN ALPS

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Abstract

The chapter examines the acculturation processes in the Eastern Alps during the Early Middle Ages, focusing on the Slavicisation influenced by agricultural transitions. It builds on an earlier research by the authors that confirmed the hypothesis of simultaneous Slavic migration and cultural diffusion and defined the Alpine Slavs as people who spoke Slavic, shared specific common ancestry and migrated to the Eastern Alps in the sixth and seventh centuries. This study focuses on how these immigrant Alpine Slavs significantly impacted the region's social and agricultural systems. Key findings include the transition from the Late Antique population's market-based wheat agriculture to a self-sufficient barley-based system introduced by the Slavs. This shift facilitated successful acculturation and led to a resilient, bicultural society. The transformation underscores the adaptability and efficiency of Slavic agricultural practices and their pivotal role in the socio-economic stability of the region during the Early Middle Ages. The study concludes that the Slavs, rather than precipitating economic decline, introduced an optimized agricultural system that mitigated the effects of the already collapsed market economy, aiding in the survival and integration of the Late Antique population.

Keywords: archaeology, Eastern Alps, Late Antiquity, Early Middle Ages, Slavs, acculturation processes, social impact, agriculture, Slavicisation

1. INTRODUCTION

Ancient Slavs is a complex subject to discuss, and the complexity begins with the definition of the term. To a linguist, ancient means something different than it does to an archaeologist. The designation Slavs can mean everything from an ancestral population traceable to the depths of prehistory (e.g., Dolukhanov 1996), to a mere figment of a Byzantine chronicler's imagination (Curta 2001). Our stance is anchored somewhere in the middle of two extremes and in the hypothesis that we study Slavs rather then "Slavs". We understand the Ancient Slavs from the sixth to the eighth century as a secondary, relational and in-group of people, who horizontally *distincted* themselves from the proverbial others through language, housing culture, dress, sustenance, and a network of social relations including genetic relatedness (Štular 2025). Specifically, we understand the Alpine Slavs who co-inhabited the Eastern Alps in the Early Middle Ages as people who spoke Slavic, shared specific common ancestry and who immigrated in Eastern Alps in the sixth and seventh centuries (Štular et al. 2022). Furthermore, we maintain that migration was indeed part of Slavicisation in the Eastern Alps, but that the subsequent acculturation processes exerted a more substantial influence.

This article explores the latter: acculturation process. In particular, the article examines how acculturation processes were significantly influenced by the transformation of the agricultural system from a market-based to a self-sufficient system. First, however, the scientific context of the acculturation process also

referred to as Slavicisation must be briefly outlined (for more details see Štular 2025).

Until the middle of the 20th century, the study of the ancient Slavs differed little from other studies of Late Antiquity and the Early Middle Ages in Europe. Within the paradigm known as the Grand Narrative, migration was understood as the main process of change (e.g. Ratzel 1909), and peoples and tribes were understood, as MacEcheron (2000, 370) puts it, as "caroming around the continent like culture-bearing billiard balls". The rest of the Early Medieval history was merely a process of peoples and nations bouncing around until they settled in places where they were still to be found in the 19th century. The Slavs were understood as part of the westward movement known as the Great Migration period. According to this theory, they emigrated from their original homeland, the *Urheimat*, in the fifth and sixth centuries to colonise the lands abandoned by Germanic tribes, who in turn are said to have fled from the Huns and their allies. The Slavs settled the areas between the Oder and the Elbe-Saale line, Bohemia, Moravia, a large part of present-day Austria, the Carpathian Basin and the Balkans in the south, as well as the upper Dnieper basin to the north. In the second half of the sixth century, they appeared in large numbers on the Byzantine borders.

In the second half of the 20th century, still within the paradigm of the Grand Narrative, the Slavic studies focused mainly on the ethnogenesis of the ancient Slavs and the search for the *Urheimat*. There were tremendous advances in terms of archaeological data collected and in terms of methodology (Parczewski 1991; Gojda 1991; Pleterski 1995; Dolukhanov 1996; Kazanski 1999). By the mid-1990s, the immutability of ethnic identity was being questioned, and the field was in the process of moving away from the perception of ancient Slavs as an ethnic group and instead viewing them as a language-based identity group (e.g. Pleterski 1995; Mamzer 1999).

The watershed event for the current state of the art in the study of ancient Slavs was *The Making of the Slavs* by Curta (2001). The book argued that the use of the ethnonym "Slavs" only became common in the contact zone between Byzantium and the Slavs along the lower Danube. Like Pohl (1988, 96–102) before him, he criticised the model of Slavic expansion from the *Urheimat* and insisted on its appearance in the Iustinianic period. However, Curta went one step further and claimed that the Slavs were essentially created by Byzantine perception: The creation of the Slavs was less a matter of ethnogenesis than one of invention, imagination and labelling by Byzantine authors. Thus, the Slavic group identity emerged in "the shadow of Iustinian's forts" along the lower Danube. Later Dzino (2010) postmodernised Curta's approach in his book *Becoming Slav, Becoming Croat*, in which he understood the early Slavs as a process rather than an entity.

In the 21st century, the archaeology of the ancient Slavs, like archaeology in general, made great methodological progress. For example, in the applications of computational (Rihter 2023) and web-based analyses of cemeteries (Eichert 2021), airborne LiDAR (Lozić 2021), geospatial analyses (Magdič 2022), and machine learning (Štular et al. 2022). In addition, a large number of factual errors underlying the hypotheses of Curta and Dzino were exposed (e.g. Fusek 2004; Sokol 2011; Lindstedt, Salmela 2020). Regardless of this, no alternative hypothesis has been proposed that would successfully address the well argumented shortcomings of the *Urheimat* hypothesis.

Currently, then, there are three competing hypotheses for the spread of Slavic language between about 400 and 850 CE. The first hypothesis assumes that the Slavs, a people, moved in all directions from their small original habitat, the so-called *Urheimat*, (e.g. Herrmann 1986; Dolukhanov 1996; Timberlake 2013). The second hypothesis assumes the diffusion of the Slavic cultural model among non-Slavic populations or, in its extreme form, the diffusion of language alone, (e.g. Pritsak 1983; Lunt 1997; Curta 2001; 2020). Many archaeologists adhere to the third, hybrid hypothesis. It states that movement, cultural diffusion, and language diffusion occurred simultaneously (Heather 2010; Pleterski 2013a; Pohl 2018; Kazanski 2020) and is supported by recent research in population genetics and linguistics. It seems that the language spread in the West Slavic zone mainly by migration to sparsely populated areas, and in the East Slavic zone by a combination of migration and language shift. The spread in the South Slavic region was triggered by migration, but the main mechanism for further spread was a language shift from local Balkan idioms to Slavic (Lindstedt, Salmela 2020).

Recently, we were able to corroborate the hybrid hypothesis for the Eastern Alps by applying machine learning and spatial analysis to an archaeological Deep Data. We confirmed two separate migrations into the Eastern Alps: the earlier one sometime after 500 CE upstream the Mura and Drava rivers, and the later one sometime before 700 CE upstream the Sava river. We envisaged that the number of immigrants was relatively small and that it was by no means a mass migration like, for example, that of Theodoric's Ostrogoths or Alboin's Lombards. Along the Mura and Drava rivers, it likely took the form of a series of near neighbourhood colonisation of mostly uninhabited landscape. Along the Sava it was more akin to a small group infiltration. In the next step of the study we employed the convergence of evidence from archaeology, linguistics, and population genetics. Linguistics and population genetics have, independently from archaeology and from each other, also deduced that there were two separate migrations to the South-eastern Alps (present day Slovenia). Archaeology and genetics validated that acculturation was

the predominant post-migration process. Linguistics confirmed that the migrants spoke Slavic, and genetics proved that they possessed a homogeneous genetic substrate inherited from a single ancestral population common only to today's Slavic-speaking ethnic groups. We were therefore able to define the immigrants as Alpine Slavs (no inverted commas), people who spoke Slavic and shared specific common ancestry (Štular et al. 2022).

Therefore, in the Eastern Alps the migration of people, cultural diffusion, and language shift took place in a single process. The migration was part of the ensuing Slavicisation, but the acculturation processes that took place afterwards were historically the most important.

However, this does not explain the enduring success of the Slavs in the *longue durée*. Pohl offers a pragmatic explanation: The Slavs, in comparison to the Germani, did not establish stable military based polities. Instead, they embraced decentralised form of social organisation (Pohl 2018, 118–126). This social organisation has been described as a fractal society because not only did all local communities shared the same structure, but the same structure was also replicated when these communities, social fractals, joined together in larger social units. These formed an adaptable and efficient network with great power of absorption (Pleterski 2013b, 10–11). Contemporary and modern authors alike perceived this organisation as "primitive", but in fact it was resilient because it was highly adapted to the socio-economic conditions of the period.

The succinct characterizations of Pohl and Pleterski thus posits that the *longue durée* success of the Slavicisation was based on a decentralised, "primitive" social organisation that was highly adapted to the conditions of the period. In this text we build upon, elaborate, and substantiate this stance with objective archaeological evidence. We believe that the key to understanding the adaptations lies in understanding the conditions: the transformation of the agricultural system and its impact on social organisation, as alluded to by Lozić (2021, 15–17). Our discussion draws on the groundbreaking findings of the three micro-regional analyses of agricultural potential in the Eastern Alps published in this volume (*Fig. 1*).

2. METHODS, MATERIALS, AND RESULTS

Each of the three micro-regional case studies we build upon used state of the art methodology and offered many interesting insights, and each must be consulted in full to get a complete picture. Here we will briefly summarise only those aspects that are relevant to our discussion.

Let us first take a look at the case study of the Bled micro-region (henceforth Bled). It revealed that the Early Medieval immigrants of late seventh century were attracted to light soils with a high water retention capacity. Such soils were particularly suitable for the cultivation of barley, which was known to be one of the most important staple crops of the time, especially in colder climates such as the subalpine. Soils with lower water retention capacity were only colonized in the eleventh century, which could indicate the transition to a wheat as a staple crop and subsequently to a higher degree of agricultural organisation (Lozić 2021; 2024 in this volume).

The immigrant Slavs, who colonised the Drava Plain microregion towards the end of the sixth or beginning of the seventh century, were confronted with a mature forest that had overgrown the long abandoned Roman landscape. The analysis of this microregion demonstrated that the choice of field and settlement locations was largely related to the soils and terrain that were best suited to a particular agricultural system. The settlements established in the seventh century were located on dry patches at the foothills of Pohorje with easy access to loose, sandy, automorphic soils, that were partially gleyed. That is, the soils with the highest water retention capacity among the available light soils. Light sandy soils could be cultivated by hand with a hoe or with a simple plough. The streams running down from the hills provided sufficient moisture for crops to grow. Sometime before the end of the 7th century, the new settlements were established in wetter areas with heavy clay soils. Cultivating these soils required the use of more advanced agricultural technologies, in particular a type of plough that not only cut and crushed the soil but also turned it over. However, the light brown soils with low water retention capacity only gained importance from the tenth century onwards (Magdič 2024 in this volume).

The analysis of the Leibnitzer Feld revealed three types of potential settlement sites. The first type were the sites on well-saturated brown soil, which were interpreted as agricultural settlements. The second type were hilltop settlements which, due to their position, do not have access to sufficient arable land. These settlements were thus not predominantly engaged in agricultural production and were defined as non-agricultural. At least some of them, for example Wildoner Schlossberg, were likely central places that fulfilled administrative and commercial functions. The third type were non-hilltop sites without favourable agricultural hinterland. Some of them were located in small depressions between the hills, others in the area of regular flooding. These sites must have served entirely to non-agricultural activities. Of particular interest is the Weitendorf site, where archaeological evidence suggests a workshop area for iron ore pro-

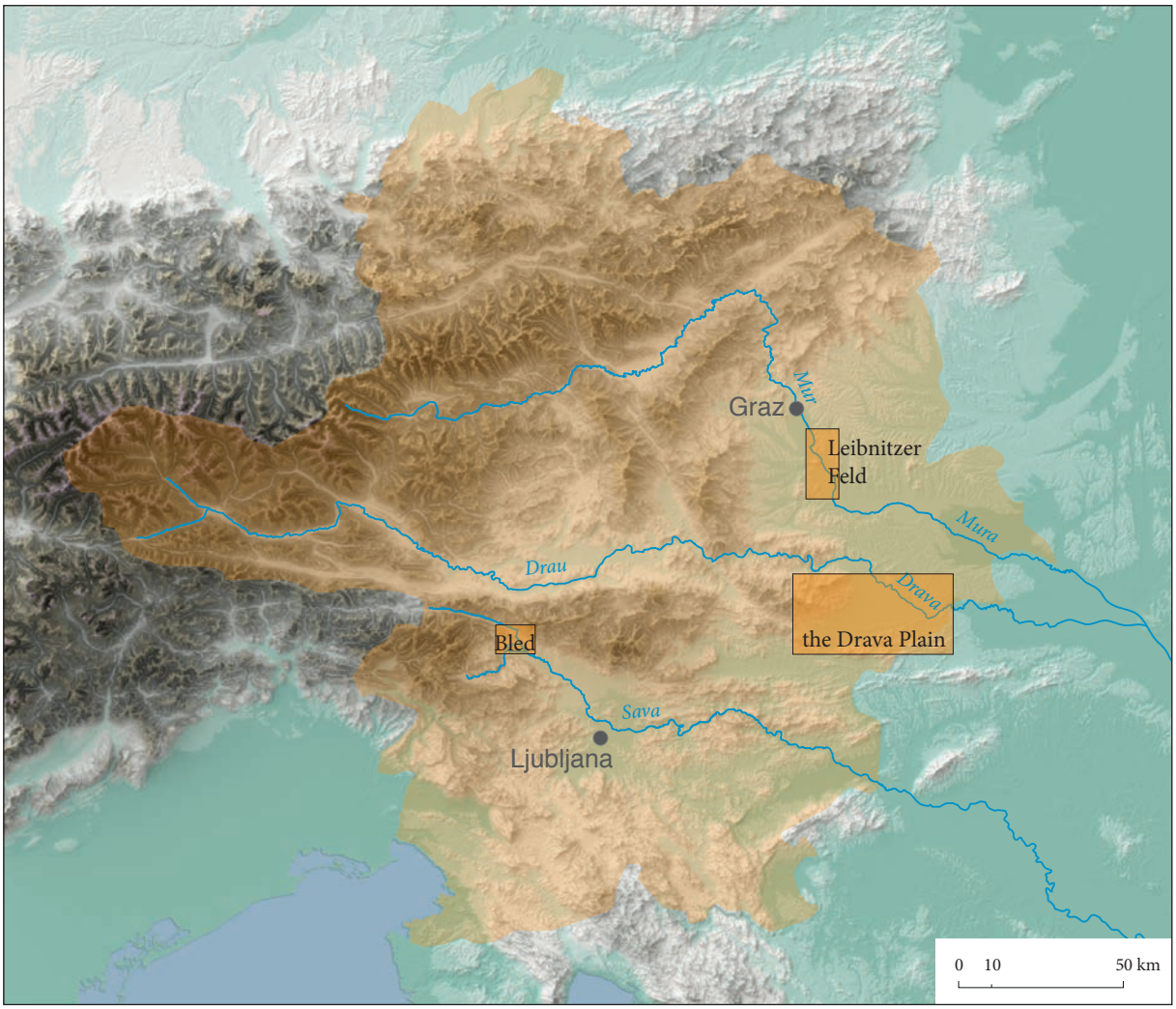

Fig. 1: Location of the three micro-regional analyses of agricultural potential in the Eastern Alps.

cessing and where interpretative mapping of LiDAR data revealed clear evidence of mining. Therefore, the site was interpreted as a mining settlement where iron ore was extracted and processed. This is the only site with demonstrated specialized non-agricultural activities in all three micro-regions (Lozić, Koch 2024 in this volume).

The three micro-regional studies thus resulted in some exciting discoveries, for example, the mining settlement in the Leibnitzer Feld and the evolution of agricultural technology in the Drava Plain. However, we focus here on the fact that all three found that to the immigrant Slavs the most important soil property was its ability to retain water. This property is defined as the soil's effective field capacity or FC. The wider implications of this for Early Medieval agriculture have already been alluded to by Lozić (2021, 15–17). In the following, we build on this by contrasting the agricultural system of the Slavs with the Late Antique one.

3. DISCUSSION

3.1 THE AGRICULTURAL SYSTEM OF THE ALPINE SLAVS

We build our model primarily on the case study of Bled and underpin it with case studies of the Leibnitz Field and the Drava Plain. In Bled, all settlements founded between the late seventh and tenth centuries were adjacent to stony brown soils with high FC (*Fig. 2*: Zone 2). In contrast, in the preceding Roman period and after the eleventh century more fertile and less stony soils with low FC were used (*Fig. 2:* Zone 3). Pleterski (2013b, 156–157) described the latter soils as the area in the plain where the soil was good and he noted that from late seventh to the end of tenth century this was a continuously forested area. However, he was unable to explain why these more fertile soils with lower FC were not cultivated in Early Middle Ages. Why, then, were

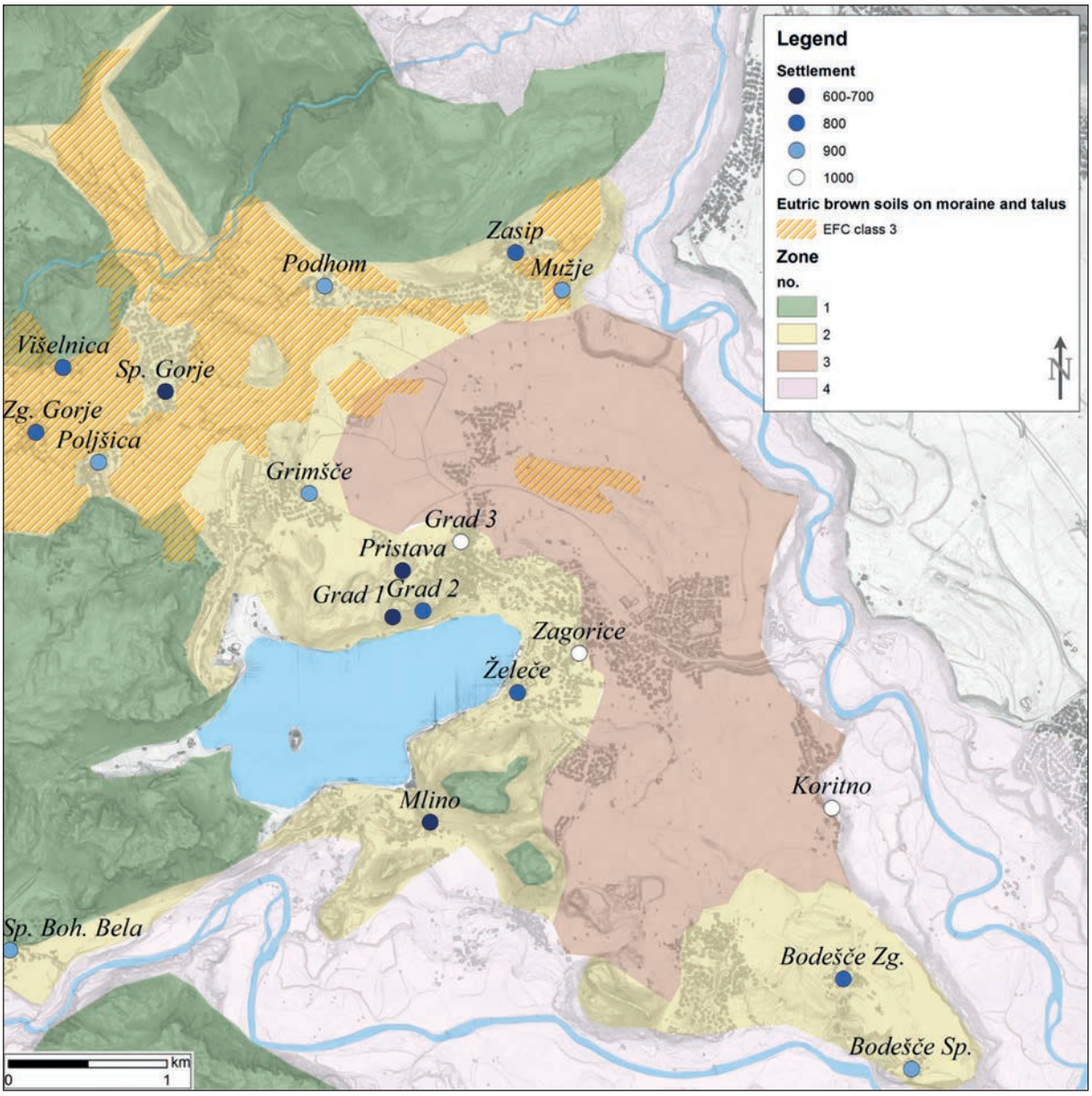

Fig. 2: Bled microregion, brown soils with high capacity to retain water (marked with dashed lines) and physiographic zones. The areas most suitable for barley-based agriculture are located at the intersection of the dashed lines and yellow Zone 2 and the areas suited for wheat-based agriculture are in Zone 3 (after Lozić 2024, Fig. 7).

less fertile soils with high FC that much more attractive for Early Medieval agriculture?

The analysis of land use characteristics suggests that soils with high FC were sought after to minimizes the risk of exposing crops to water stress (Lozić 2021, 15–17). This conclusion is noteworthy for two reasons. First, it can be used to predict the landscape contexts suitable for Early Medieval settlement throughout the region. Second, it helps to elucidate the characteristics of Early Medieval agriculture in the Eastern Alps. While the first is the subject of ongoing research that aims to map suitable soils in the entire region, the latter can be discussed here. What were the characteristics of Early Medieval agriculture in the Eastern Alps?

Early Medieval Slavs had a limited choice of the staple field crops available. Rye (*Secale cereale*), wheat (*Triticum* sp.), oats (*Avena* sp.), barley (*Hordeum* sp.), and millet (*Panicum miliaceum*) were the main cereals in the western Slavic settlement area (present-day eastern Germany) (Brather 2008). In Southern Russia we know of wheat and barley (Korobov 2012). The first Slavic settlers in northwestern Russia brought with them a great variety of cereals and legumes, but only the crops

that guaranteed agricultural success in the colder north were kept in cultivation: barley and rye (Alslebe 2012). Closer to the Bled microregion, wheat, barley and rye were the most common crops at Roztoky (Czech Republic: Profantová 2005; Machaček et al. 2024). In Thunau (Austria), both in the settlement and in one of the graves, the most common cereal remains were wheat, millet, barley, and rye (Teschler-Nicola et al. 2018). In Kleinklein (Austria), the contents of a settlement pit revealed barley, millet, and rye (Heiss, Wiesinger 2019). On Bled Island, the central location in Bled, charred barley and millet grains were recovered, but are C14 dated to the mid-13th century (Bitenc, Knific 2020, 84). Therefore, the Early Medieval Slavs, like other contemporary Europeans, relied mainly on wheat, barley, rye, and millet.

Of these, barley has the greatest ecological amplitude and is able to cope with extreme ecological conditions (Brouwer 1972). It was grown, for example, in Highland Britain (Gillingham, Griffiths 2000), in Scandinavian northwestern Europe (Hamerow 2002), and even in the Faroe Islands (Arge et al. 2005). Regardless of climate, barley was the dominant crop in western Europe and Britain at the beginning of the Early Middle Ages (Brather 2008), where it was important enough to warrant a special barley tax (Wickham 2005). Wheat in western and rye in northwestern Europe had replaced barley as the dominant cereal by the end of the Early Middle Ages (Hamerow 2002).

There are many differences between wheat, millet, barley, and rye. Most pertinent to our discussion is that while millet and rye have exceptional drought tolerance, wheat and barley do not. Under rainfed conditions they suffer from drought resulting in significant yield loss (Hossain et al. 2012; Sveinsson, Hermannsson 2017). Consequently, it is barley and wheat that require soils with high FC. Between the two, barley is better suited to colder climate because it matures earlier. In addition, it has greater tillering capacity and competes better with weeds, but generally yields less (Taylor, Cormack 2002). Wheat can potentially achieve high yields, but for this potential to materialize it requires more labour and more complex cultivation including manuring. The latter requires a complex mixed agriculture that includes sophisticated animal husbandry (Campbell 2000; Hamerow 2002). Thus, wheat cultivation is optimal for a relatively high and barley for relatively low degree of agricultural organization.

In the particular case of Bled from late seventh to the tenth century exclusively light but stony soils with a high FC were cultivated (*Fig. 2*: Zone 2). Due to their high FC, these soils are suitable for both wheat and barley cultivation. However, as wheat requires more intensive cultivation, the stony soils were far more suitable for growing barley. There are two additional pieces of evidence suggesting that barley was indeed the principal field crop. First, barley was the cereal of choice for the Slavs when they settled in what they perceived as colder climates, such as the above-mentioned colonization of northwestern Russia (Korobov 2012); the subalpine climate of the Bled microregion is colder (under any climatic conditions) than the areas from which the Slavs were arriving, for example, from the western edges of the Pannonian plain that they settled already in the sixth century (Pavlovič 2017). Second, under rain-fed conditions, barley, unlike wheat, prefers high FC to all other soil properties (Hossain et al. 2012; Sveinsson, Hermannsson 2017).

We can therefore infer with high degree of certainty that from the seventh to the tenth century barley was the staple crop in Bled. The analyses of the soils and agricultural potential in the other two microregions, Leibnitzer feld and Dravsko-Ptujsko polje (the Drava Plain), revealed the same adaptations to the local conditions: soils with high FC were prefered over all other characteristics. This tells us two things. First, Early Medieval agricultural systems in all three micro-regions were barley-based. Since the micro-regions were chosen to best represent the different landscape types and historical conditions in the Eastern Alps, we conclude that it is very likely that barley was the staple crop of the period throughout the Eastern Alps. Second, unlike in Bled, in the Leibnitzer feld and Dravsko-Ptujsko polje the Slavs colonised a forested landscape that had been all but abandoned at least a century earlier (Štular et al. 2022, 9–11; Magdič 2024 in this volume). The fact that the "barley fields" were the first to be colonised proves that it was the immigrant Slavs who introduced the barley-based agricultural system in the Eastern Alps and not vice versa.

In conclusion, based on the analyses of the soils worked by the Alpine Slavs we can infer that their staple crop was barley. Barley-based agricultural system is a low-complex one that favours stability over quantity of the yields and is thus suitable for self-sufficient societies.

3.2 TRANSITION FROM LATE ANTIQUITY TO THE EARLY MEDIEVAL PERIOD

The conclusion that the immigrant Slavs introduced the barley-based agricultural system in the Eastern Alps is important for the Early Medieval agricultural history. But also so much more! It offers a new insight in the acculturation processes taking place during the Early Middle Ages throughout, and possibly beyond, the Eastern Alps.

Let us first look at the transition from Late Antiquity to the Early Medieval period. Late Antiquity was the period when the key achievements of Romanitas were in recession but still present. Putting the art, science, and warfare aside, the key designator of Roman Antiquity was urbanization and its inseparable companion the

market economy. In Eastern Alps both urbanization and market economy have decidedly declined after the middle of the fifth century. However, in limited quantity they persevered at least until the end of sixth century. The small hilltop towns were still integrated in the monetary market economy network including regional and long distance trade as evidenced by archaeological finds of imported pottery and coins (e.g. Kos 2020; Modrijan 2020; Leskovar et al. 2024, 603). *Carnium*, today's Kranj (Sagadin 2020a, 21; Sagadin 2020b, 208–210), was the last urban settlement in the Eastern Alps and thus the only local market accessible to the inhabitants of Bled.

There are limited data on Late Antique agriculture. In the Roman period, the staple agricultural product was undoubtedly wheat. *Panem et circenses* (sic), bread of course being the most common food made from wheat. For this purpose, in Bled the fertile soil with low FC, which was most suitable for wheat but exposed to crop failure due to drought, was cultivated (*Fig. 2:* Zone 3). This is evidenced by pottery shards in the fields and by the location of the first and second century CE settlements at Zasip and Želeče which are adjacent to these fields (Pflaum 2010; Lozić 2019). But until when were these fields used? Numerous finds of ploughs and other tillage tools in hoards (e.g. Ciglenečki 1983, 50–53; Bitenc, Knific 2001, Nos. 146, 167) clearly indicate that at least some of the residents of the Late Antique hillfort towns of the sixth century were directly involved in field work. Since in Bled the "wheat fields" were adjacent to the hillfort town (*Fig. 2*) and no other fields were being cultivated at the time, we can infer that they were still in use in the sixth century. The legacy of Romanitas, the existence of the market economy, and the choice of "wheat fields" thus point to a wheat-based agricultural system in the micro-region of Bled in the sixth century.

This is further supported by two linguistic hypotheses. First, in several Balkan Slavic languages the word for bread ("kruh" in Slovenian) was developed at the time when the Slavs were in contact with the Late Antique population (Bezlaj 1964). Second, the terms describing wheat preserved as geographic terms are of Latin origin (Bezlaj 1958, 689). In other words, when the Slavs encountered the Late Antique populations the latter's staple food was bread and their staple crop was wheat. Therefore, there is sufficient evidence to infer that the Late Antique population of Bled practiced highly-complex wheat-based agriculture geared for market economy that favoured high yields (higher profit) and was able to absorb occasional crop failure (imported food could be bought on market).

However, from the middle of the sixth and especially in the seventh century the era of modest market economy was drawing to a close. One aspect of the ensuing changes was the ruralisation of the surviving cities (Bratož 2014, 569–582; Pohl 2018, 149; Ciglenečki 2023, 149–166), including *Carnium*. With its ruralisation the inhabitants of Bled lost access to the market. The only agricultural system they knew, namely complex wheat-based one geared for the market economy was thus becoming less and less suitable.

As a result, the sixth century Bled population was repeatedly under nutritional stress evidenced by the cemetery of Pristava. Of the 380 graves, 147 were dated to the 6th and early 7th century and belonged to the Late Antique population. 233 graves, dated from the early 7th century to the beginning of the 11th century, belonged to a different population, presumably the Slavic immigrants. The graves of the two population groups were located next to each other, but on separate plots with distinct grave goods and burial customs (Knific 2004; Pleterski 2014, 264, Fig. 3.3.6.34; Belak et al. 2023, ID 10003456). Anthropological analysis has revealed further significant differences between the two populations. The denture analysis of the Late Antique population reveals repeated nutritional stress, but not in the Slavic population. In addition, the life expectancy of the Late Antique population was 18 years and that of the Slavic population 27 years. This is an enormous difference that places the two populations at the extreme ends of the contemporary sites (Leben-Seljak 1996, 30–65 and 232–236). In particular, the life expectancy of the Late Antique population from Bled was the lowest of all. This indicates not only a population in distress, but possibly a population on the verge of collapse (*Fig. 3*). Recent interdisciplinary analyses of four individuals' skeletal remains from the Late Antique population of the Pristava cemetery, buried in the middle of the sixth century, tentatively confirmed malnutrition for all of them (Leskovar et al. 2024).

Therefore, when the Slavs immigrated in the Bled micro-region they encountered an isolated community in crisis practicing wheat-based agriculture. The immigrants settled amicably which is evidenced by three facts. First, at the beginning the two populations were sharing the Pristava cemetery, respecting each other's space and rituals (Knific 2004). Second, the Slavs colonised new fields in areas not cultivated by existing population and they eventually established new settlements (Pleterski 2013b). Third, there was a bidirectional transmission of agricultural knowledge and tools.

The bidirectional transmission is directly evidenced in Bled by the Sebenje hoard. It was deposited in the first third of the nineth century containing the equipment of a cavalry soldier and the entire set of farm tools. Among the latter were three ploughs, which have complemented each other in terms of utility. One was the Slavic ard and another the Alpine plough (Pleterski 1987). Alpine plough was an unmistakably regional development of the late prehistory (e.g., Bartoli 2017) still in use in Late Antiquity (e.g. Ciglenečki 1983, 50–53; Bitenc, Knific 2001, Nos. 146, 167v), but without Early Medieval paral-

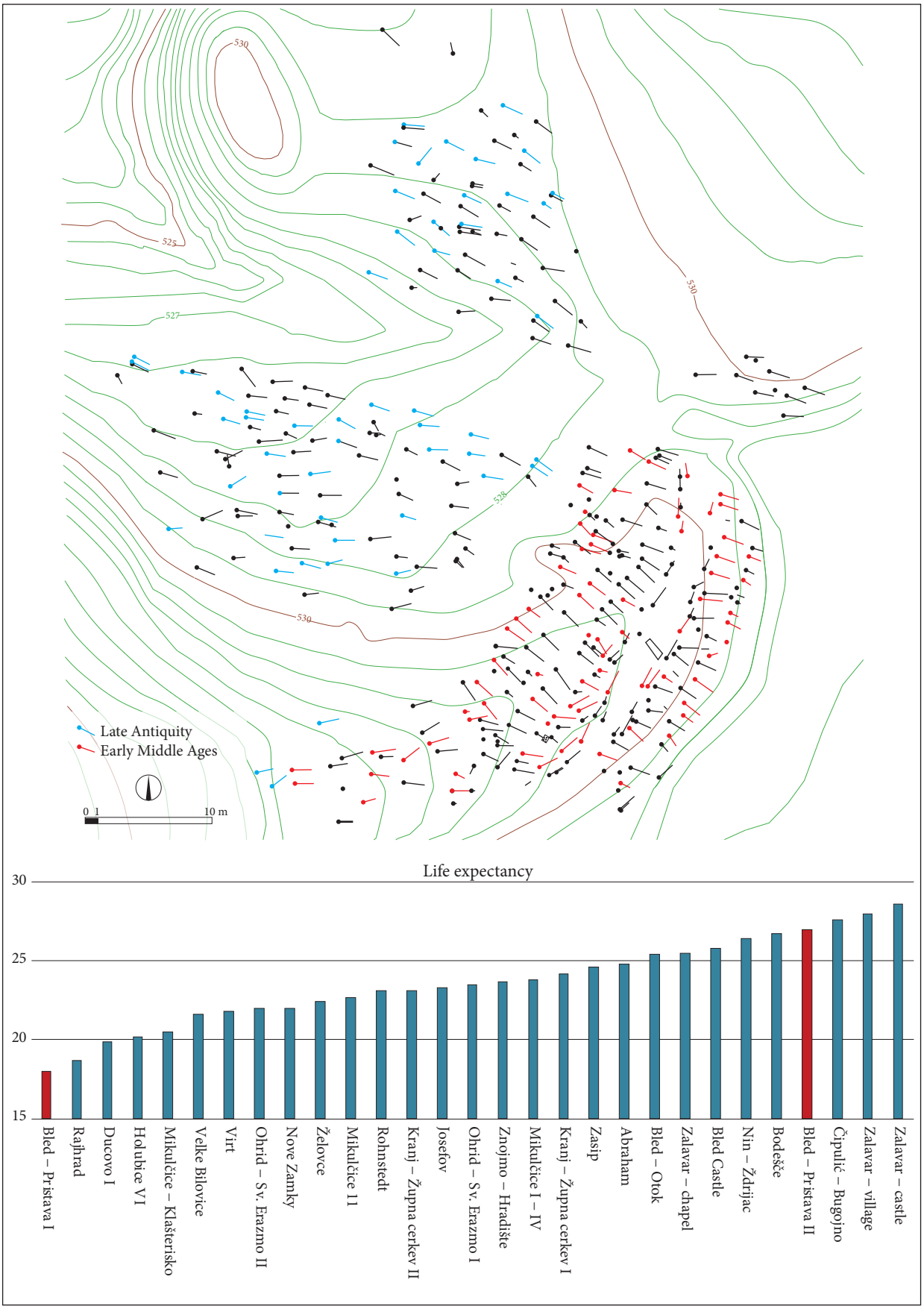

Fig. 3: Bled – Pristava, Late Antique ("Pristava I") and Early Medieval ("Pristava II") cemetery (above; after Knific 2004, Fig. 3) and life expectancy in comparison to the selected contemporary cemeteries (below; after Leben Seljak 1996, Tab. 155).

lels outside of Eastern Alps. Therefore, it could only be transmitted by the Late Antique population to its heirs. The fact that the Sebenje hoard contains both a Slavic ard and an Alpine plough is therefore direct material evidence that the population of Bled in the ninth century were the heirs of a bidirectional transfer of agricultural knowledge between the Late Antique population and the Slavs.

The amicable settlement of the Slaves in the Eastern Alps is not a new discovery. In addition to the above archaeological evidence, there is also linguistic and historiographical evidence. Linguistic evidence comes from an antiquated Slovenian term "krščenica" (translation: baptised woman) for a female farmhand. The word dates back to the time when the servants were Christians but not yet their masters (Kos 1902, XXV). Such a situation is described in the late eight century anecdote from the Eastern Alps about the priest Ingo and his feast. Ingo called the true believing servants (Latin *vere servos credentes*) to his table. He left those who ruled over them, the unbelievers (Latin *qui eorum dominabantur infideles*), sitting outside "like dogs". This inspirited the latter, believed to be the Slavs, to rush to the baptism (Kos 1902, No. 336; Wolfram 1979, 96–102). The term "krščenica" and Ingo's anecdote are often cited as an indication of lower social status of the Christian population living among the Slavs (Štih 2010a, 165; Pohl 2018, 144). Importantly, from the perspective of agricultural system, this is also evidence that the two populations cohabited within households.

Two further contemporary sources from the Balkan region provide additional context for the cohabitation of Slavs with "others". The *Strategikon* of Maurice and the Miracles of St Demetrius (*Miracula Demetrii*) report that the Slavs did not keep prisoners in eternal captivity. Rather, they sold them back or allowed them to live among them as equals after a certain period of time (Pleterski 2013b, 27; Pohl 2018, 151). Even if there were no prisoners in the example of Bled, these sources account that the Slavs were accustomed to fully accommodate outsiders into their community.

In summation, the Late Antique community of Bled was forced into a self-sufficient economy due to external global factors, the decline of market economy. Its wheat-based agricultural system became increasingly unsustainable and it was on the verge of collapse. However, the relatively small and isolated community apparently lacked the knowledge and/or resources to decisively alter the agricultural system. The much-needed new barley-based agricultural system optimised for self-sufficiency was introduced by the immigrant Slavs.

The new agricultural system was crucial to the ensuing acculturation process that can be explained in four successive steps.

First, since the wheat-based and barley-based agricultural systems utilised different resources, the Slavs were able to colonise the required fields amicably because they were of marginal interest to the Late Antique population (as evidenced by archaeological analyses by Pleterski and Lozić and indirectly by the word for bread). For a limited period of time, the two communities coexisted peacefully as equals (as evidenced by the brief overlap of the two populations in the Pristava cemetery).

Second, the barley-based system was much more successful in feeding the population (as evidenced by the anthropological analysis of the human remains in the Pristava cemetery).

Third, the Late Antique community switched to barley-based system (as evidenced by the abandonment of fields with low FC); it seems that it experienced a downward social mobility during this phase (as evidenced by written sources and linguistic evidence).

Fourth, sharing resources and knowledge as well as cohabitating in same settlements (as evidenced by the archaeology of Bled) and even same households (as evidenced by written sources and linguistic evidence) led to intensive acculturation.

Specifically, the type of acculturation can be described as an inverse integration: individuals from host population (Late Antique community) adopted the cultural norms of the dominant immigrant culture (Slavs) while maintaining their culture of origin. This lead to biculturalism, co-existence of two originally distinct cultures, also termed polyethnic society by modern historiographers (Pohl 1998, 42; Eichert 2011) and evidenced by the anecdote about Ingo from the eighth century. The bicultural society had mixed material culture (evidenced by a distinctive material culture (e.g. Eichert 2012) including agricultural tools) but eventually the Slavic language (as evidenced by the modern Slovenian language, which is Slavic) and religion prevailed (as evidenced in numerous cemeteries, e.g. Štular 2022).

The new society was known to the contemporary observes as *Carniola Sclavorum patria*. The name itself encoded the biculturalism. *Carniola* designated the location by using a pre-Latin word derived from **kar*, which recurs in various place names of rocky or stony landscapes and was used in a name of a pre-Roman tribe Carni. (e.g. Vedaldi Iasbez 1994, 239; Winckler 2012, 333); this was the legacy of Late Antique population. *Sclavorum patria* signified an externally imparted Slavic identity which was most likely due to the Slavic language and subsistence economy (which also determined other external markers, e.g., dress, dress accessories, housing).

3.3 TRANSITION FROM EARLY TO HIGH MEDIEVAL PERIOD

The community of Bled from the seventh to tenth centuries was therefore a successful self-sufficient one that practised uncomplex barley-based agriculture

on the "barley fields" with a high FC. However, in the eleventh century they expanded into areas of soil with lower FC. Why? We believe that this too was caused by an external impetus, a global process of transition to a feudal society.

In 1004 CE, parts of the Bled microregion were bestowed to the bishops of Brixen by the emperor Henry II (Štih 2004, 2011). This deed was much more than a routine exchange of ownership. It signified the assertion of direct control over Bled by the Kingdom of Germany for the first time in more than a century (for the historical context, see Arnold 1997; Štih 2010a). The Brixen came into possession of a small estate and all lands in Bled that were not directly farmed by existing owners (Štih 2004), including the then forested area with low FC soils.

The agricultural organisation of the new owners was based on the complex manorial system. The manorial system was a subsistence economy geared towards stability, based on strategies of risk avoidance through diversification of resources and redistribution through storage and transport (Meier 2011). Wheat was the most important staple crop in this system (Hamerow 2002). In other words, still in the absence of significant market economy and monetary circulation, this complex agricultural system was optimised for the cultivation of wheat and designed to routinely cope with local crop failures by resupplying from distant estates. For example, the see of the bishops of Brixen, today's Bresanssone in north Italy, is located some 200 kilometres west of Bled (as the crow flies). Remote enough to avoid concurrent local crop failures, but close enough to transport supplies.

Wheat-based agriculture was likely first introduced to Bled in the eleventh century in the two settlements that colonised the previously forested "wheat fields", i.e., the soils that are most fertile and most easily accessible in the microregion, but have a low FC (*Fig. 2:* Zone 3). The complexity of the new system also involved changes in animal husbandry, which included an increasingly complex system of summer pastures in the mountains (Štular 2006b). This is evidenced by the fact that since the eleventh century the Brixen estate was eager to take control of Bled's mountain pastures (Pleterski 2013b, 147).

As already indicated, complex wheat cultivation on fertile soils with low FC produced high yields on average, but under rainfed conditions it was exposed to occasional drought. Under the new manorial system, which enabled resilience through redistribution, growing wheat was on average more fruitful than growing barley. Thus, eventually wheat-based supplanted the barley-based system at the latest when, in the eleventh and twelfth centuries, farm by farm, much of the land passed into the direct ownership of the bishops of Brixen (Gornik 1990; Štih 2004; 2011; Pleterski 2013b). It is not inconceivable that the efficiency of the wheat-based farming was one of the driving forces behind this change in ownership. Although the first two settlements that practiced wheat-based agriculture were not founded directly by the bishops of Brixen (Pleterski 2013b) it was the newly introduced manorial agricultural system that enabled the transition to the wheat-based agriculture.

3.4. LONG-TERM SUCCESS OF SLAVICISATION

The agricultural shifts described above in the seventh century and the eleventh century are seemingly the same process in reverse. The shift from a high- to a low-complexity agricultural system is followed by the shift from a low- to high-complexity system, both facilitated by external factors. However, from the perspective of acculturation the results of the two processes were not the reversal, but the opposite. As a result of the first shift, the identity of the Late Antique population melded into the cultural melting pot in a very short time, effectively all but erasing its original form. The shift in the eleventh century had no such consequence despite the political and economic dominance of the newly arrived German-speaking landlords, that persisted for almost the entire second millennium (e.g., Štih 2010a) and was accompanied by a noteworthy and long lasting immigration of German-speaking agrarian population (Štih 2010b, 63–65). The question arises: why? Comprehending the distinctions between the seventh and eleventh century agricultural shifts leads to a deeper insight into the nuances of Slavicisation and the acculturation dynamics of the seventh century.

As typical of most self-sustaining agricultural societies, the Slavs' agricultural practices were all encompassing. The interconnected subsystems of economy, law, religion, and governance coalesced into a unified belief system (Pleterski 2014, 236–286). Why a belief system rather than a knowledge system? Abundant anthropological evidence suggests that in pre-industrial societies, knowledge is imparted during childhood through involvement in daily tasks. In adulthood, this is internalized not as learned knowledge but as an innate truth of life (Leroi-Gourhan 1990, 24–27; Gosselain, Livingstone Smith 2005, 41–43; Štular 2009, 113–114). Thus, it's not a matter of *learning* that "for optimal yield the crops are sown in spring when the median daily temperature reaches 15 degrees Celsius," but *believing* that "when Perun vanquishes Veles, it's time to return to the fields". The vestiges of this belief system, albeit modified by new agricultural technologies and Christianity, persisted into the 20th century in the form of *pratika,* small books (almanacs) that combined calendar with proverbs mixing religious and farming advice (Makarovič 1995, 47–52).

Thus for the seventh century Bled population the shift to barley as a staple crop entailed far more than merely acquiring novel tools and seeds. It dictated the

entire culinary system, which, in turn, was deeply entwined with the broader household culture (Pleterski 2008). Similarly, the positioning of the household was determined by the proximity to the fields (Štular 2006a). The shift to barley represented a comprehensive, profound, and immediate transformation of nearly every facet of life: the location of the household, the cuisine and its apparatus (including pottery), dietary habits, the annual cycle of activities, and most significantly, adopting the agricultural knowledge embedded within the belief system. In essence, a successful harvest was intricately and indissolubly linked to the notion of god(s).

However, the eleventh century shift was a transition to a high-complexity agricultural system that was not embedded in an all-encompassing structure, but rather in separate subsystems. Religion (Christianity) was transmitted concurrently, but separately from the agricultural system. Economics (landlords with financial ambitions), law (which later culminated in *Sachsenspiegel*) and governance (King) were separated from religion and to a certain degree from each other; not as separated as in post-Medieval states, but far more than in Early Medieval subsistence societies. Therefore, the agricultural shift in the eleventh century Bled did not lead to a profound change in identity that would remould the identity and undo the Slavicisation. Such a process did, however, take place in the north-eastern Alpine region, but that is another topic we will explore elsewhere (see the project Religiopolitics – the Imperium Christianum and its Commoners).

4. CONCLUSION

The foregoing discussion may seem to have predominantly encompassed the historical evolution of agriculture. The agricultural shift in the seventh century, transitioning from a more complex wheat-based to a rudimentary barley-based agricultural system ostensibly manifested as an agricultural anti-revolution. It was necessitated by the externally induced decline of market economy and was enabled by the introduction of know-how by the immigrant Slavs. The eleventh-century transformation almost mirrored that. To render the estates lucrative, the new landlords implemented the manorial system, a sophisticated wheat-based agricultural framework. This transition was also facilitated by emergent external factors: incorporation into the Kingdom of Germany and the access to a network for the efficient redistribution of agricultural produce.

However, understanding the agricultural anti-revolution enabled us to elucidate the process of acculturation that took place after the immigration of the Slavs, i.e., Slavicisation. We inferred that in the Bled case it was a four-stages process. First, the Slavs colonised the fields that were of marginal interest to the Late Antique population thus facilitating amicable co-existence. Second, the agricultural system of the Slavs was more successful in feeding the population. Third, the Late Antique community switched to the new system and likely experienced a downward social mobility in the process. Fourth, sharing resources and knowledge as well as cohabiting led to intensive acculturation which we described as an inverse integration. Individuals from the host population adopted the cultural norms of the dominant immigrant culture while maintaining their culture of origin. This lead to biculturalism, co-existence of two originally distinct cultures, preserved in historical sources as *Carniola Sclavorum patria*.

Based on this our comprehension of the "becoming Slav" process in the Eastern Alps has significantly improved. Central to this understanding is discerning the cause and effect in the transition from Late Antiquity to the so-called Dark Ages – the classic chicken or egg dilemma. Previously, it was presumed that the Slavs precipitated the final collapse of the remnants of the Late Antique Roman world, subsequently relegating themselves to a proverbial state of poverty, characterized by a low-technology society devoid of monetary systems and market economies. However, our findings suggest the contrary. They portray the Slavs as rescuers, who introduced an agricultural system optimized for the pre-existing conditions of dramatic economic decline. They potentially saved the remaining Late Antique population from a dire existence or even extinction by starvation. For several ensuing centuries, existing on the fringe of empires, the new society, forged by both indigenous and immigrant populations, appears to have offered a desirable life, marked by high life expectancy and minimal famine occurrences.

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IMAGES BEHIND THE ARCHAEOLOGICAL CURTAIN: VLACHS, SLAVS, ŽUPAS, PRINCIPALITIES, CARANTANIA

Andrej PLETERSKI

Slovenian early medieval archaeology has not been aware of the "*tyranny of the historical record*". This record has always structured the interpretation of the archaeological evidence.
[Irena Mirnik Prezelj 1998, 380]

I wish Irena [1955–2018] would be the first to read my study, and that she would experience moral satisfaction while doing so.

Abstract

The Slavs were people who, as survival opportunists, lived on the border between wet and dry environments, who cremated their dead, who had elaborate ideas concerning the landscape of the dead, and therefore mound shapes and slopes towards the south-east were important to them. According to current data, they arrived in groups from the end of the 5th century onwards. The ancient Vlachs as oldsettlers knew how to survive in the mountains, but they occasionally also inhabited the plains, to where they descended by the 9th century and merged with the Slavs who were already living there. Linguistically, the Slavic language was clearly dominant. The mountainous and dry karst world requires special skills for survival, which the Slavs did not master. Without the cooperation of the Vlachs, this world would be abandoned.

While studying the relationship between the influential spaces of churches and burial sites without churches, an archaeological tool was revealed that outlines the political relations and the extent of authoritarian power at the time the church network was emerging. According to this, the small starting point of Carantania appeared at the beginning of the 9th century, as did many individual župas as primordial political communities in the 9th and 10th centuries. They formed the foundation that has retained its importance in many places to this day.

Keywords: Vlachs, Slavs, Eastern Alps, Early Middle Ages, settlement, Christianization, churches, places of political power, župa (Slavic primordial political community), Carantania

1. WHAT THE READER CAN EXPECT

The research question is: *what can we establish from the analysis of sites as data documents about the South-eastern Alps in the period between the 5th and 11th century?* The question was set broader that the title of the project, within which this analysis emerged, would demand: Settlement of the South-eastern Alpine region in the Early Middle Ages (https://iza2.zrc-sazu.si/en/programi-in-projekti/settlement-south-eastern-alpine-region-early-middle-ages). I draw attention to the notion of a **site as a data document**. This is a data structure that is part of the ZBIVA database (for a detailed description see *3.3*), just as other data structures, graves and artefacts are also a part of it. The analysis includes only sites as data documents (see *Limitations* below). The discussion indicates only the possible connections and their interpretive potential to other data structures. Therefore, the purpose of the presented study is not a complete synthesis of the existing knowledge on life in the South-eastern Alps and the periphery during the Early Middle Ages, but primarily an analysis of what can be extracted about the settlement from the archaeological sites. Therefore, I do not delve into the review of non-archaeological, especially written sources for the time and area under consideration.

This means that my discussion answers the above-mentioned question, but also poses many new research questions, which will be answered only once an adequate volume of collections of other types of data structures is established.

The area covered by the research (see Štular, Lehner 2024, Fig. 1 in this volume) is diverse in all respects: geologically, biologically, culturally, politically, economically, historically. It is merely a mosaic of countless individualities that are constantly changing. Any generalization would be unfair to the particularities that manifest themselves on the regional or micro-regional level, yes, even on the level of an individual site. If, nevertheless, I risk certain general conclusions, this is because the entirety cannot be placed into words in any other way. Having said that, I am fully aware that the details I have overlooked, or that are yet to emerge, may fundamentally alter my current general findings.

The research covers merely a certain period. The downside of any time slice is that we are not certain what came before it and we do not understand what followed it. Traditionally, the 6th and 7th centuries have been regarded as a turning point for the territory in question. This period represents an imaginary break between Late Antiquity and the Early Middle Ages (on the vagueness and looseness of this type of periodization see: Mirnik Prezelj 1998). In order to question this turning point, we included the 5th century into our investigation. And while the turning point of these two centuries is, in many ways of lesser importance than we considered until now, we have missed another, perhaps even more important turning point. If we would have included also the 4th century it would be even more noticeable what great civilizational changes were taking place already at that time (for more on spatial, temporal, and informational limitations see *3.2.1*).

I did not know what the cognitive possibilities of the proposed research were, and there were no established research methods available for it either. My work took place alongside the digital analysis of the settlement process in the same territory. This included space-time pattern mining, time series clustering to classify sites into chronological groups and the so-called hot spots analysis, that connected everything together spatially and determined the consilience with linguistics and genetic history (Štular et alii 2022). Compared to my time-consuming work, the analysis, which used mathematical algorithms, was lightning fast. However, on their own, algorithms fail to offer an interpretation, as they do not explain what they show, and thus leave the freedom to our imagination. Since we are unfamiliar with the historical process in which the structure was created, there is a great risk that it could be misinterpreted (Pleterski 2001a). The slower process enables the recognition of historical processes and provides a chance for a better interpretation. This is not to say that mathematical algorithms are useless, by no means. However, they need the addition of various interpretive tools to interpret their results.

My study is not an overview of the existing publications and their brief content on the topics they address. For bibliographic questions arranged by individual topics, please see the Libera bibliographic database for the Early Middle Ages of the Eastern Alps (https://zbiva4.zrc-sazu.si/en/iskanje/literatura). In archaeological publications, we are used to dealing with artefacts, graves, structures, individual sites. In recent decades, various digital tools (GIS, LiDAR) have enabled the expansion of spatial research. I focused my research on sites as artefacts and their interrelationships. I carried it out in a digital environment (see *3.3*), as this task would not be feasible in any other way. In the presented initial stage, the spatial analysis digital tools have been used merely to a small extent, but I hope that the results present a sufficient challenge for the subsequent use of such tools to the greatest possible extent.

Even though the first steps of my analysis showed that the issue of settlement would be at the forefront, eventually the issue of political organization came to the fore, of course at the level of primordial political communities (see below *3.2.2*). Since these were related to the organization of space, they could be detected archaeologically. And since it increasingly seems that spatial-political units represented the basis for identifying individuals, they are also related to identity questions that arise in the face of population changes. These are research topics that researchers have so far tried to answer primarily with the help of written sources. I accepted the challenge of questioning some of their interpretations with the help of the new perspectives provided by analysing archaeological material. This also resulted in some completely new views of the past. I use written sources only as much as this is necessary for a better understanding of archaeological issues. In view of this I hope I will not be accused of establishing a tyranny of the archaeological record.

2. THE STATE OF KNOWLEDGE

45 years have passed since Paola Korošec's large, two volume monograph *Zgodnjesrednjeveška arheološka slika karantanskih Slovanov* [*Early Medieval Archaeological Image of Carantanian Slavs*] (1979). The first volume addresses the division of archaeological material into cultural groups, followed by the typochronology of artefacts, while the second volume includes a catalogue of 242 sites and 162 plates of selected artefacts. Although it does not involve written sources at any point, the

goal of the work is set in the perfect spirit of the then unconscious tyranny of the historical record (for more on this concept see Mirnik Prezelj 1998). Only in the last sentence of her book did Paola Korošec state her goal and express her belief that she has achieved it, as she supposedly used archaeological sources to support the idea that the oldest Slavic state with a multi-layered social organization was created on the territory of the Eastern Alps (Korošec 1979, 330). She did not describe its borders and social organization, nor did she write about the way of life that could be shown by the archaeological material. However, the ambition of her work is clear. While Bogo Grafenauer relied on written sources to prove the state of the Carantanian Slovenians (Grafenauer 1952), she included archaeological sources that supported her findings. While Bogo Grafenauer founded the state of the Carantan Slovenians with written sources (Grafenauer 1952), she did the same with archaeological sources. If one wished to add anything to her findings or even alter them, one would first have to expand the dataset, master new information tools and set new methodological starting points (briefly Štular, Pleterski 2018). Of course, one also had to wait for over four decades for all of this to take place.

Before one starts a comparison between new and old knowledge, one needs to be familiar with at least the rough outlines of what we believe we know. I emphasize, what we believe we know. At this, I will help myself with a certain shortcut, for I will focus on the studies by two authors who have made an effort to carry out extensive overviews. Both were created far enough outside of Slovenia that the authors were forced to find what they considered to be the prevailing opinion. Namely, they could not build their view on primary information sources, but could only rely on existing interpretations. What was worthy of their attention?

In 1995, the Russian archaeologist Valentin Vasilevich Sedov published a monographic overview of the Slavs in the Early Middle Ages (I used the Serbian translation: Sedov 2013). In the basic interpretive terms, which he did not define, he leaned upon archaeological cultures (also cultural communities), ethnolinguistic communities, tribes, ethnicity. He believes that the ethnic tribes that the Slavs encountered during the Great Migration, had a significant influence on the formation of Slavic cultures. He also believes that the Early Middle Ages is the period in which the conditions for the beginning of individual language groups among the Slavs began to appear (Sedov 2013, 9–10). His interpretive ideal is an archaeological culture that spatially corresponds to a linguistic group or a political territory. In the first part of the book he shows a series of archaeological cultures that were determined by the forms of burials, dwellings, and artefacts.

For our work, the second part of the book is of greater importance, as this addresses the formation of Slavic nations and states. It contains a chapter on the Alpine Slavs (Sedov 2013, 382–393). Its visual core is represented by two maps that apparently overlap. The first shows the political territory of Carantania (Sedov 2013, Fig. 78). Sedov summarized its borders from Grafenauer's map in *Zgodovina slovenskega naroda I [History of the Slovenian Nation I]* (*Fig. 21*), but added the territory south of the Karavanke mountain range all the way to the Kolpa river, which was said to have been reoccupied by the Avars after the collapse of Samo's tribal union (Grafenauer 1964, Map XV, 332). In this way, he limited the area in which most of the sites he summarized from Korošec (Korošec 1979, Appendix 4) were located and called this area the Carantanian culture (Sedov 2013, Fig. 79). From the matches that were thus created, he came up with the interpretation that the formation of the Principality of Carantania and the stabilization of the living conditions united the Slavic population in the Alpine region, for which he found confirmation in the fact that this area in the 8th century, also formed a unified archaeological culture (Sedov 2013, 386), which is determined by certain forms of jewellery. The Carantanian culture testifies to the ethnic unification of the Alpine Slavs. It is obvious that with its formation and development, the process of the creation of a special Slavic nation of Carantanians began. The loss of national independence and the unification brought by Christianity interrupted the process of its formation. Today, the descendants of the Alpine Slavs are represented by Slovenians. The formation of their language apparently began during the Principality of Carantania (Sedov 2013, 389–391). Thus, Sedov seemingly consolidated the consensus of the interpretation of written and archaeological sources, as established by Grafenauer and Korošec (see above).

The importance of Carantania as a political formation is such that it can be found in any broader overview of Slavic history. This was also shown in an extensive monograph by the German historian Eduard Mühle that addresses the Slavs in the Middle Ages and in doing so verifies the modern idea of the former Slavic community (Mühle 2020). As expected, such a community is not supported in medieval sources. It is important for us that in the chapter on the first Slavic statehood formations (*Herrschaftsbildungen*) he also discusses Carantania in great detail. This is a story addressing the formation and disintegration of the Carantanian identity, how the Carantanian social elite drowned amongst the aristocracy of the medieval empire. The Slavic language was to a great extent preserved by the common population, which was labelled *Windische* or *Slovenes* from the Late Middle Ages onwards (Mühle 2020, 151–157). Mühle believes that the archaeological evidence of the social elite can be found in the graves with weapons and in luxurious stones richly decorated with interlaced ornament in proprietary churches (Mühle 2020, 156). The

established idea of the large territory of Carantania as early as the 8th century, differs from Mühle's idea that Borut's Carantania was small and that Borut used the help of the Bavarians to establish himself as a regional ruler. Mühle refers to the formulation in the Conversio (*Quarantanos [...] similiterque confines eorum*, c. 4), when the subjugation of the Carantanians and their neighbours is said to have occurred (Mühle 2020, 154). Herwig Wolfram, who insists on the concept of the large territory of Carantania in the 8th century, claims quite differently that the neighbours (*confines*) are anachronistically meant to be the inhabitants of Pannonia, which was at the time still under the rule of the Avars (Wolfram 2012, 119). This example shows the great interpretive freedom when reading the same written source.

The image of the South-eastern Alpine territory's past and its neighbourhood is thus still based almost entirely on the interpretation of written sources. Carantania represents its political core. This idea was already discussed by historians between the 15th and the 18th century and it thus seems understandable that Anton Tomaž Linhart placed the concept of new Slovenian history on Carantanian foundations (cf. Mihelič 1977, 322). The pinnacle of this concept was established by Bogo Grafenauer (1952).

Since the publication of the Köttlach burial site with enamel jewellery in 1854, archaeological research has focused not only on the excavation process itself, but also on the questions that were raised already at the time: on the period the artefacts were from and to whom they belonged. So far, this debate has focused on typo-chronological discussions, and for a very long time also on the questions of archaeological culture and its ethnic definition. In the current century, new discoveries of settlements and dating with the C-14 radiocarbon method have raised the issue of Slavic migration (more on the latter below). It is characteristic that the recent monograph on Carantania, written by the Austrian archaeologist Paul Gleirscher, is based on written sources, while archaeological artefacts mainly represent merely an attractive decoration (Gleirscher 2018). With this, he proved that the "tyranny of the historical record" exists widely. This is why one might now be taken by surprise at my announcement that I will not escape the fascination with Caratania. However, this will not occur as a result of the way in which it is promoted. There are more written sources about it than about any other part of the Eastern Alpine territory, and these are also accompanied by a significant number of archaeological sources. And when we analyse the archaeological sources, Carantania stands out on its own, albeit significantly differently than the modern interpretations of written sources show.

Above all, this is going to be merely one of the topics that derive from archaeological sources.

3. METHOD

This chapter will present my conceptual starting points that lead and aided me in my research, and explain the used methods.

3.1 PREMISES AND CONSIDERATIONS

3.1.1 The area of influence of churches

Medieval **churches** are not merely a **materialization of Christianity**, but also the materialization of the **political ideology and authoritarian power** of the time. The area of influence of the newly erected churches can be seen on the map as the simultaneous abandonment of burial sites without churches (*Figs. 17; 18*).

Two scenarios. In the Middle Ages, burials in church cemeteries were one of the basic requirements demanded from the newly baptized population (Vargha, Mordovin 2019, 141–145). The implementation of this requirement depended on the political authorities and their power. We must keep in mind at least two possible scenarios, which amongst others, depended on the number of holders of political power. The first scenario focuses on a single ruler who needed ideological support as he tried to rule as a ruler independent from the will of the political community. The teaching that authority is given by God and therefore any rebellion against authority is a rebellion against God himself and worthy of God's punishment was an excellent aid to such efforts. Its starting premise can be found in the 13th chapter of Apostle Paul's letter to the Romans (Romans 13, 1,2), which is repeated in his own words by a member of the highest Saxon nobility, Bishop Thietmar of Merseburg, in his chronicle written at the beginning of the 11th century (Thietmar V, 32). According to the second scenario, Christianization was a collective decision of the entire political community that wanted to preserve a common law, as was the case in Iceland (Íslendingabók, c. VII). According to both scenarios, Christianization was primarily a political decision. Where violent forms of Christianization have taken place, this can be described in modern parlance as the imposition of a world view in the service of a political ideology.

3.1.2 Slavs and the wet environment

The observation that early Slavic settlements throughout Europe appeared on the edges of river banks is well established and widespread. At this, the role of the Pripyat Marshes is unclear and is often used in the literature only as a pejorative metaphor, a so-called Slavic ethnogenesis: Slavs, people from the Pripyat Marshes. So far, we have not yet found an answer to the question

as to what made wet environments so attractive to the Slavs. Why was a wet environment so popular amongst the Slavs? A possible answer is provided by ethnological material on the use of wet areas in Krško polje (Krško Plain) during the 19th and 20th centuries (Rihter 2019). Not only were the wet areas an excellent source of food and raw materials for various purposes, they decisively complemented the dry environment of the higher lying fields. Rihter pointed out that settlements were positioned on river banks, on the border between the upper dry and lower wet environments. This helped the inhabitants decisively rise their chances of survival in extreme weather conditions. In years of drought they were saved by the wet environment, while in the wet years they could turn to the dry environment (Rihter 2019, 12–13). Therefore, both wet and dry environments must be considered. Even Andrej Magdič, while studying the microregion of the Drava Plain (north-eastern Slovenia) within the territory of the South-eastern Alps, noticed that Early Medieval settlements were generally located so that their fields consisted of soils of different pedological classes. If we take a closer look, we can establish that most settlements were not only located on the border area of pedological classes, but were located right on the border of two pedological classes: automorphic and hydromorphic soils (Magdič 2024 in this volume), i.e. wet and dry environments. Even in the alpine environment of the Bled microregion, the Early Medieval settlers were drawn to light soils with high water retention capacity (Lozić 2021). Everything said so far does not mean that the described environmental opportunism was known only to the Slavs, but it was undoubtedly characteristic of them, and it also helped them become masters of survival.

3.1.3 Considering the models

I proceed from the assumption that all current representations of the past are merely models (see the definition *model of the past*). The usefulness of the model is measured by its interpretive power. This shows how much information from the past can be accommodated by the model without breaking down the proposed interconnection of its components. Of course, the model of the past can be completely invented in the present, but in my research, I gave priority to models that were created as close as possible to the space and time under my research. There is an expectation that the proximity of space and time increases the probability of the relevance of the model of the past.

3.1.4 Considering the identities

People identify themselves in a number of ways daily. We do not use all of these identifiers every day, but we use many throughout our lives. At the same time, we belong to various identification communities, and the intersection of these affiliations is changing over time. People in the past also identified themselves, but their identification criteria were undoubtedly different – in many ways – to those we use today.

The idea of ethnic identities as a subject of research (I am not talking about ethnos as a word) arose in the modern era (Jones 2008), when economic, social and political changes led to the emergence of modern nations. Transposing the modern concept of ethnicity as an interpretive tool for defining identity groups into the past cannot be successful, because there is no reason that what we see in the present existed in the same way in the past.

Of course, this does not mean that people in the past did not differ from each other or were similar to each other without realizing it. Of course they did, they just perceived it differently than we do today. Archaeology can reveal a lot about identity groups and their intersections, which speak about what can be broadly defined as a way of life. What was most important for people living this way, besides life itself, is revealed by the worst punishment. This was excommunication and expulsion from the legal community, which means that belonging to a legal community, its space, was the main and basic condition for survival. This was the most fundamental identification, which did not depend only on the will of the individual, but primarily on the respective legal community (see also the terms *župa* and *primordial political community*).

3.1.5 The idea of spatial-temporal axes

In the systematic input of information for the group of sites, it was possible to make many on-the-spot observations of the repetitions of site characteristics and their interrelationships. The chain of connections between the sacred and the authority deserve special attention. Its instances meander through time and yet maintain the same space. We can deal with a single site that changes its functions over time, or several sites from different periods with different functions, all of which were located in the immediate vicinity. In an idealized form, the chain in the observed period begins with a hilltop settlement in Late Antiquity. We do not know whether this was fortified in all instances, because the archaeological investigation of such sites is always different. In any case, over time, a very definite answer will be given to this question. The next link in the chain are the Early Medieval hoardes of metal artefacts (horse and cavalry equipment, weapons, agricultural tools) and shrines at or near such areas. This is a process of sacralization. This is followed by the construction of fortifications as pillars of political power. Individual rulers tried to increase their political influence by appropriating sacred

spaces. With Christianization, these sacred spaces were replaced by churches. By appointing church officials, the circle of power was completed. The construction of castles followed in the High Middle Ages. Of course, many chains are missing some individual links. Partly because they did not have them at all, since development did not always move in the same way. Partly, however, the apparent lack of links in the chain is a result of the lack of archaeological exploration.

3.2 LIMITATIONS, DEFINITIONS, WARNINGS

3.2.1 Limitations

Only all available information sources that have been preserved from the past can show us the holistic history of life in a certain area. As the size of the observed territory increases, the amount of information quickly grows to the point of being unmanageable. This problem can be partially solved by dividing it into smaller segments. What I will discuss below is a cut in different ways: spatial, temporal, informational. As a spatial cut, this addresses the territory of Slovenia, the Trieste part of the Italian province of Friuli, the Austrian federal states of Carinthia and Styria, both in their entirety, and some neighbouring districts of the Austrian federal states of Tyrol (Lienz), Salzburg (Tamsweg) and Upper Austria (Gmunden, Kirchdorf, Steyr). This is an area with Slavic toponyms that indicate the presence of a Slavic-speaking population during the Middle Ages. On the territory of Austria, the described administrative border in the west corresponds to the consolidated territory of Slavic toponyms. All other borders were arbitrarily set and encompass the core of the territory in which, according to Paola Korošec, in the „first centuries of the Middle Ages"... „the Carantanian Slavs were settled ... the bearers of manifestations of material and spiritual culture", which she described in her extensive synthetic monograph (Korošec 1979, 5; Štular, Belak 2022, 2). This opinion set me a challenge for a new valuation.

The temporal cut deals with the period between 400 and 1100, with a good useful period being between 500 and 1000 (Štular et alii 2022, 9, Fig. 3).

The information cut represents a limitation to archaeological sources. However, even in the group of archaeological resources, further restrictions are needed. These are different levels of observation. Traditionally, we gather most information while observing artefacts, which makes this level of observation the most standardized. The usual levels of observation are also the level of the site as a whole and the level of component parts of an individual site, such as graves in a burial ground and buildings in a settlement. ZBIVA currently enables classified data capturing of artefacts, graves, and sites. For the entire described territory, the database presently only contains data for all sites as a whole. Data is included for thousands of graves and artefacts, but only for selected sites, and not for all. Therefore, the presented data analysis is currently based primarily on the database of sites, their individual time spans and their properties, in as much as they could be determined (for a detailed description, see *3.3*).

3.2.2 Definitions and expressions

The only purpose of the definitions below is to explain how I understand and use individual expressions.

Conversio = *Conversio Bagoariorum et Carantanorum*, a propaganda document that was most likely created in 870 (on this date Lošek 1997, 6; Wolfram 2012, 27) to defend the Salzburg's Church territory of interest against the competition represented by the brothers Constantine (Cyril) and Methodius.

Mythical landscape

This is a form of cultural landscape that people created according to their mythical ideas or at least understood it in that way. With its help they wanted to control the forces of nature (for further details see: Pleterski 2023). The same mythical landscape can simultaneously contain several spatial ideograms.

Since the mythical landscape is materialized, it can be the subject of archaeological research. This can take place on its micro components, such as graves, buildings, on components of a higher level of observation, such as burial sites, settlements, fields, paths, and also on the level of the landscape as a whole. Folk tradition, which provides information about the cultural significance of the components within the space, is also connected to this same space. Therefore, we can study the connections between this tradition and the archaeological remains (cf. Lane 2008).

I prefer the name mythical landscape to definitions such as sacred or ceremonial, ritual landscape, which are already loaded with clearly defined ideas, and usually encompass less than the broad concept of a mythical landscape. Somewhat more conceptual discussions on this aspect of the landscape revolve either within the context of enumerating and treating holy places or on the level of discussing what someone thinks about it today (e.g. Robb 1998; Słupecki 2002; Dobrez 2009). Since I do not believe in the fruitfulness of scholastic wisdom, I prefer to open the horse's mouth and count its teeth in the continuation.

The possible number of sites within a certain period (*Fig. 1*)

I present a fictitious example at this point. The example consists of 9 sites in decades I to VII: N1–N9.

		N 1				
	N 2					
N 3						
	N4			N 5		
	N6			N 7		
N 8				N 9		
I	II	III	IV	V	VI	VII
2	4	5	2	4	2	1

Fig. 1: Possible number of sites from a certain period.

Sites 6, 7, 8, 9 have a time span of one decade each, site 4 spans over two decades, sites 2, 3, 5 span over three decades each and site 1 over four decades. The possible number of sites within an individual decade is the sum of the sites dating back to a single decade. Decade I includes 2 such sites, decade II includes 4 sites, III 4, IV 2, V 4, VI 2 and decade VII includes a single site. Sites with long time spans, which are a result of loose dating, naturally push the observed features back also to a time when they did not actually exist. This should be taken into account in the interpretation. For example, the use of cremation graves only apparently lasts until the second half of the 10th century (*Fig. 13*).

The primordial political community

This is any community that established and maintained a form of social order that included both the organized exercise of authority, including through coercion, as well as the establishment and maintenance of inward cooperation and outward responsiveness. Its population shares norms, values, beliefs, customs and inhabits a territory that is organized and has its own management (see *župa* below). The population internalizes a special communal identity. In this case, the communal territory is more than just an area that people inhabit and that gives them the opportunity to satisfy their physical needs. It is the scene of their actions over time and an integral part of their communal identity as a tangible and definable embodiment of political space. It is a home in which its members have their identity roots (cf. Cirila Toplak, summarizing the research of Lucy Mair and Hannah Arendt: Toplak 2022, 60). Of course, what describes the non-uniformly defined concept of the state also corresponds to the above description. However, with the concept of the state, we can understand a more complex implementation, which is usually defined in the context of political economy. However, one should not forget that already Hannah Arnedt warned that explaining the emergence of the state merely by satisfying material needs is too one-sided and flawed (Parekh 1981, 154).

Model of the past

As a model of the past, I understand the simplistically described relationships between components that are supposed to have existed in the past. These are structures of the ingredients and the processes that changed these structures (Pleterski 2001a). The purpose of this simplification is to make the past easier to understand and to link more easily the information that has been preserved from the past.

The Old Faith

In practical use, the label old faith means the opposite of the new faith. This can be e.g. the contrast between old and new Christian divisions in a certain territory or between Christianity and non-Christianity. In this case it is used as a neutral label, that replaces the pejorative Christian label paganism and, equally, the **Old Faith beliver** replaces a pagan.

Vlachs, Slavs and others

At this point, I am not addressing the question of concrete self-identification of the past population within the territory under consideration. This requires special treatment, which must consciously move away from the definitions we came up with in modern times. However, I consider the assessment (Štular et alii 2022) that a new population with a new Slavic language arrived in the mentioned area in the Early Middle Ages. In order to simplify the description, I call these new arrivals Slavs. I call the natives whom they encountered and shared their habitat with Vlachs. The simplified, generalized technical nomenclature does not in any way mean that the two population groups were homogeneous, so of course they should not be understood as self-evident identities. However, at the same time, both names do not close the door to such an understanding. Similarly, I use names known from the period under consideration, such as Goths, Lombards, Avars, etc.

Župa** [= **a Slavic political community]

I use the word župa to designate the model of the fundamental political territorial unit that supposedly existed among the Slavs in the time before the creation of the so-called medieval states with monarchic authority. People realized their legal identity within the župa, its space ensured their survival. It encompassed a certain number of settlements that were governed by a župan (in modern Slovenian translated as mayor). The župas were similarly structured, they had a related language, laws, customs, and a shared religious system. The image of the župa is illustrated by the example of Bled as a landscape (Pleterski 2013). Over time, župas began to unite into larger territorial, politically connected groups – principalities. As a name, župa naturally changed its meanings through time and space. At the same time, there are indications that the meaning of the župa did not disappear

with the political enforcement of the monarchical power of the medieval state, but survived until modern times as a parallel society in a special political form (Toplak 2022, 55–60 describes it as a heterotopia). In Slovenian oral tradition, these remains carry the names *hosta* (wood), *gmajna* (common land), *dežela* (province) (Pleterski 2022, 131–134). Župa could be the Slavic version of the *primordial political community*.

3.2.3 Expressions that I deliberately avoid

These are expressions that, without defining their content, are generally used in the hope that everyone understands them in the same way and that they sufficiently describe what we want to express. I am convinced that this lazy hope is misplaced.

Ethnos

It is symptomatic that the monumental *Lexikon des Mittelalters* does not include this word as a password. I interpret this as a confirmation of Siân Jones' observation that very few researchers explicitly define what the terms ethnicity and ethnic group mean to them. And there is no consensus among them (Jones 2003, 56). This means that there is no universally valid definition. However, the word ethnos is found in the adjective form in numerous lexicon entries. This means that it conveniently helps in cases in which it would otherwise have been necessary to precisely lay the conceptual foundations and consistently follow them. The words *Volk* and *Stamm* sometimes appear as synonyms (e.g. Wolfram 1997). The beginnings of the research into the concept of ethnicity reached into the 19th century, however, this research became widespread in the 20th century. It was introduced in order to explore, understand and justify modern social identities (Jones 2008). I emphasize, modern and not former.

Tribe (German *Stamm*, Latin *gens*, *natio*)

The word initially referred to a kinship group, however, in the 19th century it began to denote a gentile community linked by language, tradition and place of settlement (Wirth 1997). These are therefore modern criteria that researchers project into the past, which is an exceptional methodological risk.

Carantanian, Kötllach, culture, cultural circle, cultural group (CKC)

This is a technical term used by earlier generations of archaeologists to refer to a special group of Early Medieval enamel jewellery in the Eastern Alps and neighbouring territories. The term was introduced in 1889 by the German antiquarian Otto Tischler, who coined the term Köttlach culture based on the enamel decoration of the special Köttlach style. He adopted the name from the first known find (1853) of crescent circlet and fibulae with enamel decoration in the graves near Köttlach in Lower Austria. The initially different dating of these finds was settled down in 1899 when the German archaeologist Paul Reinecke dated them in the period between the 9th and the 11th century. The Slovenian archaeologist Walter Šmid mistakenly believed that these were limited to the area inhabited by the "Carantanian Slavs", thus proposing the name Carantanian cultural circle in 1911. Later, the compromise, Carantanian-Köttlach double name came into force (Pleterski 2001b).

The expectation of former archaeologists that the concept of ***archaeological culture*** can be equated with a group of people from the same "ethnic" identity turned out to be unfounded. Today, we know that the concept of archaeological culture includes a very modest and arbitrarily defined set of material culture characteristics as seen by archaeologists. These characteristics can be of different origins: chronological, technological, economic, social, religious (Klejn 1988). Since the concept of archaeological culture does not have a clearly defined content, modern archaeologists are abandoning its use. From this point of view, all the discussions that took place in the past about whether the items of the CKC are the material remains of solely Slavs, solely Germans, or even only natives, are methodologically wrong and surpassed. Completely independent of this is the observation that the area where the CKC artefacts appear not only as individual settlement finds but mainly as grave goods is located within a territory with Slavic toponymy.

3.2.4 Warnings

The ZBIVA v3 web interface (http://zbiva.zrc-sazu.si), provides a ***timeline*** which locates all sites that, with their time spans, at least partially touch upon the part of the timeline that we have determined with the two time sliders. The vast majority of these sites have their beginning and end set to precisely 10 years. At this I would like to emphasize that this accuracy does not mean precision. However, this provides great help in overcoming arbitrary psychological time limits and thus in turn contributes to greater accuracy. The Arches platform used for online ZBIVA (v3, 2016–2022) allows 5-year accuracy of the timeline slider movements: 1, 6, 11, 16, 21, 26 ... If we wish to find all possible sites that reach back to the decade 11–20, we set the sliders to 11 and 16, maybe both, or only to 11 or 16, but definitely not to 11 and 21, as this would also show the possible sites for the decade 21–30.

The analysis below is based on charts that show the possible number of sites with the same feature in the same time period (by decades) and maps of the distribution of these same sites. Due to the accuracy of 10 years, the charts are quite "jagged", while the accuracy of 25 years (Štular et alii 2022) gave more rounded shapes.

All distribution charts and maps, which also have a time value, always show the ***possible number of sites*** (see definition above) within a given period. For reasons of simplicity, I have omitted the label "possible" in the continuation of this text.

Visualization of site density. The location map of the used online ZBIVA (v3) allows zooming in an extremely wide range from satellite height to kneeling on the ground. Location points are marked with rhombuses. A grey rhombus represents merely the existence of a site. A different colour of the rhombus represents one or more selection criteria. Depending on the observation height, the site points are closer together or further apart. When they overlap with the height of the lookout point, they merge into circles. The number in the centre of the circle tells how many sites it combines.

The density of sites strongly depends on the level of exploration. No matter what we map, most maps show that the density of sites in the south is significantly higher than in the north. This is the result of much poorer archaeological research in Austria compared to Slovenia. Our database includes 920 sites in Slovenia (20,273 km^2, 2.11 million inhabitants) and 601 in Austria (on an area of 32,605 km^2 with 2,096 million inhabitants). The density of sites is 18.4 per 1000 km^2 in Austria, 45.4 in Slovenia, and 28.67 per 100,000 inhabitants in Austria and 43.6 in Slovenia. The territory of Austria is not that much less populated, and if we also take into account that Austria has a higher gross national product than Slovenia, we would expect better research there, but in reality, it is so much more modest that it seriously complicates a balanced analysis of both territories. In Austria, the province of Lower Austria stands out in terms of archaeological research (Eichert, Brundke 2020), however, this was not included in our analysis (see above *3.2.1*).

Arbitrarily set time spans. All time spans were determined with the help of archaeological material from individual sites, and in some cases they are the same as the time spans determined by C14 dating, which are otherwise given with an accuracy of one year, but the actual precision is considered to be significantly lower (cf. Svetlik et alii 2019). By an arbitrarily determined time span, I have in mind the span that arises when we have to set a beginning and an end to an otherwise loose dating. Arbitrary set are e.g. the boundaries of the time definition in Late Antiquity, which I have decided to set between 430 and 650. Differently set boundaries would have moved the step within the diagram to a different place, but the accompanying material does not allow for major shifts.

Dating of settlements. Late Antique settlements are dated either by small metal artefacts, jewellery, typochronological pottery groups, or the general image of the settlement. Early Medieval settlements are dated either by calibrated C14 radiocarbon time ranges, or by typochronological groups of pot rims (according to Pleterski 2010, 157–160). The latter have very broad time spans, the boundaries of which are formed by larger fluctuations in the C14 radiocarbon age calibration curve. In addition, there are relatively few pot rims. All of this means that the dating precision often exceeds the period of one century, while accuracy that shows less than half a century is rare.

Verifiability. The database is published online (Štular et alii 2021; for a description of the structure, see Štular, Belak 2022). I mention various sites in the text. The reader can find all the details on these sites and the list of literature in this database. I provide relevant citations in exceptional cases, in which the most recent data is not yet available in this version (v3) of the database.

3.3 DESCRIPTION OF THE ZBIVA DATABASE

The working premise was based on the **ZBIVA database** (description: Štular 2019; Štular, Belak 2022), which is focused on the Early Medieval **area** of the Eastern Alps and its outskirts. The ZBIVA database consists of relationally linked databases on archaeological sites, graves, artefacts, and literature. Since 1987 we have been systematically collecting data on Early Medieval sites, which at that time meant an arbitrarily determined **period** spanning from approximately 600 to approximately 1000 (cf. Mirnik Prezelj 1998, 366–367). In terms of settlement, the Early Middle Ages could, in Slovenia, begin with the settlement of the Slavs, because we expect that this led to important settlement, economic, social, and cultural changes that ended in the 11th century, when the feudalism of the medieval Roman Empire finally prevailed in the region. However, the historical causal links are stronger than they appear. Therefore, dissecting the historical flow into fragments is certainly problematic, but on the other hand, it is hard to avoid if we want to at least roughly master the subject of our study. The problem was clearly highlighted with the latest finds, which indicate that the first groups of Slavs came to the territory of the Southeastern Alps perhaps already in the second half of the 5th century, but certainly no later than in the first half of the 6th century (Pavlovič 2013; 2017; 2020; Pavlovič et alii 2021; Pleterski 2015). The transition from the so-called Late Antiquity to the so-called Early Middle Ages were clearly much more united than we have believed so far. In order to understand this transition better, we decided to include 5th and 6th century sites in our database of sites.

In addition to all this, the course of history also includes the history of effects (*Wirkungsgeschichte*). Every entity from the past has its effects even after it had ceased to exist. Like water ripples in a pond, although the stone we threw into it has sunk long ago, we can still tell by the ripples on the water that the stone was there. Over time, it thus turned out that a full understanding of the Early

Medieval situation would also require the knowledge of its effects at least until the end of the Middle Ages. However, since we were unable to expand our database in the midst of the time-limited implementation of the research, we performed this only in certain selected cases, and supplementing the database remains a task for one of the future researches.

Site description input form

ID. A unique identifier in the form of a number.

Name. The published name of the site in the language of the country of origin (e.g. Slovenian, Italian, German or Croatian), which is most commonly used. A null value is permitted. Several different names are also possible. The settlement where the site is located is listed, followed by the administrative location (which, for Slovenia, still adheres to the 1954 directory).

Lat, Lon. Determining the location with coordinates recorded in the latest revision of the World Geodetic System (WGS84); we use the most widely used decimal system with an accuracy of six decimal places. For this purpose, various suitable open access web GIS applications were used, thus providing access to maps (historical and modern) and images (aerial and satellite).

Sources used

– for Slovenia: Atlas voda (https://geohub.gov.si/portal/apps/webappviewer/index.html?id=f89cc3835fcd48b5a980343570e0b64e) and Register kulturne dediščine RKD (https://www.gov.si/teme/register-kulturne-dediscine/).

– for Austria: KAGIS for Carinthia (https://kagis.ktn.gv.at/), Digitaler Atlas Steiermark for Austrian Styria (https://gis.stmk.gv.at/wgportal/atlasmobile), TIRIS for Tyrol (https://maps.tirol.gv.at/synserver;jsessionid=4FC86C7284D5B64E028D1876844D33F4? user=guest&project=tmap_master), SAGIS for Salzburg (https://www.salzburg.gv.at/sagisonline/(S(lmyzl2llhhu5xretsf2ebyxf))/init.aspx?karte=default&geojuhuschema=Adressen/Namensgut&defaultlogo=sagis) and DORIS for Upper Austria (https://wo.doris.at/weboffice/synserver?).

– for the territory of Trieste in Italy: Regione Autonoma Friuli Venezia Giulia cartografia (http://irdat.regione.fvg.it/CTRN/ricerca-cartografia/).

All listed Austrian portals also contain the data layer of the Franciscan cadastre. In Slovenia this is incomplete and one needs to help oneself with the MAPIRE portal (https://maps.arcanum.com/en/). In addition, the GoogleEarthPro web service was used for historical satellite imagery as well as verification and retrieval.

The location accuracy score is a quantitative value (1–3) that represents confidence in the location. This helps us define the location precision of the metadata. The least accurate location (1) means that only the location of the nearest settlement is known and that the centroid of the settlement is indicated. Medium accuracy (2) is used when the location in a part of the settlement or the relationship to the settlement is known (e.g. 200 m north-east of the church). In this case, the centroid of the area in question is recorded. The highest level of accuracy (3) is used when the exact location of the area is known (e.g. geodetic measurements exist) and the centroid is recorded.

The description of the site location is a short topographical description that should help the user to the site.

Topographic location refers to the position of the area within the landscape: on an elevation, not on an elevation, in a cave or shelter, an underwater site, the edge of the (river) terrace.

The individual data record of the site does not have merely a spatial determination, but is also defined in terms of content as a functional whole during its duration. In this narrower sense, several sites can be located in the same space, each with its own data record. Some examples: a prehistoric settlement and a later Early Medieval settlement, a prehistoric burial site and an Early Medieval burial site, a Roman preiod settlement and an Early Medieval fort. Sites can also be contemporaneous, such as e.g. a settlement and a burial site.

We defined the following functional *site part*: settlement, burial site, hoard, cult place, castle/tower/fort, communication (road, port, bridge), space interventions (without communication), stray find, other.

Attention should be paid to the category stray find, which is definitely not a useful function of the past. It originates from modern times, when we know that individual artefacts come from a certain area, but we do not yet know what their function there was. With their appearance, they draw attention to the area and time of their use and predict a functionally recognizable site.

For communications such as roads, one would need linear spatial placement. For the time being, we are satisfied with point placement, where the road point means the site of an archaeological excavation where a road was found.

Data quality. Since information on site parts comes unorganized, in different forms, times and quantities, their quality is different and therefore we need their rough definition: archaeological traces, written sources, oral tradition, building remains. The basic decision was to establish the database as a collection of archaeological data. This means that it does not include most rural

areas of the researched period that exist in written sources, such as settlements and cult places (churches). The advantages of this decision lie in greater spatial accuracy, greater objectivity in the description of the time span, and greater representativeness. Of course, we can also expect weaknesses, which will only become apparent later.

We classified the informational *reliability* of collected data into three categories. Number 1 stands for unreliable data, as provided by individual finds, meagre and poorly preserved archaeological remains, all without find contexts. Its opposite is number 3, which stands for information provided by analytical publications of systematic archaeological research. What is more than 1 and less than 3 is marked with number 2.

Finds. Since the artefact database currently exists only for a few site parts, we previously indicated at least the categories of finds for each site. We are interested in pottery, non-pottery vessels, tools, other household items, building equipment, weapons, costume, dress accessories and jewellery, coins, animal bones, natural remains, etc. In doing so, knives were classified under tools (similar to axes, in the event that they were not distinctly battle axes). We classified spurs, stirrups, and bridles as weapons.

Dating. If we want to know how many site parts we have in a certain area, we also need to know the time span of each site part. We defined this with the data *First* and *Last*. Since the site part is also functionally defined, we need to date the beginning and end of the time span of this function. This means that, at this stage, we are not interested in the details of the database for individual stages in the development of a particular site grouping. Thus, for example, we are not interested in the phases of a settlement, but only in its entire duration. If the life of the settlement began in the 8th century and continues uninterrupted until today, its upper time limit is today. We are not interested in individual church buildings at the same place of worship, but the entire time of worship, the beginning of which is determined by the first church building, and its end by the abandonment of the last church building. If it is still in use, the upper time limit is set to today. The same applies to graveyards that are currently still in use, the upper time limit is set to today. Since the timing precision is set to one year, the latest years of the time spans depend on the date of the last entry.

The *First/Last* range tries to determine the time during which the site part was in use as accurately as possible. When we search for sites within a certain period of time, we expect that the found functional groupings actually existed at that time. Since we do not want too much information noise, we did not numerically define sites that are hard to determine in time with First and Last. Burial sites, for which we only know that they included graves with knives, belong to this group, because they can be placed either in Late Antiquity or in the Middle Ages, and sometimes earlier or later periods are also possible. The same applies to the general assessment of the early Middle Ages. General definitions of Late Antiquity, for example, have been numerically defined as the period between 430 and 650. This is, of course, completely arbitrary and the consequences of this arbitrariness must be taken into account in all analytical definitions.

The primary chronology source can be natural science (C14, dendro), according to publication, or one's own typochronology.

Reliability of chronology. We understand that all dating is to some extent arbitrary and depends on the one who signed it. In doing so, he must have performed a self-assessment of the reliability of his dating. Number 1 represents the least reliable dating, and is often the assumption of an arbitrary assessment of the predecessor when considering the site, with a low possibility of verification or even without such a possibility. Number 2 means that there are some tangible temporal bases, but they are few or unreliable. Number 3 means that there are enough verifiable starting points that no major changes in dating are expected in the future.

Descriptive dating. A written justification of the dating is also desired, pointing out what we relied on when dating.

A brief description of the site complements all of the above, as it helps to understand the definitions and creates a rough idea of the site.

Site description. The description of graves and artefacts is already very sophisticated in many ways. This holds much less true for sites, especially Early Medieval ones. ZBIVA's input form represents a modest attempt in this direction, which we have made for burial sites, settlements, cult places and hoards. The greatest possibilities for this are currently offered by burial sites, which are the most abundant and best researched. We have foreseen those data categories that are the most obvious and therefore most often contained in the publications.

The size of the burial site. This is determined by the number of published graves: 1–10 graves, 10–60 graves, 60–150 graves, more than 150 graves.

Location of the burial site: next to and/or in a church, without a church, within a non-Christian cult place, within a settlement. We are interested not only in whether the graves are next to a contemporary church, but also whether they are next to a church that stands today. Of course, the mere location next to a current church does not necessarily mean that under the cur-

rent church building are the remains of a church that is contemporaneous with the graves, but the probability of this is still very high. In any case, it is a causal connection. A non-Christian cult place is a cult place that could functionally exist even without a burial site, because a burial ground in itself represents a cult place. Burials in a settlement are rare, but they do exist.

Type of burial site: flat, burial mound, flat and burial mound. In archaeology, it is traditional to observe the morphology of the burial site: is the burial surface flat, or does it contain one or more mounds? The input form does currently not distinguish between natural and artificial mounds and does not describe in detail whether the graves were in, on, or next to the mound.

Slope: no, yes. If the graves are on a slope, the *Orientation of the slope* is also important. There are eight basic cardinal directions to choose from.

Burial type: inhumation, cremation, cremation and inhumation.

Unusual burials. It is up to the person entering the information to decide whether a grave is unusual.

Distance. Due to the content interdependence of sites with different purposes, we also examined the distance of burial sites from the nearest settlement. We tried to establish whether this distance was shorter or further than 500 m. Currently, the largest known distance between the settlement and the burial site is 450 m (Pleterski 2014, 250). Burial sites that are further than 500 m from the current settlement, most likely belong to a settlement that has since disappeared. One of the ways in which we established the distance from the settlement, was to examine the situation at the time in the Franciscan cadastre, i.e. 200 years ago.

Hoards. We were interested in whether they were found in the area of the settlement, which should help us determine whether this was a possible cult place.

Settlements. We expected that it is possible to observe several characteristics even in settlements: fortification, economic-administrative importance, size, method of building construction. It turned out that this is possible for some Late Antique settlements, but that it is almost completely undeterminable for later settlements due to poor archaeological research.

Cult place: church, other structure, natural environment (without buildings).

4. SELECTED THEMES

An important basic observation is that there are merely a few phenomena that apply to the entire area at the same time. As a rule, we are dealing with a puzzle of regions, each of which lived in its own way (example of the visualization of diversity in relation to the duration of site groups: Štular et alii 2022, Fig. 4).

4.1 SITES THROUGH TIME

The number of sites (*Fig. 2:* 1) fluctuates between 190 and 388. All stepped ascents and descents are the result of arbitrarily set time spans. The next question is the meaning of the decline in the 7th century. At first glance, we think of the fall in population, but the other two lines (*Fig. 2:* 2, 3) on the same chart warn us that this was not necessarily the case. The line depicting graves barely descended in the same area, while the line depicting settlements continued to show a steady decline. It is important that this decline occurred at the same time as the number of burial sites increased. This means that the decline in the number of settlements was not a result of depopulation, but of the change in the visibility of archaeological remains. Since we do not yet have a database of individual buildings within the settlements, we can, at this point, provide merely an intuitive explanation. Late Antique settlements with stone buildings are much more visible than the wooden buildings of Early Medieval settlements. In addition, the latter lie largely below modern settlements. The decline in the possible sites in the 7th century is therefore primarily a crisis of archaeological visibility.

The same conclusion can be drawn from the comparison of the distribution of settlements and burial sites (*Fig. 3*), which shows that burial sites often accumulate where settlements are rare or even non-existent, and that the reverse is also true. The distribution density of each type of site is primarily a result of archaeological research and visibility. However, this does not imply that where there were no sites, this is so only because we have not found them yet (such as, for example, Gutjahr et alii 2024 in this volume). From the mid-19th century onwards, the level of research has improved so much that where no sites are known to us, it is almost impossible to expect undiscovered intensive settlement.

I begin the analysis of the chart of sites (*Fig. 2*) with a detailed examination of the settlement curve (*Fig. 4*). We could observe and record the assessment of the location in relation to elevations already while inputting data: whether they were on an elevation, or not on an elevation, on the edge of river banks, if we simplify this these are lowland settlements. In a proper GIS analysis, which would add the elevation to the sites and at the same time show the distance from the neighbouring valley floor, we might obtain a different determination for some sites,

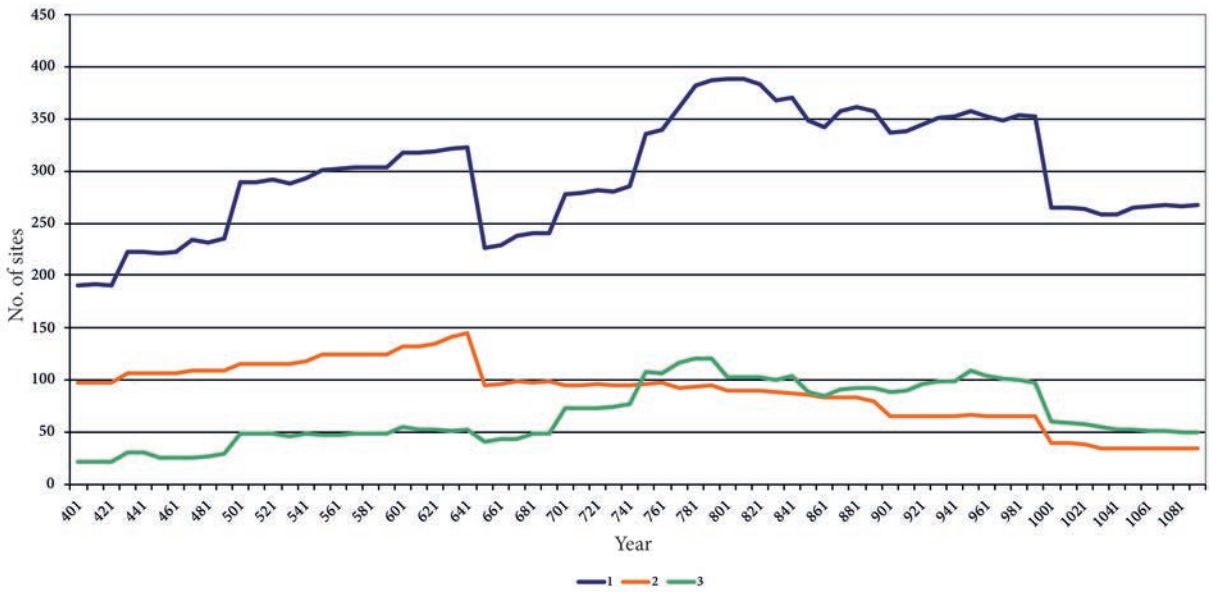

Fig. 2: South-eastern Alps. Sites through time, by decades. 1 – all sites, 2 – settlements, 3 – burial sites.

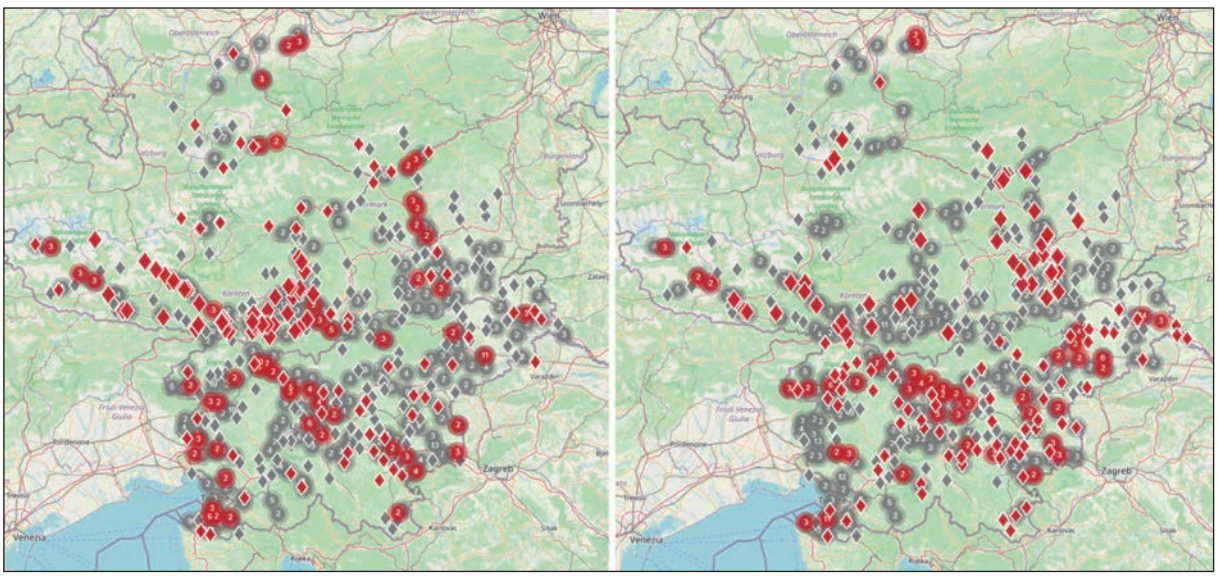

Fig. 3: South-eastern Alps. Sites in the period 401–1096. a – burial site,; b – settlements.

however, this would not affect the overall view. These are the problems of ambiguous determinations. For example, how do we classify a site, which is in a valley that is a part of a mountain plateau? The sites in the mountains, hundreds of metres above the neighbouring valley, can of course be associated with grazing and mining, however, agriculture cannot be automatically excluded, at least to a certain degree. The reverse also holds true for lowland sites. The probability that they are related to agriculture is high, but other forms of economy should also be taken into consideration. It is more than obvious that a change in the dominant economic model occurred in the 7th century, and, of course, this applies to the simultaneous view of the entire territory. Settlements on elevations dominated until the 7th century, after which settlements on lowlands, on the edges of river banks, began to prevail.

4.2 THE DECLINE OF THE ROMAN STATE

The 7th century shift has long roots. I will start with the relatively stable settlement process that took

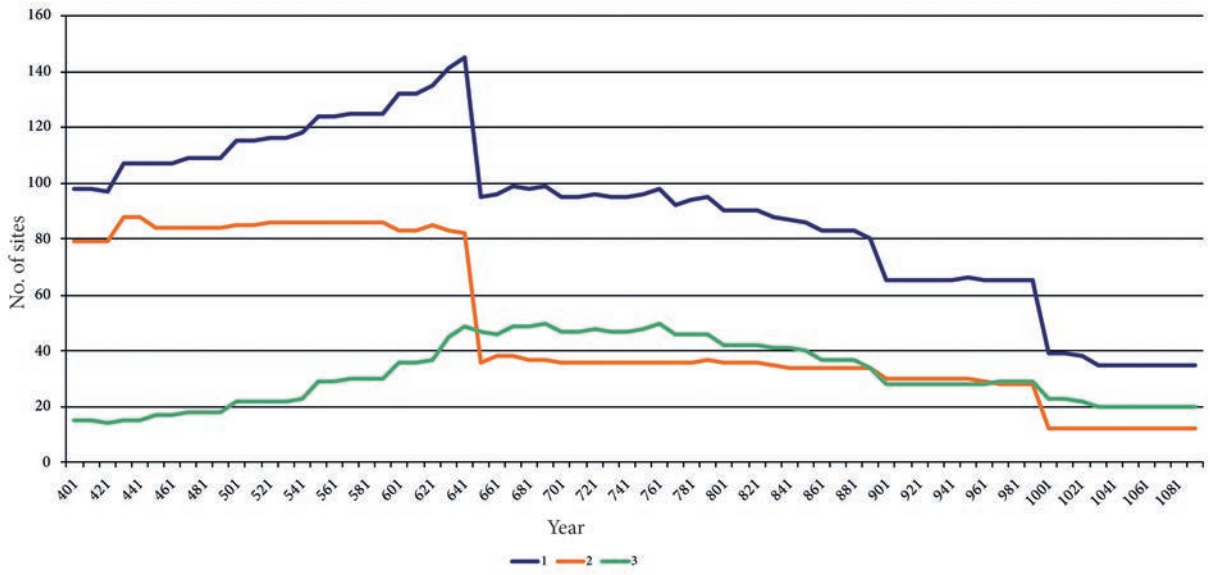

Fig. 4: South-eastern Alps. The changes in the possible number of settlements through time, by decades. 1 – settlements, 2 – hilltop settlements, 3 – settlements on river banks or not on hilltops.

place from the end of the second half of the 5th century onwards (*Fig. 5*), which followed the dramatic changes in the second half of the 4th century and the first half of the 5th century. These changes brought about the collapse of most cities, greatly increased the number of high-altitude settlements and turned the market model of economy in the direction of autarky (Milavec 2021; Modrijan 2020). It is characteristic for this time that the area opening towards the Pannonian Plain was uninhabited (Eastern Styria, Slovenske gorice, Prekmurje) or sparsely populated (Dravsko polje, Krško polje). Elsewhere, settlements are clearly visible, with the leading type being hilltop settlements, which is a characteristic of the settlement change that took place in this area in Late Antiquity (Ciglenečki 2023, 10). The Roman state collapsed and lost its power and this was the result.

The number and distribution of settlements on elevations did not change significantly in the 6th century (*Fig. 4:* 2). However, lowland settlements still existed, although in much lower numbers than high-altitude ones. On closer inspection, it is true that these were settlements that were not located on the tops of hills, but a good part of them were located at altitudes above 1000 metres above sea level, and according to the model of their non-agricultural economy, it would make more sense to consider them as high-altitude settlements. We currently know of very few true lowland settlements (e.g. Mengeš) and they were primarily located in the western part of the observed territory, i.e. far from the Pannonian Plain.

4.3 THE ARRIVAL OF SLAVS

If the 6th century hilltop settlements are viewed together with the lowland settlements that existed in the 6th and 7th centuries (*Fig. 6*), it becomes striking how the lowland settlements primarily occupied the area in the east, which was previously (*Fig. 5*) sparsely populated or even uninhabited. At the level of artefacts, these settlements are associated with the appearance of extremely archaic, handbuilt pottery without everted rims, and in the GIS analysis, they appear as settlements along the soils that develop in a wet environment (Magdič 2024 in this volume). It is true that most of the other observed territory shows a simultaneous decline in market pottery, which involves production on a fast potter's wheel, a predominance of vessels that were made on a slow potter's wheel, in some places even entirely handbuilt vessels, which, at least in terms of design, still try to imitate vessels with strongly everted rims (e.g. Knific 1994, Pl. 5: 6, 7). However, the differences between the vessels from the East and the West remain so great that we can speak of two different pottery traditions (Pleterski, Belak 2002) and, due to the different living environment, also of different ways of life. Settlements, which sought a wet environment, came together with archaic pottery from the east and can be linked to the Slavs (Štular et alii 2022). A closer look provides some clues about their arrival and the beginning of their settlement.

Considering the possibility of dating accuracy (see above), we can focus on the trends of the observed phenomena (*Fig. 4:* 3). The fact that new sites in the 6th

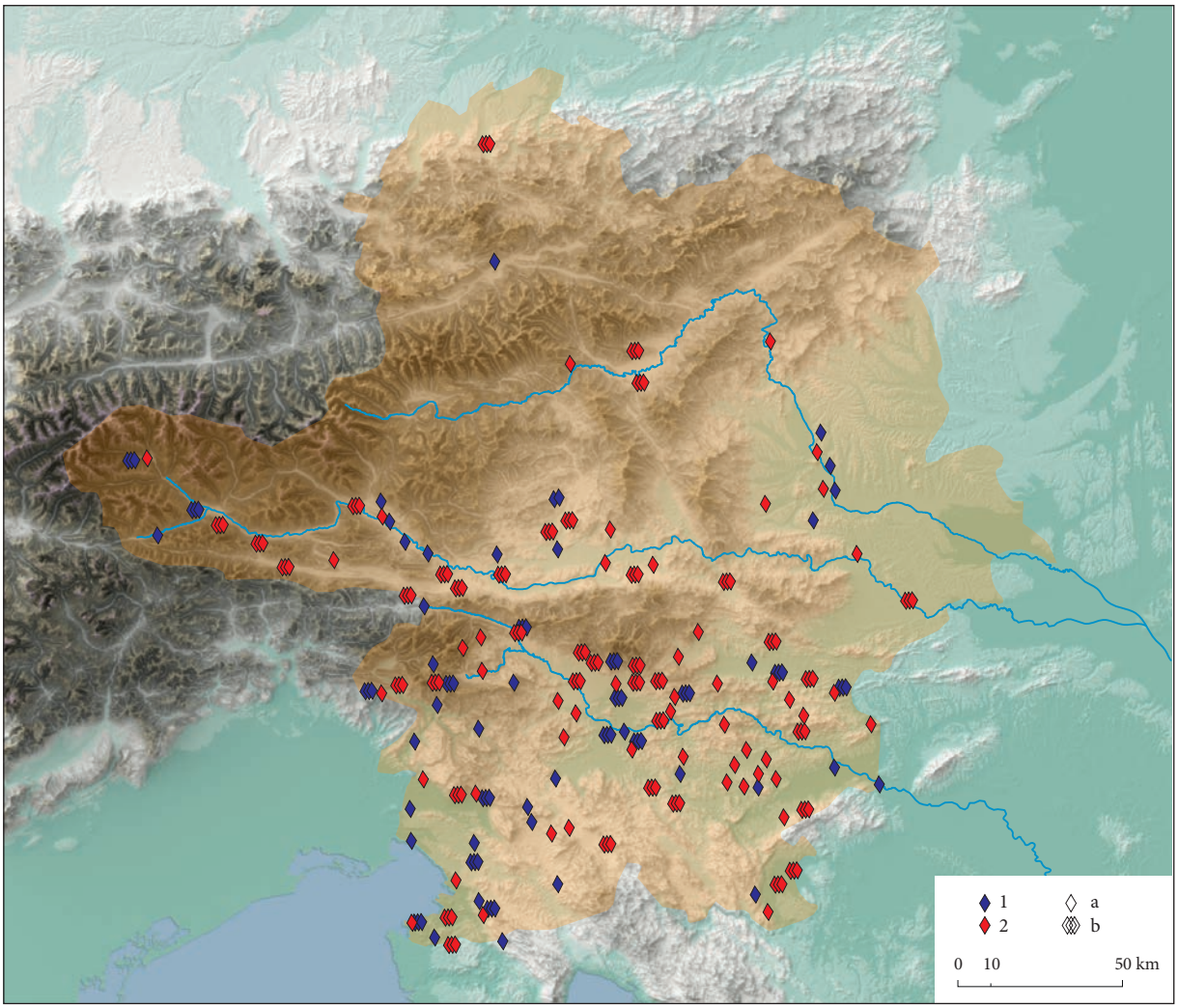

Fig. 5: South-eastern Alps. 451–496: 1 – possible sites, 2 –hilltop settlements, a – one site, b – more than one site.

and 7th centuries appear at intervals of 30–50 years is certainly the result of the rounding up in dating, however, this may also be a result of the emergence of new generations. The gradual increase in the number of settlements looks real, especially because it also appears in space – as the settling of new areas (*Fig. 7*). This shows that the Slavs arrived in small groups that settled in suitable areas and spread from there over the centuries. This is why the old notion of the sudden arrival of Slavs, who flooded the studied territory like a wave, and which could not explain where the multitude of people who populated more than half of Europe came from, is wrong (cf. Kurnatowski 1979).

Linguistic research also shows the diversity and abundance of settlement groups. From the point of view of lexicology, it is almost impossible to doubt that the so-called Alpine Slavic was not a single Proto-Slavic dialect, but a linguistic mixture of different layers (Bezlaj 1967, 5). It is also more likely that the North Slavic lexical elements in Slovenian are the result of several Proto-Slavic migrations (Bezlaj 1966, 13).

Even the analyses of the human genome cannot yet help us determine the groups of new Slavic settlers, as there is a great limitation in the collection of samples. Namely, the Slavs began to abandon the mass cremation of the dead as late as the 9th century, which was the time when they had already reached their western and southwestern borders of their settlement. Therefore, the term "Slavic genome" does not yet have real substance and is currently being reconstructed mainly by analysing modern populations that speak Slavic languages. The rough conclusion that the current speakers of Slavic languages differ genetically from each other primarily due to the different substratum populations they encountered (Lindstedt, Salmela 2020) is logical and can also be archaeologically confirmed. However, at the same time, this means that there are no distinguishing criteria that could be used to distinguish individual settlement

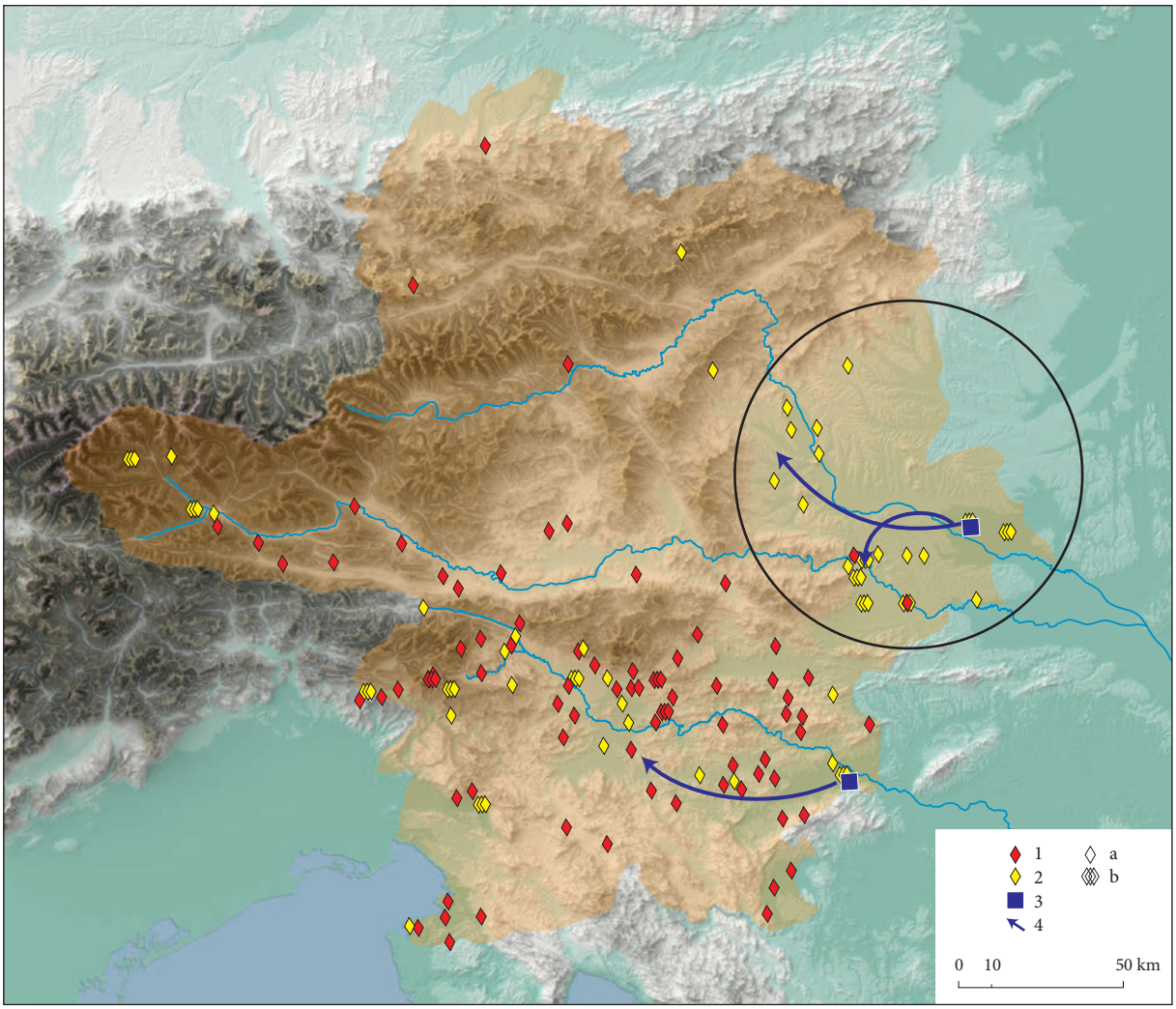

Fig. 6: South-eastern Alps. 1 – hilltop settlements (501–596), 2 – settlements on river banks and settlements that are not on hilltops (501–696), 3 – the beginning of the Slav settlement, 4 – the direction of settlement, a – one site, b – more than one site. The circle denotes the area of the section (*Fig. 7*).

groups of Slavs with the help of genomes during the Early Medieval migrations.

The territory south of Murska Sobota and Cerklje ob Krki currently appear as the earliest areas inhabited by Slavs in the territory under consideration (*Fig. 6*) (Pavlovič 2017; Pavlovič et alii 2021). Their arrival prior to the 6th century is unlikely, as the density of the settlement can only be detected from the middle of the 6th century onwards. However, these first Slavs did not arrive together with either the Avars nor the Lombards. They overtook them both (cf. Pavlovič 2017, 363–367). Lubor Niederle already advocated the very early arrival of individual groups of Slavs even before the 5th and 6th centuries (Niederle 1906, 133–161). His argumentation was not archaeological and was considered unreliable, however, archaeological finds are now approaching it in time and space.

The arrival of Slavs can also be meaningfully linked with the Eastern Gothic crossing of the Soča River in 489, which ended in the next four years with the conquest of Italy (Bratož 2014, 371–375). With the departure of the Eastern Goths, a few settlement niches emerged in Western Pannonia and on its outskirts, which were used at first by individual groups of Slavs and later in greater numbers by the organized Lombards. These first Slavs seemed noteworthy only to Martin of Braga, the biographer of St Martin of Tours, both from Pannonia. In the hymn of St Martin of Tours, Martin of Braga anachronistically listed various peoples that St Martin of Tours converted to Christianity. It seems that Martin of Braga described the conditions he knew from his youth in Pannonia in the first third of the 6th century and he also listed the Slavs among others (Šašel 1976; Bratož 2014, 398–399, 485–486). Martin's record

does not mention the Lombards, which agrees with the idea that the Slavic settlement came before the Lombard settlement.

Of course, the humble Slavic peasants were generally of no interest to Latin and Greek chroniclers and historians. It was only when the Slavs began to be used as military mercenaries and participated in predatory military campaigns that they became a sufficiently unpleasant nuisance to be noticed by various writers of the neighbouring pillaged area.

4.4 THE EXPANSIONS OF SLAVS TOWARDS THE WEST

Already in the 7th century the area of the initial settlement was populated densely enough to suffice afor a noticeable expansion of settlements towards the west (*Fig. 7*), from Prekmurje up the Mura basin and across Slovenske gorice to the Drava Plain (for the latter see Magdič 2021, 131–133). It is not certain whether the expansion upstream the Mura River really took place 30 years before the second expansion along the Drava Plain. The appearance of a larger group of sites 601–626 south of Graz in the Mura basin is the result of their arbitrary dating from 600 onwards. Their beginning could be half a century or even a whole century later (this is what Gutjahr et alii 2024 in this volume justifies with finds and C14 dating). A simultaneous movement along the Mura River and into the Drava Plain is more likely.

Anyway, in the 7th century the basic features of the settlement were already emerging, and the settlement continued. The span of individual sites varied, but they rarely lasted longer than three centuries (*Fig. 8*). In Austrian Styria, the first settlements that continue to this day (Hauptplatz and Sackstraße 18 in today's Graz) appeared as late as the 10th century. This points to another trend, according to which it appears that several settlements emerged simultaneously until the 8th century, while from the second half of the 8th century onwards merely individual consecutive sites appeared. This does certainly not depict the development of population density, but much more likely shows a change in the technology used on agricultural land. Earlier, less sustainable farming was depleting the land to the point in which it was necessary to resettle. Sustainable farming was established around 800 at the latest, and this enabled permanent settlement. Settlements continued to be abandoned, but for other reasons (war, famine, disease, natural disasters). All of the above applies to the eastern, Pannonian region.

The diagram of the duration of these settlements (*Fig. 8*) confirms that the pivotal time for settling took place in the middle of the 5th century. Only one site (Piramida in Maribor) may have extended beyond this turning point, all other settlements started anew. Even with the Piramida, it seems that its time span is primarily

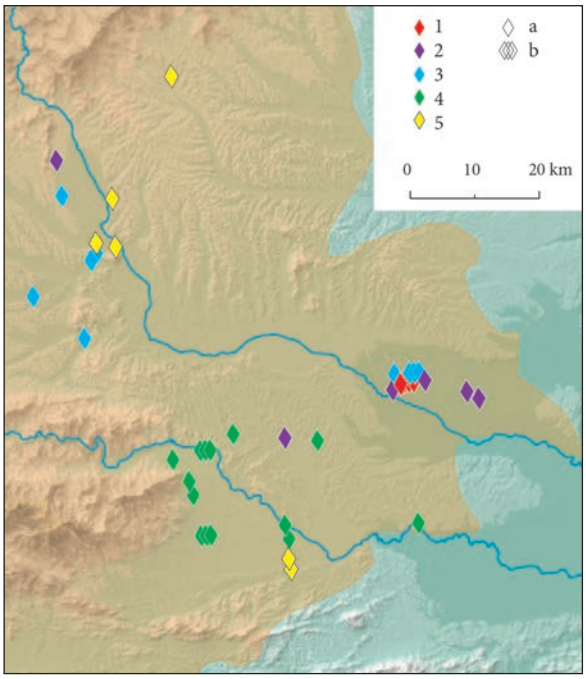

Fig. 7: North-eastern Slovenia and southern Austrian Styria. The beginning of settlements. 1 – settlements 501–546, 2 – settlements 576–596, 3 – settlements 601–626, 4 – settlements 631–646, 5 – settlements 651–696, a – one site, b – more than one site.

a matter of very loose dating. There is never such a break afterwards. Not even during the Hungarian invasions between the end of the 9th and the middle of the 10th century. These invasions did not represent total devastation. However, the number of settlements between 881/886 and 901/906 dropped by almost one third, from 30 to 21. It is almost inevitable that the Hungarian invasion route to Italy led across Prekmurje and past Ptuj along the former main Roman roads (cf. Korošec 1985; Magdič 2017, 449–453). This is also shown by the abandoned settlements within its influential range. However, even here, life did not die out completely (*Fig. 9*).

Archaeological data revealing the course of Slavic settlement further west are still very rare. In any case, the Slavs reached Bled already in the first half of the 7th century (Pleterski 2008, 36–37; 2010, 164) and much later their western edge in Pordenone in Friuli (Italy), where they appeared no later than the middle of the 9th century (Mader 1993, 264). The migration to the west lasted for over three centuries with varying intensity. So far, this is confirmed mainly by funeral customs rather than settlements outside Pannonia and its outskirts. There are two reasons for this. The practical fact is that the known number of Early Medieval settlements declined towards the west, which also saw a domination of burial sites among Early Medieval archaeological sites. The second, substantive reason is that we can observe

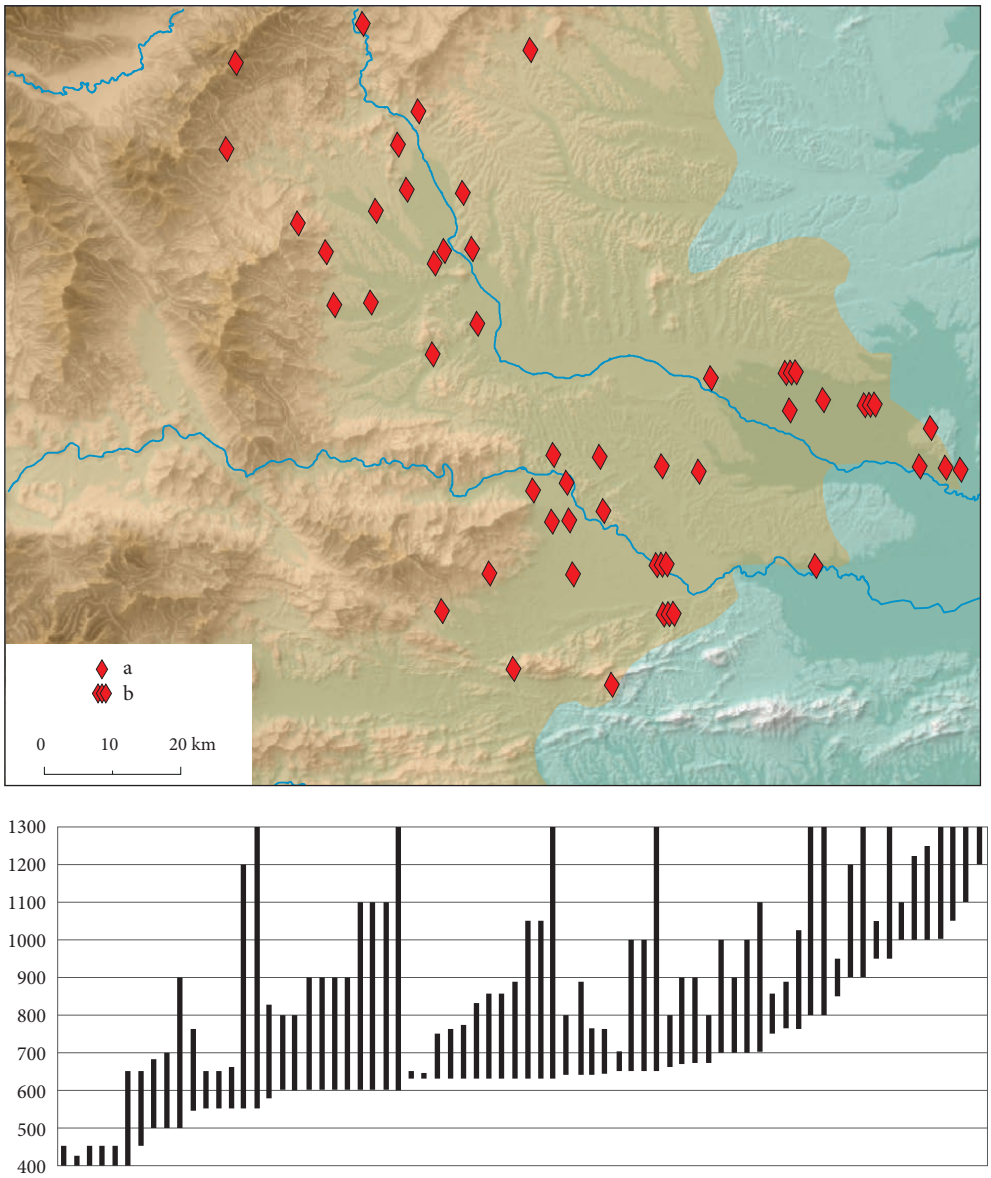

Fig. 8: North-eastern Slovenia and southern Austrian Styria. Distribution and duration diagram of settlements. The cut off points of 400 and 1300 are arbitrarily set, a – one site, b – more than one site.

differences and changes in burials, which cannot be simply attributed to the process of Christianization, but are more likely the result of different belief systems of various population groups (see below). Of course, all of these groups recieved Christianization.

4.5 BURIAL SITES AND THE GEOMORPHOLOGY

Primarily, I am interested in what can be linked to Slavs and what to Vlachs. In doing so, I consider two unavoidable assumptions for this initial stage of research. The first is that the belief system of the Slavs at that time was solid and unified. Its probability is strengthened by the high degree of similarity, which shows ethnological material from Slavic territories even in the 19th and 20th centuries (e.g. Moszyński 1929; 1934; 1939). The second assumption is the unity of the belief system of the Vlachs. It must be admitted that the foundations for this are weak. The question is to what extent can we trust the effectiveness of the process of unification during the time of the Roman state and the formal favouring of Christianity in Late Antiquity (cf. Bratož 2014, 304–307). It is highly likely that there were notable local differences, but because we do not have sufficient data at our disposal, there is no other option

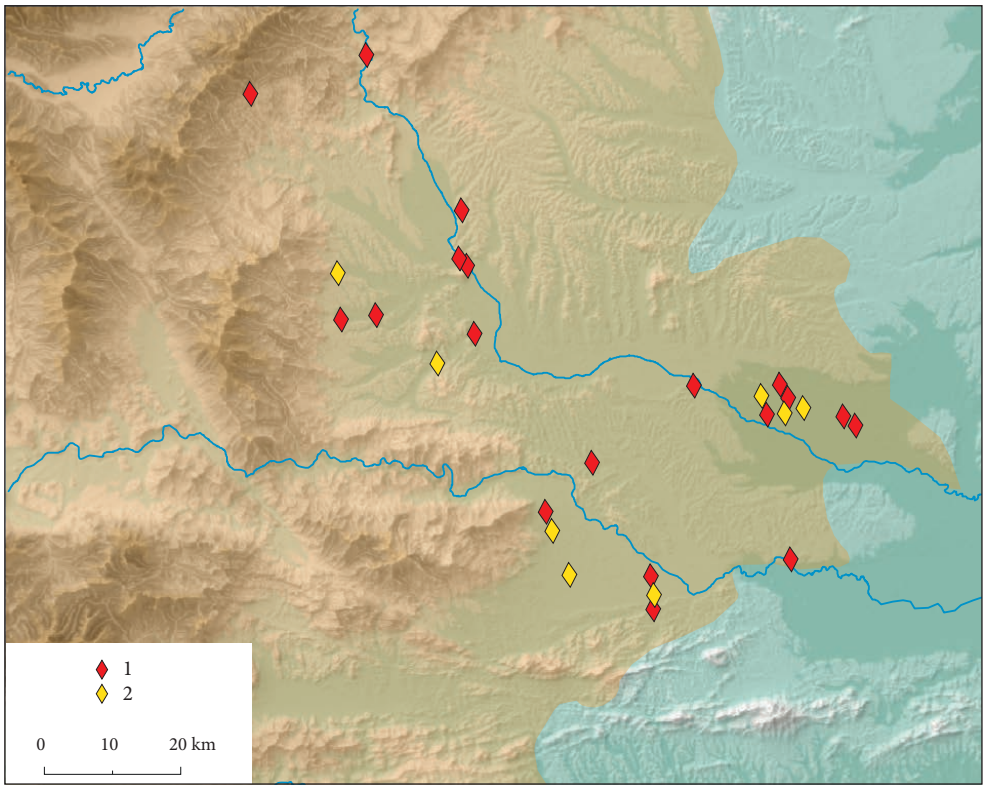

Fig. 9: North-eastern Slovenia and southern Austrian Styria. Settlements in the period 881–886. 1 – those that existed at least until 950, 2 – those that have disappeared by 901–906.

than to consider them as a whole and hope that at least some dominant trends emerge.

The chart (*Fig. 10*) shows the specific shape of the land that was chosen for burials. It includes those burial sites where the **graves were dug into the slope** and **shows the direction in which the slope was inclined**. In order to eliminate the possible criteria used in choosing the location of the church I have considered burial sites without a church separately. I also considered burial sites from two different time spans to establish the possible differences between Vlach and Slavic burial sites. The earlier span ranges from 401 to 641 (51 burial sites, of which 29 with the direction of the slope) and it should comprise predominantly Vlach burial sites. The later span ranges from 701 to 796 (98 burial sites, of which 50 with the direction of the slope), in which Slavic burial sites already had a significant share. The two groups are very similar, the only difference is that in the latter group the south-eastern direction of the slope is clearly dominant, while in the earlier group this peak is extended to the south and south-west direction.

However, since the burial sites of the earlier group are much fewer, we have to ask whether their number is representative and their diagram will not change with newly discovered burial sites in the future. Time will surely bring the answer, but the answer can also be found in other ways. We can take a small number of sites, create its slope inclination chart, add groups of sites and observe the changes in the slope inclination chart (*Fig. 11*). Currently, the grouping of sites does not include the years of discovery that could be used as random numbers to select site groups. Therefore, I helped myself by arranging the sites alphabetically by the names of the settlements and dividing them into 4 groups. Thus, I created four charts: with 7 sites, 14 sites, 21 sites, and all 29 sites. Understandably, from the last chart deviates the most the chart with 7 sites, which has a distinct peak in the southward direction. The graph that covers half of the sites is more levelled and emphasizes the directions from SW to SE. The graph depicting three-quarter of the sites evens out this trend even more and is barely distinguishable from the graph of all sites. This shows that 21 sites represent a sufficiently representative number, while 29 sites are 100% reliable. Of course, this also applies to the charts of later sites from the period between 701 and 796 and burial sites next to churches from the period between 831 and 1101 (see below). Which means that even decades from now, with new sites added, the graphs will be the same.

The third group consists of burial sites next to churches from the period between 831 and 1101 (77

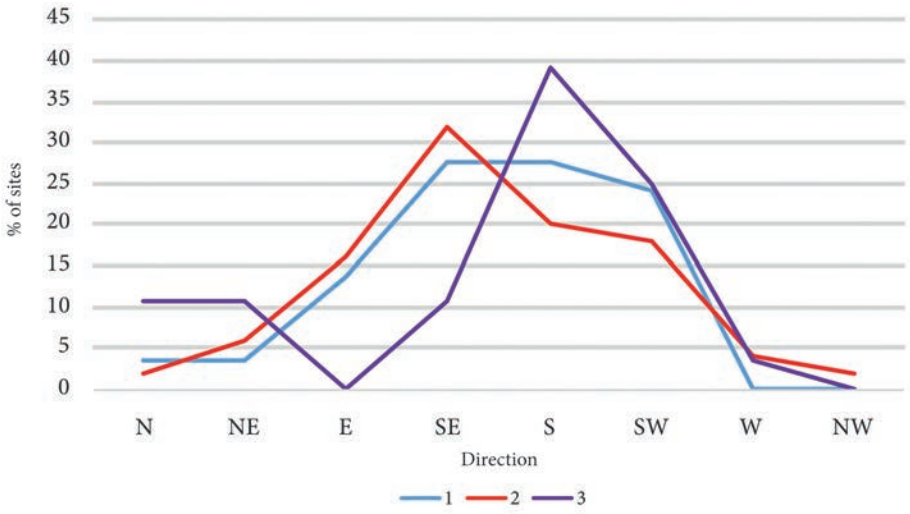

Fig. 10: South-eastern Alps. Direction of the inclination of the slope with a site. 1 – burial sites without a church (401–641), 2 – burial sites without a church (701–796), 3 – burial sites next to churches (831–1101).

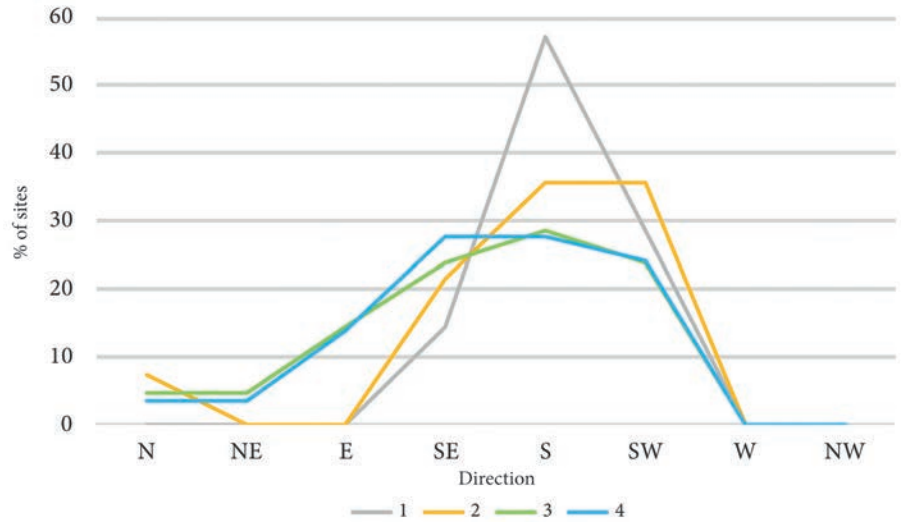

Fig. 11: South-eastern Alps. Direction of the inclination of the slope with a site. Burial sites without a church in the period 401–641. 1– 7 sites, 2 – 14 sites, 3 – 21 sites, 4 – 29 sites.

burial sites, of which 28 with the direction of the slope). In this group (*Fig. 10:* 3) the southward direction stands out, which can be explained by the medieval Christian concept, which derived the nature of the cardinal directions from the natural properties of the temperate zone of the northern hemisphere. The opposition "warm" <> "cold" added east and south to warm, and north and west to cold. "Good" and "bad" were equally distributed. When the opposite "light" <> "darkness", which is related to the movement of the Sun, was added to this, the bad value of the north was reinforced. It became a place of damnation, hell, utter hopelessness. The south is the opposite of the north and therefore the place of the Holy Spirit. The East is the place of beginning and the holy, the West is the place of death (Arentzen 1984, 148–149; similarly already in early Christianity: Sauer 1924, 87–97).

Therefore, if the shape of the charts is reliable, then the difference between the earlier and later group of graves without a church in the south and south-west slope orientation is significant. These are also the directions of the slopes that dominate the burial sites next to the churches. If these are synonymous and not homonymous observations, this could indicate a significant influence of Christianity already on the earlier "Vlach" group of burial sites. In any case, this idea should be veri-

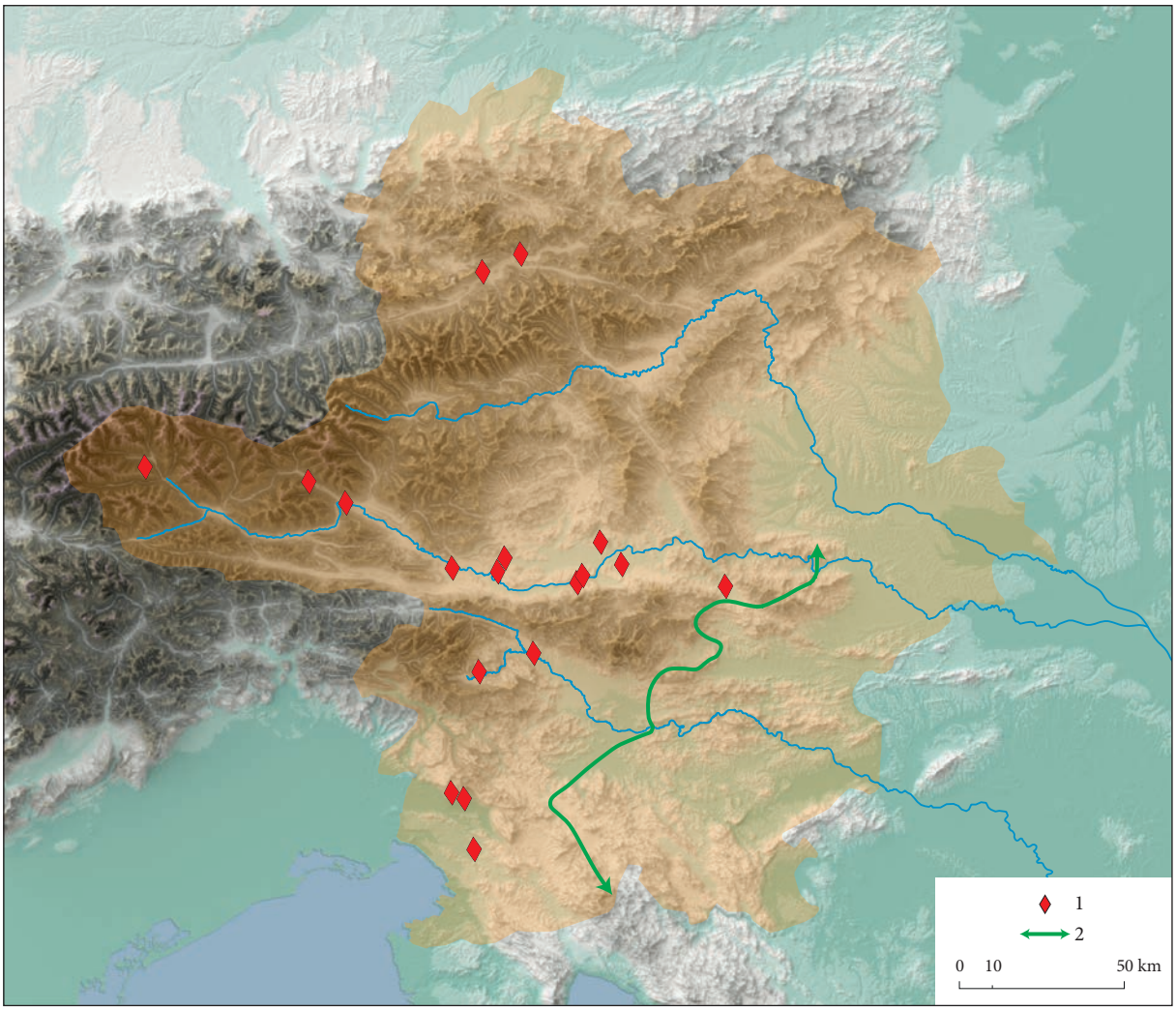

Fig. 12: South-eastern Alps. 1 – Burial sites without churches on slopes facing south or southwest, in the period 701–796; 2 –the border of weak connections between various Slovenian dialect groups (according to Ramovš 1995, Fig. 5, p. 118; Škofic 2016, map on p. 11).

fied in the future with the location of burial sites in the same area in the pre-Christian period. We will establish what the emphasis on the southeast orientation in the later group means when the considered burial sites are examined individually and in greater detail (including individual graves and artefacts) and especially in relation to their position within the respective mythical landscape. We will also see if the orientation of the graves and the orientation of the slope are connected. It is definitely worth checking whether the burial sites are oriented in relation to the sun and moon rise at solstice.

However, we have not exhausted the significance of the south and southwest orientation of the slopes on which burial sites without churches have been located. For the period between 701 and 796, such burial sites were found only in the interior of the Alps and in the vicinity of Italy (*Fig. 12*). The possibility that these are burial sites with the previously described "Vlach" tradition from an earlier period is considerable. I added a belt of slight connections between the various Slovenian modern dialect groups to the map. Fran Ramovš geographically justified the belt as a border between the high alpine world and the more transitory lowland world, which dictated a different linguistic development (Ramovš 1995, 117, Fig. 5). The above map represents a challenge to historical dialectology.

The **location on the edge of the terrace** is distinctive and telling. As a rule, this was alongside a river bank, which could indicate a desire for a wet environment, which was more pronounced in the Slavic Old Faith (cf. Mencej 1997). In the earlier group, 17.6% of burial sites have this position, in the later group 26.5%, and among burial sites next to a church 18%. While the earlier two groups without a church show that 41% and 45.9% of

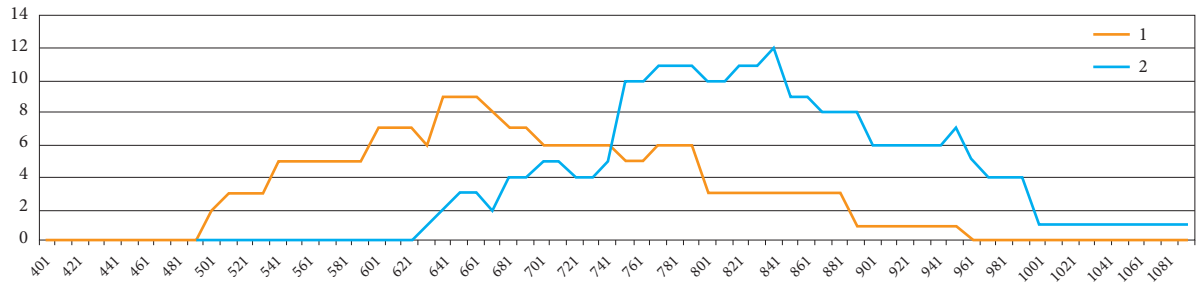

Fig. 13: South-eastern Alps. 1 – burial sites with mounds, 2 – cremation graves.

burial sites are located in the plain, as much as 59.7% of burial sites with churches are located in the plain. These numbers indicate that medieval Christianity brought noticeable differences in the choice of location.

Cremation graves and mound burials are the most telling (*Fig. 13*). In the case of the latter, we are not dealing merely with mounds that were piled at the time of burial, but also with the reuse of prehistoric mounds and the use of natural mounds, most of which were of glacial origin. At the time of their migration west and southwest between the 5th and the 9th century, the Slavs used to cremate their dead. This custom was abandoned gradually, mostly under the influence of Christianity, and to a lesser extent under the influence of neighbours who buried no cremated corpses. Burials in mounds were also not unusual (still the seminal archaeological work on burials among Slavs: Zoll-Adamikowa 1975; 1979).

In the 5th century there were no cremation graves that would reliably belong to this time and the indigenous population. A cremation grave with a shield boss from the Poljubin industrial zone near Tolmin could belong to a Germanic soldier from the last third of the 6th century (Cvitkovič 1999, 42). All other cremation graves most likely belong to the Slavs. These can help us establish the approximate western border of the Slavic settlement in the 7th century. The westernmost grave at the Lamprehtgarten biritual site in Oberlienz (East Tyrol) dates to the first half of the 7th century at the latest. There are cremation graves from the same period in the biritual burial site at Pristava in Bled, while the cremation grave at Repelec in Most na Soči dates to the second half of the 7th century or the mid-8th century. The transition to burials with non-cremated corpses took place in the 8th century, and we currently do not know of a cremation grave that would be reliably dated later than the 8th century. The Dedjek biritual burial site (Moravče pri Gabrovki) as a whole dates to until 960, and therefore the curve of cremation graves also extends until this date (*Fig. 13*: 2), although it is highly likely that its cremation graves date back to the initial period of burials. The relatively quick abandonment of cremating the death naturally indicates that Christianization was not important for this change in our area.

There are no known 5th and 6th century mound burials in the South-eastern Alps. The first mound burials appear as late as the 7th century and all three cases (Kapiteljska njiva in Novo mesto, Branževec near Dolenjske Toplice, Žale near Grad-Bled) are cremation burials. The Großprüfening site near Regensburg (Bavaria, Germany) proves that mounds with Slavic urns could exist as early as the 6th century (Losert 2011). From what has been said, it is obvious that the reuse of burial mounds is connected with the arrival of the Slavic population. Perhaps the faith in renewal and rebirth within the heart of the Holy Mountain was important (cf. Pleterski 2014, 93, 250–256). With the predominance of church cemeteries, the use of mounds naturally disappeared. This continued only at the Jewish cemetery at Judenbichl near Judendorf/Judovska vas near Villach/Beljak.

4.6 CHRISTIANIZATION

By Christianization I do not have in mind the spread of a certain world view, but I show the establishment of the spatial bases of Christianity: churches and graveyards. Of course, this was not decisive for people's intimate beliefs. If we want to observe what the Christianization process relates to in the area and what it can tell us about, we should confront several different phenomena: burial sites without churches, churches, stones with interlaced ornament and graveyards next to churches. The stones with interlaced ornament were a part of the church equipment, and although they are today located in a secondary position, they were a part of the church buildings at the time, which makes them their surviving fragments. Although these did not necessarily stand in the same location as the stones with interlaced ornament stand today, they were certainly not located very far from this location, which, in the macro view, means a negligible spatial deviation.

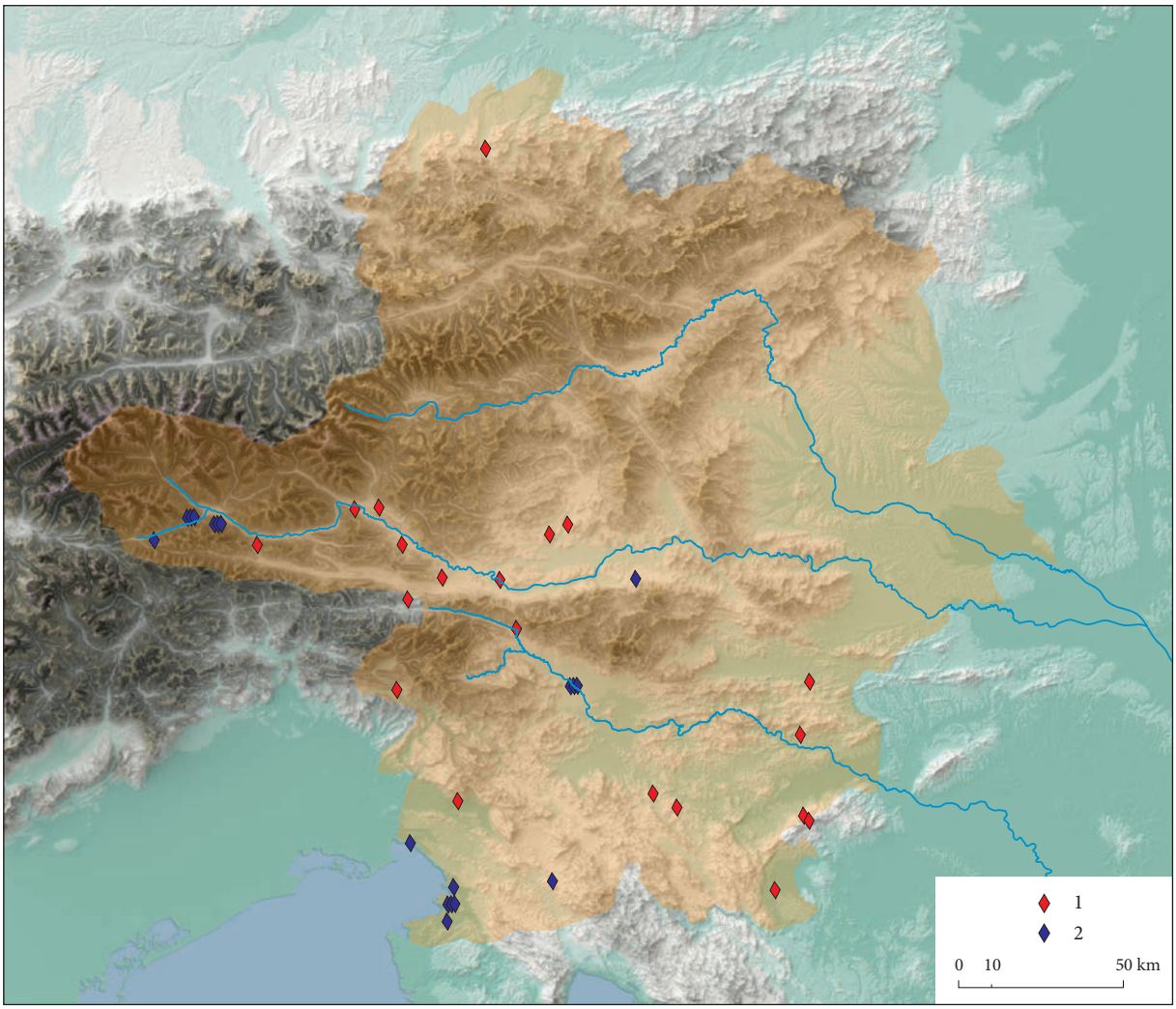

Fig. 14: South-eastern Alps. Churches. 1 – 551–596, 2 – 701–746.

When we talk about graveyards next to churches we have in mind graves next to or in former or current church buildings. Of course, this does not mean that all such burial sites stood next to a contemporary church and therefore automatically prove the existence of a contemporaneous church building, the remains of which have not yet been archaeologically proven. The earliest graves on the Island of Bled were certainly there even before the first church was built (Štular 2020a, 116), and the same holds true for the graves on the Styrian Hohenberg (Nowotny 2005, 223–224), Mali grad in Kamnik (Štular 2009, 47–61) and at Ptuj Castle (unpublished). However, the idea is that these are exceptions that do not change the impression of the whole. In the 9th and 10th centuries the burial sites without churches disappear from use and cemeteries next to churches begun to prevail (*Fig. 15:* 2, 3). The fact that the number of graveyards next to churches decreased in the 11th century may be the result of the poorer archaeological visibility of graves without grave goods. Such graves prevailed in the 11th century. However, this was also a result of the abolition of smaller graveyards next to proprietary churches due to the systematic establishment of parishes with their own graveyards (Höfler 2021, 106; see also *4.8* bellow).

Churches. The relatively modest number of churches stabilized in the 6th century and then decreased in accordance with the abandonment of settlements (*Fig. 14*). The noticeable decrease in the number of churches in the middle of the 7th century (*Fig. 15:* 4) is merely a consequence of the arbitrarily defined end of Late Antique settlements. However, the gradual decrease in the number of churches in the 7th century is obvious, and their numbers fall to a minimum in the first half of the 8th century. Almost all churches in highland settlements were abandoned (the exceptions are Hemmaberg/Junska gora and Kirchbichl above Lavant), yet a few churches in the lowlands were preserved. It is significant

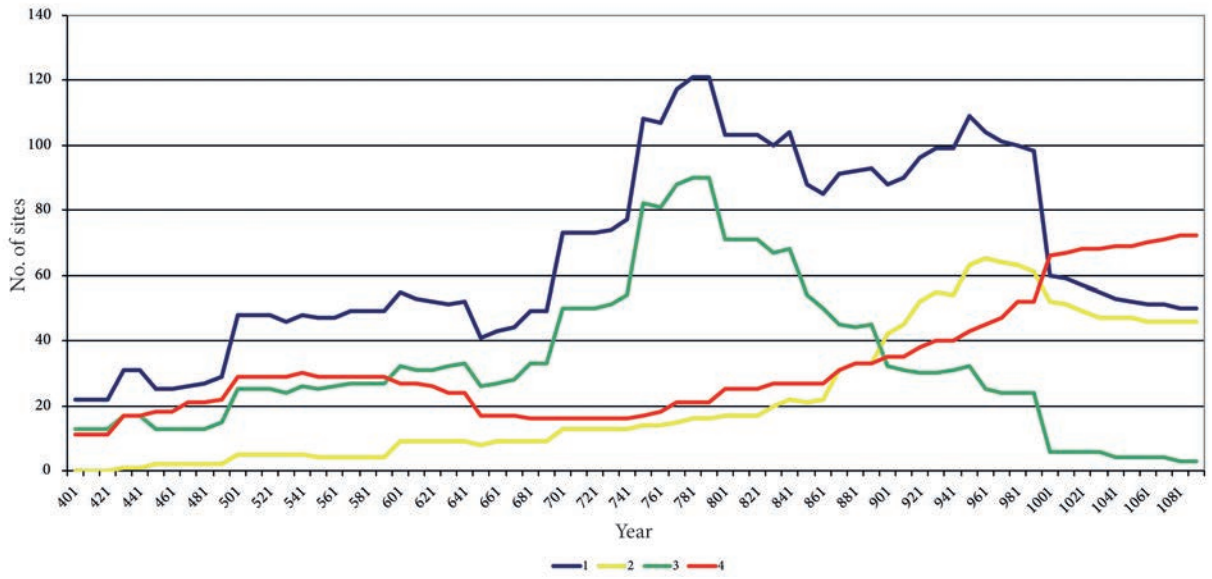

Fig. 15: South-eastern Alps. 1 – burial sites, 2 – burial sites next to churches, 3 – burial sites without a church, 4 – churches.

that these were two closed groups. The first was located in the south-west, on the territory of then Byzantine Istria, and the second was located in present-day East Tyrol. The latter indicates the probability that the Slavic settlement process at the time had not yet covered the Upper Drava basin. This is what makes the existence of churches on Hemmaberg/Junska gora and in Kranj, in the territory controlled by the Slavs, all the more interesting. It would be hard to imagine them without the co-existence of the Christian Vlach natives and the religious tolerance of the Slavs.

Christianization, as shown by the increase in the number of churches, was a slow and long-lasting process. The number of Late Antique churches was apparently exceeded only at the end of the 9th century. It should be emphasized that the well-known Late Antique churches were made of stone, while the new Early Medieval ones were initially predominantly wooden and therefore poorly visible from an archaeological point of view (see *Burial sites and churches* below).

Although the sharp increase in the number of churches in the year 1000 is a sign of the arbitrary dating of many churches from 1000 onwards, there can be no doubt that the number of churches in the 10th century increased noticeably. There can hardly be any doubt that this was also a consequence of the integration into the medieval empire.

Burial sites without a church (*Figs. 15:* 3; *16*)

All Late Antique burial sites, which were not next to churches and appeared before approximately 500, were no longer in use by 650. I already drew attention to the fact that the latter year was set arbitrary. Prominent long time spans belong to loosely dated graves. The reasons behind the time spans of the three burial sites exceeding beyond 1100 are varied. The site in Kammerhof is a single extremely loosely dated grave. Another example is Judenbichl near the village of Judendorf near Villach/Beljak, where the inhabitants of the neighbouring Jewish settlement continued to bury their dead even after the introduction of church cemeteries.

The latest burial site without a church, which appeared around 1050 (Lorenzenberg), is represented by two graves that were discovered between 70 and 90 metres from the present-day church. The probability that they belonged to the church cemetery, despite this distance, is considerable. Since we have not yet systematically included High Medieval sites into our research, we did not cover the phenomenon of cemetery walls (Sörries 2003), which limited the cemetery space around the churches. The cemetery up to and including the 11th century was larger than it was once the graveyard walls were built. A well-documented example can be found in the cemetery next to the parish church in Kranj, where the archaeologically established burial limit is up to a distance of 75 m from the church.

Following the middle of the 9th century, burial sites without churches appeared as an exception rather than a rule and they completely disappeared in the 10th century. The main period of burial sites without churches can be found in the 8th century, when they appeared in their highest numbers. There are noticeably fewer of them in the previous period, which can be attributed to the then prevailing custom of cremating the dead (see *4.5* above), which greatly complicates archaeological visibility. The decline in the number of burial sites without churches

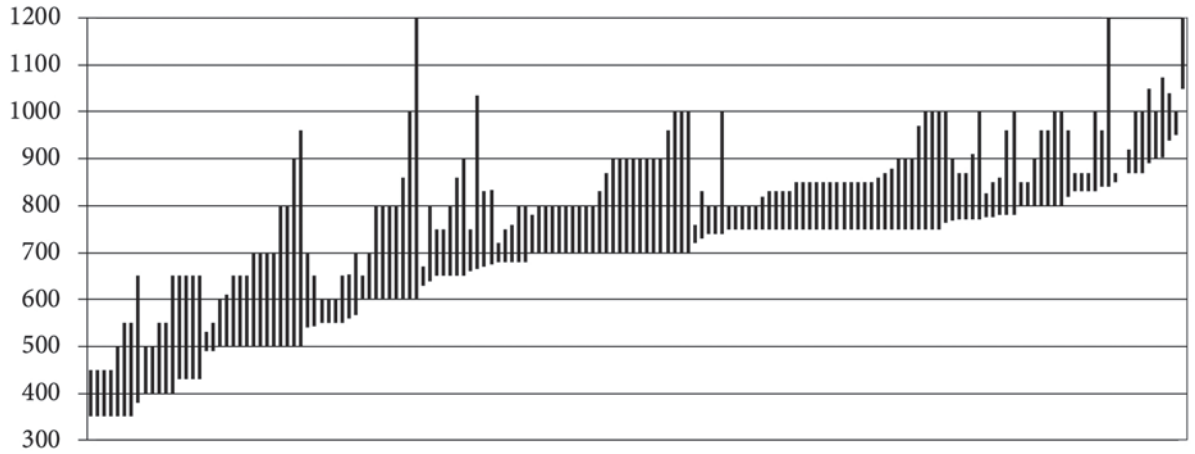

Fig. 16: South-eastern Alps. Time spans of the use of burial sites without a church.

in the 9th and 10th centuries was undoubtedly the result of the introduction of church cemeteries. Charlemagne ordered the Saxons to bury their dead in a church cemetery in 782 (Lammers 1981–1983). Non-compliance to this law was punishable by death penalty, and this is considered to be the beginning of the legal obligation to bury the dead in this way. This burial method spread in different locations at different speeds, primarily depending on the commitment and actual power of individual rulers (a short, broader overview and further details for Hungary: Vargha, Mordovin 2019, 141–142).

Burial sites and churches

The centuries in which the transition from burials without churches to burials next to churches took place can be seen with the aid of four cross-sections with intervals of 50 years. The first shows the situation in the fifth decade of the 9th century (*Fig. 17a*). One can observe the operation of both ecclesiastical and secular rulers. In the 9th and 10th centuries, the territory we are observing was under the jurisdiction of two church centres: the Patriarchate of Aquileia and the Archdiocese of Salzburg. From 796/811 onwards, the Drava River represented the border between their territories of jurisdiction. The seat of the Patriarchate of Aquileia was in Cividale del Friuli at the time, i.e. in the immediate vicinity. Despite this, the activity of the patriarchate in expanding the network of churches has not been observed. If we exclude the group of churches in former Byzantine Northern Istria and its outskirts, south of the Drava River there are only such churches and church cemeteries that can be connected with the local tradition of Vlach Christians: on Hemmaberg/Junska gora, in Kranj and Moste. The church in Volče is on the map most likely only because of its loose dating and was in all likelihood not constructed this early. Slightly higher activity can be noticed on the left, Salzburg bank of the Drava River. However, even there, the group of churches in East Tyrol still belong to the Late Antique Vlach tradition, while the other churches that appear are not found neither in the Conversio nor in the document from 860 (MGH DD LdD / DD Km / DD LdJ, Nr. 102), which supposedly documented the Salzburg missionary activity. The latter document predominantly lists manors, i.e. land holdings, which shows that the interest of the Archdiocese of Salzburg was almost exclusively economic, obtaining as much income as possible. This image shows the considerable probability that until around 830, the primarily Vlach population, that part of it which had been Christian for a long time, was buried next to the churches. Around 830 CE, the number of burial sites next to churches began to increase (*Fig. 15*: 2).

Following the efforts of Alcuin, Charlemagne's adviser, the population of the territories which Charlemagne conquered east of Friuli and Baiuvaria was imposed with a reduced church tax (Bratož 1999, 107). This apparently decreased the interest of the Archdiocese of Salzburg to construct churches, as they saw greater profits in direct land holdings. Thus, the archaeological picture shows the construction of churches on the left bank of the Drava River, however it is not particularly likely that the priests from Salzburg looked after them, but more likely someone else. One also needs to take into account the possibility that at least some churches were not consecrated and were, above all, a gathering place for collecting the contributions of the believers and demonstrating the owner's prestige.

In any case, the non-consecrated church (*non consecrata foret*, the writer expresses his disbelief with the dubitative subjunctive) in Lesce in the Gorenjska region was built no later than the mid-11th century on

the right, Aquileian bank of the Drava River, and the owner appropriated the gifts of the believers for himself as there was no worship conducted in this church *(divina obsequia ibi minime agerentur,* once again dubitative subjunctive). This situation was interrupted only in the first or second decade of the 12th century (Bizjak 2012, 38–41; Hormayr 1803, 99–100, No. XLVII; Schumi 1882–1883, 123–124, No. 133). At this point, I will not describe the meaning of a non-consecrated church without worship, to which believers still came with gifts. This was possible for three centuries after the first half of the 9th century and although this was no longer a normal situation and not a Salzburg territory, it points to the rich possibilities for coexistence and transitions between the Old Faith and Christianity. Therefore, the small church in Lesce also offers a perspective of what the "church" in Millstat in Upper Carinthia, which was restored by Prince Domitian during the time of Charlemagne, might have been (Kahl 1999). Millstatt stands on the left, Salzburg bank of the Drava River. The Domitian's legend, which was written in the second half of the 12th century states that he found a church that was dedicated to idols (*ecclesiam, que demonibus fuit addicta*; Pleterski 1994; 1997), which is an exceptional designation otherwise not found in medieval records. When they discussed Old Faith sanctuaries, they used the terms *fanum, delubrum, templum*. So, did Domitian find a non-consecrated church containing statues that he believed were idols of the Old Faith? The possibility of this thought is confirmed by a fragment of a statue found on Silberberg in Carinthia. It shows a three-faced god, on whose back a cross was later carved (Kahl 1999, 49–50; Glaser 2022). Even if it might have been created as e.g. a depiction of Triglav, the added cross changed it to The Holy Trinity.

The minutes of the 796 meeting of bishops on the banks of the Danube, at the end of the war with the inhabitants of Avaria, somewhere east of Bavaria, describe the pastoral conditions and speak of the existence of three types of otherwise rare Christian priests. One group were those whose baptism was valid, the second group were clerics with no priestly ordination, and the third were illiterate clerics. The minutes do not reveal where these groups were located in Avaria (Bratož 1999, 85–100). However, according to the Western understanding at the time, Avaria began already east of Bavaria and Friuli (cf. Wolfram 2012, 314), which means that it included a good part of the Eastern Alpine territory. We can merely speculate whether the ordained priests of the first group were ordained in Salzburg or by the auxiliary bishop Modestus (cf. Conversio, c.5). In any case, the foreboding of the rather chaotic state of Christianity, indicated by the archaeological sites, is confirmed by the listed written sources.

The last decade of the 9th century (*Fig. 17b*) shows churches were located both north and south of the Drava River. Quantitative comparisons between the two territories are misleading, because the area of Slovenia has been explored better than the area in present day Austria. In any case, the scattered and gradual disappearance of burial sites without churches north of the Drava River is noticeable. They eventually disappear at the northern foothills of the Alps. There is no doubt that the church network south of the Drava River began to expand in this period. However, this depended highly on local conditions (see *4.8* below). It is telling that the situation in the Dolenjska and Zasavje regions remained unchanged, i.e. without churches. This indicates a different nature of the authorities there, which raises the question of the political arrangement south of the Karavanke mountain range: counties or principalities, their number.

By the fifth decade of the 10th century (*Fig. 17c*) graveyards next to churches predominated everywhere. Now burial sites next to churches also started expanding in Zasavje and Dolenjska regions. Only Bela krajina remained without them. As the first half of the 10th century was a period of intense Hungarian invasions (Štih 1983), this offers a surprising image. It is even more surprising that two churches (near Središče ob Dravi and in Tišina near the Mura River) stand on the territory that was supposed to belong to Hungary at the time, which had not yet been Christianized. We will obviously have to change our ideas as regards the border territories, Hungarians and Christianization.

Pécs, which stands next to the ruins of ancient Sopianae, is a settlement with archaeological traces of cultural and religious Christian continuity since antiquity (Buzás 2016, 76–80; Tóth et alii 2020). A similar case can be found on the site of the church of St Martin in Sombathely (Kiss, Tóth 1993). Even in Veszprém, the possibility of a 9th century church predecessor is suggested (Buzás 2020, 8–10). 9th century churches with a continuation in the 11th century can be also found in Zalavár (Szőke 2021, 339–409) and Kaposszentjakab (Molnár 2022, 256). The church in Kostoľany pod Tribečom (Slovakia), which is dated to the end of the 9th or the beginning of the 10th century, St Margita in Kopčany (Slovakia), which is dated after the mid-10th century and the 10th century church in Visegrád indicate the existence and spread of Christianity in Hungary even before the formal Christianization took place (Szakács 2018, 200–203). However, the latest archaeological research places the construction of the church in Visegrád somewhat later, around the year 1000 (Buzás et alii 2017, 214) and thereby excludes it from the group of early churches. The listed churches and of course also the churches in Tišina and Grabe near Središče ob Dravi in the western part of the Pannonian basin show that Christianity, even if in an organized form, did not completely die out after the end of the Carolingian period and the arrival of the Hungarians.

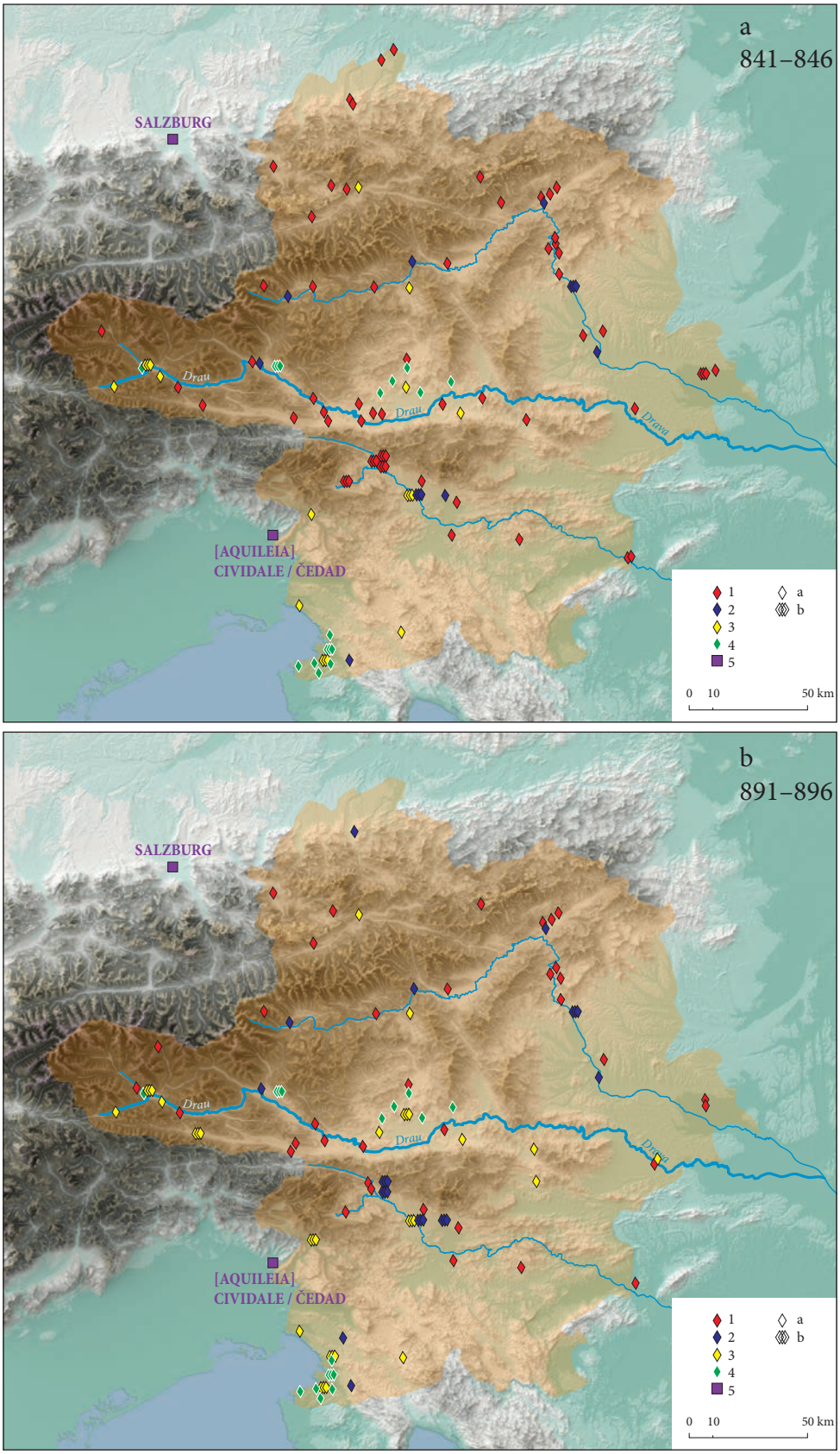

Fig. 17a, b: South-eastern Alps. 1 – burial sites without churches, 2 – burial sites next to churches, 3 – churches, 4 – stones with interlace ornament, 5 – seat of the archdiocese (Salzburg), seat of the Patriarchate of Aquileia (Cividale), a – one site, b – more than one site.

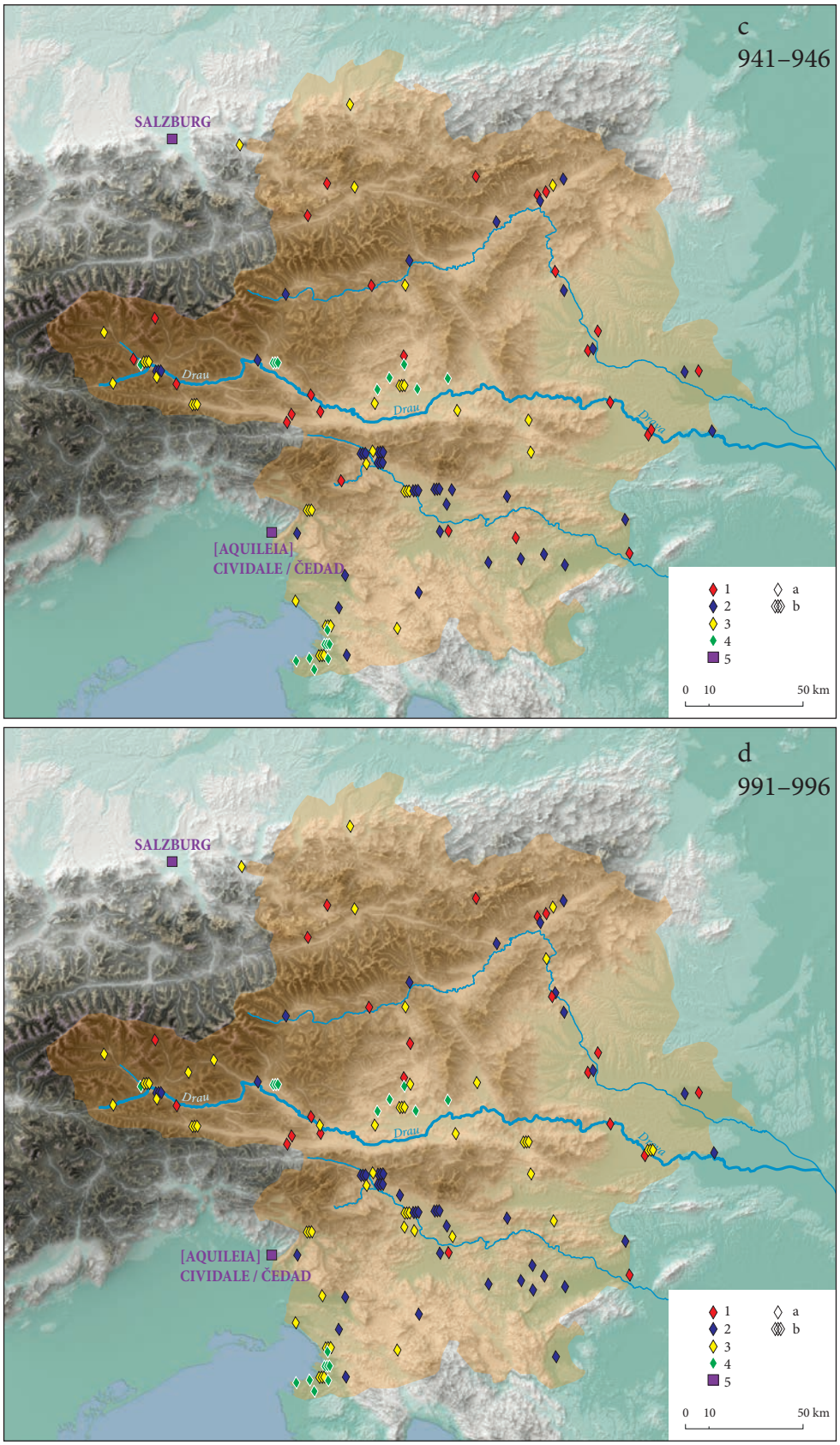

Fig. 17c, d: South-eastern Alps. 1 – burial sites without churches, 2 – burial sites next to churches, 3 – churches, 4 – stones with interlace ornament, 5 – seat of the archdiocese (Salzburg), seat of the Patriarchate of Aquileia (Cividale), a – one site, b – more than one site.

In the last decade of the 10th century (*Fig. 17d*) there were only a few burial sites without churches and by the 11th century they disappeared completely. At that time, control over burial sites was completely taken over by the Christian Church in cooperation with the secular authorities of the Medieval Roman Empire.

4.7 CHURCHES AND BURIAL SITES IN KLAGENFURTER BECKEN/CELOVŠKA KOTLINA AND THE ISSUE AS REGARDS THE ORIGINAL SIZE OF CARANTANIA

The area of Klagenfurter Becken/Celovška kotlina stands out from the general map of burial sites and churches (*Fig. 17*), for it clearly shows the spatial relationship between the placement of churches and burial sites without churches. The largest plain north of the Karavanke mountain range is relatively evenly covered with burial sites without a church, which were in use in the second half of the 8th century (*Fig. 18a*). The fact that they are least numerous in the area of the city of Klagenfurt/Celovec and its surroundings is the result of poor archaeological visibility in highly urbanized areas. We are aware of only two churches in central Carinthia from this period. One stood on Hemmaberg/Junska gora, which continued the tradition of local Late Antique churches and can be imagined in connection with the Vlach population. The second is Maria Saal/Gospa Sveta above Zollfeld/Sveško polje, if we can believe that this was the same Mary's church, which was consecrated by the Salzburg priest Modestus in the middle of the 8th century. At the time under consideration, it is attested only in a written source (state of research and discussions on localisation: Eichert 2012, 35–37).

The answer to the question as to whether the church of St Peter near Moosburg/Možberk already stood there at the time, depends on how we date the stones with interlaced ornament, from Carinthia (Karpf 2001). Stones with interlaced ornament (*Fig. 18b*: 3) are isolated finds and were preserved as spolia in later church buildings. The original locations can be guessed by the number of built in fragments.

In St. Peter bei Moosburg/Možberk stone church equipment, which was decorated with interlaced ornament, was found as spolia. Based on the large number of fragments, the narrower undated building foundations and adjacent graves, which first appeared around 830, we can conclude that a church with a graveyard existed at this location. Kurt Karpf dated the stones with interlaced ornament, with the political situation at the period between 772 and the introduction of the county system in 828 (Karpf 2001, 78). The stones with interlaced ornament in central Carinthia are well placed into the empty spaces between burial sites without churches only in the first third of the 9th century, but they would have been positioned significantly worse among such burial sites in the last quarter of the 8th century, when there were no voids yet (*Fig. 18a, b*). If we arbitrarily place the use of such church decoration in the last quarter of the 8th century, we know of at least two churches that would have stood for several decades before they started burying the dead next to them. These were St. Peter bei Moosburg/Možberk and St Tiburtius in Molzbichl in Upper Carinthia. The construction of perfectly equipped proprietary churches and the gradual transition to church graveyards is therefore much more likely to have happened in the first third of the 9th century. The inscription into the stone slab, which was built into St. Peter am Bichl/Št. Peter na Gori, might also be in line with this. The name Otker carved into this stone corresponds to the name of Prince Etgar (Kahl 2002, 53), who is mentioned in the Conversio (Conversio, c. 10) in the period between 799 and 828 (cf. Wolfram 2012, 169–174).

In the second third of the 9th century there were no more burial sites without churches in the area, which is primarily defined by stones with interlaced ornament, (*Fig. 18c*). This is a territory of 25 × 35 km between St. Veit a.d. Glan in the north and the Drava River or even the foothills of the Karavanke mountain range in the south, the Völkermarkt/Velikovec in the east and the eastern part of the Wörthersee/Vrbsko jezero in the west. We are currently uncertain where to place Jauntal/Podjuna. However, as late as the last third of the 9th century (*Fig. 18d*) the area where there were no more burial sites without a church extended to Villach/Beljak in the west.

The area from which burial sites without a church disappeared is the one in which the ruler asserted his power and forced people to respect his political will. In the first and second third of the 9th century this corresponded surprisingly well to the territory which was home to the later estates belonging to "civitas Carantana". The latter designation is usually identified with Karnburg/Krnski grad (cf. Eichert 2012, 139). In 982, these estates were the manors of Drauhofen/Dravski dvor, Grafenstein/Grabštanj, Gurnitz/Podkrnos (MGH DD O II., Nr. 275). The area described also fits the 5–6 hour walking distance from Karnburg (see Eichert 2012, Fig. 179), which stands at the southeastern foot of Ulrichsberg/Šenturška gora (with the earlier name Carantanian Mountain). Does this mean we are looking at the territory that was, in the first third of the 9th century, ruled by the prince of Carantania? Does this agree with the established belief that the family of Prince Borut had hereditary, undivided and general authority over the Carantanians as early as 740 (Wolfram 2012, 117; similarly Štih 2012, 320)? We must add to this the well-established and widely spread idea that at that time Carantania (*Fig. 21*) comprised the area between Innichen in the west, Semmering in the east, Karavanke in the south and Traunsee in the north (for example: Grafenauer 1964, 332, Map XV; similarly Kahl 2002, 392; Wolfram 2012, 359; Gleirscher 2018, Fig. 126).

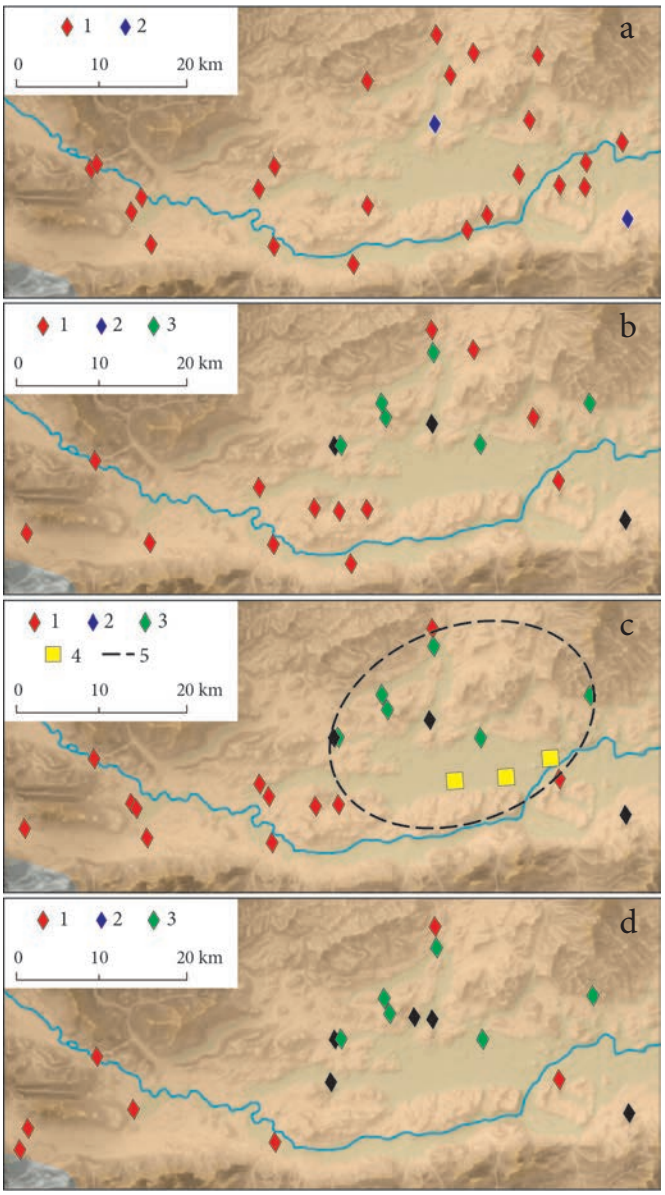

Fig. 18: Austria, Klagenfurter Becken. a – Period 746–796; b – period 801–826; c – period 831–866; d – period 871–896. 1 – burial site without a church, 2 – church; 3 – stones with interlaced ornament, 4 – manor, which belonged to "civitas Carantana" in 982, 5 – an area with no burial sites without churches.

When searching for an answer, the **models** proposed by Stefan Eichert represent a good starting point, because he also noticed a greater density of settlements and churches with stones with interlaced ornament as a sign of authoritarian power in Carinthia. According to the first model, the Carantanian princes established a hereditary central authority over the wide territory of the Eastern Alps and hegemony over other systems whose centres are shown by churches decorated with stones with interlaced ornament. According to the second model, they failed in doing so. Their hereditary authority extended merely as far as the central part of the Klagenfurter Becken/Celovška kotlina. Even Jauntal/Podjuna and the area south of the Wörther See/Vrbsko jezero lake were exempted. The princes of Carantania did not control the neighbouring areas of power, even though an outside observer might believe that they were at least the first among equals. According to the third model, no hereditary dynasty was established in Carantania, but its princes nevertheless gained power over neighbouring areas. However, since power passed from one family to another, they needed a special enthronement ceremony that legitimized each new ruler (Eichert 2020, 126–127). A fourth combination and model is also possible in this relationship between heredity and territorial extent of power. According to this model, no hereditary dynasty

was established in Carantania, and each Carantanian prince controlled solely the central area of the Klagenfurter Becken/Celovška kotlina.

The images of the development of the relationship between churches/graveyards next to churches and burial sites without churches (*Figs. 17; 18*) do not support the idea of a widespread authority of a Carantanian prince. It is believed only for the central part of the Klagenfurter Becken/Celovška kotlina that several churches were built around the same time and that burials at cemeteries without churches stopped. In the first third of the 9th century at least 6 churches stood there. I believe the two sites with stones with interlaced ornament, Zweikirchen and St. Peter am Bichl/Št. Peter na Gori, with an intermediate stone heap as a third site (Glaser 1999) to be the remains of a single church. In most cases churches stood between 6.5 and 15.5 km apart. The westernmost church (St. Peter bei Moosburg/Možberk) and the easternmost church (St. Martin/Šmartin) are separated by 34 km. This is the spatial extent of the group of churches, which did not reach even the legendary Velehrad in Moravia, where St Methodius was buried in the 9th century. There, the maximum distance between the churches in Modra and above Sady is 6760 m (cf. Rajchl 1995, Obr. 4; Galuška 1997). It is absolutely unfathomable that the Carantanian princes would have been so wealthy and interested in such a network of churches at the time. None of the above models fully correspond to this.

Of course, the presented images cannot directly testify to the issue of heredity. However, already written sources can shed some light on this issue. Indeed, the first three Carantanian princes known by name, Borut, Gorazd and Hotimir, were father, son and nephew (Conversio, c. 4). However, the mere kinship of political champions is not proof of heredity. A great example from modern history can be found in the US presidents George H. W. Bush and George W. Bush, father and son, who prove that despite their kinship, the office of the US president is not hereditary. The idea that Slavic societies chose their princes meritocratically, i.e. according to their abilities and merits, is proven by the example of the Frankish merchant Samo in the 7th century. He was chosen by the Slavs as their "king" because of his ability, because he excelled in the fight with the Avars (*Winidi cernentes utilitatem Samones, eum super se eligunt regem*. Fredegar, L. IV, c. 48). We are aware of the criteria for selecting a judge in the Carinthian region, which were, in the second half of the 11th century, described in the proposal of an addition to the Swabian Mirror (Ger. *Schwabenspiegel*) (Grafenauer 1952, 197–203; Kahl 2000). He had to be the most cogent, best, smartest; noble descent was of no importance, but honesty and truth were (Grafenauer 1952, 172). At the same time, there is no indication that the Carantanian prince held a hereditary position. Was the kinship of Borut, Gorazd and Hotimir merely a coincidence? No, because in a meritocracy the merits of the fathers confer prestige also upon his sons. Saxo Grammaticus provided a good example of this in connection with the enthronement of the Danish king in 1137, where he enumerates the merits of the deceased father, but not only birth was important for the successor, but also personal virtues (Saxo Grammaticus, L. XIV, c. 2). However, it is completely unbelievable that the government structures in Carantania would outdate those in Denmark by more than 400 years.

If we cannot possibly consider the heredity of the Carantanian princes, and if the presented images nevertheless show a space of unified authority in central Carinthia (*Fig. 18c*), in the form of a closed area of a group of churches and no burial sites without churches, who was the decisive authority? The answer is provided by the fractal society model of the ancient Slavs. I call it this because we can notice that the structure of this society was repeated in its individual components, once we observe them in greater detail. At the macro level, we can observe a broad spatial network of equal principalities with equal princes. Due to his special powers, neighbouring princes can recognize one of them as a grand prince, and he can also be appointed grand župan (similar to Stefan Nemanja in Serbia). When we take a closer look at each principality, we notice that it consists of individual župas. These were governed by equal župans, but one among them was recognized superiority due to his special powers. He became a prince, and could be appointed grand župan, or given a different title. The župans of the župa were chosen by its free members. – I emphasize that this is merely a model, but I will confront it with some structures that have been determined through archaeological research or in written sources.

Union of Four. In the 12th century Helmold of Bosau described an interesting union of four Slavic peoples (*populi*) along the Peene River (Eastern Germany): Kessini (*Kycini*), Circipani (*Cyrcipani*), Tollensians (*Tholenzi*), Retarians (*Redarii*). Because of their bravery, they were called Volci (*Wilzi*) (= the woolfs) or Ljutci (*Lutici*) (= the furious). The Redarians occupied the city of Retra (*Rethre*) with a famous sanctuary (Helmold, L. 1, c. 2). The Retarians were apparently given their name by their holy city, which was visited by all Slavic peoples. Because of the age of the city and the fame of its sanctuary, the *Tholenzi* and *Redarii* claimed the leadership over the alliance to themselves, which led to a civil war (Helmold, L. 1 c. 21). The *Lutici* had their *principes* (dignitaries) (Annales Magdeburgenses, A. 1169–1176, year 1169). This was therefore a union of at least initially equal political units, each of which had its own dignitaries. However, Fred Ruchhöft believes that the *Wilzi* and *Lutici* were meant to refer to political suc-

cession and that they should not be equated geographically (with an extensive list of different understandings: Ruchhöft 2008, 70).

The size of the župa. The distance of 6.5 km between the churches in Klagenfurter Becken/Celovška kotlina corresponds to the size of the Bled župa (Pleterski 2017), which is naturally limited. This is why I looked at even the smallest distances between neighbouring 10th century hillforts in what was at the time still Slavic Wagria (today eastern Holstein, Germany). Since I measured the distance on a survey map of the sites (Ruchhöft 2008, Fig. 51), the accuracy of the measurement was 0.5 km. The average distance to the nearest hillfort was 7.6 km. Assuming that one hillfort belongs to one župa, this distance confirms that the župas were small (see below *5.1*). This shows that each listed Carinthian church belonged to an individual župa. According to the results of the archaeological research carried out so far, none of the churches stand out and Karnburg was not built as a fortified site before the second half of the 9th century (cf. Eichert 2012, 138–151). Both indicate that the duke of the Carantanians was only the first among equals at the time these churches were constructed. This clue is of greater importance than it might seem at first glance. It does not match the propaganda impression that the Conversio tried to create, according to which the Carantanian princes (in cooperation with the Church of Salzburg) were responsible for the Christianization of the Carantanians (Conversio, c. 5). It does also not match what we usually believe was the course of Christianization among the Slavs, where first the ruling family was Christianized, and then, under the ruler's pressure, Christianity spread down the social ladder (cf. Łowmiański 1979, 282–358).

Law and sacred. First of all, let me remind you of Wolfgang Fritze's research on the legal aspects of the state development of the Slavic Obodrites in today's Germany. He drew attention to several stages of political development. Instead of the word župa, he used the technical term "small tribe" (*Kleinstamm*), and for the župan he used the term *regulus,* borrowed from Latin sources. He suspected that during the settlement process and shortly after it, the "small tribes" were not connected and probably did not have an institutionalized ruler. Until the mid-9th century, there was a union of "small tribes", each with its own *regulus*. They were subordinated to one *regulus*, who had the authority over all. In the period that followed, larger settlement groups (*Teilstämme*) began to unite into political units with a monarchical leadership. This occurred as a result of a foreign policy intervention by the Frankish ruler. In the mid-12th century the ruling family established a unified state through a network of princely castles and their administrative territories (*Burgbezirkverfassung*), and the early "tribal" groups lost their political autonomy (Fritze 1960, esp. 201–208).

In the 12th century Helmold of Bosau described his march through Slavic Wagria (today's northeastern Holstein in Germany), where they came across a fenced grove of sacred oaks of the country god Prove, which was the sanctuary of the entire country. A priest belonged there and performed celebrations and sacrificial rites. Every Monday the people of the country, the priest and the *regulus* met there for the court (Helmold, L. I c. 84). Based on this account, Fritze concluded that each "small tribe" had its own legal and cult systems, which were closely connected, since the court sat in a cult place at certain times. The "tribal" territory appears as a cult district, and the legal arrangement of the local community as a sacred order. The later prince was also subordinated to this. There was sacral inviolability and the "sovereignty" of law. He therefore sees the župa as a settlement, legal and cult union (Fritze 1960, 205–206). It seems that the situation in 8th century Carantania corresponded to the second early phase of the political development of the Obodrites.

Henryk Łowmiański also noticed the connection between law and the sacred. He pointed out that the legal aspect was extremely important in the Christianization process and therefore there were two phases, which were decided by the political community and not by the ruler himself (in the event that he did not have sufficient power on his own). In the first phase, the political community tolerated the missionary work of Christian priests, however, whether one would convert to Christianity later depended on the will and willingness of the individual. In the second phase, the conversion was a political decision of the entire community, which collectively decided for or against Christianity (Łowmiański 1979, 237–263). The best-known and best described example of a group decision to Christianize a political community comes from Iceland, where in the year 1000, after a jointly agreed procedure, a collective decision for a unified law and religion ended the impending threat of a civil war (Íslendingabók, c. VII). This political model provides an excellent explanation as to what took place in Carantania.

According to the Conversio, the auxiliary bishop Modestus and his group of priests dedicated the church of St Mary to the Carantanians (*Carantanis dedicaverunt ibi ecclesiam sanctae Mariae*, Conversio, c. 5) when they arrived from Salzburg in the middle of the 8th century. The concordance analysis of the Conversio shows that it was placed on land that, due to its importance, belonged to the community of Carantanians. It stood alone, outside the territory of neighbouring settlements. Maria Saal/Gospa Sveta fully meets this description. In the 8th century there was no settlement next to the church, for this appeared only later and was named after the church (Pleterski 1998, 256–257). It stands on one of

Fig. 19: Klagenfurter Becken/Celovška kotlina with Ulrichsberg/Šenturška gora. The painting was created by Marko Pernhart. The painting was created between 1864 (the beginning of the railway line between Klagenfurt/Celovec and Villach/Beljak) and 1871 (death of Pernhart). (https://commons.wikimedia.org/wiki/File:Markus_Pernhart_-_Klagenfurter_Becken_gegen_Nordwesten.jpg)

the holy locations within the central sacral area of the Carantanians, which was important for the entire Carantanian community (Pleterski 1996, 482–501). Modestus dedicated the church to this community and not to the Carantanian prince. Burial sites without a church were not abolished in the surrounding area, and a long period of civil wars followed (Conversio, c. 5). We can agree with Łowmiański (1979, 254–255) that the conditions corresponded to the first phase of Christianization according to the above-described model. The appearance of the second phase, which, like many other things, is omitted in the Conversio, is shown by the map of the new churches (*Fig. 18b*). This is a swiftly created space of common faith and common law. This religion is now Christian, and due to the weak prince, this could only be a joint decision of the state community, similar to the decision taken by the Icelanders two centuries later. They decided to convert to Christianity as a group and immediately. This decision was also important for the later spread of the name Carantania and for the preservation of the extremely archaic enthronement ceremony of the Carinthian princes, since it could no longer be influenced by the Old Faith, while the new religion could not gain significant influence and remained on the formalistic periphery. I will not elaborate on either of these at this point. The decision was equally important for the preservation of a broad layer of freemen who maintained their self-government until the end of the Middle Ages. In Slovenian they are called *kosezi*, in German *Edlinger* (Grafenauer 1952, 389–558; Eichert 2014). I will not discuss them in detail here either, I will merely point out the high probability that the two words did not originally denote people of the same social origin and that they are not always interchangeable.

Carantania in the narrowest sense. The territory of common law and the new Christian religion was limited to the central part of the Klagenfurter Becken/Celovška kotlina (*Fig. 18c*). So, this was Carantania in the narrowest sense of the word. Another question is how much were these Carantanians able to spread their influence and name (at least in the eyes of foreigners) to their neighbours. The name Carantanians is mentioned already around 700 by Anonymous of Ravenna (Anonymus Ravennatus, 453) and Carantania by Paul the Deacon (HL, L. 5, c. 22), which would, in the 8th century, hardly be possible if the name was limited merely to Carantania in the narrowest sense.

The model for the spread of the name in pre-Christian times is provided by the previously described

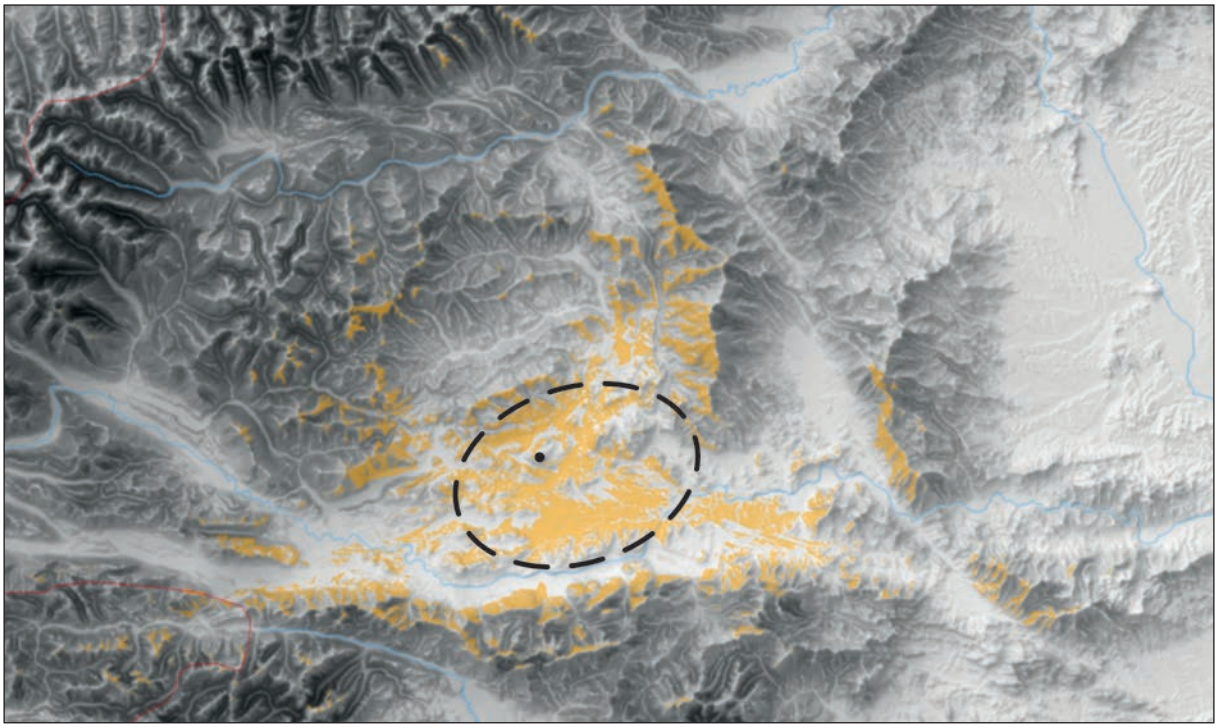

Fig. 20: Klagenfurter Becken/Celovška kotlina. Visibility (yellow) of the peak (black spot) Ulrichsberg/Šenturška gora (realisation Benjamin Štular).

Ljutci and the importance of Radegost's temple in Rethra. Carantanians are named after Caranta. The name is said to refer to the area of Ulrichsberg/Šenturška gora (Kahl 2002, 68–76). Hans-Dietrich Kahl discussed in detail why *mons Carantanus* (with the later name Ulrichsberg/Šenturška gora) is a sacred part of the central sacred space of Carantania (Kahl 2002, 245–252). That the holy mountain that rises in the heart of the Klagenfurter Becken/Celovška kotlina (*Fig. 19*), similar to the holy mountain of Říp in the heart of the Czech Republic, would give its name to the Carantanians (for further discussion see: Štih 2004a, 474-478; Kahl 2007, 355), does not come as a surprise. The most characteristic example of a sacred mountain among the Slavs is Mount Ślęża, which gave the name to Silesia, and was an object of worship (Thietmar, L. VII, c. 59).

With the spatially broader scope of the name Carantania, it is therefore about who recognized the Carantanian Mountain (Ulrichsberg/Šenturška gora) as their holy mountain. The visibility of this mountain was important (*Fig. 20*), for whoever saw the Carantanian mountain was a Carantanian. Visibility on the map is shown as the visibility of the top of the mountain, on its slopes the top is not always visible. Of course, visibility from the plains where people lived on, and not from the surrounding mountain peaks, is important. And just as the Union of Ljutci consisted of several principalities, this could also be the case for Carantania.

The extent of Carantania at the beginning of the 9th century. Charlemagne's 811 ruling on the border between the Archdiocese of Salzburg and the Patriarchate of Aquileia is usually considered as proof that the political unit of Carantania was spatially large from its very beginning (*Fig. 21*). This was the province of Carantania (*Karantana provincia*), which was divided into a northern and a southern part by the Drava River, which flows through its middle (*Dravus fluvius, qui per mediam illam provinciam currit*) (MGH DD Karol. I, Nr. 211). The understanding that this political unit of Carantania covered the territory from Eastern Tyrol to Western Pannonia was constantly overshadowed by the uneasiness of what the Patriarch of Aquileia was given south of the Drava River to make the deal territorially just. In this case, the then political Carantania would have to reach at least as far as Gorski Kotar, which is impossible. If not for anything else, because the principality of Carniola existed south of the Karavanke mountain range (Štih 1995; 2014). My former suggestion that the political unit of Carantania was at the time very small, only a part of the current-day Carinthia (Pleterski 1996), was of course met with strong objections (e.g. Štih 1997), since the Drava River was in fact the church border from East Tyrol to Pannonia. Were we really all talking about the same thing?

It seems that Janez Höfler has found a solution to this problem. He pointed out that in his ruling, Charlemagne did not follow the rule that one (admin-

Fig. 21: South-eastern Alps. Carantania between the mid-7th and the mid-8th centuries (from: Grafenauer 1964, Map XV).

istrative-political) province should belong to a single archdiocese, but decided to split this province (Höfler 2021, 94). Höfler's observation can be understood in two ways. One is his, in which, according to the prevailing understanding, the province of Carantania is seen as an administrative-political unit. And this made Charlemagne a rule breaker.

Of course, the most important was how the word *provincia* was understood in Charlemagne's office. It appears in 8 documents that are said to be Charlemagne's, of which as many as 6 are forgeries from the High Middle Ages (MGH DD Karol. I, Nr.: 219 (293/25), 227 (308/30), 240 (335), 245 (345/35, 40), 277 (412/25), 295 (442/35)). The above ruling is one of the remaining two charters. The second charter was issued in Frankfurt and was addressed to the monastery of Caunes near Carcassonne in France. This one uses the word *provintia* without a name and quite generally as the place of legal acts relating to the monastery (MGH DD Karol. I, Nr. 178 (240/ 30)).

The document that talks about the border along the Drava River was issued in Aachen (MGH DD Karol. I, Nr. 211). Both sides presented their arguments. The Patriarch Ursus of Aquileia arrived with documents, which he showed (*ostendi posse*), while the Archbishop Arno of Salzburg made an oral assertion (*asserebat*). The province they were talking about was once divided into *provincie civitates*, which mark Roman period town territories. If we keep in mind that in Late Antiquity, the area in question

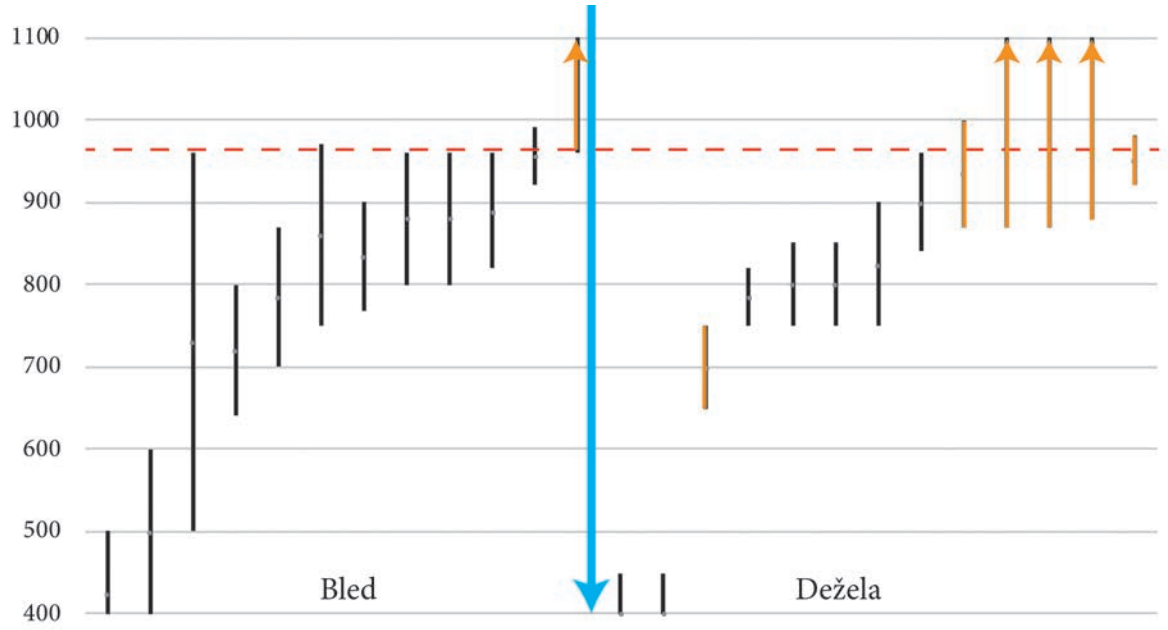

Fig. 22: Slovenia, Bled and the Dežela (Radovljica region). Time spans of burial sites. The blue line is the Sava River, which separates Bled on the right bank from the Dežela on the left bank. The orange lines are burial sites in churches or next to them. The red line demarks the end of burials in Bled. The time limits of 400 and 1100 are arbitrary.

was covered by several names (among the broader ones Venetia, Histria, Noricum, Pannonia), several provinces, even the patriarch could not claim that Aquileia comprised one province. That the ruling at the time spoke of one province was a pragmatic political solution that described the newly conquered area east of Baiuvaria and Friuli. For this area they used a name that the Archbishop of Salzburg could refer to and apparently successfully enforce. The Salzburg approach was expressed once again in the Conversio, when dealing with the dispute over the actions of Constantine and Methodius.

Thus, Höfler's observation can be understood in another way, that Charlemagne did not violate the rule, because the word province here does not mean a political unit, but simply an extensive territory, which was called Carantania by the court office. This second understanding reconciles all apparent opposites. It is highly likely that we can simultaneously speak of the small political unit of the principality of Carantania and, parallel to this, of the broad administrative-territorial name of Carantania, introduced by the officials.

4.8 THE ŽUPAS OF BLED AND DEŽELA (THE RADOVLJICA AREA)

This covers the area of the Bled-Radovljica basin, which is divided into two parts by the deeply incised Sava Valley. On the right bank we find Bled, which, according to folk tradition, was once its own "dežela" (land, area) (information from Jože Čop, Brod in Bohinj). The area on the left bank of the Sava River is even today called the Dežela of Radovljica. It is therefore about two "deželas", most likely a memory of the former župa arrangement, and the word *dežela* is used as a synonym for *župa*. Their comparison shows both local differences and broader shared processes. The archaeological image of the settlements remains incomplete and uneven, so I decided to observe the burial sites, which we already know to a satisfactory extent. Of course, we do not know all of them, and most burial sites are only partially and not fully explored. Nevertheless, there are enough of them to show some obvious changes (*Fig. 22*).

In the second half of the 5th century the settlement in the plain went through a crisis. In Bled, the Bled Castle was settled and the creation of its burial ground at Pristava took place. Although the Bled Castle has an excellent defensive position, it is, together with Pristava, in the middle of the basin, which enabled active contact between Vlachs and Slavs (Pleterski 2015, 236). The graph depicting the duration of burial sites (*Fig. 22*) does not show any interruption.

We are currently not aware of any graves that would reliably belong to the period between the second half of the 5th century and the first half of the 7th century on the opposite bank of the Sava River, however, the high-altitude settlement on Ajdna mountain belongs to this period. Apparently, at least a part of the population retreated to this side of the southern slope of Mount Stol. Their burial site is not yet known, but we can expect that

it will fill the described void. However, the last decades of the settlement on Ajdna were marked by 11 graves that were excavated in the local Early Christian church. It is likely that the inhabitants of Ajdna moved to the valley afterwards. The abandoned settlement began to transform into a cult area, which is indicated by individual representative finds of spurs, a sword hanger, a head circlet, and a belt strap-end in the layer of ruins (similarly at Gradišče above Bašelj: Štular 2020c, 233–241).

And while the Slav settlers in Bled encountered the Vlachs in the accessible valley, in the Dežela of Radovljica they were more likely to look at them from bellow upwards, from the valley towards the mountains. The fact that inhumation appeared in the Dežela of Radovljica as late as the mid-8th century, does not mean that the Slavs only moved there at the time. There was no reason for them not to arrive earlier, as they could not have reached Bled any other way than through the Dežela of Radovljica. Perhaps the earlier phase of cremation burials can be attributed to the find from Smokuč, where decades ago, on the edge of a Late Antique and Early Medieval burial ground, the locals came across a pot and a thick layer of ashes during the construction of a house (I owe this information to the excavator Milan Sagadin). All the graves in Smokuč were inhumation, there were no settlement or prehistoric finds.

The difference between the two "deželas" in the time and manner of Christianization is exceptionally telling (*Fig. 23a, b*). In Bled around 960, burials in the old village cemeteries were abandoned and at the same time, the graveyard at the central Bled church of St Martin appeared. Only burials on the Island of Bled continued for a short time. Perhaps this was done as a favour to a privileged group of people. I have in mind the garrison of Bled Castle, which the manager of the new Bled royal estate took over from the župan of Bled (for more on this see: Pleterski 2013, 170). Anthropological analysis showed that the skeletons from Bled Island were the closest to those found at Bled Castle, while the brachycephalization trend proves that this was chronologically later (Leben-Seljak 2020, 209). The desire for power enables the most unusual unprincipled coalitions. For example, the ultra-Christian emperor Henry II established an alliance with the Old Faith believers Ljutci during a 1017 CE campaign against the Christian Boleslav the Brave and even compensated them for the damaged image of their goddess (Thietmar, L. VII, c. 59-64). With good lobbying support, he was later declared a saint anyway.

A Christian ruler appeared in Bled and he was so powerful that he was able to ban the old burial sites with immediate effect and order that all burials from then on take place in the church graveyard. Periodically, this coincided with the transition of Bled into the political framework of the Ottonian Empire. And we know that King Henrik II was the owner of the Bled estate in 1004, and he later became the emperor in 1014 (Štih 2004b; Pleterski 2013, 168–170). The actual executioner of power was, of course, an unknown high-ranking state official who forcibly removed the župan of Bled. The settlement on Pristava below Bled Castle was destroyed in a fire (Pleterski 2010, 174–175).

The events in the Dežela of Radovljica were very different. Around 860, certainly by 870 at the latest, as many as four church graveyards were established there (Breg, Rodine, Radovljica, Mošnje), and in around 920 they were joined by another one in Žirovnica. The construction of churches roughly coincides with the end of burials in village cemeteries. Typochronologically, there is a noticeable link between the later jewellery from the earlier burial site in Smokuč and the earlier jewellery from the later graves near the church of St Clemens (Klemen) in neighbouring Rodine. However, the time spans of individual design types are such that they overlap at least to a certain extent. However, it is clear that the burials in Doslovče, just a little further away, lasted until around 960. It is also noteworthy that the burials in the 11th century and in the following centuries continues only at three churches out of five. This could be the result of converting the status of proprietary churches into patronage parishes. When this conversion failed, the church slipped to the level of a branch and lost its right to burials (Höfler 2016a 25; 2016b, 64). Höfler's assumption that the graves next to the church of St Radegunda on Breg predated the first church building (Höfler 2019, 23–24), is less likely because they lie in a plain that gradually descends to the south-west, which is more characteristic of burial sites next to churches (see *Fig. 10*). We do not know whether the relatively late patronage of St Radegunda was also the original one. There is no doubt that the mentioned conversion was not successful for the church of St Martin in Žirovnica.

The described events in the Dežela of Radovljica show a completely different state of power when compared to Bled. Undoubtedly, the entire area was not controlled politically by a single ruler. This is confirmed by the large number of contemporaneous churches, as well as the distance between them, which is the maximum 10 km between Žirovnica and Mošnje. This suggests that there were several power holders who responded to the Christianization campaign in the second half of the 9th century, but at the same time there was still some space left for at least one Old Belief society in Doslovče.

The differences between Bled and the Dežela of Radovljica confirm that they were two different political entities (župas). They also show that until around 960, that is, until the final transition to under the rule of the medieval empire, there was no ruler who was able to impose his political will on the local potentates. At this point, I will not enter the debate whether we can talk about any kind of county administration in Carniola

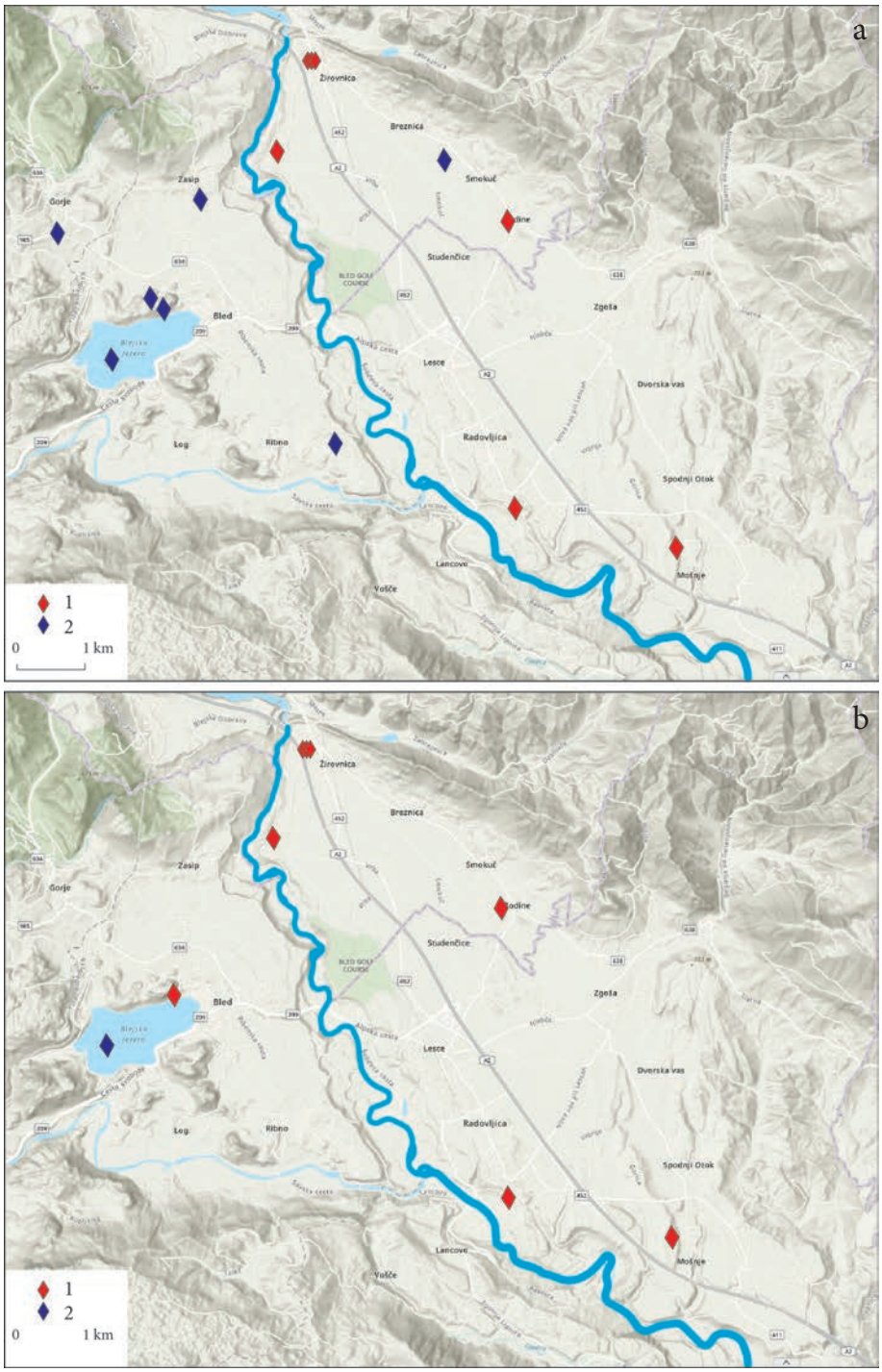

Fig. 23: Slovenia, Bled and the Dežela of Radovljica. a – Period 946-951, b – period 976-981, 1 – Churches and burial sites next to churches, 2 – burial sites without churches (source: LiDAR: Esri, Interman NASA, NGA, USGS; Garmin, Forsquare, GeoTechnologies, Inc. METI/NASA, USGS | MKRS).

before 960, or how influential the potential prince of Carniola was and how far his actual power extended (cf. Sagadin 2008, 184–186; Štular 2020b, 241). Paolo Santonino (1486) described Carniola as a plain between Ljubelj and Ljubljana (Santonino 1943, 190–191), i.e. as the present Gorenjska region. However, it is possible that the imperial administrator of Bled also controlled the Dežala of Radovljica from around 960 onwards. This is indicated by the end of burials in Doslovče around 960.

Merely as a curiosity, I mention the subsequent 1501 record in the land registry of the Lords of Škofja Loka (Peršič, Štih 1982). Historically, this highly confused text,

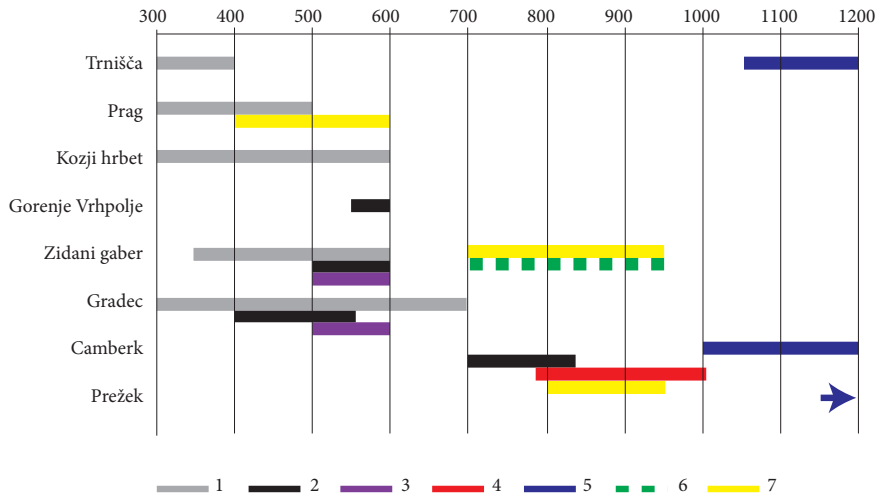

Fig. 24: Slovenia. Development of settlement on the Gorjanci mountains. Time spans: 1 – settlement, 2 – burial ground, 3 – church, 4 – sanctuary, 5 – castle, 6 – individual find, 7 – hoard. The cut-off points of 300 and 1200 are arbitrarily set.

which mixes events, persons and years, attributes the Christianization of Carniola to Henry III (king from 1039 onwards, emperor 1046–1056), definitely to a later period.

4.9 A MODEL OF THE DEVELOPMENT OF THE RELATIONSHIP BETWEEN THE SLAVS AND THE VLACHS AND THE SACRALIZATION OF SPACE – THE EXAMPLE OF THE GORJANCI MOUNTAINS AND KRŠKO-BREŽICE PLAIN

The rivers Sava and Krka meet in Krško-Brežice Plain (Krško-Brežiško polje), and their meandering created vast wetlands, which were the exact opposite of the intermediate dry plain. The southern outskirts are marked by the Gorjanci mountains. The central area was occupied by the Roman period town Neviodunum, which was abandoned in the turbulent 5th century, as well as the fort in the neighbouring Velike Malence (cf.: Ciglenečki 2023, 35, 238). At the same time, 18 km aerial distance to the south-west, above the villages of Gorenje Vrhpolje, Mihovo, Cerov Log and Gorenji Suhadol, a group of hilltop settlements appeared on the Gorjanci mountains (Križ 2021).

At the end of the 5th or the beginning of the 6th century, the vacated flatlands of Cerklje ob Krki were settled by a group of people. The following immigration criteria speak in favour of this settlement: the area with its immediate surroundings was previously uninhabited, the site has a material culture that has no local tradition (Štular et alii 2022, 9). This is why it was suggested that they were Slavs (Pavlovič et alii 2021). Typically for Slavs, the settlement was placed on the edge of the river terrace, which represents the border between the wet and dry land. In the following three centuries, the population multiplied and settled a good part of the Krško-Brežice Plain. In the 7th century we know of 4 settlements in this area, in the 8th century this grew to 9 settlements, and by the 9th century there were a many as 11 settlements in the area.

The number of settlements in the Gorjanci mountains decreased during this time, but the settlement process did not stop there either. It is best shown by the chart of the time spans of the sites (*Fig. 24*), which spread over an area covering 4 × 4 km. Their displayed time spans reflect the current level of research, which means that the time spans may change over time. Some will lengthen, others will shorten. Despite this, the rough outlines of the settlement process are still visible.

At the end of the 4th century there was a group of as many as five hilltop fortified settlements, which is an extraordinary density that currently has no explanation. In the 6th century three of them were still inhabited, two of which (Zidani gaber, Gradec) were given churches and graves next to them. In the second half of the 6th century, the Gorenje Vrhpolje cemetery was located at the foot of the Gorjanci mountains. So far, we are not certain as to which settlement this belonged to. Settlement in Gradec continued even in the 7th century. Somehow, when the settlement there stopped, the settlement and burial ground on the neighbouring Camberk began. The artefacts in the graves there (Breščak 2002; Udovč 2018) do not differ in any way from those that were used in the valley at the same time. In any case, the location on the top of the mountain ridge is exceptional. What is completely unique for a cemetery without a church is that the slope with the graves descends to the north-west. At this time, we would expect a slope towards the south-east (cf. *Fig. 10*). When we weigh between the possibility that people from the valley suddenly decided

to live in the mountains in the 8th century, and the possibility that the inhabitants of Gradec moved closer to the valley, while still remaining on the plateau, the second possibility seems much more likely. According to this second possibility, the deceased at Camberk can be defined as Vlachs. However, in the second third of the 9th century there are no longer any traces of their presence there, it seems that they moved to the plain. However, a sanctuary or sacred area in which a hoard of iron axes, blacksmith's tongs and chisels was buried, remained in use in the 9th and 10th centuries in the previously settled location. Somehow, during this period, a hoard of agricultural and blacksmith's tools was also buried in the nearby Zidan gaber, from where individual metal finds dating from the 8th to the 10th century were found. In the 11th and 12th centuries the microregion was also the home to two smaller castles in Camberk and Trnišče. These were replaced by the old Prežek castle, which was built in the second half of the 12th century.

The presented settlement development is a good **example of the realization of the model of the space-time axis** (see above), which leads from the peak of the Late Antique settlement through the sacralization of the space to a gentry's castle. However, even if we admit the existence of this axis, we still do not know the mechanisms behind the changes shown by this axis. For something like this, we would need sufficient and detailed researched cases. At this point I can merely string together a few brief thoughts, however, these are closer to research questions than anything else.

The appearance of weapons, tools, and jewellery is a familiar phenomenon at hilltop sites in the period between the 8th to 10th century (for weapons see: Štular, Eichert 2020). These were hoards of groups of items as well as individual artefacts. Since these finds were mainly found with metal detectors, it is difficult to judge how many of them were accidentally lost and how many were deposited for religious reasons. The Vlachs were better acquainted with the highlands than the Slavs, who arrived to this territory as lowland people. The distinction between *gorenci/hribci* (dwellers of the mountains) and *dolenci/poljanci* (dwellers of the lowlands) still exists today. So, were the Vlachs the ones who carried the items to the peaks, or did they just know how to arouse interest in them? And yet the top of Klášťov mountain in Moravia (Hlavica 2009; Čižmář, Kohoutek 2015; Kouřil 2021), where there were no Vlachs at the time, is also covered by hoards of tools and weapons. Was this a process that can be placed at the intersection of the penetrating Christianity and the rise of a political elite that sought means of ideological confirmation in domestic tradition?

How were the Vlachs in the valley accepted? As shepherds, merchants and warriors, as they have been throughout the centuries up to modern times south and north of the Danube? Who were the men with spurs from Brinjeva gora above Zreče and from Puščava above Stari trg near Slovenj Gradac and the man with a sax on Hemmaberg? Who did the valley Slavs choose as their župan according to the principle of meritocracy?

There is also a **folk narrative** about the fate of the people from Gorjanci, as heard by Ignac Kušljan almost a century and a half ago. It refers to the hill Grobišča/Grabišča (different on different maps) between Zidani gaber and Gradec. According to the story, a large town called Pendir stood here, which was named after its head. When, on one occasion, the town was attacked by Pendir's enemies, he had all his valuables carried into a cave called Huda peč [Fierce crag] on the opposite hill, and he also remained hidden until the enemy left (Kušljan 1968, 111). Today, it is not known where Huda peč is located. There was a large Late Bronze Age settlement in Grobišča/Grabišča (information from Borut Križ), and individual metal artefacts dated between the Late Bronze Age and Late Antiquity were found there (Dular 2008, 130). Locals know the form of the name *Grabišča* [a place for raking hay] for the Grobišča and remember the lawns where they used to rake hay. Hence the name Grabišča (information Borut Križ). It is quite likely that we owe the form of Grobišče to someone who tried to excessively convert the apparently dialectal -a into -o. Perhaps to Kušljan, who also changed Suhadol to Suhodol and dreamed of graves in Grobišče (Kušljan 1968, 111). Even the Franciscan cadastre shows no forest in Grabišče, but only meadows.

This leads us to another folk tale, about a fierce spirit in Huda peč, who terrified people who approached it. During the hay racking season, he was especially mean to the people who lived on the top of the Gorjanci mountains. No sooner had the people scattered the piles than the evil spirit spoke: "I will flood this place!" Before they managed to create hay piles, the area experienced such a downpour that all the hay was soaked. After that he shouted: "Scatter the hay, I will dry it!" But as soon as they scattered the hay, the rain poured down again. Because he pestered the locals like this year after year, they began to slowly move to the Brusnice parish in the village of Suhodol. This was the end of their settlement on the Gorjanci mountains (Kušljan 1968, 111). The headman Pendir did not hide in the cave with the evil spirit, for he arrived at the cave before the spirit. This could confirm the possibility that the first story refers to prehistoric times. The second refers to the centuries when they stacked hay in the Gorjanci mountains and for a long time lived in the mountains as well. The departure to the valley is linked to bad weather and the establishment of the village of Suhadol, which was listed as early as approximately 1306 in the land registry of the diocese of Freising. At that time, it had 10 inhabited and six abandoned farms (Blaznik 1963, 18, 173). The village is therefore earlier, it is feasible that it appeared in the

9th century. Today we have Gorenji (Upper) and Dolenji (Lower) Suhadol, however, only Gorenji is located in the lower lands, which is obviously the earlier and the first in the west along with the group of sites around Grabišče: Zidani gaber, Gradec, Camberk. The name Suhadol is not Vlach in origin, which indicates a relatively early linguistic Slavisation of the Vlachs.

The importance of hay shows that the people of the Gorjanci mountains were livestock farmers who needed winter fodder. The story reveals another clue. The evil spirit in Huda peč apparently controlled the weather. Good relations with him were therefore of vital importance. Was this the function of the shrine at Camberk? We can imagine a **model of sacralization**, according to which the Vlachs in the mountains had to maintain the good spirits of the divine forces both when they lived there permanently as well as after they moved to the valley and continued to use the upland. Thus, their former places of settlement and their immediate surroundings became places of communication with divine forces. This model includes for example the cult place in the Early Medieval shepherd's summer settlement Na bleku on the Krvavec Mountain (*Fig. 25*). It also covers the processions to the Jezero [lake] on hill Čuk above Rodik (south-western Slovenia), which also hosts a Roman period sacral tradition where the dragon Lintver, who controlled the weather and waters, lived (Hrobat 2004). When arriving for summer grazing on the mountain Bukovske planine, the inhabitants from the Bohinj area (north-western Slovenia), prayed to the black bull Skočer for good grazing, health and weather as late as the 19th century (Čop 2006).

The influence of Early Christianity in the 5th and 6th centuries was clearly marginal to the local population of the Gorjanci mountains and ended with the disappearance of the ruling elite in the 7th century.

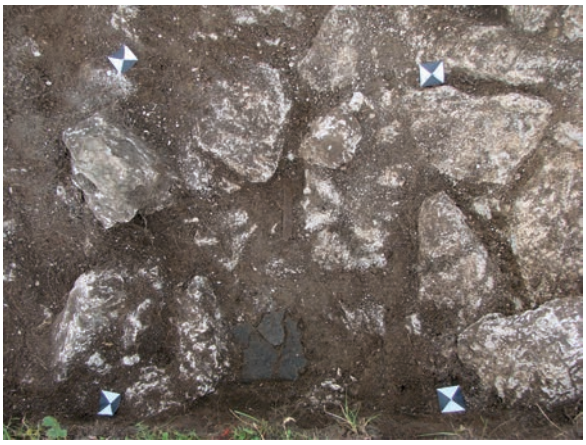

Fig. 25: Slovenia, Na Bleku, Krvavec. Excavation in 2007, Tranch VI. Hole filled with stones, charcoal, a pottery fragment and a knife with the blade and tip upwards.

5. SPATIAL POINTS OF POLITICAL POWER

5.1 STARTING POINTS

Political power takes many forms. That it also exists in space is most visibly demonstrated by state borders. The archaeology of area is still developing its analytical tools. Various authors have already proposed several different models.

The analysis described below is similar to the analysis for the territory of Hungary in the 11th century, carried out by Mária Vargha and Maxim Mordovin. In their case, the individual examples showed the power and spatial connection between castles and the first churches, but the mapping of all known sites gave a less expected picture. Some cases confirmed the assumption of the connection between castles and the first churches, but many did not, because there were both independent churches without castles and castles without churches. This was partly explained by the state of archaeological research, and partly by the fact that the churches were also the strongholds of state power (Vargha, Mordovin 2019).

Janez Höfler analysed, as he says, the building context for the territory under consideration. He compared the formulations of written sources from the 9th and 10th centuries with his art-historical observations and clues he sensed at individual locations. Thus, he developed a building model according to which, in the Early Middle Ages, every manor that was the administrative seat of the estate had a church. From the 12th century onwards, the castles built on the neighbouring hills were supposed to replace the lower-lying manors, while the churches remained where they were (Höfler 2019, 14–17). At this point, I would like to stress that the word "generally" means that there might be exceptions, that this is therefore not a firm rule.

Since it concerns proprietary churches, his second model, which refers primarily to the time after the Synod in Lateran (1059) and regulates the issue of tithe and the right of investiture is also important. The owner of the church handed over the tithe to the bishop, then received a part of it back, and above all, he was also awarded formal parish rights for the church. The main rights were baptism and burials, and the owner could also suggest the priest for the church. Churches with Early Medieval burial sites, which do not show a history of being parish churches, make it possible to conclude that they were proprietary churches, in which the described transition to a parish church did not take place and they became branch churches (Höfler 2021, 106).

While inspecting the sanctuaries, churches and hillfort settlements of Moravia and Bohemia, Lubomír Jan Konečný noticed that the early churches replaced

sanctuaries, but hillforts did not always appear close to churches. From this he drew the conclusion that the main motive for the creation of settlement centres was not to strengthen the power of the princes, but to create a cult spot that united the population of a broader area (Konečný 1980, 133). Over time, the ruler's residence and economic infrastructure could be added to this.

Fred Ruchhöft discussed in detail the development of political territories in the northern part of the Slavic territories in Eastern Germany from the settlement of the Slavs to the end of the Middle Ages. He supported their determination and delimitation for the period of the 7th and 8th centuries with dense settlements and the unpopulated spaces between them. From the 9th century onwards, he believes that the numerous hillforts represented the core of power. He identified them as *civitates*, which were mentioned in the 9th century by an unknown Bavarian geographer and believes that their density was too high in certain places. High density is represented by a distance of 5 km between individual civitates, while low density means 13 km. The administrative territories of individual hillforts (*Burgbezirk*) were assembled into larger political units, most of which can be identified by the names given in written sources (Ruchhöft 2008). Although Ruchhöft spoke of tribal territories, I would prefer to call them principalities consisting of individual župas. In the 18 political territories that he had reconstructed, there were between one and 18 hillforts in each (Ruchhöft 2008, Fig. 29), giving a total of 104, which gives an average of slightly less than 6 hillforts (župas) per political territory (principality).

Michal Hlavica set the analysis of marks and signs on the bottom of vessels found in the territories of Moravia, Bohemia, Slovakia and Lower Austria, all originating from the 9th and 10th centuries, into a broad framework of models that are linked geographically, politically and economically. The models were created in order to understand the market and political structures as explained by the political economy theory (Hlavica 2020). In an extremely simplified way (this simplification is of course mine and not Michal Hlavica's), control over at least part of the products allows political rulers to maintain political power when they distribute the resources thus obtained to their followers. An exceptionally important source of income is said to be the control of trade, both local and long-range. In a political community without a bureaucratic apparatus, the economic-political territory in a uniformly populated plain with a diameter of approximately 60 km, which is supposed to represent a day's worth (16 hours) of walking. This is an area that a political ruler can maintain from his centre alone, without employees to whom he would delegate supervisory and administrative functions. Archaeologically, the design of the market system can be recognized by the spread of marks and signs on the bottom of the vessels. Hlavica believes that there is a causal connection between the nature of the market exchange and the political system, therefore it is possible to draw conclusions as regards the organizational structure of the investigated society, its power strategies, as well as the political economy of its elite components, based on the market system. However, at the same time, he warns that a simple mapping is not possible and additional checks are required (Hlavica 2020, 102). That his caution was justified is proven by the result of his analyses, where he sees the power centres of Pohansko and Mikulčice within the same endogamous market community, but within it, Pohansko reaches the second level B, while Mikulčice only reaches the much lower fourth level (Hlavica 2020, 179, 194). The described 60-kilometre territories have several local centres in addition to the main centre and can be equated with principalities consisting of župas.

5.2 SELECTION OF POINTS

The selection of points naturally corresponds to the material sources for the considered area at a specified time. In another time and place, the selection of points would necessarily be different. The central embodiment of political power in the Early Middle Ages was the **church**. On the one hand, churches require that the construction costs are covered, and above all they need the funds to employ priests, while on the other hand, they demand strong political support, which was necessary in a territory and in a society that was predominantly not yet Christian. If we exclude the rare churches that were most likely built by the broader community (e.g. Maria Saal/Gospa Sveta, see *4.7*; and St Martin in Žirovnica see *4.8*), we must imagine that these churches were proprietary (Höfler 2019, 9–27). Thus, churches were the materialization of the power of individual potentates. As we have seen above, the construction of new proprietary churches begun as late as the 9th century. As I am trying to identify the network of local political entities before they melted into the political structures of the medieval empire, I am looking at the period of the 9th and 10th centuries. There are very few preserved building remains from this period, most of the remains are **fragments of stone church furniture, which were decorated with interlaced ornament**. However, more indirectly, they are indicated by burials next to churches with an unknown building history (see also *4.6*).

At the same time, we must also consider the **Old Faith cult places** (such as Bled Island), which most likely represented a magnet for local dignitaries.

The tacit archaeological assumption that **weapons** can (this is only one of the possibilities) mean authoritarian power has not yet been disproved, and it often seems justified. This is why I also looked for sites with weapons. As the upper time limit I chose the same limit I adopted for the churches, and as the lower one I arbi-

trarily designated the middle of the 7th century, when the structural transition from the "Vlach" Late Antiquity to the "Slavic" Early Middle Ages seems to be the most noticeable (*Figs. 2; 4; 15*).

The first **fortifications** appeared in the 9th and 10th centuries. We are referring to residences of military crews (perhaps Veliki gradec near Jezerca near Drežnica), as well as exposed fortified dwellings of local dignitaries (St. Magdalena near Baldersdorf). In any case, both were related to political power (according to the online ZBIVA timeline 801–996).

We have also noticed that the location of **High Medieval castles** is also important for the understanding and locating of earlier centres of power, however, this realisation came too late for the current phase of our research. The image that could be produced with the listed points therefore does not include High Medieval castles.

5.3 ANALYTICAL TOOLS AND METHOD

My starting point is the spatial statistical method of kernel density estimation, which is included in the ArcGIS Pro software package, and that was used to perform our analysis (for which I would like to thank Benjamin Štular). This method enables the analysis of point and line phenomena. In our case, sites are seen as points. The analysis of point phenomena is suitable for our sites. Mathematically, a smoothly curved surface is placed over each point. The value of the area is the greatest at the location of the point and decreases with increasing distance from the point, reaching zero at the distance of the search radius from the point. The density in each output raster cell is calculated by adding the values of all core surfaces that overlap the centre of the raster cell (method description: https://desktop.arcgis.com/en/arcmap/latest/tools/spatial-analyst-toolbox/how- kernel-density-works.htm, accessed on 9 July 2024). The resulting image (*Fig. 26*) has raster cells that are 1 km^2 in size, the search radius is 5 km, and the maximum area value is the default value of 1. Since I selected the site points according to various criteria (see above *5.2*), there is a possibility that their significance for determining the area of political power differs. Until we recognize the difference in meaning and know how to evaluate them numerically, all points will have the same numerical value. The search radius of 5 km represents the expected spatial extent of the Early Medieval župa and roughly corresponds to the size of the župa of Bled (Pleterski 2013; 2017). ArcGis Pro version 2.8 already has an additional option for the kernel density analysis that also considers obstacles (https://pro.arcgis.com/en/pro-app/2.8/tool-reference/geostatistical-analyst/kernel-interpolation-with-barriers.htm, accessed on 9 July 2024). Mountain ridges and difficult-to-pass river valleys certainly represent such obstacles. The former stand out already in the image and it is not even necessary to define them separately, but the criteria for the hard to cross river valleys will still need to be determined. Undoubtedly, administrative-political and market boundaries also represent obstacles, however, these cannot be determined merely from the shape of the surface. This image does not take into account the obstacles, which provides us with the possibility for further improvements. In the image, the decline in density is arbitrarily divided into nine stages.

The red line marks the border of the considered territory. At this limit, there is a possibility of its effect on the image (edge effect). There may be points of political power right next to the border, but as they are located on the other side it is impossible to see their effects.

The circles that can be seen should not always be equated with early Slavic župas. Perhaps they correspond in most cases, but certainly not in all. A detailed local treatment is necessary.

5.4 DISCUSSING THE IMAGE (*Fig. 26*)

Regardless of the fact that each of the considered site characteristics has its exceptions, it seems that the selection is justified, that the points were created in the process of asserting power. This could be indicated by two indicators. Even though the points are diverse in appearance, they are accumulated in the same area, which is the first indicator. The probable reason for this is that they share a common link – political power. The second indicator is the relatively even dispersion, which could correspond to the distribution of small political units. We still need to ascertain the impact of natural conditions with a special GIS analysis.

The level of archaeological research also has an undoubtful impact on the image. Bled and the Dežela of Radovljica stand out in terms of their strength, as they are the best archaeologically researched. They are united in a single circle, which would not have happened if the Sava Dolinka valley, which represents a demarcation line between them, was taken into account as an obstacle when creating the picture (see. *4.8* above). Since we do not know the boundaries in detail, some of the circles merged. This is particularly visible in the agriculturally favourable areas of the Ljubljana Basin and the Klagenfurter Becken/Celovška kotlina. In these areas, the density of political units could be higher than elsewhere. It is extremely likely that this was the central area of the principalities of Carantania and Carniola, however, we have insufficient data to determine their true borders. This does not mean that there were no other connections between smaller political units in the neighbourhood where there were no such concentrations. We must be aware that our insight is limited.

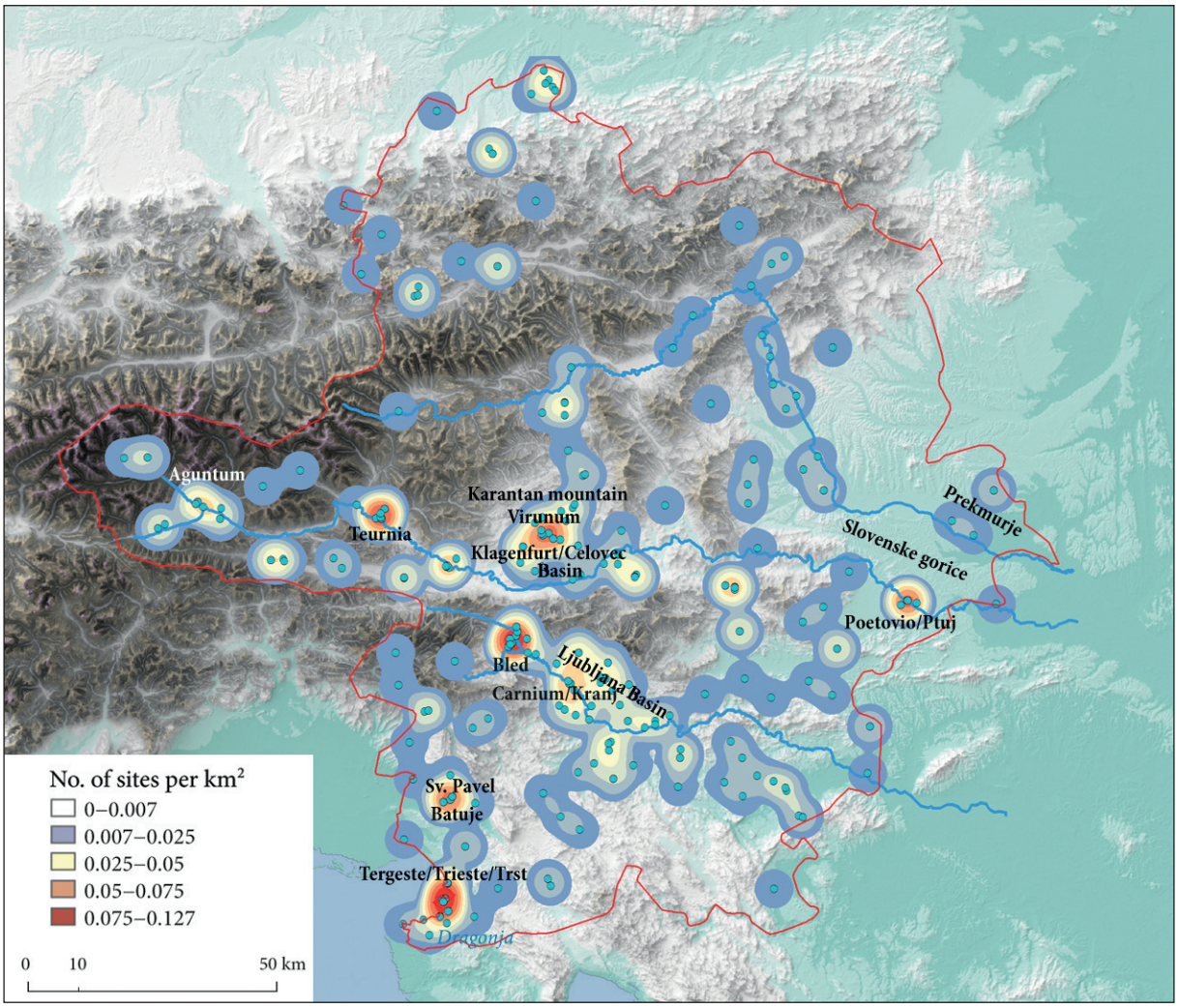

Fig. 26: South-eastern Alps. Core density of the points of political power in the period 651–996 (realisation Benjamin Štular).

Of course, the density of political units would also be expected on the fertile periphery of the Pannonian Basin for the same reason, but there are few points of political power there. In the belt ranging from Slovenske gorice to the north, there are none at all. While the absence in this zone may be explained by the exceptionally sparse settlement, such an explanation does not apply to the well-populated Prekmurje. There it becomes obvious that for the period between the 6th and the 8th century we are simply not aware of the indicators of political power, because these differed from the ones that appeared in the 9th and 10th centuries. This could be a result of the differences and changes in the power and political structure within individual territorial units. In this case, this would be partially connected to the ideological transition from the Old Faith system to Christianity, and to the greatest extent with the individualization of the authorities. This is about an individual trying to usurp the power of political decision-making, which was previously a collective power.

The strongly emphasized area of authority in the south-west, in the coastal region between Trieste and the Dragonja stream, should also be noted. If Istria as a whole was to be included in the same way, this area would undoubtedly extend to a large part of it. This area held a tradition of relatively well-organized government that remained from the time of Byzantine Istria. Later, the Frankish government relied on it, but allowed certain self-government to individual Slav groups (Levak 2007).

The area, or at least the proximity of some Roman period towns and cities, shows that even the Early Middle Ages held the conditions for accumulating political power. This is shown by the "eyes" of power in East Tyrol (Aguntum), Upper Carinthia (Teurnia), around Ulrichsberg/Šenturška gora (Virunum) and in Ptuj (Poetovio). If we exclude Bled and the Dežela of Radovljica, the area of Late Antique Kranj (Carnium) stands out.

In the search for an explanation, the area of the middle Vipava valley, where – following the collapse of the Kingdom of Lombards – political power accu-

mulated between Sv. Pavel above Vrtovin and Batuje represents a challenge.

In any case, the network of small political units shows that looking at macro political demarcations is insufficient if we wish to understand life in the area in question. What is more, such a macro view can blur beyond recognition all that was happening on the local level and influenced everyday life. We need to continue with the studies of the phenomenon of župas and the history of their effects (*Wirkungsgeschichte*), which continues to the present day (see below).

6. A HINT OF PARALLEL SOCIETIES

History is written by the victors, not the defeated, especially if the latter do not use the alphabet. Archaeology transforms material remains into some sort of ideograms that communicate many things that cannot be found in written sources. An ideogram is also a kind of record of thoughts. In the period in question, we can primarily study the process of the transformation of Vlachs into Slavs, however, we also need to take into account the existence of parallel societies that helped the Vlachs survive in the vast areas south of the Danube to this day. This retrospectively raises new research questions. How successful and complete was the Romanization process? Did a parallel society establish itself alongside the nationalized society in that period? Who did the Slavic newcomers encounter? A parallel society? And when it seems that the Vlachs survived in a parallel society that was based on economic differentiation – farmers on the one hand, shepherds, transporters, and soldiers on the other, we realize that even with Christianization, a parallel society based on worldview differences – Old Faith believers on one side and Christians on the other – was formed. Even the expansion of the state-political structures of the medieval empire did not completely erase the structures of the former župas. In many places, these remained connected to the Old Faith and survived as an invisible parallel society until the 20th century. (cf. Pleterski 2022).

7. EPILOGUE

One of the initial questions of the research was also Germanization, whatever we imagine under this term. The analysis carried out did not show its process, which most likely took place later, from the High Middle Ages onwards, and should be studied on a larger number of micro-regional cases.

We are living in a rapidly aging Europe, and many are knocking on our door, expecting a better life or at least survival in this area. This makes it possible to relive the situation during Late Antiquity, which witnessed the collapse of the Roman Empire and the steady influx of various settlers. The debate as to whether we are descendants of the natives or immigrants leads nowhere. Time and time again our ancestors are shown to be both. In the context of the settlement process, I was able to show the arrival of the Slavs as a new population into a sparsely populated or even unpopulated territory. These were people who, as survival opportunists, lived on the border between wet and dry environments, who cremated their dead, who had elaborate ideas concerning the landscape of the dead, and therefore mound shapes and slopes towards the south-east were important to them. According to current data, they arrived in groups from the end of the 5th century onwards. So far, we do not have a more detailed insight. The ancient Vlachs knew how to survive in the mountains, but they occasionally also inhabited the plains, to where they descended by the 9th century and merged with the Slavs who were already living there. Linguistically, the Slavic language was clearly dominant. When we observe artefacts, buildings, graves, burial structures, examine the living, kitchen, and spiritual culture, various branches of the economy, the origin of the ingredients will be better known. The mountainous and dry karst world requires special skills for survival, which the Slavs did not master. Without the cooperation of the Vlachs, this world would be abandoned.

While studying the relationship between the influential spaces of churches and burial sites without churches, an archaeological tool was revealed that outlines the political relations and the extent of authoritarian power at the time the church network was emerging. According to this, the small starting point of Carantania appeared at the beginning of the 9th century, as did many individual župas as primordial political communities in the 9th and 10th centuries. They formed the foundation that has retained its importance in many places to this day. The constant political games of the intervening times were of interest to the chroniclers, but they were rarely important in everyday life and represent a time that did not have as significant an impact on everything below it as we thought until now.

Translation: Sunčan Patrick Stone

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FROM LATE ANTIQUITY TO THE EARLY MIDDLE AGES. THE "DARK CENTURIES" IN STYRIA (400–650 AD) AND THE "NEW BEGINNING" OF SETTLEMENT IN THE 7TH CENTURY

Christoph GUTJAHR, Stephan KARL, Christian GREINER

Abstract

This article deals with the period of Late Antiquity (from c. 380 AD) and the first phase of Early Medieval settlement on the territory of the present-day province of Styria. In the research area, finds from Late Antiquity and, even more so, from the transition to the Early Middle Ages (around 450–650), are surprisingly rare. This situation is illustrated here on the basis of selected groups of finds, including ARSW, Late Antique lead-glazed pottery, burnished pottery, coins and jewellery/attire. Apparently, Roman rural structures in Styria hardly survived beyond the end of the 4th century. It is also noteworthy that the activities of the Lombards, Ostrogoths, the (early) Avars and various other ancient gentes in the Eastern Alpine region, seem to have passed by Styria without a trace.

The second part of the contribution focuses on the earliest Slavic settlement features in Styria (c. 600–750). The Slavic settlement presumably started before 600, but there is only clear archaeological evidence for the last third of the 7th century. This early Slavic settlement horizon is limited in terms of material and finds and spatially restricted to western and central Styria. It is determined by the pit finds from Komberg, St. Ruprecht an der Raab and Enzelsdorf. Whereas settlement pits from Komberg and St. Ruprecht yielded pottery that can be dated to the middle or second half of the 7th century, continued excavations in Enzelsdorf have provided evidence of a settlement that probably existed from the 7th to the early 11th century.

Keywords: Styria, South East Alpine Region, Late Antiquity, Early Slavs, settlement, pottery

1. INTRODUCTION. AN OUTLINE OF THE HISTORICAL AND ARCHAEOLOGICAL SITUATION IN THE SOUTHEASTERN ALPINE REGION (380–600 AD)

Christoph Gutjahr

From the last third of the 4th century onwards, the citizens of the Western Roman Empire were confronted with massive upheavals. Decisive factors for this were, among other things, the crushing defeat of the Roman troops at *Adrianopolis*[1] in August 378 and, from the 5th

[1] Weiler 1995, 163; Demandt 1996, 43; Lotter 2003, 48, 193–194, 199–200; Bratož 2011, 593. – A similar lasting effect is attributed to the crossing of the Rhine Limes by the Vandals, Quadian Suebi and Alans around 406–407 (Stickler 2002, 103–104; Lotter 2003, 195; Heather 2017, 244–248). The withdrawal of these populations from zones ahead of the Pannonian provinces may be tangible in the archaeological record (Tejral 2015, 173). Furthermore, the Vandal conquest of the Roman province of *Africa* in 429 and Rome's multiple failed attempts to reconquer it were decisive (Lotter 2003, 107; Heather 2017, 327–347); Western Rome's declining grip on the Iberian Peninsula also played a role (Heather 2017, 397–399). Momentous in terms of its exemplary effect was the *foedus* that Eastern Emperor Theodosius I concluded with the Danubian Goths under their leader Fritigern in 382, which granted the Goths extensive autonomy in Thrace and Moesia (Soproni 1985, 90; Wolfram 2003, 27; Lotter 2003, 199–200, 203; Rosen

century onwards, the weakness of the empire's leadership. The Eastern Alps and the Pannonian region and thus also the former Eastern part of *Noricum mediterraneum*, today Styrian territory, were particularly affected by these changes.[2] Because of its strategic position between Italy and the Pannonian Plain, the south-eastern Alpine region was strongly involved in the political events of that time; the invasion of Radagaisus,[3] the undertakings of Alaric[4] and the internal Roman conflicts under Emperor Theodosius I against Magnus Maximus and Flavius Eugenius (388 and 394)[5] bear witness to this. Certainly, people in *Noricum mediterraneum* were informed about the events in the Pannonian provinces (especially in *Pannonia prima* and *Valeria*) and on the middle Danube border and knew about the political and socio-economic implications for the provincial population.[6] In particular, the southeastern part of *Noricum mediterraneum* was tangentially affected, or at least alarmed, with regard to the events (Radagaisus, Alaric, later Huns)[7] and the resulting flight of large parts of the population. The latter assertion, however, cannot be specifically inferred from the written sources for Styria and can only be guessed at from archaeological findings.[8] In the early 5th century, Italy was the primary destination of those Pannonian refugees who turned westwards, later – during the Avar conquests in the late 6th century – also Istria.[9]

The "Hunnic factor" proved to be particularly momentous for the fortunes of Western Rome in general and for events in the (south-) eastern Alpine region in the first half of the 5th century, especially after the shift of the Hunnic centre of power to the Hungarian Danube region and the Tisza plain under King Ruga (around 430).[10] As early as 433–434, *Valeria* and most of *Pannonia secunda* were taken into possession "without a formal cession of Roman territory", which was accompanied by a major change in the settlement pattern in this area.[11] Even those territories that Attila

2009, 57–58; Brandt 2017, 59; see also Šašel Kos 1996, 161; Lippold 1996, 17–28). On the invasion of Pannonia (*Valeria*) by the Quades and Sarmatians, which is already recorded for 374–375, and the Roman cause for this, see especially Šašel Kos 1996, 154–173; Lotter 2003, 157. Heather (2017, 423–425) attributes a decisive part in the collapse of Western Rome to the Huns, especially to the fall of the Hun Empire. On the fall of Western Rome also: Ward-Perkins 2006, esp. 33–62; in general on Late Antiquity: Demandt 2008.

[2] After the Diocletian reforms, this area, which extended from *Aquileia* in the west to *Sirmium* in the east, corresponded to the four Pannonian provinces, two Norican provinces and the Dalmatian province in the Pannonian diocese, as well as the province *Venetia et Histria* in the Italian diocese (Lippold 1996, 17). The two Norican provinces belonged to the prefecture of Italy after the partition of Illyria in 396 (Weiler 1996, 137). For details on the course of events in the Pannonian diocese see Lotter 2003, 7–30.

[3] Wolfram 2001, 175–176; Bratož 2011, 595–596.

[4] In our opinion, before he marched to Italy in 408, Alaric took up quarters in the area of *Celeia*, as suggested by Grassl (1996, 177–184, esp. 183), which had been fortified with a city wall in the first half of the 4th century (Krempuš et al. 2005, 208–209; Ciglenečki 2014, 234). This is suggested by the route to Italy subsequently taken (via Hrušica); also, a camp in the vicinity of the capital of *Noricum mediterraneum* at that time would have been an ideal place to lend weight to Alaric's demands on Emperor Honorius (see also Gleirscher 2019, 34, 42–43). On Alaric's career and undertakings see Wolfram 2001, 143–168, esp. 161 (occupation of the Norican parts of present-day Slovenia, Carinthia and southern Styria in 408). A settlement in the Norican provinces had been brought up in negotiations by Alaric several times (Šašel 1979, 127; Wolfram 2003, 31–32). Glaser, on the other hand, assumes a direct replacement of *Virunum* in its function as capital by *Teurnia,* which is designated as capital in the *Vita Severini* 21, 2 by *Eugippius* ("*Tiburnia metropolis Norici*") (Glaser 2008, 597–599; 2015, 11–12). In any case, *Teurnia* became the Norican capital before the siege by the Ostrogoths, which is documented for 467 (*Vita Severini* 17, 4; on the correct dating of the event see: Wolfram 2003, 36 note 97; Glaser 2008, 599 note 8). For Rosenberger (2011, 213), referring to the mention of the later bishop *Paulinus* in the *Vita Severini,* it remains open whether *Teurnia* was the capital of both Norican provinces.

[5] Lippold 1996, 18, 28; Bratož 1996, 334–344 (regarding the Christianisation process); Wolfram 2001, 142.

[6] In particular, that of the first decade of the 5th century. – Müller 2000, 241–253; Tomičić 2000, 255–297; Lotter 2003, 32, note 100, 156–192, esp. 161–164 (the migration of the population of the towns of North and East Pannonia in the first half of the 5th century is compared to that of "Ufernorikum" in 488); Bratož 2007, 247–284; in detail: Bratož 2011, 589–614, esp. 596 (catastrophic conditions in the Middle Danube region in the first decade of the 5th century). The economic decline of *Noricum* and *Pannonia* began as early as with the Praetorian prefect of *Illyricum* Probus (368–375 [376], 383–387) and his ruthless fiscal policy (Lotter 2003, 156; Bratož 2011, 589–592). Several cities appear already heavily affected and partly devastated in the last third of the 4th century (e.g. *Carnuntum, Aquincum, Savaria, Sirmium;* Šašel Kos 1996, 162–163; Lotter 2003, 157; Bratož 2011, 592).

[7] Already after the defeat at *Adrianopolis* (Bratož 2011, 593, *Poetovio*). – Stickler 2002, 103–104; Heather 2017, 231–232, Map 7 (Radagaisus' route through south-eastern *Noricum*).

[8] Karl 2011, 117–126; 2013, 291–300; Gutjahr 2013, 193–294, esp. 259–275; Gutjahr, Steigberger 2018, 454–461. – It should be considered whether some of the people fleeing Pannonia initially sought refuge in the relatively safe Noricum, perhaps as a stopover on the way to Italy (especially *Venetia et Histria/Aquileia*) or awaiting a possible return to Pannonia (Bratož 2011, 598–599). According to Lotter (2003, 166), the migration from Pannonia in the first half of the 5th century "partially or not at all covered the two Norican provinces." Flight movements under Hun rule also took place within the Pannonian region from *Valeria* to *Savia* (Bratož 2011, 604–605, 611).

[9] Bratož 2011, 611–612.

[10] Stickler 2002, 105.

[11] Bratož 2011, 604–606. – With partly different assump-

received in connection with his appointment as *magister militum*[12] were not formal cessions of imperial territory (nor were they federal lands).[13] In fact, however, these developments meant the political-administrative breaking away of large parts of Pannonia from the Roman empire.[14] From the 430s until the death of Attila in 453, the campaigns of Hunnic armies roamed large parts of Western, Central and Eastern Europe and advanced into today's Turkish-Arab region.[15] They devastated large areas, but "Attila's autocracy [...] had created clear conditions in the Danube region and thus brought a period of relative peace, even if this stability was bought at the price of double loyalties".[16] The power of the Hun Empire kept the Germanic and horse-nomadic tribes on the Danube, which were controlled by the Huns, from pursuing an independent policy towards Rome.[17] For the south-eastern Alpine region, it is primarily the campaign leading to Upper Italy (452) that is associated with caesuras, especially with regard to the continuity of urban culture (*Celeia, Poetovio*).[18]

After Attila's death in 453, uncertain conditions prevailed "in both Pannonia and the other areas bordering the Danube" (Noricum/Raetia) due to the unresolved question of succession, as can be seen from the *Vita Severini*.[19] Lotter, however, assumes a "consolidation of conditions in the Middle Danube region" as early as 455, which brought Noricum another two decades of relative peace.[20] Pannonia, on the other hand, which was the settlement area of the Ostrogoths from 456/57 to 473,[21] remained heavily involved in the gentile conflicts for regional hegemony in the years following the breakdown of the Hunnic empire after the Battle on the *Nedao* (454), as well as later in the Ostrogothic-Byzantine War (South Pannonia).[22]

As early as 467, a few years before the formal end of the Western Roman Empire – usually associated in historiography with the deposition of the (counter-)emperor Romulus Augustus by Odoacer (476) – the Ostrogoths made a first, unsuccessful attempt to conquer the province of *Noricum mediterraneum*.[23] But only Theoderic succeeded after the final victory over Odoacer in the course of the longed-for permanent empire building in Italy.[24] For *Noricum mediterraneum*, the incorporation into the Ostrogothic "multi-ethnic state"[25] and the rule of Theoderic (493–526) meant about four decades

tions regarding the temporal occupation of Pannonian territory: Šašel 1979, 128 (*Pannonia Valeria* and *Pannonia secunda* are ceded to the Huns as Eastern Roman federates under King Ruga); Bona 1991, 46–60, 52 ("official" cession of the provinces of *Valeria* and *Pannonia prima* by Aëtius in 434–435), 50 (*Valeria* already in Hunnic hands in 425), 56 (conquest of the province of *Pannonia secunda in 441),* respectively; Tomičić 2000, 266 (conquest of Pannonia *secunda in 441,* cession of Pannonia *Savia* under Valentinian III in 446); Stickler 2002, 105–114, 108–109 (taking into account the Hunnic understanding of rule and rejecting an early formal handover of Pannonian territory to Ruga under Aëtius); Wolfram 2003, 33; Lotter 2003, 16–17 ("Pannonia, i.e. besides *Valeria* also Upper Pannonia up to the Sava" in 433). – The occupation of the province of *Pannonia secunda* in 427 by Eastern Rome was also only of short duration, see Lotter 2003, 15 ("... at least western and southern Pannonia, temporarily placed under Roman rule again around 427 ...").

[12] Material traces of ethnic Huns are very rare. The find material in question can only be interpreted as Hun period or as equestrian nomadic (for the southeastern Alpine area see Knific 1993, 521–542; Tomičić 2000, 266–268, 267, fig. 2). – The grave of a Hun tribesman from the middle of the 5th century from Ptuj is mentioned by Lubšina Tušek (2004, 76–79, fig. on p. 77), less certain Ciglenečki 2023, 341, 342 Fig. 4.5, ("nomadic warrior"). Heather (2017, 382–383) states that in the entire area of Hunnic activity (incl. Volga steppe, north of the Black Sea and Great Hungarian Plain) no more than 200 graves have been identified as possible Hunnic. On the difficulties of identifying finds as Hunnic (attribution to the Hunnic ethnicity) see, for example, Tejral 2010, 81–122, esp. 85, 93, 99, 101–102, 108, 110, 113–116; 2015, 175–186, 181 fig. 36 (core area of the Hunnic dominion at the time of Bleda and Attila). The find material of some graves close to the Untersiebenbrunn style group with equestrian nomadic features (e.g. Vienna-Simmering) is associated with the federated "Roman" Huns by Tejral (2015, 157).

[13] Stickler 2002, 120.

[14] Noricum was not part of the Hunnic territory on Roman imperial soil, as can be seen from the legation sent by Aëtius to the court of Attila in 449 with the participation of the governor of *Noricum ripense* or *mediterraneum Promotus* (Šašel Kos 1994a, 99–111, esp. 108–109; 1994b, 285–295; Gračanin 2003, 53–74, esp. 68–70; Weber 2004, 277–283, esp. 282–283. Lotter (2003, 18–19) assumes the year 448.

[15] See also, for example, the accompanying map of the Hunnic campaigns in: Bóna 1991; Heather 2017, 359, Map 11; 391, Map 13.

[16] Wolfram 2003, 33.

[17] Heather 2017, 384–385, 423–425. – "Gentile Anarchy" was neither desirable for Attila nor for the two halves of the Roman Empire: Stickler 2002, 94–95 (also focussing on the special nature of Roman-Hunnic conflict communication).

[18] Stickler 2002, 145–150; Ciglenečki 2014, 245.

[19] *Vita Severini* 1: "*utraque Pannonia ceteraque confinia Danuvii rebus turbantur ambiguis*" – On this topic, see Lotter 1976, 67–68.

[20] Lotter 2003, 19, 167.

[21] Schwarcz 2000, 60 (most of *Pannonia II* and parts of the old province of *Pannonia I,* perhaps also the extreme southwest of *Valeria*); Wolfram 2001, 259–268, esp. 262 (parts of *Pannonia I*, *Savia* and *Pannonia II*).

[22] Bratož 2011, 607; Heather 2017, 405–425. – Recently: Ruchesi 2020, 19–25.

[23] Šašel (1979, 131) suspects Vidimir's Goths. Schwarcz (1996, 125) assumes that the Vidimir group roamed the south of the province of *Noricum* on their way to Italy or Gaul. – Gleirscher 2019, 25–26.

[24] Theoderic's march to Italy in 489 probably led along the Drau/Drava valley via *Poetovio* and *Celeia* (Schwarcz 2000, 62).

[25] Bratož 2017, 215–248.

of political stability and economic prosperity.[26] In the course of the Byzantine-Gothic War 536/537, *Noricum mediterraneum*, along with the Provence and the two Raetian provinces, was ceded by treaty to the Franks, who held the territory until about 565.[27] The Byzantine occupation of *Noricum mediterraneum*, which lasted until 568, was only a brief interlude. This can be seen in the last phases of settlement at the fortified sites of Duel near Feistritz[28] and Rifnik near Šentjur.[29]

The most south-eastern part of *Noricum mediterraneum*, referred to in written sources as *Pólis Norikón,* had already fallen to the Byzantine Empire in 538. Only a few years later (547/548), Eastern Rome handed over the territory together with the Pannonian provinces of *Savia* and *Pannonia secunda* to the Lombards. During the Ostrogothic-Byzantine War, the Lombards had been entrusted with protective tasks as federates of the Byzantine Empire.

The extent of the territory on which the term *Pólis Norikón* is applied is disputed among scholars. Historical research believes that the name refers to *Poetovio,* which still existed in the 6th century, but archaeological sources have not yet been able to provide any proof of this.[30] Archaeology, on the other hand, associates the *Pólis Norikón* with the hilltop settlements in the *agri* of *Poetovio* and *Celeia,* where the presence of Lombard groups is well documented.[31]

With the above in mind, the following development can be outlined for the (south-) eastern Alpine region.[32] The process of general instability that began in the 4th century, as well as the successive loss of state administration and authority in the face of continuing barbarian invasions[33] led to drastic changes in the settlement landscape and in the road network.[34] This is clearly expressed – with regional and temporal variations – in a vertical shift in settlement topography.[35] In the course of this shift, in Noricum mediterraneum mainly between 350/380 and 450, hilltops favourable for settlement were newly founded or places already used in prehistoric times were resettled.[36] In addition to mostly civilian settlements, there is also evidence of a military presence at strategically relevant sites. These military bases had a control and signaling function with regard to securing access to Italy, especially after the abandonment of the *claustra Alpium Iuliarum* shortly after 400.[37] This change in settlement was accompanied by the abandonment of the *vici* and *villae rusticae* from the third quarter of the 4th century onwards; in general, a sharp decline in rural settlement can be observed.[38] Smaller hilltop settlements may have been the result of initiatives by the regional population and organised by local militias.[39]

The urban structures were also subject to massive change, which became tangible as early as the beginning of the 5th century. The examples of *Celeia* and *Poetovio* show that the exact point in time when the cities were abandoned is difficult to pin down precisely. However, the continuity of urban culture in this region is unlikely to have extended beyond the middle of the 5th century.[40] For towns exposed in the foothills of the Alps, such as *Solva,* it is highly probable that settlement ceased as early as around 400.[41] Only a few towns, favoured by their nat-

[26] Wolfram 2001, 284–290; 2003, 58–65.

[27] Wolfram 2001, 315, 343; Winckler 2012a, 150–151.

[28] Von Petrikovits 1985, 236–238; Ciglenečki 2009, 210, 217; Gleirscher 2019, 68. – On the hilltop settlement on Duel, in detail: Steinklauber 2013, 33–53, 35, Fig. 9.

[29] Ciglenečki 1994, 245–246; 2017, 151; Gleirscher 2019, 69.

[30] Šašel Kos 1994a, 99–102, 111 (including the *ager*); Ciglenečki 2017, 145.

[31] Ciglenečki 1992; 2017, 150–151. – For Gleirscher (2019, 43), the *Pólis Norikón* is the urban area of *Celeia,* which together with that of *Poetovio* went to the Lombards. See also Pohl 1996, 29–30; Pohl 2008, 6–7.

[32] Some of these developments, however, were not limited to this area, but affected the entire eastern Alpine region and the former Roman prefecture of Illyricum, or they were a widespread phenomenon in late antiquity, such as the retreat to elevations favourable for settlement and/or defence, which was common throughout the *Imperium Romanum.* With regard to the Illyrian prefecture, see Ciglenečki 2014, 232–250.

[33] Šašel Kos (1996, 164) points out a general decline in the level of culture.

[34] Ciglenečki 1985, 255–284; 1997, 179–191; 2005, 273–274; 2015, 391.

[35] Ciglenečki 2017, 143–157. – An early, probably occasion-related settlement phase at high altitudes (as "refuge castles", with temporary military use) can already be proven for the second half of the 3rd century. See Ciglenečki 2008, 486–487, 493–494 (settlement phase 1); 2015, 403; Ciglenečki 2016a, 16. – E.g. Veliki vrh above Osredek near Podsreda.

[36] Ciglenečki 2016a, 16. – The exact point in time of the abandonment of valley settlements and the succession of hilltop sites is mostly difficult to grasp: Gleirscher 2019, 28, 30.

[37] See, in particular, Ciglenečki 2015, 406–422 (providing examples from the southeastern Inner Noricum, with reference to the rather indefinite boundaries between civilian and military or purely military use of hilltop settlements in the southeastern Alpine region). See also Ciglenečki 2007, 317–328, esp. 323–325; 2017, 147–148.

[38] Ciglenečki 1999, 291; Gutjahr 2015a, 75; Ciglenečki 2017, 146–147.

[39] Gleirscher (2019, 67–68) with reference to the "problem of correctly addressing the various hilltop settlements", especially with regard to the interpretation of weapons found.

[40] Ciglenečki 2017, 145–146; Milavec 2020, 159–160. – Gleirscher (2019, 43) argues against a complete abandonment of *Celeia referring* to the "powerful fortification wall and the name continuity". With regard to the name continuity, the same also applies to *Poetovio* (Wolff 2000, 33; Gleirscher 2019, 45). See also Šašel Kos (1994a, 102) with the assumption of partially existing and functioning administrative units in *Poetovio* in the 5th/6th century.

[41] See recently Groh 2021, 313 (assuming just a few hundred inhabitants left towards the end). Stephan Karl and I assume for Solva, however, a final settlement phase (so called

ural environment, were able to escape this development and, for example, *Teurnia* (with settlement relocation within the town area on the naturally protected hill) was still able to occupy a prominent position in the 6th century.[42] Consequently, the need to distinguish between "a consolidated to moderately prosperous inner-alpine area (*municipia* Virunum, Teurnia and Aguntum) and an 'amber road' area (*municipia* Celeia and Poetovio)" was also pointed out lately for *Noricum mediterraneum*, which, situated on one of the most important invasion routes to Italy, was comparatively strongly affected by barbarian incursions.[43] However, *Virunum* was already abandoned in the earlier 5th century and the administration and church were transferred to Grazerkogel.[44] The extent to which the southeast of Noricum paid tribute to its special geostrategic position is also shown by the fact that the hilltop settlements of Ančnikovo gradišče near Jurišna vas[45] and Brinjeva Gora above Zreče,[46] which were established not far from Styria along the Amber Road (*Carnuntum-Aquileia*), but also the Gradišče on the Zbelovska gora,[47] situated on a road variant from *Poetovio* to *Celeia* (according to S. Ciglenečki, there were still regular Roman troops on them in the first decades of the 5th century), were abandoned around the middle of the 5th century at the latest[48].

In recent decades, it has been convincingly worked out how much the securing of the incursion routes leading into the Italian heartland from the north and east became the focus of military defensive measures from the second half of the 4th century onwards (presumably related to Valentinian I).[49] The picture could be made more precise and the underlying concept of a "defence in depth" or "staggered defence" at the transition from Illyrian to Italian territory was undoubtedly proven. At the beginning of the 5th century at the latest, this strategic approach replaced the linearly organised defence associated with the *claustra Alpium Iuliarum* (the road via *Ad Pirum*/Hrušica was abandoned in the first half of the 5th century[50]). However, it is questionable whether the *claustra,* which included the forts of Ajdovščina and Vrhnika as well as the city fortifications of *Tarsatica*/Rijeka,[51] were ever based on such a military concept.[52] In addition, many hilltop settlements located both west and east in the hinterland of the *claustra,* for which a military character is evident from the find material, can be proven to have existed as early as the second half of the 4th century and thus at the same time as the *claustra*.[53] Interaction obviously took place here. It was a widespread network of smaller and larger fortifications, positioned either along the roads or in strategically important places with a good field of vision, where they had control, signaling and reconnaissance functions, among others.[54] According to S. Ciglenečki, the emergence of this network was not so much based on an "overarching strategy" but rather on a "continuous adaptation to individual dangerous military situations that already occurred in the last third of the 3rd century and became more frequent in the second half of the 4th century".[55] The staggered defense also included the fortifications situated in the southeast in the lowlands towards Pannonia, surrounded by strong walls, such as Črnomelj or the Gradišče near Velike Malence, which in any case date back to the 4th century. The network of fortifications formed by the hilltop settlements with military components is undoubtedly connected with the part of the defensive system *tractus Italiae circa Alpes* mentioned in the *Notitia Dignitatum,* located in the south-eastern Alps. [56] The extent to which the secondary roads became more relevant for securing Italy after the abandonment of the Hrušica passage was demonstrated

"Restsiedlung") of poorer population groups reaching into the 5th century (see below).

[42] See, for example: Ciglenečki 2003, 263–281; 2011a, 183–195, esp. 183–184, 192; 2014, 232–250, esp. 232–234, 238–239, 242–243, 245. – More recently, summarising settlement change in the southernmost part of *Noricum mediterraneum:* Ciglenečki 2017, 143–157. See also recently and comprehensively Ciglenečki 2023, with a view to the southeastern Alps region, specifically concerning us here 25-35, 46-48, 105-107, 173-174, 190, 210-214, 226-240, 340-344 and 22 Fig. 2.1.

[43] Dolenz 2016, 122, 48, Fig. 1.

[44] On the towns of *Noricum mediterraneum* and the possible evidence of late antique settlement, most recently: Gleirscher 2019, 31–46.

[45] Ciglenečki 2007, 320–321; 2015, 411–412; 2017, 148; Modrijan 2017, 159–174. – Not until the Early Middle Ages (8th/9th century), small traces of settlement are attested again (Ciglenečki, Strmčnik Gulič 2002, 72–74, Fig. 13).

[46] Ciglenečki 2007, 321; 2015, 416–417.

[47] Ciglenečki 2007, 321; 2015, 416.

[48] Ciglenečki 2007, 324–325. In comparison, see Ciglenečki 2008, 483, Fig. 1, 485, Fig. 2. See also: Ciglenečki 2015, 422; Ciglenečki 2016b, 417–418.

[49] Ciglenečki 2016b, 416.

[50] Ciglenečki 1985, 267–270; 1997, 186, 188–189; 2005, 273–274; 2011b, 262–263.

[51] Most recently, in detail: Ciglenečki 2015, 385–430; 2016b, 409–424. – The *claustra Alpium Iuliarum were* probably in function from the last third of the 3rd century (Diocletian) until the beginning of the 5th century (Ciglenečki, Milavec 2009, 177; Ciglenečki 2015, 402). It was of importance in the intra-Roman disputes of the second half of the 4th century. However, the effectiveness of the *claustra has been* doubted (Stickler 2002, 146, 146, note 783).

[52] Ciglenečki (2015, 424) initially assumes the replacement of a linear defence system towards the end of the 4th century, before he clearly and comprehensively argues for a defence in depth that already existed from the second half of the 4th century onwards and included the *claustra* system (Ciglenečki 2016b, 419).

[53] Ciglenečki 2016b, 415–418.

[54] Ciglenečki, Milavec 2009, 177–189; Ciglenečki 2015, 404–424; 2016b, 418–420.

[55] Ciglenečki 2016b, 419; Milavec 2017, 156–157.

[56] Ciglenečki, Milavec 2009, 183; Ciglenečki 2016b, 412, 415; Milavec 2017, 157–158.

in particular for the surroundings of the important and excellently researched hilltop settlement of Tonovcov grad near Kobarid.[57]

A final phase in the establishment of fortified hilltop settlements can be observed in the (south-) eastern Alpine region from the 470s onwards; some of these settlements show continuity into the 7th century.[58] This phase includes – apart from the towns relocated to high ground – numerous fortified hilltop settlements in East Tyrol, Carinthia and Slovenia (e.g. Duel above Feistritz in the Drau/Drava Valley, Hoischhügel near Maglern, Rifnik near Šentjur, Ajdovski gradec above Vranje).[59] Both their beginning and their end can often only be dated in a frame-like manner with the current state of knowledge about the finds.[60] At least for some fortifications, construction is only considered to have taken place in the Ostrogothic period. With regard to the construction of the larger fortifications, centrally controlled planning seems likely.[61] Numerous archaeological finds of Germanic character can be linked to the historical sequence of events and penetrations of power within the above-mentioned area in the later 5th and 6th centuries.[62] Even if – to a territorially varying extent – there is no doubt about an Ostrogothic as well as a Lombard occupation of the south-eastern Alpine region, an assignment to Germanic people broken down to single individuals is only possible in a few cases.[63] Recently, the evidence of ethnic Ostrogoths for Carinthia has been completely denied,[64] even for the supposed "Ostrogothic/East Gothic period" burial ground east of Globasnitz near the former Roman road station *Iuenna*.[65] If one follows this assumption, then an Ostrogothic presence, which can be seen in cemeteries at supra-regionally important road connections, is not given for *Iuenna,* but presumably for Dravlje near Ljubljana[66] and for Miren near Gorizia at the time of Ostrogothic rule, although both already located in Italy.[67] The burial finds at least speak in favour of burial sites of East Germanic communities. The latter site is probably connected with a yet undiscovered settlement that served to guard the road to *Aquileia*.

In a sense, the interpretation of the term "presence", which is often used in literature, is at issue. Does it refer to the direct (military) presence of certain ethnic identities in an area defined geographically or by dominion, e.g. in the present case of the Ostrogoths in Carinthia? Or can this also mean an indirectly enforced exercise of power over a certain territory – in the inner *Noricum mediterraneum*, for example, executed by (Germanic) federates or Romanic militia units under the authority of the Ostrogoth king? The inclusion of the today Carinthian part of Noricum in the Italian Ostrogothic Empire is beyond question at any rate.

Regarding the presence of Lombard groups of people, reference should be made above all to the Svete gore above Bistrica ob Sotli and the Rifnik near Šentjur. For both, a Lombard occupation was assumed at last. At least grave 57 from the Rifnik, which contains two S-fibulae of the North Danubian phase (510–540), can be interpreted as a Lombard woman's grave.[68]

[57] Ciglenečki 2011b, 259–271.

[58] Gleirscher 2019, 30 (possibly until the 1st half of the 7th century). – Little research has been done on the agricultural environment or, along with the hilltop settlements, on settlement and economic structures in the valleys: Glaser 2006a, 9–17; 2012, 47–55. Milavec (2020, 160) gives a few examples of lowland settlements in northwestern Slovenia. The question arises where the population lived between about 450 and 470/480.

[59] For Slovenia, Ciglenečki (2008, 485–490, 483, Fig. 1, 485, Fig. 2) chronologically distinguishes three settlement phases; for a classification of the Late Antique hilltop settlements ibid. 490–502. See also: Ciglenečki 2014, 242; 2016a, 18, 20 (on the early medieval settlement phase of some hilltop settlements); 2016b, 415–416. On Carinthia: Glaser 2008, 595–642. For an overview of hilltop settlements with military character: Gleirscher 2019, 67–79. – In a comparison with the Late Roman hilltop settlements of the Moselle region, Prien and Hilbich (2013, 104–112), on the other hand, assume for the Late Antique settlements at Rifnik and Ajdovski gradec/Vranje (among others) a construction by the local upper class and consider a representative use (as well as a possible replacement of Roman by Germanic elites).

[60] Gleirscher 2019, 30; Milavec 2020, 160–162. – For the (re-)occupation of Late Antique hilltop settlements in Slovenia, see: Milavec 2012.

[61] Glaser 2008, 600; Gleirscher 2019, 67; Milavec 2020, 161.

[62] For Slovenia see, among others: Ciglenečki 2005, 265–280; 2006, 107–122; 2016b, 419; Milavec 2017, 158–159. On the cemetery at Rifnik, see: Bolta 1981 (e.g. grave 57). On Late Antique settlement, generally: Pirkmajer 1994, 46–64. – With regard to the finds in Slovenia associated with Ostrogoths, the location of the sites in Italy or Noricum should be noted (Gleirscher 2020, 34). For Carinthia see, among others: Piccottini 1976 (e.g. grave 1/74); Glaser 2004, 80–101; 2016, 60–63.

[63] Gleirscher 2020, 36, 95.

[64] See Gleirscher 2019, 86–118; 2020, 17–51 (providing a detailed discussion of the relevant Carinthian find material). Differently, e.g.: Glaser 2004, 86–87, 92, 95; 2016, 60–62, Fig. 63 (Ostrogothic cemetery).

[65] Glaser 2006a, 9–17; Glaser 2006b, 83–106. – For the remarkable grave 11 of the presumed commander of the road station, a Gallo-Frankish origin was recently considered (Pollak 2020, 91–119), while Gleirscher suspects a Roman. In contrast to Gleirscher (2019, 102; 2020, 37; dating to the end of 4th or, at the latest, the beginning of 5th century to end of 6th/beginning of 7th century) this results in only one Late Antique burial ground attested during the Ostrogothic period). For Pollak (2017, 265; 2020, 93) the necropolis only begins in the second half of the 5th century and ends around 550. For considerations regarding a connection between the local cemetery in Globasnitz and soldiers stationed on the Katharinakogel, see: Gleirscher 2020, 40.

[66] Slabe 1975.

[67] Tratnik, Karo 2017; 2023

[68] Bolta 1981, Pl. 10; Ciglenečki 2005, 269–270; Milavec

Frankish presence in Noricum mediterraneum has initially been associated with a group of privileged burials that were discovered in 2009 next to the church dedicated to Saints Hemma and Dorothea on Hemmaberg. However, recent radiocarbon dating now assigns these graves – with the exception of the early modern era grave 16 - to the 8th to 10th centuries (indicating that the buried individuals might be remaining Romans).[69]

Noricum mediterraneum gained defensive importance on the north-eastern flank of Italy at the latest after the voluntary evacuation of *Noricum ripense* (488)[70] under Odoacer.[71] It was possible to bypass the Amber Road via the Drau/Drava Valley and along the passes and routes to Italy (e.g. Plöcken Pass, Predil Pass, Sella di Camporosso/Canal Valley).[72] The number of forts and fortifications, often with several phases, which can be proven for the 5th and 6th centuries, partly also in succession to Roman road stations, shows the military-strategic upgrading of the inner-Alpine part of *Noricum mediterraneum* (among other things to secure the Drau/Drava valley route).[73]

2. THE EARLY DECLINE OF LATE ROMAN SETTLEMENTS IN THE AGER SOLVENSIS BASED ON ARCHAEOLOGICAL DATA

Stephan Karl

Over the last decades there has been a revival of archaeological research on Late Antiquity in the south-eastern alpine region, emphasising its specific geographic situation between different political identities and developments in the West and East and trying to account for continuity or changes based on archaeological evidence. After the early investigations on the Early Christian buildings in the Late Roman province *Noricum Mediterraneum*, two main research foci have been established since the 1980s; one on settlement patterns during Late Antiquity, the other on cemeteries.[74] Only shortly before the turn of the millennium, the processing and evaluation of the small finds were strengthened, leading to numerous specific articles and monografic publications, especially about metal finds and imported as well as local pottery.[75] In addition, monographic comprehensive examinations of individual late antique hilltop settlements provide deep insights into their archaeological record and the find material.[76]

The recent increase of new archaeological material in combination with methods of natural science and advances in theoretical-methodological considerations enables us to create a more precise and differentiated perception of this period, tackling i.a. ethnic, cultural and social transformation processes. A number of recent conference proceedings and volumes deal with the complex issues of continuity and cultural change from the Late Roman period to the Early Medieval times in the two Norican provinces and particularly in the Pannonian region.[77]

Nevertheless, archaeological evidence from Late Antiquity is scarce in the south-eastern alpine region, especially in the south-eastern part of *Noricum mediterraneum*, compared to former periods and its dating is mostly problematic because of a lack of comparable finds or imports of reliably dated objects. Also the general decrease of a regular coin circulation in the Norican and Pannonian provinces since the end of the 4th century and

2007, 348, Pl. 3: 4–5; Gleirscher 2019, 111–114, esp. 108.

[69] Eitler 2009–2010, 69–72; Glaser 2011, 67–69; 2016, 63; Gleirscher 2019, 116–118, 81, Fig. 74; see also Thanados, entity 17596 (Hemmaberg; for the period in question, see, for example, graves 4, 6, 12, 13, 18). – Individual female burials that can be associated with the Franks may be present at *Teurnia* (Gleirscher 2019, 114–115).

[70] *Vita Severini,* 44, 5. – Mainly the eastern part of the province would have been affected. Régerat 1996, 193–206; Pohl, Diesenberger 2001; Lotter 2003, 25–26, 168–169; Rosenberger 2011, 203–216. The abandonment of *Noricum ripense* was de facto, not de iure (Šašel 1990, 568). The eastern part of Noricum was subsequently taken in possession by the Lombards.

[71] This military role probably already applies to *Noricum mediterraneum* in the conflicts with Alaric in the early 5th century (Glaser 2015, 11). See also Glaser 2008, 599 (occupation of the Alpine passes by the Franks after the Ostrogothic surrender of the province). This also becomes clear in the course of the surrender of the *Pólis Norikón* to the Lombards in the context of the Byzantine-Franconian disputes (see, among others, Tomičić 2000, 276).

[72] Ciglenečki 1997, 188–189; cf. for example the maps in Ciglenečki (2011b, 261, Fig. 5.1) and Milavec, Modrijan 2014 (261, Fig. 1) for northwestern Slovenia.

[73] See the recent overview of hilltop settlements with military character in: Gleirscher 2019, 67–79, esp. 67–77. – The possibility of circumventing Italic border barriers by taking possession of Noricum mediterraneum may have prompted the Avars to advance into the (south-)eastern Alps towards the end of the 6th century (Daim, Szameit 1996, 319).

[74] E.g. Egger 1916; Piccottini 1976; Ciglenečki 1987; Glaser 1997; Steinklauber 2002; see also the comprehensive overviews by Ladstätter (2000, 16–20) and Ciglenečki (1999).

[75] E.g. Pröttel 1996; Ladstätter 2000; Ciglenečki 2000; Ladstätter 2003a; Milavec 2009; Bitenc, Knific 2012; Steinklauber 2013; see also the contributions in: Hebert, Hofer 2015.

[76] E.g. Ciglenečki 2000 (Tinje); Ciglenečki et al. 2011; Modrijan, Milavec 2011 (Tonovcov grad); Ciglenečki et al. 2020 (Korinjski hrib).

[77] E.g. Steuer, Bierbrauer 2008; Bemmann, Schmauder 2008; Heinrich-Tamáska 2011.

the known plateau in the radiocarbon calibration curve for this period are not really cooperative to approaches using archaeological data for historical statements.

This section is focusing on the decline of the Late Roman settlements in the *ager Solvensis* compared to concurrent Roman settlement patterns in the neighbouring regions, based on archaeological data.[78] The main question is how long Roman structures could be maintained in the *ager Solvensis* close to the border to *Pannonia prima* and if there are any archaeological hints for changes or even caesuras in the latest phase of a reduced but still regular and operative Roman settlement. It has to be emphasised that this contribution is not initiated by new data from recent excavations, but should give at first an overview of the state of research as a base for the following section in which the few (!) finds from the Late Antique period from the mid 5th century to the early 7th century are presented.

Some new data could be integrated into this contribution with regard to their relevance to the main question: This includes data concerning the imports of African Red Slip Ware (ARSW) in Styria, of which some fragments were reinvestigated in the course of a BA thesis by C. Greiner,[79] rectifying some erroneous interpretations. Additional new data are coming from a Late Roman well within the cemetery "Spitalsgelände" of *Solva* consisting of some hundreds of *spolia*, excavated in 1982/1983 but published only in short notes.[80] Still, a massive drawback is that extensive excavation activity in the 1970s and 1980s in Styria has left us with a large quantity of unpublished or not appropriately published find material,[81] stored in depots of different institutions which makes the access more complicated. However, in the course of the task of reinvestigating already published or preliminary mentioned find objects for this study by which we went through some hundreds of boxes in the depots, something has become more and more clear: The obvious sparseness of reliable dated finds from the second half of the 5th to the early 7th century in the *ager Solvensis* can not be explained by a research gap.[82] The turn to the 5th century and its first decades seem therefore to be crucial for the Roman settlement of the *ager Solvensis*.

[78] For a general characterisation of the Late Antique period in today's Styria, see: Steinklauber, Hebert 2001, 275–278; Steinklauber 2002, 182–184; 2018, 798–799.

[79] Greiner 2019. The thesis was supervised by S. Karl.

[80] Fuchs 1983; 1985–1986b; 1987, 77–78; Karl 2013, 283. – The findings are currently being processed by S. Karl and P. Bayer.

[81] E.g. the whole archaeological material from the excavations of Late Roman buildings on the northwestern slope of the Frauenberg in 1985 and 1986; on this excavation, see: Steinklauber 2013, 28–31. Furthermore, just as important, the Late Roman strata in the western part (an extension?) of the settlement of *Solva*: Fuchs 1985; Kainz 1989.

[82] Cf. Steinklauber 2006b, 178.

2.1. LATE ROMAN FIND MATERIAL

The Late Roman find material from the *ager Solvensis* has some specific characteristics compared to neighboring regions like Carinthia and the western part of Slovenia, which were already observed in previous works.[83] In the Middle Roman period, African Red Slip Ware (ARSW) reached this area as elsewhere in the Roman provinces in a regular manner, even though at a small scale, from the middle of the 3rd century onwards, mostly in its representative shapes Hayes 45 and 50 of Central Tunisian origin. Most noteworthy is the significant decrease of Mediterranean fine pottery imports in the early 5th century. Up to present there is no evidence for African or Eastern Mediterranean amphorae at all from the area under discussion.[84] Another aspect is the high proportion of glazed pottery in *Solva* and Frauenberg which arrived probably from Pannonian workshops, but was also produced locally. Glazed pottery became a common feature on most sites, its production peak is generally dated to the second half of the 4th century. Burnished pottery which appears in small quantities along the Norican and Pannonian limes from the middle of the 4th century onwards became popular by the late 4th and early 5th century in the Pannonian provinces. It was frequently found there together with glazed pottery, whereas on sites of the neighbouring *ager Solvensis* burnished pottery is extremely rare. However, coarse pottery represents the majority, as it prevails in any Late Roman pottery assemblage in this region. It shows local characteristics in shapes and tempering, but a distinction of the 5th century coarse pottery from the earlier material based on morphological and decorative features is still a difficult endeavour.[85] Recent research has nevertheless shown major advances in differentiating this material, defining types and establishing chronological basic frameworks. The most striking feature in the area under discussion is the scarcity of (dateable) finds from the beginning of the 5th century onwards.

Within this presentation of selected categories of Late Roman find material, the spectrum of coins has been completely excluded. As has already been asserted for several sites in *Noricum mediterraneum*, the supply of newly minted coins came to a standstill after 383, at the latest after the division of the Empire in 395.[86] Only

[83] Ladstätter 2000, 105–117, 124–130, 157–159; Steinklauber 2013; Modrijan 2015; 2019; 2020a.

[84] Ladstätter 2003a, 837–848; Modrijan 2015.

[85] Cf. Rodriguez 1997. – For a chronological classification of two groups of coarse pottery, an early one from the 4th and first half of the 5th century and a late one from the 6th and first half of the 7th century, see: Modrijan 2020c, 577–580.

[86] Kos 1986, 218–219; Ladstätter 2000, 82; Schachinger 2006, 124–125; Groh 2021, 257 (contribution of U. Schachinger).

a handful of coins from the first half of the 5th century were recorded in this area, and they are problematic: they are mostly finds from the 19th century without any archaeological context and useful location, like a solidus of Valentinianus III. for Galla Placidia (426–c. 430) from Kranach near Gamlitz[87] or an unknown numeral of Iohannes (423–425) from the Leibnitz field[88]. Only three coins can be mentioned with more confidence: a tremissis of Honorius (393–423) from the temple plateau of Frauenberg, found 1955 in the heap of the deposited excavation debris,[89] and two half-centenionales of Arcadius (383–408), not to be dated more precisely,[90] one from the hilltop settlement of Kugelstein, the other from *Solva*. These are all coin finds up to present belonging to the time range under consideration.

2.2. AFRICAN RED SLIP WARE (INCL. LAMPS)

Stephan Karl, Christian Greiner

African Red Slip Ware (ARSW) and lamps of the same North African origin are significant finds for the south-eastern alpine region, especially for discussing chronological and trade patterns.[91] They have become known at a total of 10 sites in the area of today's Styria. With their occurrence in *municipium*, *vicus*, *villa* and hilltop settlements they cover the common local settlement types of the Late Roman period. The range of ARSW within the region under discussion includes the following seven Hayes forms: 45A and B, 46, 50A and B, 61A and B, as well as the associated lamps Atlante VIII A1, A2 and B. The relatively small number (*Tab. 1*) of only 40 specimens in total of North African sigillata[92] and 6 lamps can likely be traced back to a decreasing import volume due to the longer distance on overland routes from the main harbour *Aquileia* and other ports on the Adriatic Sea[93] and presumably to the absence of a potent customer market. Of course, a certain missing portion may be justified by research history, in particular with regard to the mostly small broken pieces of ARSW in layers close to the surface, which were probably not always perceived as such and discarded as modern tile chips on site.

We can assume that ARSW was imported in the *ager Solvensis* from the middle of the 3rd century onwards, as it was already observed in a similar manner for the Pannonian region.[94] The early forms include the Central Tunesian large bowls with shallow curving body and broad flat rim Hayes 45A and B from the second quarter of the 3rd century and first half of the 4th century,[95] which are evidenced by single fragments in the *vicus* of Gleisdorf[96] and in *Solva* (insula XLI or 405 according to the new city map).[97] A fragment of the more recent form Hayes 46 was also found in this best researched insula of *Solva*.[98]

More important in *Solva*, however, are the long-lasting forms Hayes 50A and B, which – again in insula XLI/405 – are represented with 18 rim or base pieces.[99] These large plates with broad flat base and high straight wall raising at an angle (A) or curved (B) belong to the standard shape of Central Tunesian Sigillata C which is widely distributed in the Mediterranean. Hayes 50A appears in find contexts from the second quarter of the 3rd century till the first half of the 4th century, the later form Hayes 50B in contexts from the second half of the 4th century till the beginning of the 5th century.[100] Apart from *Solva*, Hayes 50A is also known from the temple plateau of Frauenberg[101] as well as from the Roman *villa* of Grünau.[102] In upper Styria (outside the *ager Solvensis*) two fragments of Hayes 50A were found in the mining settlement of Michlhallberg.[103] From a Late Roman well, which was built in the cemetery "Spitalsgelände" of *Solva*, there are further fragments of the later form Hayes 50B (fabric $C^{3/4}$).[104] A small wall fragment of Hayes 50B (fabric $C^{3/4}$) is now also evidenced at the hilltop settlement on the Franziskanerkogel.[105] The relative frequency of the forms

[87] Schachinger 2006, no. 16790; 2010a, 23, Fig. 13; Peitler 2011a.

[88] Knabl 1848, 30; Schachinger 2006, no. 16789. – Cf. Staudinger 1978, 37.

[89] Schachinger 2006, 190 no. 16788. – Cf. Staudinger 1978, 37.

[90] Schachinger 2006, 124 no. 16794; 171 no. 16795.

[91] For overviews, see Pröttel 1996; Ladstätter 2000, 85–117; Ladstätter 2003a, 834–837; 2003b, 305.

[92] The calculation of the number of individuals was based on the rim, base and stamped pieces; see Mackensen 2015, 179; additionally, wall pieces that were judged as separate individuals on the basis of the contextual processing or the form type (e.g. in the case of a single wall piece from a site) are also included; see Heimerl 2014, 99.

[93] Pröttel 1996, 171.

[94] Gabler 1988, 16, 30; Hárshegyi, Ottományi 2015, 476.

[95] On the chronology: Heimerl 2014, 26–27.

[96] Schneeberger 2016, 130, 133, 267, Pl. 12: 5. The original assignment to form Hayes 67 is corrected here.

[97] Groh 1996, 115, 214 (no. TSA 1–2); Pl. 33: TSA 2; 67: TSA 1. In each case one fragment of form Hayes 45A and B. For the new city map, see Groh 2021, 45–47, Fig. 18.

[98] Groh 1996, 116, 214 (no. TSA 3); Pl. 31 (TSA 3).

[99] Groh 1996, 115, 214 (no. TSA 4–8 (50A), no. TSA 9–21 (50B)); Pl. 31: TSA 10, TSA 12–20; Pl. 53: TSA 11; Pl. 64: TSA 9. – According to Groh (1996, 114), most of the wall pieces that cannot be clearly assigned to a form type (57 in total) probably belong to these two main forms.

[100] On the chronology: Heimerl 2014, 28–29. – Cf. Pröttel 1996, 33; Ladstätter 2000, 91–93.

[101] Groh, Sedlmayer 2005, 155, 243, Tab. 43; Pl. 25.

[102] Lamm 2011, 66, 226, no. 1992/K3/272; Pl.73.

[103] Grabherr 2001, 79, 157, no. C14–C15; Pl. 32.

[104] From the excavation of 1982/1983; unpublished; cf. Fuchs 1983; 1985–1986b; 1987, 77–78; Karl 2013, 283.

[105] From the excavation of 2020; unpublished; cf. Horváth, Koch 2021.

Fabric	Type	Site	Amount	Reference
n.s.	n.s.	Niederschöckl – Cemetery (Tumulus)	1	Hinker 2002, 214, no. 8, note 72; 219, Pl. 1: 8
n.s.	40, 45 or 50	Frauenberg – Settlement/Perl-/Stadläcker	2	Kitz 2008, 195, 212
n.s.	45A	*Solva* – Settlement	1	Groh 1996, 115, 214 (no. TSA 1); Pl. 67: TSA 1
A/D?	45A	Gleisdorf – *vicus*	1*	Schneeberger 2016, 130, 133, 267; Pl. 12: 5 (no. 99073-1,-2,-3,-4)
n.s.	45B	*Solva* – Settlement	1	Groh 1996, 115, 214 (no. TSA 2); Pl. 33: TSA 2
n.s.	46	*Solva* – Settlement	1	Groh 1996, 116, 214 (no. TSA 3); Pl. 31: TSA 3
A/D?	n.s.	Gleisdorf – *vicus*	1*	Schneeberger 2016, 130, 133 (no. 99064-2)
n.s.	50A	*Solva* – Settlement	6	Groh 1996, 115, 214 (no. TSA 4–8); Pl. 31: TSA 4–8 ; Rabitsch 2013, 34, 131; Pl. 40: 10
n.s.	50A	Frauenberg – Temple plateau	1	Groh, Sedlmayer 2005, 155, Tab. 43; 243, Pl. 25 (no. 3/29)
n.s.	50A	Grünau – *villa*	1	Lamm 2011, 66, 226, no. 1992/K3/272; Pl. 73
n.s.	50A	Michlhallberg – Mining settlement	2	Grabherr 2001, 79, 157, no. C14–C15; Pl. 32
C	50B	*Solva* – Settlement	13	Groh 1996, 115, 214 (no. TSA 9–21); Pl. 31: TSA 10, TSA 12–20; Pl. 53: TSA 11; Pl. 64: TSA 9
$C^{3/4}$	50B	*Solva* – Cemetery/Spitalsgelände	2*	Karl 2013, 281–283
$C^{3/4}$	50B	Franziskanerkogel – Hilltop settlement	1*	unpublished (excavation 2020; SE 27, no. 122)
n.s.	50A/B?	Hasendorf – *villa*	1	Groh, Sedlmayer 2010, 109, 114 (inv. 111/3)
n.s.	50?	Kugelstein – Hilltop settlement	1	Fuchs, Kainz 1998, 108 (no. Ku29; three wall pieces)
n.s.	61A	Frauenberg – Temple plateau	1	Groh, Sedlmayer 2005, 155, Tab. 43; 246, Pl. 30 (no. 43/2)
D^2	61B/Var.	Kugelstein – Hilltop settlement	1*	Pichler 1887, 107; cf. Ladstätter 2000, 110 note 594; Groh 1996, 115
n.s.	61B/Var.	Kugelstein – Hilltop settlement	1	Fuchs, Kainz 1998, 113, Pl. 3: 21 (no. Ku158)
D^2	61B/(Var?)	Riegersburg – Hilltop settlement	1*	Bauer 1997, 84, 87, no. R 21; Pl. 1
Lamp	VIII A	*Solva* – Settlement	1*	Hudeczek 1973, 54, note 17; Fig. 30; cf. Hudeczek 1988, Fig. on p. 53
Lamp	VIII A	Frauenberg – Settlement/Öden	1	Steinklauber 2013, 110, 143, no. F 516; colour Pl. 13.
Lamp	VIII A	*Solva* – Settlement	3	Kainz 1986, 39–40, 117, no. 290–292; Pl. 21: 291–293 (sic)
Lamp	VIII B	*Solva* – Settlement	1	Kainz 1986, 39–40, 118, no. 293; Pl. 21: 294 (sic)

Tab. 1: Find list of ARSW and lamps in the area of today's Styria (* verified; n.s. not specified).

Hayes 50A and B fits into the supra-regional picture and shows no special features in comparison with the Pannonian[106] and the south-eastern alpine[107] region. These plates were mass imported in the 4th century.

The North Tunisian flat-based dishes Hayes 61A and B with a vertical or slightly incurved rim shaped in a more or less triangular profile represent one of the last major ARSW imports which reached the Norican-Pannonian Danube Limes.[108] The earlier form Hayes 61A (El Mahrine 4.1[109]) was produced from the 330s or 340s onwards and distributed till the early 5th century; it

[106] Gabler 1988, 9–11, 13–14, 16, 21; Hárshegyi, Ottományi 2015, 476.

[107] Pröttel 1996, 32–33, 171; Ladstätter 1998, 51; cf. Kainrath 2011, 137.

[108] Gabler 1988, 21; Ladstätter 2000, 111; Hárshegyi, Ottományi 2015, 478. – ARSW reached *Valeria* no later than the beginning of the 5th century.

[109] Mackensen 1993, 401–402.

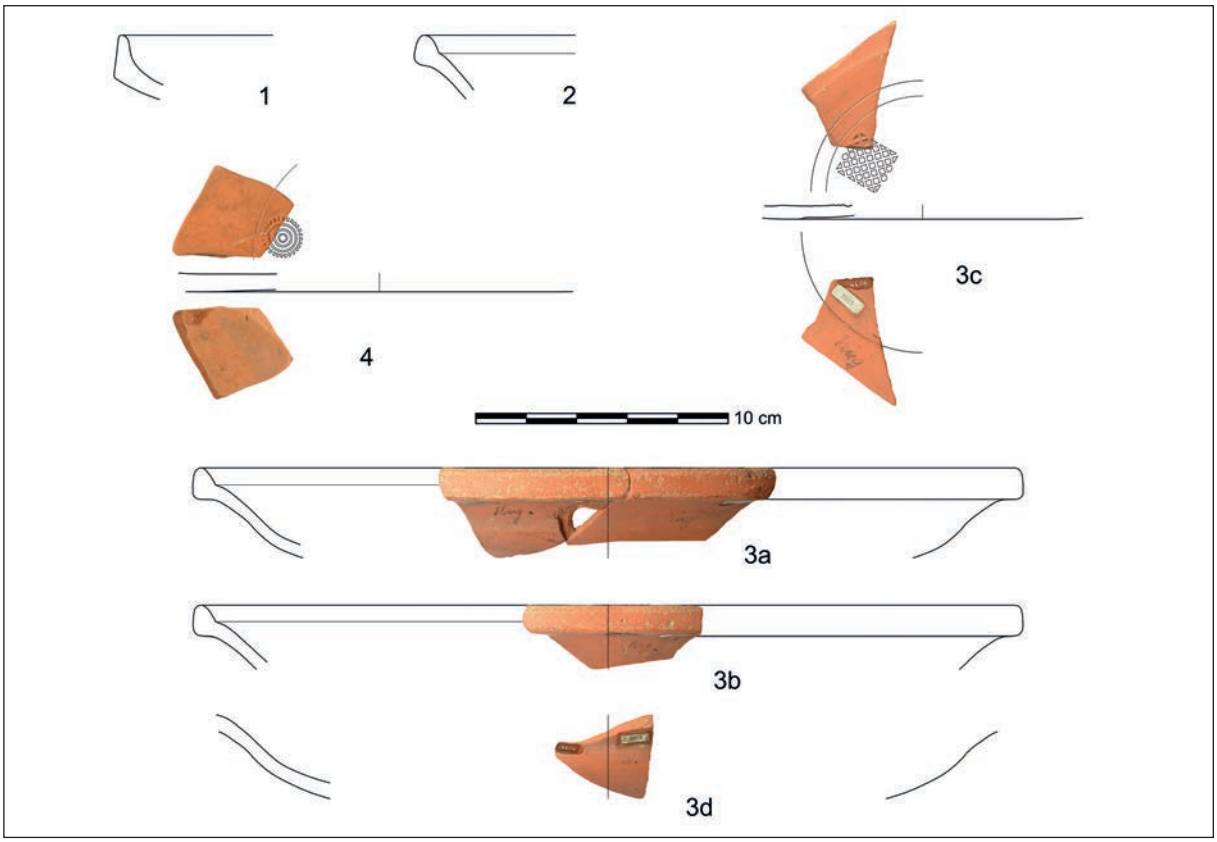

Fig. 1: ARSW of North Tunisian origin found in the area of today's Styria; 1: Hayes 61A from Frauenberg; 2, 3a–d: Hayes 61B/Var. from Kugelstein; 4: Hayes 61B/(Var?) from Riegersburg. Scale 1:3.

is basically a form of the second half of the 4th century.[110] Within the *ager Solvensis* Hayes 61A is represented only in a single piece from the temple plateau of Frauenberg (*Fig. 1:* 1).[111]

For the chronologically slightly overlapping later form Hayes 61B and its variants[112], a production period from the end of the 4th century till the second half of the 5th century is assumed, whereas the different variants, their development and dating are widely debated.[113] Whether Hayes 61B reached our area before 400 is not clear. The existence of such finds at *Ad Pirum*/Hrušica – abandoned in the first decades of the 5th century[114] – and at Keszthely-Fenékpuszta in a stratigraphic layer together with a coin of Valens from 364/378[115] don't help to solve this question. Remarkable for the southern part of *Noricum mediterraneum* is the frequency of the variant Hayes 61B/Var. respectively Sigillata type 38 Var. B3 according to the new classification by M. Bonifay.[116] These are dishes with undercut protruding rims and S-shaped wall profiles. This variant is dated by Bonifay from the middle to the end of the 5th century, which is too late in respect of sites like Hrušica (see above) and find complexes of the second quarter of the 5th century in which specimens of this variant are clearly represented.[117] However, Hayes 61B and its variants were frequent in the 1st half of the 5th century in *Noricum mediterraneum* (e.g. at Hemmaberg, Lavant).[118] In the area of today's Styria the form Hayes 61B/Var. / Bonifay Sig. type 38 Var. B3 (fabric D^2) is the youngest documented item of ARSW and indicates an end of ARSW supply before the middle of the 5th century. It occurs here exclusively on the Late Roman hilltop settlements of Kugelstein (*Figs.*

[110] On the chronology: Heimerl 2014, 37–38; cf. Ladstätter 2000, 94; Pröttel 1996, 43–44.

[111] Groh, Sedlmayer 2005, 155, 246, tab. 43, Pl. 30 (inv. 43/2).

[112] Pröttel 1996, 56: variants 61B* and 61B/Var. A new classification of Hayes 61B was undertaken by M. Bonifay (2015, 167–171): Sigillata type 38 Var. B1, B2, B3 (= 61B/Var.) and B3/late.

[113] On the chronology: Heimerl 2014, 39–40. – Cf. Pröttel 1996, 56–57; Ladstätter 2000, 94; Höck 2003, 57–58 (supposing a beginning for 61B and its variants around 390/400).

[114] Ciglenečki 2015, 394; Milavec 2017, 156–157. – Cf. Pröttel 1996, 57, 137 (suggesting an end of settlement around 400).

[115] Gabler 1988, 21; Horváth 2011, 601, 643.

[116] Pröttel 1996, 56–57; Ladstätter 2000, 94–95; Bonifay 2015, 167–171.

[117] Ladstätter 2000, 95.

[118] Ladstätter 2000, 105; Kainrath 2011, 139.

1: 2,3a–d)[119] and – most likely – of Riegersburg (*Fig. 1:* 4),[120] which belongs in all probability to the province of *Pannonia prima*. A stamped decoration in style Hayes A(III) on the Kugelstein and Hayes A(II) or A(III) on the Riegersburg piece is attested. The two contemporary stamped styles Hayes A(II) and A(III) / El Mahrine I.2 and I.3 were set by Mackensen between the mid 4th and the mid 5th century.[121]

In addition to ARSW pottery, lamps from North African origin and their regionally produced (Upper Italian?) imitations[122] reached the *ager Solvensis*, again in very small numbers. An almost completely preserved piece from *Solva* has already been presented in 1973,[123] but was only now analysed in more detail.[124] The lamp was found in 1972 during the excavation of the Insula XXVII-North/102 together with glazed pottery.[125] It is a lamp of the type Atlante VIII A1a / Bonifay 45 A with a very unusual discus decoration of a standing male person raising the right arm. By wavelength dispersive X-ray fluorescence spectrometry (WD-XRF) the origin from Henchir es-Srira in Central Tunisia has now been proven. A further lamp fragment of the same type (Atlante VIII A1a / Bonifay 45 A) comes from the so-called Öden on the Frauenberg.[126] Four other "North African" lamp fragments from *Solva* have to be mentioned, which are decorated with palm wreaths, ladder band, band of oblique stripes and tendrils on the shoulder. They can be assigned to the types Atlante VIII A2a / Bonifay 45 B, Atlante VIII B / Bonifay 43 and – currently not determined more accurately – generally to the form Atlante VIII A.[127] Lamps of the type Atlante VIII A and B were produced from the middle of the 4th century onwards; Atlante VIII A2 with ladder band decoration from the end of the 4th century.[128] The end of these types – significantly no lamps of the late Atlante X type are known from this area (in contrast to *Poetovio*/Ptuj[129]) – is to be set around 500.

The chronologically sensitive North African fineware can best be used to date the persistence of settlements into the 5th century and as a meaningful reference for cross-regional comparative studies; of course we have to keep in mind the small amount of ARSW pieces. In the *ager Solvensis* and the directly adjacent Pannonian part to the east we can recognise a spectrum of finds similar to that of Ptujsko Polje with the main urban centre *Poetovio*/Ptuj[130] and, in the western parts of *Pannonia Prima, Savaria*/Szombathely, *Salla*/Zalalövő, *Iovia*/Ludbreg as well as at the inner fortification of Keszthely-Fenékpuszta.[131] In the whole region the latest dateable ARSW finds are North Tunesian dishes of Hayes 61B or Hayes 61B/Var. / Bonifay Sig. type 38 Var. B3. Two pieces of Hayes 61B are known from the hilltop settlement Ančnikovo gradišče near Jurišna vas, while one piece was found in *Poetovio*/Ptuj.[132] Two pieces of Hayes 61B were discovered in Keszthely-Fenékpuszta.[133] For the area of today's Styria it is notable that they are only found in hilltop settlements (Kugelstein and Riegersburg) and not in the urban centre *Solva* or other settlements in the lowland. The spectrum of finds indicates that the regular supply of ARSW import already terminated at the beginning of the 5th century

[119] From the excavation of 1885/1886, stored at the Universalmuseum Joanneum at Graz, inv. 4534a–d; see Pichler 1887; cf. Groh 1996, 115; Ladstätter 2000, 110, note 594. – Probably all four fragments (a–d) originate from one vessel. Another rim piece comes from the new excavation of 1997; see Fuchs, Kainz 1998, 113, Pl. 3: 21 (no. Ku158).

[120] From the excavation of 1989/1990, stored at the Bundesdenkmalamt, inv. Rb V 255-5; see Bauer 1997, 84, 87, no. R 21, Pl. 1. – The ARSW fragment was assigned to form Hayes 67 by I. Bauer. Ladstätter (2000, 110, note 594) had supposed form Hayes 61B. We are following this attribution; most likely it is form 61B/Var. like the piece from Kugelstein. Due to the fabric D^2, form Hayes 59A/B has to be rather excluded; cf. Mackensen 2013, 349–350; Heimerl 2014, 34–36.

[121] Mackensen 1993, 433; 2013, 349. – Cf. Ladstätter 2000, 98; Heimerl 2014, 44.

[122] For the general problem of the recognition of imitations in relation to ARSW, see: Ladstätter 2000, 85, 98–99, 104; 2003a, 850–851.

[123] Hudeczek 1973, 54, note 17; Fig. 30; cf. Kainz 1986, 39–40, 117, no. 289; Hudeczek 1988, Fig. on p.53. – Since the first publication in 1973, this piece was supposed to be an imitation: Ladstätter 1998, 59, note 55, Fig. 6 (distribution map of lamps of the type Atlante VIII and imitations); Ladstätter 2000, 112; 209, find list 8, Fig. 55; Steinklauber 2013, 110.

[124] Greiner, C., Karl, S., C. A. Hauzenberger, Eine Öllampe der African Red Slip Ware aus Flavia Solva – eine nordafrikanische Sigillata aus dem zentraltunesischen Produktionszentrum von Henchir es-Srira; in preparation

[125] Pammer-Hudeczek, Hudeczek 2002, 468, note 65.

[126] Steinklauber 2013, 110, 202 no. F 516, colour Pl. 13. – The lamp was assigned only generally to the type Atlante VIII A; it was classified as an imitation or, according to the assessment of M. Bonifay, as probably originating from Central Tunisia.

[127] Kainz 1986, 39–40, 117–118, no. 290–293, Pl. 21: 291–294 (the numbers on the plate are not correct). – The lamp with a Christogram (Atlante VIII C2a) in the Universalmuseum Joanneum at Graz published by Pohl (1962, 225, Pl. 24: 3) with the label "Pettau or Leibnitz" comes from *Poetovio*/Ptuj; see also Carandini 1981, 197 (here also erroneously listed in Austria).

[128] On the chronology: Abspacher 2020, 73–76. – Cf. Heimerl 2014, 57. According to Bonifay (2015, 364), the types Atlante VIII A1 and A2 are characteristic for the first half of the 5th century.

[129] Pröttel 1996, 201 (Atlante X A1a). – The type Atlante X was produced ca. from 400 onwards; cf. Ladstätter 2000, 102; Heimerl 2014, 59–61; Abspacher 2020, 76.

[130] Pröttel 1996, 128–130.

[131] Hárshegyi, Ottományi 2015, 477–479.

[132] Ančnikovo gradišče: Pröttel 1996, 201, no. 1–2; Pl. 3: 7 (61B; D2); Modrijan 2019, 85; 2020a, 324; *Poetovio*/Ptuj: Pröttel 1996, 199, no. 31, Pl. 2: 9 (61B; D^2).

[133] Gabler 2008, 20–21, 38, no. 43–44, Fig. 5: 2–3 (61B); Horváth 2011, 601.

in this most south-eastern part of *Noricum mediterraneum* and only single imports of fine pottery from the Mediterranean reached the hilltop settlements persisting into the 5th century. The demand for this high-quality tableware was shifted to these remote sites. However, ARSW finds of the 5th century are remarkably scarce in this area between the south-eastern alps and the Pannonian plain. The ARSW import ended already around the mid 5th century (with the latest recorded form Hayes 61B/Var.) in this exposed region. In contrast, the hilltop settlements in Slovenia (Vranje, Tinje, Rifnik) as well as the core area of Carinthia (Ulrichsberg, Hemmaberg) reveal ARSW finds – at least sporadic – until the end of the 6th and the beginning of the 7th century (e.g. Hayes 82, 84 and 109).[134] This spectrum is additionally supplemented by imports of Late Roman C Ware (LRCW) from the Eastern Mediterranean from the second half of the 5th century onwards.[135]

2.3. GLAZED POTTERY

Lead-glazed pottery is an inherent part of the Late Roman find material at many archaeological sites within the Raetian, Norican and Pannonian provinces, especially along the mid-Danubian limes.[136] It was produced from the last third of the 3rd till the mid 5th century at several sites across this region. It is mainly tableware, mostly representing open forms like plates or bowls, whereas kitchenware is mainly represented by mortaria. Special forms like glazed lamps are not really abundant in this region. Glazed pottery appears first with mortaria which have additionally a colour-coated surface (LRG 1[137]) in the last third of the 3rd century; it is e.g. a type characteristic for the workshop of *Iustinianus* from *Poetovio*/Ptuj.[138] At *Favianis*/Mautern this type of mortaria is represented in the Late Roman period 5 of the fort and *vicus* (270/280–360/370).[139] Occasional finds in layers of this period 5 reveal also other shapes of glazed pottery, like a fragment of a jug with applied crescent- or horseshoe-like ornament[140] or a early variant of plates with sloped rims,[141] but they are generally rare.[142]

The organised production and distribution of glazed pottery started within the study area in the second third of the 4th century when the exclusivity of previous glazed vessels was followed by a broad usability, resulting in an expansion of the repertoire on different shapes of tableware by various pottery workshops across the region.[143] An extensive repertoire of glazed pottery is now frequently found in archaeological contexts that could be dated to the second and third quarter of the 4th century.[144] According to T. Cvjetičanin, a second period of increased appearance can be recognised at the end of the 4th century and the first half of the 5th century.[145] After the mid 5th century, vessels with glazed surfaces appear only sporadically, consisting only of a small number of forms.

In the south-eastern part of *Noricum* and the western part of *Pannonia prima*, the appearance of Late Roman lead-glazed pottery is generally dated to the second half of the 4th century, but it still occurs till the beginning of the 5th century.[146] Within the area of today's Styria, it has been registered at 14 sites, sometimes only as sparse fragments (mostly mortaria). However, the date of the first occurrence of this ware in the *ager Solvensis* can not be confirmed with certainty. A stratigraphic layer with glazed pottery in the insula XLI/405 of *Solva*, dated by a coin of Constantius II into the time after 351/355, can not exclude that the small broken pottery sherds are earlier than the accumulation of this layer.[147] Within the filling of the pit G 7 below this layer there are actually some fragments of tableware, one is obviously the bottom part of a biconical glazed cup (*Fig. 3:* 5).[148] As for the excavations at the sites "Wallschnitt" and "Öden" on the Frauenberg, there are comparable difficulties in using the stratigraphic layers for conclusions on the appearance of glazed pottery within the *Solva* area.[149] Here

[134] Ladstätter 2003b, 305.

[135] Ladstätter 2000, 105–117; 2003a, 834–837; 2003b, 305.

[136] For overviews, see Ladstätter 2000, 117–130; 2003a, 848–849; 2003b, 307–308; Cvjetičanin 2006; Horváth 2011, 602–606; Hárshegyi, Ottományi 2015, 489–499 .

[137] LRG (Late Roman Glazed pottery) according to the typology of Cvjetičanin (2006).

[138] Bónis 1990, 29; Istenic 1999/2000, 193–194, Fig. 185–186; Cvjetičanin 2006, 21, 188, 191; Horváth 2011, 607–609.

[139] Groh, Sedlmayer 2001, 182; 2002, 205–206, Fig. 137 (glazed mortarium 3); 303–304, Tab. 178; cf. Bru Calderón 2011, 98 (*Aelium Cetium*/St. Pölten). – For the similar beginning of glazed pottery (mortaria) in the last third of the 3rd century in *Raetia,* see: Reuter 2013, 361–362.

[140] Groh, Sedlmayer 2002, 244, Pl. 28/438; cf. Hárshegyi, Ottományi 2015, 493–494, 497. – This brown glazed "Pannonian" fine ware is also known in some examples in Styra, e.g. from Saazkogel, *Solva* or Leutschach.

[141] Groh, Sedlmayer 2002, 184–185, Pl. 27: 427.

[142] On the glazed pottery of period 5 in general: Groh, Sedlmayer 2002, 300, 304.

[143] Cvjetičanin 2006, 137–142, 191–193.

[144] E.g. in period 5 of *Aelium Cetium*/St. Pölten (315/330–375): Bru Calderón 2011, 98–99; for period 6 of *Favianis*/Mautern (370/380–450): Groh, Sedlmayer 2002, 303–304. – For archaeological contexts in the Pannonian area, see: Hárshegyi, Ottományi 2015, 489–499.

[145] Cvjetičanin 2006, 141, 191, 198, 207 (on the second phase of intensive production).

[146] Modrijan 2020c, 581. – Cf. Steinklauber 2013, 65; Modrijan 2019, 86 (to the mid 5th century).

[147] Groh 1996, 142–143, 146–148 (Layer 2); cf. Ladstätter 2000, 129; 2003b, 307.

[148] Groh 1996, 141, 192 (no. K 148); Pl. 41: K 148. – The filling of the pit belongs to period III+ (after 278–mid 4th century).

[149] Steinklauber 2013, 13–17 ("Wallschnitt"), 18–24 (ex-

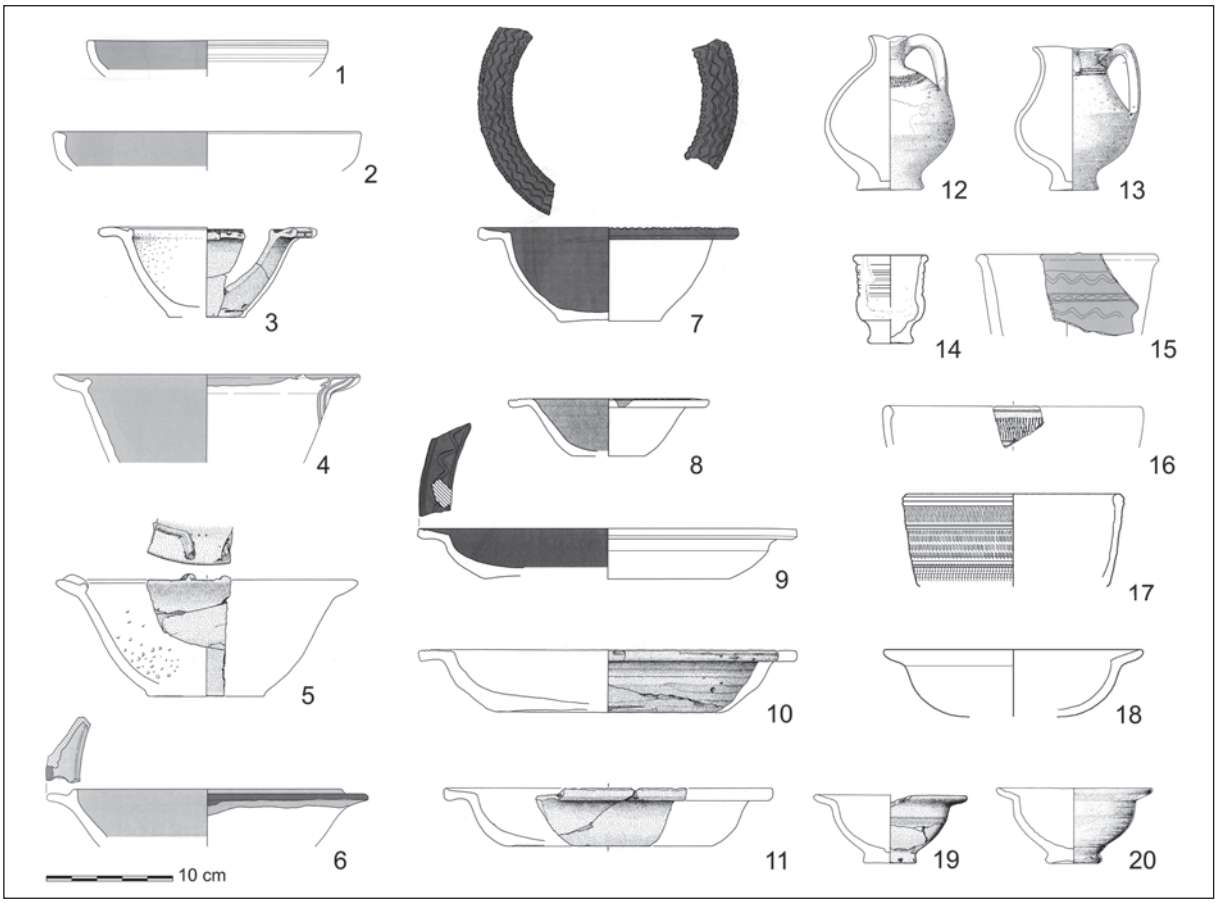

Fig. 2: Spectrum of the main characteristic shapes of Late Roman glazed pottery from Frauenberg. Scale 1:6.

the layers are mostly lying directly upon the bedrock. The coins of Valentinian I (367/375) and Theodosius I (379/383) from these layers can only be used for post-dating the overlying strata or archaeological features (e.g. the kilns); but sherds of glazed pottery were dispersed in all these layers down to the bedrock. Radiocarbon dating of the utilisation time of a heating channel of a Late Roman building within the Frauenberg settlement (excavation "Menhart") has given the result of 420–600 (2 Sigma); glazed pottery – some of them with burning traces – were found in the filling and overlying layers of this heating channel (*Fig. 2:* 2,4,8).[150] The Late Roman cemetery Perl-/Stadläcker of Frauenberg yielded only few – expectably completely preserved – vessels: a jug from grave F 224 (*Fig. 2:* 12) and a mug from grave F 170 (*Fig. 2:* 19); a third vessel, a three-handled pot, could not be assigned to a grave (*Fig. 2:* 13).[151] Unfortunately no well dateable finds like coins accompanied these grave goods.

The stratigraphical sequence of the filling layers of the recently published deposit pit on the temple plateau gives more valuable information. Glazed pottery occurred here numerously in the upper filling layers (e.g. *Figs. 2:* 17; *3:* 2), especially in SE 169, whereas the lower layers like SE 256 or 258 yielded only a mortarium and a wall piece of undefined shape.[152] Several coins indicate a filling of this pit over a longer period (a closing around 380 is assumed); the filling layers with glazed pottery are dated after 355 according to the numismatic evidence.[153] Just as important is another context from *Solva* – unfortunately unpublished with the associated pottery – coming from insula VII/802. From the excavation along the so-called Hochweg in the years 2003/2004, several completely preserved glazed vessels (a.o. plates/bowls and mortaria) were found in a pit in room C. The pit itself with these obviously deliberately deposited vessels is dug into the debris layers of the abandoned building – partly destroying the adjacent wall M21 thereby –, from

cavation at the locality "Öden" in 2004).

[150] Hinker 2007a, 55; Steinklauber 2013, 25–28 (excavation of 2007, "Menhart"). – For the radiocarbon dating, see also: Lehner 2009, 174; 2011, 54.

[151] Steinklauber 2002, 88–89, 225–226, 236, Figs. 132, 136–138; Pl. 39, 53.

[152] Schrettle 2019, 92 (contribution of S. Tsironi), 197–202 (contribution of K. Peitler), 281–284.

[153] Schrettle 2019, 200 (contribution of K. Peitler).

which several coins of Constantin I and, as the latest coin, one of Constans I from 337/340, were recorded.[154]

The time frame of the occurrence also depends on the question of the provenance of the pottery. In relation to the *ager Solvensis*, they are either coming from the Pannonian area or from local workshops of *Solva*/Frauenberg. Local production is evidenced by a test piece of a mortarium on Frauenberg[155] – and probably by another piece, a misfired beaker (*Fig. 2:* 14), see below –, but the repertoire of the products from this/these workshop/s has still to be defined based on macroscopic or archaeometric analysis. The vanishing of glazed pottery at *Solva* and environment can be assumed to be chronologically similar as in the adjacent western part of Pannonia (*Savaria*/Szombathely, *Scarbantia*/Sopron, Keszthely-Fenékpuszta). There, glazed pottery disappears gradually from archaeological contexts of the first third of the 5th century in which burnished pottery becomes more and more dominant.[156]

For the *ager Solvensis*, two aspects are noticeable regarding glazed pottery. First, the high amount of this ware in Late Roman layers on the Frauenberg, but also in the adjacent settlement *Solva* itself. The evidence for the latter is only mentioned in several publications by E. Hudeczek, the long-time excavator of this archaeological site (1976–2007).[157] He draws attention to the fact that glazed pottery occurs in layers of the last phase of the regular, planimetric town, in layers below the ground and walking level of the latest (irregular) building phase of *Solva* (the so-called "Restsiedlung"; see below). On the Frauenberg, approximately 2% of the Late Roman pottery finds are glazed.[158] The prevalence of this category of pottery can certainly be traced back to the local production on the Frauenberg. It is also striking that outside the urban area of Frauenberg/*Solva* the distribution of glazed pottery is dramatically falling in number; one exception is the *villa* and *horreum* of Rannersdorf[159], east of *Solva*, which shows strong relations to the municipal city visible in the spectrum of pottery finds (e.g. in the marble tempered coarse ware).

Frauenberg is the site on which the greatest quantity of glazed pottery has been found within the *ager Solvensis*.[160] The vessels are mostly oxidised and hard fired, made of a well purified clay with inclusions of fine mica and few particles of a quartz-like stone. Grains of crushed bricks are rare. Some have a grey core in section caused by reduced firing.[161] This can be observed especially behind the glazed surfaces. The glaze is normally green to olive green, often well preserved and glossy. Few are covered with a brown glaze. The majority of the open shapes are only coated on the inner side, sometimes including the rim zone. Some of the fragments show only glaze splashes, especially on subordinate surfaces.

Mortaria are the most frequent group of glazed pottery on the Frauenberg as elsewhere. They are characterised by a conical wall with a short rounded rim and a wide horizontally or slightly obliquely everted collar which normally overreaches the rim (*Fig. 2:* 3–6).[162] The rim diameter ranges from 16 to 40 cm with a midspread between 23 and 27 cm. The shape corresponds to the type "glazed mortarium 4" of *Favianis*/Mautern which is only evidenced in period 6 of the fort (370/380–450) respectively to LRG 5 according to new typology of T. Cvjetičanin.[163] This type is widely spread in the Norican and Pannonian provinces.[164]

The tableware of glazed pottery is represented on the Frauenberg by a limited repertoire of shapes. Numerous are plates with a flat base and a wide horizontally or slightly obliquely everted rim. The rim diameter ranges from 13 to 34 cm, with a midspread between 17 and 30 cm and a median at 26/27 cm (*Fig. 2:* 9–11).[165] The rims are sometimes decorated by concentric grooves, wavy lines, incised notches or feather rouletting. The plates belong to LRG 71, a form which is omnipresent at sites in the south-eastern alpine region.[166] Next to plates, there are calotte-shaped bowls with the same horizontally or slightly obliquely everted rim as the plates but with a deeper body (*Fig. 2:* 7–8).[167] The base

[154] Heymans 2004, 516, Fig. 26.

[155] Steinklauber 2013, 65, no. F 29; colour Pl. 1.

[156] Hárshegyi, Ottományi 2015, 498–499, note 164. – Cf. Bónis 1991, 143–144; Ottományi, Sosztarits 1996–1997, 158, Tab. 1 (from the pottery kiln: 10+13% burnished; 5% glazed); Horváth 2011, 643.

[157] E.g. Hudeczek 1973, 54; 1977, 461; 2002, 210; Pammer-Hudeczek, Hudeczek 2002, 468, note 6.5. – Cf. Kainz 1989, 99.

[158] Schrettle 2019, 91 (contribution of S. Tsironi); cf. Steinklauber 2013, 65. – For the site of Hemmaberg with a share of even 6% see: Ladstätter 2000, 118; cf. Magrini, Sbarra 2015, 48.

[159] Schrettle 2010; 2017.

[160] Steinklauber 2002, 88–89; Schrettle 2014, 92–96 (contribution of S. Tsironi); Steinklauber 2013, 65–70; Schrettle 2019, 91–96 (contribution of S. Tsironi).

[161] Cf. Ottományi 2011, 274.

[162] Examples for *Fig. 2* are taken from Steinklauber 2013 (3: F 175, 4: F 855, 5: F 161, 6: F 596).

[163] Cvjetićanin 2006, 26–28. – Cf. Groh, Sedlmayer 2002, 208–210, Fig. 138.

[164] E.g. Korinjski hrib: Ciglenečki et al. 2020, 98–99 (contribution of Z. Modrijan); Hemmaberg: Ladstätter 2000, 118–119; Ančnikovo gradišče near Jurišna vas: Modrijan 2020a, 319, Fig. 3: 6. For similar mortaria from Keszthely-Fenékpuszta see: Horváth 2011, 606–609. A local production of this mortarium type is attested at *Savaria*/Szombathely: Ottományi, Sosztarits 1996–1997, 155–156.

[165] Examples for *Fig. 2* are taken from Steinklauber 2013 (9: F 394, 10: F 250, 11: F 160).

[166] Cvjetićanin 2006, 53–55 (with many analogies); Rifnik: Bausovac, Pirkmajer 2012, 1, Fig. 3: 1–5; Korinjski hrib: Ciglenečki et al. 2020, 100, Fig. 4.2: 3–4; Ančnikovo gradišče near Jurišna vas: Modrijan 2020a, 319, Fig. 3: 3.

[167] Examples for *Fig. 2* are taken from Steinklauber 2013

is either flat like that of the plates or is slightly disc-like emphasised. They are usually smaller than the plates with a rim diameter of around 16 to 20 cm. The rims are sometimes richly decorated; e.g. the bowl F 862 from the temple plateau (*Fig. 2:* 7)[168] shows wavy lines between concentric grooves and cordons of notches on the edges. Such bowls belong to LRG 27, one of the most widespread types in the Danube and neighbouring regions, which are represented in different variants.[169] As a variant of this type we can identify a yellow-brown glazed, calotte-shaped bowl with a stretched and slightly obliquely everted rim (*Fig. 2:* 18; rdm 20 cm).[170] Another type of a bowl takes over a shape from the local coarse pottery; a calotte-shaped bowl with an inside curved rim (*Fig. 2:* 1–2).[171] The rim edge is either rounded or cut off obliquely inwards. They have rim diameters between 19 and 24 cm. Another group of bowls bears a different kind of relation when regarding its morphology. These calotte-shaped bowls or mugs of small sizes with rim diameter of around 12 cm, have pronounced disc-like bases like small jugs and slightly obliquely everted rims. One mug was found in grave F 170 of the cemetery Perl-/Stadläcker mentioned above (*Fig. 2:* 20). Another fragment with completely preserved profile comes from the "Wallschnitt" on the Frauenberg (*Fig. 2:* 19).[172] Another significant group represented on Frauenberg are biconical three- or two-handled cups with dense rouletting decoration. The rim diameter ranges between 17 to 21 cm. They were found during several excavations on the Frauenberg, e.g. in the "Wallschnitt" (*Fig. 2:* 16)[173] or on the temple plateau (*Fig. 2:* 17)[174]. On the basis of a recent revision of some fragments from Frauenberg we will address this group at the end of this section separately. Other shapes are only evidenced in single specimens, like the already mentioned jug from grave F 224 (*Fig. 2:* 12) and the three-handled pot (*Fig. 2:* 13). A cylindrical beaker with horizontal grooves is exceptional (*Fig. 2:* 14).[175] It has a height of 7 cm and a rim diameter of 6 cm. Its deformation of the outer wall is noteworthy, as it looks misfired and fused with parts of another vessel in the kiln. It might be of local production. A pot-like vessel (or a deep bowl) with a decoration consisting of wavy-lines separated by a notched band is also unusual (*Fig. 2:* 15).[176]

Decoration with wavy lines and notching appears only at an advanced production stage of glazed pottery which is dated from the late 4th century, from 380 or even 400, onwards.[177] The share of wavy line decorated vessels on the Frauenberg is low compared to other sites like Hemmaberg or *Gardellaca* (*Cardabiaca*)/Tokod (*Fig. 2:* 7,9,15).[178] In contrast to Frauenberg, glazed pottery with wavy line decoration is up to present unknown from *Solva* itself. This absence and in general the lack of finds securely dated into the 5th century should not be taken as an indication for an end of settlement activities in the lowland already at the end of the Valentinian time, i.e. at the end of the 4th century.[179] It is still an open question how to date and interpret the latest settlement phase of *Solva*, the so-called "Restsiedlung", as it was named by E. Hudeczek.[180] He has favoured to date its beginning around or shortly after 400.[181] During this last period, simple wooden houses were built on foundations made of demolished stone and brick or integrated into individual rooms of the former and already dilapidated buildings of the planimetric town. Sometimes these huts avoided the ruins and were erected directly on the streets.[182] The channel heating systems typical for the Late Roman period are mostly the only archaeological evidence for these buildings; pavement levels or fireplaces are rarely recognised. This last settlement phase of *Solva* shows a pronounced degradation and clearly changes in the residential construction. Similar phenomena of wooden huts built irregularly within the ruins and public spaces are known in *Aelium Cetium*/St. Pölten, *Savaria*/Szombathely or *Sirmium*/Sremska Mitrovica.[183] At the end of the 4th century a densifica-

(7: F 862, 8: F 854).

[168] Schrettle 2014, 24–25, 57, 80, Fig. 75; same as Steinklauber 2013, 220, no. F 862; Pl. 95.

[169] Cvjetićanin 2006, 34–39 (with many analogies); add Ančnikovo gradišče near Jurišna vas: Modrijan 2020a, 319, Fig. 3: 1–2.

[170] Schrettle 2019, 95, 303, no. F13.71.379-1; Pl. 3: 1 (contribution of S. Tsironi).

[171] Examples for *Fig. 2* are taken from Steinklauber 2013 (1: F 570, 2: F 853).

[172] Steinklauber 2013, 67, 185; Pl. 16.

[173] Steinklauber 2013, 66, 185, no. F 174; Pl. 16 (rdm 20 cm).

[174] Schrettle 2019, 95–96, 305, no. F 14.168,172,200.533, Fig. 53, Pl. 7: 3 (contribution of S. Tsironi); see *Fig. 3: 2* (after the new assembling) .

[175] Schrettle 2019, 96, 305, no. F14.168.534; Fig. 54; Pl. 7: 4 (S. Tsironi)

[176] Steinklauber 2013, 66, 212, no. F 717; Pl. 77 (rdm 13.8 cm).

[177] Bonis 1991, 144; Ladstätter 2000, 128; Hárshegyi, Ottományi 2015, 490, 494 .

[178] *Gardellaca* (*Cardabiaca*)/Tokod: Bonis 1991, 144; Hemmaberg: Ladstätter 2000, 123–124; cf. Korinjski hrib, where wavy line decoration is not attested: Ciglenečki et al. 2020, 101 (contribution of Z. Modrijan); this seems also true for Ančnikovo gradišče near Jurišna vas: Modrijan 2020a, 320.

[179] Cf. Steinklauber 2010a, 25; Groh 2021, 172–173, 313.

[180] Hudeczek 1977, 466–467; 1988, 53; 2002, 211.

[181] Hudeczek 1977, 467; 1988, 53; 2002, 210–211; 2008, 275–276. – The assumption that the last building phase of the planimetric town was destroyed during the raids of the Gothic troops led by Radagaisus in 405/406 was purely fictional and has been avoided in later works.

[182] Pammer-Hudeczek, Hudeczek 2002, 470; Hudeczek 2008, 276, Fig. 13.

[183] *Aelium Cetium*/St. Pölten: Scherrer 2011, 111; *Sa-*

Site	Shapes	Decor	Amount	References
Solva – Settlement	mortarium, plate, bowl, cup, pot	grooving, rouletting	"not at all rare"	Groh 1996, 143, 146–147, 194, no. K 148–149; Pl. 41 (Grube G7); K 288, K 289, K 293, Pl. 56 (Schicht 2); Pammer-Hudeczek, Hudeczek 2002, 468, note 65 ("gar nicht so selten"); Heymans 2004, 516, Fig. 26; Rabitsch 2013, 44, 46–47, 139, 141–142; Pl. 49: 9–10, 51: 16(15), 52: 6
Solva – Cemetery	mortarium, cup	rouletting	3	Schrettle, Tsironi 2007, 249, note 241 (unpublished; from the cemetery Marburgerstraße, formerly in the museum Flavia Solva); unpublished fragments from the Late Roman well within the cemetery "Spitalsgelände"
Frauenberg – Temple plateau	mortarium, plate, bowl, cup, jug, beaker, pot	grooving, rouletting, wavy line, notching	>85	Groh, Sedlmayer 2004, 464, 470; Schrettle 2014, 24–25, 57, 80, Fig. 75; 92, Pl. 47: 5 (contribution of S. Tsironi); Groh, Seldmayer 2005, 152–155; Tab. 40, 43 ; Pl. 24: 459/2; 29: 38/22; Steinklauber 2013, 220, no. F 862; Pl. 95; Schrettle 2019, 91–96 (contribution of S. Tsironi)
Frauenberg – Settlement/ Öden, NW-Slope	mortarium, plate, bowl, cup, mug, jug, three-handled amphora,pot	grooving, rouletting, wavy line, notching	>65	Steinklauber 2013, 65–70; several unpublished fragments exist from the excavation of 1985/1986; see Joanneum Jahresberichte 1985, 117–118; FUCHS 1985–1986a; Fuchs 1986
Frauenberg – Cemetery/Perl-/ Stadläcker	bowl, jug, three-handled amphora	grooving, rouletting	3	Steinklauber 2002, 88–89, no. GK.2–4; Fig. 131, 136–137; Pl. 39 (F 170); Pl. 53 (F 224)
Rannersdorf – *villa*	mortarium, bowl, cup, jug, beaker, pot	grooving, rouletting	>15	Schrettle, Tsironi 2007, 249, 278–279; Pl. 40: 7, 10–11; 43: 4; Schrettle 2017, 42–44, 54, 58, 60, 64; Pl. 2: 2; 3: 1, 17, 20; 4: 10, 17, 23; 6: 4, 10–11 (contribution of S. Tsironi)
Löffelbach – *villa*	jug	-	1	Marko 2017, 133, no. 610031; Pl. 20
Aichegg near Stallhofen – Farmstead	mortarium, bowl, cup?	-	>10	Bauer, Hebert, Schachinger 1995, 101, no. 474–476, 490–491, 494–495; Pl. on p. 130–131
Schönberg near Hengsberg – Settlement	plate, bowl, cup?	rouletting	4	Oberhofer 2012, 96–97, 324, no. F176–179; Pl. 11
Wildoner Schloßberg – Hilltop settlement	Mortarium, plate?, bowl?	-	4	Bauer 1997, 111, no. W6–7, W11–12; Pl. 42; Tiefengraber 2018, 251, Fig. 271
Kugelstein – Hilltop settlement	plate, bowl	...	>10	Pichler 1887, 123; Fuchs, Kainz 1998, 108 (Ku70, 259, 298), 109 (Ku62), 116 (Ku241); Pl. 6: 55–56
Riegersburg – Hilltop settlement	mortarium	-	1	Bauer 1997, 88, 94, no. R32; Pl. 2
Heiliger Berg near Bärnbach – Hilltop settlement	mortarium, plate	-	9	Bauer 1997, 113–114, no. B1–4, B22–25; Pl. 44–46; Steinklauber 2006a, 248, 253, no. 9; Fig. 2
Eppenstein – Hilltop settlement	mortarium, bowl, cup, jug, pot?	-	5	Unpublished; see Steigberger, Steinegger 2015/2016, 270
Frauenburg – Hilltop settlement	plate, bowl	grooving	2	Unpublished; see Steinegger 2017, 183; Steinegger et al. 2019, 116–117
Knallwand near Ramsau – Hilltop settlement	mortarium, plate	grooving	8	Steinklauber 2005, 150, 167–168, no. K1–K8; Pl. 2

Tab. 2 →

Site	Shapes	Decor	Amount	References
Röthelstein near Wörschach – Hilltop settlement	plate	grooving, notching	2	Steinklauber 2005, 161, 178, no. R1–R2; Pl. 14

Tab. 2: Find list of Late Roman glazed pottery in the area of today's Styria (sites only with fragments of not clearly defined shapes are excluded).

tion of the settlement on the Frauenberg ridge can be observed, similar to Poetovio/Ptuj with the castle hill (Grajski hrib) and the Panorama hill.[184] The observed differences in the find material between Frauenberg and *Solva* are probably due to a social gradient; it seems that a poorer population remained and lived in the lowland settlement, probably together with newcomers. The already observed poverty of the Late Roman graves (also with some barbaric elements) discovered in the *Solva* cemeteries supports this assumption.[185]

Most of the sites with glazed pottery in the middle Danubian provinces have a military origin or are characterised by the presence of soldiers. This has resulted in the hypothesis that the increasing need for glazed pottery is connected with the military reorganisation of the Pannonian provinces and the stationing of new troop units.[186] Also for the site of Frauenberg, several militaria are evidenced and even a small garrison is assumed.[187] Glazed pottery was also found in settlements on rural sites (e.g. Aichegg near Stallhofen or Schönberg near Hengsberg, *Tab. 2*). According to P. Hárshegyi and K. Ottományi, glazed pottery is first of all a feature of romanisation, which soldiers and wealthier members of the middle classes could afford.[188] It is therefore a sign of a certain prosperity and a still functioning economy.[189] For *Solva*, this is obviously still true for the third quarter of the 4th century.

Biconical three- or two-handled glazed cups with rouletting decoration

Biconical glazed cups with dense rouletting decoration are common among the glazed pottery in the Norican and Pannonian regions.[190] The rouletting is executed by two or three circumferential registers of multiple fine rouletting bands separated by grooves. Only the rim and the vertical wall with the rouletting decoration is covered with glaze, while the lower conical wall part and the inside show normally only some glaze splashes. The form exists in two sizes, a smaller variant with two handles and a rim diameter of around 12 cm and a larger, mostly three-handled variant with a rim diameter between 16 and 18 cm.[191] The first is sometimes classified as a beaker, the latter as a bowl.[192] This shape is mostly represented in the smaller variant. Noticeably, several specimens of the larger variant were found on the Frauenberg (*Fig. 3:* 2,3).[193] Base fragments of this characteristic shape were also evidenced in the insula XLI/405 of *Solva* (*Fig. 3:* 5)[194] and in the backfilling of a Late Roman well (*Fig. 3:* 6) in the cemetery of "Spitalsgelände". In course of a revision of the recently found cups from the temple plateau, two exemplares could be assembled from several fragments.[195] One piece (*Fig. 3:* 2) has a stacking trace on the lower part.[196] Although both are of similar size (*Fig. 3:* 2: rdm 17.2 cm; *Fig. 3:* 3: rdm 19.6 cm) and fabric, they differ in their rouletting decoration. For the yellow-brown-glazed cup (*Fig. 3:* 3) a broader rouletting tool was used and stronger impressed into the clay. Additionally, the rim zone is higher with two or even three grooves. On the

varia/Szombathely: Vida 2011b, 634–635; Scherrer 2003, 63; for the pottery kiln built under the arcades of a street see Ottományi, Sosztarits 1996–1997; for *Sirmium*/Sremska Mitrovica and other sites with remains of such late irregular dwellings see Ciglenecki 2014, 232–238.

184 Horvat et al. 2003, 163–165; Ciglenečki 2017, 145.

185 Pammer-Hudeczek, Hudeczek 2002, 467–470.

186 Magrini, Sbarra 2005, 72–73; 2015, 43. – Cf. Cvjetičanin 2006, 144–148, 196–197; Horváth 2011, 603; Steinklauber 2013, 65.

187 Groh, Sedlmayer 2005, 155, 209–210, 241, no. 223/14; Pl. 21; Schrettle 2019, 83–84, Figs. 48 (lorica squamata), 143; Groh 2021, 207. – For the garrison see: Ladstätter 2002, 318, 353–356.

188 Hárshegyi, Ottományi 2015, 495, 499.

189 In this context it has to be mentioned that glazed pottery is also supposed to be a substitute or a supplement for the decreasing imported tableware vessels from the Mediterranean: Ladstätter 2000, 125; Cvjetičanin 2006, 139, 195–196; Vida 2011b, 636.

190 Hárshegyi, Ottományi 2015, 490–493.

191 Ottományi 2011, 266–267; Pl. 2: 6–8, 6: 3.

192 Bausovac, Pirkmajer 2012, 1–2.

193 Steinklauber 2013, 66, 178, 185, nos. F25–26; 174; Pl. 3, 16; Schrettle 2019, 95–96.

194 Groh 1996, 141, 192, no. K 148; Pl. 41.

195 We thank B. Schrettle for the opportunity to study this material. Comparisons for *Fig. 3:* 2: Schrettle 2019, 91–93, 95–96, 305–308, Fig. 53; Pl. 7: 3 (F14.168/172/200.272/378/533; cf. *Fig. 2:* 17); Pl. 7: 17 (F14.174.423); not illustrated: F14.196.468; Fig. 52; Pl. 8: 10 (F14.196.469/472/473); Pl. 10: 14 (F15.196.32); Pl. 10: 13 (F15.196.45); Pl. 9: 9 (F15.196.88); Pl. 10: 15 (F15.196.264); Pl. 13: 6 (F15.233.275). Comparisons for *Fig. 3:* 3: Schrettle 2019, 91–93, 95–96, 319; Pl. 30: 1 (F14.169.540); Pl. 30: 3 (F14.169.536).

196 Cf. Bru Calderón 2011, 20, Fig. 37.

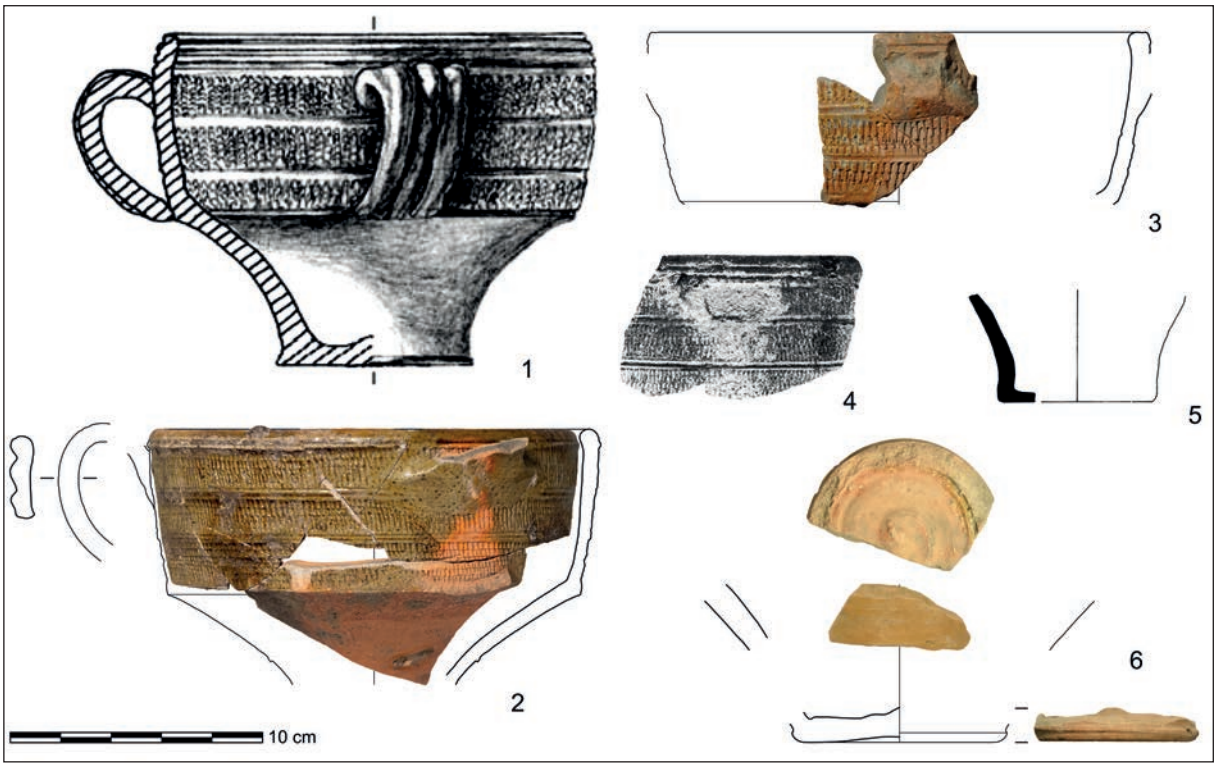

Fig. 3: Biconical three (or two-) handled glazed cups with rouletting decoration; 1: from the cemetery of Budaörs; 2, 3: from the temple plateau of Frauenberg; 4: from *Gorsium-Herculia*/Tác; 5, 6: from *Solva*. Scale 1:3.

green-glazed exemplare (*Fig. 3:* 2) marks of all three handles are preserved. Both cups have closest parallels in the find material of *Gorsium-Herculia*/Tác (*Fig. 3:* 4).[197] Some details of the rouletting and some morphological features (also in the combination with the glaze colour) are so closely related that a common origin can be assumed. At *Gorsium-Herculia*/Tác different rouletting motive types could be differentiated, some of them were attributed to a local production based on their frequency on the site.[198] The Frauenberg rouletting decoration belongs to these local motive types. Another parallel of a completely preserved cup was found in grave 427 of the cemetery of Budaörs (*Fig. 3:* 1).[199] Its outline is almost congruent with the green-glazed cup from Frauenberg. Further cups of this larger size with a rouletting decoration matching these local *Gorsium* types were discovered at *Poetovio*/Ptuj, Hemmaberg and on the hilltop settlements of Rifnik and Ančnikovo gradišče near Jurišna vas.[200] It is noticeable that this stylistically close group of vessels of supposed Pannonian (*Gorsium*) origin spread outside of Pannonia only in the western adjacent part of *Noricum Mediterraneum*. Other cups of this larger variant were found at *Favianis*/Mautern and *Aelium Cetium*/St. Pölten, but they differ in details of shape and decoration.[201]

The smaller variant of these biconical glazed cups with rouletting decoration, the proper two-handled skyphos, is widespread in the Pannonian cemeteries and settlements of the second half of the 4th century.[202] This variant probably appears shortly before the mid 4th

[197] For *Fig. 3:* 2: Fitz, Bánki 1972, 243, Pl. 13: 10; Fitz et al. 1973, 332–333, Pl. 9: 1; 9: 3 (= *Fig. 3:* 4); 1984–1985, 215, Pl. 33: 605; 1986–1988, 133, Pl. 42: 647; 1994, 366, Pl. 51: 460; cf. also Fitz et al. 1982–1983, 146, Pl. 38: 502. For *Fig. 3:* 3: Fitz et al. 1984–1985, 238, Pl. 57: 523. For further analogies from *Gorsium-Herculia*/Tác see Bausovac, Pirkmajer 2012, 1, note 15.

[198] Bánki 1992, 42–44, Fig. 6. – For *Gorsium-Herculia*/Tác as a production center of glazed pottery see also Bónis 1990, 29–30; Hárshegyi, Ottományi 2015, 496.

[199] Hárshegyi, Ottományi 2015, 491–493, Fig. 1: 17; Ottományi 2011, 266, Pl. 2: 8 (rdm 16.4 cm).

[200] *Poetovio*/Ptuj (from Hajdina): Mikl-Curk 1976, 47, 97, no. 3924, Pl. 6: 17; Hemmaberg: Ladstätter 2000, 122, 245, Pl. 7: 6 (rdm 22 cm); Rifnik: Bausovac, Pirkmajer 2012, 1, Fig. 3: 8 (rdm 21); Ančnikovo gradišče near Jurišna vas: cf. Bausovac, Pirkmajer 2012, 1, note 10 (mentioning Ravnik 2006, 95, Pl. 3: 15–16).

[201] *Favianis*/Mautern: Friesinger, Kerchler 1981, 199, Fig. 7: 1 (burnt layer of the kiln); Gassner 2000, 251, 280, Fig. 209: D5.19 (rdm 14 cm); Groh, Sedlmayer 2001, 182, note 21; 2002, 304, Pl. 27: 426 (period 5.3); according to Groh, Sedlmayer 2001, 184 the kiln in the area "Vicus West" was active in period 6 (370/380-450); *Aelium Cetium*/St. Pölten: Bru Calderón 2011, 35, Fig. 23; Pl. 28: 4 (rdm 18 cm).

[202] Bónis 1991, 131–133.

century as indicated by a cup found in grave 110 of the cemetery Somogyszil together with two coins of Constantine I (one of them 334/335).[203] Two other cups are associated with coins of Valens (364/378), one from grave 132 of the same cemetery of Somogyszil,[204] the other from grave 11 of the cemetery of *Gerulata*/Rusovce[205]. From the settlement of Budaörs fragments of cups of this smaller variant are found in layers together with coins from 351 to 375.[206] According to the archaeological contexts, these cups appear from the late second quarter of the 4th century and have a main time of usage in the second half of the 4th century.[207] The larger variant starts probably a little bit later than the classical two-handled shape. The deposit pit on the temple plateau of Frauenberg mentioned above may provide a dating of the occurrence of this type in the *ager Solvensis* during the third quarter of the 4th century. How long the larger type was produced and distributed is difficult to determine. Basically, the decoration with dense rouletting motifs, which is typical on these three- or two-handled cups, is a sign for the earlier stage of glazed pottery.[208] Another argument for dating these large cups not longer than the third quarter of the 4th century is that according to Z. Bánki the production of glazed pottery at *Gorsium-Herculia*/Tác gradually decreased after the 370s the more *Gardellaca* (*Cardabiaca*)/Tokod swung up to the predominant production centre for the Pannonian region.[209]

2.4. BURNISHED POTTERY

Coarse pottery with a burnished surface and decoration fired in a reducing atmosphere is characteristic in the Late Roman/late antique find material of the middle Danubian provinces of Noricum and Pannonia and of their bordering regions.[210] It is mostly found in settlements and forts along the limes and in the Pannonian lowland. In *Noricum mediterraneum*, burnished pottery is only of subordinate importance and evidenced only in single pieces on a handful of sites (e.g. from Carinthia: Lendorf near Klagenfurt, Kathreinkogel, Hemmaberg[211]). This under-representation is probably also aggravated by the fact that this kind of pottery is difficult to recognise, especially in an environment of similar looking Late Latène pottery finds (e.g. on the Frauenberg).

Burnished pottery occurred after some predecessors during the Valentinian time and increased afterwards during the late 4th century and the first third of the 5th century which is confirmed by various archaeological contexts in the provinces of *Pannonia prima* and *Valeria* as well as of *Noricum ripense*.[212] In *Favianis*/Mautern, burnished pottery is documented from period 5 (270/280–360/370), but does not appear in large numbers until the period 6 (370/380–450).[213] According to P. Hárshegyi and K. Ottományi, the appearance of this decorative treatment of the pottery surface in the Late Roman period can be explained by the settlement of peoples from the Barbaricum in the province and the arrival of other newcomers.[214] Local Roman pottery workshops seem to be influenced by the new arrivals and enriched their repertoire. Glazed and burnished pottery was even produced at a few sites by the same pottery workshop, as at *Favianis*/Mautern, *Savaria*/Szombathely or *Gardellaca* (*Cardabiaca*)/Tokod.[215] This period of time is mostly dated to the last quarter of the 4th and the beginning of the 5th century.

As mentioned, burnished pottery is extremely rare in *Noricum Mediterraneum*; this is especially true for the *ager Solvensis*. Nevertheless, there are few pieces – currently only in a small number of three items – which bridge the gap between the Pannonian, Carinthian and Slovenian find sites. They are all coming from *Solva* and Frauenberg. The first one, found during the excavation of the Late Roman settlement remains on the northwestern slope of Frauenberg in the years 1985 –1986 (excavation "Lippnegg"), belongs to a pot with an outwardly curved rim and a bulge separating the narrow neck zone from the shoulder (*Fig. 4:* 1).[216] Unfortunately, there was no chance to reexamine this

[203] Burger 1979, 50–51, Pl. 20: 3 (rdm 11.2 cm).

[204] Burger 1979, 56, Pl. 23: 1; 34: 1 (rdm 9.3 cm). – Grave 132 contains 3 coins of Constantius II (337/361; 355/361) and one of Valens (364/378).

[205] Krekovič 1998, 40, Pl. 31: 2 (rdm 7.4 cm).

[206] Ottományi 2011, 266–267, Pl. 2: 7; 6: 3.

[207] Ladstätter 2000, 128; Bausovac, Pirkmajer 2012, 1; Reuter 2013, 363–364. – In Ottományi (2011, 267) and Harshegyi, Ottományi (2015, 493) these cups are dated from the first third of the 4th century until the beginning of the 5th century.

[208] Hárshegyi, Ottományi 2015, 494.

[209] Bánki 1992, 40; cf. Bru Calderón 2011, 82. – According to Ottomanyi, Sosztarits (1996/1997, 181) *Gorsium-Herculia*/Tác belongs to the sites where burnished pottery was not produced.

[210] For overviews see: Groh, Sedlmayer 2002, 313–321; Ladstätter 2003a, 849–850; Groh, Sedlmayer 2013, 504–505; Hárshegyi, Ottományi 2015, 500–509.

[211] Groh, Sedlmayer 2002, 316, note 1030; Ladstätter 2003a, 849–850; Lendorf: Rodriguez 1997, 161, Pl. 11: 111; Kathreinkogel: Rodriguez 1997, 161, Pl. 11: 105; Hemmaberg: Rodriguez 1997, 161, Pl. 9: 86–87.

[212] Horváth 2011, 628; Groh, Sedlmayer 2013, 504; Hárshegyi, Ottományi 2015, 500–502.

[213] Groh, Seldmayer 2002, 313–314.

[214] Hárshegyi, Ottományi 2015, 500–501.

[215] Groh, Sedlmayer 2001, 184; Hárshegyi, Ottományi 2015, 506. 508. – For a compilation of these workshops see: Ottomanyi, Sosztarits 1996 –1997, 181–182.

[216] Artner 1998–1999, 224, 267, fig. 4; cf. Schrettle 2014, 56, note 189; Gutjahr 2015a, 77, note 30; 2020, 56, note 7. – For this important, but in essence still unpublished excavation see: Joanneum Jahresberichte 1985, 117–118; Fuchs 1985–1986a; 1986; Steinklauber 2013, 28–31.

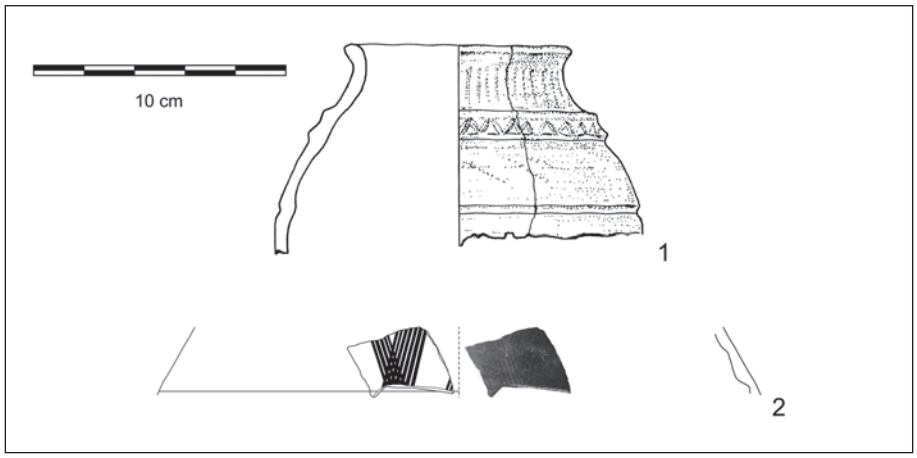

Fig. 4: Burnished pottery from the last quarter of the 4th century to the beginning of the 5th century from Frauenberg. Scale 1:3.

important object in the museum depot, so the classification is based on the published drawing. It has vertical burnished stripes on the neck, a slightly deepened (incised?) zigzag line (wavy line?) on the bulge and diagonal burnished stripes (very faint) on the shoulder, which was framed below by a groove. The shape and decoration features refer this piece to the second group of burnished pottery as it was determined by P. Hárshegyi and K. Ottományi.[217] The authors are dating this group from the last quarter of the 4th century to the beginning of the 5th century. A comparable pot of similar size (rdm 11 cm) and decoration (with incised wavy line) – with traces of a handle – was found at *Favianis*/Mauern in period 6 (370/380–450).[218] Another fragment from Frauenberg was discovered during the recent excavation on the temple plateau in 2018.[219] This wall piece belongs probably to a large jug or even to a pot (*Fig. 4:* 2; max. pres. diameter 23.4 cm). The black coloured fabric is reduced and medium hard fired without any visible inclusions. The shoulder zone is decorated with a band of alternating diagonal stripe groups (one with 5 and the other with 7 stripes), partly crossing. These stripes are slightly deepened in the polished surface. A fine incised horizontal line is limiting this ornamental band below. It resembles the large jugs with narrow neck and lattice pattern on the shoulder from the *vicus* of Budaörs, which are part of the second group of burnished pottery there (380–430).[220] The decoration of stripe groups is quite common, evidenced also in *Noricum ripense*.[221] A third fragment was recently evidenced in the "city moat" of *Solva*; it is up to date not published but only cursorily mentioned in a recent publication.[222] According to the first report, it comes from the top filling layers of this moat. On this basis, the decay of the moat was dated into the Valentinian time.

This small number of burnished pottery from *Solva* hardly allows any further evaluations. The pieces are certainly imports from the Pannonian area where several workshops were evidenced in the form of pottery kilns, pottery waste and other specifics.[223] The sites where a production of burnished pottery is argued that are closest to the study area are *Savaria*/Szombathely and Keszthely-Fenékpuszta.[224] Exact parallels could not be recognised in the published material from this western Pannonian region. Remarkable for both Frauenberg pieces is the precision and elaboration of the burnished decoration; burnished pottery from the neighbouring sites are more simple, as from the hilltop settlement Ančnikovo gradišče near Jurišna vas or from *Poetovio*/Ptuj.[225] On Ančnikovo gradišče c. 1% of all Late Roman pottery finds belongs to the category of burnished pottery. Parallel to the latter site, the burnished pottery from *Solva* can be dated to the same time frame, from the last quarter of the 4th to the beginning of the 5th century. The most scarce evidence in the *ager Solvensis* – in spite of the closeness to Pannonia – is nevertheless difficult to explain.

[217] Hárshegyi, Ottományi 2015, 503–507.

[218] Groh, Sedlmayer 2002, 260–261, Fig. 151; Pl. 41: 759.

[219] No. F18.457.1 (unpublished); for the excavation see Schrettle 2018.

[220] Ottományi 2009, 416, 437, Fig. 3: 9.

[221] E.g. from Vienna-Aspern: Friesinger, Kerchler 1981, 252, Fig. 26: 3; *Favianis*/Mautern: Groh, Sedlmayer 2002, 315, Pl. 31: 526.

[222] Groh 2021, 295.

[223] Ottomanyi, Sosztarits 1996–1997, 181–184; Hárshegyi, Ottományi 2015, 506 (workshops of group 2).

[224] Ottomanyi, Sosztarits 1996–1997, 178; Horváth 2011, 606; Hárshegyi, Ottományi 2015, 506, note 197.

[225] Ančnikovo gradišče: Modrijan 2019, 86, Fig. 3: 5; 2020a, 320–321, Fig. 4; 2020b, 359, Fig. 6: 6; *Poetovio*/Ptuj: Mikl-Curk 1966, 56, Pl. 2: 11 (grave 38); 58, Pl. 3: 3 (no. 3514); 1976, 45, 95, Pl. 9: 12 (no. 3514); 12: 14 (no. 3513).

3. THE FINDS FROM THE PERIOD 450–650 AD

Christoph Gutjahr

It has already been stated several times that in Styria, finds from Late Antiquity and, even more so, from the transition to the Early Middle Ages (around 450 to 650 AD), are surprisingly rare.[226] Comprehensive research in the recent past was able to increase the known inventory only insignificantly. Apart from the silver-gilt bird fibula (450–500 or around 500, *Fig. 5*) and the four lead bullae of the Eastern Roman emperor Markianos (450–457)[227] from *Solva,*[228] only very few objects from Styria can be attributed to the Migration Period – furthermore, the circumstances of their discovery often remain unclear.[229] From Kirchbichl near Rattenberg (district of the Mur/Mura Valley), there is a bird fibula (approx. 470–525, *Fig. 6*)[230] and a bronze bow fibula decorated by chip-carving of the Prša-Levice type (450/460–480/490, *Fig. 7*); the latter is a Danubian/East Germanic product. The Kugelstein near Frohnleiten (Graz-Umgebung district), featuring an extraordinary strategic position, is the find spot of an iron crossbow fibula of the Siscia type (second half of the 5th century/first half of the 6th century, *Fig. 8–9*), which was discovered during excavations in 1885–1886. An equal-armed bronze bow brooch was found in Mantscha (Graz-Umgebung, district, second half of the 6th century/first half of the 7th century, *Fig. 10*). In grave 15 of the cemetery of Hohenberg near Aigen (Liezen district), dating to the decades around 800, two late antique pigeon fibulae have been found (5th–7th centuries).[231] A hollow armlet (Kolbenarmring) with a pearled rim presumably originates from the vicinity of Leoben (mid 7th century, Leoben district, *Fig. 11*).[232] An openwork disc brooch with an inscribed cross and ring-and-dot ornament made of non-ferrous metal from grave 8 of the early medieval cemetery of Grötsch (Leibnitz district, *Fig. 12*) can also be dated to the early Middle Ages (last two to three decades of the 7th century or around 700).[233] It is probably an piece that had been in use for a long time for which a broader dating (6th/7th century) including Late Antiquity was initially considered.[234] A pin with a bird-shaped head made of non-ferrous metal, a dislocated find from the filling of a Medieval ditch at Wildon/Schlossberg, may also belong to this period (*Fig. 13*).[235] An allegedly Byzantine lead tessera (6th/7th century?) that was found around 2002 in Andritz, Graz-Stadt district, is currently missing.[236] Also untraceable are the pottery fragments mentioned by Schmid from his excavation west of the so-called Almhäuser (Altenmarkt, municipality of Vordernberg, Leoben district) below the Präbichl saddle (presumably 1929, definitely before 1932), which Schmid classified as late medieval on the basis of their decoration.[237] In 1992, Eibner associated them with fragments of (later) Merovingian biconical vessels because of their decoration technique (latticed triangular and rectangular stamped motifs as well as ring-and-dot ornaments and rouletted decoration).[238] In fact, however, the sherds are the remains of cups/jugs of late medieval to early modern provenance (approximately late 14th to early

Fig. 5: Bird fibula from *Solva*.

[226] Gutjahr 2015a 76–78; 2018, 42–44; 2020, 55–62.

[227] Gutjahr 2015a, 76, 101–102, note 21.

[228] Gutjahr 2015a, 76, 101–102, note 21; 2020, 56, note 8. For an overview of bird fibulae: Losert 2003, 152–162.

[229] For the finds: Gutjahr 2020, 55–57.

[230] The bird fibula from grave LLG83 (grave 30/2013) of Liefering-Lexengasse (Greussing 2020, 160, 420, Fig. 5a; around 500) is very similar.

[231] Nowotny 2005, 208–210, pl. 14/45 (grave 15).

[232] Recently, with reference to the difficulties in distinguishing Late Antiquity and the Early Middle Ages: Milavec 2020, 162.

[233] Koch 2003, 222.

[234] Gutjahr 2018, 43; 2020, 57.

[235] The pin with a bird-shaped head (see Bauer 1997, 110–111, Pl. 43: W28) matches the – in itself very heterogeneous – group of pins with a bird-shaped head of the 4th to 7th century mentioned by Vida (2009, 244–249, 246, Fig. 5; 247 Fig. 6A. – The main area of distribution of this type of pin is in the eastern territories of the Byzantine Empire: Vida 2009, 245, Fig. 4; 2011a, especially 416–418, 417, note 171.

[236] Records of the Bundesdenkmalamt (Federal Monuments Office). The find was handed over to the Bundesdenkmalamt and later transferred to today Universalmuseum Joanneum for identification. It is currently not traceable.

[237] Schmid 1932, 56–58; 57, Fig. 45.

[238] Eibner 1992, 26–27.

Fig. 6: Bird fibula from Kirchbichl near Rattenberg.

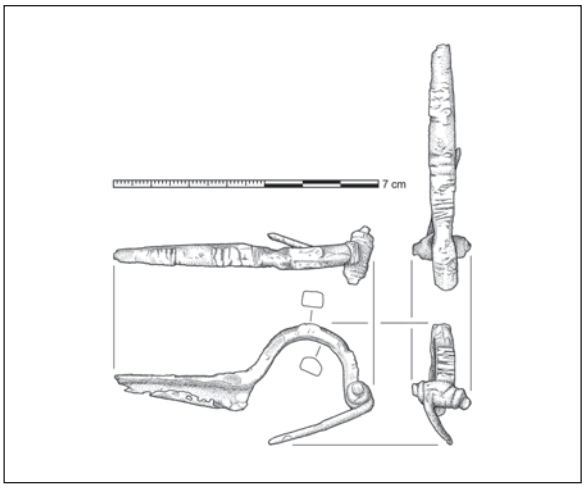

Fig. 9: Crossbow fibula of the Siscia type from Kugelstein near Frohnleiten, drawing.

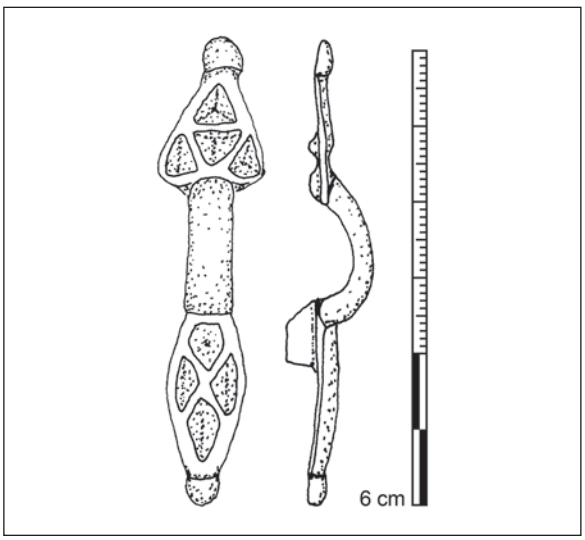

Fig. 7: Bronze bow fibula of the Prša-Levice type from Kirchbichl near Rattenberg.

Fig. 10: Bow fibula from Mantscha.

Fig. 8: Crossbow fibula of the Siscia type from Kugelstein near Frohnleiten.

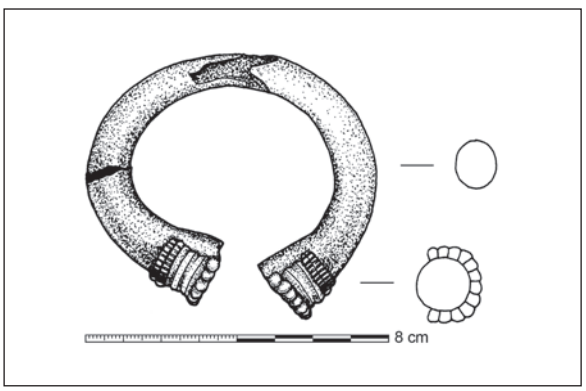

Fig. 11: Hollow armlet (Kolbenarmring) with a pearled rim from the vicinity of Leoben.

Fig. 12: Disc fibula from Grötsch.

16th century),[239] which eliminates them from the find material that is included in this study.[240]

Two half relief fibulae (bird and deer) made of cast non-ferrous metal from the strategically important castle hill of Eppenstein (Murtal district)[241] complete the inventory of the late antique and early medieval finds. This includes all of the currently known small

Fig. 13: Non-ferrous metal pin with a bird-shaped head from the castle hill of Wildon.

finds from more than 160 years of archaeological research in Styria.

If we look at the numismatic data, the situation is not better. Finds of Eastern Roman or Early Byzantine coins between 450 and 700 are equally rare (*Tab. 3*).[242] Except for four coins (*Fig. 17*), from Annaberg near Leoben, Eppenstein (only the item found 1952), Krottenhof near Sankt Ulrich am Waasen and Graz-Andritz – the latter three with the special fate to become lost after discovery –, they have all no verifiable provenance: they were either found in the 19th century or by modern collectors. In the case of Einhof near Seibersdorf bei St. Veit the coin of Justinianus I was probably lost together with other Roman coins on this find site during modern times.[243] Noticeable are two *solidi* of Leo I from the hilltop settlement of Eppenstein.[244] They belong to two different mints *Constantinopolis* and *Roma*, whereby the latter is quite unusual for the Norican and Pannonian area.[245] Whether this gold coinage is part of a military pay is unclear.[246]

[239] See also: Holl 1963, 391–394; 356, Fig. 46–47; 363, Fig. 63; 364, Fig. 65; Holl, Parádi 1982, 105, Fig. 52; Fig. 165 (esp. 3-8); Kerman 1997, 147; 158, Fig. 6/22.

[240] Consequently, they have not been included in compilations of LA/EMA finds in recent years (Gutjahr 2015a, 76–77; 2018, 42–43; 2020, 55–58). I would like to thank my colleagues Iris Koch, Manfred Lehner, Daniel Modl, and especially Johanna Kraschitzer, all from Graz, for their review and hopefully final chronological assignment of the Altenmarkt sherds.

[241] Steinklauber 2010b, 21, Fig. 2.3; Pl. 2: 2.3; Gutjahr 2015a, 102–103, note 28; Steinklauber 2010b, 24, Fig. 2.4; Pl. 2: 2.4; Martin 1994, 569, 571, Fig. 162. For the bird (dove) fibula, a very similar specimen can be cited from Puštal above Trnje: Bitenc et al. 1991, 75 no. 72 (5th/6th century); Bitenc, Knific 2012, 432, 431 Fig. 1, no. 7.

[242] For the recent assessment of the coin finds in Styria from the period from 450 to 1100 we are grateful to Karl Peitler (Universalmuseum Joanneum Graz). For information and photographic material of relevant coins we thank Andreas Bernhard for the Burgmuseum Deutschlandsberg and Susanne Leitner-Böchzelt from the MuseumsCenter | Kunsthalle Leoben.

[243] Schachinger 2006, 239.

[244] Steinklauber 2010a, 14–15.

[245] Hahn 1990; Prohászka 2011, 85.

[246] Prohászka 2011, 71. – Cf. Milavec 2020, 166.

Site	Ruler	Denomination	Issue	Type	Storage	Key reference
Eppenstein, found 1952	Leo I	Solidus	462/466, *Constantinopolis*	RIC X 605	lost	Hahn 1990, 243; Steinklauber 2010b, 15; Zbiva ID 10004050
Eppenstein	Leo I	Solidus	467, *Roma*	RIC X 2518	Burgmuseum Deutschlandsberg	Schachinger 2006, cat. 16796; Pl. 16: 16796; Steinklauber 2010b, Fig. on p. 14–15; Zbiva ID 10004050
Leibnitz field, found before 1848	Leo I	Tremissis	(457–474)		lost	Hahn 1990, 244; Schachinger 2006, cat. 16798; Zbiva ID 10004058
Frauenberg	Basiliskos	Solidus	474–476, *Constantinopolis*	RIC X 1002 or 1003	private property, unknown	Schachinger 2006, cat. 16799; Zbiva ID 10004059
Giesselegg near Wies	Anastasios I	Follis	(491–518), *Constantinopolis*		Burgmuseum Deutschlandsberg	Zbiva ID 10004060
Krottendorf near Sankt Ulrich am Waasen, found in the 1970s		Follis			lost	Mirsch 1994, Fig. on p. 81; Zbiva ID 10004055
Mitterdorf near Voitsberg, found before 1827	Justinus I	Follis	518–522, *Thessalonica*	MIB 68	UMJ	Hahn 1990, 243; Schachinger 2006, cat. 16839; Zbiva ID 10004061
Einhof near Seibersdorf bei St. Veit, found 1956	Justinianus I	AE	527–565, *Ravenna*		private property Leutzendorff	Schachinger 2006, cat. 16840; Zbiva ID 10004062
Annaberg near Leoben, found 1989	Justinianus I	Follis	538–539, *Nicomedia*	MIB 114	MuseumsCenter | Kunsthalle Leoben	Schachinger 2006, 210, 240 (no. 16841); Pl. 41: 16841; Zbiva ID 10004057
Pichling near Stainz	Justinianus I	Follis	538–539, *Nicomedia*	MIB 114	Burgmuseum Deutschlandsberg	Zbiva ID 10004063
Äußere Kainisch near Bad Mitterndorf ("Goldbichel"), found 1877	Justinianus I	Follis	538–539, *Constantinopolis*		Krajské muzeum Cheb, Czech Republic	Modl 2010, 162; Zbiva ID 10004066
Großfeiting near Wildon, found before 1879	Justinianus I	Half-follis	552–565, *Salona*	MIB 250 (similar)	UMJ	Zbiva ID 10004067
Knittelfeld, found before 1819	Phokas	Follis	605–606, *Constantinopolis*	MIB 61 c	UMJ	Hahn 1990, 244; Schachinger 2006, cat. 16842; Peitler 2011b; Zbiva ID 10001858
Graz-Andritz, found c. 1983/1984	Heraclius	Follis	617		UMJ	Artner 1997, XXXIII, XLVII; Zbiva ID 10003604
Straden, found before 1826	Heraclius	Follis	610–641, *Constantinopolis*	MIB 164	UMJ	Hahn 1990, 244 (Leo V, 813–820); Schachinger 2006, cat. 16843 (Leo III, 717–741) and cat. 16844 (Constantinus V Copronymus, 741–745); Zbiva ID 10001870

Tab. 3: Coin finds of the LA and the early EMA period from 450 to 700 in the area of today's Styria.

Two more sites that have only been archaeologically investigated in recent years should be mentioned here.

From the ruins of Frauenburg Castle near the village of Unzmarkt-Frauenburg in western Upper Styria (Murtal district), which has been the target of long-term archaeological investigations since 2012, late Roman and Late Antique radiocarbon dates have been collected from various layers. However, no chronologically correlating finds or (structural) findings have been presented so far that could at best be connected to a Late

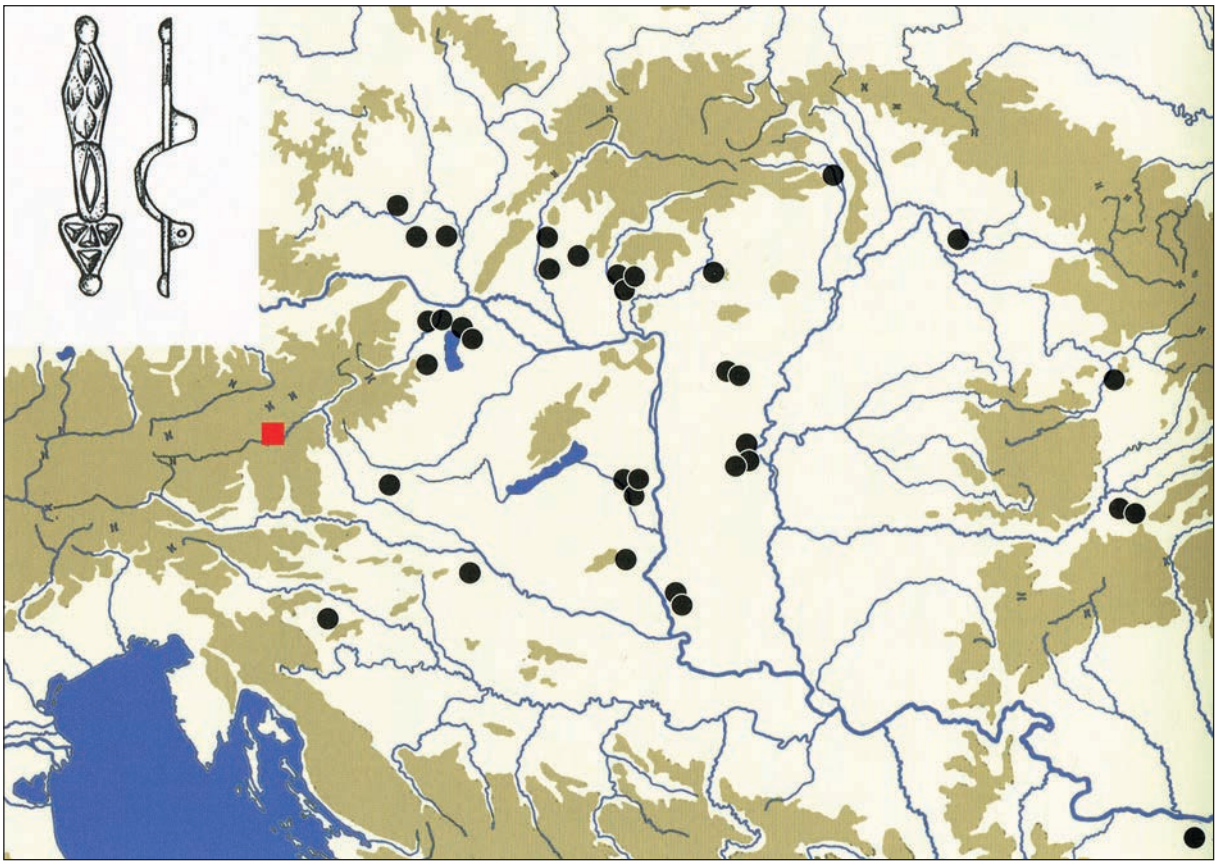

Fig. 14: Distribution of fibulae of the Prša-Levice type in the middle Danube region. Square: Kirchbichl near Rattenberg.

Antique phase (after 450 AD) on the castle hill.[247] The finds and findings in question still have to be published. In principle, a late antique settlement persistence of whatever type and intensity cannot be ruled out for the site, which is located close to a Roman *via publica* ("Norische Hauptstraße").[248]

Another finding from Riegersdorf in eastern Styria (Hartberg-Fürstenfeld district), which is located close to the border with Burgenland, cannot be classified more precisely on the basis of the excavation results published for the time being. For a kiln discovered there in 2016, an early medieval date is assumed, although only a radiocarbon date pointing to Late Antiquity (5th/6th century) is given.[249]

In comparison to the extensive finds from Late Antiquity and the Migration period in Carinthia and Slovenia that come from hilltop settlements as well as burial grounds, the almost negligible number of contemporaneous finds from Styria is astonishing. We will deal with this disproportion below.

Most of today's Styria belonged to the Roman province of *Noricum mediterraneum* and consequently – at least legally – to the Ostrogoth Empire, even though this is not visible in the archaeological evidence.[250] In view of the localisations that have been proposed so far, it can hardly be assumed that the Pólis Norikón, which was assigned to the Lombards by the Byzantines, or at least subsequently legitimised by contract, affected the territory of today´s Styria. The interpretation of the Styrian finds remains uncertain. They show no indications of the presence of Ostrogothic or Lombard groups or military troops, nor are there any indications of local militias. Essentially, there are no finds that show any kind of contact (trade, exchange, gifts, dowry etc.) with Ostrogothic, Lombard or Frankish milieus.[251] The few

[247] Steinegger 2017, 188–190; Steinegger et al. 2019, 117, esp. 120 note 5–6; Steinegger 2020, 97.

[248] Hinker 2010; Steigberger, Vrabec 2016.

[249] Czubak, Chmielewski 2016, 462, D6910–D6913.

[250] Wolfram 2001, 315–324; 2003, 62; Bratož 2014, 372 375.

[251] In contrast to neighbouring Carinthia and Slovenia. The small finds are generally to be assigned to the East Germanic milieu (e.g. the fibula from Rattenberg; cf. Gleirscher 2019, 96) or, like the bird fibulae, are typical of the cemeteries of the western Merovingian circle (westmerowingischer Reihengräberkreis). The earliest occurrences of bird fibulae are almost exclusively associated with Alemannic, Bavarian and Franconian graves (Losert 2003, 154). The bow fibula from Mantscha is usually regarded as an element of the male Roman costume: Ibler 1991, 105–109; Martin 1994, 578–579, Fig. 173, 1012; Thörle 2001, 96–98, 259–266 (group III A); Pl. 60–61; Map 15. – Gleirscher (2019, 96) assumes a derivation

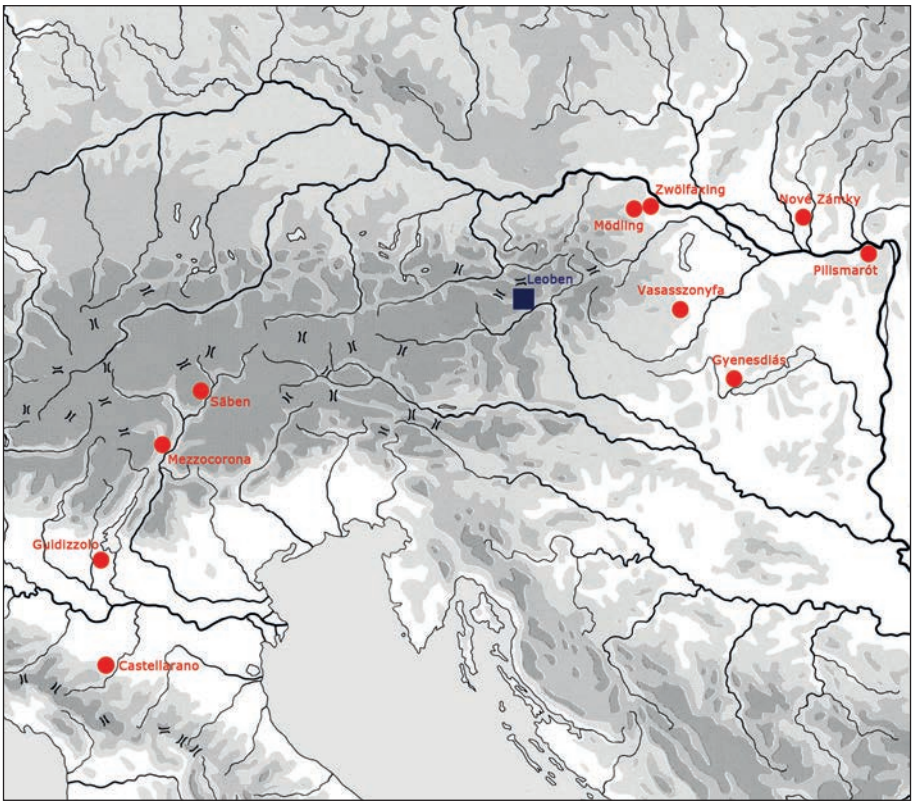

Fig. 15: Distribution of hollow armlets (Kolbenarmringe) with a pearled rim. Square: vicinity of Leoben.

objects of Germanic and Roman origin dating from the Migration period do not give us any reliable indications of ethnic identities, territorial disposition or the affiliation of Styrian regions to any of the various spheres of control during Late Antiquity and at the beginning of the Early Middle Ages.

Only three of the above-mentioned objects can be linked quite safely to a larger geographical and cultural-historical framework: The Prša-Levice type fibula from Rattenberg represents an element of the Danubian female costume from the second half of the 5th century and turns out to be the most western exponent in the mapping of this type's find spots in the central Danube region (*Fig. 14*). According to J. Tejral, this group of fibulae can be attributed into the central Danubian culture, which was established in the post-Attila period, which originated in indigenous Danubian traditions and bore both an East Germanic/equestrian nomadic and a late antique legacy.[252]

The hollow armlets (Kolbenarmringe) with a pearled rim are Italic products that were also used as traditional costume elements in the western part of the Avar territory – they document contacts beyond the area of the Eastern Alps, between western Pannonia and the Lombard realm.[253] The location given for the Styrian armlet (vicinity of Leoben) suggests routes crossing Styrian territory, connecting these two historically important regions (*Fig. 15*).

Finally, the crossbow fibulae of the "Siscia" type have a clear focus of distribution in the south-eastern Alps; according to T. Milavec, they were worn here by the Roman or Romanised population (*Fig. 16*).[254]

It is noteworthy that the activities of the Lombards, Ostrogoths, the (early) Avars and various other ancient *gentes* in the Eastern Alpine region,[255] well documented in the neighbouring areas, seem to have passed by Styria without a trace, and not even a rudimentary persistent *romanitas* can be identified. This is surprising, the more so as evidence increases that the Roman populations of the central and eastern Alpine region, Pannonia, Italy and the Dalmatian coastal landscape were in contact

of East Germanic types.

[252] Tejral 2008, 268. – See also Heinrich-Tamáska, Straub 2015, 634–635 (as characteristic of Zsibót-Domolopuszta type graves = type 5 graves; phase D3 according to Bierbrauer 2015, 374).

[253] Distelberger 2004, 20.

[254] Milavec 2009, 224, 233–234, 236–237, 229 Fig. 8. – Different: Schulze-Dörrlamm 1986, 686–689 (Germanic), 694, 695, Fig. 110; Gleirscher 2019, 92–93.

[255] Winckler (2012a; 2012b) gives an overview of the relevant period. On the 5th and 6th centuries in Noricum and Pannonia see also: Ruchesi 2020, 17–33.

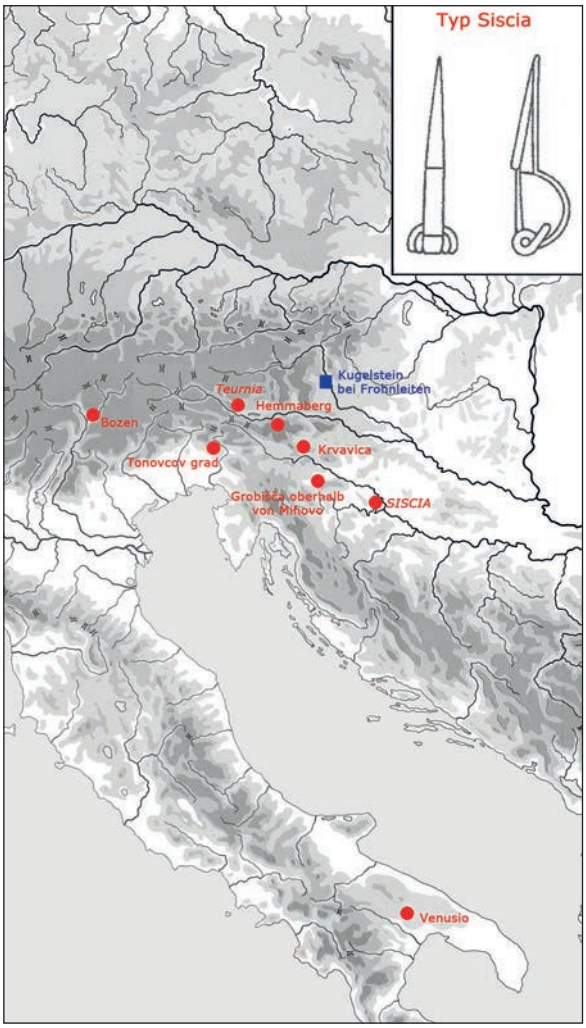

Fig. 16: Distribution of crossbow fibulae of the Siscia type. Square: Kugelstein near Frohnleiten.

with one another well into the 7th century.[256] When looking at the disc fibulae of the Christian population of the early Keszthely culture, F. Daim clearly emphasised that the long-distance travel and communication routes (e.g. Amber Road) to Italy and further into the Eastern Mediterranean, running just outside of today's Styria, were still used during the early Avar period.[257] Furthermore, for Pannonia in the early Avar period – particularly taking into account the necropoleis of the Keszthely culture and other Pannonian cemeteries – T. Vida postulated an influx of Mediterranean groups from the Byzantine Balkans in addition to a remaining Roman population with ties to the western Mediterranean (northern Italy, Dalmatia, south-eastern Alps).[258] T. Milavec interprets finds of Balkan crossbow fibulae with an inverted foot in Slovenia as a sign of an otherwise hardly tangible (and in Styria non-existent) Byzantine presence after the Gothic Wars.[259]

It is an open research question to what extent and in what form Styria participated in the changes in settlement patterns and economic structures that took place in the Eastern Alps and in the Pannonian region during Late Antiquity/Migration period.[260] In addition, it remains unclear whether and, if so, to what extent Styria participated in the above-mentioned supra-regional exchange and was affected by migratory movements of various ethnic groups (Romans, Germans, etc.). At the moment, we can only assume that the existing Roman road network was still in use in Styria. Although this assumption cannot be proven by means of archaeological evidence, it suggests itself in view of the geographical situation of the area within the better researched regions of western *Noricum mediterraneum* (Carinthia, East Tyrol), Pannonia and northeastern Slovenia. The use of the long-distance trade routes and passes (e.g. Pyhrnpass, Triebener Tauern), which mainly went across Styria in a north-south direction, is indicated by the presumed route of the clothing donation episode from the *vita Severini* or – somewhat later – the find spot of the aforementioned bracelet near Leoben in the upper Mur/Mura valley.[261] Bypassing of former Roman roads due to their lack of maintenance can of course also be expected in Styrian territory.[262]

After the middle of the 5th century, Styria must not be thought of as completely deserted – even if in the 6th/early 7th century, there was no situation of persistent Late Antique administration, organisation, order and authority comparable to that of western Noricum mediterraneum or the neighbouring Slovenia. Central places and church buildings that can be associated with this type of continuity are missing in Styria. The absence of Roman place names is striking, but – as the example of Carinthia shows – it should not automatically be concluded that there is no *romanitas*.[263] Roman or

[256] See, for example: Glaser, Gugl 1996, 18–24; Bierbrauer 2004, 51–72; Vida 2008a, 422 (surviving *romanitas* also outside the Keszthely culture); 2009, 233–259; 2011a, 397–455.

[257] Daim 2002, 119–121 (Keszthely – Poetovio – Celeia – Emona – Aquileia to Italy and the Central Byzantine area and via Keszthely to Aquincum).

[258] Vida 2009, esp. 235–237, 244–255 (deported "prisoners of war"; see, for example, the bird-head pin from Wildon, *Fig. 13*). – Roman continuity in Keszthely-Fenékpuszta and beyond (Lesencetomaj-Piros kereszt) is also assumed by Müller (1992, 259, 274–281). See also Szőke 2000, 490–491.

[259] Milavec 2009, 224, 237.

[260] Pars pro toto, the construction of hilltop settlements, the ruralisation of the cities, the retreat into regions with potential for mining activities (salt mining in Upper Styria?) or to still prosperous "urban" centres (western *Noricum Mediterraneum*?) as well as the possible continuity of travel routes can be named.

[261] Vita Severini 29; Régerat 1996, 203; Winckler 2012b, 146.

[262] Winckler 2012b, 116–117.

[263] Glaser 2008, 595.

indigenous romanised parts of the population remained in the country; last but not least, this is suggested by the tradition of pre-Roman toponyms.[264]

We can put on record that the rural structures in Styria hardly survived beyond the end of the 4th century. For the only Roman town in Styria, *Solva*, the loss of urban structures is to be expected around 400. There are indications that some remnant settlement activity existed until the first half of the 5th century, but more in the sense of a partial re-use or very limited further use of a settlement area than in the sense of an urban continuity (see above). Overall, based on the findings and finds, it can be assumed that there is a significant reduction in settlement in Styria as early as the first half of the 5th century. Only a few settlement sites like the Frauenberg near Leibnitz[265] or the three fortified Upper Styrian hilltop settlements in the Enns valley (Gröbminger Schlossbühel, Knallwand in Ramsau and Röthelstein near Wörschach) existed until the middle of the 5th century. These hilltop settlements came to an end in a fire.[266]

As mentioned, at present there is no evidence of hilltop settlements or fortifications, church buildings or burial sites from the second half of the 5th and 6th centuries in Styria. An archaeological investigation of the Kirchbichl near Rattenberg, located in the upper Mur/Mura valley near Fohnsdorf, could potentially provide information about Late Antique settlement. From this site, possibly a small *vicus* or an alpine country estate in slightly elevated position (mid-1st to at least 4th century), as mentioned above, two Germanic fibulae from around 500 are recorded.[267]

It should also be pointed out that, despite its location not far from the Amber Road,[268] Styria is apparently outside the distribution of African and Eastern Mediterranean Late Antique types of amphorae.[269] In addition, no Late Antique tableware dating to the period after 450 is known from Styria.[270] This seems important in view of the fact that North African and Eastern Mediterranean imported goods are crucial for the dating respectively for the setting of the chronological framework of the (south) east Alpine hilltop settlements. In Styria, however, there is not only a lack of datable imports,[271] but a general lack of pottery, including coarse ceramics, that could be dated reliably later than the middle of the 5th century. [272]

The few pieces of Late Antique or Migration period attire and jewellery are, given their character as stray-finds, entirely separated from their original context, and can hardly be associated with hilltop settlements of the 5th/6th centuries. More probably, these finds provide information about supra-regional trade (or just travelling) routes that were still in use (*Fig. 17*).

If we put the finds from the period from AD 450 to 650 in relation to more than 160 years of archaeological research in Styria,[273] considering the long research traditions in the late Roman/Late Antique core regions such as Kugelstein near Frohnleiten or Frauenberg near Leibnitz, it can be concluded that their small number cannot be explained by the state of research. More likely, a considerable surviving Roman or romanised population has to be ruled out.[274] This does not mean that a continuation of Roman settlement in Styria beyond the middle of the 5th century is to be completely denied, but it probably existed to a very modest extent and was restricted in the expression of its material culture. Historical linguistics also assume a sparsely populated area into which the Slavs immigrated.[275] The "settlement vacuum" after 450 is not a consequence of an insufficient state of research, but largely depicts historical reality. Almost twenty years ago, U. Steinklauber titled a paper on Late Antiquity in Styria with "Die Römer gehen".[276]

[264] Recently: Gutjahr 2020, 62 note 39.

[265] Steinklauber 2018, 758–759. So far, there is no conclusive evidence of a Christian population living there deep into the 5th century, as recently mentioned by Ciglenečki 2023, 29. The preserved architectural fragments of the early Christian church and the finds from the late antique cemetery do not support this assumption. The Frauenberg would then also represent a kind of "settlement island" at the fringes of the Pannonian Plain, at a time (around 450 at the latest) when people had otherwise long since retreated from exposed landscapes.

[266] The Ennstal hilltop sites have been associated with a line of fortification or boundary between *Noricum ripense* and *Noricum mediterraneum*, and questions about their affiliation to a province or city were raised (Steinklauber 2005, 135–198, esp. 164; 2018, 764–765). In order to explain their early abandonment, Gleirscher (2019, 78) recently considered that the Enns valley might have belonged to *Noricum ripense*, which was given up by Odoaker in 488.

[267] Ehrenreich et al. 1997, 193–252, esp. 193–195; Steigberger, Vrabec 2016, 187–190, 193; Steigberger, Steinegger 2016, 264–267. – In our opinion, the current evidence is not sufficient to identify a hilltop settlement that was still in use in the 6th century (Gleirscher 2019, 78–79).

[268] Ladstätter 2003, 836.

[269] Ladstätter 2003, 837–848; Modrijan 2015, 28, Fig. 8; 29, Fig. 9.

[270] See, for example, Ladstätter 2003, 834–837.

[271] Milavec 2002, 160.

[272] See, for example, the shapes in: Modrijan 2020, 579, Fig 3.

[273] See Karl, Modl 2018, 67–75 (contribution of D. Modl).

[274] Gutjahr 2020, 77–78. – Only the Eppenstein animal fibulae, the above-mentioned Late Antique pieces from early medieval graves and the fibulae from Mantscha and Kugelstein might be associated with a Roman population (see note 235 and 340). Especially in the case of the latter two finds, nothing can be said about the actual ethnic identity of the wearer.

[275] Lochner von Hüttenbach 2008, 30.

[276] Steinklauber 2006b, 173–179; see also Steinklauber

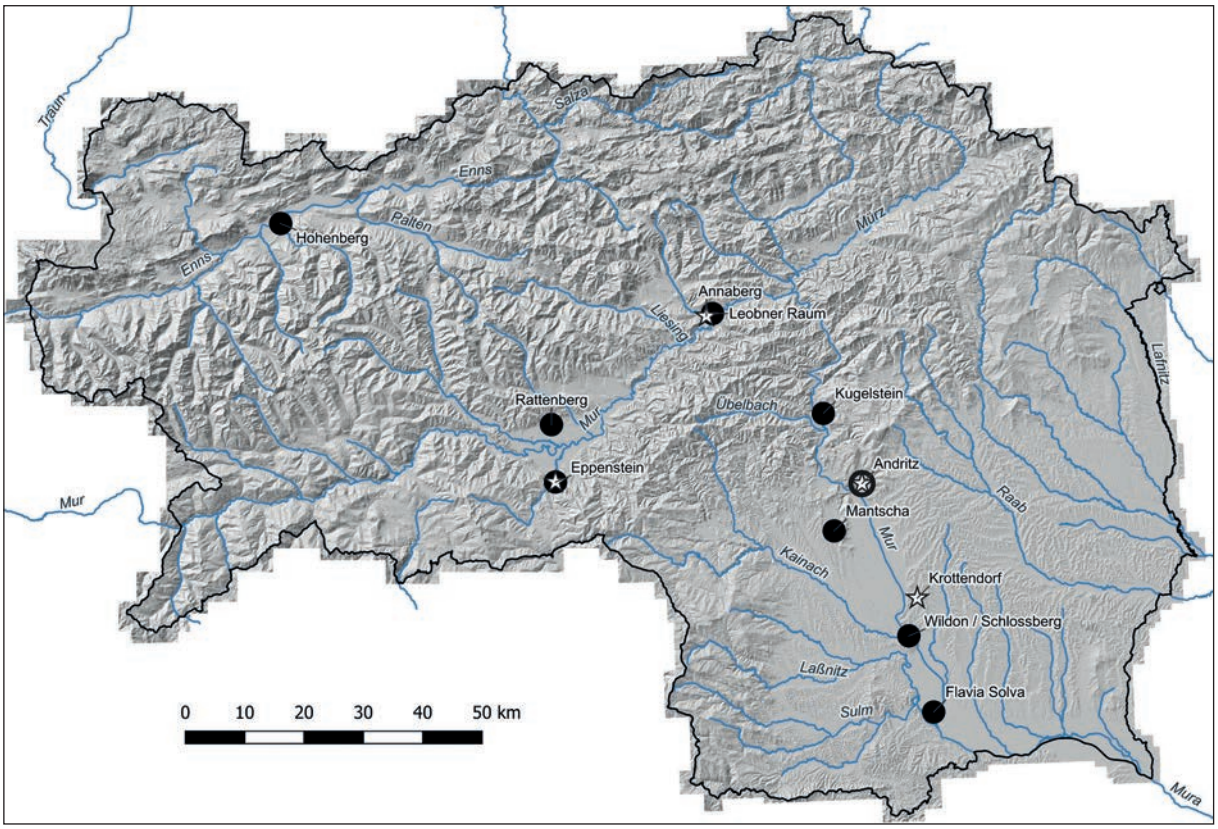

Fig. 17: Distribution of sites in the area of today's Styria with find material from the second half of the 5th century till the first half of the 7th century. Circle: small finds (origin is certain or at least probable). Ring: small find (uncertain; currently not available); star: coin (assured origin).

Based on the above data, this pointedly formulated statement can be agreed with.

It can be stated that, according to archaeological evidence and material culture, Styria remained firmly rooted in the Roman Empire until about the middle of the 5th century.[277] However, in our opinion, large parts of Styria were separated from the persisting Roman world and the developing (Germanic) successor states and spheres of control from the second half of the 5th century onwards. The negative result regarding settlement is not limited to Styria[278] but also includes neighbouring areas in the east[279] as well as in the south.[280] For parts of this large area a quite numerous remaining Roman population has been considered, which would have seriously opposed the Lombard efforts of expansion.[281] Recently, however, the thesis of an earlier Slavic occupation was articulated, contradicting the assumption of Roman residual settlement.[282] However, neither of the two cultural phenomena is visible for the 6th century in the archaeological finds from Styria. Under the premise of military events in the first half of the 5th century, which exerted pressure on the remaining people, resulting in emigration, the question arises as to the size of the remaining population in the area around the middle of the 5th century. Around 400, only a few hundred people are likely to have lived in *Solva*, and only a few hundred inhabitants are assumed for the settlement on Frauenberg,[283] which persisted longer. The Hunnic campaign of 452 presumably led to further waves of emigration. Hunnic attacks

2008, 423, note 52. – In a way, the image of Styria around 450 is reminiscent of the one that Milavec (2020, 162) draws of Slovenia regarding the abandonment of the hilltop sites at the end of the 6th and in the 7th century ("shutdown of the region", "minimal contact ... with the outside world"). However, in Styria even local pottery production seems to be lacking after 450.

277 Best visible using the example of the Late Antique settlement on Frauenberg with the associated cemetery on Perl-Stadläcker (Steinklauber 2002; 2012, 127–132; 2013; 2018, 758–763).

278 Gutjahr 2020, 74 (esp. note 109).

279 West Pannonia (the areas west of the Lombard settlement along the line Savaria – Keszthely – Sopianae) and the south of today Austrian province of Burgenland.

280 Flat areas of the Drau/Drava valley in the vicinity of *Celeia* and *Poetovio* as well as the Prekmurje (Ciglenečki 2008, 485, Fig. 2).

281 Vida 2008b, 76.

282 Pavlovič 2017, 383–385, 364, Fig. 9.

283 Steinklauber 2002, 45–46, note 107 (200 to 350 people).

on today's Styrian territory may also have taken place earlier (from around the 430–440s). The Raab valley is the ideal route for Hunnic raids into eastern Styria.

In conclusion, much speaks in favour of Styria being largely void of settlement for more than 200 years. In this context it should be remembered that the hilltop settlements with regular Roman troops in the area of south-east Noricum along the Amber Road (e.g. Ančnikovo gradišče near Jurišna vas) were abandoned after the middle of the 5th century. After 450, they apparently no longer could be held in this relatively open terrain, and their repopulation began only in the Early Middle Ages. In addition, the situation in neighbouring Pannonia after the Battle of Nedao (454–455) was characterized by continuous armed conflicts. Under these circumstances, the further colonisation of open terrain could not appear desirable – like everywhere else, people withdrew to better protected, elevated sites. It is possible that the remaining Roman parts of the population, as F. Ruchesi recently suggested for the Romans in Pannonia of the second half of the 5th century, also joined the military contingents of Germanic peoples.[284]

The question arises whether Styria,[285] then sparsely populated and economically irrelevant, was of direct military or strategic importance for the dominating powers in the later 5th and 6th centuries. It was probably of little importance for the Ostrogoths, who dominated the region at the end of the 5th and during the first decades of the 6th century. With the affiliation of the regions of Slovenia and Carinthia to the Ostrogothic kingdom (beforehand belonging to Italia and *Noricum mediterraneum*), there was protection against the east and northeast – Noricum had to protect both Italy and the flank of Gothic Dalmatia and Pannonia.[286]

Also on the part of the Lombards, who became a powerful factor in Pannonia in the 6th century, there is no evidence of any interest in colonising the area of Styria. The occupation of the fertile Pannonia at the beginning of the 6th century took place well-regulated by the military along the central Danube Limes and was based on important places of Roman settlement, which were still of strategic importance despite their ruinous state.[287] The settlement activities of the Pannonian Lombards did not extend beyond the western end of Lake Balaton. It is possible that the Lombards did not envisage any further settlement – probably due to their limited number; the failure to reach out to the west would therefore have demographic causes and nothing to do with Roman or early Slavic groups being an obstacle. For the Lombards – with clever military tactics and supported by well-chosen marriage alliances – it was in any case much more tempting to venture south into economically potent areas along the former central Danube Limes (Pannonia prima and Valeria). The opportunities resulting from the support of the Byzantines were cleverly used; in 547–548 the south-east area of Noricum (Pólis Norikón) and the south Pannonian Savia were taken over. It is well known that this policy ended (and succeeded) in 568 with the entering and takeover of Northern Italy.

Apparently, only the early Slavs, who, in the historical evidence, appear in the south-eastern Alps in the course of the Avar expansion to the west around 600, had an interest in the occupation and ettlement of Styria. However, evidence of Slavic settlement activity in Styria does not exist before the middle or the last third of the 7th century (see below).

In conclusion, it should be noted that Styria was only reintegrated into a larger political entity in the second half of the 8th century in the course of the Frankish-Carolingian expansion towards the east, when a new political order was established.[288] For Styria (including Slovenian Lower Styria) it should also be noted that from Late Antiquity to the High Middle Ages it was always located on the periphery of larger spheres of power or in overlapping zones of influence.[289]

4. THE EARLY SLAVIC SETTLEMENT (AROUND 650–750 AD) – THE MOST IMPORTANT SITES

Christoph Gutjahr

The Slavic settlement of what was to become Styria during the Early Middle Ages presumably started before 600, after the Lombards had left the southeastern Alpine region for Italy in 568. This dating seems plausible if one assumes, like the majority of researchers does, that the Bavarian-Slavic conflicts mentioned by Paulus Diaconus[290] for 592 and 595 took place in the upper Drau/Drava valley in today´s Carinthia.[291] A Slavic

[284] Ruchesi 2020, 19–25, esp. 20–22.

[285] Nothing is known about mining in Upper Styria.

[286] Wolfram 2001, 320–323, esp. 323.

[287] Vida 2008b, 76.

[288] As possible exceptions to that rule, the upper Enns and Mur/Mura valleys and the Styrian Salzkammergut (with the important burial sites of Krungl near Bad Mitterndorf and Hohenberg near Aigen) can be named, where the furnishing of the elite burials shows a clear connection to the core of Carantania. See e.g. Nowotny 2005, 177–250; Breibert 2011, 441–452; for Carantania, recently: Eichert 2014, 61–78; Eichert 2020, 101–128; Eichert 2020, 101–128.

[289] Spreitzhofer 2000, 628, 636.

[290] Historia Langobardorum IV 10, 39.

[291] Considering recent research on the early Slavs in the southeastern Alpine region, a (temporary?) Slavic settlement in southern central Styria would also be possible from the end of the 5th or the first half of the 6th century onwards (Pavlovič 2015, 59–72; 2017, 349–386; 2020, 175–197). Gleirscher (2019, 138) is sceptical about this, referring to the uncertainty factor in radiocarbon dating of charcoal fragments.

settlement horizon in Styria can be assumed not only because of historical considerations, but also because of the toponyms,[292] in its oldest cultural occurrence in Central Europe ("Prague culture"),[293] this Slavic settlement horizon is currently not archaeologically tangible in Styria, neither by settlement[294] nor by graves. Characteristic early Slavic cremation burials with urns of the so-called Prague type are missing from Styria so far. Only a cremation grave (urn) from Wohlsdorf (Wettmannstätten) in western Styria, which has been recovered several decades ago and thought to be from the Early Middle Ages, could make an exception.[295] On the other hand, several cremation graves of the 7th and 8th century are known from neighbouring Slovenian regions (Drau/Drava valley, Prekmurje).[296] There are no early Slavic cremation graves from Carinthia either, but at least pottery of the Prague type has been found in the settlement material from the Hemmaberg near Globasnitz.[297] Either cremation graves of early Slavic date have not been recognized by archaeological research in Styria so far, or the population of that time practiced a burial rite hardly to be proven archaeologically.[298] Nevertheless, in Styria there is an early Slavic settlement horizon with ceramic finds from the time around 700, which is limited in terms of material and finds and spatially restricted to western and central Styria.[299] This is primarily determined by the pit finds from Komberg, municipality of Hengsberg (Leibnitz district), St. Ruprecht an der Raab (Weiz district) and Enzelsdorf, municipality of Fernitz-Mellach (Graz-Umgebung district), which will be briefly presented in the following; a short description of the find material is included.

4.1. KOMBERG (*Pl. 1:* 1–5)

The sherds from Komberg come from a settlement pit that was excavated during pipeline construction (TAG II) in 1987.[300] It is the oldest quite comprehensive complex of early medieval finds in Styria, located on a northern slope, a little below the hilltop, of a ridge following the valley of the Kainach river (390 m above sea level).

The roughly rectangular pit (2.20 by 1.40 meters) yielded fragments of a few pots with simply-formed rims and a fragment of a disc-shaped spindle whorl. The porous fragments *Pl. 1:* 1–2 are heavily tempered with coarse, possibly carbonate material. The tempering of the fragments *Pl. 1:* 3–4, both belonging to the same pot, consists, aside from a few possibly carbonate elements, of individual and partly larger pebbles. The surfaces of the sherds are dominated, in a strongly nuanced way, by the colors reddish brown (*Pl. 1:* 1, 3–4) and light brown (*Pl. 1:* 2). The fracture of the sherds is gray to dark gray, in some parts with the tendency to almost black.

The ceramic shows an unsteady shaping and surface treatment and appears to have been manufactured merely freehand. Only the clumsy decoration of a band of wavy lines on the larger pot fragment *Pl. 1:* 1 may hint to the yet inexperienced use of a very simple turntable.[301] The pit assumingly yielded a few more ceramic fragments but these are currently missing in the owner's depot.[302]

An older radiocarbon analysis of a charcoal sample dates the Komberg pit to the years 663 to 881 AD (OxCal 4.4, 1260 ± 50, 95,4% probability). The ceramic fragments can be – with a certain amount of caution – dated to the middle of the 7th or possibly to the second quarter of the 7th century – in particular if compared, for instance, to the pottery from Enzelsdorf, which seems typologically more developed and can be dated as far back as the mid-7th century by recent radiocarbon data (see below).

From their appearance, the fragments from Komberg correspond with phase-2 ceramics of the Slovakian chronology according to G. Fusek (first half of the 7th

[292] Lochner von Hüttenbach 2004, 151–158; 2008, 30–43.

[293] Recently summarized in: Pavlovič 2017, 373–374, 379–389.

[294] In contrast to Slovenia. See, among others: Guštin, Tiefengraber 2002, 47–62; Pavlovič 2008, 49–52.

[295] Lehner 2009, 201 (esp. note 1323). – The find, handed over to the Landesmuseum Joanneum by W. Artner about 40 years ago, has been missing ever since. Perhaps a rim piece from the area of the Roman *villa* in Kleinklein is to be assigned to a pot of the Prague type (Großklein, Leibnitz district; Gutjahr, Roscher 2004, Taf. 3: 15; cf: *Pl. 9: 56*). Charred material from another allegedly Early Medieval cremation burial, unearthed 2016 in the vicinity of the Roman *villa* in Grünau (Groß St. Florian, Deutschlandsberg district) was radiocarbon-dated recently, yielding a Late Bronze Age date.

[296] Tomanič Jevremov 2002, 65–66 (7th century); Pleterski 2008, 39; Šavel 2008, 65–70 (2nd half of 7th to first half of 8th century). – A cremation burial dug into a Hallstatt burial mound was found in Novo mesto (Dolenjska, second third of 7th century, see Belak 2014, 397–403); on northwestern Slovenia, for example: Mlinar 2002, 111–112 (Most na Soči, 7th/8th century).

[297] Ladstätter 2000, 159–164. – A decorated rim sherd from the second half of the 7th century comes from the HA building complex at *Teurnia* (Bekić 2016, 44, Fig. 19; Pl. 72: 11).

[298] For example, Gutjahr 2020, 64, note 48.

[299] Partly persisting into the 8th century. The attribution to the Slavs is made exclusively based on the archaeological material in Central European comparison, their actual identity and/or ethnicity as well as the language these people spoke are not known.

[300] Hebert 1996, 67–70; Gutjahr 2018, 44; Gutjahr 2020, 64–65.

[301] For illustrations of the ceramics see: Hebert 1996, 67, Fig. 1; 69, Fig. 4a–c, e.

[302] We thank the Burgmuseum Archeo Norico, Deutschlandsberg for permission to publish the Komberg sherds.

century/turn from 6th to the 7th centuries up to the second third of the 7th century)[303] and with horizon I of the Moravian chronology according to J. Macháček (second half of the 6th century to first half of the 7th century)[304] – so there are consistencies as far as chronology is concerned.

The discrepancy between the archaeological dating and the dating by means of natural sciences can be explained by the largely unknown stratigraphy of the Komberg pit assemblage. It is possible that the ceramic sherds originated from a layer at the bottom of the pit, while the charcoal sample was taken from a layer connected with the subsequent filling of the pit at a later time.[305]

Fig. 18: St. Ruprecht an der Raab. pit SR 5.

4.2. ST. RUPRECHT AN DER RAAB (*Pl. 1:* 6; *3:* 13)

In 1989, during the construction of a gas pipeline, two features – later named SR 5 and SR 12 – were discovered near St. Ruprecht an der Raab (Weiz district). The site is located on a flood-protected terrace approximately 650 m southeast of the confluence of the Weizbach and Raab rivers, some 1200 meters from today's village center.

SR 5 was an oblong pit, 4.00 by 1.50 meters, 0.20 meters deep, with rounded edges, and east-northeast/west-southwest oriented. A charcoal analysis from 1990 dates the filling 640 to 779 AD (OxCal 4.4, 84.2%, 610–618 AD, 0.7%, 786–832 AD, 8.2%, 852–875 AD, 2.4% probability, 1315 ± 55; *Fig. 18*).

SR 12 was a roughly oval-shaped pit (4.00 by 1.70 meters), a little deeper than SR 5 (0.40 meters maximum) and almost exactly west/east oriented. A charcoal analysis from 1990 dates the pit 772 to 1024 AD (OxCal 4.4, 95.4% probability, 1125 ± 60; *Fig. 19*).

Fig. 19: St. Ruprecht an der Raab. pit SR 12.

The purpose of these pits is unknown. They may have been pit houses,[306] judging from the layout, but no hearths or furnaces were found. There is also no evidence for craft activities (with the exception of some spindle whorls). So, in a neutral way, they may be just called settlement pits.

Among the finds are a few spindle whorls, a grinding stone (currently missing, material unknown), and possibly, a fragment of a rubbing stone (currently missing, material unknown), five glass beads, a few animal remains from cattle and sheep or goat, as well as fragments of approximately 30 ceramic pots, differing in wall thickness and treatment, but similar to each other in terms of fabric (temper, surface, fracture) and burning.

The fragments are tempered – very rare in Styria, at least in the early medieval context – with grog (mostly evenly sorted) and possess carefully smoothed surfaces with a few holes. They show signs of very low temperature and poorly controlled firing environments.[307]

Technologically, two kinds of ceramics can be distinguished. The minority was simply handmade without any mechanical aid, while the majority was formed with a pivoted turntable (possibly an early version of a hand-operated potter's wheel). On a base fragment in SR 5, the imprint of a pivot can still be seen, suggesting the use of some mechanical device.

The ceramic finds of St. Ruprecht consist entirely of pots. Most of them are not decorated, but there are – on the shoulders and, possibly, the bellies of some vessels – a few uneven horizontal and vertical grooves as well as a band of flat and steep wavy lines. Parallels can be found in Slavic pottery primarily east and northeast of Styria. Judging from analogies with Slovakian, Moravian, Lower Austrian and Western Hungarian finds, the St. Ruprecht sherds can be dated to the second half or the last third of the 7th century. The fragments correspond with phase-3 ceramics of the Slovakian chronology ac-

[303] Fusek 1994, Fig. 71–72; Pl. 2.
[304] Macháček 2000, 37, 39–41.
[305] Gutjahr 2020, 65, note 55.
[306] Bekić 2016, 34, 73; 2018.
[307] Based on recent ceramic analyses by Patrick Fazioli, Mercy University, New York City (USA, 2023).

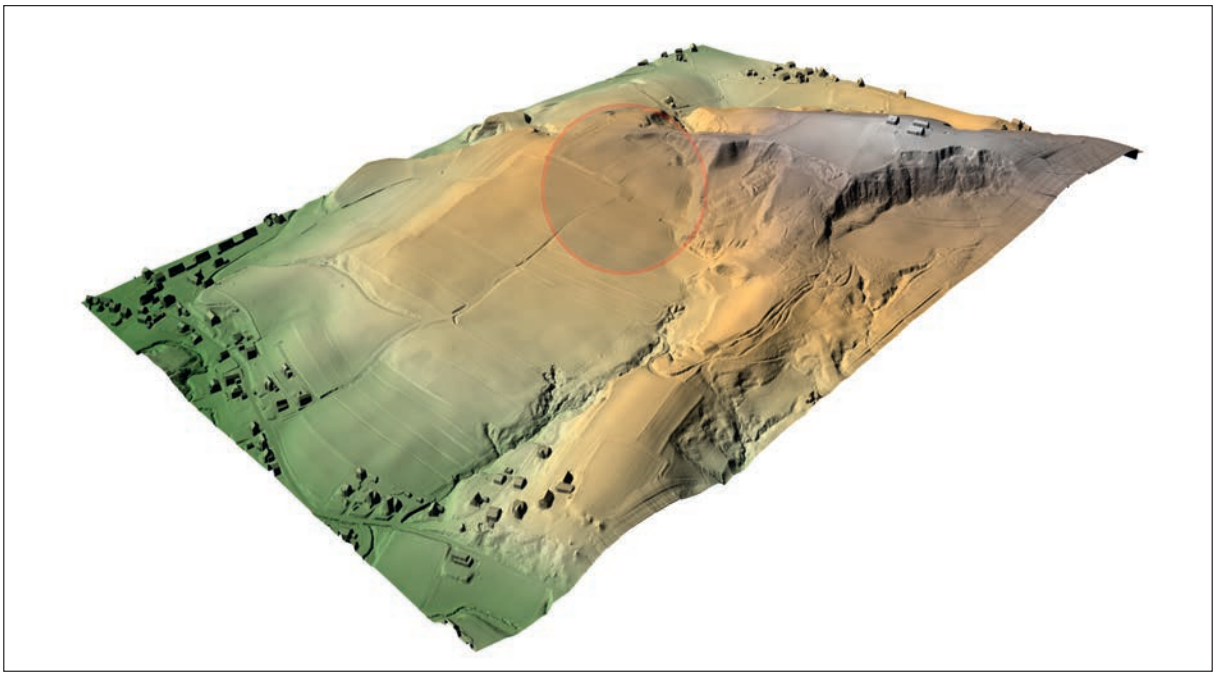

Fig. 20: 3D model of the Enzelsdorf plateau. The circular area refers to the excavation area.

cording to G. Fusek[308] and horizon II (interpolated) of the Moravian chronology according to J. Macháček,[309] which in absolute chronology means approximately the second half of the 7th century. The mixed inventory (ornamented and plain), the appearance of archaic ornaments (the vertical grooves, see *Pl. 1:* 6; *2:* 7) and the presence of only very few entirely handmade vessels also support this theory. Furthermore, the two pots *Pl. 1:* 6 and *Pl. 2:* 7 reveal in their body shape similarities with the oldest Slavic ceramics of the Prague type, so the last third of late 7th century (at the latest the turn of the 8th century) is a fairly safe bet.

The five glass beads from pit SR 12 – four millet seed beads ("Hirsekornperlen") made of opaque black glass and half a twin-eye bead made of grey-greenish brown, spotted glass, applied with three yellow dots – fit quite well in this time frame. According to A. Pasztor,[310] the twin-eye beads were fashionable from the second half of the 6th to the first third of the 8th century, with their heyday between 570 and 680 AD. Some lead residue in the pit suggests that there may have also been one or more small lead beads.[311]

[308] Fusek 1994, Fig. 73–74; Pl. 2.

[309] Macháček 2000, 37, 39–41.

[310] Pasztor 1995, Pl. 1: 18; 87, Tab. 1; 88, diagram 1; 89, diagram 2 (duration: about 2nd half of 6th century to 1st third of 8th century).

[311] We thank the Universalmuseum Joanneum, Graz, for permission to publish the St. Ruprecht findings; for more detail about St. Ruprecht an der Raab see the preliminary reports by: Schipper 1996, 71–76; Gutjahr 2018, 44–45; 2020, 65–67.

4.3. ENZELSDORF (*Pl. 3:* 14; *7:* 47)

Enzelsdorf, part of the municipality of Fernitz-Mellach (Graz-Umgebung district), is located on the left bank of the Mur/Mura river, some 20 kilometers south of Graz.

The archaeological site (390 m above sea level) is situated on a spacious terrace of 500 by 400 meters, with a panoramic view to the southwest and west, 80 meters above the Mur/Mura river and 70 meters above the village of Enzelsdorf (*Fig. 20*).[312]

In 1998, a waste pit on the terrace was thoroughly examined, revealing ceramics of the 10th century and a lot of archaeobotanical samples like beans, rye seeds, peach stones etc.[313]

In spring and late summer 2014, three early medieval objects were excavated by the association Kulturpark Hengist (*Fig. 21*). Object/pit 1 was rectangular with rounded edges, 3.65 by 2.05 meters, with a maximum depth of 0.33 meters, west/east oriented.[314] Object/pit 2, to the south of object 1, was also rectangular with rounded edges, but significantly smaller (2.00 by 0.45 to 0.70 meters) with a maximum depth of 0.36 meters, northwest/southeast oriented (*Fig. 22*). A few months after the discovery of these pits, a third early medieval assemblage was found on a lot west of the original excavation site (excavation Kulturpark Hengist, *Fig. 23*). It

[312] Gutjahr 2018, 45–46; 2020, 68–70.

[313] Gutjahr 2003; Thanheiser, Walter 2004, 183–190.

[314] Bekić (2018, 70) identifies the remains of pit 1 as a former "Grubenhaus".

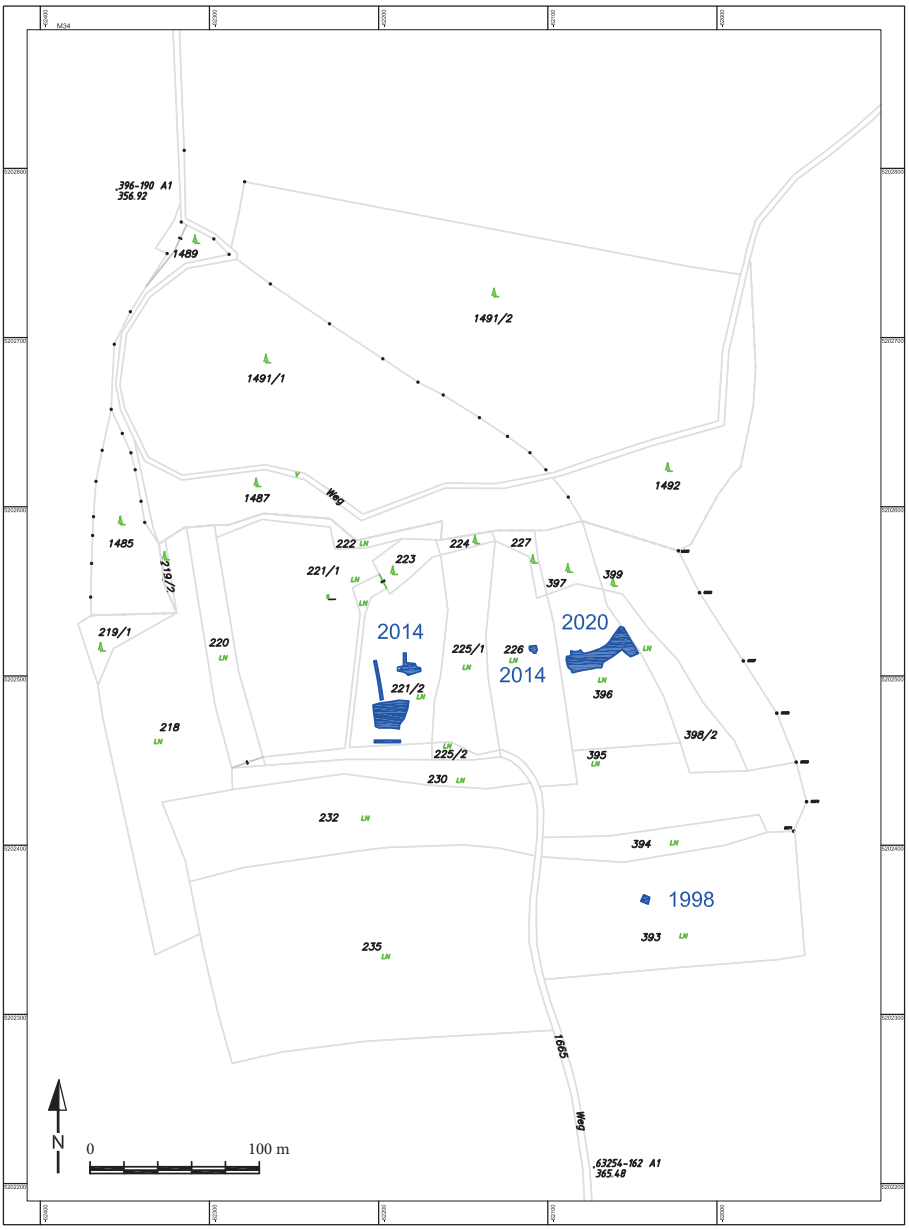

Fig. 21: Overview of the excavation areas 1998–2020.

Fig. 22: Enzelsdorf, pits 1 and 2, DOF 1.

Fig. 23: Enzelsdorf, object 3, DOF 2.

was a natural pan, filled with erosion layers (7.50 by 6.00 meters, maximum depth 0.47 meters). The uncovered layers SE 35, SE 20 and SE 11 were subsumed under the name object 3. It can be assumed that these layers are washed-away sediment from higher terrain, which successively filled a formerly existing trough-shaped depression.

In pits 1 and 2, fragments of two disc-shaped spindle whorls and more than 200 ceramic fragments were found; 31 of them could be used for reconstruction drawings and were included in the finds catalogue (3 of them from object 2; *Pl. 3:* 14 – *4:* 23). The complex consists entirely of pots, with the exception of a Late Antique lid fragment. The pottery is tempered with coarse and fine gneiss sand, sometimes carbonate was added. It is difficult to determine whether gneiss was added as temper or was an original component of the clay.[315] Technologically, all pots were built up freehand, but with some turntable usage at least concerning the rims. Entirely handmade vessels without any mechanical aid were absent in this small find complex. Decoration consists of bands of wavy lines and horizontal grooves, sometimes combining the two motifs (*Pl. 4:* 21), which is quite common in the Early Middle Ages.

The Enzelsdorf sherds fit well into the range of 7th century Slavic pottery. Their rim profiles correspond with phases 2 and 3 of G. Fusek's Slovakian chronology (approximately 7th century) and with horizon II according to J. Macháček's so-called middle-Danubian ceramic chronology (second half of the 7th century). They can also be connected to the groups S2 and V2 of the Eastern Alpine region according to A. Pleterski[316] – analogies to the Enzelsdorf sherds are also to be found in the geographical vicinity, for instance at Prekmurje and in Štajerska (Slovenian Styria).[317]

The archaeological dating of the Enzelsdorf findings to the second half of the 7th century, based on formal analogies, is confirmed by radiocarbon data from pit 1, which covers the period 637 to 691 AD (OxCal 4.4, 76.2%, 607–623, 3.4%, 697–702, 0.9%, 741–774, 14.9% probability, 1360 ± 30).[318]

In object 3[319] (stratigraphic units 11 and 20 plus scattered finds) early medieval ceramic fragments from more than 20 vessels were found, quite similar to the finds in objects 1 and 2 (compare *Pl. 3:* 14 with *Pl. 4:* 24) in temper, form, style, surface, color and ornament (*Pl. 4:* 24; *5:* 32). They can therefore probably be dated to the second half of the 7th century as well. Additionally, the

Fig. 24: Enzelsdorf, object 10, DOF 8.

stratigraphical units of object 3 yielded archaeobotanical finds (particularly rye seeds, cone wheat grains, spelt grains, emmer grains) and some animal bones (mainly small ruminants). A recent radiocarbon analysis of a charred grain kernel yielded the periods of 674 to 779 AD (61.3 % probability), 785 to 837 AD (26.0 % probability) and 846 to 877 AD (8.1 % probability, 1250 ± 30, OxCal 4.4). The latter periods are clearly irrelevant to the dating of our material. The radiocarbon date supports the above-cited assumption of dating the finds to the decades around 700. However, taking account of a certain consistency in the shapes of vessels, a temporal expansion into the first half of the 8th century seems possible.

In autumn 2020, a fourth excavation campaign took place on the Enzelsdorf field, triggered by the feared destruction of features superficially torn by the plow. Of the total excavation area of 438 m², objects 10 and 11 as well as a post construction to be inferred from eight post pits are of particular interest.

Object 10 was an oval-shaped pit (4.80 x 2.50 m) oriented approximately east-west, which can be divided into two areas (*Fig. 24*). Their transition was defined by a slight constriction in the ground plan. The smaller western section was slightly off-axis to the north. In the west, the bottom was shallow and the pit was about 0.40 m deep, whereas the area in the east had a concave bottom with a depth of 0.60 m. The youngest backfill (SE 54) consisting of a very dark gray-brown sandy silt with some ceramic fragments and broken river gravels was deposited long after the end of the settlement.

The older backfills SE 72, 73 and 104 of dark gray silt contained large quantities of pottery fragments, broken river debris, sandstones, limestones, and some animal bones. Characteristic of these layers were the large quantities of charcoal, with the average size of the charcoal pieces being three centimeters. All the stones showed signs of heat exposure. The three backfills could be distinguished from each other by their different charcoal content. In the southeast, the floor contained

[315] Based on recent ceramic analyses by Patrick Fazioli, Mercy University, New York City (USA, 2023). Temper still assumed differently in Gutjahr 2015, 76.

[316] Pleterski 2010, 158, 238–239, 247–248.

[317] Bekić 2016, 34–142, esp.105–125.

[318] For pits 1 and 2 see: Gutjahr 2015b, 73–91, 80 (radiocarbon date).

[319] Gutjahr 2025, in print; Heiss et al. 2025, in print.

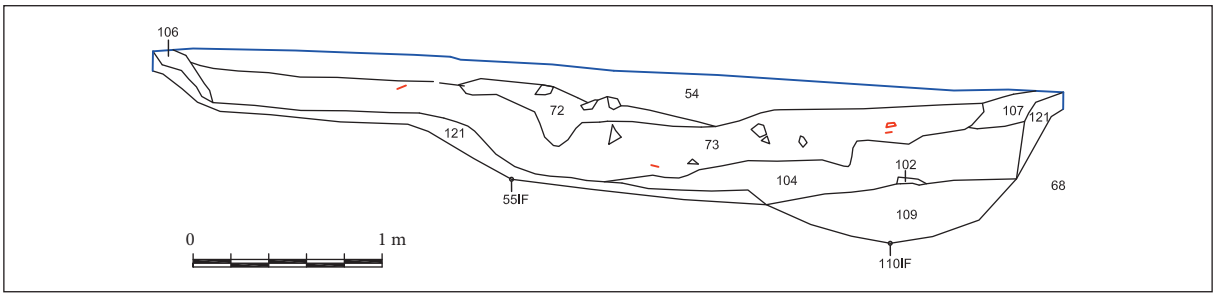

Fig. 25: Enzelsdorf, object 10, west-east profile. View to the north.

a depression (1.50 x 1.00 x 0.25 m) that was oval in plan with a steep sloping wall and concave floor. Its uppermost backfill (SE 102) was composed mainly of densely bedded, broken river gravels and pottery fragments, plus some animal bones and a few sandstones and limestones. On top of and between the stones, which were also exposed to heat, charcoal and ash were found. Under the stone concentration, larger pieces of charcoal (up to 10 cm; wood species identification revealed oak) and some pottery fragments were found in a dark brown silty matrix (SE 109).

The original function of the pit is not clear. A pit house in the sense of a dwelling can be excluded due to the lack of a furnace.[320] Neither an occupation layer nor any building structures inside and outside the pit could be found. One posthole on each of the narrow sides could at best be associated with a roof construction. Individual postholes in the north and east of the object were probably not directly related to the pit.

At present, it is most likely that the pit was used as a cellar within an above-ground (block) house, but a sunken workshop area cannot be ruled out. It is certain that after the loss of its original function the pit was filled deliberately and most likely in rapid succession. The ceramic fragments, some of which are quite large, speak for a secondary deposit.[321]

To the west of object 10 was an oval pit oriented fairly exactly north-south (object 11,

SE 75/76 IF) with a length of just under 4 and a maximum width of 1.70 m. Here, too, the pit was divided into two sections and showed a slight constriction in the southern third. While the southern section was only eight centimeters deep, the depth in the north was as much as 0.23 m. Most of the pottery fragments occurred in the northern section, the broken fluvial debris and also the remaining stone material were exposed to heat.

Eight post pits (Obj. 16, 18–19, 21–22, 25–27) in the west of the excavation area resulted in a square ground plan of about 3.70 x 3.70 meters. Originally, the construction consisted of three rows of three post pits each. The three northern pits were located in the area of object 11, with one of the post pits disturbing the interface of the pit. Unlike the other post pits, they exhibited wedge stones of fluvial debris. The backfills contained either no or very few finds. It is possible that this was once a storage hut.

The processing of the find material is not yet completed, but a brief summary can be given here (*Pl. 5:* 33; *7:* 47): Particularly from object 10 there is a large number of larger pottery fragments, which are to be connected predominantly with barrel-shaped to slightly bulbous pots. Occasionally, more bulbous vessel forms also occur. The quality of the fabric (grain, surface, fracture) largely corresponds to the ceramic material from objects 1–3, but the vessels predominantly show a somewhat lighter surface color (nuances from light brown to gray-brown). Based on the scientific analysis, most of the pottery fragments can be assumed to be tempered with possible carbonate inferred from voids.[322] Conformance with the material from objects 1–3 is found in the design of the rim zones as well as the protruding and non-reinforced rims; however, the very lip is often rounded. The ceramic material is characterised by a high degree of decoration, mainly wavy band ornaments and horizontal grooves typical for the Early Middle Ages. Furthermore, a spindle whorl, a bone awl and two small yellow millet grain beads ("Hirsekornperlen"), which came to light by sediment flotation, originate from object 10. With reference to the ceramic finds from the Enzelsdorf objects 1–3 and the early medieval ceramic material otherwise known from Styria, as well as supra-regional comparisons,[323] a dating to the decades around 700 seems plausible for the ceramic material recovered in 2020; given the abundant decoration, the first half of the 8th century is also conceivable. This archaeological dating approach also finds support in several radiocarbon dates. One of them, a sample from object 10 (SE 73, cf. *Fig. 25*) is pre-

[320] According to Bekić, 2018, however, such structures are associated with the remains of small pit houses.

[321] Nowotny 2015, 123–134.

[322] Based on recent ceramic analyses by Patrick Fazioli, Mercy University, New York City (USA, 2023).

[323] See, for example: Wawruschka 1998–1999, 347–411; Wawruschka-Firat 2009 (e.g., Baumgarten an der March); Pleterski 2010, 158–160; Bekić 2016, 95, 94, Fig. 51 (cf. Drava-Mura-Sava 1b and 2a).

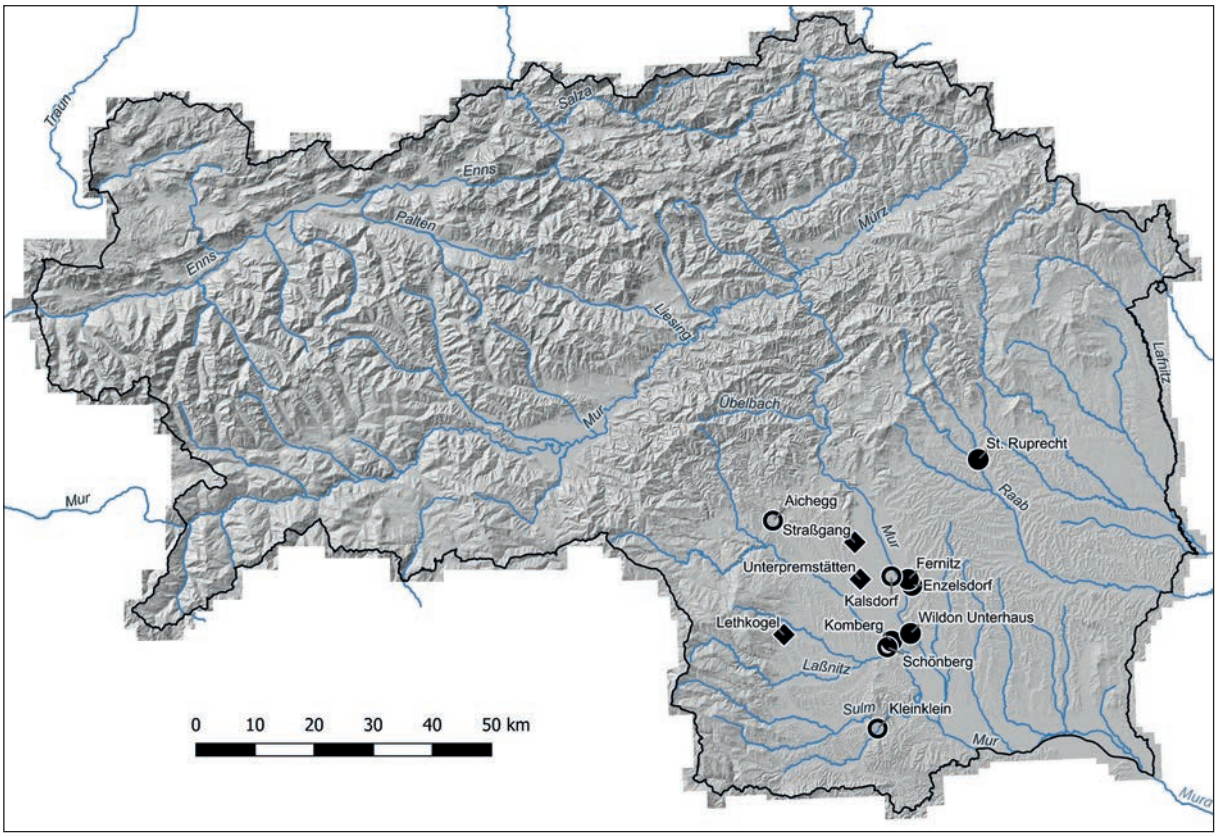

Fig. 26: Distribution of Early Medieval sites with pottery of the second half of the 7th and first half of the 8th century in the area of today's Styria. Circle: Ample proof. Ring: Sufficient proof. Rhombus: Probable, but currently only limited evidence.

sented here: OxCal 4.4, 1270 ± 30, 664 to 778 AD (84.8% probability) and 788 to 827 AD (10.4% probability).[324]

The Enzelsdorf ceramic complexes excavated in 1998, 2014 and 2020 may be small in quantity, but they are significant nonetheless, since pottery from the second half of the 7th century has not been found very often so far in Styria.[325]

It is fair to assume that there was a settlement on the terrace above modern-day Enzelsdorf from the 7th century onwards, possibly continuing until the early 11th century. However, due to the relatively small portion excavated, it is impossible to say anything about the true size, structure and dynamics of the settlement. Modern-day Enzelsdorf evolved, in any case, in the early high-medieval period on the banks of the Jakobbach, a creek a little further downhill.[326]

4.4. INTERPRETATION

As briefly mentioned above, a settlement horizon with ceramic find material from the second half of the 7th and the first half of the 8th century in Styria, which is for the time being small and spatially limited to western and central Styria,[327] is emerging (*Fig.* 26).[328] At the present time the sites Komberg, St. Ruprecht an der Raab, Enzelsdorf and Fernitz represent this horizon.[329] Most probably also a part of the ceramic material from Unterhaus ("Rasental", municipality of Wildon) can be assigned to this settlement horizon (*Pl. 7:* 48 – *8:* 55). Already in 2006, at the beginning of the rescue excavation, the remains of a pit object (Obj. 2, preserved

[324] The sample was taken from charcoal residues on a ceramic fragment.

[325] Gutjahr 2015b, 80–82; 82, note 51.

[326] Purkarthofer [1984], 10–23, 29–30, Fig. on p. 17; Gutjahr 2003, 171–174 (contributions of O. Kustrin, C. Gutjahr).

[327] The fact that Upper Styria and the Mürz valley are not represented here may be due to the state of research.

[328] Recently presented several times, see Gutjahr 2015b, 82–83; 2018, 46; 2020, 70–72. At that time predominantly associated with the 7th century. Recalibrations of older as well as more recent radiocarbon dates suggest an extension of the material into the first half of the 8th century.

[329] Gutjahr 2002, 156, Figs. 16; 18. – The sherds shown in Gutjahr 2002, 156, Figs. 21–23 probably also belong to the 7th century.

length 1.20 m, preserved width 0.82 m, depth 0.44 m) could be documented in an excavation profile. The pit was densely backfilled with large Leithakalk limestone rubble and boulders (to about 0.20 m) and contained some decorated early medieval sherds and a base fragment with the imprint of a pivot. Via incarbonated remains attached to one of the sherds, a radiocarbon date pointing to the second half of the 7th/first half of the 8th century is available for the pit (OxCal 4.4, 1320 ± 30, 652 to 709 AD, 51.9% probability and 723 to 775 AD, 41.6% probability).[330] The remaining ceramic material from the Unterhaus Early Medieval settlement belongs predominantly to the 8th century according to a first review.[331] On the basis of the sparse ceramic find material - to be interpreted with caution as an indication of at least short-term settlement - the affiliation to the settlement horizon characterized by this oldest early medieval pottery from Styria is to be considered at least for some other sites. These include Kleinklein (municipality of Grossklein, *Pl. 9:* 56–57, stray finds)[332], Aichegg near Stallhofen (*Pl. 9:* 58–62)[333] and Graz-Straßgang (*Pl. 9:* 63)[334]. It should be noted that from all these sites no metallica are known so far.[335] It is possible that further sites can be added to this early Styrian settlement horizon, primarily Schönberg,[336] but also Unterpremstätten and Kalsdorf, but the number of sherds currently available, especially from the latter two, is very small and the pottery cannot be precisely categorised without an autopsy. It is remarkable that early medieval pottery is not infrequent known at the sites of Roman *villae* (for example Kleinklein) or *vici* (Haslach,[337] Kalsdorf, Saazkogel[338]). However, it is unclear whether there was a deliberate recourse to Roman-period structures or whether just the same topographical locations were appreciated.[339]

In addition to the sites of Komberg, St. Ruprecht an der Raab and Enzelsdorf, the mentioned, albeit small, settlement traces of the 7th century are to be seen in the context of Slavic immigration. The possible impact of a remnant late Romanic or Romanised population on settlement activity and early medieval pottery production, however, can hardly be evaluated.[340] We could also consider a merging process between Romans and Slavs for Styria, but hardly anything is known about it due to the lack of literary traditions and the meager archaeological sources.

It is unclear from which direction the Slavic settlement of Styria in the early Middle Ages came. L. Bekić assumes, based on the distribution of sites, a Slavic immigration to Croatia at the end of the 6th century through the Moravian Gate via Burgenland, the Hungarian counties of Eisenburg (Vas) and Zala into the Prekmurje region and Međimurje.[341] It seems not too far-fetched that

[330] Beta Analytic, 1320 ± 30.

[331] The Early Medieval findings are currently being processed. However, there are also some younger early medieval sherds in the pottery material from Unterhaus.

[332] Gutjahr 2002, 150–151, 151, Fig. 1 (from the area of a Roman *villa*). – In Kleinklein, Early Medieval features and finds already came to light on the occasion of the excavations at the Hallstatt princely grave Kröllkogel in 1995. In addition, a larger number of surface finds are available from surveys which were carried out by the author as a participant in the excavations at that time. Some of the ceramic finds from the 1995 excavations date back to the 8th century. Further excavation campaigns aiming at Early Medieval settlement took place in 2017 and 2018 (Kiszter et al. 2019, 132–134). The suggested dating (10th century) of the pottery seems rather late, more likely the forms are to be connected with the 8th/9th century. The attribution of the two bowls to the Early Middle Ages is questionable, they are rather Late Roman/Late Antique forms, see: Steinklauber 2013, Fig. 29–30. However, we cannot completely rule out an early medieval attribution without an autopsy.

[333] Bauer et al. 1995, 86, 87, Fig. 18; 124 cat. 343. – It was possible to sort out the sherds shown here from the mainly Roman pottery. In addition to the pieces listed above, several other wall fragments, some of them undecorated, probably belong to the Early Middle Ages. We thank Eva Steigberger, Vienna/BDA, for the possibility to autopsy the Aichegg pottery.

[334] For some sherds from Graz-Straßgang a *terminus ante quem* of 550 to 660 AD is given by stratigraphy and a radiocarbon date (Hinker 2007b, 729, 730, Fig. 67: 1–5; Pleterski 2010, 92, 92, Fig. 4.9., group S1).

[335] Actually, the hollow armlet from the vicinity of Leoben already belongs to the early Middle Ages (see above). Due to the few small finds in Styria between 450 and 650, however, it was included in the distribution map of Late Antiquity/Migration Period (see *Fig. 17*).

[336] Oberhofer 2012, 76, 115, 381, Pl. 50: K1 K2; see Fig. 7).

[337] Gutjahr 1999, 879–880. Contrary to the assumptions of the time, the rim fragment shown in Gutjahr 1999, 880, Fig. 674 can be dated to the 8th century, and for the sherd ib. 880, Fig. 675, a dating to the 7th century does not seem improbable.

[338] Tiefengraber 2005, 197.

[339] Gutjahr 2020, 71, 71 note 93. – It remains open, also on the basis of the Kleinklein findings, whether a (conscious) "early medieval after-use of the villa rustica" took place here or simply a "reuse" or "early medieval use." Basically, the location on a (flood-proof) terrace is not unusual for early Slavic settlements (Kiszter et al. 2019, 132–133).

[340] Regarding the genesis of Slavic pottery, for which a Late Antique/Roman influence is assumed in several respects, this cannot be ruled out. Exemplary: Macháček 1997, 355–358; Ladstätter 2000, 159–164; Eichert 2010, 131–134; on the interaction: Pleterski, Belak 2002, 98–103. – Evidence of a remaining Roman population element is generally extremely rare in Styria (see also note 274). Possibly grave 73 from Krungl with an iron ring fibula can be referred to here. As comparable fibulae from Gusen (grave 162) or Schwanenstadt (grave 73, both Upper Austria), they can be associated with a survival of Roman traditions (Breibert 2022, 118). In both cases, the fibulae were found in a position on the shoulder, which is typical for late Roman costume.

[341] Bekić 2012, 34–35; see also Fusek 2008, 645–646, 646 Fig. 1; Pavlovič 2015, 69. – For the western incursion route

Styrian territory was also touched in this setting. For the settlement of St. Ruprecht an der Raab an immigration from the east (upstream from Pannonia) seems most probable. In the light of very early radiocarbon dates (first half of the 6th century) of early Slavic settlement findings from Prekmurje, however, it cannot be ruled out[342] that individual Slavic migration movements ran upstream from the south and subsequently affected the side valleys.[343] From the second half of the 7th century onwards, an increase in settlement density at the edge of the southeastern Alps is clearly noticeable.[344]

It should be emphasized once again that an early Slavic settlement (6th and first half of the 7th century) in today´s Styria has not yet been proven by archaeological finds.[345] On the one hand, this is surprising in view of the geographical proximity to Carantania, on the other hand, relevant find material in Carinthia and East Tyrol[346] has only become known to a very small extent so far. Up to this day, early medieval valley or lowland settlements have hardly been uncovered in Styria.[347] In the chronological sequence or partial overlapping (with Kleinklein and Wildon-Unterhaus) only the settlement site in Weitendorf from the second half of the 8th and the 9th century, located a few kilometers west of the Wildon Schlossberg, is close to the sites listed above.[348] For all these sites, burials are not yet available. Early medieval burial grounds do not begin in Styria until the middle of the 8th century (Hohenberg, Krungl);[349] after the abandonment of the Late Roman/Late Antique cemetery on the Frauenberg near Leibnitz around 430–450,[350] burial evidence in Styria is missing for striking 300 years. As late as in the Carolingian-Ottonian period – thus outside this overview – there are finds from early medieval settlements at high altitudes, which belong to the context of early medieval fortifications/castles/*curtes* (e.g. Kirchberg near Deutschfeistritz, Graz-Umgebung district,[351] Wildon Schlossberg, Leibnitz district, Ulrichsberg near Deutschlandsberg[352] or Georgiberg near Kindberg, Mürzzuschlag district[353]). For some of them, such as the Schlossberg next to Wildon[354] and the Kirchberg next to Deutschfeistritz, there are indications of use already in the later 8th century; however, further archaeological investigations are necessary for a more precise account.[355]

of the southern Slavs see: Udolph 2016, 105. According to Udolph (2016, 83–107, esp. 93) southern Poland and western Ukraine are assumed to be the home and starting point of the Slavic expansion.

[342] Guštin, Pavlovič 2013, 217–221, esp. 219–220; Pavlovič 2015, 59–72; Pavlovič 2017, 349–386. – Pavlovič (2020, 189) suspects Slavic groups settled as federates of the Byzantine Empire to have left the very early findings in Nova tabla near Murska Sobota and in Cerklje ob Krki. See most recently in detail on Cerklje ob Krki Pavlovič, et al. 2021: They assume that these Slavic groups were used to protect the border of the Eastern Roman Empire or were recruited as mercenaries in the Byzantine army. Cremation burials, some of which were almost contemporaneous with the settlements in Enzelsdorf and St. Ruprecht an der Raab, were found in the Popava II cemetery near Lipovci (Šavel 2008, 70).

[343] Admittedly, it cannot be ruled out that immigration occurred simultaneously or staggered both from the east and from the south.

[344] Guštin, Pavlovič 2013, 218; Pavlovič 2020, 190.

[345] However, its existence could perhaps be hinted at by the two stray finds from Kleinklein, which are visually reminiscent of Prague types (*Pl. 9:* 56–57).

[346] Stadler 2011, 471–472; 470, Fig. 4: 1; 471, Fig. 5 (Slavic cremation burial ground?).

[347] Gutjahr 2015a, 94.

[348] Gutjahr 2011, 137–191. In addition to archaeological analogies in the ceramic material, also well corroborated by radiocarbon dates (Object 128: OxCal 4.4, 1270 ± 40, 661–779 calAD, 74.7%, 786–834 calAD, 15.8%, 849–876 calAD, 4.9% probability; Object 121: OxCal 4.4, 1190 ± 30, 709–722 calAD, 1.6%, 771–897 calAD, 88.0%, 923–952 calAD, 5.8% probability).

[349] Gutjahr 2015a, 87–93. There is only one recently discovered burial from Unzmarkt-Frauenburg (grave 5/SE 72), which could date to the 7th century based on the radiocarbon date. (Steinegger, 2020, 100, Murtal district). At best, the radiocarbon-dated bones of "saint" Beatrix from Mariahof (1st half of the 8th century, Murtal district) could also be cited here (Hebert 2004).

[350] Steinklauber 2002, 187–188; 2018, 789.

[351] Gutjahr 2006.

[352] Lehner 2004.

[353] Artner, Hampel 1999, 62–68.

[354] Tiefengraber 2018, 252–254, Pl. 193–196.

[355] For the site Schwanberg-Tanzplatz, the publication of the find material is in preparation by S. Kiszter as part of her PhD thesis; for the moment, see Kiszter, Schrettle 2020, 31–37.

Illustrations:
Fig. 1–4: University of Graz (S. Karl).
Fig. 5: Naturhistorisches Museum, Prähistorische Abteilung,Wien.
Fig. 6, 10: Federal Monuments Authority Austria (BDA).
Fig. 7: Heymans 1997, 760, Fig. 1000.
Fig. 8–9, 12: Universalmuseum Joanneum, Archäologie & Münzkabinett, Graz (J. Kraschitzer).
Fig. 11: Fuchs, Obereder 1999, Pl. 28: 5.
Fig. 13: Universalmuseum Joanneum, Archäologie & Münzkabinett, Graz (D. Modl).
Fig. 14: source: Terjal 2008, 260, Fig. 6; map: StAF-Kulturpark Hengist, Wildon (supplemented by Ch. Gutjahr).
Fig. 15: Kulturpark Hengist, Wildon (Ch. Gutjahr), after Wührer 2000, 44, 44 note 171, Distelberger 2004, 20 and Müller 2008, 296, Fig. 8: 3–4.
Fig. 16: source: Milavec 2009, 229, Fig. 8; map: Kulturpark Hengist, Wildon (Ch. Gutjahr).
Fig. 17: Map: I. Koch (using QGIS®); data source: Open Data Österreich (www.data.gv.at), hill shading – 5m from ALS.
Fig. 18–19: Universalmuseum Joanneum, Archäologie & Münzkabinett, Graz.
Fig. 20: E. Lozić; data source: GIS-Steiermark (gis.stmk.gv.at), point cloud.
Fig. 21, 25: Kulturpark Hengist, Wildon (M. Arneitz-Gutjahr).
Fig. 22: Kulturpark Hengist, Wildon (Ch. Gutjahr).
Fig. 23: Kulturpark Hengist, Wildon (M. Trausner).
Fig. 24: Kulturpark Hengist, Wildon (M. Mandl).
Fig. 26: Map: I. Koch (using QGIS®); data source: Open Data Österreich (www.data.gv.at), hill shading – 5m from ALS.
Pl. 1: 1–5: Burgmuseum Archeo Norico, Deutschlandsberg (J. Kraschitzer, Graz).
Pl. 1: 6; 3: 13: Universalmuseum Joanneum, Archäologie & Münzkabinett, Graz (J. Kraschitzer).
Pl. 3: 14; 9: 57: Kulturpark Hengist, Wildon (J. Kraschitzer).
Pl. 9: 58–62: Federal Monuments Authority Austria (J. Kraschitzer).
Pl. 9: 63: Federal Monuments Authority Austria (Hinker 2007, 730, Fig. 67:1).

Databases
Thanados = The Anthropological and Archaeological Database of Sepultures; https://thanados.net/entity/175496 (21 March 2024)
ZBIVA = Zbiva 3 database: https://as.parsis.si/zbiva/ (2019–2022), upgraded to Zbiva 4: https://zbiva4.zrc-sazu.si/ (2023→) (21 March 2024)

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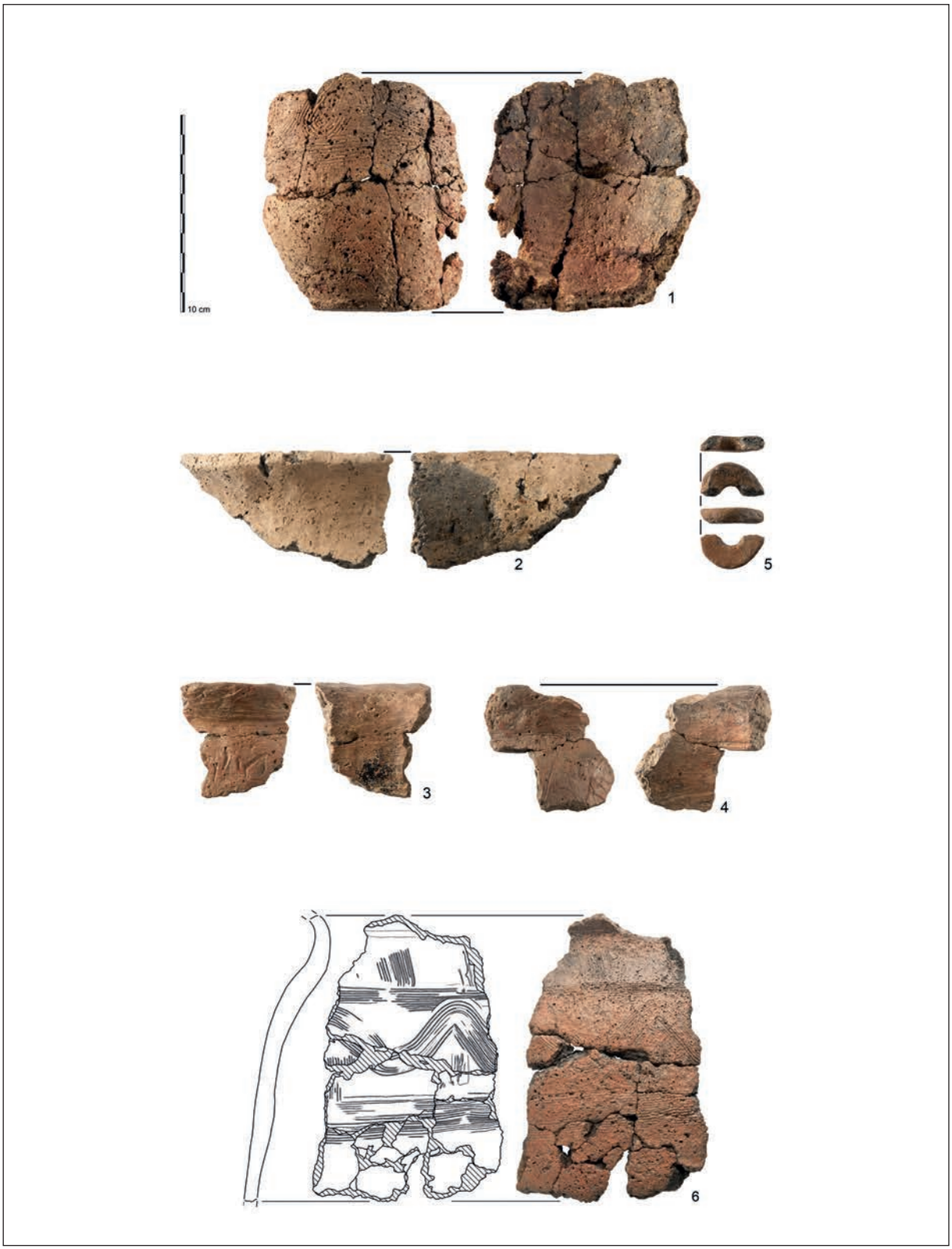
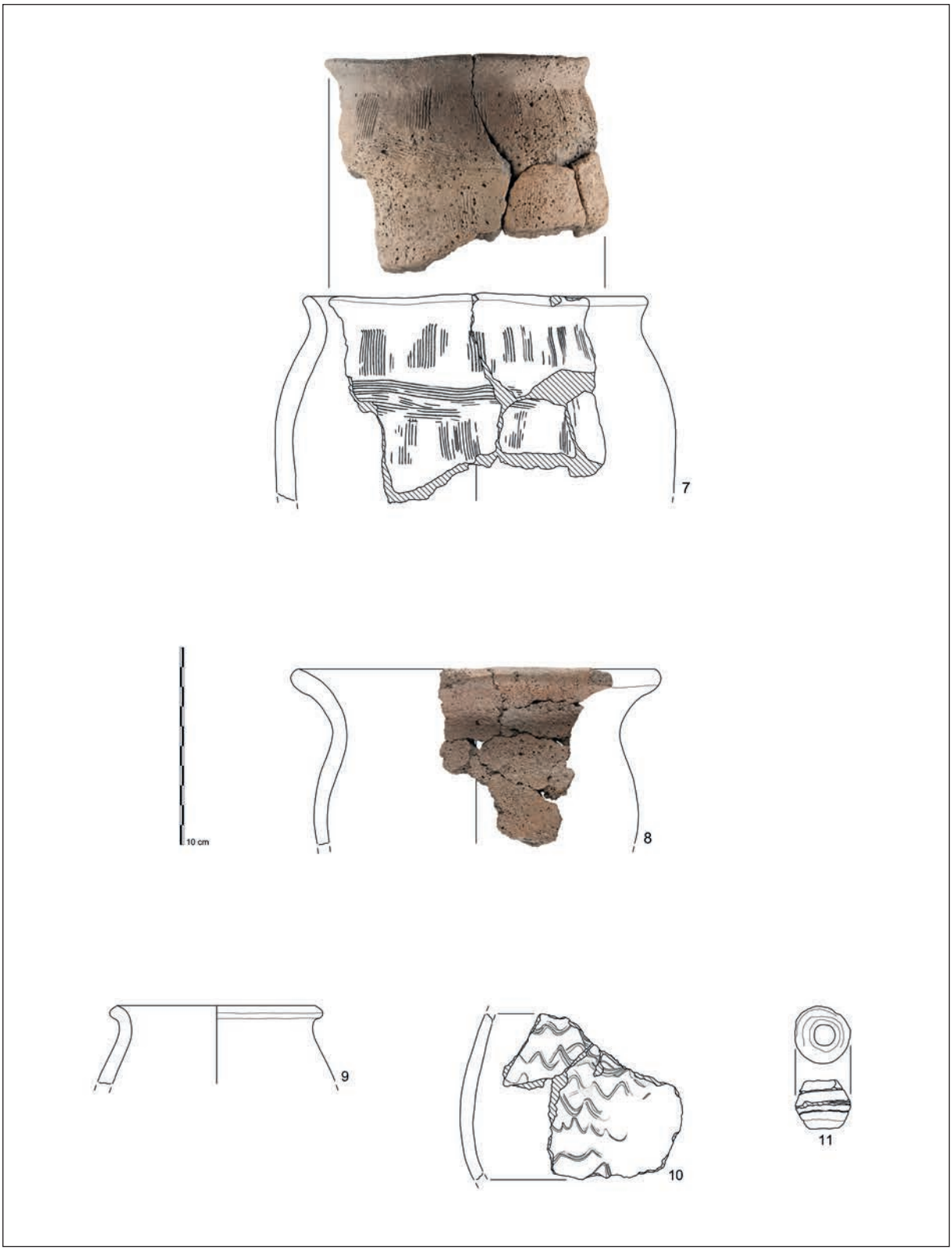
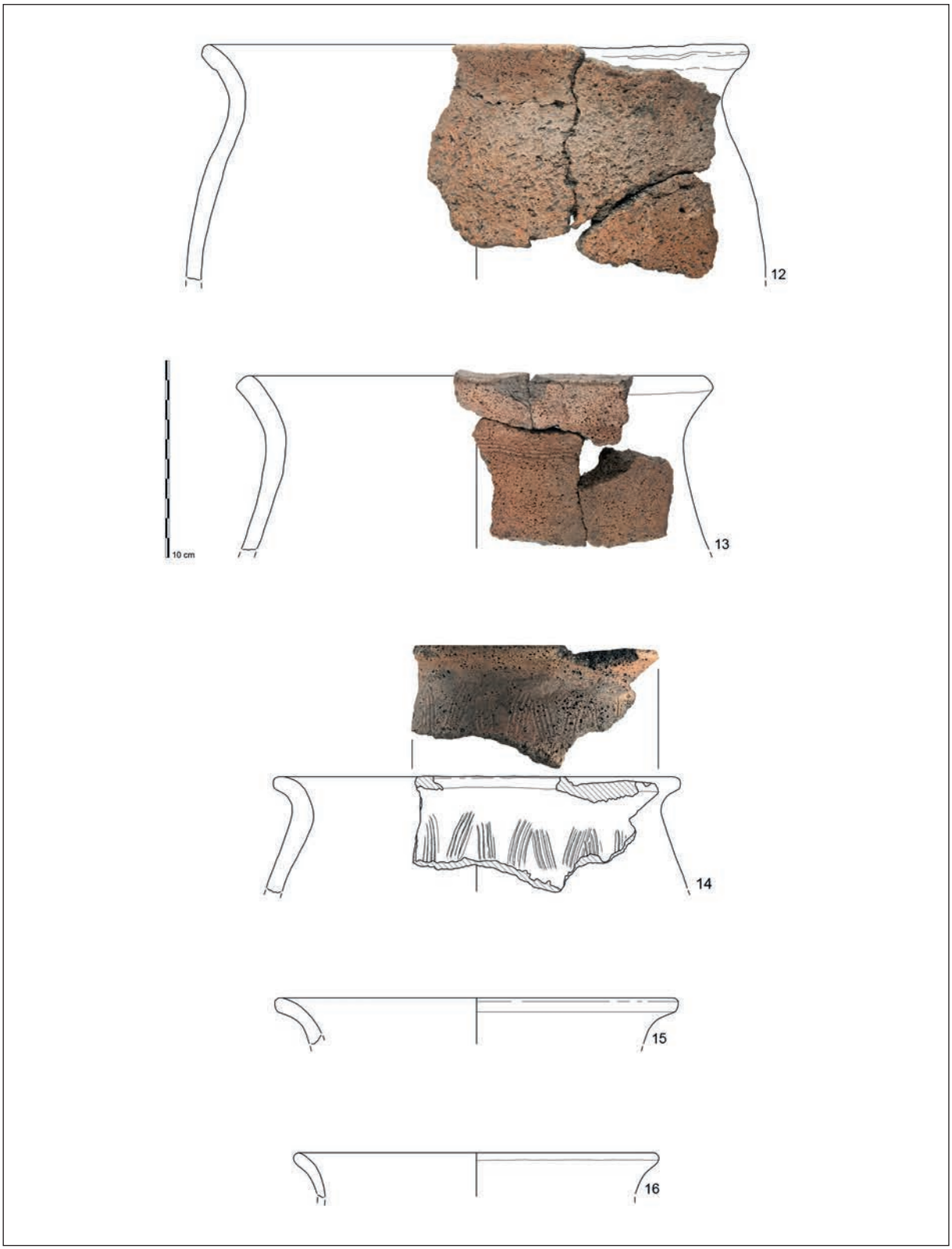


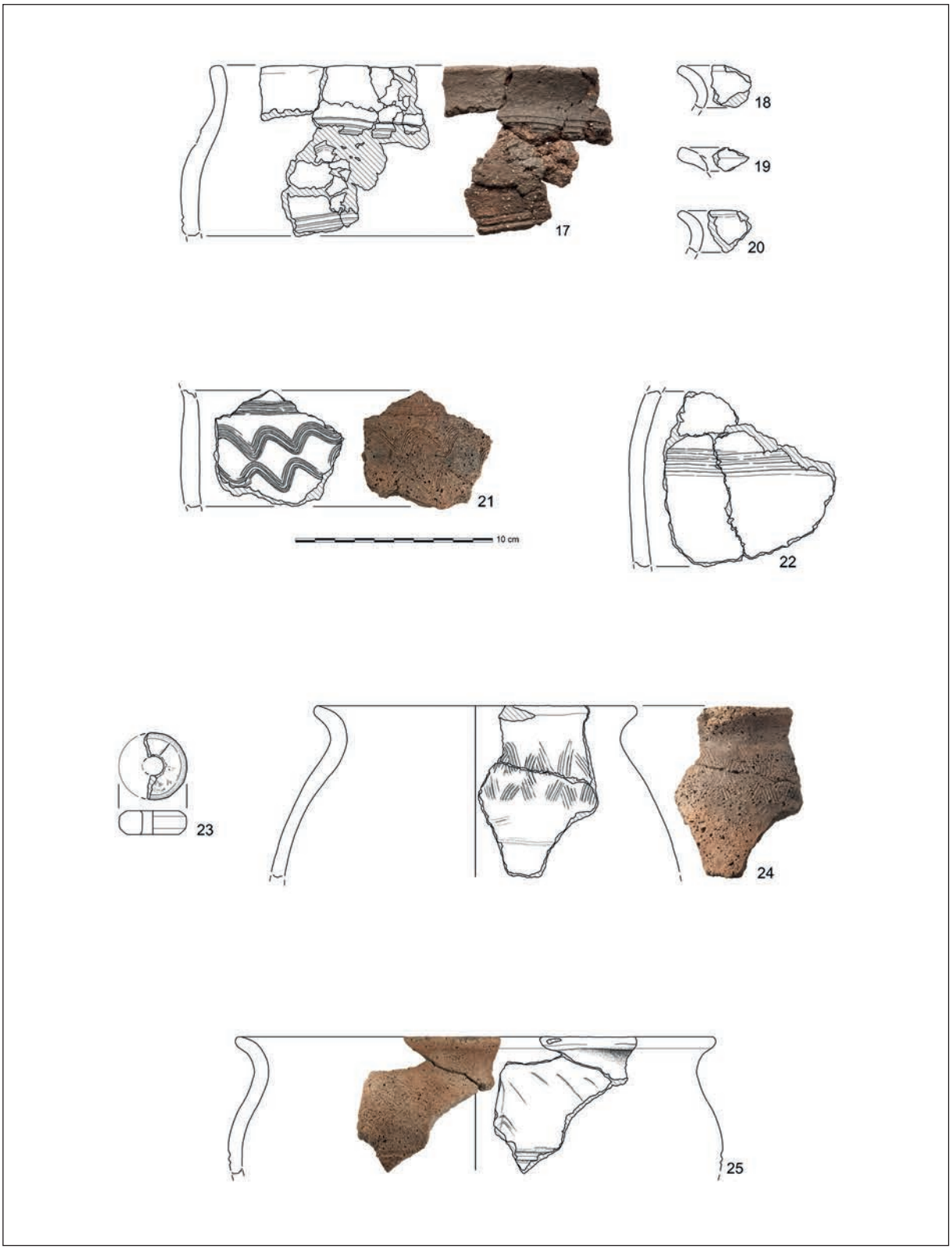
Pl. 1: Komberg, 1–5. St. Ruprecht an der Raab, pit SR 5, 6. Pottery. Scale 1:3.



Pl. 2: St. Ruprecht an der Raab, pit SR 5, 7–8, pit SR 12, 9–11. Pottery. Scale 1:3.



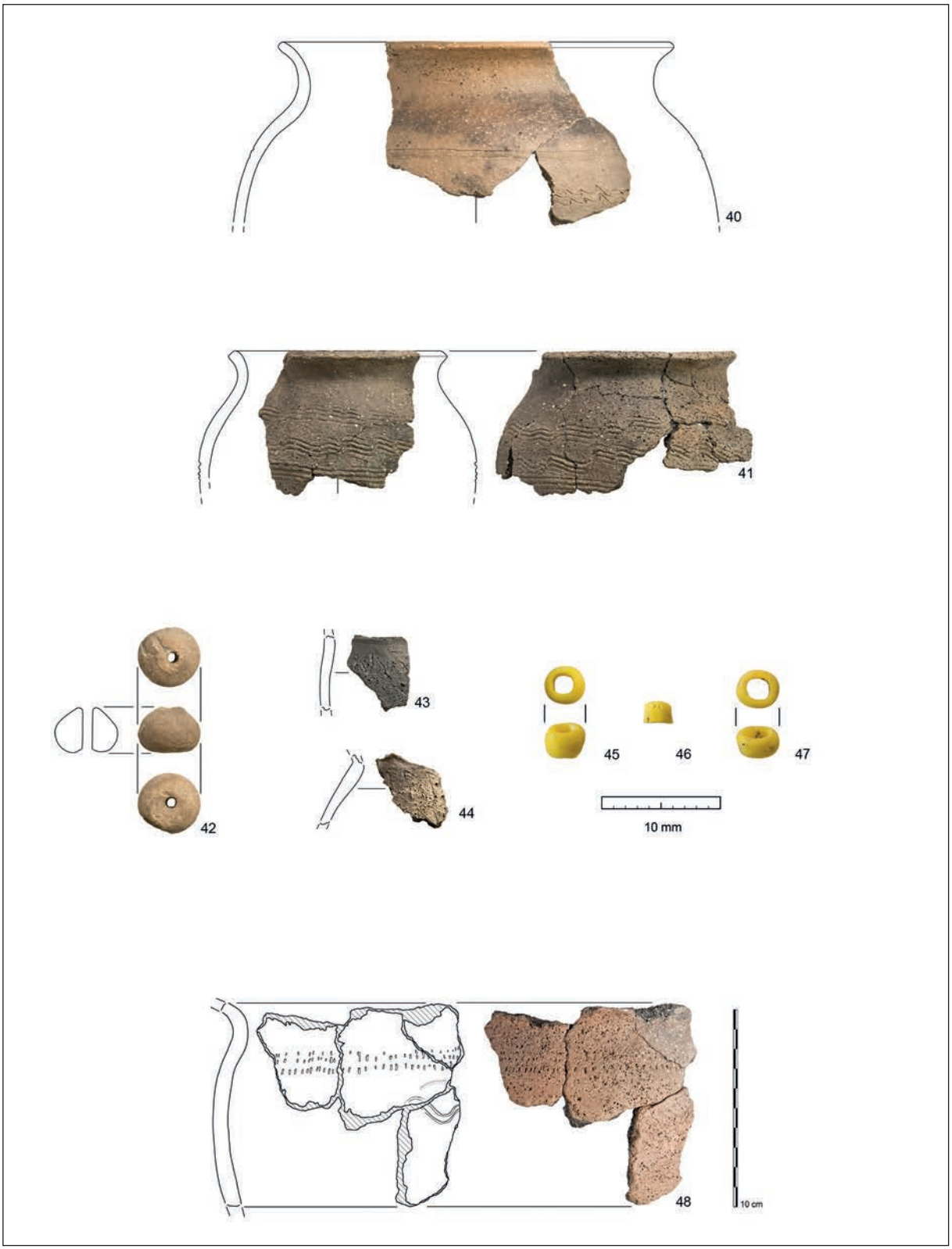
Pl. 3: St. Ruprecht an der Raab, pit SR 12, 12–13. Enzelsdorf, pit 1, 15–16, pit 2, 14. Pottery. Scale 1:3.



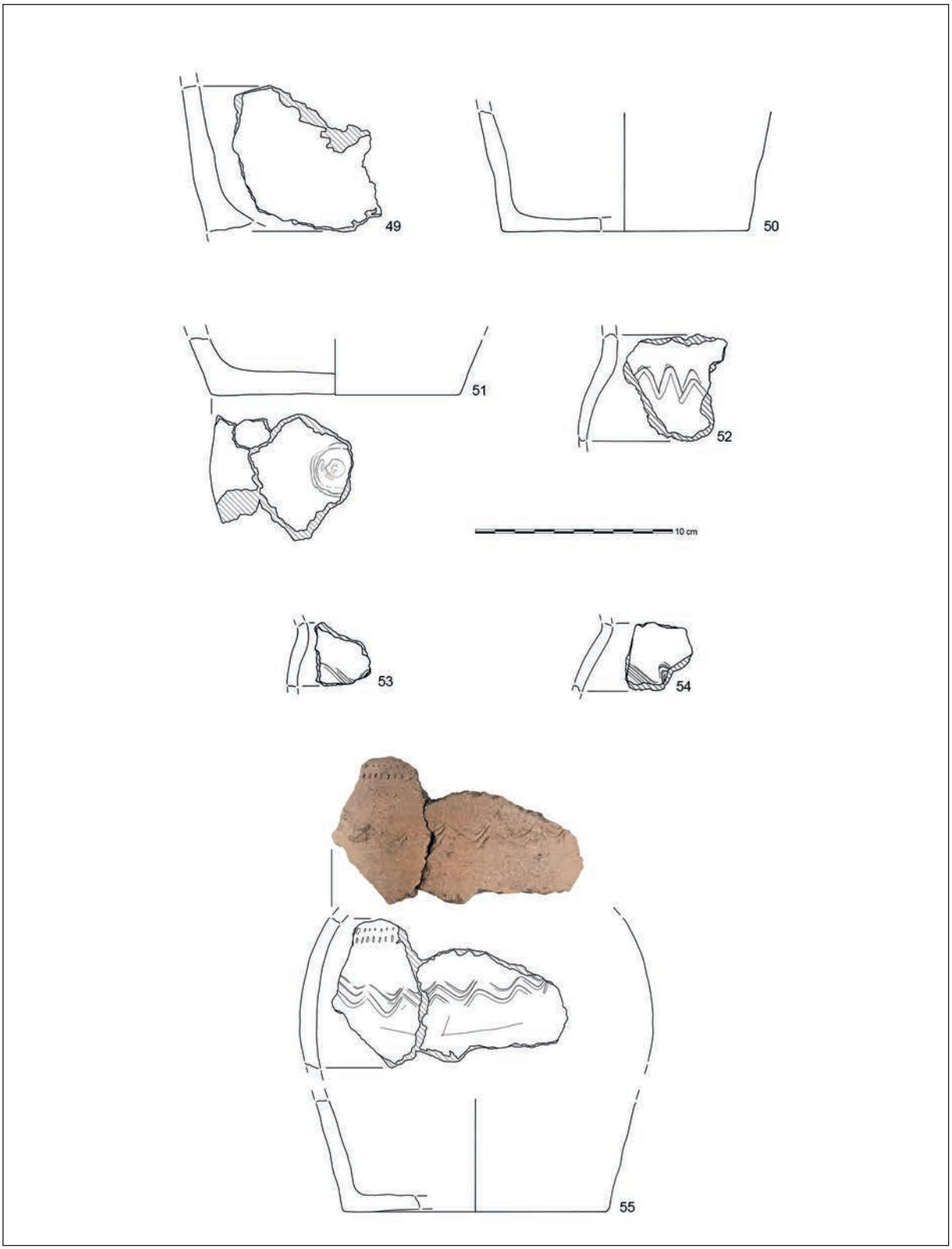
Pl. 4: Enzelsdorf, pit 1, 17–21, 23, pit 2, 22, object 3, 24–25. Pottery. Scale 1:3.

Pl. 5: Enzelsdorf, object 3, 26–32, object 10, 33–35. Pottery. Scale 1:3.

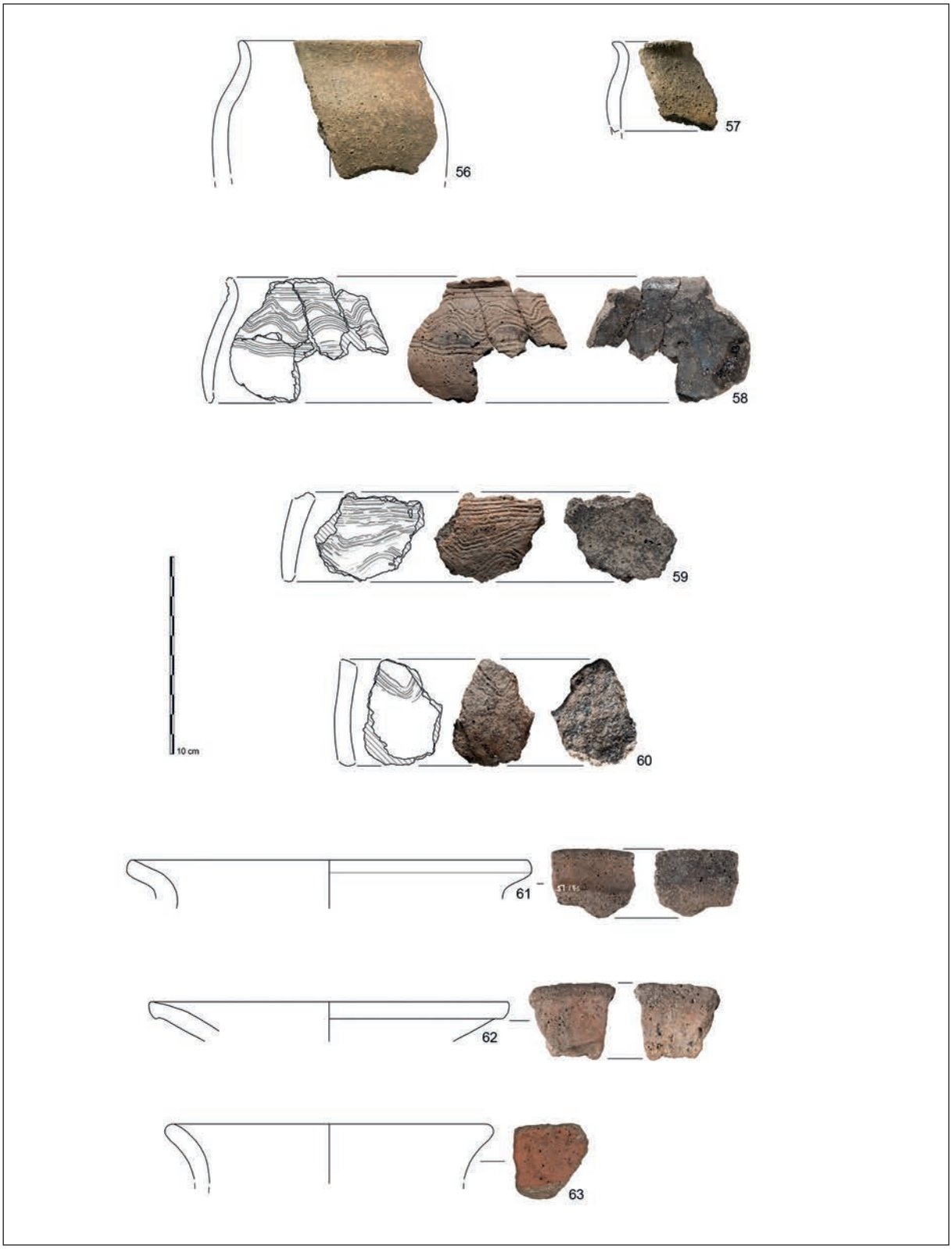
Pl. 6: Enzelsdorf, object 10, 36–39. Pottery. Scale 1:3.



Pl. 7: Enzelsdorf, object 10, 40–44. Pottery. 45–47. Beads. Scale 2:1. Wildon-Unterhaus, object 2, 48. Pottery. Scale 1:3.



Pl. 8: Wildon-Unterhaus, object 2, 49–55. Pottery. Scale 1:3.



Pl. 9: Kleinklein, 56–57. Aichegg, 58–62. Graz-Straßgang, 63. Pottery. Scale 1:3.

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EARLY MEDIEVAL SETTLEMENT IN STYRIA. CONSIDERATIONS ON SETTLEMENT PATTERNS AND LAND USE

Iris KOCH

Abstract

In this chapter, the early medieval settlement activity in the south-eastern Alpine region is examined based on archaeological data from the Austrian province of Styria. The analysis focuses on identifying patterns and concentrations of settlements, but also on evaluating the location of individual settlement sites in the landscape. In order to be able to assess the location of a site in its entirety, it seems necessary to take into account a wide variety of parameters from the terrain to the (relative) altitude and proximity to rivers, the settlement history of the area, but also the landscape with its resources and the relationship between settlements.

The analysis succeeded in highlighting areas with increased density of sites, which can be interpreted as settlement chambers and local or regional centres. With regard to the location, it has become apparent that numerous settlement sites use significantly elevated positions on hilltops and crags. The use of hilltops apparently already began around 800 AD, at the latest. Another finding is that prehistoric and Roman sites were often re-occupied by early medieval settlements. The probable reasons for this include unchanged favourable locations, but also intentional re-occupation. The archaeological data - supplemented by the results of archaeozoological, archaeobotanical and anthropological investigations - shows diversified land use by means of agriculture, animal husbandry, hunting and other uses of natural resources.

Keywords: Early Middle Ages, Styria, settlement patterns, hilltop, land use

1. INTRODUCTION

The state of research on early medieval settlement in the Austrian province of Styria has improved in the last few decades to such an extent that an analysis of the sites with regard to their distribution can now be undertaken. One aim of this study is to work out patterns and to identify the more densely populated areas. The following interpretation is conducted against the background of the landscape and the natural conditions of the varying regions. Another key aspect is the location of the individual settlement sites within the landscape, taking into account the relative altitude above the valley floor, possible links to settlement activities of other periods and chronological development. The embedding of settlement in the historical framework is examined on the basis of a few selected aspects. The overall picture is complemented by an examination of early medieval land use and man-environment relations in the study area, taking into account the available data from natural sciences (archaeobotany, archaeozoology and anthropology).

1.1 GEOGRAPHICAL SETTING

The province of Styria as a study area (*Fig. 1*) hardly corresponds to the early medieval political situation,

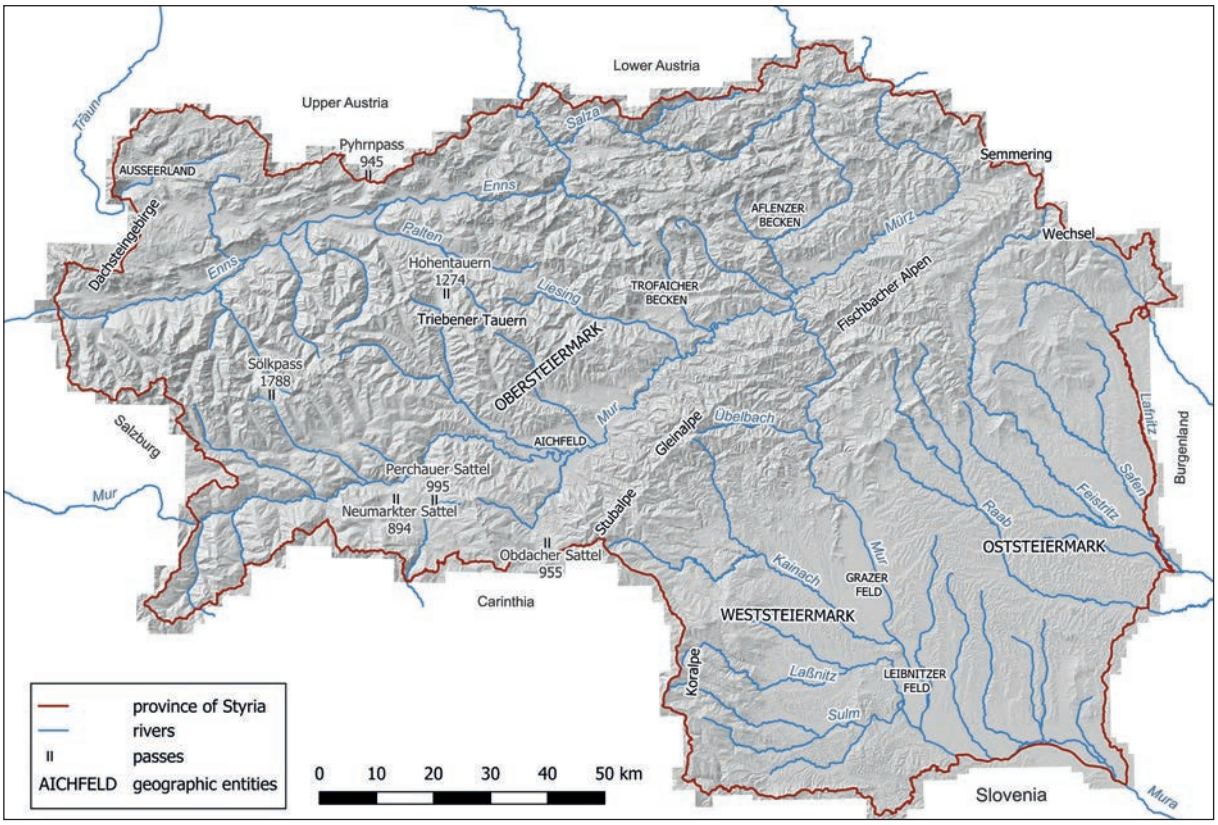

Fig. 1: The Austrian province of Styria. Geographic overview.
Figs 1–4: Koch (using QGIS®); Basis: Digital Terrain Model - Airborne Laserscanning Resolution 5 m (https://www.data.gv.at/katalog/dataset/9a6653e0-d5d3-11e3-9c1a-0800200c9a66)

and today's borders are also only partially based on natural (geological or hydrological) features. However, we know too little about the early medieval boundaries in the south-eastern Alps to use them for defining a practicable research area, especially in the case of Styria. Furthermore, there is a certain tradition in Austrian early medieval archaeology to summarise the state of research by province.[1] The early medieval sites in Styria have to be considered on the one hand in the context of the state of research and on the other hand against the background of the landscape and natural conditions, which can only be briefly outlined here.

The province can be roughly divided into Upper Styria, which is characterised by the northern and central Eastern Alps, and Eastern Styria as well as Western Styria south of the Alps, dominated mostly by hills ("Hügelland"; "Riedelland"). The border between these very different areas is represented by the mountain range that runs along the line Koralpe - Stubalpe - Gleinalpe - Fischbacher Alpen. In Upper Styria, settlement activity is concentrated on relatively narrow bands along the river valleys (especially Enns, Mur, Mürz), which in some sections widen into basins.[2] The structure given by the river valleys is also important for the rest of the province, with the river Mur (and its tributaries Kainach, Laßnitz and Sulm), and, in the east, the river Raab (and its tributaries Feistritz, Safen and Lafnitz) being of significance. The connection of the Upper Styrian settlement sites to those of the neighbouring provinces (Upper and Lower Austria, Salzburg, Carinthia) depends on natural passages such as river valleys and passes.[3] The situation to the southeast and east of the province is largely open, which is why the Styrian sites south of the Alps should be considered in the context of the neighbouring regions of Burgenland, Slovenia and Hungary.

[1] For example, for Styria: Gutjahr 2015a; 2018; 2020; Carinthia: Eichert 2010; 2012; Lower Austria: Wawruschka 2009; Nowotny 2013; Kühtreiber, Obenaus 2017; Upper Austria: Leskovar 2016. – In this chapter, the term "Early Middle Ages" roughly refers to the period from 600 to 1000 AD.

[2] Aichfeld/Murboden; Aussee, Trofaiach and Aflenz basins etc. For the characteristics of the Alpine region, among others: Winckler 2012, esp. 22–28. For the study area, see also: Rabensteiner, Berg 2019.

[3] Passes are crucial for the travel routes, for example Neumarkter and Obdacher Sattel, Sölkpass, Triebener Tauern, Pyhrnpass, all of them important north-south crossings.

1.2 STATE OF RESEARCH

Early overviews and maps of the early medieval sites of Styria were provided by W. Modrijan[4] (1963) and D. Kramer[5] (1992; 1996). More recent summaries of the state of research have been compiled in the last few decades, both for the entire province[6] and for some geographical areas.[7] In addition, Styria is included in some databases that follow a transregional or transnational approach.[8] Today, more than 120 sites from the early medieval period are known in Styria (*Fig. 2*).[9] Their compilation, however, poses certain difficulties. For example, a decision must be made whether to include sites mentioned in the older literature, whose finds were never published,[10] or sites that rely on a single radiocarbon date for their dating. When interpreting the overall picture of early medieval settlements in Styria, several factors must be considered. For example, it is difficult to estimate how many sites on the valley floors have fallen victim to the erosion caused by the once strongly meandering rivers or to the massive modern building activities and agriculture.[11] On the other hand, some major construction projects (e.g. railways, gas pipeline construction), regionally limited survey activities and initiatives have a beneficial effect on the state of research, leading to a distortion in the number of sites for some regions compared to others. Whereas the large construction sites tend to bring to light archaeological features in the valleys and at their edges, early medieval sites at high altitudes more often show up during research excavations on prehistoric and (late) Roman hilltop settlements and medieval castles, where the Early Middle Ages often appear as "coincidental findings".

[4] Modrijan 1963.

[5] Kramer 1992; 1996.

[6] Gutjahr 2012, 8–15; 2015a, 97–98; 2020, 55; Koch 2018, 181–210. – Some archaeological sites are also included in historical publications, e.g. in the map published by H. Baltl: (2004, Fig. 10).

[7] For example for the Graz area: Artner 1997; Horváth 2022; for the Enns valley and the Aussee region: Mirsch 2013; Breibert 2022, 163–166; for the Mürz valley: Tiefengraber 2006.

[8] E.g. Thanados (https://thanados.net/; accessed on 12 July 2024); ZBIVA (http://zbiva.zrc-sazu.si/; accessed on 12 July 2024). See also Štular 2019; Pleterski 2024 in this volume (Description of the Zbiva database). – Styria is also occasionally included in transnational studies, e.g. Korošec 1979; Giesler 1997; Bekić 2016; Štular et al. 2022.

[9] A detailed register of all Styrian early medieval sites by Ch. Gutjahr and the author is in preparation.

[10] In some cases, the finds are no longer accessible, which means that a review and verification of the early medieval dating is (currently) not possible.

[11] With regard to the construction methods prevailing in the early medieval study area, including little stone, the question of undetected settlements within today's villages arises. Cf. Gleirscher 2000, 70; Lehner 2009, 199–200.

2. EARLY MEDIEVAL SITES IN STYRIA

2.1 CATEGORIES

By now, quite a few early medieval settlement features are known from Styria. Floor plans of ground-level buildings can be recognized at the sites of Wildon/Im Rasental,[12] Enzelsdorf[13] and, most likely, Kirchberg/Deutschfeistritz.[14] There are also numerous settlement pits[15] of various sizes, such as those from St. Ruprecht an der Raab,[16] Komberg,[17] Enzelsdorf[18] or Weitendorf[19,20] Of the approximately 120 early medieval sites (*Fig. 2*), at least 13 can be safely assigned to the category "settlement features", another eleven are either layers with (partly relocated) early medieval finds documented during excavations, or findings whose dating to the Early Middle Ages is based solely on a radiocarbon date.[21] Large-scale studies of settlements are lacking so far, thus for a period of more than 400 years, no statements can be made about the external shape and internal structure of a settlement or even just one entire farmstead in the study area. As for ecclesiastical buildings, the excavated predecessors of the existing churches at Mariahof and at Frauenburg Castle are the only reasonably certain early medieval churches in the study area so far. The dating is supported in both cases by early medieval graves.[22] Actual fortifications (in the sense of a built defence) are also rare. The hilltop Lethkogel near Stainz can be listed here,[23] as well as some other fortified sites that are dated

[12] Gutjahr 2007b.

[13] Gutjahr, Mandl 2020; Gutjahr et al. 2024 in this volume (subchapter 4.3).

[14] A stone building or stone foundation as a presumed iron processing facility documented in an excavation in the 1940s. Cf. Gutjahr 2006.

[15] As for the findings published so far, an interpretation as pit houses is unlikely due to the small size, absent interior fittings and subdivision etCh. Gutjahr 2018, 44; 2020, 66.

[16] Schipper 1996; Gutjahr 2002, 149–150; 2018, 44–45; 2020, 65–67.

[17] Hebert 1996; Gutjahr 2018, 44; 2020, 64–65.

[18] Gutjahr 2002, 151–152; 2003; 2015b; 2018; 2020; Gutjahr, Trausner 2014.

[19] Gutjahr 2011a.

[20] For St. Ruprecht an der Raab, Komberg and Enzelsdorf, see also Gutjahr et al. 2024 in this volume.

[21] Radiocarbon dates that make a dating to the Early Middle Ages seem just as likely as a dating to the High Middle Ages were not taken into account.

[22] Summarising the research results: Steinegger 2020, 96–109. In both cases, A. Steinegger does not completely rule out an older, late antique origin of the churches. – Also some bones which are kept at Mariahof in a (modern) reliquary in today's church probably originate from an early medieval burial, as they have yielded an early medieval radiocarbon date: Hebert 2004.

[23] See subchapter 2.3.1. On early medieval fortifications in Styria, among others: Kramer 1989; Gutjahr 2015a, 94–96.

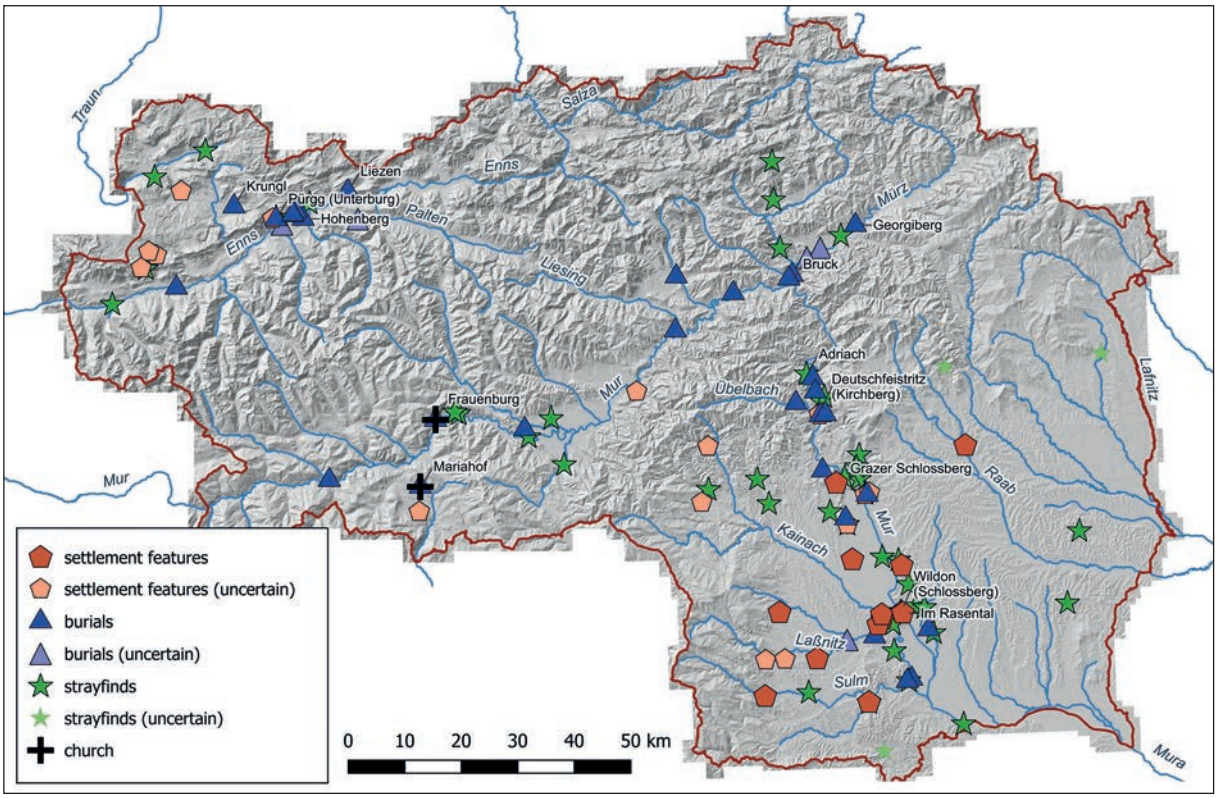

Fig. 2: Early medieval sites in Styria.

to around 1000 AD and are thus at the chronological edge of the Early Middle Ages.[24]

Early medieval burials are known from at least 34 sites. Some stray finds point to further, destroyed graves. Most of the early medieval burial sites in Styria have been only partially excavated. Only in the case of Grötsch[25] the entire site seems to have been captured (approx. 70 burials, 54 of which have been examined archaeologically). The burial site that yielded the most early medieval burials is Krungl[26] (at least 283), followed by Grötsch, Hohenberg,[27] Waltersdorf/Bleikolmhügel,[28] Peggau,[29] Graz/Alte Universität[30] and possibly Leibnitz/Altenmarkt.[31] In the whole of Styria there is only one presumed early medieval cremation burial,[32] all the rest are inhumation burials. Burial sites are indeed indicators of nearby settlement sites, but in Styria it has not yet been possible to identify the settlements belonging to the numerous known graves.[33]

Stray finds make up the largest group among the early medieval sites. These are often pottery fragments, individual finds of jewellery and accessories or, more rarely, weapons (arrowheads; spearheads). Finds whose original location can no longer be determined are counted among the stray finds in the map (*Fig. 2*).

– P. Gleirscher considers an early medieval origin or phase for some additional hilltop settlements: Gleirscher 2010.

[24] E.g. the fortifications on Mitterberg next to St. Marein and Schlossberg next to St. Lorenzen/Knittelfeld: Tiefengraber 2014; Tiefengraber, Tiefengraber 2014. – Also, the excavation of a cistern at Eppenstein Castle revealed that it was built at an early date, probably around 1000 AD or in the first half of the 11th century: Steinegger, Kraschitzer 2020.

[25] Published by Kramer (1981, 206–207) in a preliminary report; cf. Gutjahr 2015a, 88–89. – A comprehensive publication is being prepared by Ch. Gutjahr.

[26] Including a summary of the older literature: Breibert 2008; 2011; 2015; 2022.

[27] Including a summary of the older literature: Nowotny 2005; 2008.

[28] Tiefengraber, Tiefengraber 2013.

[29] Gutjahr 2012, 87–170.

[30] Fürnholzer 2003; Fürnholzer, Gutjahr 2005; Gutjahr 2012, 16–62.

[31] In this case, the number of early medieval burials is unclear due to the initially tumultuous recovery of burials and the long duration of the site, as a cemetery belonging to a derelict church of St. Martin. The cemetery is only published in preliminary reports: Christian 1982; Fuchs 1987; Kramer 1988. – A comprehensive publication by Ch. Gutjahr and the author is in preparation.

[32] A cremation burial from Wohlsdorf. It has not been published and is now lost. See Lehner 2009, 201; Gutjahr 2015a, 79; 2020, 62–63.

[33] Possible exception: Kirchberg/Deutschfeistritz with a burial at the foot of the hilltop (formerly E-Werk-Straße). Gutjahr 2006, 309–310, 322–323; 2012, 92.

2.2 DISTRIBUTION OF SITES AND SETTLEMENT PATTERNS

It becomes apparent that the sites are mainly situated along the large river valleys of Mur, Mürz and Enns.[34] In Western Styria, some sites are located on the edges of the Koralpe mountain range.[35] Eastern Styria has only a small number of sites, and burials are so far completely absent.[36] The before-mentioned varying natural conditions within the province are also reflected in the distribution of the site categories, to the extent that in Upper Styria there is almost no evidence of settlements in the narrower sense, whereas burial sites (as indicators for settlements) are numerous. In general, Styria shows an advanced spatial coverage in the Early Middle Ages – settlement took place along pre-medieval travel routes, but also reached remote areas.[37]

Some regions of Styria show an increased number of sites, so that a relatively dense population can be assumed:[38]

- The section of the Enns valley between Liezen and Pürgg.[39] Here, settlement activities can be identified mainly based on the burial sites (Liezen, Stainach, Hohenberg, Pürgg/Unterburg). Associated settlement features are missing so far. In terms of traffic and path networks, the passage from the Enns valley through the narrows near Pürgg via Krungl to the Ausseerland is of relevance, probably also the Pyhrnpass.[40]
- Burial sites in the Mürz valley between Bruck and the Georgiberg hilltop[41] also suggest several settlements along the river. It is questionable whether a travel route via Semmering to south-eastern Lower Austria already existed in the Early Middle Ages. A pathway towards the area of Neunkirchen with the burial sites of Köttlach and Pitten seems at least possible[42] On the other hand, also for Roman times, finds that would indicate a traffic route east of Mürzzuschlag are absent so far.[43]
- In the middle section of the Mur valley, between Deutschfeistritz and Adriach, several burial sites are known, of which rather small sections have been excavated. They are grouped around the Kirchberg, next to Deutschfeistritz, as a settlement site (and probably an early castle).[44] The river Übelbach flows into the Mur here, and an old pathway leads along the Übelbach valley to the Gleinalpen passages and further into the upper Mur valley.[45] Furthermore, the north-south connection passing through this section of the Mur valley is of supraregional importance.[46] The Roman road ran alongside the right bank of the Mur (evidenced by milestones), a side route probably on the left bank of the Mur.[47]
- At the northern and western edge of the Graz plain ("Grazer Feld"), on both sides of the Mur, a relatively large number of sites are situated.[48] The Schlossberg of Graz appears suitable as a regional centre. Early medieval pottery that originates from this site has only recently been published.[49] The earliest archaeological features on today's main square are dated to the late 10th or 11th century.[50] Supraregional north-south and east-west connections meet in the Grazer Feld.[51]
- A significant concentration of sites is grouped around Wildon and the adjacent Schlossberg on the northern edge of the Leibnitz plain ("Leibnitzer Feld").[52] There are at least five places with early medieval settlement features within a few kilometres, thus the settlements are in the majority compared to the burial sites. The Wildoner Schlossberg is considered to be the location of the Hengistburg, which was first mentioned in writing in 1053, but probably goes back to an early medieval fortification.[53] The

[34] Especially in Upper Styria, the river valleys largely determine the traffic routes. For the continuity of travel routes, see: Lehner 2009, 147.

[35] Franziskanerkogel/Primaresburg, Lethkogel, Deutschlandsberg (castle), Ulrichsberg and Schwanberg. – For Deutschlandsberg (castle), see: Schrettle et al. 2021.

[36] Ch. Gutjahr explains the lack of burials in Eastern Styria as due to the state of research: Gutjahr 2012, 14; 2015a, 98.

[37] For example the Aflenz basin, the eastern Dachstein plateau etc.

[38] Cf. Koch 2022, esp. 184 Fig. 5.

[39] Cf. Breibert 2022, 163–165.

[40] Cf. Winckler 2012, 147.

[41] See the overview provided by: Tiefengraber 2006, 345–346.

[42] Lehner 2009, 148–149; Gutjahr 2020, 59–60.

[43] For the distribution of Roman sites: Koch 2020. On possible alternative routes: Gutjahr 2020, 59–60. – K. Winckler assumes that the route via Semmering was only established at the end of the first millennium AD: Winckler 2012, 160.

[44] Ch. Gutjahr describes the Kirchberg as a central place of the middle Mur valley (i.e. between Graz and Bruck) in the early medieval period: Gutjahr 2012, 146.

[45] Among others: Fuchs, Mirsch 2011, 8, 11, 29–30.

[46] Gutjahr 2012, 146.

[47] Lehner 2010, 342; Koch 2020, 141. – For routes in the middle Mur valley in general: Fuchs, Mirsch 2011.

[48] See also: Artner 1997, 32–33, 47–48; Horváth 2022.

[49] Horváth 2020.

[50] Recently: Horváth 2022, 142–147.

[51] A crossing situation is assumed at the foot of the Schlossberg.

[52] Gutjahr 2012, 205, 255, Fig. 1; 2015a, 94, 95, Fig. 13. See also note 53.

[53] Annales Altahenses Maiores 1053. See: Kramer 1992 (summarising the state of research); Giesler 1997, 482–485. – The Early Middle Ages on Schlossberg are only apparent through stray finds and relocated pottery in younger layers: Gutjahr 2002; Gutjahr, Roscher 2002a; Gutjahr 2011b; Tiefengraber 2018a, 47, 61, 106, 252–254, 268, 274; 2018b, 118–121,

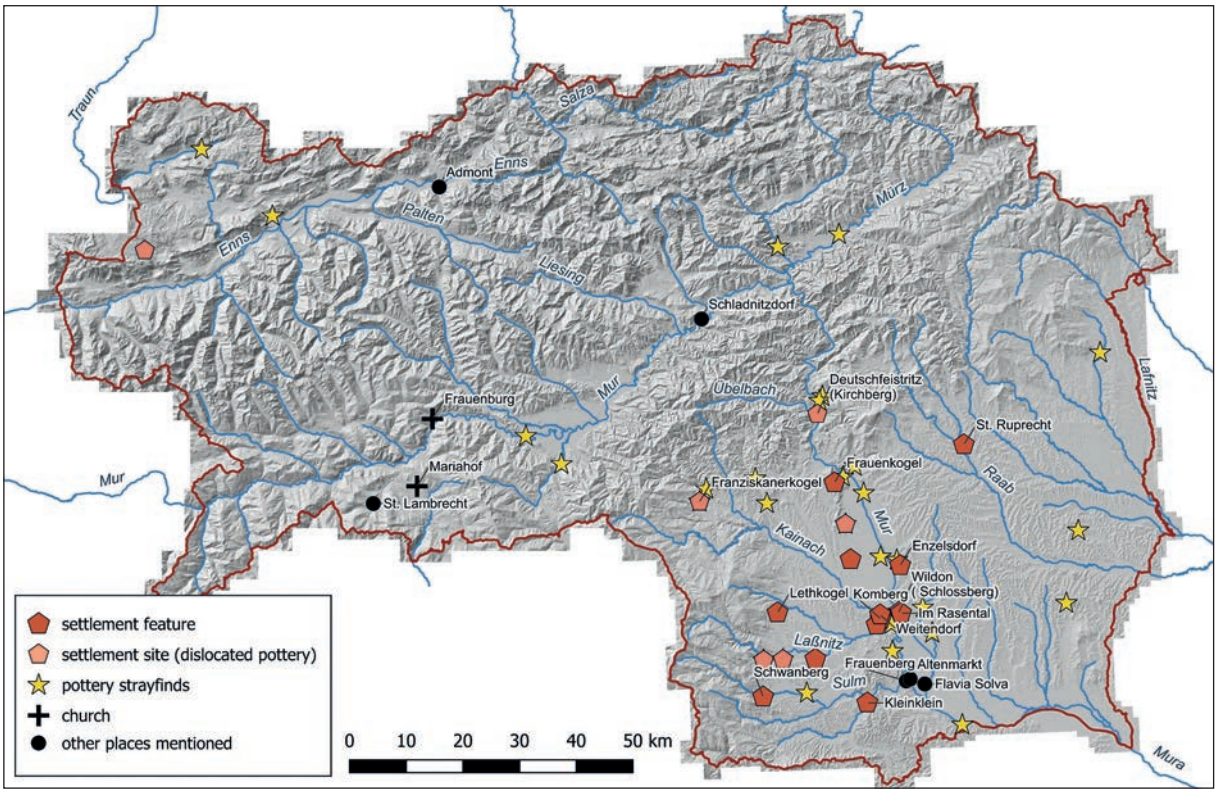

Fig. 3: Early medieval settlement sites in Styria. A selection of settlement features and pottery stray finds.

exceptionally favourable location is characterised by a narrow point in the Mur valley and the confluence of the Kainach and Mur rivers, with an old travel route leading directly past the eastern and northern foot of the Wildoner Schlossberg.[54]

It stands to reason that there was a social hierarchy within the above-mentioned settlement chambers, in which regional power structures are reflected.[55] The presence of local or regional elites has so far hardly been recognizable in the settlement sites and buildings in the study area,[56] but can be inferred from the grave inventories (e.g. Hohenberg, Krungl) and some stray finds. It can further be assumed that the use of places at high altitudes was reserved for the socially superior, or at least subject to their approval.

2.3 CONSIDERATIONS ON THE LOCATION OF SETTLEMENT SITES

When considering the location of individual settlements, it makes sense to filter out the settlement sites in the narrower sense (*Fig. 3*). For this purpose, in addition to the actual settlement features,[57] 24 sites with early medieval pottery stray finds[58] as settlement indicators can be included. In the case of metal stray finds (mostly accessories), the informative value appears to be lower, for they might have been lost along pathways. They are therefore not considered as settlement indicators here. Although burials do indicate settlements in their vicinity, they are

Pl. 193–196; Gutjahr et al. 2018, 25. Additionally, there are some metal finds (all of them stray finds), including a lunula-shaped temple (or: headdress) ring and an enamel disc fibula (both unpublished). Actual settlement features are known from the probably associated site "Im Rasental" on the southern slope of the Schlossberg: Gutjahr 2007b.

[54] Roman road, with the "Reichsstraße" as its successor. For the former Reichsstraße among others: Gutjahr et al. 2018, 97.

[55] For a conception of hierarchies in early medieval Slavic communities in the south east Alpine region, among others: Pleterski 2003; 2010; 2013, 9–11, 166; Eichert 2013; 2017; 2020.

[56] For example, stone construction, above-average size of the buildings or the entire site, a type of fortification etc. could be considered as a hint to an elite.

[57] See subchapter 2.1. In the following, additionally to the documented settlement (and church) features, layers with relocated early medieval pottery are included (as long as the pottery can be assumed to originate from the immediate vicinity). Features whose dating exclusively relies on radiocarbon dates are omitted, as well as sites whose early medieval phase is dated to the very end of the period (10th/11th century).

[58] Sites whose exact location is unknown are also omitted.

also not taken into account for the following analysis.[59] The result is a number of 44 early medieval sites, which quite safely can be addressed as settlements.[60] In the following discussion, these settlement sites are examined with regard to their location. The focus is on patterns and the question of relevant factors in the "choice of location" for an early medieval settlement in the research area. Among the numerous possible starting points, the relative altitude of the site above the valley floor, preceding and succeeding settlement phases and chronological developments are singled out.[61]

2.3.1 (Relative) Altitude and terrain

The relative altitude above the valley floor can be used to assess the location of a site within the landscape formed by a river valley.[62] It can be defined as the height above the bank of the nearest larger river.[63] It is noticeable that only a few[64] of the early medieval settlement sites in the study area lie in the range of 0–5 m above the valley floor.[65] For the question of whether a site is at risk of flooding, current data on the flood risk can be used, but it is hardly possible to make a reliable statement about conditions in the Early Middle Ages.[66] According to the present state of research, significantly higher locations are far more common: More than half of the settlement sites are located 35 m or more above the bottom of the valley.

In addition to the relative altitude, the location can also be classified according to the type of terrain used by the settlement site.[67] Settlements such as Weitendorf, Kleinklein or St. Ruprecht an der Raab[68] are located on higher or at the transition from lower to higher terraces.[69] The findings from the sites "Im Rasental" near Wildon (in a kind of saddle location) and Enzelsdorf (with the characteristic field name "Hochfeld") are located even higher. These and similar sites are located on slopes, elevated terraces and plateaus, often at some distance from the (main) river. Hilltops and crags[70], which offer a certain natural protection, are particularly common, e.g. the Wildoner Schlossberg[71] and Grazer Schlossberg. Less steep hilltops like the Kirchberg/Deutschfeistritz or the Ulrichsberg[72] render the group somewhat inhomogenous. Many sites of this location category can be found lined up along the river Mur, often situated on elevations that protrude into the Mur valley. In addition to the natural protection, these places usually also offer far-reaching visibility.[73] A different intention was apparently pursued in the case of the site on the Frauenkogel hilltop near Gösting, which is almost hidden in the valley of the Thalerbach. Here, an irregular polygonal rampart covers a relatively large area[74] and spreads out on the "back" of the Frauenkogel facing away from the Thalerbach and the Graz basin. Until recently, only a few unpublished stray finds were known from this site.[75] During an archaeological investigation in the spring of 2021,[76] it was ascertained that the rampart is a wood-earth construction fronted by a dry stone wall. The small amount of pottery from the excavation can be

[59] It has not yet been adequately clarified for the study area at what (maximum) distance settlements and associated burial sites can be located from one another. The burial site could therefore be located in a significantly different location (e.g. on a higher or lower river terrace) than the settlement site.

[60] "Settlement" is understood here and in a broad sense, as a place where people live and/or work.

[61] Further possible factors to be included would be, for example, the availability of raw materials, the orientation of the slope (if applicable) or travel routes.

[62] Recently, focusing on the topic of early medieval settlement location and hilltop sites in Styria: Koch 2022.

[63] The current course of the rivers is used here, in the absence of data on their early medieval course. Older river courses can be seen in the Franciscean cadastre (around 1820), and oxbow lakes can often be seen on orthophotos (usually not datable). However, this hardly helps with the specific question of whether today's river bank edge is higher or lower than in the Early Middle Ages. The course of rivers, which usually had several branches, probably changed with every major flood. See: Gutjahr 2012, 146.

[64] Six out of 44.

[65] It must be taken into account that in some cases, pottery stray finds may not indicate the correct location of the settlement, but could have been washed down from a higher terrace.

[66] Corresponding data layers in the digital map of GIS Steiermark clearly relate to today's conditions, i.e. to today's terrain and the rivers in their current, often regulated course: (https://gis.stmk.gv.at/wgportal/atlasmobile/map/H%C3%B6hendarstellung%20-%20Gel%C3%A4ndeinformation/H%C3%B6hen-%20Gel%C3%A4ndedarstellung; accessed on 11 July 2024). Archaeologically proven alluvial layers would be more relevant.

[67] Naturally, there is always a certain randomness in such a division, and in some cases the transitions are fluent.

[68] The settlement sites listed here are all mentioned in other sections of the chapter, the basic literature is cited there.

[69] The term "terrace" is used here not strictly according to its geological definition. For the terraces of the Mur valley from a geological point of view, see: Fabiani 1978, Fig. 4.

[70] Cf. the categorisation of hilltop sites with military finds in the Eastern Alps in: Štular, Eichert 2020.

[71] See note 53.

[72] Lehner M. 2004.

[73] Cf. "landscape presence" in: Štular, Eichert 2020, 222–223.

[74] A total of approx. 4.1 hectares, of which 3.2 hectares are taken up by the core of the fortification. In contrast to the larger core area, the outer bailey facing north is secured with a ditch in addition to the rampart. The laser scan (ALS) also shows a pincer gate. – The first description of the site, including a schematic drawing, is provided by: Flucher 1966.

[75] Kramer 1992, 62; Artner 1997, XLVII; Gutjahr 2015a, 94–95. – These stray finds include pottery (allegedly 10th century) and a fire steel.

[76] The excavation was conducted by the author: Cf. Koch 2022, 180–181. – The processing and analysis are still ongoing.

dated to the 9th–10th centuries. Radiocarbon data from charred wood that belongs to structural parts in the core of the rampart however suggests that it was not built before the High Middle Ages.[77] Therefore, without further investigation, it currently seems most likely that the site was used in the Early Middle Ages[78] and (re)fortified in the High Middle Ages.[79]

Caves and Alpine pastures can be regarded as "special cases" within the group of sites at high altitudes. The early medieval use of caves is documented several times for Styria.[80] The type of use - for example for storage, for cultic purposes or as a temporary shelter - currently remains unknown. Another special case are Alpine pastures, whose early medieval use is documented for the eastern Dachstein plateau mainly through stray finds and radiocarbon data.[81]

The extent to which the different types of location are related to different functions and requirements of the individual settlement sites still needs to be examined in detail. Assuming that the majority of the early medieval settlements in the valleys were oriented towards agriculture, the soil types in the vicinity of the settlements and the hydrological conditions should also be included in the analysis of the situation.[82] E. Lozić recently presented a new methodological approach for this purpose.[83]

[77] The results include one early medieval (88,3% 770–894 cal AD) and one high medieval date (93,2% 1032–1177 cal AD). Unfortunately, a dendrochronological examination did not yield any results. It was at least possible to determine that all six wood samples were oak.

[78] The evidence of the pottery is supported by another radiocarbon date from inside the rampart (82,7% 770–900 cal AD). The exact type of use and the question of whether the site was fortified at this time must remain open for now. – For refuges ("Fluchtburgen"), see (among others): Štular, Eichert 2020, 224. Here, a combination of the features "hidden", "remote" und "basic defensibility" is introduced as characteristic for refuges, the availability of suitable farmland is of low importance considering the sporadic usage of the site.

[79] Prehistoric and possibly Roman use of the site is also speculated, but there is little archaeological evidence for this so far.

[80] Mostly on the basis of pottery fragments. Some are published, e.g. the material from the Repolust cave and the "Halbhöhle" in the middle Mur valley: Modl, Kraschitzer 2013/14, 215, 219–220, 227. Others are only mentioned in older literature and therefore difficult to verify. The use of caves in Upper and Western Styria and the middle Mur Valley, especially around the Kugelstein hilltop, has been proven in many cases for prehistoric and Roman times, so it is not a specifically early medieval phenomenon.

[81] Mandl 1996, 63–67; 2003, 199–200.

[82] Useful information is provided by the eBod digital soil map: (https://bodenkarte.at/; accessed on 11 July 2024).

[83] Lozić 2021. – For a corresponding analysis of the early medieval sites in the Leibnitzer Feld, see: Lozić, Koch 2024 in this volume.

2.3.2 Preceding and succeeding settlement phases

At 28 out of 44[84] early medieval settlement sites, there are indications for prehistoric use of the location.[85] In some additional cases, prehistoric finds are known from the surrounding area. It is likely that in some cases prehistoric sites were specifically sought out because of their existing fortifications (ramparts), but so far this can only be assumed with good reason in the case of the site on Lethkogel near Stainz in Western Styria.[86] It is a plateau-like, flattened hilltop which slopes steeply towards the east, with a surface of around 1.2 hectares at its top. Archaeological excavations provided evidence of a hilltop settlement that had already existed in the Copper Age and had been fortified in the late La Tène period. In the Early Middle Ages, a ditch was apparently dug into the La Tène rampart, and a dry stone wall was built. This adaptation and "reconditioning" of the fortification seems to have been carried out in the 8th/9th century judging by the pottery finds.[87] Another example of a tie to prehistoric structures in early medieval times is the positioning of the Waltersdorf/Bleikolmhügel burial site[88] in the Aichfeld/Murboden basin at the edge of a burial mound from the Hallstatt period.[89] At almost two thirds (26 of 44) of the early medieval sites, there is evidence of (late) Roman pre-use of the area. In some additional cases, Roman finds are known from the vicinity.[90] Among the Roman sites frequented in the Early Middle Ages are *vici*, *villae*, farmsteads and hilltop settlements.[91] In the case of early medieval sites at the location of a Roman settlement, continuity cannot necessarily be assumed,[92] since the period 450–600 AD in Styria is hardly tangible from an archaeological point of view,[93] and a significant decline in settlements

[84] At the current state of research.

[85] Often Bronze Age/Urnfield Culture, but also Copper Age, Neolithic, Hallstatt and La Tène periods.

[86] Artner 2008; Baur 2009.

[87] Artner 2008, 31. – For examples of early medieval reuse of Roman and prehistoric hilltops in Bavaria: Later 2020.

[88] Tiefengraber, Tiefengraber 2013.

[89] The situation reminds of the early medieval burials of Grabelsdorf (also at the site of Hallstatt burial mounds; among others: Szameit, Stadler 1993; Eichert 2010, 146–147).

[90] (Most of) Styria belonged to the province of Noricum (mediterraneum) in Roman times.

[91] E.g. at Kleinklein: Mele, Kiszter 2017. – There are no confirmed early medieval finds from the immediate area of the *municipium* Flavia Solva, only a few disputable finds of coins without precise location, cf. Hahn 1987, 460.

[92] At most, settlement in Roman ruins ("Ruinenkontinuität"), or else a mere re-occupation of a place ("Platzkontinuität"). On the topic of continuity: Lehner 2009. Especially for Leibnitz and Frauenberg: Lehner 2011; 2016.

[93] Now summarising the entire evidence: Gutjahr et al. 2024 in this volume. – There are almost exclusively stray finds: Gutjahr 2018, 42–43; 2020, 55–60. On late Roman hilltop settlements: Steinklauber 2006. Providing an overview of

must be assumed.[94] The close relations between the early medieval sites and those of preceding periods can be explained in part by the very dense distribution especially of Roman sites, in part by the use of travel routes that remained the same, and by similar demands towards the settlement locations.[95] It should be borne in mind that Roman ruins and other structures must have been visible almost everywhere in the research area in the Early Middle Ages.[96] The number of early medieval settlement sites that show both prehistoric *and* Roman settlements as "predecessors" is relatively large (22 sites, i.e. 50%).

More than two thirds of the early medieval sites on hilltops or crags share their location with a high and/or late medieval castle.[97] In some of these cases, continuity from the early to the High Middle Ages can be considered likely from an archaeological point of view. However, at Schwanberg, which is a comparatively well researched site, there is a hiatus that shows in the dating of the finds and can be linked to a burnt layer.[98] Also, the early medieval use of an elevated location does not necessarily imply a fortification. We can hardly ever make any statement about the shape of the settlement, and this is often because in the course of the construction of high medieval castles earlier phases were removed down to the bedrock.[99]

(late) Late Antiquity in Styria, including historical facts and archaeological references to early Christianity: Gutjahr 2012, 385–388, 393; 2015a, 75–78.

[94] Nevertheless, it cannot be assumed that the area was deserted: Gutjahr 2015a, 77–78; 2018, 43–44. Ch. Gutjahr assumes a remaining Roman or autochthonous/Romanic element, referring to the continuity of pre-Roman place names. The end of the late Roman/late antique hilltop sites in Styria is difficult to determine, partly due to the difficult chronology of the finds.

[95] Gutjahr 2018, 46; 2020, 61, 71. – M. Lehner assumes a causality that stems from both settlement history and topography and lists several possible reasons for this: Lehner 2009, 51. Regarding Roman settlement sites as a source of raw material: Lehner 2009, 129; Gleirscher 2020, 84; Eichert 2020, 122. Summarising the use of Roman roads and routes in the (early) medieval eastern Alpine region: Giesler 1997, 320; Lehner 2009, 147–150; Winckler 2012, 116–118; Gutjahr 2020, 61. A definitive continuity of Roman roads into the Middle Ages cannot be proven for now, but a continuity of the travel routes can be assumed.

[96] Gutjahr 2020, 71, note 93. – For the late Roman devil's ditch in the Leibnitz plain that became a boundary mark in early medieval times: Gutjahr 2013.

[97] Cf. Koch 2022, 182 Fig. 4.

[98] Kiszter, Schrettle 2016; Kiszter, Schrettle 2020, 35–36. – According to the excavators, the hiatus follows the early medieval phase, which extends into the 10th century.

[99] For example, the early medieval phase on Franziskanerkogel/Primaresburg near Maria Lankowitz in Western Styria can for now only be grasped in the form of stray finds, in spite of the excavations in 1984, 1986, and 2020–2022: Gutjahr, Roscher 2002b; Trummer 2003, 10, 24–25, 27; Horváth, Koch 2021, 97–98, 120. – For the more favourable situation in Schwanberg: Kiszter, Schrettle 2020, 34.

2.3.3 Chronological development

At this point, the question arises whether the location of the sites is in any way related to their dating. For this purpose, only sites that can be dated more precisely than just generally "into the Early Middle Ages" are considered. Based on the remaining, rather modest data basis, only preliminary statements can be made. Nevertheless, it can be stated that the earliest sites (second half of 7th century, first half of 8th century) can be found in all categories of altitude, not just on low terraces near the rivers.[100] Accordingly, higher altitudes were not beginning to be used at some later date within the Early Middle Ages, but as early as the 7th century. Here a link to the climatic conditions seems plausible, as the earliest known settlements in Styria still fall within the later stages of the Late Antique climatic pessimum, when bad weather and flooding were quite frequent.[101] Hilltops and crags were used from around 800 AD on, at the latest.[102] In most cases, based on the archaeological data, it cannot be decided whether these early settlement phases included defensive structures, but there are some indications that these places, due to their naturally protected location and/or existing fortifications (e.g. in the form of a prehistoric rampart) were specifically sought out. Sites that persisted for several centuries up to the 10th century are often in an elevated position, but not necessarily naturally protected by steep cliffs.

2.4 THE ARCHAEOLOGICAL EVIDENCE IN ITS HISTORICAL CONTEXT

It is also to be discussed to what extent settlement activity is influenced by the historical and political circumstances and events.[103] Since this is a very broad topic, only a few aspects are to be singled out here.

[100] Special attention should be paid to Enzelsdorf and Komberg. In Lower Austria, early Slavic settlements tend to prefer locations with a lower altitude: Wawruschka 2009, 129; Nowotny 2013, 237. In the area of Bled (Slovenia), the majority of settlements are located "where the plains meets the hillslopes": Pleterski 2013, 155, 161; Lozić 2021. See also: Pleterski 2024 in this volume.

[101] See subchapter 3.1 (climate).

[102] Lethkogel, Schwanberg, Kirchberg/Deutschfeistritz, Wildoner Schlossberg. Possibly also Grazer Schlossberg and Primaresburg/Franziskanerkogel. Cf. Gutjahr 2015a, 97.

[103] A summary of the historical events in the early medieval south-eastern alpine region would go beyond the scope of this chapter; it would also counteract its archaeological focus.

2.4.1 Slavic, but not Carantanian?

The earliest early medieval settlement features in Styria[104] can be found south of the Alps on the edges of the large river valleys (Mur, Raab).[105] These features are likely to be associated with Slavic immigration,[106] even if genuinely "Slavic" finds, apart from pottery of the Prague type, are hardly distinguishable,[107] and Slavic cremation burials are missing in the investigation area so far, probably due to the state of research.[108] From a political point of view, it is rather unclear where (or to whom) the territory of today's Styria belonged in the 7th and 8th century AD. When the Slavic political entity of Carantania was consolidated in today's Carinthia, the territory of modern Styria was probably only partially included. Research opinions differ when it comes to Carantania's boundaries.[109] The Upper Styrian area of Neumarkt probably belonged to this principality, which can be argued on the basis of a marble relief featuring interlaced ornaments ("Flechtwerkstein") known from Mariahof.[110] Reliefs like this are being interpreted as part of the furnishings of early churches. Burials of the Grabelsdorf type,[111] as those known from Krungl and Hohenberg, can also be assessed as indicators of a region's affiliation to Carantania, or at least its cultural dependency.[112] For Styria south of the Alps, a (mostly) Slavic border area between Carantania and the Avar sphere of control can be assumed, perhaps in the shape of a more or less independent regional sphere of power.[113] An immediate presence of Avars has in any case not been proven, although there are a few Avar accessories found in burials.[114]

2.4.2 Bavaria, Francia, "western" influence

From the written sources, an increasing influence of the Bavarians and Franks on the south-east Alpine region since the middle of the 8th century can be deduced. The Avar wars mark a turning point in the balance of political power. The incorporation of the region into the Carolingian Empire followed; it was concluded with the introduction of Bavarian counts (Carolingian "Grafschaftsverfassung", no later than 828 AD) and the removal of the local rulers.[115] In the archaeological sources, these processes are currently barely visible. At least the changes in burial rites, turning away from grave goods, can be seen as a sign of advancing Christianisation and thus as an indirect consequence of changing political circumstances.[116] However, this is to be seen as

[104] First half of the 7th century, second half of the 8th century.

[105] Enzelsdorf, St. Ruprecht, Komberg (all around the second half of the 7th century, maybe slightly earlier or later) and also Straßgang (radiocarbon date of the second half of the 6th/first half of the 7th century). They are only between 1 and 4 km away from the main rivers Mur and Raab (in their current course). Gutjahr (2018, 44–46) provides an overview of these sites. See also: Gutjahr 2020, 64–70; Gutjahr et al. 2024 in this volume. Some other sites (mainly pottery stray finds) could also date to the 7th century: Gutjahr 2018, 46; 2020, 70–71.

[106] Among others: Gutjahr 2015a, 80; 2018, 44; 2020, 62–64, 72. Slavic-speaking immigrants can be assumed due to the strikingly widespread Slavic toponyms in Styria: Mader 1986; Lochner-Hüttenbach 2008, 30–43. The formation of Slavic toponyms probably continued into the High Middle Ages. Ch. Gutjahr assumes that the immigration came from the south, possibly also (additionally) from the east and spread from the large river valleys into the side valleys: Gutjahr 2015b, 83; 2018, 46; 2020, 72. On this topic, recently: Štular et al. 2022. See also: Pleterski 2024 in this volume.

[107] Szameit 2000; Nowotny 2013, 232; Gutjahr 2015a, 80. – A pottery fragment of a probably "Prague type" pot has been found at Kleinklein: Gutjahr 2018, 44. Critical towards the question of the ethnic interpretation of finds, among others: Kramer 1996, 58–61; Szameit 2000, 525; Nowotny 2005, 233–234; Lehner 2009, 127; Eichert 2020, 110.

[108] Apart from the possible exception of an unpublished burial from Wohlsdorf: See Note 32.

[109] For a summary of the discussion: Lehner 2009, 108–112; Gutjahr 2012, 151–153. – In general, early medieval borders should not be thought of as linear. Cf. Winckler 2012, 79, 83. To mention all relevant literature on Carantania would go beyond the scope of the discussion. From an archaeological point of view, among others: Eichert 2012, 219–225, 307–310, 341–343; 2014.

[110] For the temporary custom of marble furnishings ("Flechtwerksteine") in churches in Carantania: Karpf 2001, 66–67, 78; 2003, 886–888, 895–896. Marble furnishings have been mentioned as indications for the affiliation of the Neumarkt area to Carantania: Lehner 2009, 216, 220; Gutjahr 2012, 156; Gleirscher 2018, 272. – On the marble relief, the church and the early medieval graves of Mariahof: Lehner S. 2004; Steinegger 2020. – A marble relief at St. Lambrecht, showing interlaced ornaments on a second-use Roman stone, has also been dated to the Early Middle Ages: Johannson-Meery 1993, 91–92 (citing older literature). Yet a later dating approach has repeatedly been proposed: Karpf 2003, 894, note 96; Gleirscher 2020, 85.

[111] Szameit, Stadler 1993, 228–229; Eichert 2010, 160–164; Gutjahr 2015a, 87; Eichert 2020, 118–119, 123.

[112] Among others: Gleirscher 2018, 191–195; Gutjahr 2020, 136. – Expressing doubts, though based on toponyms: Winckler 2012, 99–100.

[113] For the conception of a Slavic domain ("župa") in the (middle) Mur valley: Pleterski 2003, 28–30; 2010, 145, 146, Fig. 2. – A. Pleterski considers a possible association of this domain with the (ethnic ?) group "Dudleben".

[114] Lehner 2009, 110; Gutjahr 2020, 60, 75.

[115] Wolfram 1987, 275, 281; 1995, 220, 222. – For the Carolingian *marca orientalis* ("Ostmark"), see also: Giesler 1997, 27, note 143.

[116] For grave goods in Styria: Gutjahr 2015a, 89–90. See also: Nowotny 2005, 194–195; Breibert 2011, 564–566. – For Styria, it can be assumed that Christianisation had to be restarted from zero, because so far there is no clear evidence of churches in this area that survived from Late Antiquity, and

a long-lasting process in which the upper class took a pioneering role, the rest of the population following with some delay, and which could only be completed with the expansion of the church infrastructure.[117] Apart from Mariahof with its probably early medieval church, there are some hints in the form of early medieval burials next to existing ecclesiastical buildings.[118] For a few more churches (or their predecessors), an early medieval date (around 1000 AD) has been considered based on either radiocarbon dates[119] or the way of construction.[120] The churches that are mentioned in written sources possibly concerning Styria (e.g. "ad Undrimas" in the Conversio Bagoariorum,[121] ecclesia "ad Sabnizam" in 860 AD,[122] two churches in "Liupinatal" in 925 AD[123]) cannot be safely located at the time being.

The increasing use of locations at high altitude, usually providing natural protection, in the advancing Early Middle Ages is probably related to the exercise of rule and representation, and the taking over and defence of the territory.[124] Stray finds of winged spearheads and spurs also point in the direction of elites.[125] However, it is difficult to make any statement on the local and regional rulers and their political affiliation based on archaeological finds. In any case, some contemporary written sources give evidence of the economic and political penetration of the country by Carolingians and Ottonians. The sources name early medieval places that can be localised in Styria and differentiate between different categories (including *curtis*, *locus*, *civitas*).[126] Some of these mentions can be conclusively associated with modern place names (e.g. ad Pruccam = Bruck an der Mur), but only in the rarest of cases the respective locality can be identified with an archaeological feature. One charter deserves special mention, as it gives detailed information about the location of a *curtis* in the south-eastern Alps: The *curtis Zlatina*[127] mentioned in 904 AD is described so precisely that it can be located on a terrace in Schladnitzdorf near Leoben, where the stream Schladnitzbach flows into the Mur. It is a tongue of land approx. 220 m long and up to 120 m wide, which only rises between 15 and 20 m above its surroundings.[128]

2.4.3 Hungarian crisis

Historical and archaeological research has repeatedly raised the question of how the "Hungarian threat" on the eastern border of the Frankish Empire from approx. 900 AD onwards and the temporary loss of territory associated with the Hungarian wars affected Styria.[129] Unfortunately, the archaeological data is poor.

no clear evidence of early Christian predecessors under today's churches: Lehner 2016, 150–151. At Frauenburg Castle, there are hints to late Roman times/Late Antiquity, but the excavated burials start only in the Early Middle Ages (7th/8th century): Steinegger 2020, 100. – For the possible continuity of Christianity in the south-eastern Alpine region (especially, in its western part), among others: Gleirscher 2020. For the Christianisation of the Carantanians, recently: Štih 2020. For food as a grave good, see also subchapter 3.3.

[117] The cross and pigeon fibulae (in secondary use) from Hohenberg and Krungl can be seen as a possible indicator of Christianisation; a stronger hint comes from enamel disc fibulae with Christian motifs (from the end of the 9th century on): Gutjahr 2015a, 80–83, 91; 2020, 57.

[118] E.g. at the Frauenburg hilltop: Steinegger 2020, 96–101; at Hohenberg; within a chapel ("Pöglhofkapelle") next to Bruck; at the Georgiberg hilltop next to Kindberg: See note 41. For the Altenmarkt burial ground, see above (subchapter 2.1) and below (subchapter 2.4.3). – Some of the known metal stray finds (accessories) probably also originate from destroyed burials in church cemeteries.

[119] E.g. the predecessor of the Leechkirche in Graz: Lehner 1996.

[120] E.g. the use of spolia in the crypt of the monastery church in Göss (Upper Styria): Lehner 2005, 164, note 6.

[121] Summarising: Lehner 2019. Recently: Gleirscher 2020, 92–93. – For an approach that identifies the church "Undrimas" with the church "Liburnia" resulting in none of them to be located in Styria, but in Carinthia: Pleterski 2000.

[122] MGH DD LD no. 102. Cf. Note 134. – "Sabniza" is probably the river Safen, "ad Sabnizam" therefore could be located in the vicinity of Hartberg.

[123] "ad Sanctum Petrum sanctumque Rodbertvm" (Steirisches Urkundenbuch 1, no. 14); the valley "Liupinatal" is probably in the vicinity of Leoben: Lehner 2005, 165.

[124] Gutjahr 2015a, 97. – Ch. Gutjahr draws a connection with the development and organisation of the newly won lands after the Frankish-Carolingian takeover.

[125] Spearheads from Stornalm (Mandl 1996, 67), Franziskanerkogel (Trummer 2003, Pl. 10, 1; 2019). For the spurs, see subchapter 3.6. – Another probable, albeit not winged spearhead has been found in an early medieval grave of a young man under the existing church at Frauenburg Castle: Steinegger 2020, 100.

[126] For example, "civitas Zuib" and "locus Lipnizza" in a donation from Emperor Otto I to the church of Salzburg under archbishop Friedrich I in 970 (MGH DD OI no. 389). Both are assumed to be located in the Leibnitz/Frauenberg/Seggauberg area, in both cases the (more precise) localisation is controversial: Karl 2013, 203–205; Lehner 2016, 154–155; Gutjahr 2020, 77. For the term "civitas", see also: Pleterski 2000, 447–449; Winckler 2012, 236–238.

[127] MGH DD LK no. 31. Ludwig the child donates a *curtis* (mansion) in Schladnitz(dorf), protected by a wall, and 20 dependent farmsteads in the Leoben valley to Arpo, son of Count Otakar: "in loco Zlatina dicto ubi riuus eiusdem nominis Zlatina in flumen Muora dictum intrat, illam curtem muro circumdatam [...]"

[128] Murgg 2010, 161. – No (documented) excavations have been conducted so far.

[129] After the battle of Pressburg in 907, a large part of the march is temporarily lost. – Wolfram 1995, 222; Giesler 1997, 297. From an archaeological point of view, among others: Kramer 1996; Lehner 2009, 211, 246. For bibliographical references that question the traditional conception of the

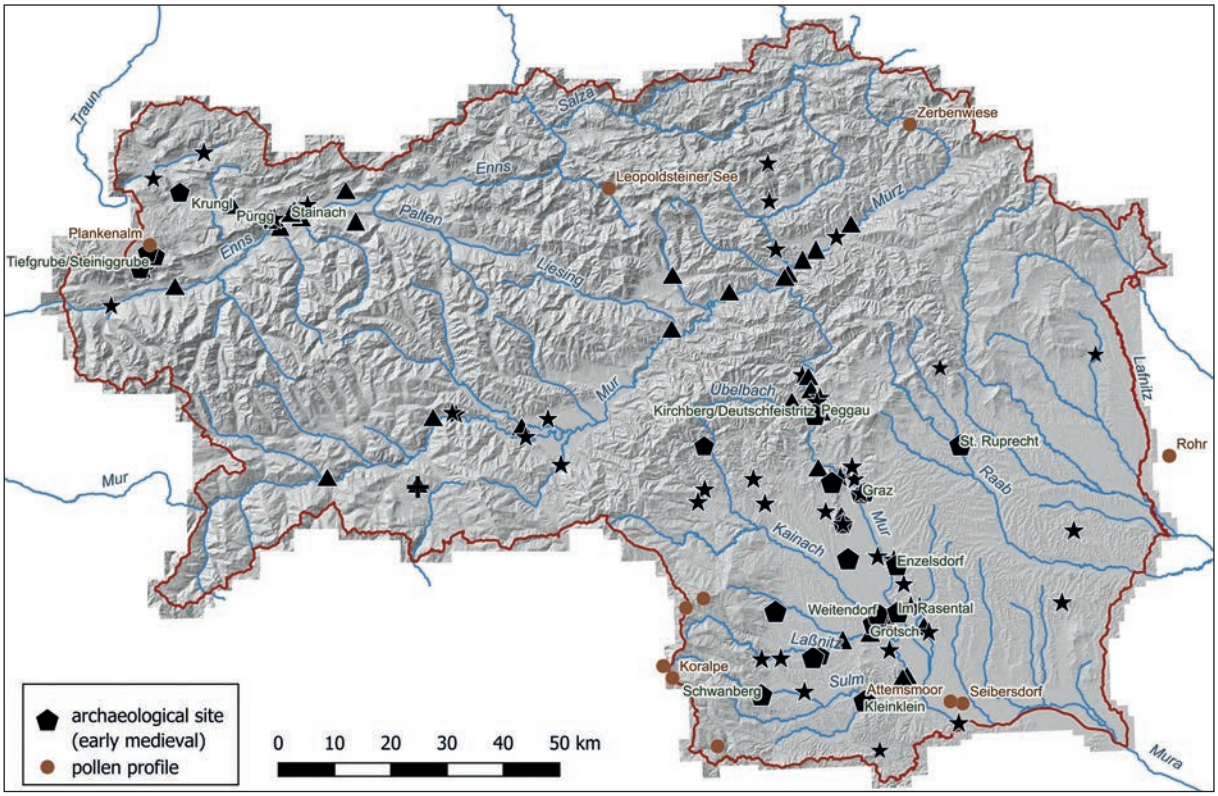

Fig. 4: Early medieval settlement in Styria. Sites mentioned in chapter 3 (Paleoenvironment) are indicated.

An interpretation of the sites at high altitude along the middle Mur valley as early castles and defence against the Hungarians has been considered (Kirchberg/Deutschfeistritz, Straßengel, Grazer Schlossberg, Wildoner Schlossberg, Frauenberg/Seggauberg).[130] Two individual finds of rhombic arrowheads were addressed as "Hungarian" by D. Kramer,[131] but such arrowheads may also originate from a later period.[132] Graves with a specific composition of inventory featuring an early Hungarian element ("gemischtes Inventar") in Straßengel and probably also in Leibnitz/Altenmarkt are perhaps to be seen as evidence of a temporarily extended Hungarian sphere of influence.[133] The presumably continuous occupancy of the Leibnitz/Altenmarkt burial ground from the 9th century (at the latest) to the 16th century seems to argue against an interruption of settlement in the Mur valley.[134] In Eastern Styria there is currently neither any settlement feature nor a burial that can be clearly dated to the 10th century, but this hardly serves as evidence of a hiatus, as it possibly derives from the poor state of research concerning the Early Middle Ages in this area.[135]

3. PALEOENVIRONMENT AND ASPECTS OF LAND USE

The following section aims at providing an overview of the currently available data on the topic of relations between early medieval settlers and the environment in the study area (*Fig. 4*).[136]

Hungarian crisis: Later 2020, esp. 137, Note 7.

[130] Gutjahr 2015a, 96.

[131] Kramer 1992, 67. They originate from the hilltops Franziskanerkogel and Wildon/Schlossberg.

[132] Apparently, in some places they are in use until the 13th or even 14th century: Kühtreiber, Obenaus 2017, 48.

[133] Cf. Obenaus 2008, 210–211. – For Straßengel: Mirsch 1999.

[134] Gutjahr 2015a, 92; Lehner 2016, 154, Fig. 2. – According to Ch. Gutjahr, the (now abandoned) church of St. Martin near the Altenmarkt burial site is probably the proprietary church ("Eigenkirche") of the *curtis* "ad Sulpam" mentioned in 860 (MGH DD LD no. 102): Gutjahr 2015a, 92. E. Staudinger established a connection between Altenmarkt and *ad Sulpam* just before the archaeological investigation of the burial ground: Staudinger 1978. For the charter, among others: Jeitler 2012.

[135] The same problem of scarce data comes into play in view of the question if an eastern border along the watershed between Mur and Raab, which is known in writing as "mons Predel", played a role for early medieval settlement in Styria (or only later on). – For *mons Predel*, among others: Purkarthofer 1979; Posch 1978, 32–34; Wolfram 1985, 139; Lehner 2009, 108–110, 115. See also: Tiefengraber 2007, 191–193.

[136] For the theory of man-environment relations in the

3.1 CLIMATE

For the study area, significant climatic differences between the alpine area and its southeastern foreland can be observed, the mountainous area and its valleys being significantly colder and wetter. But also small-scale climatic differences should be taken into account when assessing the location of a site. For example, the elevated plateau ("Hochfeld") on which the Enzelsdorf settlement site is located has a particularly favourable climate with slightly milder temperatures than the adjacent Grazer Feld in winter.[137] In addition, we have to consider historical climatology, which can only be briefly mentioned here. Between approx. 300 BC and 350 AD there was a warm period in Europe that also affected the study area. It was followed by a cold period lasting until approx. 660 AD, with lower average annual temperatures and changed weather conditions. Around 450 AD, there was a high glacier level in the Alps.[138] The "Late Antique Little Ice Age"[139] included an increase in precipitation, stronger river activities and flooding.[140] Especially in the 6th century AD an "atmospheric dust veil" led to unfavourable climatic conditions, which are being associated with famine and epidemic outbreaks.[141] The abandonment of settlements, fields and pastures is evident in pollen profiles in many places in the shape of a decrease in grain and increase in tree pollen.[142] Between approx. 850 and 1250 AD there was another warm period with temperatures that roughly correspond to today's.[143] This "medieval climate anomaly" was accompanied by a strong population increase and extensive deforestation.[144] Whereas at the beginning of the Middle Ages large parts of the country were covered with forest (approx. 85%), it is assumed that the proportion of woodland in Central Europe fell steadily to approximately 15% by the 13th century.[145] Bork et al.[146] assume based on a broad range of data, including pollen profiles, that the proportion of forest in Germany (excluding the Alpine region) was still 87% around the year 750 and 65% around the year 1000 AD. Kaplan et al., on the other hand, calculate the share of forest in "usable" land at approx. 29% for Germany and 20% for Austria in 1000 AD.[147] Possibly, the Alpine region and thus a significant part of Styria was less affected by deforestation than other regions, because large parts of the forests are located in steep terrain and are therefore difficult to access. In any case, the wide distribution of Slavic place names, some of them specifically indicating clearing of woodland ("Rodungsnamen"), show that in the study area deforestation was already progressing at a time when the Slavic population was still dominant in language.[148]

3.2 ARCHAEOBOTANY

3.2.1 Pollen profiles

Relatively few analyses of pollen profiles are available for the study area, and the existing ones often do not cover the Early Middle Ages or cannot clearly distinguish them from other periods.[149] For a profile from Seibersdorf on the southern edge of the Leibnitzer Feld[150] for example, a section "PZ Sei-9" has been defined with a date of approx. 800–1500 AD. It contains

Middle Ages (focussing on western Central Europe), see: Schreg 2011.

[137] Thanheiser, Walter 2003, 185.

[138] Büntgen et al. 2016; Bork 2020, 21. For the study area: Drescher-Schneider, Wick, 2001, 21. – A summary on the climate in Europe in Late Antiquity and the Middle Ages, including the historical implications, is provided by: Preiser-Kapeller 2021.

[139] Büntgen et al. 2016.

[140] Bork 2020, 21. – For the study area: Drescher-Schneider, Wick 2001, 21.

[141] Among others: Toohey et al. 2016; Bork 2020, 21; Montanari 2000a, 20.

[142] E. g. Behre 1988, 647. – However, this does not seem to apply equally to the entire Alpine region. A pollen profile from the area of Bischofshofen, for example, does not show any interruption in settlement from the middle of the 1st millennium AD; the cerealia curve apparently begins (once again) around 500 AD and does not break off until modern times: Wahlmüller 1988.

[143] Bork 2020, 21–22. – K. Winckler summarises both historical and scientific data on the early medieval climate in the Alps and states that little can be said with confidence: Winckler 2012, 37–61.

[144] G. Comet questions if all of these are effects of the favourable climate, and suggests that a change in the social order (towards the feudal system) might also have played a decisive role: Comet 2000, 167.

[145] Bork 2020, 22. – See also, among others: Behre 1988, 647–648.

[146] Bork et al. 1998, 161 Tab. 4.1.

[147] Kaplan et al. 2009, 3023 Tab. 3. "Usable land" is defined by the authors as "land available for clearing for agriculture", ruling out e.g. steep terrain.

[148] Lochner Hüttenbach 2008, 31. – The complete assimilation of the Slavic-speaking population in Styria is said to have been completed only in the 14th century. The majority of Styrian place names that indicate clearing, however, are interpreted as being of Bavarian origin: Lochner Hüttenbach 2008, 43, 52–53.

[149] For basic information on the method of pollen analysis and the difficulties associated with it: Jacomet, Kreuz 1999; Draxler, Lippert 1999, 396. The distance radius of the represented flora largely depends on the species in question. For grain, it is usually only a few kilometres, while various tree pollen can spread much further.

[150] Wick, Drescher-Schneider 1999; Drescher-Schneider, Wick 2001. – In the 2001 publication, the original dating approach for the youngest section of the profile (Roman period) was revoked.

grain (*Cerealia*[151]), including rye, as well as buckwheat (*Fagopyrum/Fagopyrum esculentum*), the latter towards the end of the section. Buckwheat is usually assumed to be available in Austria only from the 12th century, at the earliest.[152] The cultivation of grain (rye) in the area of Seibersdorf in the Early Middle Ages is therefore likely, but not certain, due to the large time span indicated for the relevant section. It was not until the Late Middle Ages and the early modern period that the plants that indicate human activities (synanthropic species; "Kulturanzeiger") increased significantly in Seibersdorf. The situation is similar with a profile from Rohr (Burgenland). Here, the section "PZ R-7" covers a large timespan from the Roman era to the early modern times.[153] Draxler and Lippert[154] summarise that at the south-eastern foothills of the Alps there was a sharp rise in pine (*Pinus sylvestris*), but also grasslands in the Early Middle Ages, which may indicate increased pasture activities. The cultivation of grain declines sharply compared to the Roman era. Another pollen profile was taken at the Attemsmoor, not far from Seibersdorf.[155] A radiocarbon date of approx. 960–1080 AD[156] was obtained from the middle of the profile, the Early Middle Ages should thus be at least partially covered. In the profile there is a clear indication of forest clearance both before and after the area from which the radiocarbon date originates. F. Kral[157] considers the older of the two events to be an effect of Carolingian settlement activities (9th century), but he also points out that further scientific dating is required for a more precise classification. In any case, a decrease in tree pollen and a simultaneous increase in the number of synanthropic species before the turn of the millennium could be ascertained; little grain and some hops or hemp[158] could be verified, as well as species that usually accompany pasture farming and therefore suggest animal husbandry. A pollen profile from the Alpine region, from the Zerbenwiese raised bog (Nassköhr, Neuberg an der Mürz) at approx. 1300 m a.s.l. provided evidence of rye in late antique/early medieval times.[159] In a pollen profile from the Leopoldsteinersee in the Eisenerz area (628 m a.s.l.), according to Drescher[160] the first onset of rye at the beginning of the Early Middle Ages can just be recognized. F. Kral and F. Schreiner[161] found on the basis of pollen profiles from the Koralm mountains[162] at the border between the provinces of Styria and Carinthia that here the forest density was very high in the 8th to 11th centuries (especially fir, beech, spruce), whereas the anthropogenic influence is described as very low. A pollen profile from the Plankenalm in the Dachstein area also indicates human presence in the (late) Early Middle Ages.[163]

3.2.2 Macroscopic plant remains from archaeological contexts

By now, a number of archaeobotanical analyses on plant remains from early medieval archaeological contexts are available for Styria.[164] The sample quantities are often small. In two settlement pits in Enzelsdorf (Obj. 1, Obj. 2), which can be dated to the 7th/8th century,[165] charred grains of naked wheat or wheat,[166] (other) grasses[167] and legumes[168] could be detected. Another layer documented at this site (Obj. 3, SE 20) contained little archaeobotanical remains, among which several types of grain could be identified (rye, naked wheat, cultivated barley, emmer and spelt), as well as cultivated millet, legumes and a fragment of a grapeseed.[169] In a

[151] In the following, the scientific name of plants/species is only mentioned when confusion seems likely.

[152] For the example of Lanzenkirchen Castle, see: Kühtreiber 2000, 49. As for Styria, an occurrence of buckwheat in a pollen profile from Attemsmoor (see below) has been dated to the 15th century by Kral (1984). – Prior to the High Middle Ages, the plant is found in eastern and, very sporadically, in northern central Europe: Drescher-Schneider, Wick 2001; Bakels et al. 2015.

[153] Drescher-Schneider, Wick 2001.

[154] Draxler, Lippert 2001, 396.

[155] Kral 1984. – The profile was obtained in 1982.

[156] Felber 1985, 619.

[157] Kral 1984, 199–200.

[158] *Cannabiaca/Humulus*. This could also be pollen from wild hops.

[159] Drescher-Schneider, Draxler 2016, 119, 121, 127–128. – Apart from rye, sweet chestnut, walnut, olive tree and hemp/hops were documented. Especially the pollen of chestnut and olive tree can be carried over large distances and do not prove the distribution of these plants in the vicinity.

[160] Drescher-Schneider 2003, 189–190.

[161] Kral, Schreiner 1985, 318.

[162] The data basis consisted of five profiles extracted from moors in various areas of the Koralm mountain range, between the "Freiländer Moos" in the north and Laaken in the south.

[163] 10/11th century: Kral 1994.

[164] Basic information on the method and the conservation conditions in dry soil, among others: Thanheiser, Walter 2003. – In addition to those listed here, the analyses of the botanical and zoological remains from the oldest backfill layer of the Eppenstein cistern are of interest (around 1000 AD/1st half of the 11th century): Steinegger, Kraschitzer 2020, 121–122.

[165] Parcel No. 226. See: Gutjahr 2015b, 75, 80. – The pottery can be dated to the second half of the 7th or first half of the 8th century; this dating is supported by a radiocarbon date. The filling probably took place shortly after the pit had been abandoned. See also Gutjahr et al. 2024 in this volume.

[166] Naked wheat (*Triticum durum/aestivum*); wheat (*Triticum sp.*): Gutjahr 2015b, 75.

[167] *Poaceae*. This family of plants also includes cereals.

168 In this case *Fabaceae cultae*, i.e. cultivated legumes: Gutjahr 2015b, 75.

169 Heiss et al. (in print). – It is often difficult to distinguish between cultivated grape (*Vitis vinifera* subsp. *Vinifera)* and wild grape, but in this case the cultivated type has been identified. Ch. Gutjahr dates the associated pottery finds into

waste pit at the same settlement site[170] which can be dated to the 10th or early 11th century, the remains of several types of grain, including naked wheat,[171] rye, barley and millet (*Panicum miliaceum*) were found. In addition, peas, horse beans (*Vicia faba*), peaches, hazelnuts, blackberries/raspberries and (probably) walnuts could be detected.[172] Ch. Gutjahr[173] assumes that the pit was abandoned and subsequently used as a waste pit. Because the grain was already prepared ready for use[174] and the pit also contained charred pottery, the contents could represent burnt storage supplies. From the early medieval settlement in Kleinklein,[175] plant remains from a waste pit[176] could be examined. The filling of the pit comprised relatively few remains of cultivated plants, including barley, (broomcorn) millet, and some specific wild plants that indicate human influence on the ecosystem.[177] The pottery from the waste pit of Kleinklein can be dated to the 9th/10th centuries, a barley seed fragment yielded a radiocarbon date of the 8th–10th centuries.[178] Archaeobotanical analyses have also been carried out on samples from the Schwanberg site,[179] including a burnt layer and two pit fillings.[180] The features linked to early medieval settlement activities contained little barley, millet, oats, einkorn wheat (*triticum monococcum*), peas and possibly rye, as well as walnut and grapevine (*vitis vinifera*), and one of the layers yielded a lot of tree pollen (most notably *Abies alba*, i.e. silver fir). S. Kiszter and B. Schrettle conclude that the settlement was probably abandoned at the end of the Early Middle Ages and nature reclaimed the plateau, at least for a short time.[181]

3.3 ARCHAEOZOOLOGY

The waste pit in Enzelsdorf, already mentioned in the section on archaeobotany, yielded only a few highly fragmented and therefore hardly identifiable faunal remains.[182] The settlement pits Obj. 1 and Obj. 2 contained a few bones from domestic pigs and cattle.[183] Obj. 3 mainly contained the bones of small ruminants (*Caprinae*, i.e. sheep/goat).[184] The largest of four early medieval waste pits at Kleinklein contained plenty of identifiable material for archaeozoological analysis. The species include domestic cattle, domestic pigs, chickens, small ruminants, roe deer, and wild boar.[185] The bones show signs of cuts, chewing and fire. At least a part of the assemblage is most likely kitchen waste.[186] Based on the size of some of the bones, it can be concluded that the livestock were smaller than in Roman times.[187] This reduction in size is not evident in wild animal bones. The smaller size of farm animals compared to other periods is not exclusively to be seen as negative but had certain advantages, including less required space and food consumption; the milk yield is difficult to estimate.[188] The analysis of animal bones from Schwanberg[189] showed remains of (domestic) cattle, small ruminants, wild boar and red deer.[190] The number of (determinable)

the second half of the 7th, or possibly the first half of the 8th century: Gutjahr 2018, 45; 2020, 69–7. A charred cereal grain from this context yielded a radiocarbon date of the late 7th–9th centuries.

[170] Parcel No. 393. See: Gutjahr 2003; Thanheiser, Walter 2003.

[171] A distinction between durum wheat (*Triticum durum*) and common wheat (also: bread wheat; *Triticum aestivum*) was not possible.

[172] Thanheiser, Walter 2003, 189; Tables of archaeobotanical results in: Črešnar et al. 2019, 265–266.

[173] Gutjahr 2020, 68.

[174] Thanheiser, Walter 2003, 185. – The sample material contained only grains, other parts of cereal plants were completely absent, and the proportion of so-called "Erntebegleiter", i.e. wild plants associated with agriculture, was very low.

[175] Mele, Kiszter 2017; Kiszter et al. 2019. – It is the area of a Roman settlement, probably a *villa*.

[176] It is the largest of four waste pits that were documented in the course of the excavations in 2017 and 2018.

[177] Kiszter et al. 2019; Heiss, Wiesinger 2019; Tables of archaeobotanical results in: Črešnar et al. 2019, 267. – Another (albeit uncertain) find of rye might be counted among the cultivated plants.

[178] Kiszter et al. 2019.

[179] For Schwanberg/Tanzboden, see the excavation reports (a selection): Schrettle 2011; Kiszter, Schrettle 2016. – It could be an early fortification, although S. Kiszter and B. Schrettle remain cautious regarding the interpretation: Kiszter, Schrettle 2020.

[180] From the excavations in 2012, 2015 and 2016: Tables of archaeobotanical results in: Črešnar et al. 2019, 269–272; Heiss, Wiesinger 2019, 352–356.

[181] Kiszter, Schrettle 2020, 35–36.

[182] Gutjahr 2003, 168.

[183] Contribution by G. Christandl in: Gutjahr 2015b. See also: Gutjahr 2015b, 75; 2020, 68. – Among the pig bones, at least one younger and one older specimen could be identified.

[184] Gutjahr 2018, 45; 2020, 69. – The number of bones is small. The distinction between the bones of sheep and goats is considered a "classic problem" in archaeozoology.

[185] Kiszter et al. 2019; Toškan 2019, 372–375.

[186] This is indicated by the traces of fire. The cuts that were found on almost all bones indicate "secondary butchery", i.e. the (further) dissecting of animals. According to B. Toškan, the chewing marks can be traced back to the fact that waste was lying around on the surface for a while and was not covered straight away, so that dogs could chew on it: Toškan 2019, 374. See also: Kiszter et al. 2019.

[187] Toškan 2019, 374. This phenomenon is already widely known for the Early Middle Ages.

[188] It has been stated that smaller cows can in some cases even produce larger amounts of milk: Frosdick 2010, 20–21. – Cf. the considerations of A. Pleterski, who assumes a poor milk yield in early medieval Slovenia: Pleterski 2008, 149.

[189] Excavations in 2015 and 2016: Toškan 2019. – For the present compilation, only the part relating to the Early Middle Ages is taken into account.

[190] There are also numerous indeterminate animal bones ("*indeterminatus*").

bones from the early medieval contexts is small, but cattle and sheep/goats clearly predominate; game is only documented by a single find. Here, too, the smaller size of the farm animals (specifically the small ruminants) compared to Roman times was evident.[191] On the hilltop Kirchberg/Deutschfeistritz[192] an iron-processing plant, which can probably be associated with an early castle, was uncovered in 1949.[193] In addition to early medieval pottery, iron slag, metal objects and animal bones were found. Unfortunately, most of the finds can no longer be linked to specific features, which is why it cannot be ruled out that some of them belong to the high medieval phase of the site.[194] According to the excavator M. Mottl,[195] the animal bones included domestic dogs, domestic pigs, shorthorn cattle, goats, horses, deer, beavers and brown bears. In the course of a revision of the finds, which are only partially preserved,[196] cattle, pigs, small ruminants, some wild boar bones and the canine of a bear could be identified.[197] The material also contains tools made from animal bones, including a bone needle from the fibula of a domestic pig and a bone awl from the tibia of a domestic sheep/goat, as well as a spindle whorl made of bone and the antler shoot of a red deer with cut marks.[198] The identifiable game species suggest extensive forests in the area around Deutschfeistritz in the (Early) Middle Ages.[199] Excavations at the early medieval settlement "Im Rasental" between the hilltops Wildoner Schlossberg and Buchkogel have yielded numerous animal bones, mainly cattle, but also a significant amount of horses, complemented by pigs and a small amount of game.[200] Only a few animal remains of domestic cattle and sheep/goats were found in two settlement pits at St. Ruprecht an der Raab, which have been dated to the second half or the last third of the 7th century.[201] In the excavated features of the early medieval settlement of Weitendorf, animal remains were rare, and they could not be identified with certainty.[202] The section of the settlement covered by the excavation is likely to have been a craft/workshop area; the pit in question contained a significant amount of pottery.[203] Animal bones from other sites are sometimes mentioned in preliminary reports,[204] in some cases the analysis is still pending.[205] At the Alpine site of Tiefgrube/Steinigrube at approx. 1640 m a.s.l. on the eastern Dachstein plateau, the investigation of a fireplace within the stone foundation of a small wooden cabin revealed, among other finds, various animal bones, including sheep/goats, chamois, deer, brown hare, the cut off part of a stag antler and two small fragments of horn cores, possibly from domestic cattle. A radiocarbon date from the fireplace indicates its use in the Early Middle Ages (7th/8th centuries).[206] Sheep, goat and cattle would go well with the early medieval alpine farming assumed for the eastern Dachstein plateau; additionally, the wild animal bones suggest hunting. However, the site was also used in other periods – Roman Age finds were made in the immediate vicinity – so the question arises whether all the bones that originate from the foundations of the cabin can be assigned to the Early Middle Ages.

In Styria, early medieval faunal remains were not only found at settlement sites, but also in graves. In these cases, food offerings can be assumed. This can be regarded as an expression of non-Christian ideas about the hereafter or incomplete Christianisation; in this matter, fluent transitions are likely.[207] The custom of food as a grave good is common in the early medieval eastern Alpine region, especially in the 8th century. Poultry bones (especially chicken bones), eggshells, but also pig bones occur. The food was usually placed at the feet of the buried individual.[208] Pottery vessels in graves also indicate food and drink as grave goods.[209] From the

[191] Toškan 2019, 380.

[192] Gutjahr 2006.

[193] It is located on the western slope of the hilltop. According to the pottery, the early medieval use of the site began as early as the 8th/9th centuries: Gutjahr 2006, 308.

[194] In addition, some of the finds origin from a small cave called "Kinghöhle", which is also located on the western slope, in the vicinity of the other features. See: Gutjahr 2006, 283.

[195] Cited in: Modrijan 1963, 48–50.

[196] Gutjahr 2006, 283–284.

[197] See: Christandl 2006. – Some other bones could not be determined.

[198] Gutjahr 2006, 302–303.

[199] Gutjahr 2006, 284.

[200] Gutjahr 2007b; 2018, 42; Ch. Gutjahr, private communication. – A comprehensive publication of the excavation is being prepared by the excavator Ch. Gutjahr.

[201] Gutjahr 2020, 66. On St. Ruprecht also: Schipper 1996; Gutjahr 2002, 149–150; 2018, 44–45.

[202] Only in object 128, a settlement pit: Gutjahr 2011a, 145, 151. – The animal bones were identified as the tooth of a horse or cattle and possibly the calcined metatarsal bone of a pig. In addition, there are a few small indeterminable calcined fragments.

[203] For the interpretation of the Weitendorf site, see: Gutjahr 2011a, 150–151, 163.

[204] E.g. in Unterbergla in the Laßnitz valley, pits with early medieval pottery and animal bones were examined: Fuchs, Grzywacz 2011. – Based on the pottery, the pits can be preliminarily dated to around 800 AD.

[205] For example, a very small amount of burnt bones was found together with early medieval pottery during the 2021 excavation at the rampart on Frauenkogel near Gösting (see also: subchapter 2.3).

[206] Two additional radiocarbon dates from the entrance area revealed a younger age (9th–13th and 10th/11th centuries): Mandl 1996, 64–65; 2003, 200. – A similar site, also with an early medieval radiocarbon date, is located at Stornalm/Kehr (also on the eastern Dachstein plateau): Mandl 1996, 65.

[207] Summarising the problem: Breibert 2015, 152–153; 2022, 131. Breibert (2011, 565) states that "food and beverage gifts indicated by animal bones or remains of wooden buckets or vessels rather contradict Christian ideas".

[208] Breibert 2015, 152–153; Breibert 2022, 129–131.

[209] For the southeast Alpine region: Nowotny 2008, 29;

burial site at Krungl,[210] at least two burials with animal bones are known: Grave 258 (child) contained, among other things, bird bones, grave 269 (adult), among other things, a boar's tusk, and in both graves other (undetermined) animal bones were found.[211] It is likely that there were more burials with animal bones, but that these were neither documented nor preserved in the course of the early excavations at this site.[212] For Hohenberg, a horse skeleton is mentioned in a newspaper article of the late 19th century, but the context remains unclear.[213] In the course of the investigation of the early medieval burial ground in Graz/Alte Unversität, 18 graves with 19 burials that date back to around 800 AD were examined.[214] Grave 2 contained the bones of a chicken and probably a young duck and a goose, which can be interpreted as food offerings.[215] In addition to pottery vessels, animal bones were also found when three graves were unearthed in 1937 in Stainach[216] (Enns valley), however, the early medieval dating of the bones does not appear to be entirely certain.[217] In Grötsch (Laßnitz valley) 54 burials of an early medieval burial site were scientifically examined, some of which contained bird bones.[218] In Pürgg/Unterburg two of the three excavated early medieval graves contained a "bird skeleton".[219] The graves of Grötsch, like those of Stainach/Schwimmbad and Pürgg/Unterburg, can be dated to around 800 AD.

Eichert 2010, 130, 134–135; Gutjahr 2015a, 89; Breibert 2022, 129–131.

[210] Most recently: Breibert 2008; 2011; 2015; 2022. – The burial site was in use in the 8th–10th century (approx. 740–1000 AD).

[211] Breibert 2022, 131. – W. Breibert assumes that the bird bones must have been chicken bones; in early medieval Lower Austria, they are the most common type of food offering in graves. In Steyr-Gleink (Upper Austria), pig bones are relatively common.

[212] Breibert 2022, 131.

[213] E. Nowotny outlines that the contemporary statements on these early excavations are contradictory: Nowotny 2005, 182.

[214] Fürnholzer 2003; Fürnholzer, Gutjahr 2005; Gutjahr 2007a; 2012, 16–62.

[215] Gutjahr 2007a, 353.

[216] It is the burial site "Schwimmbad". Not far from these, burials at the "Gasthaus Zur Post" were discovered: Kloiber 1953; Modrijan 1963, 79–80.

[217] These could have been relocated bones in the grave filling, but the pottery provides an additional hint to food as grave goods. Ä. Kloiber undertook a (new) assignment of the finds to the individual graves on the basis of Schmid's excavation notes: Kloiber 1953. Mention is made of splinters from a boar's tusk and remains of the lower jaw, as well as teeth "from herbivores" and an animal tubular bone. See also: Gutjahr 2015a, note 74.

[218] Kramer 1981, 206–207; 1995, 89. – A comprehensive publication of the burial site by Ch. Gutjahr is in preparation. The bird bones are probably chicken bones (private communication Ch. Gutjahr).

[219] Kramer 1980, 7.

3.4 ANTHROPOLOGY

Anthropological analyses make a vital contribution to our understanding of the relations and links between the settlers and their environment. By now, anthropological examinations of skeletons from the (incompletely excavated) burial sites of Peggau, Graz/Alte Universität, Frauenburg, Mariahof and from a single burial in Deutschfeistritz have been made.[220] In the following section, only a few aspects that appear relevant to the above-mentioned topic are singled out. Among the 21 individuals of the early medieval burial site of Peggau in the middle Mur valley (approx. second half of the 8th century), six skeletons show changes in the thigh bone which have been identified as "Poirier's facets" and are considered as an indication of frequent riding.[221] Ch. Gutjahr points out that in the Early Middle Ages, riding was reserved for an upper class, and that the group of people buried in Peggau probably represent the entourage of a local ruler, maybe the owner of the fortification on Kirchberg/Deutschfeistritz, just across from Peggau on the right bank of the river Mur.[222] Two thirds of the examined skeletons show signs of deficiency diseases, which according to S. Renhart[223] indicate an at least temporarily strained nutritional situation and a diet low in vitamins. In the examination of the 19 skeletons from Graz/Alte Uni-

[220] For Peggau: Contribution by S. Renhart in: Gutjahr 2012, 172–189. For Graz: Contribution by S. Renhart in: Gutjahr 2007a, 360–266. For Deutschfeistritz (burial, formerly E-Werk-Straße): Appendix by S. Renhart in: Gutjahr 2006, 330–331. For Frauenburg and Mariahof: Steinegger 2020, 98–108. There are anthropological analyses of one skull from an early medieval burial at Diemlach, and of three skeletons from Stainach, but the results do not seem relevant in this context. For Stainach: Kloiber 1953. For Diemlach: Kloiber1963. As for the skeletons of Leibnitz/Altenmarkt (see note 31), which have only recently been examined, it is so far unclear which could be early medieval.

[221] For the burial site: Gutjahr 2012, 87–170. For Poirier's facets: Gutjahr 2012, 147; Contribution by S. Renhart in: Gutjahr 2012, 182; cf. Steinklauber 2020, 371. – Of the six skeletons with the mentioned characteristic deformation of the thigh bone (in five cases on both sides), five have been anthropologically identified as male (one of them uncertain), one as female. Various skeletal changes are associated with horse riding. Among them, Poirier's facets are considered particularly significant; in Avar and early Hungarian equestrian graves, for example, they occur frequently (Berthon 2019; Bühler, Kirchengast 2022). However, in the past there was often confusion in the terminology of changes in the neck of the femur, as Radi et al. (2013, 261–263), Berthon (2019, 77, 143–144) and Göhring (2021, 513–516), among others, emphasise; furthermore, it cannot be completely ruled out that Poirier's facet is occasionally caused by other activities than riding.

[222] Gutjahr 2012, 147.

[223] Contribution by S. Renhart in: Gutjahr 2012, 181–182.

Fig. 5: The Sausal area in winter with the Koralm mountain range in the background. View to the west. (Photograph: I. Koch.)

versität, six individuals showed changes in the bones caused by deficiency diseases.[224]

3.5 SELECTED WRITTEN SOURCES

Some written sources provide additional information on economic practices and the exploitation of natural resources in early medieval times in the research area.[225] As an example, the above-mentioned[226] charter from 970[227] can be cited, a donation from emperor Otto I to the archdiocese of Salzburg. Among the donated properties are the "curtis Vduleniduor"[228] with 50 dependent farmsteads, the "civitas Zuib" (or at least the emperor's share of it), the "locus Lipnizza" and the "nemus Svsil". The location of these properties remains controversial.[229] While the *curtis* might be identified as the site on Ulrichsberg near Deutschlandsberg,[230] and "Zuib" and "Lipnizza" most probably can be found in the area of Leibnitz, Frauenberg and Leibnitzer Burgberg,[231] the forest *Susil* can be associated with the hilly and partly steep terrain west of the Leibnitzer Feld, which today still bears the name "Sausal" (*Fig. 5*). In a charter from 982[232] Otto II confirms the donation, defining the limits of the *civitas Zuib* and mentioning appendant fields and oak forests. *Susil* ("Susel") is also mentioned, this time as "forestis cum banno" and with the addition that here in "dulcibus vallibus" bears and wild boars could be hunted exclusively during a precisely defined period from three weeks before the autumn equinox

[224] Contribution by S. Renhart in: Gutjahr 2012, 75–76. – The skeletons in question include two individuals that have been anthropologically identified as women, one man and three subadults.

[225] For example, by mentioning manorial centres (*curtis* or similar). Alongside manorial structures, a certain number of "free" settlers can be expected. They are probably inadequately represented in the written sources: Giesler 1997, 277.

[226] See note 126.

[227] MGH DD OI no. 389. Transcription and translation: Karl 2013, 198–199.

[228] This Slavic toponym can be roughly translated as "farmstead/manor in the valley". Its German name "Nidrinhof" is also mentioned in the charter. For an interpretation of the Slavic term "dvor": Pleterski 2013, 166–167.

[229] Summarised by: Karl 2013, 156–157, 198–205, note 530. See also: Giesler 1997, 338–339. With particular attention to the archaeological evidence: Lehner 2016, 154–159; Gutjahr 2020, 77.

[230] A rampart on Ulrichsberg near Deutschlandsberg (Western Styria) is visible in the digital terrain model; an early castle (11th century) at the location of today's church (St. Ulrich) was documented during excavations: Lehner M. 2004. – Some pottery fragments and radiocarbon dates give evidence of an early medieval phase.

[231] Karl 2013, 205.

[232] MGH DD O II no. 275. Transcription and translation: Karl 2013, 199–200. See also: Giesler 1997, 328–331.

until St. Martin's Day.[233] Accordingly, hunting in this area had been a royal/imperial privilege that now passed to Salzburg. The fact that big game (bears) was hunted here is noteworthy, as this area was hardly remote in the Early Middle Ages, but was surrounded on all sides by settlement sites.[234]

The extraction of salt as an important natural resource in early medieval Styria[235] is so far only attested by a charter: In 931 a farmstead in the Lavant valley (Carinthia) with an (iron) smelting furnace was exchanged for a salt pan and properties in Admont (Upper Styria).[236] The exchange took place between Count Alberich and the archbishop of Salzburg. To date, no early medieval finds originate from the Admont area. W. Breibert[237] considers the salt trade to be an economic basis of the settlement to which the Krungl cemetery belongs. Both salt production using salt pans and iron smelting are accompanied by a high demand for firewood.

3.6 DISCUSSION

As stated above, due to the mostly small excavated sections of settlements, no statements can be made on the size of the early medieval villages or farms or on the internal disposition of settlements. Several settlement pits, often of unknown function, have been documented at various sites. There are no buildings or outlines that could be clearly identified as farm buildings, storage buildings or stables.[238] In the case of Enzelsdorf, there are at least indications of the chronological dimension of an early medieval settlement. Here, a continuous existence from the 7th to the 10th/11th century is at least likely, based on the individual features that have been excavated so far. They are located at some distance from one another, so small-scale relocations cannot be ruled out at the moment.[239] Also at Wildon/Im Rasental and Kleinklein, a continuity of settlement over several centuries seems likely.[240] At the current state of research, conclusions about the population count of communities may at best be drawn from the burial sites, but these, too, have in most cases not been fully excavated. One possible exception is Grötsch. Ch. Gutjahr[241] assumes that the site was in use during two or three generations (approx. from the last third of the 8th to the first third of the 9th century). Based on a number of 70 burials (54 of which were archaeologically documented),[242] it might have been the inhabitants of a single farmstead who buried their dead here.[243] In cases where the excavated part of a settlement is small, the location of the site can still give a hint to its economic focus. An essential question is that of the availability of suitable arable land.[244] In addition to soil types, the shape of the terrain and hydrological conditions can be included.[245] If there is little or no suitable arable land in the vicinity of a settlement, a different economic focus (e.g. animal husbandry, metal production, etc.) might be considered. In the study area, there are indications for early medieval extraction and processing of bog iron ore.[246] At the moment we can only make assumptions about the role of other raw materials; the extraction of salt in Upper Styria at least appears in the written sources.[247]

[233] Cf. Fichtenau 1981; Jeitler 2008, esp. 14–15, 20–21. – The establishment of a *forestis* was a way of excluding the public from the use of the forest. Initially, apparently only the king was authorised to do this.

[234] Corresponding considerations on Gars-Thunau: Czeika 1999, 178.

[235] Summarising: Winckler 2012, 161–163; Breibert 2022, 158–161.

[236] Steirisches Urkundenbuch 1, No. 20. – Admont is already mentioned in 859 as "Ademundi vallis" on the occasion of a donation: Steirisches Urkundenbuch 1, No. 6.

[237] Breibert 2022, 158–163, 165.

[238] Gutjahr 2012, 204; 2015b, 82; 2018, 45.

[239] Gutjahr 2015b, 82, 86. – The high medieval village of Enzelsdorf developed on a considerably lower altitude, at the edge of the Mur valley.

[240] This militates against the idea of continuous settlement relocation due to depleted soils, as stated by: Winckler 2012, 258, 296. – For the concept of shifting settlement locations see also, among others: Schreg 2011, especially 313–314.

[241] Gutjahr 2012, 11. He speaks of a "Hofgrablege".

[242] Kramer 1981, 206–207; Gutjahr 2012, 10–11. – Approx. 15 graves are likely to have been destroyed before the excavation.

[243] Estimating the number of families/individuals belonging to a farming unit in the Bled region: Pleterski 2013, 159, 164.

[244] Not forgetting that a clearing of woodland was usually necessary. Within the research area, there is no good case to believe that arable land survived from Late Antiquity on a large scale. Clearing also has an influence on the soil: Pleterski 2013, 156.

[245] Lozić 2021. See also: Lozić, Koch 2024 in this volume.

[246] Here, above all Weitendorf (finds of stones with traces of strong heat as possible remains of (smelting) furnaces and limonite concretions; Gutjahr 2011a, 150–151) and the Kirchberg /Deutschfeistritz (see note 14 and subchapter 3.3) should be mentioned. Also at Enzelsdorf, there are indications of iron processing (Gutjahr 2015b, 74; 2020, 69–70; contribution by D. Modl in Gutjahr 2015b, 84), but these appear to be relocated Roman finds. In this context, the indication of early medieval settlement activity in the Eisenerz area, where iron is still mined today, in the pollen profile of Leopoldsteinersee is of interest (see subchapter 3.2.1). Stamped pottery found during an 1931 excavation at Vordernberg near Eisenerz (Schmid 1932, 56–59) has been dated to the 6th/7th centuries by C. Eibner (1992, 26), though a dating to the Late Middle Ages appears to be more likely (private communication Ch. Gutjahr and J. Kraschitzer, see also Gutjahr et al. 2024 in this volume, subchapter 3). On the question of iron production in the Leibnitzer Feld: Lozić, Koch 2024 in this volume.

[247] See above, subchapter 3.5.

The pollen profiles available for Styria only permit limited statements for the Early Middle Ages, as a more precise chronological breakdown is often not possible. A general decline in the cultivation of grain compared to Roman times can be seen, but also the cultivation of rye stands out. Archaeobotanical analyses of samples from archaeological excavations have so far been rare in Styria,[248] however, the state of research has recently improved.[249] Particularly noteworthy is the Enzelsdorf site, where features of the 7th/8th centuries have yielded a wide range of grains, supplemented by legumes. A similar diversity can be found in a rubbish pit from the 10th century at the same site. The cultivation of several different types of grain contributes to food security, as crop failures of a single type can be compensated for, the cultivation of summer and winter grain allows for a better distribution of the work, and the possibility of crop rotation prevents soil fatigue.[250] The various species also make different demands on the soil and have different advantages and disadvantages.[251] Also at Schwanberg, several types of grain could be identified, including oats. The plant remains from Kleinklein include barley and millet and also show the influence of humans on the ecosystem in the form of synanthropic species. Although there are only a few extant analyses, based on rather small amounts of botanical remains, it can be established that for now, barley is a grain that is always present, usually also rye, often millet.[252] Most of the identified plant species are to be seen in the context of arable farming and cultivation. Especially with fruit and nuts, an acquisition by collecting wild fruit is also possible, in addition to horticulture.[253] Finds of early medieval agricultural tools are not yet known in Styria.[254]

Animal remains as evidence of animal husbandry are known from various early medieval sites within the research area, including settlement sites and burials. However, the level of research into this group of materials is very inhomogeneous. Sometimes animal bones are only briefly mentioned, and there are indications that they were in some cases not picked up during excavations in the late 19th and early 20th century or were left in place afterwards.[255] An expert archaeozoological analysis has only been undertaken for the finds of a few sites. Here, too, the state of research has recently improved significantly.[256] Still, most of the assemblages consist of small amounts. It follows that a list of the identifiable species can be made, but further analyses are hardly possible.[257] This applies, for example, to the ratio of the individual species to the total number, from which conclusions could be drawn about the importance of a species for human nutrition.[258] Still it can be assumed

[248] It is necessary for appropriate sediment samples to be taken during the excavation. An overview of archaeobotanical research on medieval complexes in Austria up to 2013 is given by: Kunst, Popovtschak 2013.

[249] Above all, within the scope of the "PaleoDiversi-Styria" project and the resulting publication (Črešnar et al. 2019). The earliest analysis presented for an early medieval site in Styria is that of Enzelsdorf: Thanheiser, Walter 2003.

[250] Thanheiser, Walter 2003, 185. – It is difficult to say at which time the use of the two- and three-field-system (i. e. crop rotation) began in the south-eastern Alpine region; Slavic populations are sometimes associated with slash-and-burn methods in agriculture, but obviously this does not apply always and everywhere: Pleterski 2008, 119; 2013, 160, 179. With regard to the western Slavs, Brather (2008, 171) speaks of an alternation of cultivation and fallow land, each lasting several years ("Feld-Gras-Wirtschaft"), from the 9th century onwards. He continues that the fallow periods were then shortened in late Slavic times, and that the classical three-field system was not introduced until the Late Middle Ages. In contrast to this, for the area of Bled (Slovenia), the three-field system is assumed as early as the 8th century and may have been deployed alongside occasional slash-and-burn practices: Pleterski 2008, 119. Schreg (2011, 314) emphasises that there are also some serious risks inherent in the three-field system, especially when combined with larger fields, shorter periods of fallow and an increased need of manure, resulting in a decline in biodiversity, soil exhaustion and increasing erosion.

[251] For example, spelt is considered to be particularly robust; husked grain is easier to store; bread wheat has higher demands on warmth, moisture and soil quality than rye; barley prefers a mild, not too humid climate; millet has little water requirement, but is sensitive to frosts: Colardelle, Verdel 2000; Thanheiser, Walter 2003, 184–185. In general, low grain yields are assumed for the Early Middle Ages.

[252] Rye and millet are also abundant e.g. in archaeobotanical assemblages from the early medieval settlements of Sand and Gars-Thunau (Lower Austria): Kunst, Popovtschak 2013, 118. Further examples of the predominance of rye and millet (alongside wheat) can be found in the early and high medieval Thaya (Dyje) and Notte valleys: Biermann, Macháček 2015, 192–294. See also: Štular, Lozić 2024 in this volume.

[253] Thanheiser, Walter 2003, 186–187. – The sensitive peach tree, for example, needs sufficient care in order to thrive (cf. Kühtreiber 2006, 149). Black mustard (*Brassica nigra*), which was found in the 10th century waste pit at Enzelsdorf, is an important spice plant, of which there were still abundant wild occurrences up to modern times: Thanheiser, Walter 2003, 168. Mushrooms, honey etc. could also be obtained from the forests (cf. Brather 2008, 175–176).

[254] In this context, however, a whetstone and a possible millstone fragment from St. Ruprecht an der Raab are worth mentioning: Gutjahr 2018, 44.

[255] In addition, some finds are (currently) missing.

[256] Črešnar et al. 2019.

[257] For the possibilities that arise from abundant data, see among others: Hüster-Plogmann et al. 1999; Saliari, Pucher 2019, 270–271. For uncertainty factors and distorting effects that should be taken into account when interpreting animal bones, see also: Kühtreiber 2006, 146.

[258] For a possible composition of a family's/farmstead's livestock, with regard to the early medieval settlement of Pristava: Pleterski 2008, 149. – A. Pleterski also emphasizes the minor importance of meat for the nutrition of ordinary people: Pleterski 2008, 120, 149–150.

that pigs made a significant contribution to the consumption of meat.[259] Statements on the distribution of bones within a settlement area that could indicate areas of activity (slaughter, dismembering, cooking, crafts, waste disposal) are currently very limited. There is also a lack of data on the age and sex of animals at slaughter, which could provide information on primary use, breeding and possibly meat deliveries "from outside".

The farm animal species identified for the study area in the Early Middle Ages include cattle, (domestic) pigs, small ruminants (sheep/goats), chickens and horses. Various types of poultry and pigs have so far been identified in burial contexts. Although nutrition can be assumed to be the primary motivation for most animal husbandry,[260] the actual type of use (meat, milk, draught animal, riding, wool, bones, hides and horn as raw material for crafts etc.[261]) can rarely be determined. Finds of spurs and the anthropological observation of Poirier's facets on skeletons hint at the use of horses as riding animals. Spurs are currently known from at least four early medieval burial sites in Styria.[262] Usually it is only a single burial within the site that reveals a member of the local elite in this way.[263] Apart from the burials, there is also a spur from Kirchberg/Deutschfeistritz.[264]

For the high proportion of pig bones, which is often found in early medieval contexts,[265] there is a variety of possible explanations. On the one hand, pig farming is linked to a suitable environment ("open" forests as wood pastures).[266] R. Frosdick[267] emphasises the advantages of the omnivorous pigs, which are easier to feed, for new settlement sites that are only just being established. As an alternate explanation, a high proportion of pigs at some early medieval sites in southern and eastern (central) Europe has been interpreted as an expression of a preference of the Slavic population.[268] Indeed, in the Early Middle Ages the proportion of pigs in animal husbandry increased in most regions of Central Europe compared to Roman times, but this is also true, for example, for non-Slavic parts of today's Germany.[269] N. Benecke[270] links this phenomenon to a change in agricultural methods, which resulted in less fallow land in agriculture and therefore less pasture for sheep and cattle. For the advancing Middle Ages, pork – especially the consumption of younger animals – is considered typical of an aristocratic diet, along with poultry and fish.[271]

Alpine farming on the eastern Dachstein plateau is proven by early medieval radiocarbon dates from hut locations and various early medieval stray finds. For these sites, seasonal use can be assumed, and they must have had associated farmsteads in the valley, for which archaeological evidence is largely lacking so far. If the animal bones from the site Tiefgrube/Steiniggrube are actually to be dated to the same (early medieval) period, this would prove that cattle and sheep/goats were taken to the mountain pastures.[272] This data is relevant for understanding the early medieval settlement development,

[259] This is indicated e.g. by the larger pit at the site of Kleinklein. See above (subchapter 3.3).

[260] Except possibly in the case of sheep (wool production) and probably in the case of horses. See: Gutjahr 2006, 283–284. – Eating horses is largely tabooed in the Middle Ages, especially in the christianised areas, but – as archaeozoological results show – it seems to have happened now and then. Examples can be found in: Pucher, Schmitzberger 1999, 117; Kühtreiber 2006, 147; 2010, 69; Frosdick 2017, 129–130. S. Brather states that horses were used as riding and draught animals: Brather 2008, 180. M. Schmaedecke (2000, 109–110) on the other hand believes that in the Early Middle Ages, the use of horses was constricted to riding, and that cows or oxen were the only draught animals.

[261] Further examples: Brather 2008, 182; Winiwarter 2010, 11. – V. Winiwarter speaks of "multifunctional animals". Some types of use are though difficult to prove archaeologically, e.g. the deliberate spreading of manure as fertiliser on the fields, which became common practice only in the 11th century according to: Colardelle, Verdel 2000.

[262] Pürgg Unterburg (1 fragment); Waltersdorf Bleikolmhügel (1); Grötsch (1); Hohenberg (3 fragments).

[263] From this representation as a mounted warrior – or at least a person who rides – the presence of horses can be deduced, assuming that spurs don't have only symbolic meaning. Cf. Saliari, Pucher 2019, 270 ("Die Anwesenheit von Pferden ist oft mit einer Elite verbunden, die sich diese Tiere und ihre Kosten leisten konnte."). This is also evident from early medieval written sources.

[264] Gutjahr 2006, 26.

[265] Benecke 1994, 196; Brather 2008, 176. – But this is not always the case; in Sand (10th century), for example, game predominates, and cattle come first among the domestic animals: Pucher, Schmitzberger 1999, 199; Saliari, Pucher 2019, 266–267.

[266] Among others: Rehazek, Marti-Grädel 2010, 63; Kühtreiber 2010, 67–68.

[267] Frosdick 2010, 20–21.

[268] Toškan 2019. – L. Bartosiewicz notes a sharp drop in the proportion of pigs in early medieval Hungary after the Hungarian conquest: Bartosiewicz 1999, 146.

[269] Benecke 1994, 125, 128; Brather 2008, 176. – Conversely, the early medieval settlement of Pristava (Slovenia), which is referred to as Slavic, shows a prevalence of cattle, followed by *caprinae*, and only a small amount of pig bones; the analysis is however based on a rather small assemblage: Toškan, Dirjec 2008.

[270] Benecke 1994, 201.

[271] Among others: Hüster-Plogmann et al. 1999, 230; Kühtreiber 2010, 68–69; Rehazek, Marti-Grädel 2010. – This tendency can already be observed for the zones of higher status at the early medieval centres of Pohansko and Mikulčice (Biermann, Macháček 2015, 294), but most of the data originate from high to late medieval castle sites. But even at sites with a high social status, the pattern cannot be observed equally everywhere. Both the social stratification among the elites and a chronological development within the Middle Ages have to be taken into account. Cf. Pasda 2003, 131–135, 149–150.

[272] For a compilation of (albeit undated) animal bones: Mandl 1999.

which apparently not only spread in the river valleys and at their edges, but also (occasionally) used regions at very high altitudes.[273] A few fragments of early medieval pottery cauldrons are also known from the research area,[274] a connection with milk processing (specifically cheese production) has been suggested.[275] The manufacture of yarn and textiles is documented by spindle whorls and loom weights; sheep farming can be assumed for this purpose. The use of flax in early medieval Styria has not yet been proven. Spindle whorls are extant from several known settlement sites,[276] also from the burial site of Pürgg, and there are loom weight fragments from Enzelsdorf and from Kirchberg/Deutschfeistritz.[277]

Bones of wild animals (as evidence of hunting) are known from several sites and include roe deer, wild boar, red deer and bear, possibly also chamois, brown hare and beaver. Among these sites, Schwanberg and Deutschfeistritz represent potential early castles,[278] but wild animals were also identified at Kleinklein, a settlement that can be preliminarily referred to as "rural" based on the small section excavated so far. The proportions of game in the animal bones varied widely in early medieval Europe, but were mostly low.[279] Hunting and the consumption of game are often associated with a social elite.[280] A central question is whether – or rather, from which time on – the right to hunt was limited.[281] For the Sausal forest, there are regulations regarding bear and wild boar for the late 10th century. Otherwise, it is likely that in areas that were largely covered by forest in the Early Middle Ages, the population's diet was supplemented by game.[282] An arrowhead from the Feistringstein cave north of Aflenz can be considered as possible evidence of hunting.[283] Numerous bear bones were found in the cave. However, the arrowhead is a stray find, and even if it really is late early Medieval, the wounding or killing of one of the bears at this time is not proven.[284] Fishing and other ways of exploiting the river landscapes can be assumed but have not yet been verified for early medieval Styria.[285]

The picture drawn by archaeozoology, archaeobotany and anthropology is complemented by archaeological results, (non-organic) finds and the sparse written sources. Overall, we can state a very extensive use of natural resources, in the form of diversified agriculture,[286] intense animal husbandry and hunting, supplemented by crafts (especially textile processing), in some places with a specialised focus on iron or salt production. Forests were not just areas that still had to be cleared, but were also valuable suppliers of food and raw materials as well as, in some cases, protected noble

[273] The fact that there is not more evidence of early medieval activity on alpine pastures in Styria is most likely due to the state of research. J. Horvat gives numerous examples of early medieval sites between 1200 and 1700 m a.s.l. in the Julian and Kamnik-Savinja Alps and the Karawanks. Some of these sites are apparently not (only) related to pasture farming, but (also) to ore mining: Horvat 2019.

[274] Gutjahr 2011b; Gutjahr et al. 2018, 25; Tiefengraber 2018a, 254, Fig. 274; 2018b, 118, Pl. 194,3.

[275] Pleterski 2008, 54, 115, 141, 149. – For comparative examples, see: Pleterski 2008, 16, Fig. 1.4, 76, Fig. 4.92.

[276] Komberg; Weitendorf; St. Ruprecht; Enzelsdorf (2014, pit 1 and 2); Kirchberg/Deutschfeistritz. There are also two spindle whorls from a cave near Gradenberg (near Köflach), which were found together with presumably early medieval pottery, but these are stray finds. For Gradenberg: Modrijan 1963, 56.

[277] Gutjahr 2020, 70.

[278] In any case, these are sites that are at least partially naturally protected.

[279] E.g. in (early) medieval settlements in Moravia (6th to 12th century), only 1–2% game content: Nekuda 1999, 49–50. – Exceptional: An assemblage from the 10th century from the site Sand, in which game accounts for more than 40% according to the number of finds, 54.6% according to the minimum number of individuals: Pucher, Schmitzberger 1999, 111, 120; Felgenhauer-Schmiedt 2008, 332. In addition, a wide range of wild animal species is present at the site. A similarly high proportion of wild animals was found in Gars-Thunau. For general information on hunting, among others: Czeika 1999, 184.

[280] For the Early Middle Ages, among others: Montanari 2000b. For the Middle Ages in general: Kühtreiber 2010, 66; Pasda 2003, 24–30, 149–150. – It should be noted that even at castle sites, the proportion of wild bones is rarely more than 5%, and game thus made little contribution to everyday nutrition: Kühtreiber 2010, 69; Rehazek, Marti-Grädel 2010. Evaluation of examples from Central Europe and southern Scandinavia: Benecke 1994, 191.

[281] On principle, in early medieval times anyone was allowed to hunt: Fichtenau 1981, 18; Bökönyi 1995, 57. Cf. Pasda, 2003, 24. M. Montanari (2000a, 18–19) states (in view of central Europe) that woodland and pastures were abundant and that their use did not lead to any conflicts at least until the 9th century. According to E. Pucher and M. Schmitzberger, hunting for big game was a privilege of the nobility from the High Middle Ages on at the latest: Pucher, Schmitzberger 1999. For Gars-Thunau (finds from the 8th–10th centuries), the relatively frequent occurrence of rare wild animal species (elk, bear, wolf, bison) led to the conclusion that hunting privileges were granted: Czeika 1999, 178.

[282] Especially in areas for which no special rules had been determined, and with regard to less prestigious species. See: Saliari, Pucher 2019; Brather 2008, 183.

[283] Friedl 2000.

[284] A radiocarbon date from one of the bear bones from the cave points to prehistory, but there are bones from other specimen that have not (yet) been dated: Döppes, Pacher 2005, 31–32.

[285] Possibly for taphonomic reasons. See: Saliari, Pucher 2019, 269. – In the settlement of Burgwiese near Ansfelden, for example, there is evidence of a significant amount of fishing for the Early Middle Ages: Trebsche 2008, 217.

[286] This kind of mixed economy ("Mischwirtschaft") is apparently typical of the Early Middle Ages, whereas from the High Middle Ages on, the focus on agriculture/grain dominates: Montanari 2000a, 18; 2000b, 139–140; Comet 2000.

hunting grounds. It can be deduced from the anthropological analyses that despite broad-based agriculture and the additional exploitation of "wild" nature, the danger of malnutrition was immanent at least for parts of the population.[287]

4. CONCLUSION

The distribution of sites in Styria shows that early medieval settlement attained an advanced spatial coverage. An increased density of sites, especially in the Enns and Mur valleys, reveals settlement chambers and local or regional centres. A wide variety of locations were used for settlement, whereas sites on the edges of low terraces that rise only a few metres above the valley floor are rare. Settlement sites are likely to be found on higher terraces, plateaus and slopes. There are particularly numerous sites in a significantly elevated position, on hilltops and crags. This prevalence can be explained by a preference for naturally protected locations, but also by the effort to occupy strategic positions, often at the junctions of traffic routes. In several cases, the use of such places started as early as around 800 AD. However, actual features belonging to early medieval fortifications have so far rarely been documented. This is partly due to the building of high/late medieval castles, which often appear as successors to the early medieval sites at high altitude. It also must be taken into account that settlement sites at low altitudes are often affected by destruction (building, agriculture, roads). In some cases, the associated burial sites are known, which indicate that the settlements in the plains and at the edge of valleys had a larger share in the overall picture than could be proven archaeologically. The fact that prehistoric and Roman sites were often re-occupied by early medieval settlements can partly be explained by the unchanged "favourable locations" and by an orientation towards the traffic routes, which remained similar over time, especially in Upper Styria, where they are mainly determined by the Alps and large river valleys. Furthermore, in some cases an intentional re-occupation of sites can be assumed. Statements about the internal structure of early medieval farmsteads and settlements are currently hardly possible due to the small size of the excavated sections. The archaeological data – supplemented by the results of archaeozoological, archaeobotanical and anthropological investigations – in any case shows diversified land use by means of agriculture, animal husbandry, hunting and other uses of natural resources. In order to be able to assess the location of a site in its entirety, it seems necessary to take into account a wide variety of parameters from the terrain to the (relative) altitude and proximity to rivers, the settlement history of the area, but also the landscape with its resources and the relations between settlements.

[287] Burial sites Graz/Alte Universität and Peggau. See subchapter 3.4. For the precarious nutritional conditions in the Early Middle Ages, among others: Montanari 2000a.

Abbreviations:

ANNALES ALTAHENSES MAIORES = VON OEFELE, E. 1891, *Annales Altahenses Maiores*, Monumenta Germaniae Historica. – Scriptores Rerum Germanicarum in usum scholarum 4, Hannover.

MGH DD LD = KEHR, P. 1934, *Die Urkunden Ludwigs des Deutschen, Karlmanns und Ludwigs des Jüngeren*. – Die Urkunden der Deutschen Karolinger 1, Berlin.

MGH DD LK = SCHIEFFER, Th. 1960, *Die Urkunden Zwentibolds und Ludwigs des Kindes*. – Die Urkunden der deutschen Karolinger 4, Berlin.

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MGH DD OII = GESELLSCHAFT FÜR ÄLTERE DEUTSCHE GESCHICHTSKUNDE (ed.) 1888, *Die Urkunden Otto II* . – Die Urkunden der deutschen Könige und Kaiser 2/1, Hannover.

Steirisches Urkundenbuch 1 = ZAHN, J. (ed.) 1875, Urkundenbuch des Herzogthums Steiermark 1. 798–1192, Graz.

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