

# The application of grapholinguistics in palaeography. A case study: Croatian Glagolitic and Cyrillic palaeography


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*Abstract.* Palaeographic research based on grapholinguistics is a relatively new approach within the framework of Croatian palaeography. To accept writing as a form of expression equal to speech, it was necessary to redefine it and create an adjusted description of it. In the forefront of observation, *script* as a complete material ready to be subjected to structural analysis is replaced with *writing*, a cognitive process that transmits a message from an author to a reader/listener. This view on palaeographic research required a different methodological approach, which was successfully resolved with the invention of *palaeographic categories*. These categories are not an entirely new invention; by observing research material through them, the process of script development became clearer. This method has already been tested on numerous documents and charters from the Croatian Mediaeval period. The material analysed in this research was written in either Glagolitic or Cyrillic script. The main goal of this paper is to present current research related to Croatian Mediaeval literacy that uses this methodology.

## 1. Introduction

As scientific disciplines, palaeography and grapholinguistics have a great deal in common. If we examine the definition of grapholinguistics as “the linguistic sub-discipline dealing with the scientific study of all aspects of written language” (Neef 2015: 711), it becomes apparent that the main connection between them is their shared field of research—writing systems. This particular field of interest is probably one of the main reasons they have been marginalised by “mainstream” scientific fields such as linguistics and history. To some extent, these disciplines are still marginalised and viewed as “auxiliary” sciences. Also, both palaeography and grapholinguistics have a marked interdisciplinary character. Historically, palaeographic research has been conducted

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for more than three hundred years (taking Mabillon's "De re diplomatica libri VI" [1681.] as the starting point). Throughout this lengthy time period, palaeography developed its own terminology and research methods; with the newest technological advances, it launched itself into the sphere of the *digital humanities*.<sup>1</sup> The grapholinguistic method in Croatian palaeography is a relatively new approach. The key work responsible for its introduction, which correctly places Croatian literacy in the broader European context, is Mateo Žagar's *Grafo lingvisti ka srednjovjekovnih tekstova* (Grapholinguistic of Mediaeval texts, 2007). This book also serves as a solid starting point and methodological reference for grapholinguistic-based palaeographic research. Žagar is known as one of the most productive authors in the field of Croatian Slavic Palaeography, and has written numerous grapholinguistic studies of Glagolitic and Cyrillic written monuments, most of which hail from the Middle Ages.

## 2. The Methodology of Grapholinguistic-Based Palaeographic Research

Palaeographic research conducted in this way uses various palaeographic categories as its main methodological tool. These categories are: letter coordination in the linear system and the general characteristics of a given script; special letter forms; word dividers (punctuation and capitalization, use of blank space, and separation of words in texts); ligatures and abbreviations; the writing of numbers in texts. These have been established as the parameters of systematic palaeographic description, and as such, they play a very important role. The category of *coordination in the linear system* primarily implies the process of simplifying and aligning the letter lines in the central part of the system and the development of letter forms within this system with the aim of achieving optimal writing speed while maintaining recognizable, easily read letter shapes. The phenomenon of coordination is necessary for the writing to literally "flow" as quickly and as efficiently as possible. Coordination differs according to letter type, and in some cases, the nature of the document plays a key role in the creation of this process (e.g., coordination in liturgical texts differs greatly from that in diplomatic charters).

The category of *special letter forms* is mainly focused on the morphology of the letter itself. Research on the morphological characteristics

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1. The digital humanities (DH) is an area of scholarly activity at the intersection of computing or digital technologies and the disciplines of the humanities. It includes the systematic use of digital resources in the humanities, as well as the analysis of their application (Drucker 2013: 9).

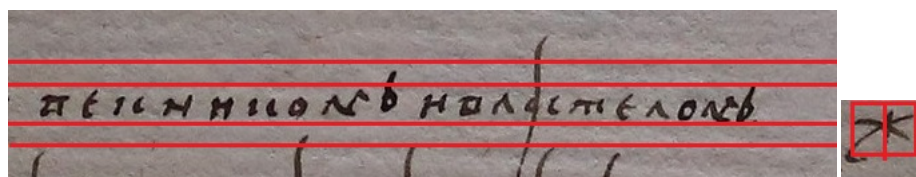


FIGURE 1. Example of a four-line system and its letter module, *Transcript of Emperor Stefan Dušan's Charter* (1352.), Ragusan scribe Đivo Parmezan

of letter forms in various documents allows us to better identify different chanceries and writers, sometimes even different timespans within which a certain letter was used. This is the most important category in grapholinguistic-based palaeographic research.

The separation of individual words in texts with blank spaces that serve as boundary indicators, together with other word dividers, is one of the main conditions for a writing system to be successfully understood. The aim of the study of *word dividers: punctuation and capitalization, use of blank space, and separation of words in texts* is to identify the process by which separate writing was established in a script. The use of word dividers and capital letters is incorporated into every modern European orthography, and their use strongly reflects the civilizational achievement of a given script. Their purpose is to visually optimize a written language message, enabling readers to easily parse the text, both in the case of voiced and silent reading.

Abbreviations, whether contractions, superscriptions, or suspensions, are the result of a writing process derived from the writer's intention to save space on the page. These are largely the result of the ideological motivation that the "sacred words" (sacrament) should not be written in their entirety, following the Jewish principle of not pronouncing the Lord's name. Ligatures also belong to the category of abbreviations, but represent a somewhat different phenomenon. Unlike other abbreviations, ligatures are always generated by a combination of two letters, creating a new, specific letter form.

The *category of writing numbers* identifies all the methods used to write numbers (be it Roman numerals, Arabic numerals, or letters in some scripts like Cyrillic and Glagolitic) and any specifics regarding their writing (if they exist). The provided data is a helpful tool by which to draw parallels between writing methods and various writers and chanceries. This can, of course, also help in the dating of documents—for example, the increased use of Arabic numerals in Croatian history began in the 15th century.<sup>2</sup>

2. Although there are some examples from the late 13 ct. in documents originating from Dubrovnik's chancery (Novak: 293.).

### 3. About the Origins of the Glagolitic Script

Glagolitic script is a unique phenomenon in the world of palaeo-Slavic studies. It shows no immediately apparent similarity to any other known script, and the details of its origins have not yet been fully ascertained. The issue of its creation is one of the most complex questions in the entire field of palaeo-Slavic studies. The main creation theories are divided into three categories—exogenous, endogenous, and a combination of the two (exogenous-endogenous). Exogenous theories are based on the attempt to prove that another script known in the 9th-century Byzantine empire was used as the foundation of Glagolitic script. The most common theories were the Western or Latin theory (including the “St. Jerome theory”), the Gothic or migration theory, the Syrian theory, the Georgian theory, the Armenian theory, etc. The theory claiming that the root of Glagolitic script lies in 8th- and 9th-century Greek minuscule has long been the most widely accepted. This theory was first put forth by Isaac Taylor and Vatroslav Jagić (hence the name *Taylor-Jagić theory*). It survived until the 1970s, when the endogenous view came to the fore (Žagar 2021: 79, 106). The endogenous theories assumed an original, individual approach to the creation of Glagolitic script and the creation of a universal principle according to which its letters were developed, composed, and combined. The combination of three Christian symbols—the circle, the triangle, and the cross—is the basis of Georg Tschernochvostoff’s theological idea of the origins of Glagolitic script. The idea that all the characters in Glagolitic script share a unique graphetic schema (module) was first introduced in 1982 by Vasil and Olga Yonchev. Their attempt to reconstruct a unified letter module from which all Glagolitic letters were derived also included a search for symbolism, but not to the same extent as Tschernochvostoff’s. The proposed wheel/rosetta-shaped module consists of a combination of the symbols of the cross (the letter *a*), Saint Andrew’s cross (X), and the circle. It is also necessary to emphasize that Yonchev correctly recognized that the oldest Glagolitic script was in essence an uncial, two-line script. One of the most important discussions on the origins and development of Glagolitic script was written by Austrian palaeographer Thorvi Eckhardt (1955). She opposed the Taylor-Jagić theory and shifted her research focus to the creative world of Saint Constantine (Cyril), who was most likely the author of Glagolitic script. She focused on the process of writing, discarding the static observation of individual letters.<sup>3</sup>

Of all these theories, the most plausible today is that Glagolitic script was authored by St. Cyril (Constantine), who created it with under

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3. This idea is crucial for the development of grapholinguistic-based palaeographic approach.

the influence of some contact scripts (such as Greek minuscule script, Georgian, Armenian, etc.). This claim provides the best compromise between the exogenous and endogenous theories by connecting them. As St. Cyril was a well-educated scholar, he likely knew many scripts, the letters from some of which were surely an inspiration in the creation process of Glagolitic script. Yonchev's theory and his creation of a geometric letter module should not be dismissed. However, bearing in mind the broad distribution of this geometric element (wheel/rosseta), it is difficult to say if it was indeed the author's intent to create letters according to this module or if the reconstruction of this schema was a byproduct of a deductive research process.

#### 4. The Development of Angular Glagolitic Script and Grapholinguistic-Based Research in Croatia

Within the framework of Croatian Glagolitic palaeography, the most exciting event to occur between the late 12th and early 13th century was the creation of the angular version of Glagolitic script. Unlike the earlier, rounded Glagolitic script, the angular version was almost exclusively used along the modern-day Croatian coastline<sup>4</sup> and part of the hinterland situated west of the river Krka, while Cyrillic script became dominant east of this border. This is the most simplified explanation of the Glagolitic/Cyrillic diachronic aspect of Croatian Mediaeval literacy. Latin script is the third part of this equation, which was best defined by Eduard Hercigonja as "the triliterate and trilingual culture of the Croatian Middle Ages" in his book of the same title (2006).

The development process of angular Glagolitic script is much easier to understand if observed through the category of letter coordination in the linear system. The formation of the letter module in any script is directly related to its linear organisation. In the case of rounded Glagolitic script, the two-line linear organization was responsible for the coordination of the letters and the creation of the recognizable letter module presented by Yonchev. In 13th-century European literacy, the script was *minusculed*. Because of the rise of scribal awareness that written messages should be delivered faster, advanced writing techniques and

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4. There were two unsuccessful attempts at introducing Glagolitic script to the western Slavs. The first was that of Charles IV of Bohemia (1346-1378), who, having received the Pope's permission to reintroduce Slavic liturgy, invited a group of Benedictine monks from Glagolitic parishes in Dalmatia to the Emmaus monastery in Prague. This monastery was later destroyed, together with the initiative, during the Hussite wars. The second was that of King Casimir the Great of Poland (1333-1370), who invited Glagolitic monks to the Benedictine monastery in Kleparz near Kraków (Schenker 1995: 165-166).

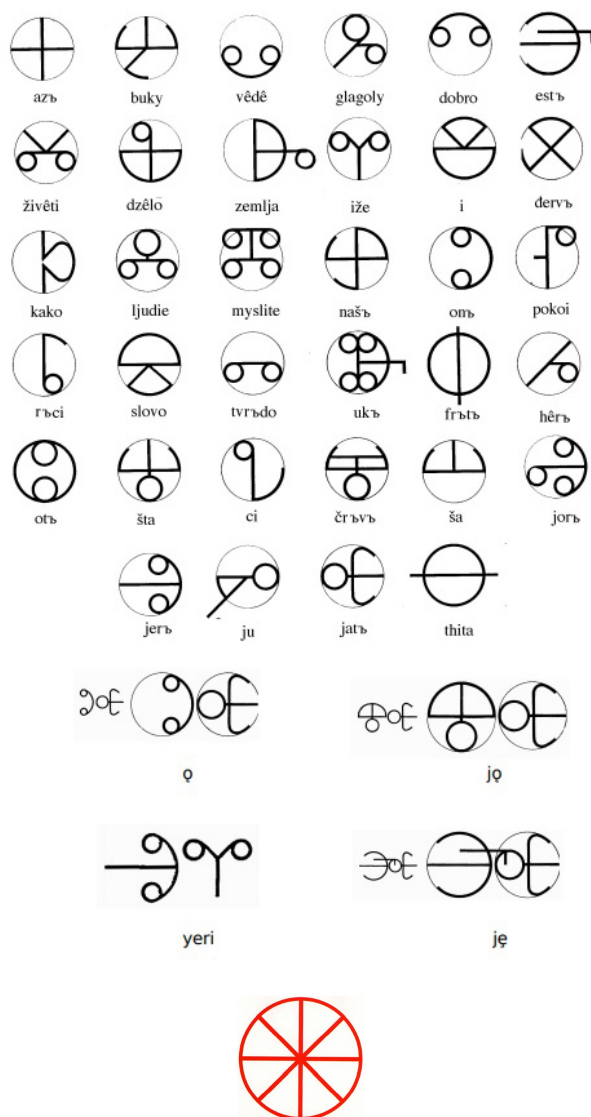


FIGURE 2. A basic portrayal of the rosetta-shaped Glagolitic letter module and the ideal letter forms of round Glagolitic script according to Vasil and Olga Yonchev (1982)

the development of angular cuts to quill tips conditioned a transition to a four-line system of linear text organization, in which the original two lines became the central part of the new system. The main letter parts are coordinated in this central area, while the so-called weak parts (mostly hyper-extended letter lines that are not crucial to the recognition of the letter itself, but are helpful to visual orientation in the text) breach the upper or the lower line (ascenders/descenders), sometimes even both.

The adjustment of complex angular Glagolitic letters to the four-line system created a new square letter module divided into six equal parts. This module was not an exact graphic orientation; it emerged as a concept developed through the minusculation of letter forms. This process also initiated the transition from rounded to angular letter lines (after which these script types are named), the most significant morphological change to take place in the script's history. With it came a change in the letter fields, which opened the way for the more extensive use of ligatures (a special form of abbreviation wherein a combination of two or more letters results in a new letter form). Palaeographic research, such as that conducted under the Scientific Center of Excellence for Croatian Glagolitism, shows the great frequency of ligature writing in Glagolitic liturgical books. For example, The Second Beram Breviary has 322 ligature combinations, which were recorded a total of more than 30,000 times across its 264 folios. This meticulous palaeographic research on the First and Second Beram Breviary (the study on the First Beram Breviary has yet to be printed) is a representative example of recent study of Croatian Glagolitic literacy that is completely based on the grapholinguistic approach. Soon, the Scientific Centre of Excellence for Croatian Glagolitism plans to complete two similar research projects on the First and Second Beram Missal, thus presenting the literary wealth of the Beram Scriptorium.<sup>5</sup> These projects are, by their nature, not merely palaeographic. Each edition includes a printed facsimile and transliteration, studies of morphology, syntax, writing systems, phonology, and vocabulary. In addition to the printed editions, digital databases contain a virtual dictionary with a grammatical and morphological description of each word.<sup>6</sup>

Recent research has placed a greater focus on the graphetic organisation of Glagolitic texts (the visual placement of text on the page, including the division of the text into lines, the formation of word blocks/abandonment of *scriptura continua*, abbreviations, punctuation, the inclusion of different letter sizes and types, the use of blank space as

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5. Beram is a hill settlement in the central part of the Istrian peninsula. It was one of the most important places in Croatian Medieval Glagolitic literacy.

6. Transliterations are available at <https://beram.stin.hr/>. Public access to the dictionary and other data is still unavailable due to the site being under construction.



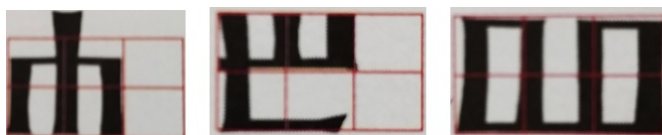


FIGURE 4. Examples of letters *a*, *b*, *v* in the angular Glagolitic script's letter module


word dividers, etc). Unlike traditional palaeographers, who avoided systematic overviews, the grapholinguistic method takes into account the fact that changes in letter forms take place during changes in the visual transposition of texts. As a result, some patterns between round and angular Glagolitic script have been successfully recognized. Blank space is the main word divider, and its use in 7th-century British and Irish scriptoria marked the beginning of the word separation process (the abandonment of *scriptura continua*). In the context of Glagolitic texts, the use of blank space came after the establishment of angular Glagolitic script (13th century); the more frequent use of initials (for chapter marking), versals (segmentation of text), and punctuation came with it. In angular Glagolitic liturgical texts, punctuation was placed in nearly every blank space in the middle of the line. Another use of punctuations was the marking of numerals, which were (as in Cyrillic script) written as letter forms. Each letter had a numeral value; punctuations combined with a superscripted horizontal line (*titlo*) served as the method by which to differentiate between numerals and standard letters. This practice is common between Glagolitic and Cyrillic scripts, the difference being that Cyrillic script began to use Arabic numerals more often in the 15th century (specifically in diplomatic minuscule script).

The use of abbreviations—suspensions, contractions, and superscriptions (and the aforementioned ligatures)—as a method of saving time and space is another graphetic tool used more often in angular than in rounded Glagolitic script. This data represents yet another interesting fact tested and proven in recent grapholinguistic-based palaeographic research. Although traditional palaeographers recognized this more frequent use of abbreviations, the magnitude of the difference in its usage between the observed scripts became visible after the completion of the aforementioned research.

## 5. Grapholinguistic-Based Palaeographic Research on Croatian Cyrillic Literacy

Unlike Glagolitic script, the origins of Cyrillic script are much easier to explain. Based on Greek uncial script, it developed during the First Bul-

TABLE 1. Examples of abbreviations (contractions) from the London fragment of the Saint Apollonia Breviary (Žagar, Badurina, Paskojević 2021: 226)

Primjer	Transliteracija i versta kracenja	Pozicija u tekstu
	<i>c(ēsa)r</i> Kontrakcija	Ia: 7. r., Ib: 1. r., 7. r., IIa: 3. r., IIIa: 13. r., IIIb: 7. r.
	<i>c(ēsa)rstvuetb</i> Kontrakcija	Ia: 6. r.
	<i>b(og)a</i> Kontrakcija	Ia: 10. r. <i>b(ogo)mb</i> , Ib: 3. r., 5. r., 14. r. <i>b(ož)e</i> , IIb: 7. r.,
	<i>b(r̃st)a</i> Kontrakcija	IIIb: 2. r. IIa 5. r., IIIa 12. r.
	<i>is(u)b(r̃st)b</i> Kontrakcija	IIa: 2. r., 6. r., IIIb: 6. r., 14. r.
	<i>g(ospod)i</i> Kontrakcija	Ib: 14. r., IIa: 1. r., IIIa: 6. r., IIIb: 14. r.
	<i>g(ospode)vē</i> Kontrakcija	IIIa: 5. r., IIIb: 13. r.
	<i>g(ospodi)nb</i> Kontrakcija	IIIa: 9. r.
	<i>zap(o)vēdaū</i> Kontrakcija	Ib: 11. r., IIIa: 2/3. r., 13. r., IIIb: 7. r.

garian Empire during the reign of Tsar Simeon I the Great (late 9th—early 10th century) and under the cultural influence of the Byzantine Empire. It was most likely created at the Preslav Literary School by students of Saint Cyril and Methodius (Curta 2006: 221-222). The change in the linear system and the script's minusculation in the 14th cen-

ture is the most interesting dynamic observed in my grapholinguistic-based research<sup>7</sup> on the script as regards Mediaeval Croatian literacy. This includes developmental processes in the graphemic system and script of Cyrillic charters and documents from Dubrovnik's Mediaeval Slavic chancery and its significance in the broader geopolitical context, especially in diplomatic correspondence with neighboring countries and principalities (Mediaeval Bosnia, Hum, Duklja, Serbia, various autonomous feudal rulers), as well as with more prominent political entities like the Ottoman Empire. Chronologically, the research covers the period from the late 12th to the late 15th century, following the graphic characteristics of the script used in Dubrovnik's Mediaeval Slavic chancery. The research material included roughly 50 representative charters and documents from the Croatian State Archives in Dubrovnik. This institution has one of the largest collections of Cyrillic documents in the Balkans, counting around 10,000 units (exact number unknown). The focus of the research was on *diplomatic minuscule*, a script mainly used in diplomatic, business, and legal communication (hence the name). This script is graphologically quite different from the widespread *Ustav*, a two-line formal uncial version of Cyrillic script that was mainly used for liturgical purposes. The transition from a two- to a four-line system of text organization—the main characteristic of the minusculation process—conditioned the morphology of a significant number of letters in the script. Morphological changes in the script can be observed from the late 12th century. In the *Charter of Ban Kulin* (1189), a trade agreement between the Banate of Bosnia and the Republic of Ragusa, some letter forms display the beginnings of the morphological characteristics of the diplomatic minuscule. The letter *a* begins to show signs of an elongated main vertical line (the elongated vertical line is the main characteristic of the letter form in the diplomatic minuscule script). This same elongation pattern of the “weak” letter parts is also apparent in the letters *z* and *b*, where the lines drop beneath the lower line. These morphological characteristics marked the beginning of the minusculation process. Elongated letter lines slowly began to disintegrate the two-line schema of the *Ustav*, and the transition to the four-line schema resulted in the development of the new script. The transition to the four-line schema brought changes in the letter module; the horizontal line in the square of the two-line letter module specific to *Ustav* became vertical in diplomatic minuscule. One morphological change that may indicate the usage of the new letter module in *Charter of Ban Kulin* (written in *Ustav*) is the separation of the vertical lines in the letter *k*, which is typical of diplomatic minuscule.

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7. And also doctoral thesis named “Processes of development of Diplomatic Cyrillic Minuscule in the documents of the Medieval Dubrovnik Chancery.”

The morphological traits of diplomatic minuscule are traced in the charter *Tsar Ioan Asen II grants commercial privileges to the commune of Ragusa (Dubrovnik) and its merchants*. This charter is another trade agreement regulating the trade rights of Ragusan merchants. Written in 1230, it is one of a few surviving documents from the 13th century written in this way. The elongation of letter lines that breach the linear system can be seen in the letters *a, z, r, u, b, c, ê*. Like the *Charter of Ban Kulin*, the letter *k* is written with separated letter lines. This time, the right vertical line lost its angle (and is thus reminiscent of the Latin letter *c*), giving it its recognizable minuscule form.

The standardization of diplomatic minuscule took place in the 14th century. All the main morphological features of the newly created script are apparent in various documents from Dubrovnik and neighboring chanceries (Nemanjići dynasty, chancery of King Tvrtko II of Bosnia). Because of the changes in the linear system, the letter *v* lost its recognizable bellies and took a squared form, while the letter *d* was rotated 90 degrees to the left. Some of the changes that can be related to the influence of Latin are connected to the letters *n* and *č*; *n* was written identically to its Latin counterpart, while the letter *č* took a shape similar to the Latin letter *v*. The last morphological change that can be related to the coordination process took place at the turn of the 15th century, when the clockwise rotation of the letter *b* by 90 degrees simplified its writing in the four-line system. This characteristic can be easily recognized in documents from the two most productive scribes of Dubrovnik's Slavic chancery of that time: Rusko Hristoforović and Nikša Zvijezdić. Also, the morphological characteristic of line elongation is apparent in numerous letters in the diplomatic minuscule script (*g, d, z, ž, i, m, r, u, f, b, ê, c, ê*). The main rule was to elongate the lines wherever possible, similar to cursive script. Another graphic characteristic that helps to emphasise the relationship with cursive script is the binding of letters. This feature was not widespread, but it served its purpose—the acceleration of the writing process whenever used. One of the scribes who bound letters frequently is the aforementioned Nikša Zvijezdić.

Most Cyrillic written documents display the usage of abbreviations in all their forms. The frequency of abbreviations (especially ligatures) is relatively low compared to Glagolitic script. The most used abbreviations were superscripts (*ôl*), contractions, and a combination of superscripts and contractions. Common examples include some of liturgical names and adjectives like *b(ri)sta, s(ve)tibb, m(i)l(o)stb, g(ospo)d(i)nb*. All these examples belong to the so-called *Nomina Sacra* word group, which is related to the Hebrew tradition of avoiding the pronunciation of God's name (jvhv). This pattern was recognized in the early 20th century by German scientist Ludwig Traube (1907). However, some of these words also have non-religious meanings as well, which is understandable considering the nature of the research material. The absence of ligatures in

TABLE 2. Alphabet of the Diplomatic minuscule script by scribe Nikša Zvijezdić (Žagar, Paskojević 2014: 237)

a	z	o	h	ju
b	i	p	ō	ja
v	j izostaje kao samostalni slovni oblik	r	č	je
g	k	s	c	ks
d	l	t	č	ê
e	m	u	š	
ž	n	f	  	

the researched Cyrillic corpus may be explained by the fact that, unlike angular Glagolitic script, the morphology of Cyrillic script (specifically diplomatic minuscule) hinders or prevents the creation of a wide variety of ligatures such as those present in angular Glagolitic script. The fact

that minuscule Cyrillic letter forms were simplified and accommodated to faster writing brings additional clarification to this observation.

TABLE 3. Examples of Cyrillic abbreviations, scribe Nikša Zvijezdić (Paskojević 2018: 321)

	$\dot{o}^a$	Superscript
	<i>istinom<sup>u</sup></i>	Superscript
	<i>car<sup>s</sup>ka</i>	Superscript
	<i>svē<sup>s</sup>agō</i>	Superscript
	<i>sasta<sup>le</sup>no</i>	Superscript
	<i>b(o)gu</i>	Contraction
	<i>g(ospo)<sup>d</sup>(i)nami</i>	Contraction and superscript
	<i>Tvr<sup>s</sup>ko</i>	Ligature and superscript
	<i>dmitr<sup>o</sup>v<sup>o</sup></i>	Ligature

The use of punctuations, initials, and letters is somewhat similar to Glagolitic script. The most significant difference is that Cyrillic script had a shorter transition to the minusculization process, which resulted in the earlier abandonment of *scriptura continua* as compared to Glagolitic script. Since the Cyrillic research material included only secular documents, initials appear on a much smaller scale as compared to Glagolitic script. Besides numerals, punctuations are also used in the text to end sentences and more extensive text chapters. These are sometimes even

accompanied by the writing of a capital letter, although the orthography was not fully systematized.

## 6. Conclusion

The grapholinguistic-based palaeographic method in the specific (more traditional) context is primarily concerned with analytical palaeography, which mostly focuses on letter morphology (Žagar 2007:54). The defined palaeographic categories, which are the main methodological research tool, broaden this context and emphasise all aspects of the writing process relevant to the efficient transmission of a message from writer to reader—from letter coordination in the linear system to the usage of blank space, abbreviations, and numerals. The large amount of data obtained through grapholinguistic-based palaeographic research can be used in various scientific disciplines (besides history) such as linguistics, typography, orthography, etc. The aforementioned examples are merely representative of the research conducted so far. The intent of the author of the current article was to provide a solid outline of the topic and to promote the use of the grapholinguistic method, which is relatively new in the framework of Croatian Mediaeval palaeography.

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