

# **Power in Landscape**

**Geographic and Digital Approaches  
on Historical Research**

herausgegeben von

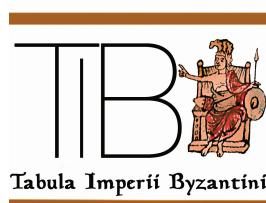
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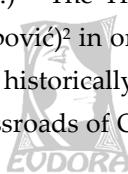
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# **Illustrating Workflows in Digital Humanities: Byzantine Macedonia in the 13<sup>th</sup>/14<sup>th</sup> Centuries and Its “Transformation” from Analogue to Digital<sup>1</sup>**

*Mihailo St. Popović, Rainer Simon (Vienna, Austria)*

## **Introduction**

The aim of this article is to illustrate, how source-based data on Byzantine Macedonia, which has been analysed with methods and means of the academic disciplines of Byzantine Studies and Historical Geography, has been processed and visualised with tools deriving from Digital Humanities according to the research aims of the Digital Cluster Project “Digitising Patterns of Power (DPP): Peripherical Mountains in the Medieval World” at the Institute for Medieval Research of the Austrian Academy of Sciences in Vienna. It will be shown, what consecutive steps have been undertaken within the DPP Case Study “The Historical Region of Macedonia (12<sup>th</sup>–14<sup>th</sup> Cent.) – The Transformation of a Medieval Landscape” (conducted by Mihailo Popović)<sup>2</sup> in order to create a digital best practice for the area of research, which is a historically important region in the very heart of the Balkan peninsula at the crossroads of Orthodoxy, Roman Catholicism and Islam.



<sup>1</sup> This article derives from scholarly results achieved within the Digital Cluster Project “Digitising Patterns of Power (DPP): Peripherical Mountains in the Medieval World” [funded by the programme “Digital Humanities: Langzeitprojekte zum kulturellen Erbe” from 2015 to 2018], the FWF – Austrian Science Fund project entitled “Byzantino-Serbian Border Zones in Transition: Migration and Elite Change in pre-Ottoman Macedonia (1282–1355)” [FWF Austrian Science Fund Project P 30384-G28] and the project “The Ethnonym of the Vlachs in the Written Sources and the Toponymy in the Historical Region of Macedonia (11<sup>th</sup>–16<sup>th</sup> Cent.)” [Project No. MK 03/2016, Centre for International Cooperation & Mobility (ICM) of the Austrian Agency for International Cooperation in Education and Research (OeAD-GmbH)] at the Institute for Medieval Research of the Austrian Academy of Sciences in Vienna (Austria). We, the authors, are indebted to the Austrian Academy of Sciences, the aforesaid Institute, the FWF – Austrian Science Fund as well as to the Ministry of Education, Science and Research of the Republic of Austria for their support.

<sup>2</sup> URL: <<https://dpp.oeaw.ac.at/index.php?seite=CaseStudies&submenu=makedonien>>, 21.01.2019.

The integral basis, regarding the sources as well as the secondary literature, for the present DPP Case Study has been provided by the ongoing scholarly research of Mihailo Popović on the volume *Tabula Imperii Byzantini* (*TIB*) 16 “Macedonia, Northern Part”, which is part of the Long-Term Project *Tabula Imperii Byzantini* (*TIB*) of the Austrian Academy of Sciences.<sup>3</sup> *TIB* 16 covers the Byzantine province of *Macedonia Secunda* and parts of the provinces *Macedonia Prima*, *Dardania*, *Epirus Nova*, *Praevalitana* and *Dacia Mediterranea*. Since Byzantine Macedonia is today divided between Greece, the Republic of North Macedonia and Bulgaria, the volume “Macedonia, Northern Part” comprises the entire territory of the Republic of North Macedonia and two districts of Bulgaria (namely Kjustendil and Blagoevgrad). Thus, it bridges the gap between the volumes *TIB* 6 “Thrace” and *TIB* 11 “Macedonia, Southern Part” (Peter Soustal).<sup>4</sup>

The main part of each volume of the *TIB* comprises a catalogue of the Byzantine names of towns, settlements, fortresses, churches, monasteries, fields, mountains, rivers and lakes in alphabetical order, which is extracted for each region/province of the Byzantine Empire from four categories of sources. These categories are the written sources from the 4<sup>th</sup> century AD to the 15<sup>th</sup> century AD (e.g. charters, historiography, inscriptions etc.), the archaeological evidence (excavation reports, monuments), the toponyms and the physical state of landscapes.<sup>5</sup>

Research on the volume *TIB* 16 is based on written sources (mainly in Greek, Latin, Old Slavonic and Ottoman), monuments, archaeological reports and a vast variety of toponyms as well as extensive secondary literature, mostly in the South Slavic languages. Surveys in the area of research have been regularly conducted by Mihailo Popović (i.e. in the years 2007, 2008, 2010, 2016, 2017), during which monuments, archaeological remnants (e.g. roads) and toponyms were

<sup>3</sup> URL: <<https://tib.oeaw.ac.at/index.php?seite=status&submenu=tib16>>, 21.01.2019.

<sup>4</sup> Cf. on the definition of Byzantine Macedonia: Johannes Koder, Macedonians and Macedonia in Byzantine Spatial Thinking, in: Byzantine Macedonia. Identity, Image and History. Papers from the Melbourne Conference July 1995, ed. John Burke/Roger Scott (Byzantina Australiensia 13, Melbourne 2000) 12–28.

<sup>5</sup> Mihailo Popović, Mapping Byzantium – The Project “Macedonia, Northern Part” in the Series *Tabula Imperii Byzantini* (*TIB*) of the Austrian Academy of Sciences, in: Mapping Different Geographies, ed. Karel Kriz/William Cartwright/Lorenz Hurni (Lecture Notes in Geoinformation and Cartography, Berlin/Heidelberg 2010) 219–234, at 222.

documented with GPS-waypoints and GPS-tracks.<sup>6</sup> These layers of GPS data are integrated into the present Case Study and the *DPP OpenAtlas Database*. The results, which have been achieved by *TIB 16*, are systematically enriched and expanded by the application of new methods in Historical Geography, such as settlement theories (e.g. the modified Central Place Theory)<sup>7</sup> and by applications deriving from GIScience (e.g. Historical Geographic Information Systems/HGIS) as well as Digital Humanities. All of these aspects have been elaborated and tested by the author (partly with co-authors) before<sup>8</sup> – in preparation of DPP as well as of the *Digital Tabula Imperii Byzantini (DigTIB)*<sup>9</sup> – and after as Principal Investigator (PI) of DPP.

<sup>6</sup> See on the history and methodology of the Long-Term Project *Tabula Imperii Byzantini (TIB)* of the Austrian Academy of Sciences: Johannes Koder, Überlegungen zu Konzept und Methode der „*Tabula Imperii Byzantini*“, in: Österreichische Osthefte 20 (1978) 254–262; Id., Perspektiven der *Tabula Imperii Byzantini*. Zu Planung, Inhalt und Methode, in: *Geographia antiqua* 5 (1996) 75–86; Andreas Külzer, Möglichkeiten zur Rekonstruktion historischer Landschaften: Die Historische Geographie, in: Fragmente. Der Umgang mit lückenhafter Quellenüberlieferung in der Mittelalterforschung, ed. Christian Gastgeber/Christine Glassner/Kornelia Holzner-Tobisch/Renate Spreitzer (Wien 2010) 173–184; Mihailo St. Popović, The Project *Tabula Imperii Byzantini (TIB)* of the Austrian Academy of Sciences, in: *Ostkirchliche Studien* 58/2 (2009) 267–272; Popović, Mapping Byzantium 219–234.

<sup>7</sup> Cf. the overview on this method in: Johannes Koder, Land Use and Settlement: Theoretical Approaches, in: General Issues in the Study of Medieval Logistics: Sources, Problems and Methodologies, ed. John F. Haldon (History of Warfare 36, Leiden/Boston 2006) 159–183.

<sup>8</sup> Mihailo St. Popović, Are the Historical Geography of the Byzantine Empire and Digital Humanities a Contradiction Per Se?, in: Bulgaria Mediaevalis 3 (2012) 255–269; Mihailo St. Popović/Markus Breier, Tracing Byzantine Routes – Medieval Road Networks in the Historical Region of Macedonia and Their Reconstruction by Least-Cost Paths, in: Proceedings of the “16<sup>th</sup> International Conference on Cultural Heritage and New Technologies” (Wien 2011) 464–475; Mihailo St. Popović/Juilson J. Jubanski, On the Function of “Least-Cost Path” Calculations within the Project *Tabula Imperii Byzantini (TIB)* of the Austrian Academy of Sciences: a Case Study on the Route Melnik-Zlatolist (Bulgaria), in: Anzeiger der philosophisch-historischen Klasse der Österreichischen Akademie der Wissenschaften, 145. Jahrgang/2. Halbband (2010) 55–87; Mihailo St. Popović/Bogdan Sandric, Transfer of (Historical) Geographic Knowledge Then and Now. From Static Data to User Oriented Visualization, in: e-Perimetron. International Web Journal on Sciences and Technologies affined to History of Cartography and Maps 7/2 (2012) 50–61; cf. especially the monograph: Mihailo St. Popović, Historische Geographie und Digital Humanities. Eine Fallstudie zum spätbyzantinischen und osmanischen Makedonien (Peleus, Studien zur Archäologie und Geschichte Griechenlands und Zyperns 61, Mainz/Ruhpolding 2014).

<sup>9</sup> URL: <<https://tib.oeaw.ac.at/index.php?seite=digtib>>, 01.02.2019.

Therefore, the starting point for the present Case Study within DPP (see above) has been the method of the project *TIB* in general and the data on *TIB 16* in detail. In the following we will systematically lead the readers in seven steps from an analogue starting point in the aforesaid Case Study to its digital transformation and visualisation. This approach will provide a transparent outline of our scholarly research and workflow within DPP in the past four years (i.e. from 2015 to 2018).

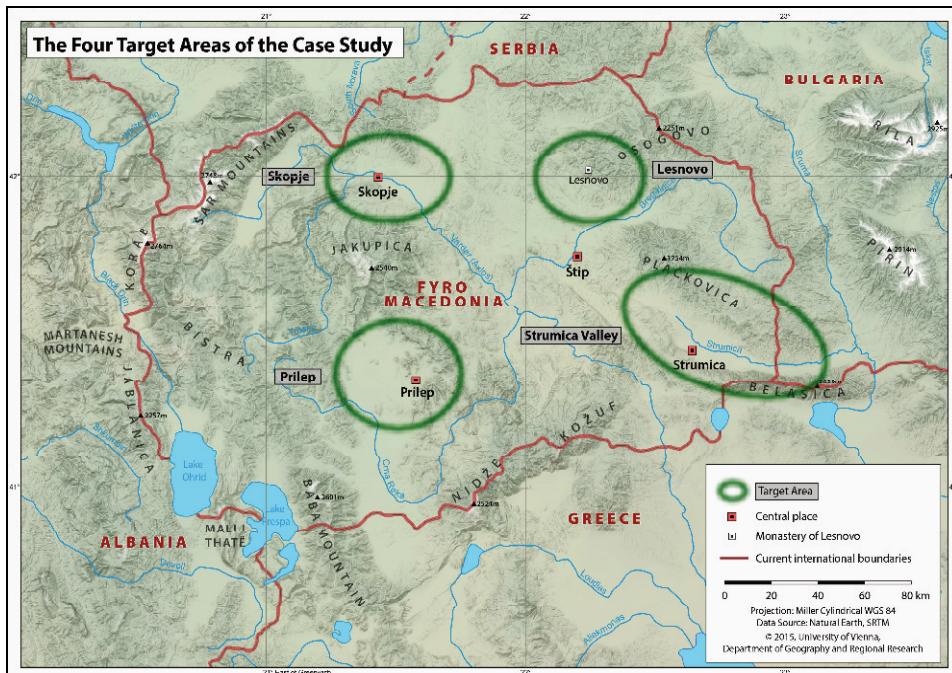


Fig. 1 The Four Target Areas of the Case Study

## Step 1

At the beginning we had to define time and space within the Case Study. It was of the utmost importance to select a period in the history of Byzantine Macedonia, which would provide a sufficient amount of written source evidence to be read, analysed and embedded into the envisaged *DPP OpenAtlas Database*. With regard to the area of research we decided to focus on the territory of *TIB 16* (see above), and again to highlight so-called target areas. This was deemed necessary, because it would have been impossible to cover the entire territory of *TIB*

16 digitally in the four years of DPP's duration. That is why our Case Study decided to draw primarily upon published medieval Serbian, Bulgarian and Byzantine charters from the 13<sup>th</sup> and 14<sup>th</sup> centuries and to focus on four target areas, which are as follows: the city of Skopje and its environs, the Monastery of Lesnovo and its landed property, the town of Prilep and its surroundings and the valley of the river Strumica (*Fig. 1*). This definition has been accomplished before the submission of the project DPP, based on a first evaluation of the corpus of relevant medieval charters on the area of research on the one hand and on the data provided by *TIB 16* on the other hand. Moreover, this evaluation of sources by Mihailo Popović and the student assistant David Schmid resulted in a catalogue of catchwords of Serbian (and partly Byzantine and Bulgarian) administrative, settlement, agricultural and economic terminology concerning the area of research.<sup>10</sup> The respective catalogue relates to the five entities in our *DPP OpenAtlas Database* (i.e. the backend of the project DPP; see below), which are as follows: *Source, Event, Actor, Place* and *Reference*.

## Step 2

In accordance to the aforesaid four target areas (Skopje, Lesnovo, Prilep and Strumica) four clusters of medieval charters have been assembled, read, excerpted and structured based on the catalogue of catchwords and the five entities in the database. These clusters of charters are in detail:

### *The Charter Cluster of Skopje*

The cluster on the target area of Skopje consists of several sub-groups of charters. The first sub-group is on the Church of the Presentation of the Theotokos in the village of Arhiljevica. Three charters are relevant in this context. The first is a *chrysobull* of the Serbian Emperor Stefan Uroš IV Dušan (reigned 1331–1355), with which he confirmed the foundation of the respective church by *sebastokrator* Dejan and its landed property. The original charter has not come upon us. Its

<sup>10</sup> This catalogue of catchwords is published in: Mihailo St. Popović/Vratislav Zervan, Signs and Maps of Power in Medieval Europe: A Case Study on Byzantine Macedonia (13<sup>th</sup>/14<sup>th</sup> Centuries), in: MEMO – Medieval and Early Modern Material Culture Online: MEMO #2 – Digital Humanities & Materielle Kultur [doi: 10.25536/20180206: URL: <<http://memo.imareal.sbg.ac.at/wsarticle/memo/2018-popovic-signs-and-maps-of-power/>>, 22.01.2019].

content is preserved only in two later transcripts (dated to the years 1349 and 1354/55).<sup>11</sup> The third charter was issued in 1378/79 by the Serbian Empress Jevdokija and her son Konstantin Dragaš, through which they donated the Church of the Presentation of the Theotokos in the village of Arhiljevica together with its possessions to the Monastery of Chilandar on Mount Athos.<sup>12</sup>

The second sub-group of this cluster comprises the region of Ovče Polje, which is to be found to the South-East of the target area of Skopje. In 1352/53 the Serbian Emperor Stefan Uroš IV Dušan granted the Church of Saint Nicholas on the river Pčinja beneath the fortress of Kožle with a *chrysobull* to the Metropolitan Jakob of Serres. After his death the rights should devolve to the Monastery of the Holy Archangels Michael and Gabriel near Prizren.<sup>13</sup>

The third sub-group is the so-called “Svetoorhandjelovska hrisovulja” in favour of the Monastery of the Holy Archangels Michael and Gabriel near Prizren, which was issued by the Emperor Stefan Dušan in or soon after 1347/48.<sup>14</sup>

The most abundant (fourth) sub-group of this cluster are the three charters for the Monastery of St. George-Gorg near Skopje. In the first charter, which is dated to the period from 1258 to 1277, the Bulgarian Tsar Constantine I Asen (reigned 1257–1277) confirmed previous donations of properties and population to the Monastery of St. George-Gorg near Skopje and added his own.<sup>15</sup> The Serbian King Stefan Uroš II Milutin (reigned 1282–1321) issued the second charter after the refurbishment of the Monastery of St. George-Gorg in the year 1300. He confirmed the donations given to the monastery by former Byzantine, Bulgarian

<sup>11</sup> Vladimir Aleksić, Dva prepisa potvrđne hrisovulje Stefana Dušana povodom osnivanja Manastira Vavedenje Presvete Bogorodice, zadužbine sevastokratora Dejana, u selu Arhiljevica kod Preševa, in: Stari srpski arhiv 12 (2013) 31–65; Žarko Vujošević, Arhiljevička hrisovulja cara Stefana Dušana, in: Initial. A Review of Medieval Studies 1 (2013) 241–254.

<sup>12</sup> Pavle Dragičević, Povelja „Carice“ Jevdokije i njenog sina Konstantina o darivanju Hilandaru njihove baštinske crkve u Arhiljevici, in: Stari srpski arhiv 10 (2011) 87–102.

<sup>13</sup> Gramota na Car Dušan za crkvata Sv. Nikola kaj Kožle od 1353 godina (ed. Lidija Slaveva, Spomenici za srednovekovnata i ponovata istorija na Makedonija 3, Skopje 1980) 411–423.

<sup>14</sup> Siniša Mišić/Tatjana Subotin-Golubović, Svetoorhandjelovska hrisovulja (Izvori za srpsku istoriju 3, Beograd 2003) 85–114.

<sup>15</sup> Zbornik srednjovekovnih ciriličkih povelja i pisama Srbije, Bosne i Dubrovnika. Knjiga I: 1186–1321 (ed. Vladimir Mošin/Sima Ćirković/Dušan Sindik, Izvori za srpsku istoriju knj. 9, Cirilički izvori knj. 1, Beograd 2011) 254–258. Cf. on this charter URL: <[http://monasterium.net/mom/MedDocBulgEmp/1277-xx-xx\\_taq\\_Constantine\\_Tich/charter](http://monasterium.net/mom/MedDocBulgEmp/1277-xx-xx_taq_Constantine_Tich/charter)>, 28.01.2019.

and Serbian rulers. Finally, King Milutin also granted new privileges, landed property and population to the respective monastery.<sup>16</sup> In 1376/77 the Serbian nobleman Vuk Branković donated the Monastery of St. George-Gorg to the Monastery of Chilandar on Mount Athos at the request of his brother Gerasim, who was monk in the latter.<sup>17</sup>

The fifth sub-group of this cluster are two charters for the Monastery of Saint Nikita near Skopje. In ca. 1299/1300 (or 1308?) the Byzantine Co-Emperor Michael IX Palaiologos (reigned 1294/95–1320) issued – at the instigation of the Serbian King Stefan Uroš II Milutin – a charter for the Tower of Hrusija of the Monastery of Chilandar, through which the possessions of the Monastery of Saint Nikita near Skopje were confirmed.<sup>18</sup> In May 1308 (?) the Byzantine Emperor Andronikos II Palaiologos (reigned 1282–1328) confirmed – again at the instigation of the Serbian King Stefan Uroš II Milutin – the possessions of the Monastery of Saint Nikita for the Tower of Hrusija.<sup>19</sup> This charter is only preserved in a Serbian translation. It seems plausible that Andronikos II had also issued a Greek charter in the years 1299/1300, because the aforesaid parallel Byzantine charter by Co-Emperor Michael IX Palaiologos is preserved, which was issued most probably in the years 1299/1300 and in which plenty of the mentioned places were also donated.

Finally, the last (sixth) sub-group is comprised by three charters concerning the Chapel of Sveta Petka in the village of T'morane. The Serbian King Stefan Uroš II Milutin donated the chapel with its possessions to the Monastery of Chilandar on Mount Athos. According to Srdjan Pirivatrić, King Milutin conquered the town of Skopje and its surroundings from the Byzantine Empire in the year 1282, but lost it to the Byzantines at some point between 1282 and 1298 and certainly reconquered it before 1298/99. That is why he most probably issued his charter concerning the Chapel of Sveta Petka after his reconquest of

<sup>16</sup> Zbornik srednjovekovnih čiriličkih povelja i pisama 316–329.

<sup>17</sup> Stanoje Bojanin, Povelja Vuka Brankovića o darovanju Skopskog manastira Svetog Georgija manastiru Hilandaru, in: *Stari srpski arhiv* 8 (2009) 119–128, at 121.

<sup>18</sup> Gramota na car Mihail IX Paleolog za manastirot Sv. Nikita kaj Skopje od 1299 (?), po april (ed. Lidiya Slaveva/Vladimir Mošin, Spomenici za srednovekovnata i ponovata istorija na Makedonija 1, Skopje 1975) 286–292, at 288–292.

<sup>19</sup> Zbornik srednjovekovnih čiriličkih povelja i pisama 406 f.

Skopje, i.e. in ca. 1299/1300.<sup>20</sup> The second charter, which is mentioning the afore-said chapel, was issued by Stefan Uroš II Milutin for the Tower of Hrusija of the Monastery of Chilandar. The original of this *chrysobull* is not preserved. The text of the document is known from an interpolated charter, which was issued between the end of the year 1313 and 26 July 1316, and from a forged charter, which can be dated on the grounds of the used water mark to the period from 1334 to 1336.<sup>21</sup> The Chapel of Sveta Petka is again mentioned in the so-called “Opšta hrisovulja” (“General Charter”) by the Serbian Emperor Stefan Uroš IV Dušan to the Monastery of Chilandar, through which he confirmed all previous donations and records of the land-inventory of the monastery. Although the charter bears the year 1348 as date, it is with the utmost probability not an original. Lidija Slaveva considers the charter to be a copy, which was written after the year 1365.<sup>22</sup>

### *The Charter Cluster of Lesnovo*

The cluster of sources concerning the target area of Lesnovo consists of three pieces of evidence. The first is the foundation charter of the Monastery of Lesnovo, which is a donation inscription in three parts on stone, two parts of which are in Old Serbian and one part in Greek language. The Old Serbian inscription starts on a marble architrave above the Western entrance of the *katholikon* (i.e. on the Eastern wall of the *narthex*) and continues outside above the Southern entrance to the *naos*. This inscription is dated to the year 1341 and calls the *katholikon* a “Church of the High Commander of the Heavenly Armies the Archistratigos Michael” (храмъ великаго војводе въшних силь Архистратига Михаила). The donors were the Great Vojvode (*Veliki Vojvoda*) Jovan Oliver, his wife Anna Mara (Ana Marija) and his son Kraiko (Krajko) during the reign of the Serbian King Stefan Uroš IV Dušan.<sup>23</sup>

<sup>20</sup> Charter edited in: *Zbornik srednjovekovnih ciriličkih povelja i pisama* 332f. Cf. on the dating: Srdjan Pirivatić, *Hronologija prvih vladarskih akata kralja Milutina izdatih posle osvajanja Skoplja*, in: ΠΕΡΙΒΟΛΟΣ – Mélanges offerts à Mirjana Živojinović, Tome I, ed. Dejan Dželebdžić/Bojan Miljković (Beograd 2015) 205–213.

<sup>21</sup> *Zbornik srednjovekovnih ciriličkih povelja i pisama* 437–445.

<sup>22</sup> Siniša Mišić/Marija Koprivica, Opšta hrisovulja cara Stefana Dušana Hilandaru, in: *Stari srpski arhiv* 14 (2015) 65–106.

<sup>23</sup> Gordana Tomović, *Morfologija ciriličkih natpisa na Balkanu* (Beograd 1974) 57 (No. 37).

The second source is a charter, which was issued by the Emperor Stefan Dušan in the year 1347. Therein, he founded the Diocese of Zletovo and donated the Monastery of Lesnovo to its territory.<sup>24</sup> Finally, the Serbian nobleman Konstantin Dragaš donated the Monastery of Lesnovo to the Monastery of Chilandar on Mount Athos on 15 August 1381.<sup>25</sup>

### *The Charter Cluster of Prilep*

The town of Prilep and its surroundings comprise the third target area, on which three charters of King Stefan Uroš IV Dušan are preserved (1334/35; 1343/44; 1344/45).<sup>26</sup> After the conquest of Prilep King Dušan issued an Old Serbian charter in 1334/35 for the Monastery of Treskavec to the North of the town. He donated villages, settlements, abandoned lands, summer and winter pastures, watermills, metochia and churches and a fair in the town to the monastery. Božidar Ferjančić argued that the second charter (Treskavac 2) for the Monastery of Treskavec is a forgery, while the first and third (Treskavac 1 and 3) are authentic.<sup>27</sup> Djordje Bubalo expressed the opinion that the second charter (Treskavac 2) is an unofficial document based on the first and the third charter (Treskavac 1 and 3).<sup>28</sup>

### *The Charter Cluster of Strumica*

Finally, medieval charters on the valley of the river Strumica were assembled, read and analysed in order to research the fourth target area. At this point we would like to highlight one charter as vivid example. The Serbian Emperor Stefan Uroš V (reigned 1355–1371) confirmed in a *chrysobull* in May 1356, together

<sup>24</sup> Siniša Mišić, Hrisovulja cara Stefana Dušana o osnivanju Zletovske episkopije, in: Stari srpski arhiv 13 (2014) 181–206; also cf. Archimandrit Leonid, Hrisovulja Cara Stefana, data u Skoplju 1347 godine, iz crkvenog i državnog sabora, koji bijaše skupljen u to doba, a kojom se osniva episkopska stolica u manastiru Ljesnovskom, in: Glasnik Srpskog Učenog Društva 10 (27) (1870) 287–296.

<sup>25</sup> Žarko Vujošević, Povelja Konstantina Dragaša Hilandaru o manastiru Lesnovu, in: Realia Byzantino-Balkanica. Studia in honorem LX annorum Professoris Christi Matanov (Sofija 2014) 453–475.

<sup>26</sup> Gramotite na Stefan Dušan za manastirot Treskavec (ed. Lidija Slaveva/Vladimir Mošin, Spomenici za srednovekovnata i ponovata istorija na Makedonija 4, Skopje/Prilep 1981) 55–185, at 77–92, 113–126, 143–153.

<sup>27</sup> Božidar Ferjančić, O poveljama kralja Stefana Dušana manastiru Treskavcu kod Prilepa, in: Zbornik Radova Vizantološkog Instituta 7 (1961) 161–168.

<sup>28</sup> Djordje Bubalo, Za novo, kritičko izdanje treskavačkih hrisovulja kralja Dušana, in: Stari srpski arhiv 7 (2008) 207–229.

with his mother the Empress Jelena-Jelisaveta, the possession of the Church of Saint Nicholas in the town of Melnik with its landed property to the Metropolitan Kiril.<sup>29</sup>

In total 43 Serbian, Bulgarian and Byzantine charters from the 13<sup>th</sup> and 14<sup>th</sup> centuries were read and analysed according to the aforesaid catalogue of catchwords. During this work package within our Case Study a special emphasis was put on the following catchwords, which are related to the “Signs” and “Patterns of Power” (see below): gradū – градъ (town, upper town, fortress); selo – село (village); selište – селиште, селище (settlement site or abandoned village); exalimo – езалимо (escheated property); trūgū – тръгъ (marketplace, farmer’s market); panagjurū – панагюръ (fair); manastyrī – манастиръ (monastery); crīkva – цръква (church); vinogradū – виноградъ (vineyard); vodēnica – водѣница (water mill).

They were extracted systematically, interpreted in the respective context and embedded as well as linked by Mihailo Popović and David Schmid in the *DPP OpenAtlas Database*.

### Step 3

As “space” and its relation to power are an essential part of our research, the spatial representation of the various entities, which are found in our sources is a very important topic in DPP and closely related to the conceptual framework and data model. Where it is possible, the precise location of physical things is recorded in the *DPP OpenAtlas Database*. Technically speaking, this is achieved by using point, line and polygon geometries provided by PostgreSQL’s GIS extension PostGIS. In many cases the medieval written sources are not very accurate, and often it is not possible to determine exactly the spatial position or extent respectively shape of the entity mentioned. This geographical fuzziness and general uncertainty is a remarkable challenge in Digital Humanities and in DPP. However, in order to distinguish various spatial qualities, DPP has developed a

<sup>29</sup> Rade Mihaljić, Hrisovulja cara Uroša melničkom mitropolitu Kirilu, in: *Stari srpski arhiv* 2 (2003) 85–97.

framework for the spatial position of physical things and their representation in the database. In our sources there are mainly three classes of these entities:

- a) Physical things like buildings, settlements, regions, areas etc., which have or originally had a position in space and a certain extent.
- b) Roads/routes/rivers, which have or originally had a position in space and a certain extent.
- c) Spots with no spatial extent, which have only point coordinates.<sup>30</sup>

Apart from the described spatial model we have applied the “modified Central Place Theory” to the data of our Case Study. The regressive method of the “Central Place Theory” was initially defined by Walter Christaller and modified by Johannes Koder for the Byzantine Empire, i.e. for the needs of Byzantine Studies. Walter Christaller described a hierarchy of three levels of settlements, which he embedded in a hexagonal grid. The highest level consists of the “Central Market Town (CMT)”, followed by the “Intermediate Market Town (IMT)”, and the lowest level is called “Standard Market Town (SMT)<sup>31</sup>.

Johannes Koder has shown on various examples that a two-level-system has to be applied for the Byzantine Empire (and therefore also to Byzantine Macedonia). According to his calculations the distance between two administrative centres (CMT+IMT) could be 39 to 46km, whereas the distance between an administrative centre and a “Standard Market Town” amounted to 13 to 15km.<sup>32</sup>

Unfortunately, we cannot trace the exact delimitations of villages in Byzantine Macedonia, because the aforesaid charters do not contain instructive data on this issue. Nevertheless, Vassiliki Kravari has succeeded in calculating the average extent of a village and its surrounding area in Byzantine Macedonia for

<sup>30</sup> Cf. on this issue in detail: Stefan Eichert/Bernhard Koschicek/Mihailo St. Popović, Digitising Patterns of Power (DPP): A Digital Approach towards Recording, Managing, Analysing and Presenting Archeological and Historical Information based on Case Studies from Eurasian Mountainous Regions, in: *Acta Archaeologica Carpathica* 51 (2016) 257–283, at 273–277.

<sup>31</sup> Walter Christaller, *Die zentralen Orte in Süddeutschland. Eine ökonomisch-geographische Untersuchung über die Gesetzmäßigkeit der Verbreitung und Entwicklung der Siedlungen mit städtischen Funktionen* (Jena 1933, reprinted Darmstadt 1968); Id., *Das Grundgerüst der räumlichen Ordnung in Europa. Die Systeme der europäischen zentralen Orte* (Frankfurter Geographische Hefte 24/1, Frankfurt/M. 1950); Id., How I Discovered the Theory of Central Places: A Report About the Origin of Central Places, in: *Man, Space and Environment*, ed. Paul Ward English/Robert C. Mayfield (New York 1972) 601–610.

the 13<sup>th</sup> and 14<sup>th</sup> centuries, which amounted to approximately 15 km.<sup>33</sup> If we apply the formula  $A=r^2\pi$ , we may deduce that villages in Byzantine Macedonia were surrounded by a radius of ca. 2 km of landed property. Of course, village boundaries were neither hexagonal nor circular, i.e. mathematically ideal, at all, because they depended upon the local geographical and geological conditions as well as anthropogenic factors.<sup>34</sup>

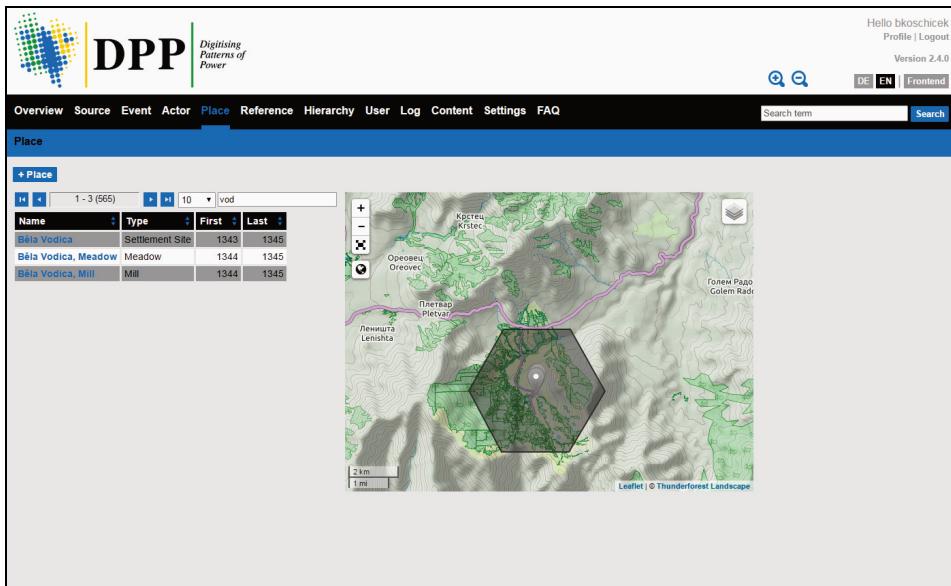


Fig. 2: An Example of a Polygon of Hexagonal Shape in the DPP OpenAtlas Database

For the time being, we have drawn polygons of hexagonal shape around the localised villages within the entity *Place* in the *DPP OpenAtlas Database*, by taking into account distances of 2 km according to the aforesaid radius (Fig. 2). This is of course an approximation, because at the moment we do not have the possibility to draw circular (or other) autoforms in our backend. In the near future we will undertake together with Andrei Nacu (Romanian Academy of Sciences, Institute

<sup>32</sup> Koder, Land Use and Settlement 159–183.

<sup>33</sup> Vassiliki Kravari, L'habitat rural en Macédoine occidentale (XIIIe–XIVe siècles), in: Byzanz als Raum. Zu Methoden und Inhalten der historischen Geographie des östlichen Mittelmeerraumes, ed. Klaus Belke/Friedrich Hild/Johannes Koder/Peter Soustal (Veröffentlichungen der Kommission für die Tabula Imperii Byzantini 7, Wien 2000) 83–94.

<sup>34</sup> Popović, Historische Geographie und Digital Humanities 56 f.

for Social Sciences and Humanities, Sibiu) a cost surface analysis for all the localised villages in order to achieve village boundaries, which are modelled based on the actual landscape and its slope and therefore are closer to reality.

#### **Step 4**

DPP states in its project outline that: “A focus will be put on mountainous areas and the interaction of human development of power and natural environment.”<sup>35</sup> This approach is mirrored in our aforesaid catalogue of catchwords, which, amongst others, indicates the following related source-based terms: planina – планина (summer pasture); zimovište – зимовиште (winter pasture); katunū – катоунъ (a temporary settlement of nomads, specifically Vlachs); respective individuals and / or groups involved (i.e. Vlachū, Vlasi – Влахъ, Власи).

In order to enhance this work package within our Case Study “The Historical Region of Macedonia (12<sup>th</sup>–14<sup>th</sup> Cent.) – The Transformation of a Medieval Landscape”, Mihailo Popović and the Ss. Cyril and Methodius University of Skopje (Faculty of Philosophy, Institute for History; Prof. Dr. Toni Filiposki) started a joint scholarly project entitled “The Ethnonym of the Vlachs in the Written Sources and the Toponymy in the Historical Region of Macedonia (11<sup>th</sup>–16<sup>th</sup> Cent.)” in 2016, which focused on the interplay between the resident population and the nomads (i.e. the Vlachs) in the area of research from the 11<sup>th</sup> to the 16<sup>th</sup> centuries.<sup>36</sup> This project (Project No. MK 03/2016) was funded by the Centre for International Cooperation & Mobility (ICM) of the Austrian Agency for International

<sup>35</sup> URL: <<https://dpp.oeaw.ac.at/index.php?seite=CaseStudies>>, 30.01.2019.

<sup>36</sup> Cf. the following publications on the Vlachs with extensive bibliographies: Mihailo St. Popović, Spätbyzantinische Siedlungen und wlachische Transhumanz in den Flusstäler der Strumica und Kriva Lakavica, in: Südosteuropäische Romania: Siedlungs-/Migrationsgeschichte und Sprachtypologie. Romanistisches Kolloquium XXV (Tübinger Beiträge zur Linguistik 532, Tübingen 2012) 227–240; Id., Das Kloster Hilandar und seine Weidewirtschaft in der historischen Landschaft Mazedonien im 14. Jahrhundert, in: ΠΕΡΙΒΟΛΟΣ – Mélanges offerts à Mirjana Živojinović, Tome I, ed. Dejan Dželebdžić/Bojan Miljković (Beograd 2015) 215–225; Id., Vlachen in der historischen Landschaft Mazedonien im Spätmittelalter und in der Frühen Neuzeit, in: Walchen, Romani und Latini. Variationen einer nachrömischen Gruppenbezeichnung zwischen Britannien und dem Balkan (Forschungen zur Geschichte des Mittelalters 21, Wien 2017) 183–196.

Cooperation in Education and Research (OeAD-GmbH) for two years (1 July 2016–30 June 2018) and formed an additional, new case study within DPP.<sup>37</sup>

The project has explored manifold written sources related to the Vlachs in Byzantine Macedonia based mainly on medieval Serbian and Byzantine charters as well as Early Modern Ottoman Tax Registers. Relevant toponyms were identified and localised based on Austro-Hungarian (on a scale of 1:200,000) and Yugoslav (on a scale of 1:100,000) maps from the 19<sup>th</sup> and 20<sup>th</sup> centuries. Moreover, the Austrian side has built upon the manifold data provided by *TIB 16* (see above).<sup>38</sup>

In addition to identifying and evaluating the aforesaid written sources, journeys to the respective country of the cooperation partner were undertaken in order to bring together the project partners, to strengthen their ties and to enable a thorough discussion of the relevant medieval sources on the Vlachs. The aim was to reach a common level of interpretation and to prepare the respective data for inclusion into the *DPP OpenAtlas Database*.

From the Austrian point of view two important work packages have been successfully accomplished within the framework of the joint scholarly project in the summer of 2017 and 2018. From 17 July until 31 July 2017 Mihailo Popović as the Austrian project leader and Jelena Nikić as scholarly co-worker travelled to Skopje in order to conduct research in the State Archive of the Republic of Macedonia and in the library of the Macedonian Academy of Sciences and Arts concerning the joint research question. Moreover, two surveys *in situ* were accomplished together with Toni Filiposki and Boban Petrovski, namely in the canyon of Matka to the South-West of Skopje and in the Ohrid-Prespa region, where the relevant local toponymy and respective monuments were localised and documented. From 4 June until 10 June 2018 Mihailo Popović and David Schmid as scholarly co-worker travelled to Skopje to continue the aforesaid research based on archival material as well as the published bibliography in the Macedonian archives and libraries. In addition, two surveys were conducted *in situ* in the valley of the river Vardar and the region of Konjuk in North-Eastern Macedonia together with Toni Filiposki and an external expert, the Archaeo-

<sup>37</sup> URL: <<https://dpp.oeaw.ac.at/index.php?seite=CaseStudies&submenu=skopje>>, 30.01.2019.

<sup>38</sup> URL: <<https://tib.oeaw.ac.at/index.php?seite=status&submenu=tib16>>, 30.01.2019.

logist Prof. Dr. Viktor Lilčikj from the “Ss. Cyril and Methodius” University of Skopje.

Jelena Nikić and David Schmid have input the acquired data and the localised toponymy into the *DPP OpenAtlas Database*. These data sets have also been extracted into a Demo-Version, which may be accessed freely online.<sup>39</sup> The input of the data and its visualisation (i.e. digital mapping) has yielded new results and has helped the scholars involved in the project to discern the patterns of distribution of the Vlachs in Byzantine Macedonia through time and space, on which further research has been conducted and published.<sup>40</sup>

Moreover, it has to be stressed that the project “The Ethnonym of the Vlachs in the Written Sources and the Toponymy in the Historical Region of Macedonia (11<sup>th</sup>–16<sup>th</sup> Cent.)” has been implemented as the Case Study “Ethnonym of the Vlachs” into the map-based online application (*DPP Mapviewer*, i.e. the frontend of DPP), which will be put online in the summer of 2019 and which will enable the users to query freely the data of this sub-project.

## Step 5

Since DPP “focuses on the analysis of the depiction of space in medieval written sources, of the interaction between built and natural environment, of appropriation of space and the emergence of new political, religious and economic structures of power”<sup>41</sup>, the embedded data of our Case Study has been and will be used for in-depth studies on manifest “Signs of Power”<sup>42</sup>, like venues of medieval Serbian State Councils or places of imperial presence (i.e. for example of ambulant kingship) in the area of research.

<sup>39</sup> URL: <<https://demo-dev.openatlas.eu/>>, 30.01.2019.

<sup>40</sup> Cf. the article by Toni Filiposki and Boban Petrovski entitled “Vlachs from Macedonia in the Medieval Written Sources: Case Study on Polog” in this volume. See also: Mihailo St. Popović/Jelena Nikić, Byzantinistik, historische Geographie und Ethnographie in dem Königreich Jugoslavien an dem Beispiel des Professors Milenko S. Filipović und der Philosophischen Fakultät in Skoplje (1925–1940), in: *Zbornik Radova Vizantološkog Instituta* 55 (2018) 305–324.

<sup>41</sup> URL: <<https://dpp.oeaw.ac.at>>, 30.01.2019.

<sup>42</sup> Cf. on the meaning and definition of “Signs of Power” in DPP: Mihailo St. Popović/Veronika Polloczek, Digitising Patterns of Power (DPP): Applying Digital Tools in the Analysis of Political and Social Transformations in the Historical Region of Macedonia, 12<sup>th</sup>–14<sup>th</sup> Centuries, in: *medieval worlds: comparative & interdisciplinary studies* 5 (2017) 170–194, at 186–189.

Here, we have resorted for example to the itineraries of the Serbian King Stefan Uroš IV Dušan in Byzantine Macedonia, which were reconstructed and published by the Serbian scholar Miodrag A. Purković, and have re-evaluated and augmented them with new methods and data.<sup>43</sup> Their visualisation helps us to become aware of the patterns of royal movement in a contested border zone between the Byzantine Empire and the Serbian Kingdom and to understand its role in the appropriation of space through imperial power.

This approach leads us directly to the FWF Austrian Science Fund Project P 30384-G28 “Byzantino-Serbian Border Zones in Transition: Migration and Elite Change in pre-Ottoman Macedonia (1282–1355)”, which is conducted by Mihailo Popović (as Project Leader) and is hosted at the Division of Byzantine Research of the Institute for Medieval Research of the Austrian Academy of Sciences.<sup>44</sup> Two scholars, namely Vratislav Zervan and Bernhard Koschicek, are engaged in this project, which will last for four years (1 October 2017–30 September 2021).

Although it is a sub-project of the Long-Term Project *Tabula Imperii Byzantini* (*TIB*), it interacts with DPP concerning several aspects, which are addressed in two distinct work packages, namely “Rivalling Political Concepts – Byzantium and the Medieval Serbian Oecumene” and “Cross-Border Societies and Elite Change in Byzantine Macedonia”. Special attention is given to the analysis of formulations in Byzantine and Serbian charters with regard to the Serbian expansion in the area of research, the acquisition of new territories and their administrative incorporation on the macro-level and to the localisation of conquered settlements with related settlement typologies as well as on the change of local elites on a micro-level. Moreover, tools from Digital Humanities in mapping and visualisation, which were amongst others developed by DPP, are applied in order to communicate the achieved results to the interested public. The

<sup>43</sup> Miodrag A. Purković, Itinerar kralja i cara Stefana Dušana, in: *Glasnik Skopskog naučnog društva* 19 (1938) 239–244. Our article on this issue will be published soon: Bernhard Koschicek/Mihailo St. Popović/Vratislav Zervan, Memories are Made of This: Tracing Ambulant Rulers, Local Elites and Shifting Borders in Byzantine Macedonia (1282–1355), in: Edited Volume in Honor of Predrag Matićić, Columbus, OH [in press].

<sup>44</sup> URL: <<https://tib.oeaw.ac.at/index.php?seite=sub#borderzone>>, 30.01.2019.

data of this sub-project contributes to our Case Study and also enriches the map-based online application, the *DPP Mapviewer*.

### **Step 6**

In the spring of 2017 Mihailo Popović has accomplished two new scholarly co-operations, firstly with the Hilandar Research Library (HRL) of the Ohio State University<sup>45</sup> and secondly with the project Pelagios<sup>46</sup>. Thus, the aim to digitise/to scan selected manuscripts (i.e. Serbian charters), as outlined in the project proposal of DPP, has been implemented. Amongst others, the Hilandar Research Library is archiving and preserving precious Byzantine, Bulgarian and Serbian medieval charters on the monasteries and their landed property in Byzantine Macedonia.

In the present Case Study the scans of the charter, which has been evaluated, was provided generously by the aforesaid Hilandar Research Library (signature HRL, SPEC.HM.SDS.132 and 133), which will lead to a sustainable continuation of the synergy in the future. The researched charter was issued to the Monastery of Saint George-Gorg near Skopje by the Serbian King Milutin in the year 1300 (see above). Its scan was annotated with the help of the software *Recogito*<sup>47</sup>, which was developed by Pelagios.



*Mihailo St. Popović*

<sup>45</sup> URL: <<https://library.osu.edu/hrl>>, 02.02.2019.

<sup>46</sup> URL: <<http://commons.pelagios.org/>>, 02.02.2019.

<sup>47</sup> URL: <<https://recogito.pelagios.org/>>, 02.02.2019.

The screenshot shows a user interface for a digital edition of Homer's *Odyssey*. The top navigation bar includes icons for file operations (New, Open, Save, Print, Cut, Copy, Paste) and a user status message "Logged in as Rainer Simon". Below the header, the title "Homer: The Odyssey" and the date "800-700 BC" are displayed, along with a note about 10 Annotations, no other contributors, and CC0 1.0 license.

The main content area shows two blocks of Latin text from the Iliad. The first block contains the beginning of Book 1, where Odysseus describes his journey back to Ithaca after the fall of Troy. The second block continues the narrative, mentioning Neptune's departure and the Ethiopians. Annotations are visible as colored boxes and arrows pointing to specific words or phrases like "Troy", "Ithaca", and "Neptune".

Fig. 3: Screenshot of the Online Platform Recogito, Example of a Text Annotation

The screenshot shows a user interface for a digital edition of an anonymous medieval map of the Mediterranean. The top navigation bar includes icons for file operations (New, Open, Save, Print, Cut, Copy, Paste) and a user status message "Logged in as Rainer Simon". Below the header, the title "Anonymous: Map of the Mediterranean" and the date "2 years ago" are displayed, along with a note about 54 Annotations, no other contributors, and CC0 1.0 license.

The main content area shows a detailed manuscript page of the map. A callout box is open over a specific location in the Eastern Mediterranean, specifically the area around Cyprus. The callout box is titled "«Giazira Qubras»" and contains information about the island: "Cyperus (island)" with the identifier "plades:707458", a description as "Third largest island in the Mediterranean Sea.", and a note that it is "Cyprus, Insula Cypris, Insula Cypros" from "50 BC - 2100". The callout box also includes a small map of the island and a "Cancel", "OK & Next", and "OK" button at the bottom.

Fig. 4: Screenshot of the Online Platform Recogito, Example of a Map Annotation

*Recogito* is an online platform for collaborative document annotation (cf. Fig. 3 and Fig. 4).<sup>48</sup> It provides a personal workspace for uploading, collecting and organising source materials (texts, images and tabular data), and collaborating in their annotation and interpretation. In addition to commentary and tagging, *Recogito* supports *semantic annotation*, i.e. the marking up of Named Entities with identifiers from digital authority files. The use case that is currently implemented to the full extent is *geo-tagging*: by annotating place names in a text or digitised map or manuscript with links to an online gazetteer (such as GeoNames<sup>49</sup> or the Pleiades Gazetteer of the Ancient World), users can create maps from documents easily, export their data for use in other tools, and connect their work to other data on the Web.

Since its launch in December 2016, *Recogito* has attracted more than 2,200 registered users, with an activity between 200 and 1,500 edits per day on average. We have been receiving favorable feedback about the general usability of the tool, as well as about how the results produced with it yield new perspectives on sources, aid communicating and teaching, how the process of collaborative annotation itself has value for scholarly and educational purposes, and how the annotation of place names or other kinds of geographic entities (such as peoples, regions or natural features) can be an important first step in the analysis of many kinds of historical documents, including travelogues, historiographical accounts and maps.

Currently funded by the Andrew W. Mellon Foundation until the end of 2019, *Recogito*'s development roadmap has been shaped by community involvement and feedback. Our community has also helped to translate the interface and training material into six languages (Dutch, German, Italian, Persian, Spanish, Turkish), and we are working with them to develop further case studies for using *Recogito* in the classroom and in research.

Most recently, we have extended *Recogito* with a functionality for annotating relationships between entities, adding further to what we feel has high potential

<sup>48</sup> Rainer Simon/Elton Barker/Leif Isaksen/Pau de Soto Cañamares, Linked Data Annotation without the Pointy Brackets: Introducing Recogito 2, in: Journal of Map and Geography Libraries 13/1 (2017) 111–132.

<sup>49</sup> URL: <<https://www.geonames.org/>>, 03.02.2019.

to offer enhanced ways for scholars in the Humanities to interpret and enrich their source material, prepare them for further analysis in other environments, and produce new scholarly results, including interactive formats such as geo-spatial or graph visualisations.

Rainer Simon

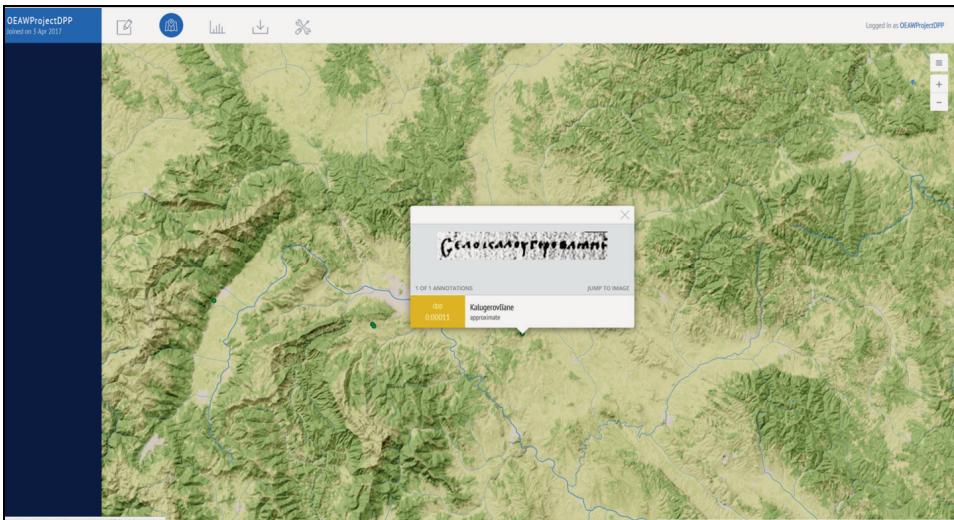


Fig. 5: Screenshot of the Online Platform Recogito, Annotation of the Charter of the Serbian King Milutin from the Year 1300

The places (i.e. villages) in the charter of the Serbian King Milutin from the year 1300 have been identified, extracted and localised by Mihailo Popović and David Schmid. Altogether 32 places in a base map of Pelagios were linked to the respective toponyms in the scans of the charter (Fig. 5).<sup>50</sup> These entries were again linked to the respective entry in the *DPP OpenAtlas Database* and, thus, to the *DPP Mapviewer* via permalinks.

## Step 7

What is more, the analysis and input of data deriving from Serbian, Bulgarian and Byzantine charters from the 13<sup>th</sup> and 14<sup>th</sup> centuries in the *DPP OpenAtlas Database* yields new scholarly results concerning Byzantino-Serbian linguistic aspects.

<sup>50</sup> See the following link in order to browse the pilot study in this field: <<http://recogito.pelagios.org/OEAWProjectDPP>>, 03.02.2019.

As has been mentioned above, the two charters for the Monastery of Saint Nikita form an integral part of the charter cluster on the target area of Skopje. The first charter was issued in Greek language by the Byzantine Co-Emperor Michael IX Palaiologos most probably in 1299/1300, the second is a Serbian translation of a Greek charter by the Byzantine Emperor Andronikos II Palaio-logos from 1299/1300 (or 1308?). Both are providing a fascinating insight into the Byzantine and Serbian settlement terminology of the time. From a linguistic point of view a direct comparison of the specific terms for the designation of settlements proves to be most instructive, because it illustrates a cultural transfer in the border zones between the two rivalling domains.

At this point we would like to highlight two examples:

In ca. 1299/1300 a Church of Saint Nicholas was donated by Co-Emperor Michael IX with its vineyards and watermills in the village of Ljuběne to the Monastery of Saint Nikita (θεῖον ναὸν εἰς ὄνομα τιμώμενον τοῦ παμμάκα-ρος Ἀγίου Νικολάου καὶ διακείμενον εἰς τὴν περιοχὴν τῆς Λουμπεανίνης)<sup>51</sup>, which was confirmed by Andronikos II – at the instigation of the Serbian King Stefan Uroš II Milutin – in ca. 1299/1300 (or 1308?) [I druga cr(ь)k(o)vъ S(ve)t(a)-go Nikoli obrētajušti se vъ naměsti Ljuběni, s vinograđi i sъ vodeničijemъ i pročego naměstija eže vъ oblasti jeg(o)].<sup>52</sup>

The village of Viništa was given by Michael IX to the Monastery of Saint Nikita (ἔτεον τόπον καλούμενον Βίνισαν, διήκοντα μέχρι τοῦ ὥχθου τοῦ Σελ-κόβου).<sup>53</sup> In the charter of Andronikos II the donation of the respective village is confirmed (Drugo město Viništa ōpirajušti do brěga Selkova).<sup>54</sup>

Such a data structure enables us to create a catalogue of Byzantine and Serbian settlement terminology with the possibility of direct comparison, e.g.: upper town/fortress: κάστρον – град (grad); lower town: ἐμπόριον – трг (trg) or амборь (ambor) and προάστειον – подградије (podgradije); old village: παλαιο-

<sup>51</sup> Gramota na car Mihail IX Paleolog za manastirot Sv. Nikita kaj Skopje 288–292.

<sup>52</sup> Zbornik srednjovekovnih čiriličkih povelja i pisama 406f. Cf. on the localisation: Vassiliki Kravari, Villes et villages de Macédoine occidentale (Paris 1989) 135; Miodrag Al. Purković, Popis sela u srednjevekovnoj Srbiji, in: Godišnjak Skopskog Filozofskog Fakulteta 4/2 (1939/40) 53–160, at 114.

<sup>53</sup> Gramota na car Mihail IX Paleolog za manastirot Sv. Nikita kaj Skopje 288–292. Cf. on the localisation: Kravari, Villes et villages 173f.

<sup>54</sup> Zbornik srednjovekovnih čiriličkih povelja i pisama 406f.

χώριον, τό = старо село (staro selo; the opposite of a new village); abandoned village: παλαιοχώριον, τό = селиште (selište); settlement site for a new village: селиште (selište); hamlet: ἀγρίδιον, τό = заселк, заселак (zaselk, zaselak) etc.

This research question has evolved in our Case Study during DPP and will be elaborated thoroughly in future projects.

## Conclusion

The present contribution sums up the experience gained during our research on the Case Study “The Historical Region of Macedonia (12<sup>th</sup>–14<sup>th</sup> Cent.) – The Transformation of a Medieval Landscape” as well as its scholarly and digital outcome. The reader has been guided systematically in seven steps from an analogue starting point in the Case Study to its digital transformation and visualisation. A focus was put on the (digital) how and not on static figures and visualisations alone, because quite often digital projects fail to explain their respective workflow step by step. That is why we have chosen the present transparent and comprehensible approach.

Online publications of written sources and of archaeological data regarding Byzantine Macedonia are very scarce. Both may be found as open access publications in the form of pdf files, but not as structured open data. Up until now there has also not been created a standard or best practice to provide the respective information online. The present Case Study has filled this gap substantially.

By comparing different scholarly editions of the aforesaid clusters of charters and by extracting data from these written sources according to the research questions of DPP, we have established a rich corpus of source-based material, which was then embedded into the *DPP OpenAtlas Database* (Fig. 6). Thus, we have established an online repository with the capability of state of the art dissemination and visualisation. These aims were achieved in close cooperation with the Team Department of Geography and Regional Research of the University of Vienna (Prof. Dr. Karel Kriz).<sup>55</sup>

<sup>55</sup> Cf. the respective, joint publications: Karel Kriz/Alexander Pucher/Markus Breier, Digitizing Patterns of Power – Cartographic Communication for Digital Humanities, in: Proceedings of the International Cartographic Association 1 (2017) 1–5 [doi: 10.5194/ica-proc-1-62-2018]; Mihailo St. Po-

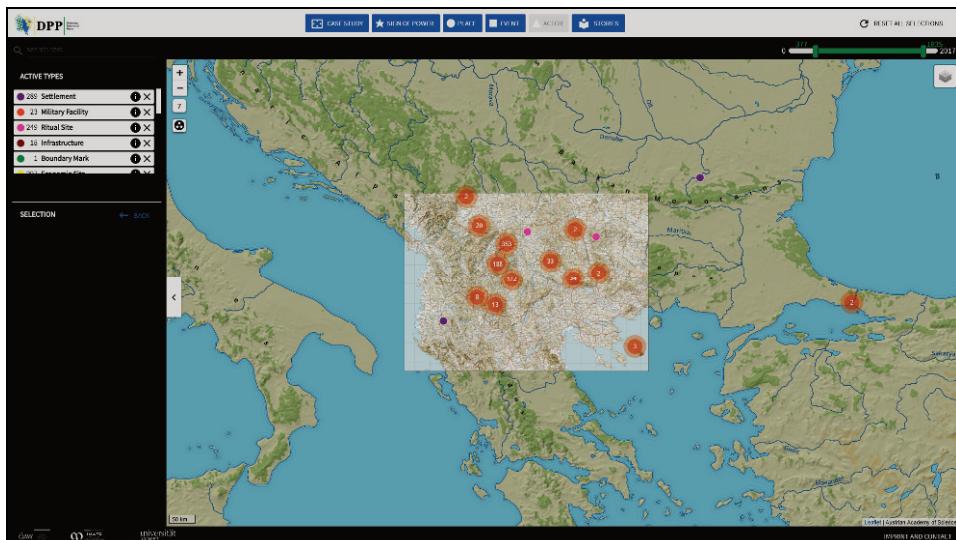


Fig. 6: Screenshot of the DPP Mapviewer with a Georeferenced Layer of the Map *Tabula Imperii Byzantini* (TIB 11 and TIB 16), 1:800,000

Consequently, this Case Study serves as a role model for similar sources and for future projects. In fact, its data forms the nucleus for the online atlas “Maps of Power: Historical Atlas of Places, Borderzones and Migration Dynamics in Byzantium”<sup>56</sup>, which is in preparation by the Long-Term Project *Tabula Imperii Byzantini* (TIB) at the Austrian Academy of Sciences for the summer of 2019 and which is developed by two ongoing sub-projects of the TIB, namely “Byzantino-Serbian Border Zones in Transition: Migration and Elite Change in pre-Ottoman Macedonia (1282–1355)” [FWF Austrian Science Fund Project P 30384-G28] and “The Digital Tabula Imperii Byzantini (Dig-TIB) as Contribution to the World’s Cultural Heritage” [Jubiläumsfonds der Österreichischen Nationalbank, Project No. 17771].<sup>57</sup>

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pović/David Schmid/Markus Breier, From the *Via Egnatia* to Prilep, Bitola and Ohrid: a Medieval Road Map based on Written Sources, Archaeological Remains and GIScience, in: Space, Landscapes and Settlements in Byzantium (Vienna/Novi Sad 2017) 289–317, 511–518.

<sup>56</sup> URL: <<http://oeaw.academia.edu/MapsofPower>>, 03.02.2019); cf. also the article entitled “The Digital Cluster Project ‘Digitising Patterns of Power (DPP)’: Uniting History, Archaeology, Geography and Cartography with Tools from Digital Humanities” of Mihailo St. Popović in this volume.

<sup>57</sup> URL: <<https://tib.oeaw.ac.at/index.php?seite=sub#digittb>>, 03.02.2019.

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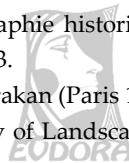
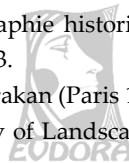
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