

# BULGARIA MEDIAEVALIS

Volume 3/2012



BULGARIAN HISTORICAL HERITAGE FOUNDATION  
Sofia

# ARE THE HISTORICAL GEOGRAPHY OF THE BYZANTINE EMPIRE AND DIGITAL HUMANITIES A CONTRADICTION *PER SE*?

MIHAILO ST. POPOVIĆ/VIENNA

## 1. Overview

Since the *21st International Congress of Byzantine Studies* in London in 2006 the worldwide scholarly community of Byzantinists has become witness to the most interesting and fascinating interaction between historical geography and geoinformatics, i.e. the field of applications deriving from Geographic Information Systems (GIS), of project-related online presentations as well as of databases and of computer-based models.

Firstly, I would like to give an overview of some of the various scholarly initiatives and results from our Byzantine Commonwealth between 2006 and today. Let us begin with a project named *Pleiades*, which is based in the United States of America and gives scholars, students and enthusiasts worldwide the opportunity to use, create, and share historical geographic information about the Greek and Roman World in digital form.<sup>1</sup> Two other impressive US-projects are *The Digital Atlas of Roman and Medieval Civilization (DARMC)*, which makes freely available on the internet the best materials for a GIS approach to mapping and spatial analysis of the Roman and mediaeval worlds<sup>2</sup>, and *ORBIS: The Stanford Geospatial Network Model of the Roman World*, which reconstructs the time cost and financial expense associated with a wide range of different types of travel in Antiquity. *ORBIS* is based on a simplified version of the giant network of cities, roads, rivers and sea lanes that framed movement across the Roman Empire.<sup>3</sup>

By shifting the view from the New to the Old World, the scholarly journey leads us to the United Kingdom, and here to a trend-setting project named *HESTIA: the Herodotus Encoded Space-Text-Imaging Archive*, which might be of interest to Byzantinists working in the field of historical geography as well as in the field of literature.<sup>4</sup> *HESTIA* provides a new approach towards conceptions of space in the ancient world. Herodotus' narrative is 'marked-up' intending to capture spatial information, including place names and regions.

The British project *Mapping the Jewish Communities of the Byzantine Empire* at the University of Cambridge aims to map and interpret Jewish life in the Byzantine Empire using GIS.<sup>5</sup>

The next point of interest is France, which has two very exciting projects to offer

<sup>1</sup> <http://pleiades.stoa.org/> (accessed 8 May 2012).

<sup>2</sup> <http://darmc.harvard.edu/icb/icb.do> (accessed 29 May 2012).

<sup>3</sup> <http://orbis.stanford.edu/> (accessed 29 May 2012).

<sup>4</sup> <http://www.open.ac.uk/Arts/hestia/> (accessed 8 May 2012).

<sup>5</sup> <http://www.mjcb.eu/> (accessed 10 May 2012).

to the Byzantine scholarly community. The first is conducted by the *International Center for the Study of the Ancient Roads* and by a team of the *National School of Architecture Paris Val de Seine* in order to create an inventory of caravanserais which span from China in the East to Spain in the West and to elaborate a GIS of roads connecting them.<sup>6</sup> One part of this project comprises wayside caravanserais and road networks in mediaeval Syria from the 12th to the 16th century, on which Cinzia Tavernari completed her PhD-thesis at the end of 2011.<sup>7</sup>

The second French project is called *CartoMundi*. It encourages the exchange and gathering of cartographic knowledge on an international scale and facilitates smoother relations between map users and institutions which hold them. The portal of *CartoMundi* allows the user to select institutions preserving maps in the geographic area selected on the world map.<sup>8</sup>

A very interesting German web site entitled *OmnesViae: Roman Routeplanner* combines the Tabula Peutingeriana with internet technology.<sup>9</sup> A similar approach is provided by the French web site called *Itinéraires romains en France*.<sup>10</sup>

Continuing this overview, I would like to highlight some aspects of Austrian research on the historical geography of the Eastern Mediterranean. In February 2009 I took part in a workshop entitled *Mapping Different Geographies*, which was organised by Professors Karel Kriz and William Cartwright in Puchberg am Schneeberg in Austria. Two papers concerning Byzantine Studies were published in the Proceedings of the workshop by the Springer publishing house. The first is on “DIFAB – A Databased Visual Archive of Byzantium and the Challenges of Indexing Historical Material Culture” by Fani Gargova, Sarah Teetor, Daniel Terkl and Ulrike Unterweger<sup>11</sup>, the second is mine on “Mapping Byzantium – The Project ‘Macedonia, Northern Part’ in the Series Tabula Imperii Byzantini (TIB) of the Austrian Academy of Sciences”<sup>12</sup>. Since then I have been actively engaged in intertwining Byzantine

<sup>6</sup> <http://www.archatlas.org/workshop09/works09-tavernari.php> (accessed 8 May 2012).

<sup>7</sup> The title of the PhD is: “Caravansérails et Réseaux Routiers du Bilād al-Šām (fin XIIe siècle-début XVIe siècle)”; cf. also the following publications of the same author: A. DEL-C. TAVERNARI, Les réseaux de polygones de Thiessen. Application à la géolocalisation robuste de caravansérails décrits dans les récits anciens de voyageurs, *Géomatique Expert* 70 (Août-Septembre 2009) 97–101; C. TAVERNARI, Les routes du Bilād al-Šām au bas Moyen Âge, *L'émoi de l'histoire* 32 (2010) 85–114.

<sup>8</sup> <http://www.cartomundi.fr/site/> (accessed 8 May 2012).

<sup>9</sup> <http://omnesviae.org/> (accessed 8 May 2012).

<sup>10</sup> <http://itineraires-romains-en-france.pagesperso-orange.fr/default.htm> (accessed 10 May 2012).

<sup>11</sup> F. GARGOVA–S. TEETOR–D. TERKL–U. UNTERWEGE, DIFAB – A Databased Visual Archive of Byzantium and the Challenges of Indexing Historical Material Culture, in *Mapping Different Geographies (Lecture Notes in Geoinformation and Cartography)*, Berlin–Heidelberg 2010, 201–217.

<sup>12</sup> M. POPOVIĆ, Mapping Byzantium – The Project “Macedonia, Northern Part” in the Series Tabula Imperii Byzantini (TIB) of the Austrian Academy of Sciences, in *Mapping Different*

Studies with Historical Geographic Information Systems (HGIS), on which I will report in detail below (cf. 2. Personal Perspectives and Scholarly Results).

The next aim of this overview is Serbia. Remarkable is the monograph written by Siniša Mišić on the waterways and the use of water in mediaeval Serbia.<sup>13</sup> Moreover, a Serbian translation of the book “Der Lebensraum der Byzantiner. Historisch-geographischer Abriß ihres mittelalterlichen Staates im östlichen Mittelmeerraum” by Professor Johannes Koder was published in Belgrade in 2011.<sup>14</sup> In preparation are the Proceedings of the *Fifth National Conference of Byzantinists of Serbia* entitled “Византијски свет на Балкану/The Byzantine World in the Balkans”, which will be edited under the supervision of Professor Ljubomir Maksimović at the Serbian Academy of Sciences and Arts and which will also contain articles on the historical geography of Byzantium as well as of Serbia.

With regard to Greek scholarly projects on the historical geography of the Byzantine Empire an initiative by Professor Myron Myrdis has to be highlighted. He works at the Department of Cartography of the Aristotle University of Thessaloniki and develops an electronic atlas of Greek monasticism, of which a pilot application exists so far. In the application the user will have access to photographs, historical facts, maps of routes to the monasteries, along with all the information collected about the monasteries themselves.<sup>15</sup> In her article entitled “*Rural Towns and In-Between or Third Spaces Settlement Patterns in Byzantine Epirus (7th–11th Centuries) from an Interdisciplinary Approach*” and published in 2009 Myrto Veikou is re-evaluating existing settlement theories and comes to the conclusion that Byzantine space was to a certain extent “rurban space” by combining the “rural” and the “urban” areas.<sup>16</sup>

Research on the historical geography of Bulgaria includes Andrew Poulter’s “The Bulgarian-British Research Programme in the Countryside and on the Site of an Early Byzantine Fortress: the Implications for the Lower Danube in the 5th to 6th Centuries AD”<sup>17</sup> as well as Rossina Kostova’s “Changing Settlement Patterns on the Byzantino-Bulgarian Periphery: the North Part of the West Black Sea Coast 8th

*Geographies (Lecture Notes in Geoinformation and Cartography)*, Berlin–Heidelberg 2010, 219–234.

<sup>13</sup> С. МИШИЋ, *Коришћење унутрашњих вода у српским земљама средњег века*, Београд 2007.

<sup>14</sup> Ј. КОДЕР, *Византијски свет. Увод у историјску географију источног Медитерана током византијске епохе*, Београд 2011.

<sup>15</sup> <http://www.scribd.com/doc/56706048/THE-ELECTRONIC-ATLAS-OF-GREEK-MONASTICISM> (accessed 10 May 2012).

<sup>16</sup> M. VEIKOU, “Rural Towns” and “In-Between” or “Third” Spaces Settlement Patterns in Byzantine Epirus (7th–11th Centuries) from an Interdisciplinary Approach, *Archeologia Medievale* 36 (2009) 43–54.

<sup>17</sup> A. POULTER, The Bulgarian-British Research Programme in the Countryside and on the Site of an Early Byzantine Fortress: the Implications for the Lower Danube in the 5th to 6th Centuries AD, in *The Lower Danube in Antiquity (VI c. BC–VI c. AD). International Archaeological Conference, Bulgaria, Tutrakan, 6.–7.10.2005*, Sofia 2007, 361–384.

to 12th C.”<sup>18</sup>, “Space and Power on the West Black Sea Coast 11th to 12th C.: the Sigillographic Evidence”<sup>19</sup> and “Bulgarian Landscapes in Medieval Studies: the Last Fifteen Years”<sup>20</sup>.

This short outline clearly testifies to the vividness as well as to the innovation in the field of historical geography of the Byzantine Empire, which should be continued with the same enthusiasm in the years to come.

## 2. Personal Perspectives and Scholarly Results

In the second part of this article I would like to add some personal perspectives, thoughts and scholarly results, which are connected directly to my area of research, i.e. the historical region of Macedonia. From 1 March 2009 until 30 September 2011 I conducted research as a research assistant within the FWF Austrian Science Fund Stand-Alone Project “Economy and Regional Trade Routes in Northern Macedonia (12th–16th Century)” (P 21137-G19) at the Institute for Byzantine Studies of the Austrian Academy of Sciences.<sup>21</sup>

The area of research of the project focused on those parts of Byzantine Macedonia, which lie today in the territory of the Former Yugoslav Republic of Macedonia (FYROM) and of the Republic of Bulgaria. The aim of the project consisted of detailed research on regional lines of communication and trade routes – apart from the well documented arteries *Via militaris* and *Via Egnatia* respectively – and as a consequence on the economic area of northern Macedonia, which was conducted mainly on the basis of written sources from the end of the 12th century until the end of the 16th century. It was anticipated that the expected new results would provide an important contribution to understanding the communication and interaction of local economic centres in the area of research on the one hand and that they would on the other hand offer a differentiated assessment of the significance of northern Macedonia regarding the transfer of goods and resources (keyword mining) between the river Danube, the Pirin-mountains, the Aegean and the Adriatic Sea.

This approach, which had been defined in advance, was refined to a certain extent during the duration of the project by introducing two levels – a macro-level and a micro-level – of scholarly research. The macro-level comprised the border zones between the Byzantine Empire and the Serbian mediaeval state, migration, transportation networks, mining and the fairs in the above-mentioned part of the historical

<sup>18</sup> R. KOSTOVA, Changing Settlement Patterns on the Byzantino-Bulgarian Periphery: the North Part of the West Black Sea Coast 8th to 12th C., in *Temporis Signa. Archeologia della tarda antichità e del medioevo* III, Spoleto 2008, 15–37.

<sup>19</sup> R. KOSTOVA, Space and Power on the West Black Sea Coast 11th to 12th C.: the Sigillographic Evidence, in *A Centennial of Dr. Vasil Haralanov (1907–2007)*, Šumen 2008, 207–225.

<sup>20</sup> R. KOSTOVA, Bulgarian Landscapes in Medieval Studies: the Last Fifteen Years, *Annual of Medieval Studies at CEU* 15 (2009) 177–195.

<sup>21</sup> Cf. on the project and the scholarly results: <http://www.oeaw.ac.at/byzanz/routes> and <http://oeaw.academia.edu/MihailoPopovic> (both accessed 29 May 2012).

region of Macedonia, whereas the micro-level focused on the settlement pattern and pasture farming in one specific border zone (namely the valleys of the rivers Strumica/Strumešnica and Kriva Lakavica). This double-winged approach enabled the reconstruction of political and of economic interactions in the whole area of research as well as a re-evaluation of current methods of historical geography through case studies on the micro-level of a specific border zone, which will be published additionally in my professorial dissertation (Habilitation) entitled “Von den Quellen zum Visuellen in der historischen Geographie. Zentrale Orte, Siedlungstheorien und Geoinformatik, angewendet auf die historische Landschaft Makedonien (13. bis 16. Jahrhundert)” [“From the Sources to the Visual Display in Historical Geography. Central Places, Settlement Theories and Geoinformatics applied on the Historical Landscape of Macedonia (13th–16th Century)”].

The project addressed several highly important scholarly topics within the fields of Byzantine Studies, South East European Studies and historical geography. On the micro-level it focused on the correlation between settlement processes (i.e. clearings, hamlets, villages, deserted villages), changing borders, transportation networks and societies in the above-mentioned specific border zone of the historical region of Macedonia and it proved that significant data can still be extracted from widely known and published sources (i.e. from Byzantine and Old Slavonic charters dating from 1152 AD until 1395 AD), whose value for the study of settlement processes in the historical region of Macedonia has practically been neglected so far in the bibliography.

The relevant data was collected in the first year of the project by the reading of Byzantine and Old Slavonic charters on the area of research, by taking into consideration new editions and corrective dating, by the analysis of the charters regarding roads and trade routes, their designation and adjacent toponyms and by the inclusion of further sources (e.g. Ottoman defters). One of the key elements of the project was the testing of the applicability of the so-called modified “Central Place Theory” based on the evidence deriving from the above-mentioned written sources in order to create models of settlement patterns (with a special emphasis on the valleys of the rivers Strumica/Strumešnica and Kriva Lakavica). Several of my scholarly publications, which were based on the preliminary works of the project leader Professor Johannes Koder<sup>22</sup>, proved the usefulness of this approach<sup>23</sup>, which should be applied to other parts of the historical region of Macedonia as well as of the Byzantine Empire

<sup>22</sup> A summary of his results can be found in: J. KODER, Land Use and Settlement: Theoretical Approaches, in *General Issues in the Study of Medieval Logistics: Sources, Problems and Methodologies (History of Warfare 36)*, Leiden–Boston 2006, 159–183.

<sup>23</sup> M. St. POPOVIĆ, Siedlungsstrukturen im Wandel: Das Tal der Strumica bzw. Strumešnica in spätbyzantinischer und osmanischer Zeit (1259–1600), *Südost-Forschungen* 68 (2009) 1–62; M. St. POPOVIĆ, Die Siedlungsstruktur der Region Melnik in spätbyzantinischer und osmanischer Zeit, *3PBH* 47 (2010) 247–276; M. St. POPOVIĆ, Das Flußtal der Kriva Lakavica in spätbyzantinischer und osmanischer Zeit (1259–1600): Das Verhältnis des Ortes Konče zum Siedlungsnetz der Städte Štip und Strumica, *REB* 69 (2011) 159–184.

in the near future.

Moreover, it has been shown that the results of the project on the settlement processes and on their typology can successfully be combined with applications deriving from the field of HGIS. Indispensable geodata (e.g. GPS waypoints, GPS tracks) needed for the programming of GIS-based models was gathered in the second year of the project as outlined in the initial proposal (cf. fig. 1). For this reason two surveys were conducted in the area of research – the first by Peter Soustal and myself in Bulgaria in June 2010, the second by Johannes Koder and myself in FYROM in August/September 2010. The data recorded during both surveys comprised archaeological evidence (traces of roads, bridges), GPS waypoints and GPS tracks as well as documentation via digital photography *in situ*.

At the end of the second year and in the third year of the project the applicability and the usefulness of HGIS was tested for the stand-alone project and consequently for the overall project *Tabula Imperii Byzantini* of the Austrian Academy of Sciences. One of these applications, which allows for the combination of space and time, the animation of scholarly results and thus the dissemination to a broader public on the world-wide web, is provided by the application of *Google Earth Outreach*. Through the programming of *Timelines* and their animation I succeeded in illustrating progressively the development and the degradation of settlements in parts of the historical region of Macedonia based on the written mediaeval sources (cf. fig. 2).<sup>24</sup>

Furthermore, research in the historical cartography of the southern Balkan peninsula was conducted in order to acquire additional geodata (i.e. old maps) suitable for georeferencing via HGIS and for reconstructing the loss of settlement structure in Macedonian towns between the Middle Ages and today.<sup>25</sup>

Data deriving from mediaeval charters, from archaeological excavations, from historical cartography and from surveys in the area of research was used to create two GIS-based models (i.e. “least-cost path”-models) with the assistance of two GIS technicians. Thus, Juilson J. Jubanski and I programmed and published a “least-cost path”-model of replication of a mediaeval route between Melnik and Zlatolist (cf.

<sup>24</sup> M. St. POPOVIĆ, The Dynamics of Borders, Transportation Networks and Migration in the Historical Region of Macedonia (14th–16th Centuries), in *Europa im Geflecht der Welt. Mittelalterliche Migrationen in globalen Bezügen (Europa im Mittelalter 20)*, Berlin 2012, 155–172.

<sup>25</sup> M. St. POPOVIĆ, Die fünf vorzüglichsten Städte Macedoniens auf Plänen des k. k. Konsuls Wilhelm von Chabert aus dem Jahre 1832, *Thetis. Mannheimer Beiträge zur Klassischen Archäologie und Geschichte Griechenlands und Zyperns* 18 (2011) 187–196; M. POPOVIĆ, P. SOUSTAL, Mapping ‘Macedonia’s Five Most Excellent Cities’ – What do Byzantine Studies, Austrian Cartography from the 1830s and GIS have in Common?, in *Proceedings of the 25th International Cartographic Conference, Paris, 3–8 July 2011*, Paris 2011, CO-426 [cf. [http://icaci.org/files/documents/ICC\\_proceedings/ICC2011/Oral%20Presentations%20PDF/E1-History%20of%20cartography%20and%20GI%20science/CO-426.pdf](http://icaci.org/files/documents/ICC_proceedings/ICC2011/Oral%20Presentations%20PDF/E1-History%20of%20cartography%20and%20GI%20science/CO-426.pdf) (accessed 15 May 2012)].

fig. 3)<sup>26</sup>, while Markus Breier and I created and presented a “least-cost path”-model of prediction of a mediaeval route (the so-called *basilikos dromos*) between Štip and Petrič, which was published in 2012 (cf. fig. 4).<sup>27</sup>

The results achieved on the micro-level were intertwined and enriched with several layers of the macro-level. These layers include scholarly publications on the mines in the eastern part of the historical region of Macedonia (FYROM, Bulgaria)<sup>28</sup> and fairs in the southern Balkan peninsula<sup>29</sup> as well as on the transportation network in the entire historical region of Macedonia. Especially the results on the transportation network, which are based on mediaeval and early modern written sources, were evaluated and refined additionally by network analytical tools (i.e. the computer programme *\*Ora Version 2.2.9*). Thus, different values of centrality could be calculated (Closeness Centrality, Betweenness Centrality, Total Degree Centrality) and used for further analysis (cf. figs. 5 and 6).<sup>30</sup>

The contribution of my scholarly work to the progress of the field of historical geography consists of two main aspects. The first aspect comprises new scholarly results on settlement processes and on the settlement typology as well as the interaction between border zones, transportation networks and migration in the area of research. The analysed data deriving from the above-mentioned charters amends the overall picture of the historical region of Macedonia based on the Byzantine historiography. The second aspect pays attention to the increasing importance of Digital

<sup>26</sup> M. St. POPOVIĆ–J. 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), *Anzeiger der philosophisch-historischen Klasse der Österreichischen Akademie der Wissenschaften* 145. Jahrgang/2. Halbband (2010) 55–87.

<sup>27</sup> M. St. POPOVIĆ–M. BREIER, Tracing Byzantine Routes – Medieval Road Networks in the Historical Region of Macedonia and Their Reconstruction by Least-Cost Paths, in *Proceedings of the “16th International Conference on Cultural Heritage and New Technologies”*, Vienna 2011, 464–475 [published online via: [http://www.stadtarchaeologie.at/wp-content/uploads/eBook\\_CHNT16\\_Part4.pdf](http://www.stadtarchaeologie.at/wp-content/uploads/eBook_CHNT16_Part4.pdf)]. Cf. also: M. St. POPOVIĆ, Altstraßenforschung am Beispiel des Tales der Strumica bzw. Strumešnica in spätbyzantinischer Zeit (1259–1375/76), in *Niš i Vizantija. Osmi naučni skup, Niš, 3–5. jun 2009. Zbornik radova VIII*, Niš 2010, 417–432.

<sup>28</sup> M. St. POPOVIĆ, Kontinuitäten und Diskontinuitäten in der Nutzung südosteuropäischer Bergwerke von der Spätantike bis zur osmanischen Zeit am Beispiel der historischen Landschaft Makedonien, in *Das Osmanische Europa. Probleme und Perspektiven der Forschung* [in press].

<sup>29</sup> M. St. POPOVIĆ, New Insights into the History of Balkan Fairs in the Historical Region of Macedonia (13th–19th Centuries), *BM 2 [Studies in Honour of Professor Vassil Gjuzelev]* (2011) 757–776.

<sup>30</sup> M. St. POPOVIĆ, Networks of Border Zones: A Case Study on the Historical Region of Macedonia in the 14th Century AD, in *Understanding Different Geographies*, ed. K. KRIZ–W. CARTWRIGHT–M. KINBERGER (Lecture Notes in Geoinformation and Cartography), Berlin–Heidelberg 2013, 227–241; M. St. POPOVIĆ, Towards a Mathematical Evaluation of the Significance of the Via Egnatia within the Transport Network of the Historical Region of Macedonia, in *Proceedings of the Conference “Makedonija niz vekovite”*, Skopje 2012 [in press].



Humanities in the historical geography of the Byzantine Empire. Thus far, Professors John Haldon<sup>31</sup> and Vincent Gaffney<sup>32</sup> have published exclusively relevant GIS-based models on Byzantium. My stand-alone project “Economy and Regional Trade Routes in Northern Macedonia (12th–16th Century)” has enriched this field of research considerably by creating and publishing additional models, which are suitable for comparisons (Balkan peninsula – Asia Minor) and can be used by archaeologists in the planning and in the course of their excavations.

Consequently, both aspects break new scientific ground and open up new perspectives for the future. A forward-looking field of research, which is closely connected to shifting borders and migration in the historical region of Macedonia, is the change of ruling elites in the above-mentioned border zones. We witness for example on the basis of the charters a flight of Byzantine noblemen and landowners from their landed properties in the wake of the expansion of the Serbian mediaeval state in the 14th century and a redistribution of abandoned land (*exaleimma*) as well as of privileges to Serbian noblemen by the new rulers.

During the duration of the project the scholarly results were published in printed form and to a certain extent also in pdf-format in the world-wide web<sup>33</sup>. In the third year of the project it has become clear that the limits of printed media are reached soon when it comes to publishing GIS-based models. Thus, the project addresses the crucial question how to transfer historical geographic knowledge from static data to user oriented visualisation.<sup>34</sup>

This leads to the need to develop new methods. In order to intertwine all results/layers of the project digitally, an integrative interface will be needed in the world-wide web. A contribution to this issue has been given in my professorial dissertation (see above). Furthermore, I participated in three important international conferences in 2011 (39th Annual Conference of Computer Applications and Quantitative Methods in Archaeology, “Revive the Past”, Beijing; 25th International Cartographic

<sup>31</sup> See for example: J. F. HALDON (ed.), *General Issues in the Study of Medieval Logistics: Sources, Problems and Methodologies* (*History of Warfare* 36), Leiden–Boston 2006; J. HALDON, Roads and Communications in the Byzantine Empire: Wagons, Horses, and Supplies, in *Logistics of Warfare in the Age of the Crusades. Proceedings of a Workshop held at the Centre for Medieval Studies, University of Sydney, 30 September to 4 October 2002*, Aldershot 2006, 131–158; <http://www.princeton.edu/avkat/> (accessed 31 May 2012).

<sup>32</sup> Cf. for example: V. GAFFNEY–P. M. VAN LEUSEN, Postscript–GIS, Environmental Determinism and Archaeology, in *Archaeology and Geographical Information Systems*, London 1995, 367–382; V. GAFFNEY–H. GAFFNEY, Modelling Routes and Communications, in *Handels-güter und Verkehrswege. Aspekte der Warenversorgung im östlichen Mittelmeerraum (4. bis 15. Jahrhundert)* (*Veröffentlichungen zur Byzanzforschung* 18), Wien 2010, 79–91.

<sup>33</sup> <http://oeaw.academia.edu/MihailoPopovic> (accessed 29 May 2012).

<sup>34</sup> M. St. POPOVIĆ–B. ŠANDRIC, Transfer of (Historical) Geographic Knowledge Then and Now. From Static Data to User Oriented Visualisation, *e-Perimetron, International web journal on sciences and technologies affined to history of cartography and maps* 7/2 (2012) 50–61 [published online via: [http://www.e-perimetron.org/Vol\\_7\\_2/Popovic\\_Sandric.pdf](http://www.e-perimetron.org/Vol_7_2/Popovic_Sandric.pdf)].

Conference, Paris; 16th International Conference on Cultural Heritage and New Technologies, Vienna) in order to establish cooperations with related areas of science (geographers, cartographers, GIS technicians, archaeologists).

On this basis transdisciplinary issues and methods continue to be discussed with Professor Karel Kriz and his project team (Department of Geography and Regional Research, University of Vienna), with Professor Evangelos Livieratos (International Cartographic Association, Commission on Digital Technologies in Cartographic Heritage) and with Professor Anton Escher (Geographisches Institut, Johannes Gutenberg University Mainz) with the aim to create a web-based interface, which will foster the digital dissemination of the GIS-based results of the project and the validation of the created models and which will contribute in addition to the Open Access Policy of the FWF Austrian Science Fund.

If we return to the initial question, whether the historical geography of the Byzantine Empire and Digital Humanities are a contradiction *per se*, it becomes clear that this is by no means the case. As has been shown above, projects in the field of Byzantine Studies from all around the scholarly world embrace the need to incorporate new technical achievements in the layout of their respective projects, to make full use of GIS and to present their results to an international audience in the world-wide web. Neglecting this vital scholarly approach of the 21st century may result in a marginalisation of Byzantine Studies in general and of the historical geography of the Byzantine Empire in particular. The more complex and difficult the ways to acquire funding become, the more user oriented and outward looking the scholarly outreach has to be in order to justify the awarded funds. An academic subject existing on the verge of scholarly events and innovations is doomed to fall into oblivion.



Fig. 1. GPS Track of a Mediaeval and Ottoman Route in the Valley of the River Kriva Lakavica (Google Earth; KML-Layer by M. St. Popović)

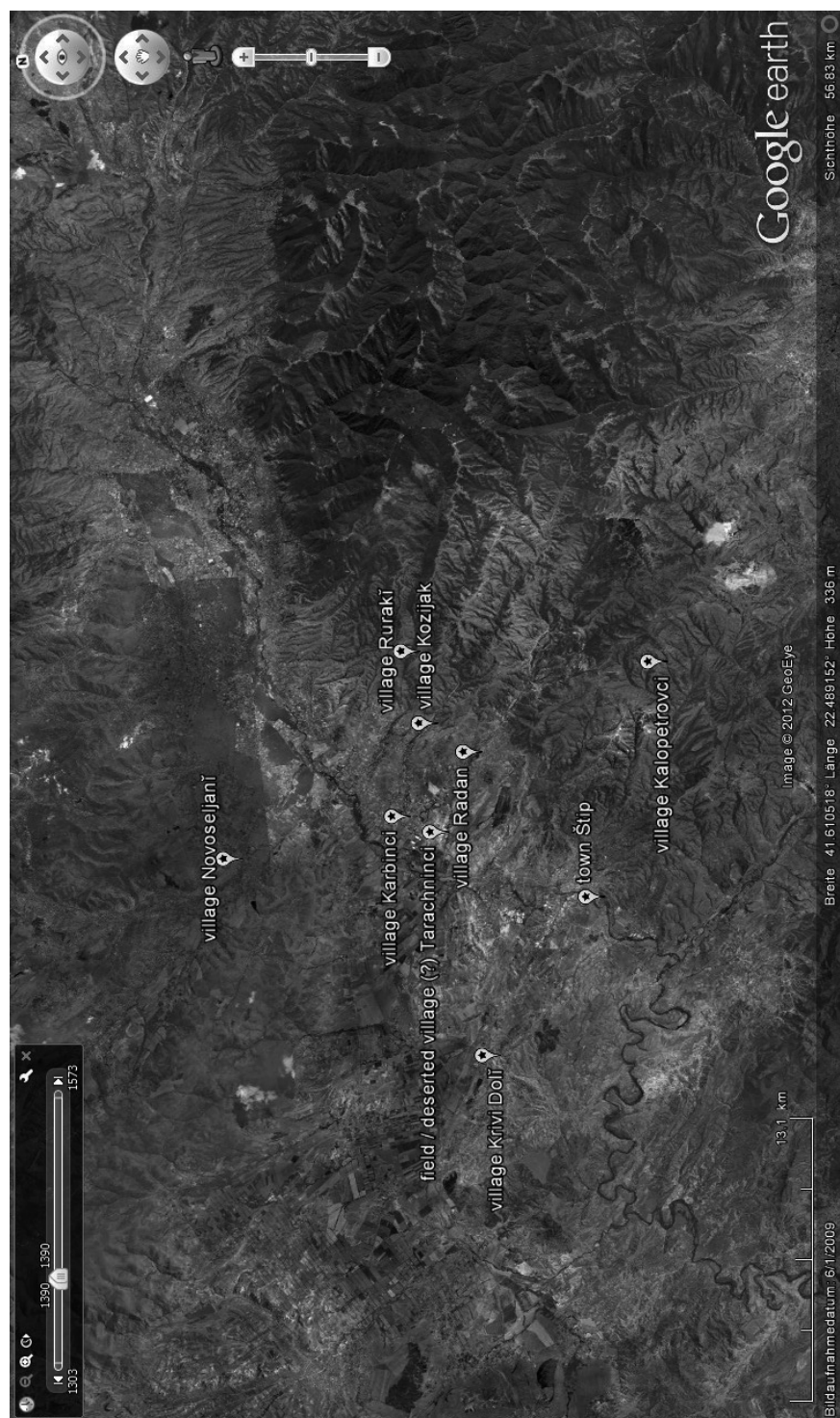


Fig. 2. Timeline of the Settlement Pattern of the Surrounding Area of Štip (Google Earth; KML-Layer by M. St. Popović)

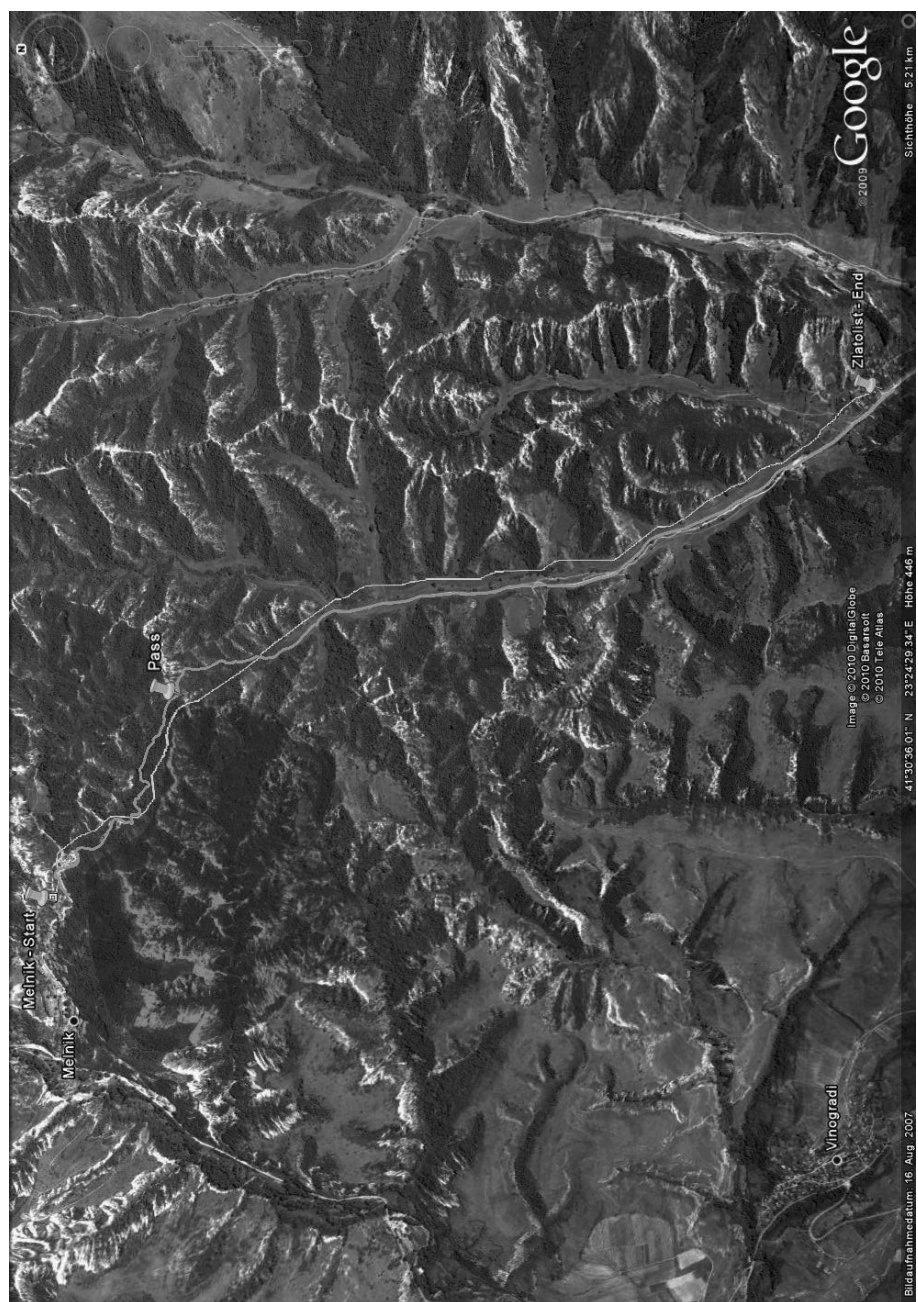


Fig. 3. "Least-Cost Path"-Model of Replication of a Mediaeval Route between Melnik and Zlatolist (Google Earth; KML-Layer by M. St. Popović and J. J. Jubanski)

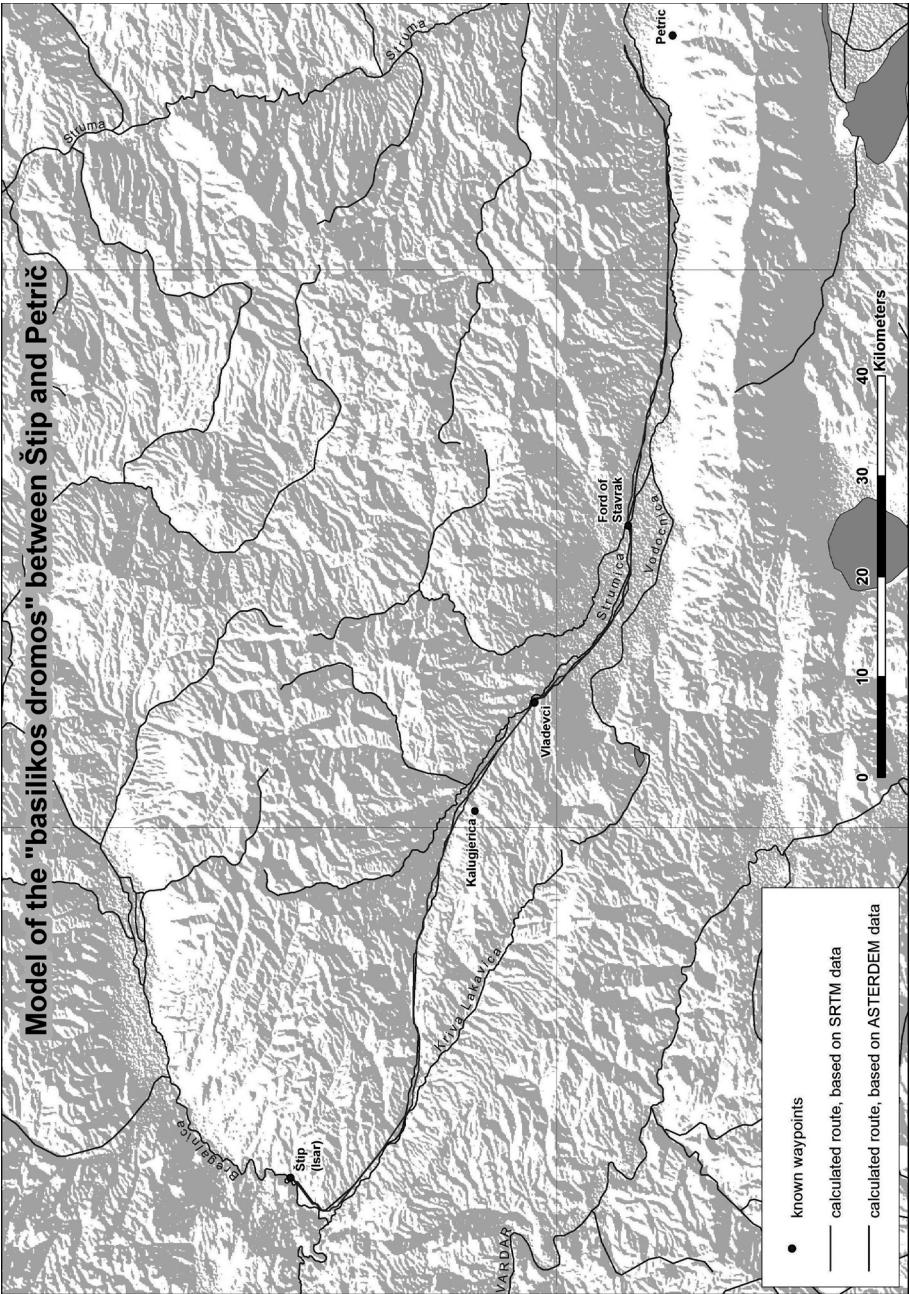


Fig. 4. "Least-Cost Path" -Model of Prediction of a Mediaeval Route between Štip and Petrič (M. St. Popović and M. Breier)





Fig. 5. The Transportation Network in the Historical Region of Macedonia (Google Earth; KML-Layer by M. St. Popović)

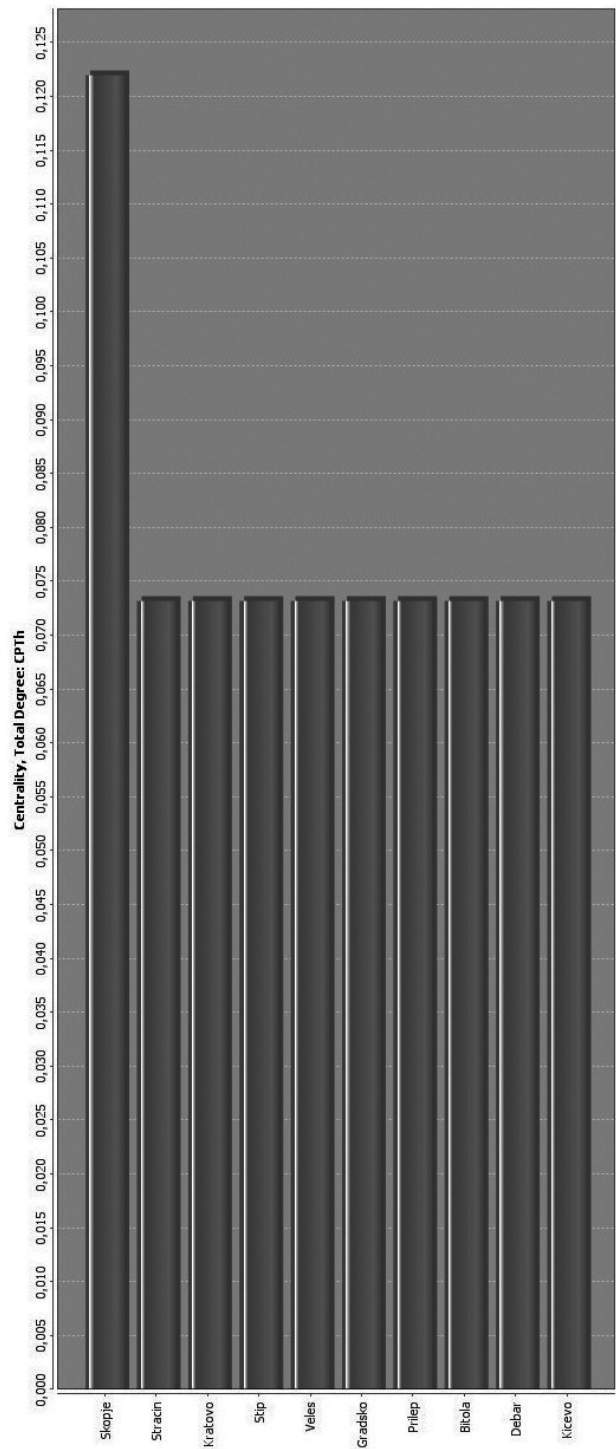


Fig. 6. Results in the Category Total Degree Centrality for the Transportation Network in fig. 5 (\*Oma Version 2.2.9; M. St. Popović)