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ARCHEOLOGICAL DIGITAL MAP OF THE TOPLICA REGION

Abstract: The goal of this paper is to present a decade long exploration of historical, sacral and archeological sites in the Toplica region, a district in Serbia. The survey resulted in a large interactive map with 14 layers where all known objects in this region related to the national heritage are depicted. The positions of sacral objects are noted, from the Neolithic period to the modern times. As a final product, the multilayer 1:10000 to 1:50000 interactive digital maps are produced, with all layers individually recorded. The metadata related to these sites are included and roads to these sites are presented. The rest of the metadata are related to the existing settlements, communication system and hydrography in this region.

Keywords: GPS tracking, Toplica region, digital map, multilayer data, historical and archeological heritage

1. Introduction

Digital map of the Toplica region is a part and the result of the project *Archeological and sacral objects of the Toplica region*. We started this rather ambitious project in autumn 2002 and it is still running. The Toplica region is very rich in many archeological and historical sites, some of them dating back to the year 5000 B.C. It was the main reason why we started the project. A similar map would be a Google map. However, it lacks many features and details which our map has. For example, our digital map has fourteen thematic layers. As far as we know, there is no similar digital map of this region, particularly with this number of information and layers. In this paper, we shall describe the archeological layer.

Data collected during the project are mostly deposited in the [eCatalog of cultural monuments in Serbia](http://spomenicikulture.mi.sanu.ac.rs/eCatalog_of_cultural_monuments_in_Serbia), the Internet oriented project of the Mathematical Institute in Belgrade, led by Zoran Ognjanović. This site is the largest Internet database of cultural and historical monuments in Serbia. It contains data on more than 2000 objects, some of them with several hundred entries, photos, texts, drawings and references. Data related to the Toplica region, mostly photos with comments, can be found at <http://spomenicikulture.mi.sanu.ac.rs/-mapa.php?okr=21>. We are planning to implement soon our digital map in this site as an interactive Internet map.

In the Toplica region, besides archeological sites, there are also many sacral objects: orthodox churches, monasteries and old pre-Christian sanctuaries, mostly from the Roman period (1st-5th c.) and remains from the Ottoman period (15th-19th c.). However, some of the most important archeological sites related to the history of Serbia are from the Middle Ages. Namely, Toplica was one of the main regions of the newly formed Serbian Kingdom in the 12th century. For example, the first capital of the Grand Prince Stefan Nemanja who founded the medieval Serbian state, was Kuršmlija, the second biggest town in Toplica. There are also the first foundations of the Nemanjić Dynasty, the monastery of Sv. Nikola (Saint Nicholas)

and the Monastery of Presv. Bogorodica¹ near Kuršumljija, both built around 1160. The beauty of this part of Serbia and rich historical heritage took the attention of many writers and travelers. Here we shall mention only famous travelers Evliya Çelebi (mid 17th c.) and Felix Kanitz (second part of the 19th c.) [5]. Large parts of their travelogues were devoted to the Toplica region. Their writings are important and valuable historical documents and sources. Nowadays, many of these objects are ruins or very rusty and they are often at difficult places to visit. Our aim has been to preserve them at least in the digital form and present them to the general public and specialist in the fields of archeology and history. The technical parts of the project are:

- Determination of precise locations (geographical coordinates) with 10 meters precision using GPS (General Position System) technology,
- Recording access paths and roads to these objects,
- Collecting main data and description of the main features of these objects in the digital form,
- Presentation of collected data on the Internet to the general public.

2. Toplica region

Geographical position of the Toplica region. Toplica valley is located in the south part of Serbia. On the South, Toplica borders with the Serbian province Kosovo and Metohija. It is situated between the mountains, with peaks up to 2000 meters high bordering the valley. A river of the same name passes through the valley and the Toplica valley lies in the middle of the basin of the river Toplica. This region occupies about 2230 km².



Figure 1: Position of the Toplica region in Serbia

Ethnic groups in Toplica. The Toplica region was inhabited since the ancient times and many tribes and ethnic groups were living or spent some time there: Avars, Celts, Dardans, Romans, Byzantines, Turks and of course Slavs. When Turks came to this region, many other ethnic groups mostly of Islamic religion settled in Toplica. Some parts of the town of Prokuplje still carry the names from these ancient peoples; for example “Čerkez mala”, according to Adygé people from Caucasus region. Most of these ethnic groups followed the withdrawal of Turks from Serbia in the second part of the 19th century. With the liberation of

¹ Presveta Bogorodica, literally translated *Blessed Mother of God*, or probably more commonly *Virgin Mary*, see www.catholic.com/tracts/mary-mother-of-god

Toplica from Ottomans, people from still occupied parts of the Balkans came to Toplica. So at the end of the 19th century beside Serbs, the main population, there were Aromanians, Greeks, Jewish people, Shopi and Montenegrins [13]. Each ethnic group added to the diversity of folk customs and the way of living. Today, most of these ethnic groups are assimilated into Serbs.

The oldest culture found there is named *Starčevačka* (Starčevo culture) and dates back to the year 5000 B.C. Toplica obtained its name in the 7th century, when the Slavic people began to settle to the Balkan Peninsula. Many important roads passed through Toplica, for example the medieval caravans from Dubrovnik to the East. One entrance to the town of Prokuplje still carries the name “Carina” (Customs), denoting the ancient place where traders once had to pay customs’ duty. Many other archeological sites show that the Toplica region has rather important historical and cultural heritage.

3. Digital map

Many small and two large expeditions were organized in Toplica since 2002 and almost all archeological and sacral places out of one hundred in the whole region have been processed. The researchers were on the road in this region altogether more than 3,500 km and 70 days. All expeditions were organized and in most cases financed by the authors of this paper. Beside geographical data, we took several thousands of photos during these journeys. Our survey resulted in a large interactive map of the Toplica region with 14 layers covering physical geographical data, settlements, roads, hydrography and cultural monuments. All known objects in this region related to archeological, sacral and historical sites were depicted. By means of GPS tracking, the geographical coordinates (in Universal Transverse Mercator coordinate system 34x with Hermannsogel datum as the reference point) of these objects were collected and roads going to these sites recorded. For example, the positions of sacral objects were noted, from the Neolithic period to the modern times. As a final product, the multilayer 1:10000 to 1:50000 interactive digital maps were produced, with all the layers individually recorded. The metadata related to these sites are included. For example, all the roads are classified into six categories, following their importance and quality.

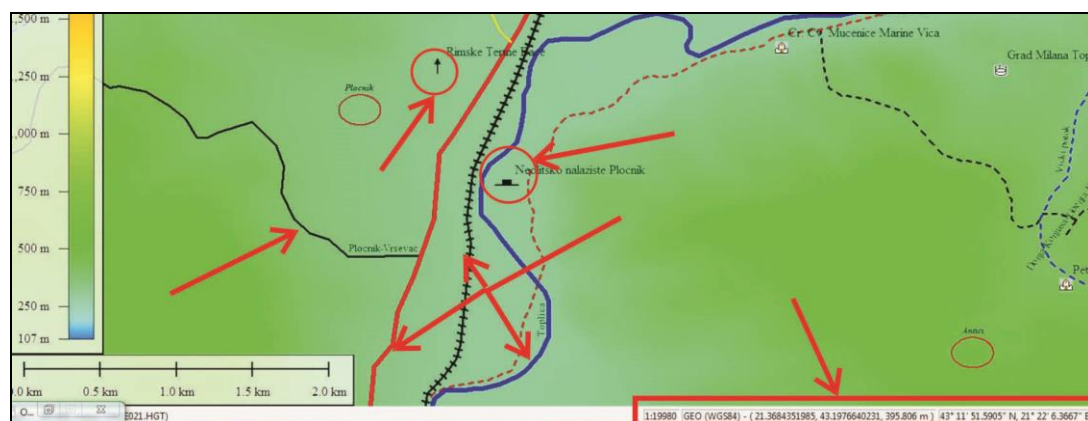


Figure 2: The archeological map of the Toplica region, with layers (entities). Two circles present archeological objects: Roman thermae and the nearby prehistorical settlement on the left bank of the river Toplica. Other entities include roads, railroads and rivers. Additional data are on the right bottom corner: projection type, longitude, latitude and altitude, the zoom value and orthogonal coordinates.

The rest of the metadata are related to the existing settlements, communication system and hydrography in this region. The map has very large resolution, up to 10 meters. The length of depicted roads on the map totals 6120 km. We designed and produced the map using software GeoMedia (version 6.1) and Global Mapper (version 13). The map is vectorized and has many useful functionalities. It has 2D and 3D views and can be zoomed, rotated and viewed under desirable angles. Appropriate layers, one or more, can be made visible on demand of the user.

We applied one novelty in creating our digital map. Namely, we used the software Global Mapper for creating the 3D grid format of the map from a digitized copy of a planar map. In fact, we used its advanced functionality to build the 3D grid from the contour lines on a planar map. After applying this software tool, the 3D grid was obtained which consisted of points having not only latitude and longitude, but altitude as well.

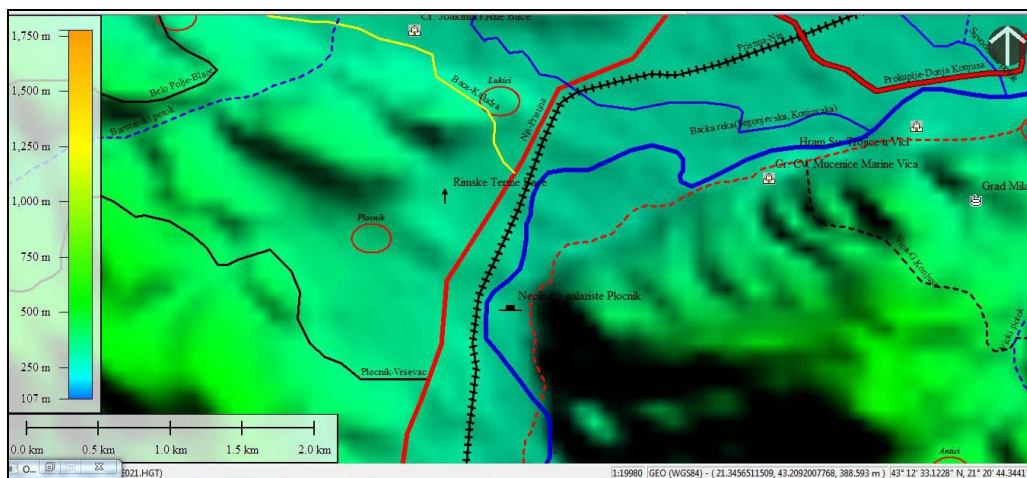


Figure 3: The 3D view of the map with archeological layer and grid elevation data. The average error of elevation grid file is 5m.

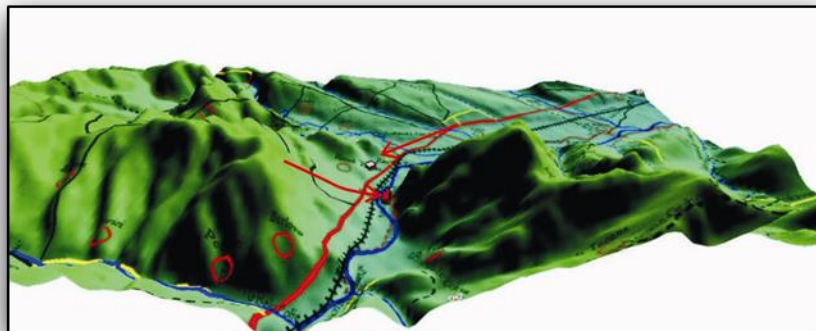


Figure 4: The position of the two buildings on the map

It appears that this process of transforming contour lines into the set of elevated points is rather precise, exactly as much as the original map is accurate. In our case, the precision is about three meters. The accuracy was an important parameter for the subsequent faithful presentation on the map of other entities, such as rivers, roads and buildings.

4. Archeological objects depicted on the map

All visited and explored archeological and sacral objects in the Toplica region are presented on the map. While surveying this region, several archeological sites not yet mentioned in the literature were discovered. They are included on the map, too. Here is a selection of the most important sites.

Neolithic archeological site in the village of Pločnik. This site is located at the bank of the Toplica River half way from Prokuplje to Kuršumlija. This archeological complex is part of the Vinča culture, or Starčevo culture, which flourished from 5500 to 4000 B.C. on wide territories of the Balkans. Pločnik archeological site dates from the Early Neolithic period from 5500 to 4700 B.C. and spreads on about 120 hectares. The artifacts found witness that the people who lived there knew about trade, handicrafts, art and metallurgy. More than 60 different forms of wonderful pottery and wonderful figurines were found.



Figures 5 and 6: Figurines found at the archeological site in the village of Pločnik

The Pločnik archeological site was uncovered in 1927 by Miodrag Grbić, curator of the National Museum in Belgrade. Today, Julka Kuzmanović-Cvetković, the curator of the National museum in Prokuplje is very meritorious for exploration and popularization of this archeological site.

Roman thermae. The remains of Roman bath date about the 3rd c. B.C. This is another archeological site near the village of Pločnik, located just a few hundred meters from the Neolithic archeological site. It is believed that Roman soldiers used to come here for rest and cure

Saint Procopius church in the town of Prokuplje. Built in the 10th century, this is one of the oldest churches in Serbia. Nearby, there is a small church, also called the Latin Church since

it was used for the religious service by the members of Dubrovnik (Republic of Ragusa) colony which existed in Prokuplje in 16th and 17th centuries.



Figure 7: Roman thermae

Endowments of Stefan Nemanja in the Kuršumljija region. This place is known for its monasteries and churches in the town of Kuršumljija, the first capital of the Nemanjić Dynasty. It includes St Nicolas' monastery and the Virgin Mary monastery, the first Nemanjić endowments. Nearby is the Holy Trinity Church, built in the beginning of the 20th century.

The Monastery of Saint Nicholas was built between 1160 and 1166 together with the nearby Monastery of the Virgin Mary. These monasteries were the first endowments of Stefan Nemanja, the founder of Nemanjić Dynasty. The monastery is located on a plateau above Kuršumljija and is oriented to the estuary where the river Banjska flows into the Toplica. Nemanja's coming to the power correlates with the building of the monastery. Namely, building of this monastery produced the conflict between Nemanja and his three brothers. In this conflict Nemanja won and became in 1166 the great prefect and the absolute ruler of Serbia. In the courtyard of the monastery, Nemanja built his palace and Kuršumljija became the seat of his prefecture. So, Kuršumljija became the first capital of Nemanjić Dynasty.

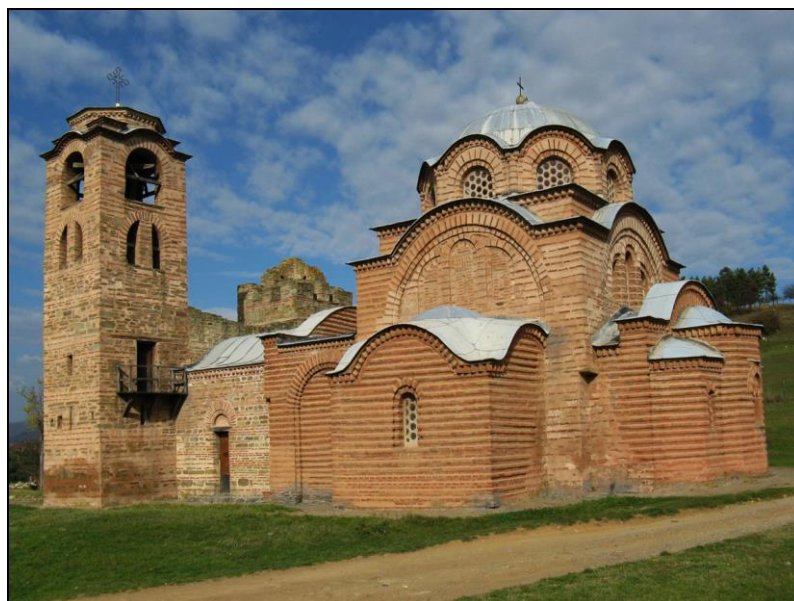


Figure 8: Monastery of St Nicholas

After the Great Migration of Serbs in 1690, the monastery was deserted. The decay of the church and the whole complex started then. However, the monastery was the most destroyed just before the depart of Ottomans from Serbia, in the second half of the 19th century. The restoration of the monastery church began immediately after the Second World War. It was interrupted several times and ended in 2003. The Monastery architecture was influenced by two styles. Byzantine influence is quite observable. For example, there is a similarity with the church Saint Sophia in Istanbul (Constantinople) and other churches there, e.g. Vlacherna gate (Holy Sanctuary of the Mother of God at Vlacherna, Istanbul). Also, there are some Romanic elements. The porch with two turrets looks similar to the St. Triphon Cathedral in Kotor. The master who built the church is unknown, but some authors believe that it was the same one who built the St. Triphon Cathedral in Kotor. This monastery represents beginning of the Rascian style (Raška style) in Serbian Medieval architecture.

The Monastery of the Virgin Mary was the first endowment of Stefan Nemanja. Nemanja built this monastery after meeting in Niš with Byzantine emperor Manojlo Komnine about 1159, according to the evidence of his son Stefan the First Crowned. Stefan claimed that it was founded as a nunnery ruled by Nemanja's wife Ana, called Saint Anastasia.



Figure 9: Monastery of Virgin Mary

The Monastery church was built on the place of early-Byzantine church from the 6th century. This church is unique among all Medieval buildings, not only Serbian but Armenian, Coptic and Macedonian too. The Monastery precedes in style the Rascian period. Architecturally, it stands quite separately as a special and enigmatic type of building. Some

authors have found similarities with the old models of Persian and Egyptian sacral architecture. After the Great Migration of Serbs in 1690, the monastery was deserted. Today, we can see just mystic ruins consisting of the remains of external walls and parts of wall iconostasis. The frescos were completely destroyed. Kanitz wrote [5] about their existence and wealth.

Other sites. We list some of the most important archeological and sacral places and objects in the Toplica region which we explored during our expeditions. Their geographical coordinates are also presented. The accuracy of geographical coordinates is about 10 meters.

1. Church of St' Ilias, village Draguša (N43°16.3918' E021°22.4296')
2. Fort in Pridvorica, Kurvin grad (N43°21.8684' E021°19.0052')
3. Monastery of Ajdanovac (N43°20.8692' E021°22.8898')
4. Church of St Prokopije (N43°13.8241' E021°34.9800')
5. Latin Church, Prokuplje (N43°13.8607' E021°34.9647')
6. Latin Church, village Glasinac (N43°12.1813' E021°42.0564)
7. Roman thermal springs (N43°13.8099' E021°34.9899')
8. Church St Mina (N43°10.2868' E020°58.6012')
9. Church St Nikola (N43°08.3933' E021°16.6102')
10. Log-cabin church of Saint Lazar (N43°08.7300' E021°15.7957')

5. Conclusion

The archeological layer of the presented digital map depicts most of the archeological and sacral objects in the Toplica region, about one hundred of them. Besides the geographical entities, such as geographical coordinates and roads to these objects, it also contains other valuable information such as pointers to related photos, texts and dating. We believe that this map, particularly when implemented for Internet use, will be useful for further study of the historically very interesting Toplica region.

References

- [1] Avramović, D. G., Mirković, D.C. *Hram Svetih Arhangela Mihaila i Gavrila u Toplici* (The temple of St. Angels Michael and Gabriel in Toplica). Parish of Kondželj, Kondžel, 2000.
- [2] Dimitrijević, S., *Dubrovačka trgovina u Leskovcu i okolini i uloga dubrovačke kolonije u Prokuplju* (Dubrovnik trading in Leskovac and vicinity and the role of Dubrovnik colony in Prokuplje), preprint in [2] from "Naše stvaranje", Leskovac, 1955.
- [3] Dimitrijević, S. *Das Neolithikum in Syrmien, Slawonien und Nordwestkroatien – Einführung in den Stander Forschung*. Archeologica Iugoslavica, X, 39-76, Belgrade, 1969.
- [4] Jocić, M. *Древно Прокупље*, (Ancient Prokuplje). Prokuplje, Library of National Museum of Toplica in Prokuplje, 2007.
- [5] Kanitz, F. *Serbien - historisch-ethnographische Reisestudien*. Leipzig, 1868.
- [6] Kuzmanović-Cvetković, J. *Prokuplje, grad Svetog Prokopija* (Prokuplje, the town of St. Procopius). Prokuplje, National Museum of Toplica, 1998.
- [7] Maksimović-Damnjan, M. *Hronika Kosanica* (Kosanica Chronicles). Kuršumljija, Opštinski odbor SUBNOR-a Kuršumljije, 1996.
- [8] Marjanović, P. *Toplički ustanak 1917. godine* (Toplica Uprising in 1917). National Museum of Toplica, Prokuplje, 2003.
- [9] Marjanović, P. D. *Топлица кроз векове* (Toplica trough Ages). Prokuplje, National Museum of Toplica, 2008.

- [10] Marković, G., editor, group of authors, *Spomeničko nasleđe Srbije* (The monumental heritage of Serbia). Beograd, Republic office for protection of cultural heritage, 2007.
- [11] Miljković, D. *Raspeће вечности – цркве и манастири Куршумлијске области* (The crucifixion of eternity – churches and monasteries of Kuršumlija District). Niš, private edition, 1998.
- [12] Perović, M. *Топлички устанак* (Toplica Uprising). Belgrade, Kultura, 1988.
- [13] Rudić, V. *Становништво Прокупља* (Population of Prokuplje). Belgrade, SASA, 1992.
- [14] Stanojević, M. *Туристичке вредности Топличког краја* (Tourist values of Toplica region). PhD thesis defended at the University of Priština, 2001, printed in extenso in *Ekonomika*, vol. XLVII, Niš, 2001.
- [15] Šegan, M., Milovanović, M. *The monuments and sites of Toplica district of Serbia in Digital catalogue of cultural monuments*. Paper presented at CIDOC2012 - Enriching Cultural Heritage, Helsinki, Finland, June 10-14, 2012.
- [16] Terzić, S., editor, *Kuršumlija kroz vekove* (Kuršumlija through the ages). Proc. Sci. Conf. Prolom Banja, 2000, Historical Institute of SASA, Belgrade, 2000.
- [17] Vasić, M., Marinković, D. Proc. *Prokuplje u Praistoriji, Antici i Srednjem veku* (Prokuplje in prehistory, Antiquity and Middle Age). Prokuplje 1995, Archeological Institute Belgrade, 1999.

Related Internet sites

[eMonuments project](http://spomenicikulture.mi.sanu.ac.rs) of the Mathematical Institute in Belgrade, <http://spomenicikulture.mi.sanu.ac.rs>
[Pločnik archeological site](http://www.panacomp.net/) at <http://www.panacomp.net/>
[Virtual library](http://elibrary.matf.bg.ac.rs) of Faculty of Mathematics in Belgrade, <http://elibrary.matf.bg.ac.rs>.

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