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Updates on the Atlas of Medieval Settlements of the Hungarian Kingdom

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Summary: The Atlas of Medieval Settlements of the Hungarian Kingdom was published in 2022 as an exclusive contribution of the Institute of Cartography and Geoinformatics of ELTE Eötvös Loránd University to the celebrations of the 800 year long existence of the fundamental, historical document of the Hungarian statehood, the Golden Bull. In this atlas, most of the settlements of the Hungarian Kingdom are depicted with their names and name variations that ever existed until 1526. This was the year of the Battle of Mohács (a town at the southern region of Hungary) when the Hungarian army suffered a fatal defeat in the war against the Ottoman troops. After the battle, Suleiman the Great took control in the central regions of the Kingdom. The Ottoman rule lasted 150 years while lands of the occupied areas depopulated, and most of the settlements vanished.
The settlement network presented in the Atlas is the cartographic compilation of the enormous historical-topographic research that was carried out by historians of the present and of the past centuries. In total, the Atlas consists of 64 map page spreads in scale 1 : 200 000. The atlas is based on geoinformatic database and background. Besides historical and cartographic chapters, eight additional maps of the Carpathian Basin and of the Hungarian Kingdom in scale 1: 2 000 000 complete the work. These maps of original vegetation, unregulated hydrography, historical toponymy, and varying administrative systems and boundaries from the 11th century to 1526 provide natural and administrative background to the historical topic. Digital Index of the atlas is based on a large, geoinformatic database of the project and is accessible via Internet.

Introduction

2022 was a significant year in the Hungarian history because it was the 800th anniversary of the royal charter named the Golden Bull. In 1222, King Andrew II of Hungary issued this document to establish the rights and obligations of the nobility thus it was the first constitutional document and one of the cornerstones of the development of the Hungarian statehood and parliamentarism (Figures 1 and 2). The charter is named after the authenticating golden royal seal hanging on it. By its structure and content, the Golden Bull is similar to Magna Carta Libertatum, issued by King John of England in 1215.

The Atlas of Medieval Settlements of the Hungarian Kingdom covers more than five hundred years starting from the establishment of the Christian monarchy in 1000 AD until the Ottoman takeover in 1526. That time, the geographic area of the Kingdom included the Carpathian Basin, the surrounding areas outside the Carpathians, covering regions of Moravia, Galicia, Moldova, Valachia, Slavonia, Dalmatia, Styria and Lower Austria. We set the goal to reconstruct and portray the largest possible number of locations and of the toponymy of the medieval settlements of the Kingdom that ever existed until the tragic battle against the Ottoman troops in 1526, and to provide a special cartographic contribution to the celebrations of the 800-year long existence of the Golden Bull.

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Figure 1. Reconstruction of the Golden Bull of Andrew II (1222)

Figure 2. Andrew II of Hungary in Chronica Hungarorum written by János Thuróczy

Brief history of the Hungarian Kingdom up to 1526

The state of Hungary started to be formed in 895 in the Carpathian Basin as a federation of united tribes. In 972, prince Géza of the Árpád dynasty started to integrate the country into Christian Europe but it was his son, Stephen I, who completed his work by establishing the first Kingdom of Hungary that was recognized as a Catholic Apostolic Kingdom. In 1241–1242, the kingdom suffered a major Mongol (Tatar) invasion that resulted about two million (half of the population) victims. To repel the attack, King Béla IV (1206-1270) let Cumans and Jassic people into the country, who were fleeing the Mongols. Later, they were fully assimilated into the Hungarian population. Charles I, a descendant of the House of Árpád and the House of Anjou in Naples, ruled Hungary from 1309 to 1342. His foreign and domestic political activity was characterized by dynamic development of the settlement system and of international trade. In Hungary, just like in Western Europe, from the 13th century onwards, the king granted *jus stapuli* (the right to stop goods) to the main trade centers. This meant that foreign and Hungarian merchants moving in the country were

obliged to travel on the main routes, enter towns having jus stapuli, hold fairs, and sell their goods there. As a result of this, cities with the right to stop goods received regular high income, which accelerated the socio-economic development of these settlements.

During King Sigismund's reign (1387–1437), Ottoman armies advanced in the Balkans. In 1389, they won a victory at Kosovo field (Rigómező), and Hungary's southern neighbors became Ottoman vassals. In the 1420s, Ottomans attacked Slavonia from Bosnia and Transylvania from Walachia. King Sigismund ordered to construct a system of fortresses in the area bordering the Turks, which was completed in the second half of the 15th century.

When Suleiman I (the Great) (1520–1566) came to power in the Ottoman Empire, he ordered the Ottoman troops to advance in the Balkans. In the summer of 1521, Ottomans reached the Hungarian border in the south. At the cost of great losses, they occupied the most important southern fortresses, like Szabács, Zimony and Nándorfehérvár (now Belgrade). At this time, the Sultan retreated. He launched his next campaign five years later in 1526 when he destroyed the Hungarian army in the battle of Mohács. In this battle, King Lajos (Louis) II fell, too. This battle was extremely tragic for the Hungarians because the Kingdom lost its southern territories and lost the political and military leaders, too. After the victory, the Ottoman army marched to Buda, the capital of the Kingdom, and caused great destruction on their way. When they arrived, burned the city down, and retreated but left a significant Ottoman force in Hungary.

After the defeat at Mohács, János Szapolyai was elected as János (John) I (1526–1541) and Archduke Ferdinand of Austria was elected as Ferdinand I (1526–1564) Kings of Hungary. The decade and a half of the dual kingdom was spent in constant fighting. In 1541, the Ottomans occupied Buda by trickery, and Hungary was divided into three parts. The Kingdom of Hungary (the western and northern part of Hungary) remained under the rule of Austrian Ferdinand I, the Ottoman fief Transylvania was ruled by the Hungarian Szapolyai's son János (John) II (1540–1571), and the central and southern regions of the country became the most distant provinces of the Ottoman Empire (Figure 3). Large areas of these land got abandoned, depopulated and ruined during the 150 year-long Ottoman rule. The united European Christian armies attempted to expel the Ottomans three times, but only the campaign of 1686 was successful.

Figure 3. Area of the states in the Carpathian Basin from 1000 to 1600 (Detail, Bereznay /2009/)

Sources

Cartographic editing of the Atlas was preceded by extensive historical research. To provide the most accurate representation of the settlements in the largest possible area, we used 147 textual and

almost 160 cartographic sources, which included original antique, complied historical and modern ones, both in analog and digital form. As the detailed description of the sources exceeds the scope of the article, we only mention the most important ones here.

Sources of historical toponymy

Information on Medieval settlements are preserved in original administrative documents, donation letters and tax registers. By detailed processing of these documents, and by analyzing archeological data, outstanding historians Dezső Csánki[1] and György Györffy[2] reconstructed a great part of the settlement network. Both authors elaborated the area of the Kingdom in counties and unfortunately, not all counties were completed. Their works are the most important sources of the toponymical content of the Atlas. Historic toponym researcher, György Lelkes[3] made the preliminary editing of these monographs for the project. Missing areas were supplemented with works summarizing results of modern archaeological research on one or more counties[4] and with Péter Timár's series[5] summarizing the most recent research of original documents of the period.

There are only a few early, and mostly small-scaled cartographic sources, that only show the largest cities (eg Buda, Pest, Győr, Esztergom, etc.). Among them, we mention the so-called Lázár's map (1528), which preserves nearly 1,400 settlement names of the medieval Kingdom of Hungary. Names of many former settlements have been preserved as area names, so for localization of medieval settlements, it is necessary to use maps with a scale suitable for representing the smaller areas with their names. For example, sheets of the first military survey of the Habsburg Empire (1782-1785) show many Hungarian names unfortunately with incorrect spelling, but they are an excellent source for locating medieval castles and monasteries. The second military survey (1818-1869) is a better source than the first, because the sheets are easier to read, and the spelling of toponymy is more reliable. Area names are the most detailed in the sheets of the third military survey (1869-1887). The earliest possible cartographic sources are supplemented with maps from 19th-century cadastral surveys.

Large-scale mapping has been carried out differently in the successor states of the former Austro-Hungarian Monarchy, and in many places the Hungarian toponyms were replaced with forms of the new state languages. For this reason, we had less modern cartographic material available to locate the settlements in areas outside the borders of modern Hungary. To locate toponymy in these areas, in addition to those listed above, we used very diverse source material, including local topographical and administrative maps, road atlases, tourist maps and others. Online digital maps such as Open Street Map, Google Maps, and varak.hu[6] were of great use in localization of the toponymy, too.

Sources of the geographical background

Geographic background of the historic content was generated from a high-resolution SRTM (Shuttle Radar Topography Mission) model. SRTM is a high-resolution digital topographic database of Earth that was created with a specially modified radar system installed on board the Space Shuttle

[1] Csánki D. (1941)
[2] Györffy Gy. (1963)
[3] Lelkes Gy. (2011)
[4] Example: Archaeological topography of Hungary
[5] Timár P. (2019)
[6] varak.hu is a web page of castles, forts, and fortified sites in the Carpathian Basin

Endeavour in the mission of 2000. SRTM based elevation models are free to download over the internet[1] and are widely used in geographic information systems. Settlements naturally develop in a higher number and form a dense network on lower areas (in plains and hilly areas) than on higher (mountainous) areas. In order to present densely populated areas in detail, intervals of the hypsometric representation are smaller in lower areas and larger in higher areas.

Sources of historical hydrography

Settlements can only be represented by knowing the hydrographic characteristics of the area. Reconstruction of medieval hydrographic components was an important segment of the historical research. Originally, there were large river floodplains with permanent and temporary swamp lands in the lowland areas of the Carpathian basin, and these natural elements fundamentally determined the spatial development of the settlement structure.

Economic boom of the late modern period (i.e. the first half of the 19th century) in Hungary brought the need for larger river control works. Growing intensity of economic production made it necessary to keep destructive floods between dams, to bring river floodplains into agricultural production, and development of waterways accelerated trade and provided transport routes. River regulations started in 1846 along the river Tisza. During the works, 94 bends were cut, and the length of the river was shortened by 453 kilometers. As a result of the systematic river regulation, course of the affected rivers changed significantly, many bends, backwaters, marshy and wetland areas disappeared.

To prepare the hydrographic content of the Atlas, we used 1 : 200,000 scale sheets of the first and of the second military surveys, because these works show hydrographic elements in the required detail. However, these surveys don't show hydrographic conditions of the Middle Ages either, they show the state of the river network prior to regulations, so they have a closer image to the original state than any modern maps. Figure 4 shows the central segment of the overview map (1 : 2 000 000) of the Carpathian Basin with layers of the reconstructed (original) hydrography.
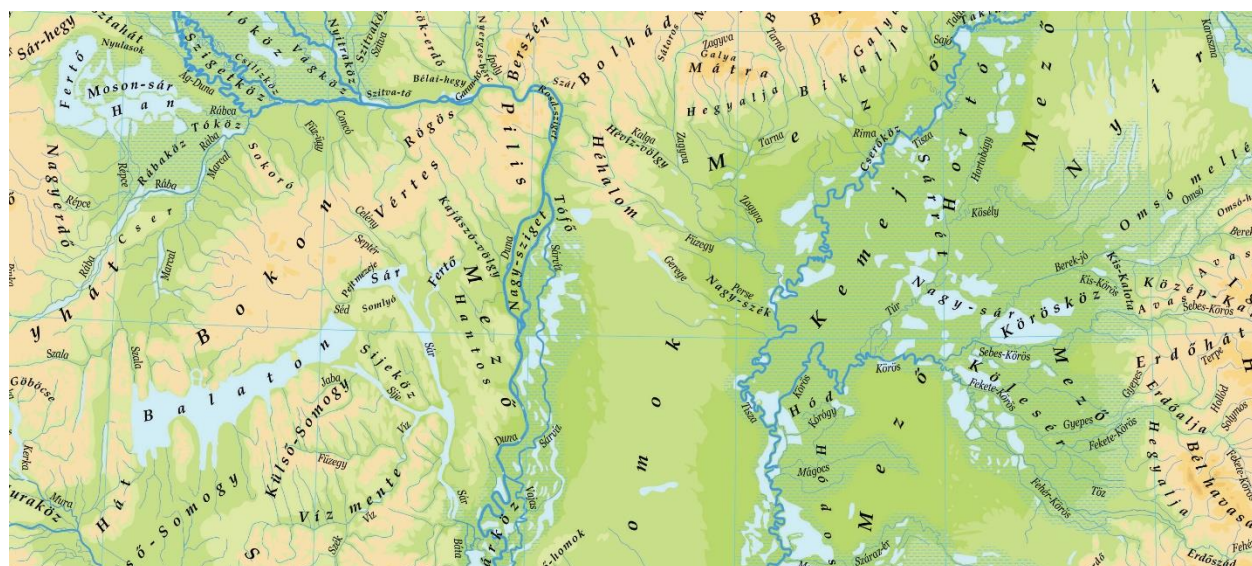

Figure 4. Detail of the reconstructed hydrography in scale 1 : 2 000 000

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[1] Elevation models from SRTM: eg https://dwtkns.com/srtm30m/

Phases of map editing

Works of the Atlas of Medieval Settlements of the Hungarian Kingdom started in 2018. During the entire editing process, specifics of both printed and on-line version of the atlas were considered. Moreover, the Atlas took part in the academic education of the Institute as a compound, multi-levelled project in which more than 40 students participated.

Creating geodatabase

The cartographic content was created in QGIS environment and based on a complex geodatabase. The working database consisted of generalized hypsometric layers generated from SRTM, a digital elevation model (DEM), raster layers of scanned and georeferenced sheets of the military surveys, layers of online web maps (eg OpenStreetMap and OpenTopoMap), and editable vector layers of the cartographic elements with data tables (eg point layers of the settlements, line and polygon layers of rivers, lakes, swamp areas, and administrative borders). Sheets of the military surveys were removed from the published version. The most complex element of the database is the attribute table of the settlements. Here, besides typical variables like current name and administrative divisions (eg current country, current settlement, if exists), historical administrative divisions, type of the point element (royal town, market town, village, fort/castle, monastery, major settlement out of the area), status of localization (undoubtedly, approximately, and doubtfully localized) and name variations were recorded, too. In general, settlements have two-three name variations but in certain cases this number increased to seven or eight (Figure 5). We used conformal Pseudo-Mercator projection, which is also called as web-Mercator, with an equidistant parallel at 47° in order to facilitate digital publishing of the atlas and to allow integration of a web map with actual content in the online version.
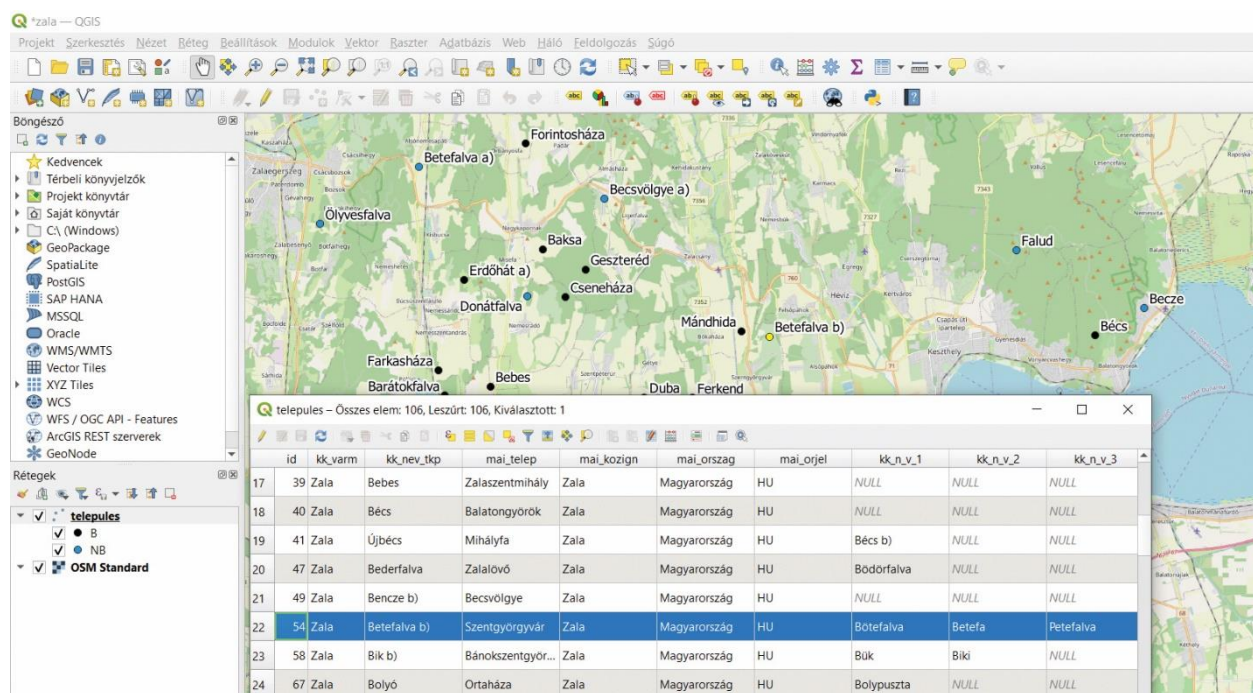

Figure 5. Screenshot of the database in progress, focusing on the settlements of Zala county. The highlighted settlement, Betefalva (today Szentgyörgyfalva) has four name variations.

Digitizing

Hypsometric layers were automatically created with GIS tools, but some layers needed manual vectorization. Hydrographic elements, mostly swamp areas, the river network, and lakes, are closely related to the relief and are fundamental in the representation of the historical content. We used 1 : 200 000 scale sheets of the third military survey of the Habsburg Empire. It was important to maintain the same level of generalization while preparing these layers as detailed as possible in this scale, in every section of the Atlas. Establishing graphic continuity of hydrographic elements at neighboring sheet edges was a separate part of the task. Line thickness of the river sections, that indicates the section character of the rivers, was automatically set based on the corresponding data of the attribute table (Figure 6). Border lines of different administrative units were also manually vectorized. These elements are easy to handle in GIS as they are straight lines with constant line width (Figure 7).
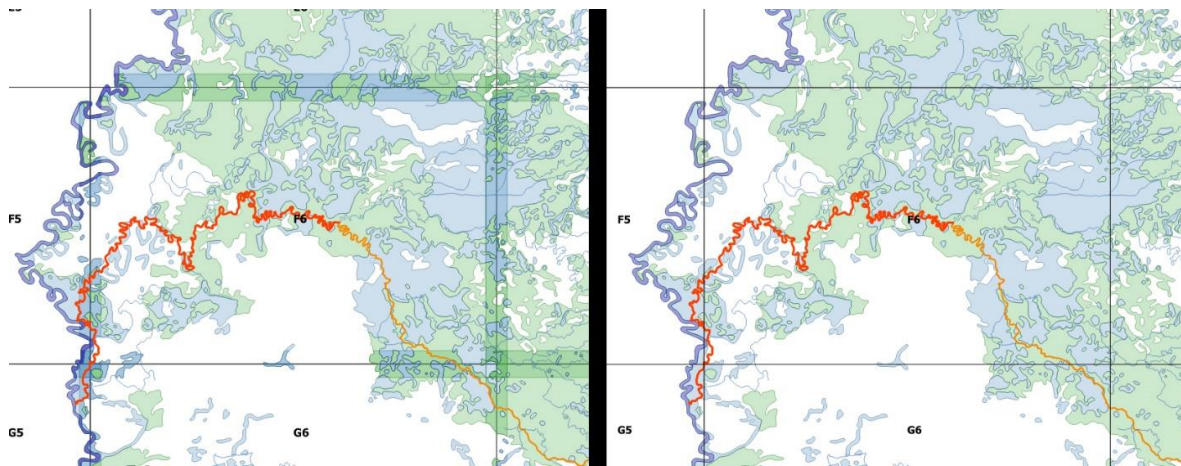

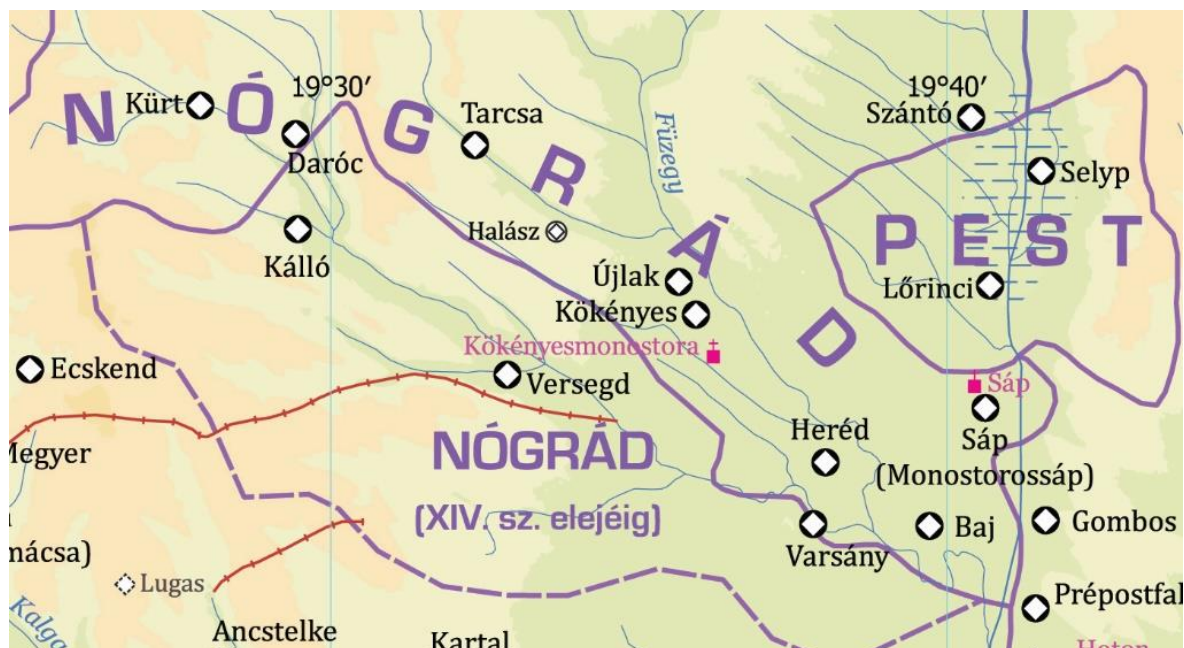Figure 6. Red and orange working colors indicate different classes of river sections.

Figure 7. Boundary of counties and privileged areas in 1498. Dashed lines indicate the same before 1498.

Locating settlements

As stated above, the main goal of this atlas is to collect and localize the largest possible number of historical toponyms of the Hungarian lands. This work covers about five hundred years, therefore several different cases in the toponymical content needed to be managed in an easily understandable way. The simplest case is where the medieval settlement still exists with its original name (eg *Kassa*). In other cases, the settlement became part of another settlement over the centuries, and it became a district of a town, and kept its original name (eg *Óbuda*). But there are settlements that vanished and never appeared again. Their names are possibly preserved as territorial names (eg the name of former settlement *Sőreg* is preserved in the name of a forested area near the existing village *Tápiószentmárton*). The most complicated case is when the settlement disappeared sometime in the past, and a few decades or hundred years later (still in the past) another settlement was established at the very same spot with a different name (eg *Temérdekegyház*, later *Felső-Almás*, today *Bácsalmás*).

All known information on locations and on medieval name variations are stored in a geodatabase with some other data that are useful in querying. Our database contains approximately 12 000 records of still existing settlements and about 8000 records of vanished settlements that don't exist in any form anymore. Because of the large number of vanished settlements, possibility of location is an important question. Correct identification of the spot of a vanished settlement depends on the quality of the descriptive content of the historical sources. In case, textual sources or archeological excavations provide exact details on the location, it is easy to locate the settlement even if it does not exist anymore. These items are symbolized as *undoubtedly localized* settlements (18 165 items). But several sources provide looser geographic descriptions with less concrete details, like "Village A is situated to the north of village B" or "village A is situated at the banks of creek B". Surviving geographical or territorial names help us to determine a maximum 10 km^2 wide area. These settlements are *doubtfully localized* items (3091 items). The third type of records consists of items where localization is not possible. These are the cases where there is not enough data in the historic sources to find their exact spot in the map, but their existence and their approximate location are known. We decided to symbolize these settlements as *approximately localized* items (1411 items). Table 1 shows the symbology of the settlements.

◆ KASSA	Free royal town, privileged settlement	◇ Kertvélyes	Undoubtedly localized village
❖ Torna	Market town	◎ Kórógy	Doubtfully localized village
■ Sólyomkő	Castle, fortress	◇ Csiklin	Approximately localized village
† Varannói kolostor	Monastery	◯ Lidečko [Lédec]	Major settlement outside of the territories of the Hungarian Kingdom

Table 1. Symbology of the settlements in map sheets (1 : 200 000)

Managing toponymy

The Atlas shows the settlements names of the Middle Ages in a modernized version, they are transliterated to the modern spelling of the Hungarian language. This modification was necessary because Hungarian words (personal names and settlement names) were recorded according to the Latin spelling in the medieval documents. As Hungarian language has 39 sounds (today written with 44 letters) while Latin has only 27 letters, Latin-like transliteration of the toponymy resulted in a lot of inappropriate and inconsistent name spelling in the original sources. Written name variations arose due to the undeveloped spelling, and because informants and recorders often spoke different languages. Example on this general phenomenon is the set of variations of *Miscoucy – Myscouch – Miscoz – Myskolch* for a town named *Miskolc*. We solved the transliteration based on systematic sound relationships and we tried to indicate the forms of the name that were used as early as possible, or that may have changed in the meantime. For the sake of the latter, in case of many settlements, we indicated two names in the map, which represent a form used earlier and a form used later, but both were used before 1526.

Administrative territorial units (counties) were in continuous development during the half millennium depicted in the atlas. Extent, number, and name of the counties have undergone many changes thus we decided to show the territoriality of the public administration of the end of the 15th century (1498). Territories of the Székelys, of the Cumans and of the Saxons autonomously operated in the Kingdom. These areas were connected the county system, too. Outside the Kingdom, borders of internal administrative areas are not indicated, areas of the neighboring countries are marked only with territorial names. We provide an overview of the territorial changes outside the borders of the Hungarian Kingdom in map pages showing the Carpathian region.

Besides settlements and administrative units, geographic areas also have historical name variations. Reconstruction of historical area names is difficult because of the lack of sources, and it requires deep etymologic research. The geographic names of the Atlas were collected from ethnographic studies and from the historical topographic monographies mentioned in the chapter *Sources of historical toponymy*.

Atlas in hard copy

After four years of localization and map editing, the Atlas of Medieval Settlements of the Hungarian Kingdom was published in 2022 for the 800th anniversary of the Hungarian Golden Bull by the Board of the Hungarian Corvin Chain Award (Magyar Corvin-lánc Testület). The Atlas was produced in 500 copies but commercially it is not available. (Figure 8)

Editors had the intention to provide the widest range of information about the period covered by the Atlas and about the special characteristics of the editing process within the frames of the book format thus five studies were also included. These are 1. Demographic characteristics in Medieval Hungary; 2. Outlines of the historical research; 3. GIS environment; 4. Principles and characteristics of map editing (including location and name variations of the settlements); 5. Reconstruction of Medieval names of geographic areas and water elements. Besides these historical and cartographic chapters, eight additional maps of the Carpathian Basin in scale 1: 2 000 000 complete the work. Two of these maps show the original vegetation and the unregulated hydrography of the Carpathian Basin, and six of them show the varying administrative systems and boundaries in the Hungarian Kingdom by centuries, from 11th century to 1526. These sheets provide natural and administrative

background of the historical content, and also give some information on the areas outside of boundaries of the Kingdom.

The Atlas consists of 64 pages spreads in scale 1 : 200 000. Settlements are grouped in eight types (free royal town; market town; undoubtedly localized village; doubtfully localized village; approximately localized village; inferred settlement; fort/castle/monastery; major settlement outside the Kingdom). A total of 24,1047 settlement-type objects are indicated in the map sheets, which consists of 974 castles or forts, 406 monasteries and 22,667 villages, market towns or cities. However, the settlements developed differently during the five hundred years that the Atlas covers, they are mapped in the same page despite a part of them never existed at the same time. They are presented in their highest category of law that achieved until the end of the Middle Ages. So, by looking at the sheets of the atlas, we receive a wide picture of the area embracing the pre-Ottoman centuries. There are five types of historical boundaries (of the Kingdom; of counties; of certain privileged areas; etc.). Relief is symbolized with hypsometry in 16 categories from "below 100 m" to "over 2400 m" above sea level of which ten categories are under 1200 m in order to represent plain areas in detail. The work ends with lists of historical sources of 147 items and of modern cartographic sources of 160 items. The 78-page long Name Index (Figure 9) is accessible via Internet in digital form. It is based on the geoinformatic database of the project, and it is possible to download it in PDF format, too by opening a QR code placed in the volume. (Figure 10)
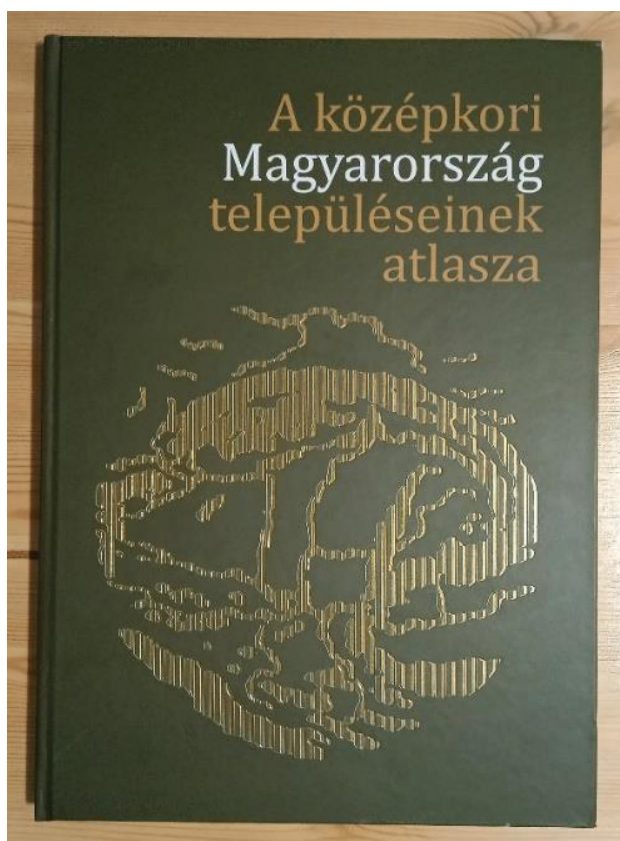

Figure 8. Cover of the Atlas of Medieval Settlements of the Hungarian Kingdom

NAGYKOSZTOLÁNY – NÉMETKÁNYÓ　　　A KÖZÉPKORI MAGYARORSZÁG TELEPÜLÉSATLASZA

18°30'-48°10'
Nagykosztolány | Nyitra | Nagykosztolány (Veľké Kostoľany) | 6 | 17°40'-48°30'
Nagykraljevec | Zágráb | Gornji Kraljevec | 37 | 16°10'-46°00'
Nagykubra | Trencsén | Trencsén (Trenčín) | 2 | 18°00'-48°50'
Nagykutas | Zala | Nagykutas | 29 | 16°40'-46°50'
Nagylak | Csanád | Nagylak (Nădlac) | 41 | 20°40'-46°00'
Nagylak | Fehér | Marosnagylak (Noşlac) | 44 | 23°50'-46°20'
Nagylég | Pozsony | Lég (Lehnice) | 13 | 17°20'-48°00'
Nagylehota | Bars | Nagyülés (Veľká Lehota) | 7 | 18°30'-48°20'
Nagylészna | Valkó | Vajszka (Bajcка) | 58 | 19°00'-45°20'
Nagylezsemér | Valkó | Lezsimir (Лежимир) | 58 | 19°30'-45°00'
Nagylipóc | Valkó | Cserig (Cerić) | 57 | 18°50'-45°10'
Nagylő | Pozsony | Nagylévárd (Veľké Leváre) | 6 | 17°00'-48°30'
Nagylőcse | Pozsony | Nagylúcs (Veľká Lúč) | 13 | 17°30'-47°50'
Nagylók | Sopron | Lakfalva (Lackendorf) | 20 | 16°30'-47°30'

Nagysúr | Pozsony | Súr (Šúrovce) | 6 | 17°40'-48°10'
Nagyszabaton | Tolna | Gyönk | 39 | 18°30'-46°30'
Nagyszakácsi | Somogy | Nagyszakácsi | 38 | 17°10'-46°20'
Nagyszalacska | Ung | Zalacska (Zalužice) | 10 | 21°50'-48°40'
Nagyszalatna | Trencsén | Felsőszalatna (Slatina nad Bebravou) | 7 | 18°10'-48°50'
Nagyszank | Baranya | Józseffalva (Josipovac) | 48 | 18°30'-45°30'
Nagyszármás | Kolozs | Nagysármás (Sărmaşu) | 35 | 24°00'-46°40'
Nagyszécsény | Arad | Temesszécsény (Seceani) | 50 | 21°10'-45°50'
Nagyszederjes | Torda | Nagyszederjes (Mura Mare) | 35 | 24°40'-46°30'
Nagyszeg | Közép-Szolnok | Nagyszeg (Noţig) | 26 | 23°10'-47°20'
Nagyszékás | Arad | Temesszékás (Secaş) | 51 | 21°40'-45°50'
Nagyszentgyörgy | Bodrog | Zombor (Сомбор) | 49 | 19°10'-45°40'
Nagyszentpál | Somogy | Iharosberény | 38 | 17°00'-46°20'
Nagyszilva | Sáros | Nagyszilva (Veľký Slivník) | 4 | 21°10'-49°00'

Nátánd | Kézdiszék | Nyújtód (Lunga) | 54 | 26°10'-46°00'
Návoj | Nyitra | Simony (Partizánske) | 7 | 18°20'-48°30'
Náznánfalva | Marosszék | Náznánfalva (Nazna) | 44 | 24°30'-46°30'
Nazra | Valkó | Vukovár (Vukovar) | 57 | 18°50'-45°20'
Nebáncs | Somogy | Kaposvár | 39 | 17°40'-46°20'
Nebáncs | Torda | Sáromberke (Dumbrăvioara) | 44 | 24°30'-46°30'
Nebojsza | Pozsony | Galánta (Galanta) | 13 | 17°40'-48°10'
Nebojsza | Valkó | Szentlászló (Laslovo) | 57 | 18°40'-45°20'
Necpál | Nyitra | Privigye (Prievidza) | 7 | 18°30'-48°40'
Necpál | Turóc | Necpál (Necpaly) | 2 | 18°50'-48°50'
Nécs | Doboka | Nec (Neţeni) | 35 | 24°20'-47°00'
Nécs | Kolozs | Nyerce (Mierţa) | 34 | 23°10'-46°50'
Nedec | Trencsén | Vágnedec (Nededza) | 2 | 18°50'-49°10'
Nedelice | Zala | Drávavásárhely (Nedelišće) | 37 | 16°20'-46°20'
Nedelice | Zala | Zorkóháza (Nedelica) | 37 | 16°20'-46°30'
Nedelistye | Nógrád | Nederes (Nedelište) | 8 | 19°20'-48°20'

Figure 9. Detail of the Name Index

On-line atlas

Interactive version of the Atlas of Medieval Settlements of the Hungarian Kingdom is available at this link: http://www.corvinlanc.hu/kmta/ (Figure 11). It is optimized for desktop use but it works on smartphones as well but at the current version, legend is not visible in smartphone use. In default setting of the web map, users can see the historical map layers but it is possible to switch to actual, on-line topographic maps of OpenStreetMap and OpenTopoMap by modifying the transparency of the historic layer.

Digital Name index is built in the user interface as an attribute-based search box. Results of the name search are displayed in tabular form, and by clicking on a given row, the interactive map viewer zooms to the selected settlement. The table also contains the name of the county where the settlement was situated, the actual (modern) name of the settlement in Hungarian and in other state languages (in case the settlement is not situated within the modern boundaries of Hungary), the section (sheet) number, and the value of the western and southern border grid lines in relation to the settlement. Boxes of *Search* and *Legend* are fixed but it is possible to close them. Web-version of the Atlas was created in HTML environment as a Leaflet map generated in QGIS.

Figure 10. Readers can reach the on-line atlas, and the digital name index via this QR code

Figure 11. Screenshot of the on-line version of the Atlas of Medieval Settlements of the Hungarian Kingdom with Digital Name Index showing the actual Budapest area. The first text box contains a brief introduction with the link to the Name Index. The second text box is a search and result box where the reader receives the list of the matching settlement names to the query with data of county name, actual settlement name, sheet number, and the geographic co-ordinates. The third text box shows the most important elements of the legend. By adjusting transparency ("Átlátszóság"), users can compare the map to modern topographic maps OpenStreetMap and OpenTopoMap.

Conclusions

Four years ago, we decided to reconstruct the original medieval settlement network of the Hungarian Kingdom that existed before 1526. After this year, a great number of the settlements got destroyed and vanished because of war events and because of connected socio-economic changes in the central part of the Carpathian Basin. Our task was to record early, vanished and still existing toponymy in a meritorious, cartographic way. Preserving early, ancient geographic names is the mission of a cartographer because these names are fundamental parts of a nations' past, culture, and identity. We were happy to involve 42 students at the Institute of Cartography and Geoinformatics of ELTE in several phases and tasks of this project. Although we have completed the development of the Hungarian version of the Atlas, in view of the growing international interest, we have also started translating the chapters and the online map into English.

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