16th ICA Conference

Digital Approaches to Cartographic Heritage International Cartographic Association Commission on Cartographic Heritage into the Digital

hosted by the

Faculty of Geography Babeş–Bolyai University

Conference Abstracts

Digital Approaches to Cartographic Heritage

Editors Angeliki Tsorlini Chrysoula Boutoura



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International Cartographic Association Commission on Cartographic Heritage into the Digital **16th ICA Conference Digital Approaches to Cartographic Heritage**

Cluj-Napoca, 22-24 September 2022

Conference Abstracts

Editors: Angeliki Tsorlini, Chrysoula Boutoura Thessaloniki: AUTH CartoGeoLab



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Abstracts

SESSION I

23 September 2022 11.00-12.30

ILOVAN O.-R. Cluj-Napoca

Babeş-Bolyai University, Faculty of Geography and Territorial Identities and Development Research Centre

The Cartographic Discourse about the Romanian Space and Territorial Development, from the Modern Period to Present

Representations are never innocent constructions of historical and geographical realities (tangible or intangible), and they impact our perceptions of space and of the world. Therefore, my research aims to show how the places, regions and the present-day territory of Romania were created through maps (i.e., cartographic representations) and thus to identify the features of the cartographic discourse about Romanians and the Romanian space in historical time (starting with the modern period to present day Romania). Besides the ethnic, religious and, in general, cultural markers represented on maps, I pay attention especially to the representations of development, as this connection between territorial development and its cartographic representations has not been explored so far in research about the Romanian space. My main research question is the following: How is territorial development represented through maps? And secondary research questions: Where is placed the cartographic discourse about development within the overall cartographic discourse about Romanians and the Romanian space (physical, cultural, socio-economic features, representations of political borders, etc.)? When did this cartographic discourse about territorial development appear and what is its relationship with other types of visual imagery about territorial development? The research material consists of the resources provided by the Catalog of Hidden Maps of GeoPortOst: cartographic representations of the Romanian space, its urban area and regions as found in historical and thematic maps produced and circulated during the modern period and up to present. This research material is analysed using critical visual methodology. The visual imagery is interpreted in relation to the context of its creation and to the dominant political, cultural, and socioeconomic discourses of the respective periods. This research should be included in the one about the modernisation of the Romanian territories, before and after the creation of the nation state in 1918.

BARTOS-ELEKES Zs. Cluj-Napoca

Babeş-Bolyai University, Faculty of Geography

Digital tools concerning the analysis of maps representing Hungary and Transylvania (1683–1711)

As a result of the war between the Holy League and the Ottoman Empire, Hungary and Transylvania became part of the Habsburg Empire. During and shortly after the war important maps of these newly acquired territories were drawn by members of the Habsburg army and of the Society of Jesus.

Among these early works is the manuscript map series of the Hungarian and Transylvanian counties (Mappae Comitatuum Regnum Hungariae), kept in the collection of the Jesuit scholar Gábor Hevenesi. The maps delineated the Hungarian counties surprisingly differ from the printed pocket atlas of Hungary supervised by Hevenesi (Parvus Atlas Hungariae, 1689), but they are similar to the well-known Dutch maps of Hungary by De Wit and by Visscher. The maps delineated the Transylvanian counties are similar to the manuscript and printed maps versions of Transylvania (Mappa della Transilvania, 1699) by Giovanni Morando Visconti and to one of the manuscript map of Johann Christoph Müller (Mappa Geographica Transylvaniae). Almost all of these above maps are undated; the authorship of some maps is unclear. The author of the present paper has analyzed the maps using the following digital tools: rectification of the maps (in Global Mapper), their accuracy analysis (in MapAnalyst) and the compilations of georeferenced gazetteers (in Microsoft Excel). These methods have been used to distinguish the source maps and the copied ones; to fix the years when these undated maps were drawn; to clarify the roles of the authors; to understand the correlation between these maps.

MAGYARI M., A.-K. BÁLINT, Z. BARTOS-ELEKES Budapest, Cluj-Napoca Eötvös Loránd University / Babeş-Bolyai University

The correlation between the atlas and the county map series of Hungary by Gábor Hevenesi

Gábor Hevenesi was one of the most important figures of the Hungarian cartography. His two major works are Parvus Atlas Hungariæ, a so-called 'pocket atlas' and Mappæ Comitatuum Regni Hungariæ, a county map series of Hungary and Transylvania. The atlas, printed in 1689, is the first atlas presenting Hungary that represents around three thousand toponyms on its sheets and in its index. The county maps are manuscript maps which are part of the Collectio Hevenesiana, kept in the ELTE University Library of Budapest. However, there are no signs that they were actually drawn by Hevenesi himself. Although these county maps bear at least the same importance in the Hungarian cartography of the 17th century as the 'pocket atlas of Hungary', they have not been analyzed thoroughly yet.

Our research intends to compare on one hand the two works by Gábor Hevenesi, on the other hand the county map series with similar works of the era. Through their geoinformatic analysis, spotting the differences and similarities between this map series and other cartographic works might become easier, and as a result, answers to the so far unresolved questions regarding the author(s), the publication date or the sources of the map series might be provided.

PÁL M. Budapest

ELTE Eötvös Loránd University, Faculty of Informatics, Institute of Cartography and Geoinformatics

An inventory and digital map of toponym evolution – a case study in Northern Hungary

Geographical names or toponyms are indispensable elements of most map types. They help map readers to identify objects on the field and provide information about the geographical thinking of certain groups of people. However, in a broader, non-cartographic aspect, toponyms determine our everyday life as we use them when travelling, walking, planning excursions and working in the field. The role of small settlements has rapidly decreased during the last decades. The abolishment of the socialist industrial and agricultural policy and the processes of globalisation forced people to move to the cities and search for new job opportunities. The formerly booming agricultural outskirts and forests became abandoned and less important for the local people. This has led to the fading of toponyms too - as they have not been used regularly. We have designated Váraszó, a village in Northern Hungary, to examine and visualise toponym evolution in parallel with land-use changes. Various large-scale map types and textual databases were collected since the end of the 18th century (Habsburg First Military Survey) - 16 sources were examined altogether. Around 250 distinct toponyms were recorded: many of them had more variants in the different map sources. These variants mainly refer to land-use types (e.g., grazing, forestry) and changes (e.g., when cultivation is ended in an area). Some distinct aims were set to be completed. The most important is to inventory and preserve local toponyms as these carry the cultural traditions of the local people and have special meaning to them. We also established a classification system of toponyms mainly based on land use types, morphological categories, and cultural meanings. Thirdly, an online, Leaflet-based map was compiled to present the toponym content of each examined source material: this also well illustrates changes in land use activities during the past few centuries.

DEMETER G., É. Sz. SIMON, B. F. ROMHÁNYI, G. K. HORVÁTH, G. NÉMETH Budapest HAS, Research Centre for the Humanities, Institute of History

Creating a database to study settlement level socio-economic development and landuse changes for the Hungarian Kingdom, 1550-1930

It is well-known that the Habsburg Monarchy did great efforts to produce maps of all kind from the whole territory of the empire at the end of the 18th century. The so-called military mappings, available online for years at www.mapire.eu, were however not the only one and most detailed attempt. Unfortunately, the material of the subsequent cadastral mapping serving as basis for future taxation was destroyed by the local authorities after the death of king Joseph. But the local conscriptions containing some economic and demographic data did survive. The HAS together with the National Archives decided to organize these data into data tables, publishing them online, then, as a next step to attach them to the existing contemporaneous cartographic material available at www.hungaricana.hu. The first effort was done by the Arcanum (the one that created the Mapire) available at https://archives.hungaricana.hu/hu/urberi/ where the conscription of peasants from 1767 is connected to an OSM. The idea to visualize other datasets (at settlement level) available already in the online space of the state archives https://adatbazisokonline.hu/ and to attach them to maps was extended to the Ottoman conscriptions (1550-1600s), the dicalis taxation of the Royal Hungary (same era), the first Regnicolaris conscriptio after the Ottoman rule (1720), the Lexicon locorum (1775), the Josephinian census of 1785, the subsequent conscription of peasants and lands as basis for the planned cadastral mapping (1786). These were added to the more than 7 million settlement level data from the censuses and tax conscriptions from 1865, 1880, 1910, already available at GISta Hungarorum (http://www.gistory.hu/g/en/gistory/index), where GIS-basemaps are also available to create thematic maps. The project in its present stage can visualise any settlement level data on the "blank-shape" maps, which are georeferenced, thus can be superimposed on georeferenced historical map collections (like Mapire).

SESSION II

23 September 2022 13.45-15.15

VARDAKOSTA I. Athens

Harokopio University Library & Information Centre

Geo-information literacy: a necessary component of the Map/GIS Libraries

The rapid technological changes in cartographical applications and information systems favoured the widespread use of geographical information in human's everyday life. Map/ GIS libraries maintain a variety of materials in print and

electronic form while offering a range of services to their users, -experts and/or not - in order to meet their various information needs. The continuous spread of digital cartography along with the complex approaches to the analysis of geospatial data both in academia and in the daily life of the citizens requires ensuring the correct and maximum use of geo-library collections. Additionally, the incorporation of technology and services in the library daily work affect how librarians keep up with the instruction and training they provide to their users.

User education and the development of information literacy programs in libraries is not a new concept, but it is a long-standing, and a traditional component of their function. According to ALA (1989) to be information literate, a person must be able to recognize when information is needed and has the ability to locate, evaluate and use effectively the needed information.

The purpose of this paper is to raise awareness amongst librarians in their involvement in user's education programs and in communicating their geo-collections. The paper examines concepts and definitions related to user education, explores how significant Map/GIS libraries approach information literacy and what methods are used for this achievement to be accomplished. Furthermore, the paper underlines the role of the Map/GIS librarian and the necessary skills that he/she must have in order to successfully fulfil his educational duties.

CARHART G., K. DENEAULT Portland, ME

Department of Public Works, City of Portland

Portland, Maine, Above and Below Ground, A Municipal Archive and its Interconnection with the Modern Digital GIS Mapping of a 389-Year-Old City

GIS, Geographic Information Systems are not new, all that is new is the format in which spatial data is presented and stored. Today we map and present geographic data in a digital/pixel format drawing on information stored in digital files. We layer information to build a map of a region or city. Key to this is the underlying historic maps and plans that made up the analog GIS map of a city. The Department of Public Works, Engineering Archive, in the City of Portland, Maine, holds some 100,000 plan sheets, thousands of site and report files, and thousands of surveys and sewer field books, dating back to the late 18th century. We will show practical aspects of how the City of Portland is integrating its analogue Engineering Archive into its modern digital GIS mapping. We will discuss how the integration of these materials into Portland's GIS city map is in fact a two-way system, where the archive helps to build the GIS map, and the GIS map is used as a finding aide to identify items that are in the collection. One further aspect that we will cover, is how we are using the digitization and georeferencing of historical materials in the collection to map the way in which climate change is affecting Portland's coastline. The coastline plays an intricate and sustainable role in the economic vitality of Portland. Poor land management practices during the last 100 years have resulted in erosion and the subsidence of sediment and large areas of land fill. As a result, critical infrastructure is now becoming more exposed to rising sea levels, storm surges, and precipitation. Historic plans are one tool that we can use to better understand, interpret, and adapt to an ever-changing landscape.

REES G. London

British Library

Locating a national collection through interface design

This presentation outlines how the Locating a National Collection (LaNC) project will help cultural heritage organisations to use location data - such as where objects were made and used or the places they depict and describe - to connect UK cultural heritage collections. LaNC is funded by the AHRC as part of 'Towards a National Collection: Opening UK Heritage to the World', a programme that addresses the lack of coordination between different online collections and catalogues as a major barrier to public access and research. Based in the British Library, St Pancras, with co-investigators in the National Trust, Historic Royal Palaces and the University of Exeter, LANC develops a strategy for a national system that allows collection items from these and our partner organisations to be discovered through location. The project connects digital records from historic environment organisations, such as visitor and conservation sites, with those from galleries, libraries, archives and museums (GLAMs), such as digitised maps or metal-detectorist finds.

The Pelagios Network has developed a methodology that uses gazetteer referencing to link research data with considerable success, building a community of partners and stimulating research. We build on their methodology, scoping its application to national organisations and exploring ways to render content accessible and meaningful for public audiences. Stakeholder evaluation including impact assessment, focus groups, behavioural data analysis and testing of the project's web-map visualisation, Peripleo, has helped the project understand motivations of audiences like community groups, schools and heritage visitors. LaNC encourages cultural heritage organisations to take up a common approach to location metadata, providing a roadmap that enables diverse organisations to expose this in a consistent way, ultimately spear-heading a movement beyond text-based searches in cultural heritage.

APPEL S. Milwaukee, WI

American Geographical Society Library, University of Wisconsin-Milwaukee Libraries

Advances in Collaborative Digital Index Mapping

Map and Geography librarians involved in the GeoBlacklight community have been collaboratively developing a digital geographic index map standard. OpenIndexMaps is a community-based standard, using the GeoJSON format, for creating, sharing, and comparing geographic index information for paper map series and other collections. The idea for OpenIndexMaps was sparked by the 2017 Geo4LibCamp unconference and has been a staple project of the GeoBlacklight community since. The GeoJSON format is based on JavaScript Object Notation and can be used to store simple to complex geospatial data, in this case, bounding boxes and attribute (catalog) information for map sheets. GeoJSON is more interoperable and platform agnostic than proprietary formats such as Shapefile or Geodatabase, more widely adopted than most open geospatial formats, and native to the WebGIS environment. The Open-IndexMaps project is the latest iteration of a project that has been underway for some time but is catalyzed by the use of Geographic Information Systems in libraries and map collections. The Geodex system, cartobibliography software developed in the 1980s at the American Geographical Society Library at the University of Wisconsin-Milwaukee, did not reach a critical level of adoption and long-term support, but set the groundwork for creating and sharing index information among map collections. OpenIndexMaps has the potential to bring about the original aim of the Geodex project -to create a union catalog of large paper map series and other collections held in part across various institutions and to compare holdings information among collections. There is the potential to expand well beyond paper map series and use the standard for aerial or satellite imagery and other geospatial data. Ultimately, OpenIndexMaps will advance collection management of paper map series, enhance discoverability of geographic collections, and simplify cooperation between institutions.

SHAWA T. Princeton, NJ

Princeton University Library

Creating Orthomosaic Images from Historical Aerial Photographs.

We have recently started a project to process historical aerial photographs of northern Namibia bordering Angola. These aerial photographs were taken in 1943, 1970, and 1972. The aerial photographs were accidentally found by Professor Emmanuel Kreike of the Princeton University History department in the early 1990s when he was researching in an archive in Windhoek, Namibia. There are 1400 aerial photographs covering roughly 220 x 18 miles. The 1943 aerial photos are unique, because for the first-time, aerial photography technology was used in capturing the landscape of northern Namibia. At that time, the area was sparsely populated. These aerial photos will allow researchers to understand changes in the landscape of northern Namibia with the influx of refugees and migrants coming from Angola in the 1970s and later because of war, drought, and political repression. The 1943 aerial photos could be compared with those of the 1970s, 1990s, and 2000s to understand changes in northern Namibia's environment over half a century.

In my presentation, I will explain the whole workflow of how analog aerial photographs were converted to digital, how I created the technical data (Frame Data/Exterior Orientation Table and Camera Data) using scanned aerial photos and flight plan map information, used the technical data table, and created orthomosaic images.

SESSION III

23 September 2022 15.30-17.00

SUAREZ R. Aix-en-Provence

CartoMundi, Aix-Marseille University – CNRS

Opening CartoMundi - New tools and new functionalities

The website CartoMundi - Online Promotion of the Cartographic Heritage, currently proposes more than 70000 references for cartographic documents and displays about 6000 reproductions. The functionalities of the website have been specified about ten years ago. Since this period, several new tools to deal with online geomatics have been developed and the number of digital reproductions has deeply increased. Thanks to a new plan developed by the French Ministry for research, to promote the libraries collections - CollEx-Persée -, CartoMundi have obtained a grant to renew its web site according to new technologies and needs of researchers. This project involves transforming a tool developed locally by a university into a platform of national interest in close collaboration with establishments such as the National Library, the Geographic Institute and several university libraries. The proposed paper will focus on the developments that will modify the CartoMundi website in the coming months with regard to a new mapping solution for librarians who wish to draw and provide geographical data and the use of web services for the catalog enhancement.

KOUKOLETSOS T., G. NIKAS, P. GRIGORIADIS Athens

Hellenic Military Geographical Service (HMGS) / Army History Directorate HMGS (AHD)

When GIS and Military History collide: new perspectives

Military History is based on Battle Plans, which aim to provide an understanding of the conditions, the conduct of the battle and the respective conclusions. The technology and the available means to create such Battle Plans in the past lead to an abstract and general information of the battle formations and movements, usually in a form of a sketch diagram, failing to correlate with the terrain. Moreover, in cases of battles that last for days and include formation movements, the effort to depict the whole battle in a single sketch diagram leads to a complex and cartographically incomprehensible result. Consequently, the objective of the Battle Plan in the form of a sketch diagram is not always achieved. While trying to correlate the sketch diagram with the real terrain (georeferencing), as well as to enhance it with a shaded relief, the need to use historical maps of the same era came up, in order to combine cartographic and historic accuracy. Moreover, additional historical information from other sources, if present, needs to be used in order to evaluate as well as enrich the final product.

Hellenic Military Geographical Service (HMGS) and Army History Directorate (AHD) cooperate and combine Geographic Information Systems (GIS) to produce enhanced digital interactive maps in geospatial pdf format. These maps present geo-historical data in layers, allowing for a selective and partial presentation of the original sketch diagram (e.g. day by day or involved forces), while additionally combine the historical map and shaded relief. As a result, these common pdf files comprise a valuable tool for a better understanding of Military History. Finally, starting from a battle sketch, digitization of the relevant historic information and combination of GIS capabilities build the prospect of further development, digital products and applications.

TSORLINI A., C. BOUTOURA, E. LIVIERATOS Thessaloniki

Aristotle University of Thessaloniki, Laboratory of Cartography and Geographic Analysis – CartoGeoLab

Studying the development of Greek communities in Central Europe in 18th century, combining information from historical maps and texts through a digital map library system

The lack of security and stability in the Balkan peninsula due to Ottomans' expansion, as well as the end of the Ottoman control in Central Europe at the end of 17th century and the Habsburg Monarchy establishment during the next centuries resulted in the migration of populations from the Balkan peninsula to Central Europe. At the same time, the reorientation of the Ottoman trade to European countries had created new economic conditions and opportunities for Ottoman citizens and especially for those belonging to the Christian orthodox Church. Merchants and craftsmen from Northern Greece, who migrated to cities in Central Europe, played an important role in the trading of domestic goods and western products following specific directions and routes to reach their destinations. They were settled in cities and founded independent companies operating with limited autonomy in the eastern part of the Hungarian Kingdom and in Transylvania, which were then developed into significant trading centres in 18th century. Information about their routes and their activities, as well as the development of their network can be found in books, articles or historical maps and diagrams, searching digitally and physically in different sources in libraries or map collections. In this paper, we conduct this research through a digital map library system, which gives the opportunity to the users to get textual information about specific topics from articles and books and combine it with relevant cartographic or other related material with reference to the same area and period. Through this system, it is possible to learn more about these communities and the founded commercial companies in connection with the time period and the area, where they were developed; to acquire information about their activities, the people involved and their origin as well as the goods they traded and to visualize on maps their routes from Northern Greece to countries in Central Europe and the network established between merchants active in different cities of Habsburg Empire, which played an important role in the configuration of the economic and social character of these cities in 18th century.

STAMNAS A., A. TSIACHTA, O. GEORGOULA, P. PATIAS Thessaloniki

Aristotle University of Thessaloniki, School of Rural and Surveying Engineering

An endangered aspect of the Industrial Heritage. Study and mapping of the Decauville Systems in Greece of the 19th and 20th century

The railway marked the developments of the 19th century. The industrial revolution brought significant changes in human activity motivated by economic growth. Railway networks were developed and installed around the world for both cargo and passenger services. The Decauville system played a key role in the development of the railways. In Greece, as in many other places, such systems were developed and installed in various areas, both in the mainland and in the islands. They were developed for different purposes such as e.g., the permanent connection of isolated areas with urban centres (Volos), military purposes, the transport of industrial products mainly in ports, the extraction and the transport of mineral deposits in mines, even in the context of archaeological excavations. Today most of them

are abandoned and need protection, restoration and reuse. In the context of the preservation of this important industrial heritage, the first step is the recording and mapping of these systems. This work takes an approach by creating a Geographic Information System which provides geographical and thematic information on a number of such facilities in Greece including historical maps, aerial and terrestrial photographs and other data that are crucial in such a study.

SESSION IV

24 September 2022 10.00-11.15

GUSEV D., S.-K. STAFEYEV West Lafayette, IN, Moscow Purdue University / Rosgeolfond

Claudius Ptolemy's East Africa Georeferenced and Visualized

In this paper, we present the product of the most recent continuation of our multi-year project that has involved georeferencing and visualization of data from Claudius Ptolemy's classical 'Geography'. The previously developed set of more than 2,200 translations of the ancient coordinates of Ptolemaic objects to the modern coordinates that can be visualized in modern GIS instruments, such as ArcGIS and Cesium, is extended to East Africa. The provinces of Cyrenaica, Aethiopia below Egypt, Marmarica, the Libyan nome, and all of Egypt together contribute 400+ new points to the expanding body of georeferenced coordinates to close the gap between West Africa and Arabia.

LIU D., K.-N. VU, A. NANETTI Singapore, Guangzhou, Hanoi

Guangdong University of Technology, School of Art and Design / Nanyang Technological University, School of Art, Design and Media

Information Visualisation Tools to Explore Fra Mauro's World Map (dated 1460 CE)

Historical maps are increasingly used as a source for historical research since they can provide useful interpretive insights. The digital format available now represents the basis for obtaining evidence and discovering new under-standing in the field of historical map research. Expert users such as geographers and historians make use of historical maps as primary resources for their historical research. The importance of historical and cultural sharing and inher-itance development from the aspects of education, cross-cultural and cognition has become increasingly apparent. Although a lot of museums and libraries launched their digital map collection projects online to bring more scientific, geographic, technical, and historical data to a broader user. However, to engage a larger audience, new visualising, and analytical approaches in line with digital sharing are necessary.

This research attempted to facilitate an innovative communications technology setting in which users with different education levels are able to collaboratively investigate and explore the historical maps system in a rich and engaging digital experience. Therefore, information visualisation was proposed as a digital tool to change how users interact with data/information, how data/information and its connections can be examined, and subsequently, to influence the direction of their historical research. It can not only save time, and increase efficiency, but also update research methods and expand research topics.

In this paper, by using the Fra Mauro Map dated 1460 and the Genoese World Map dated 1457 as a showcase, information visualisation was used to enhance users' understanding of historical world maps. As one of the essential preliminary components, this paper firstly introduced map integration approach and data representation, as well as map image coordinates highlighting for Fra Mauro Map, followed by types of information visualisation approaches and its best practices utilized in digital history. Five typologies of information visualisation techniques (Radial Tree, Force-Directed Graph, Satellite View, Treemapping, and OpenStreetMap) and their design process were demon-strated as an online application on the EHM (Engineering Historical Memory) website. Consequently, the paper examined the development process and data analysis, as well as how to choose the right visualisations for different historical map projects. Lastly, the paper also highlighted the research contributions on historical maps, addressing the visualisation of hierarchically structured data, discovering the promotion of new insights and reduction of cogni-tive load and demonstrating the design of visual narratives.

Acknowledging the importance of information seeking on historical maps, this paper aims to communicate different cultures and perspectives along with historical map visualisation, to help individuals, particularly scholars to enrich their research in the historical maps by providing them with the ability to efficiently identify locations, textual units, place names, narratives that correspond to each other and today's world through a multi-dimensional information visualisation application that allows users to interact with data resources.

JILKOVA P., J. MOCICKOVA Prague

Czech Technical University

Czech-German Ethnic Border (1840–1940): Cartographic Image and Reality

In the period from the mid-19th century to the 1930s, the cartographic representation of ethnic and language borderlines became a gradually frequented topic in thematic maps and often served as one of the important tools in the purposes of modern national movements. The nationality issue was one of the key social and political issues in the Czech lands in this period. Although the Czech-German language borderline changed only a little in the examined period, Czech- and German-speaking nationalist cartographers tried to modify its depiction on maps by using various methods of manipulation. Besides "traditional" methods of manipulation (propaganda titles, texts or slogans), the authors used also some specific methods of cartographic manipulation, such as manipulative colours or deliberate distortions with the use of well-chosen data classification methods indicating the percentages of a certain ethnic group in a given territory.

Within the research, we performed the GIS analysis on selected maps depicting the Czech-German ethnic border to visualize to what extent the maps of Czech, German and Austrian provenience differed in its depiction in comparison with each other and over time. The results were published as thematic web maps using a map overlay concept to show the differences not only in the delineation of the Czech-German ethnic/language border but also in the extent of German language territory. Furthermore, an interactive web mapping application was designed to enable the users to interactively compare the maps across all periods. As a part of the research, a web-database of more than 280 maps depicting the Czech-German ethnic border was created. The web map application and the database are available via the project website: https://cha.fsv.cvut.cz/web/NarodnostniMapy/indexEN.html.

ZENTAI L., E. HAJDÚ Budapest

ELTE Eötvös Loránd University, Faculty of Informatics, Institute of Cartography and Geoinformatics

Exploring intentional distortions in Cold War tourist maps

There are two (partly) historical commissions in the ICA: Commission on the History of Cartography and the Commission on Cartographic Heritage into the Digital. Since these commissions usually deal with maps for a given period, research on maps for the past 50 to 100 years is largely omitted. Yet cartography of the Cold War period may be a very interesting area of research because it became a common practice in socialist countries to distort maps published for the general public between the 1950s and 1980s. However, this activity has never been documented previously.

In the Soviet Union, the distortion of maps began in the 1920s, but as maps had not been made for a broader public before, the Soviet map users had no basis for comparison. However, accurate, high-quality tourist and city maps were published in most socialist countries (e.g., Poland, Hungary, East Germany) even between the two world wars, so the map users easily recognized the distortions and it was difficult for them to accept the situation at least. Since maps made available to the general public were produced only by state map publishers at this time, only they knew the technique of distortions. This technique, originally initiated by the Soviet experts, was developed in the early 1960s in East Germany and introduced in all socialist countries. Prior to the digital age, it was not an easy task to implement these geometric distortions.

This study examines the geometric distortions of tourist maps of the Mátra Mountains in Hungary. This area did not have too many military objects (therefore it was not a subject of special targeted distortions during the Cold War). However, the accuracy of maps for the general public is questionable and can be numerically verified and determined.

SESSION V

24 September 2022 11.30-12.45

VASILCA D. Bucharest

Technical University of Civil Engineering Bucharest

Steps for identifying the projection of an old map

Identifying the projection of a map poses significant challenges due to the wide variety of projections featuring similar properties. Correct identification requires the analysis of the network of meridians and parallels in terms of shape, then determining the type of curves through which they are represented so as to find out the group of projections it belongs to (e.g. azimuthal, conical, cylindrical, etc.). In order to determine the class of cartographic projection (i.e. conformal, equal area, equidistant in certain directions), angle measurements must be made on the map along with measurements of meridian and parallel arcs for calculating the local scale along them. In the present work, the above steps were taken to identify the projection of two maps – one at a medium scale and the other at a small scale – namely the map of Bessarabia at the approximate scale 1:1.400.000 made in 1821, and the general map of the Russian Empire with the Neighbouring Polish Kingdom and Grand Duchy of Finland at the approximate scale

1:8.700.000 made in 1827. Both maps form part of the Geographical Atlas of the Russian Empire, the Kingdom of Poland, and the Grand Duchy of Finland, as compiled and engraved by Vasiliĭ Petrovich Piadyshev. The current paper also describes the two maps in terms of content and how details are represented on each one.

GALAMBOS Cs., G. TIMÁR Budapest

Mineral Property Registry Department, Regulated Activities Authority, Budapest | ELTE Eötvös Loránd University, Department of Geophysics and Space Science, Institute of Earth Sciences

Georeference and colour sign system of the 1879 geological map of Switzerland

The 1879 Geological map of Switzerland was compiled on the topographic basis of the 1:100000 scale Dufour map (Dufourkarte) of the country. The 1:100000 Dufourkarte has 25 sheets, 21 of them covers the territory of the country, and the 'corner ones' bear the title, the sheet skeleton, and the name and elevation point register. The terrain extents of the sheets is 70 x 48 kilometres. Geographic coordinates are indicated in the sheets, with no grid coordinates. However, the sheet boundaries follow the map grid lines.

The Dufourkarte has Bonne projection with the centre at the Old Bern Observatory (central meridian is 7.44021 degrees from Greenwich, latitude of centre is 46.95167 degrees). The datum is using the Schmidt ellipsoid (a=6377804 m; 1/f=302.0178081) and its location parameters are: dX=+1096 m; dY= 23 m; dZ= 676 m. The Old Observatory is depicted in Sheet XII. The northern boundary of Sheet VII is N=+6000 m; so the southern edge follows the line of N=-42000 m. Western edge is E=-50000 m while the eastern one is E=+20000 m. From this sheet, the system can be easily coordinated and georeferenced, using just the sheet corner points.

The geological content shows interesting details, both from cartographic and structural geological points of view. The colouring system is the last one, before the Bologna unification, resolved by the Second Geological Congress in 1878, which has apparently no effect on this map product. Switzerland is the piece of land, where the nappe systems were discovered, mainly based on this map series. Additional sheets show cross sections, indicating the large folds (nappes) supposed to form the Swiss Alps. Interestingly enough, these forms were identified also in 1879 but accepted by the mainstream science only later, when the age of the Earth was supposed much closer to the present accepted figure.

TIMÁR G., K. EDMONDS, C. MUGNIER Budapest, Huntingdon, Baton Rouge, LA

ELTE Eötvös Loránd University, Department of Geophysics and Space Science, Institute of Earth Sciences | The Salonika Campaign Society | Louisiana State University

Georeference of the Allied trench-maps of the WW1 Salonika front

The territory of Greece and of Bulgaria bordering on the north, as well as in present-day Northern Macedonia, which was annexed to Serbia only two years before WW1, was not systematically mapped on a large scale before the war. For this reason, the Eastern Army of the Entente had to devise their own system for mapping the position of the front: this was the Macedonian Triangulation, a British-French collaboration.

The 1:50000 and then 1:20000 and 1:10000 scale map sections produced on this basis have no section numbers, only designations. The coordinates are given in kilometres (rectangular coordinates) in a projection not specified on the maps, and no geographical coordinates are given. However, the georeferencing of the sections can be performed to a surprising accuracy of about 80 meters without the need to identify ground control points (GCPs), using only the intersection points of the coordinate grid and the parameters of the coordinate system. The latter, according to our research, are:

The starting point of the geodetic datum is the White Tower of Thessaloniki. Its coordinates are given in the triangulation documents: latitude 40d37m21s and longitude 22d57m41s. Using the position read in WGS84 and a geoid undulation of 42 m, using the Bessel 1841 ellipsoid, the positioning parameters of the datum ellipsoid are: dX=+923m; dY=-809m; dZ=+535m. The starting point of the projection of the coordinate grid is a point described in the grid by coordinates E=173000m; N=129000m. Its latitude is 40d40m32s, longitude 23d17m41.5s, on the local geodetic datum.

GEDE M., K. KERKOVITS, L. VARGA Budapest

ELTE Eötvös Loránd University, Faculty of Informatics, Institute of Cartography and Geoinformatics

Automatic Georeferencing of the 1951–53 Topographic Map Series of Hungary

A fully automatized method was developed to georeference the scanned 1:25000 map sheets of the Hungarian topographic survey carried out in 1951–53. The core of the process is the detection of the corners of the map content and the recognition of the sheet identifiers. The sheets depict geographic quadrangles whose extent can be derived from the sheet ID. The sheet corners are used as GCPs for the georeference.

The maps are using the Gauss–Krüger projection system. The geodetic base is dual: the Bessel ellipsoid in the western and southern part of the country and Krasovskiy ellipsoid in northeast. The datum transformation parameters were

also adjusted to minimize the misplacement of the georeference. Special attention was paid for the sheets along the edge of the two parts as these sheets had irregular shape.

The whole process is implemented in Python, using only open source tools: OpenCV for image processing, Tesseract for OCR and GDAL for georeferencing. 1147 map sheets were processed with an average speed of 4 seconds per sheet. False detection of the corners is automatically filtered by geometric analysis of the detected GCPs, while the sheet IDs are validated using regular expressions. The error of corner detection is under 1% of the sheet size for 89% of the sheets, under 2% for 99%. Although the system is finetuned to this specific map series, it can be easily adapted to any other map series having approximately rectangular frame.

SESSION VI

24 September 2022 14.00-15.30

KAIMARIS D., P. PATIAS, T. ROUSTANIS, A. STAMNAS, M. TASSOPOULOU, C. GEORGIADIS, K. KLIMANTAKIS, M. PAPPA, S. ANDREOU, K. EFKLEIDOU, N. KOUIDIS *Thessaloniki* Aristotle University of Thessaloniki | Ephorate of Antiquities of Thessaloniki Region | Infodim

Use of archaeological archives: 3D visualization of old two-dimensional drawings

The two-dimensional drawings of older archaeological excavations describe unique historical phases, giving a wealth of information about them. These designs, implemented by hand, are mostly accompanied by photographs and calendars of the excavations. Today, archival material is being digitized and is a unique source of knowledge about both history and science of archaeology over time.

As part of the SmartEye research project, the old two-dimensional drawings (horizontals and vertical sections) of the archaeological trenches of the Toumba and Thermi excavations in Thessaloniki (Greece) were first digitized in order to be integrated into an Augmented Reality (AR) application which will provide information to future users about the archaeological activity that has taken place in these areas in the past. Then, the three-dimensional models of archaeological excavations or even wider areas in which archaeological researches were carried out, were created and the texture was given to these models. Various methodologies and software programs were tested to finally select the most suitable one for introducing textured models into the Augmented Reality application.

In this regard, historical data can be best used, presented to a wider audience, not necessarily scientific, or even compared to other contemporary data obtained with modern technologies of collecting, processing and displaying 3D information (e.g. laser scanning, UAV and close-range photogrammetry).

MALAPERDAS G., R. GRETHE, N. ZACHARIAS Kalamata, Hannover

University of The Peloponnese, Laboratory of Archaeometry | Niedersächsisches Landesmuseum Hannover

Returning to the past, for the revival of the future: Analysing the value of old maps for the preservation of cultural heritage

The fortress of Navarino (Niokastro Pylos, Greece) has undergone various renovations since its construction in 1573. The castle was frequently changed to meet the demands of the people who lived there. Buildings were planned and constructed, streets were planned out, and the majority of the infrastructure was later demolished.

This infrastructure is now only very infrequently preserved. On the case study of a map of Navarino fortress from 1830 planned by the French engineers of General Maison and comparing it to today's condition using GIS; this case study demonstrates the possibilities and advantages of digitizing old maps. The map was georeferenced and used to create geographic information, displaying the data acquired. The results of this pro-cess are comparing the historic building infrastructure to the current building infrastructure, as well as the path structures back in 1830 and nowadays. As a result of the digitizing procedure, the exact positioning of the buildings, building blocks, and passage structures within Niokastro's walls were verified. It was also able to digitally render the complete picture of the castle infrastructure at that time, as well as to discover the foundations of communities that had either fallen over time or had been demolished by human activity. These maps indicate how the old development plan influenced the current situation and will serve as a reference for future research, helping to preserve cultural heritage in a significant way.

TASSOPOULOU M., A. STAMNAS, O. GEORGOULA, P. PATIAS Thessaloniki

Aristotle University of Thessaloniki, School of Rural and Surveying Engineering

Pictorial maps and three-dimensional representations of architectural structures in ancient coinage

Representations of buildings, monuments, and even ancient cities are the most popular subjects illustrated in ancient coinage (Tahberer, 2021). Ancient coins can be utilized as a physical record of remarkable monuments indicating how the ancient cities were organized and developed through time. Most of the time, the engravings in coinage are the only surviving evidence for documenting the ancient built environment. Although most of the landscape depictions are gen-

eralized and simplified orthographic projections of the facades of the buildings, noteworthy three-dimensional representations can also be identified. These three-dimensional representations are mostly axonometric projections showing the main face of the structure and others as well. In addition, other decorative and morphological elements are also represented. Most of the time, the artists were not focusing on depicting the landscape and the structures in detail, as they adopted conventions that lessened the value of their representation. However, one can associate these representations with the existing landscape or the remaining traces of ancient constructions in the ground.

This project aims to identify and record how buildings, landmarks, ancient cities, and other remarkable monuments were depicted in coinage (usually symbolic). What are the main categories of these representations related to each coin type? What are the focal points for mapping representation, and how do cartographers or artists emphasize them? Threedimensional representations are identified in different types of coins through time. At the same time, representations are also categorized regarding the socio-economic characteristics of each ancient city. Within that framework, the project explores the value of these representations and how these engravings can contribute to the cartographic, architectural, and archaeological studies of ancient cities.

PAZARLI M., K. DIAMANTIS, V. GERONTOPOULOU Thessaloniki, Athens

General State Archives of Greece-Cartographic Heritage Archives / Onassis Library/Onassis Foundation

The Panhellenic Student Competition "Hack the Map: Imaginary Worlds" - Flipping the educational model for new age learners

This paper presents an innovative Panhellenic digital student competition for school groups of secondary education, entitled: "Hack the Map: Imaginary worlds", which is conducted remotely during the school year 2021-2022 by the Onassis Foundation and the Onassis Library in collaboration with the General State Archives, the Cartographic Heritage Archives / Historical Archives of Macedonia, and the Department of Geography of Harokopio University, Athens, with the approval of Ministry of Education and Religious Affairs and under the auspices of General Secretariat for Greeks Abroad and Public Diplomacy, Ministry of Foreign Affairs.

The competition is organized for the second consecutive year as the results and the feedback we received from the first event (Hack the Map: Rigas' Charta) were really encouraging, despite the difficulties the educational community encountered due to the Covid-19 pandemic. With regards to the content, this time we are inspired by old maps and imaginary illustrations of Greece created by European travellers between 16th-20th centuries. Also, we improved the structure of the former competition and enriched the educational material provided through the digital platform Classroom.

The competition invites school teams from Greek High Schools in Greece and abroad to choose one or more cartographic exhibits, to combine them with historical events or imaginary stories and to use advanced digital tools to create projects of augmented reality, virtual reality, digital storytelling and 3D video game for PC and Android devices. This cooperative educational initiative develops an innovative educational model for teaching the lessons of history, geography, cartography and visual arts, by applying OBL, GBL and PBL methodologies. Through this fruitful synthesis, we reuse cultural heritage materials in combination with new technology practices and interactive open access techniques, aiming at better learning results for students 13-17 years old with a variety of interests, supporting their aspirations and unleashing their digital abilities.

PATIAS P., D. KAIMARIS, T. ROUSTANIS, A. STAMNAS, M. TASSOPOULOU, C. GEORGIADIS, K. KLIMAN-

TAKIS, S. SYLAIOU, J.-G. PAPADOPOULOS, D. KARADIMAS, I. CHARALAMPOPOULOS Thessaloniki Aristotle University of Thessaloniki / International Hellenic University / Thessaloniki State Conservatory (KOTH) / Vision Business Consultants / Beetroot

Augmented Reality in changing and evolving the viewing experience: the DigiOrch research project

The experience of attending live performances (e.g. a play, a concert, or a sporting event) nowadays has changed and continues to change at a rapid pace. Today, other audio-visual products are added and integrated to this experience, and it is possible to enrich it with the digital media and devices we have at our disposal. For example, Augmented Reality (AR) applications are gaining ground either as standalone artistic creations or as part of performances, offering possibilities for immersion or even interaction at times.

As part of the DigiOrch research project, an Augmented Reality application is being developed which combines spatial as well as thematic information (i.e. venue and the event), for a performance of the State Conservatory of Thessaloniki, such as the stage and the orchestra, the positions of the musicians etc. The project includes, in addition to system development, the collection, the digitization and the processing of a large amount of data (websites, videos, animations, images, audio files, texts, 3D models, drawings, maps, etc.).

This application can be used in the future in other venues such as ancient theatres, monuments, historic sites, etc. and connect with other innovative technologies offering unique viewing experiences to users.

Notes









