Representation of Maghrebian Toponyms on Hungarian Globes (19th to 20th century)

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DOI: 10.30921/GK.77.2025.2.3

Absztrakt

A tanulmány a 19. század elejétől a 20. század végéig terjedően tárja fel a magrebi helynevek magyar földgömbökön való formai megjelenését. A dolgozat elsődleges forrásai azok a magyar földgömbök, amelyek felbecsülhetetlen kartográfiai történeti értéket képviselnek. Az adatbázis különböző formában megírt helyneveket tartalmaz, ide értve a helyes mai írásmódot és magyar kiejtést éppúgy, mint a névírási változatokat: a korábbi megnevezéseket, diakritikus jeleket és átírási változatokat. A kutatás multidiszciplináris megközelítésével a magyar földgömbök magrebi helyneveinek (földrajzi neveinek) időbeli változására (fejlődésére), illetve a kartográfiára és a nyelvészetre gyakorolt tágabb vonatkozásaira kíván rávilágítani oly módon, hogy tanulmányozza azok megjelenését a különböző korszakok különböző térképein és földgömbjein. Ez az elemzés a helynévformák és az írásmód eltéréseit is felméri, vizsgálva a különböző korszakokban használt változatokat. Ez magába foglalja konkordenciamintázatok vizsgálatát, a magrebi helyneveknél sajátos nyelvi jellemzők azonosítását, valamint formáik időbeli változásainak nyomon követését.

Abstract

This study explores the representation of Maghrebian toponyms on Hungarian globes spanning the early 19th to the late 20th centuries. The primary sources for this study are Hungarian globes, which act as invaluable historical cartographic artifacts. The dataset comprises toponyms written in diverse forms, including their correct new spelling and Hungarian pronunciation as well as variations in orthography, former naming, diacritics, and adaptations. Through a multidisciplinary approach, this research strives to shed light on the evolution of Maghrebian toponyms on Hungarian globes and the broader implications for cartography and linguistics by studying their manifestation on different maps and globes from various periods. This analysis will also assess variations in toponym forms and spelling, examining the variants used in different periods. This includes investigating concordance patterns, identifying linguistic features specific to Maghrebian toponyms, and tracking changes in their forms over time.

1. Introduction

This paper is a chapter of a bigger PhD project that strives to investigate how the place names of the Maghreb region were used in Hungarian publications in the past two centuries, namely in school atlases, world atlases, university textbooks, and on globes. Consequently, this current contribution is an extension of preceding research, akin to the earlier publication on Maghrebian toponym variants in Hungarian school atlases (Alasli, 2021).

Examining the representation of Maghrebian toponyms on Hungarian globes provides a distinctive perspective and unveils how the Maghreb region was perceived and depicted over time. Exploring the toponymic variations and linguistic adaptations of Maghrebian place names on Hungarian globes offers insights into phonological, orthographic, and morphological changes. It also demonstrates how Hungarian cartographers perceived and portrayed Maghrebian toponyms. Furthermore, Hungary's geographical distance and limited historical contact with the Maghreb, in contrast to countries like Spain, France, Italy, or Portugal, make the Hungarian case particularly intriguing. While these (Indo-European) languages have established exonyms and translations in their cartographic representations, this study focuses on a smaller (non-Indo-European), geographically distant language, exploring how it handled and handles Maghrebian geographical names. In other words, this study strives to investigate how the geographical names of a large (Semitic) language that does not use Roman letters and was under French influence come into a small language that uses Roman letters but was under German stress through centuries. In addition, this research can also serve as a model for an in-depth analysis of the geographical names of any region. For instance, future students and researchers could pursue analogous research goals, employ similar methodologies to analyze Maghrebian names in a different language or explore the presentation of Hungarian toponyms on Maghrebian maps. Moreover, the study aims to deliver a concordance of the place name variants from reliable sources, including globes, school atlases, world atlases, and university textbooks. The outcomes of this research extend beyond personal interest, benefitting Hungarian teachers, editors, map makers, university instructors, historians, and translators working on guidebooks for the Maghreb.

My enthusiasm for the subject was also strengthened by the fact that Hungarian cartography and cartographers are considered among the best in the world. I was surprised to learn that Hungarian cartographers and their contributions have garnered widespread acclaim and acknowledgment on the global stage of cartography and by the international profession in the world. For instance, the International Cartographic Association (ICA), founded in 1959, chose Budapest as the host city for its 1989 world conference and map exhibition, highlighting the international recognition of Hungarian expertise in this field. The ICA has also honoured three Hungarian scientists – Sándor Radó in 1979, Árpád Papp-Váry in 1995, and István Klinghammer in 2003 – with the prestigious Honourable Fellowship, acknowledging their remarkable contributions to both the ICA and the broader field of cartography. Moreover, László Zentai's noteworthy role as the Secretary-General and Treasurer of the ICA from 2011 to 2019, and his current position as Vice-President (2019–2027) further exemplify the leadership roles assumed by Hungarian cartographers within the ICA, particularly as elected chairpersons in commissions like the Commission on Cartography and Children (vice-chaired by José Jesús Reyes Nuñez in 2019–2023 and recently (2023–2027), Commission on Cartographic Heritage into the Digital (chaired by Mátyás Gede), and Commission on Map Projections (chaired by Krisztián Kerkovits). Besides, the recognition of Hungarian cartography extends beyond individuals to their notable products. László Perczel's manuscript globe from 1862 received acclaim and Lettera di distinzione at the Third International Geographical Congress in Venice in 1881 for its geographically accurate, detailed, and aesthetically pleasing representation of the Earth, along with its extensive coverage of geographical names (Márton et al., 2021). Another remarkable achievement was the detachable structural-morphological globe of the Earth with a 40 cm diameter, edited by Mátyás Márton and produced by the Cartographia Enterprise, which won the prize for the best demonstration aid at the Internal Map Exhibition of the ICA in 1989 (Papp-Váry, 1990). In addition, Cartographia's globes (Kartográfiai Vállalat) were published in various languages, including Czech, German, English, and Polish, thus demonstrating a commitment to the international market (Márton, 1988). Furthermore, the National Atlas of Hungary – Natural Environment was awarded first prize in the ICA World Exhibition of Cartographic Products in Tokyo in 2019, attesting to the high quality of Hungarian cartographic work (Nemzeti Atlasz, n.d.). The National Atlas of Hungary – Society continued this success by receiving the ICA Award Popular Vote on atlases in the ICA World Exhibition of Cartographic Products in Florence in 2021 (International Cartographic Association, 2023). These instances collectively underscore the global respect and appreciation earned by Hungarian cartographers and their impactful contributions to the field.

These achievements highlight that Hungarian maps are renowned for their cartographic precision and historical contextualization, making them valuable resources for studying the representation of the Maghreb region and its toponyms. Therefore, using Hungarian globes as primary sources for Maghrebian toponyms offers a unique opportunity to explore these place names' geographical and historical significance. Consequently, the study focuses on general globes dating from the first years of the 19th to the last decade of the 20th century. The choice of period for this study – general earth globes dating from the first years of the 19th to the last decade of the 20th century – is explained by the fact that the first Hungarian-language globe was created in 1801–1803, while globes from the 21st century were not considered since the Hungarian writing of Maghrebian names on globes followed established and already settled practices. There have been no recent changes in the representation of these names.

It is crucial to clarify that although the Hungarian maps depict an indefinite sovereignty border in the southwestern region of Morocco, such boundary disputes or interpretations of sovereignty are not considered for this research. More specifically, the study concentrates on the toponyms from the entire territory of Morocco, including its northern regions, and stretches all the way to Lagouira (on the Atlantic coast south of the Tropic of Capricorn, indicated as La Güera in the 2022 edition of the Hungarian Cartographia's world atlas), encompassing areas within the Sahara. Therefore, by the Maghreb, we mean the political geographical area encompassing nations such as Morocco, Algeria, and Tunisia, which boasts a multifaceted cultural and linguistic heritage shaped by an intricate tapestry of historical events, including colonialism, trade routes, and cultural exchanges. These factors have left a profound imprint on the toponymic landscape of the region.

2. Toponymy, Maps and Globes

Toponymy encompasses the study, description, and elucidation of terms that have served or continue to serve to denote facets of nature in their relationship with human presence. This broad spectrum encompasses everything from orientation terminology to street designations within a specific region, including names of sources, rivers, mountains, towns, settlements, and countries. They are regarded as providing "the most useful geographical reference system in the world" (Uluocha, 2015). Throughout history, people have used geographical names as a spatial framework, offering an efficient and immediate method of defining and locating places on the Earth's surface "without using geographic coordinates or the complicated geodetic calculations introduced in the modern period." They are also "an intricate kaleidoscope of elements" that includes the story of humankind, making them a part of humanity's cultural heritage (Cantile, 2016). Geographical names are more than just labels on a map (Kerfoot, 2009). Place names "are redolent with meaning. Beyond the simple assemblage of letters and their syntax, they are infused with connotations both real and imagined". Thus, they serve as rhetorical instruments, effectively conveying a nuanced sense of the landscape to which they are connected (Rofe–Szili, 2009). From a geographic perspective, they "offer, at first glance, a beguiling window to understanding the physical environment and its development through time" (Zelinsky, 1955). Linguistically, "naming is clearly not arbitrary, since the action of naming a place is a conscious one" (Radding–Western,

2010). Naming also allows us "to distinguish one salient location from another, facilitating communication and reducing ambiguity" (Coates, 2006). In addition, "Toponyms are an important part of our cultural heritage and are thus more than names, they also encode history" (Villette–Purves, 2018).

2.1. A complementary perspective on space

In visualizing space, maps and globes play distinctive yet complementary roles. While maps are typically two-dimensional representations, globes introduce a vital three-dimensional, spherical aspect to our understanding of the Earth.

Globes have been considered a "symbol of geography and of scholarship in general" for centuries. "Innumerable pictures and drawings from ancient and from modem times bear witness to this" (Oberhummer, 1924). However, it is crucial to note that in earlier times, the practical utility of globes far transcended their contemporary applicability and function. It is somewhat regrettable that globes are not more widely integrated into our daily lives. Developing a habit of consulting globes when contemplating global events, environmental issues, or international conflicts could significantly improve our collective understanding of these complex matters. Globes offer a unique perspective that bridges the gap between our mental models of the world and the actual reality, fostering a deeper awareness of global dynamics.

In essence, proficiency in map and globe skills is more than just a functional tool in modern society; it constitutes a fundamental form of knowledge with broader implications for our everyday lives. Both maps and globes are crucial in rectifying inaccuracies within our cognitive perception of space, helping us align our mental constructs with the actual world.

2.2. Toponymy and cartography

Cartography preceded writing and has a rich history, evolving alongside human exploration and technological advancements. The desire to visually represent the Earth and navigate its terrains led to its development. Cartography is a dynamic field that reflects the evolving understanding of the Earth and its representation throughout history. Essentially, cartography functions as a means to visually represent a geographical space, with toponymy playing a crucial role in identifying various components within these representations.

Cartographically, toponyms serve as fixed reference points on maps; therefore they hold vital significance in the cartographic construction of landscapes. They serve as "cartographic labels that can be used for orientation, navigation, recreation, and reference points" (Uluocha, 2015). Therefore, "cartography is an unbeatable tool for the study, standardization, and dissemination of toponymy" (Mitxelena-Hoyos–Amaro-Mellado, 2023).

The primary characteristic of a geographical map lies in its ability to faithfully portray the places it encompasses, underscoring the importance of prioritizing the correct rendition of toponyms. Thus, a comprehensive map necessitates accurate representation of the names associated with the depicted locations. In modern cartography, the comprehensive depiction of the terrain entails not only precise geometric descriptions but also the inclusion of accurate names for all types of locations, whether they are inhabited or uninhabited. This combination of geographical data and toponyms is essential for creating detailed and informative maps.

2.3. Toponymic transcription

Toponyms "shall be spelt in accordance with generally accepted rules of linguistic correctness" (Sandin, 2016). Toponyms, an integral part of a language, necessitate orthographic conformity to established linguistic conventions within that language. The written representation chosen for a toponym should accurately mirror how the local people pronounce it and, equally importantly, should align with the broader social consensus. Deviating from the commonly standardized spelling of a toponym to an unconventional form, which does not correspond to the local pronunciation, may render it unusual or unidentifiable.

Toponymic transcription, which involves representing the names of geographical places in a globe or other cartographic documents, presents a significant challenge, especially in countries influenced by foreign languages and cultures or in regions with intricate linguistic contexts. The rich tapestry of civilizations, cultures, and dynasties that have passed through, settled, and governed in places like Morocco, Algeria, and Tunisia, has left a profound imprint on the names of these locations. These appellations bear historical significance and carry the unique characteristics of each civilization, culture, or ruling dynasty. They often overlay, juxtapose, or intertwine with the original Berber toponyms or names of the indigenous Libyans, creating a diverse and intricate toponymic landscape. Therefore, the challenge lies in accurately capturing this complex historical and cultural layering while respecting the linguistic nuances and pronunciation of the local population. When a place name is imported into another language, it often involves adapting the toponym to the linguistic rules of the target language. This adaptation spans various linguistic aspects, including orthography, phonology, morphology, syntax, and pragmatics. This transformation of toponyms encompasses processes such as translation, transcription, and transliteration..

3. Methodology

3.1. Data selection

Selecting Hungarian globes with Maghrebian toponyms is vital in this research, as it constructs the foundation for the subsequent analysis. The process involves identifying relevant political and relief globes that contain place names from the Maghrebian region, assuring their authenticity, and assessing their suitability for the research objectives (Table 1). Naturally, mostly only the larger sized globes are considered as they contain the largest number of place names. The globes are grouped according to major periods of Hungarian history. The selected timeframe

stems from the consideration that while earlier globes did exist, they were not made in Hungary or by Hungarian cartographers. The decision was to include globes produced in Hungary exclusively, adding a distinctive national context to the collection. The inaugural Hungarian-made globe emerged in the early 19th century, marking a significant historical milestone in the country's cartographic contributions. All examples are available for study in the excellent Virtual Globes Museum (referred to as VGM from now on; http://terkeptar.elte.hu/vgm/?lang=hu) managed by the founder Prof. Mátyás Márton at the Institute of Cartography and Geoinformatics at ELTE University. Moreover, the place names and their Hungarian versions presented in this study have been taken from the maps and names index of Cartographia's world atlas published in 2022. Using data from such a reputable atlas provides the accuracy and credibility needed for the toponymic information.

Following the collection of names from diverse globe sources, the collected data underwent a systematic organization and categorization process. Subsequently, a comprehensive analysis was conducted, considering both historical and linguistic aspects from the past two centuries. The detailed examination and discussion of these names will be presented in the results section, offering insights into their evolution and linguistic nuances.

Details regarding the globes have not been included in this article due to length constraints. However, comprehensive information about all the maps listed in the table is easily accessible in high quality through the Virtual Globes Museum. Each globe is uniquely identified by an ID, represented by the last number in its respective internet link indicated in the last column of Table 1. Interested readers seeking more elaborate descriptions and explanations, provided in Hungarian and occasionally in English, are encouraged to visit the respective page for an in-depth understanding.

3.2. Methods

Using the Descriptive Statistics method, specifically Frequency Analysis, the research determined each toponym's frequency, thereby identifying the most common and less common place names within the dataset. This statistical approach provided valuable insights into the distribution and prevalence of Maghrebian toponyms.

Moreover, Geographic Information Systems (GIS) software, specifically QGIS, was employed to represent the spatial distribution of these toponyms visually. This geographic visualization allowed for a clear and intuitive understanding of where these toponyms are located geographically, enabling the identification of spatial patterns and concentrations.

In addition to the spatial analysis, a comparative linguistic analysis was conducted to unveil variations in Hungarian orthography, phonetics, and diacritics among the toponyms. This linguistic perspective sheds light on the multifarious ways these place names have been represented.

Furthermore, the availability of maps from different periods facilitated the conduct of a temporal analysis of the evolution of Maghrebian toponyms. This investigation delved into how these toponyms' distribution, prevalence, and linguistic characteristics have changed over time, delivering a comprehensive historical context for the study. It is worth noting that the official orthography of the Hungarian language underwent several changes during the presented periods. The first regulation of Hungarian orthography by the Academy was in 1832. However, the issue of writing geographical names began to be addressed much later in Academic regulations than of personal names. The individual solutions to the unregulated writing problems and the contradictory decisions of the various official actors, also contrary to linguistic laws, caused enormous confusion in this area. The writing geographical names was one of the most disorganized issues in Hungarian orthography. It is essential to recognize that this regulation and subsequent editions, extending through the mid-20th century, did not provide detailed instructions for the writing of non-Hungarian place names. The Academic rules on transcription only dealt with the writing of names mainly from Russian, Greek and Chinese until its 11th edition in 1984. This gave a general statement that the proper names of non-Latin script languages (such as Arabic) are usually converted according to the Hungarian alphabet, preferably from the source language. However, the world atlases of Kartográfiai Vállalat consistently used the French transcription for the Arabic place names of the former French colonies, except for certain natural features. This context explains the representation of Maghrebian toponyms on Hungarian globes during these historical periods.

These methodological approaches collectively enriched our understanding of Maghrebian toponyms and their evolution.

4. Results and Discussion

Due to length constrains, this chapter only presents the major toponymic features of the first four Hungarian globes. All others can be reached through the VGM.

The manuscript globe from 1801–1803 bears an influential place in history as the inaugural Hungarian-language globe ever created by students from the esteemed Reformed College of Debrecen. Notably, the contents of this globe were meticulously drawn directly onto its surface. Within the depiction of the Maghreb region, it is intriguing to observe that the term "BARBARIA" is used to represent this area. Additionally, dotted lines on the globe function as markers for specific delineated and named regions. Furthermore, the toponym "SAHARA PUSZTASAG" stands out (in capital letters), reflecting the designation used then.

The subsequent manuscript globe from 1803–1804 also holds historical significance as one of the earliest examples of Hungarian-language manuscript globes. In this representation, "Marokko" is clearly legible, while "BARBARIA" is only partly discernible due to fading letters and colours. The toponym "Gualata" is also identifiable along the Tropic of Cancer. However, other names are either fully or partially illegible. For instance, "ZAN" should read "FEZZAN." Notably, the Sahara Desert is referred to as "SÁ[H]ARA PUSZTA," with "puszta" denoting "wasteland." (The letter H is illegible in the name, because the font is blocked out by an eye-catching wide line of the Tropic of Cancer.) It is interesting to observe that contemporary Hungarian maps now use the phonetic "Szahara" only without any generic element, reflecting changes in toponymy over time.

Károly Nagy (1797–1868) emerged as a prominent luminary during the Hungarian Reform Age, believing that the nation's advancement hinges on the proliferation of educated individuals. A noteworthy accomplishment attributed to Károly Nagy is the creation of the first-ever printed globe in Hungarian, which he completed in 1840. This globe distinguished itself as the first Hungarian printed globe to feature names of places in the

Table 1. Hungarian globes selection

Historical period	Year	Author; publisher (as in the VGM)	Description (diameter)	Link
Enlightenment	1801–1803	Budai Ézsaiás; Református Kollégium Nagykönyvtára, Debrecen	The earliest known manuscript globe in Hungarian (25 cm)	http://terkeptar.elte.hu/vgm/2/?lang=en&show=globe&ord=date&id=125
	1803–1804		One of the earliest known manuscript globes in Hungarian (32 cm)	http://terkeptar.elte.hu/vgm/2/?lang=en&show=globe&ord=date&id=126
Hungarian Reform Age (1825–1849)	1840	Nagy Károly	The first printed globe in Hungarian language, with hachured relief, country boundaries, without hand-colouring (31.65 cm)	http://terkeptar.elte.hu/vgm/2/?lang=en&show=globe&ord=date&id=29
Austrian rule over Hungary (1849–	1862	Perczel László	The largest, unique, hand-drawn relief-political globe (127.5 cm)	http://terkeptar.elte.hu/vgm/2/?lang=en&show=globe&id=76
Hungarian Compromise with Austria (1867) until the end of the Monarchy (1918)	1868–1870	Felkl Jan	Political globe with hachured relief (31.8 cm)	http://terkeptar.elte.hu/vgm/2/?lang=hu&show=globe&id=131
	1896	Kogutowicz és Társa, Magyar Földrajzi Intézet	Hungarian political and physical globe (51 cm)	http://terkeptar.elte.hu/vgm/2/?lang=en&show=globe&ord=id&id=23
	1897	Kogutowicz és Társa, Magyar Földrajzi Intézet	Hungarian political earth globe (25.5 cm)	http://terkeptar.elte.hu/vgm/2/?lang=en&show=globe&ord=date&id=58
	1910	Magyar Földrajzi Intézet r. t.	Political globe for schools (51 cm)	http://terkeptar.elte.hu/vgm/2/?lang=hu&show=globe&id=24.
Between the world wars	1931	Kogutowicz Károly, Turner Ferencz; Kókai Lajos	Relief globe for schools (32 cm)	http://terkeptar.elte.hu/vgm/2/?lang=hu&show=globe&id=127
	1933	Takács József, Turner István; Kókai Lajos	Political globe (21.5 cm)	http://terkeptar.elte.hu/vgm/2/?lang=hu&show=globe&id=87
	1937	Kogutowicz Károly, Takács József; Kókai Lajos	Political globe with shaded relief (32 cm)	http://terkeptar.elte.hu/vgm/2/?lang=hu&show=globe&id=128
	1942	Takács József, Turner István; Kókai Lajos	Political and relief globe for schools (40 cm)	http://terkeptar.elte.hu/vgm/2/?lang=hu&show=globe&id=92.
The high time of Cartographia	1962	Kartográfiai Vállalat	Relief globe for schools (40 cm)	http://terkeptar.elte.hu/vgm/2/?lang=hu&show=globe&id=43
	1993	Cartographia, Belma Kft.	Illuminated globe (25 cm)	http://terkeptar.elte.hu/vgm/2/?lang=hu&show=globe&id=69
Digital reconstruction of the largest globe	2019	Márton Mátyás; ELTE Térképtudományi és Geoinformatikai Tanszék	Digital reconstruction of the largest Hungarian globe from 1862 (127.5 cm)	http://terkeptar.elte.hu/vgm/2/?lang=hu&show=globe&id=159

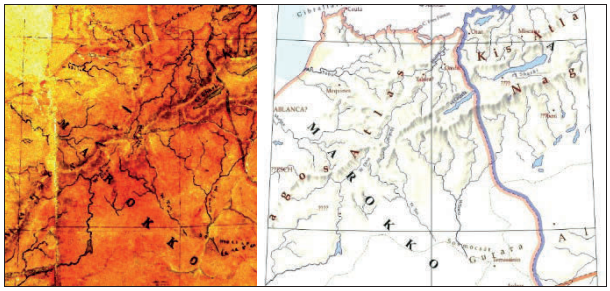

Figure 1. Photo showing a part of Morocco on the original globe (1862) and on the corresponding spherical lune of the reconstructed globe (2019)

Maghreb region, thereby enhancing its historical and cultural significance. This globe also marked the first time Hungarian cartography embraced the metric system. Nagy used Jüttner's globe and maps from well-known English and French mapmakers as references, including the latest geographical discoveries. According to Katalin Plihál, in 1833, Nagy proposed creating and disseminating printed terrestrial and celestial globes to underpin education in Hungary. This initiative proved instrumental in affording countless young individuals access to essential geographical knowledge in their native tongue, thereby broadening their horizons (Plihál, 2016). It is noteworthy that the toponyms on the globe were translated from German and written in Hungarian script, aligning with the broader development of Hungarian national identity during the Reform Age.

(It is worth noting that in Kókai Lajos' globe of 1942, the place names were edited by József Takács, a teacher of geography and an internationally recognized Hungarian expert on geographical names, mainly on Arabic place names.)

Furthermore, the "132 cm diameter manuscript globe of László Perczel from 1862 is among the largest ones of Central Europe" (Gede et al., 2011). However, it has been verified that the correct size is 127.5 cm (Márton, 2019) . "This unique work of art, which has suffered irreparable damage due to the ordeals of the 20th century", holds immense cultural significance and is a vital part of our cartographic heritage. Thanks to digital processing, it was possible to create three artistic copies of Perczel's globe (Ungvári et al., 2021). "Large parts of the surface of the sphere are not only worn, but they are also physically damaged" (Lente et al., 2020) (Figure 1). As the original globe was made in one copy, it could not influence the usage of Arabic names in schools. However, it recorded more than seventy place names of the Maghreb region, some of which had never appeared on Hungarian maps before. This justifies presenting an analysis of labelling the Arabic place names on the studied area of the globe.

The most time-consuming and extensive work in the digital reconstruction was the identification and completion of the names. The condition of the names varies significantly; some names are easily legible, others suffer from faint or missing letters, and question marks mark the illegible characters. Professor Mátyás Márton, an expert in the field, has pointed out that the most detailed Hungarian-made map or globe depicting the Maghreb region prior to Perczel's globe was likely created by Károly Nagy in 1840. This suggests that any name found on Perczel's globe but absent on Nagy's globe was probably incorporated by Perczel from foreign sources, often with modifications to conform to Hungarian spelling conventions. According to Lente, Perczel likely used maps from "Universal-Handatlas (Heinrich Berghaus), Glogau, 1859" as references during the design of his globe. Numerous visual similarities between the graphics of the atlas and the globe substantiate this assertion. Additionally, many geographical names were directly borrowed from specific map sheets of this atlas, often retaining their original German spellings. Moreover, it is also evident that he made use of "Atlas complet du précis de la géographie universelle, Paris, 1812". This source was particularly valuable in assisting with the geographical names of Africa and the archipelago in the South Pacific Ocean. Notably, the atlas "Galetti Egyetemi Világrajza (Falk Miksa), Pesten, 1857" was published in Hungarian, which aligns with Perczel's aspiration to promote the Hungarian usage of geographical names. This atlas is of particular significance as it provides an exhaustive geographical overview of the world, complemented by richly illustrated maps (Lente et al., 2020).

The 2019 reconstructed Perczel globe – following the mistakes on the original – displays some notable discrepancies in the placement of certain toponyms. For instance, the toponym "Barika" is positioned approximately 100 kilometres northwest of its expected location. Similarly, "Bordj," if indeed referring to Bordj-Bou-Arreridj, is shifted approximately 100 kilometres to the east. "Talsint?" appears to be potentially misplaced by over 200 kilometres. However, such misplacements of place names were not considered and were not dropped when collecting the names. Additionally, there are toponyms marked with question marks, like "Aarine?" and "Tinidjarin?" thus creating challenges in terms of identification. Furthermore, there are other toponyms for which the original name remains uncertain, adding an element of ambiguity to their representation on the globe.

4.1. Maghrebian toponyms collected

A total of 297 Maghrebian toponyms were collected and analyzed as part of this study, providing a substantial dataset for research and analysis of place names on Hungarian globes spanning different historical periods (Figure 2).

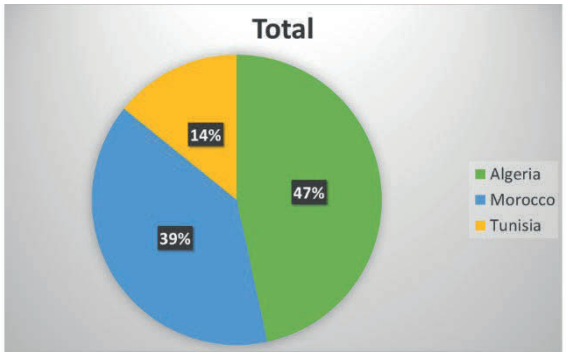

Figure 2. Total of toponyms collected

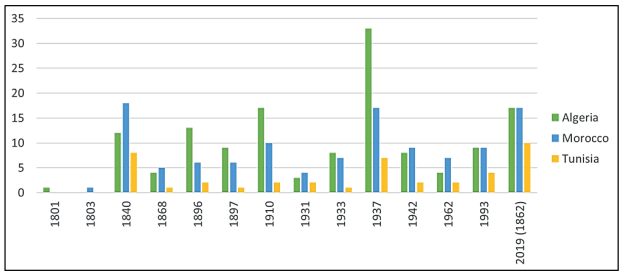

Figure 3. Yearly count of toponyms per country

This visual representation (Figure 3) provides a clear overview of how the number of collected toponyms has evolved over time. The lowest recorded count was one toponym, which occurred in 1803, signifying a notable drop compared to other years. Conversely, the highest recorded count was 56 toponyms in 1937, which stands out as the peak count in the dataset. The decision to focus on bigger globes from various periods aligns with the principle that bigger globes can accommodate a more significant number of names. However, the quality of the fonts and the overall legibility of the toponyms played an influential role in the selection process. Globes with poor font quality were excluded from the study, emphasizing the importance of clear and legible representation.

In the case of Perczel's globe, the original globe would have been challenging to analyze or consider for toponymic research. Its reconstruction enhanced the legibility and quality of the fonts, making it a valuable source for studying the toponymy of the Maghreb region.

Indeed, the reconstruction and restoration efforts ensure that historical maps and globes remain accessible and provide accurate representations for researchers, educators, and the general public. Moreover, it contributes greatly to the broader understanding of our world's history, geography, and cultural heritage.

4.2. A spatial analysis to visualize the distribution of the toponyms

Figure 4 illustrates the geographical distribution of the collected toponyms, uncovering an interesting concentration pattern. Specifically, there is a notably higher concentration of toponyms in the upper regions of Morocco, Algeria, and Tunisia compared to the lower parts of these countries. This concentration is not only explained by the fact that the southern areas of the Maghreb countries have much fewer recorded place names because they have been less populated due to the harsh physical geographical environment. It is also true that the collection of toponyms has been more extensive in the northern areas of these nations, while the southern regions appear to have fewer documented toponyms. This geographic pattern may reflect historical, cultural, or research biases that have influenced the recording of toponyms in these regions.

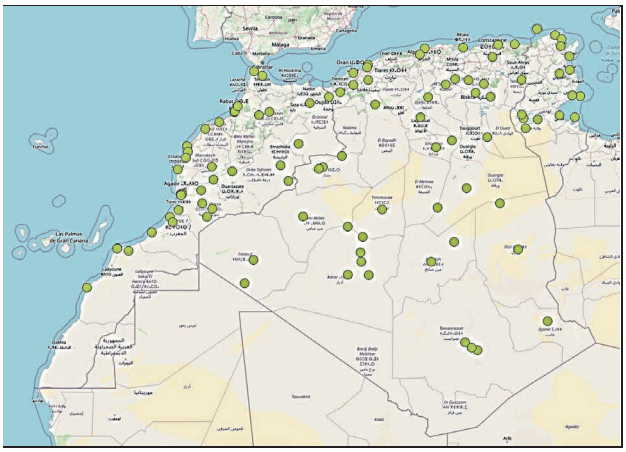

Figure 4. Spatial distribution of the collected toponyms

The proximity of the northern regions of Morocco, Algeria, and Tunisia to Europe could significantly contribute to the higher concentration of documented toponyms in these areas. Historically, these regions have had closer interactions, exchanges, and influences with European nations, which could have led to more extensive record-keeping and documentation of toponyms. Additionally, factors such as colonialism, trade routes, and cultural exchanges may have played a role in the greater attention given to these northern areas regarding geographical documentation.

4.3. Toponymical variations

Upon collecting all the toponym variants from the Hungarian language globes, each variation has been recorded and systematically classified into nine major categories, each shedding light on the diverse ways in which toponyms can evolve and adapt:

– Diacritical variation: This category encompasses variants that maintain orthographic similarity to the official spelling but introduce changes in diacritics (accents or marks) by adding or removing them in one or more letters.

– Foreign language influence: Variants falling under this category are derived from other languages, such as Spanish, German, French, or Arabic, reflecting the influence of linguistic borrowings or cultural interactions.

– Typographical error: Variants in this category suggest that the differences in toponym spellings are unintentional mistakes.

– Official form: This category represents the latest official spelling of the toponym, indicating that the variant is the result of an official change or update.

– Historical/colonial former name: Variants in this category emphasize the historical context or colonial influence.

– Orthographic/spelling variation or alternation: This category encompasses alterations such as hyphen or dash usage, letter insertions or deletions, and the substitution of different letters.

– Hungarian orthography and pronunciation patterns: Variants in this category reflect adaptations to Hungarian rules, encompassing phonetic or morphological changes.

– Hungarian translation: Variants in this category involves translating one part or the entirety of the toponym into Hungarian.

– Shorter form: Variants in this category represent abbreviated forms of the official spelling, reflecting a more concise representation of the toponym.

Certain toponyms exhibit more than one variation type. Hence, for a rigorous statistical analysis, the most prominent or influential variation was selected and documented in the "Variation type" column. To ensure that all variations are adequately recorded and to maintain a comprehensive interpretation, the second layer of variation was thoughtfully included in the "Comments" column within the dataset. This particular approach ensures that all relevant variations are documented and can be referenced as needed while allowing the primary variation to take precedence during analysis. Consequently, the dataset achieves depth, offering a detailed comprehension of toponymical variations and their intricate dynamics.

The recorded variations in the Toponymic Dataset exhibit a diverse range of categories, each offering unique insights into how these place names have been represented over time. Diacritical Variation retained 11 instances, whereas Orthographic/spelling variation or Alternation encompassed 33 instances. In addition, 32 toponyms were influenced by other languages, while 36 instances were identified as Historical/colonial former name. Besides, Hungarian orthography and pronunciation patterns influenced 29 instances, and Hungarian translation comprised 21 toponyms. Moreover, the official or standard spelling of toponyms was recorded for 125 instances. Besides, three instances of toponyms were presented in abbreviated or shortened forms. Finally, seven instances resulted from typographical errors or mistakes in the representation of the toponym.

4.4. Frequency of the toponyms

The dataset analysis displayed the toponyms with the highest frequency of appearance on Hungarian globes. These frequently occurring toponyms are as follows:

– Morocco (Figure 5): Marrakech (11 occurrences), Fès (10 occurrences), Tanger (9 occurrences), Rabat (7 occurrences), Casablanca and Essaouira (6–6 occurrences)

– Algeria (Figure 6): Alger (12 occurrences), Oran (10 occurrences), In Salah (9 occurrences), Biskra and Constantine (8 occurrences), Tindouf (7 occurrences)

– Tunisia (Figure 7): Tunis (12 occurrences), Gabès (6 occurrences)

These toponyms provide valuable insights into the prominence and significance of specific Maghrebian locations on Hungarian globes throughout the analyzed periods.

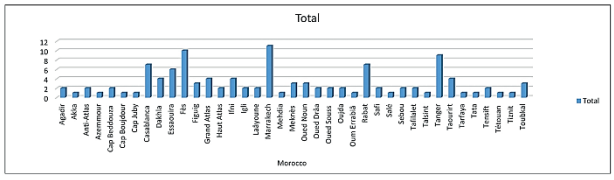

Figure 5. Frequency of Moroccan toponyms

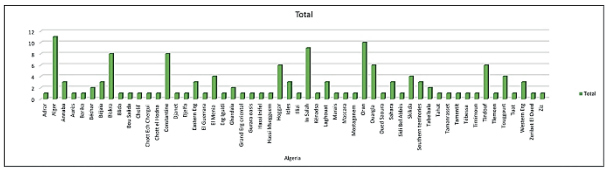

Figure 6. Frequency of Algerian toponyms

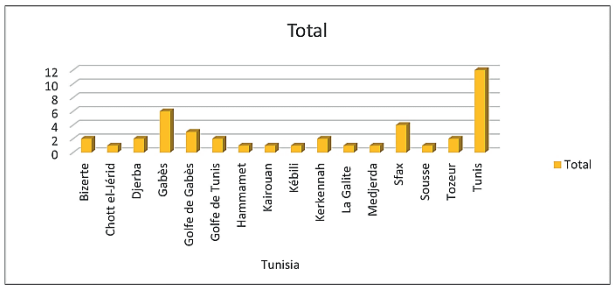

Figure 7. Frequency of Tunisian toponyms

4.5. Toponym dataset of Hungarian globes (19th to 20th century)

A large comprehensive dataset of Hungarian globes from the 19th and 20th centuries that feature Maghrebian toponyms was assembled. Each toponym was documented and structured in a systematic manner using a tabular format with the following columns, ensuring a comprehensive record of the toponym data. This constructed database will be a valuable resource accessible to researchers, map makers, editors, linguists, and travelers interested in the Maghreb region. Currently, the database is a work in progress, with ongoing efforts to fill in certain names and update data, and it will be made openly available once completed.

Note that Table 2 presents only an extract of place names and columns from the dataset. It is a sample providing an insight into the structure and construction of the database. This preview emphasizes the commitment to transparency and accessibility, with the complete and finalized database anticipated to offer a vital tool for those engaged in research, cartography, linguistic studies, and exploration within the context of the Maghreb.

– Globe's ID: This column records the unique identifier in the VGM associated with the globe from which the toponym was collected. This helps in tracking the source of each toponym.

– Country: Specifies the country with which the toponym is located or associated, providing geographic context.

– Toponym: This column includes the official form of the toponym in both its French and Arabic representations along with the Hungarian pronunciation taken from the world atlas of Cartographia Kft. (2022), ensuring linguistic accuracy and completeness.

– Feature: This column identifies the specific geographical feature to which the toponym pertains. It helps contextualize the toponym within its geographic context.

– Coordinates: This column provides the geographic coordinates (latitude and longitude) associated with the toponym, enabling precise location identification on the Earth's surface.

– Variants: In this column, the various toponymical variations are documented. These variants capture how the toponym has been represented over time.

– Type of variation: This column categorizes the type of toponymic variation, as outlined in the previous classification, helping to classify and analyze the variants systematically.

– Comments: This column serves as a space for additional notes or comments that provide context, explanations, or any relevant information about the toponym. It allows for a more comprehensive understanding of each toponym.

The structured database offers a comprehensive and systematically organized repository for the collected toponyms, facilitating efficient retrieval and analysis of toponymic data from various sources. Notably, the advantages of this structured dataset include:

– Efficient retrieval: Researchers can quickly access toponymic data, allowing for more effective geographic information retrieval. This expedites the research process and enhances the efficiency of data analysis.

Table 2. Extract of the Toponymic Dataset

Country	Toponym	Latitude	Longitude	Feature	Variant	Year	Variation type	Comments
Morocco	**Figuig [Fígíg]** فجيج	32.10891	–1.22855	*Settlement, city*	Figig	1910	Foreign language influence	
	Haut Atlas [Magas-Atlasz] الاطلس الكبير	31.75000	–6.50000	*Mountain range*	Magas-Atlasz	1910	Hungarian translation	Plus an addition of the hyphen
					Magos Atlas	2019 (1862)	Typograph-ical error	"o" instead of an "a" for the Hungarian "Magas"
Algeria	**Béjaïa [Bedzsája]** بجاية	36.75587	5.08433	*Settlement, city*	Bugia	1840 1910	Foreign language influence	Portuguese influence
					Bougie	1937	Historical/colonial former name	French name
	El Menia [Goléa] المنيعة	30.71909	3.00376	*Settlement, village*	El-Golea	1896 1910	Historical/colonial former name	Plus an addition of the hyphen
					El Goléa	1937	Historical/colonial former name	
					El Golea	1897	Historical/colonial former name	Plus an omission of the accent
	Tamanrasset [Tamánrászet] تامنراست	23.55000	5.18333	*Settlement, city*	Font Laperrine	1937	Historical/colonial former name	"n" instead of an "r" for the French name
	Touggourt [Tuggúrt] تقرت	32.93315	6.34115	*Settlement, city*	Tuggurt	1868–1870	Foreign language influence	Might be Spanish influence
					Tugur	2019 (1862)	Typograph-ical error	
Tunisia	**Golfe de Gabès [Gábeszi-öböl]** قابس **خليج**	34.00000	10.41670	*Gulf*	Gabes ö.	2019 (1862)	Diacritical variation	+Shorter form of " öböl"
					Gábèsi öb	1937	Hungarian orthograph-y and pronunciat-ion patterns	
					Kis-Szirtisz	1962	Hungarian orthograph-y and pronunciat-ion patterns	Hungarian adaptation to "Lesser Syrtis"
	Kerkennah [Kerkenna-szk.] قرقنة	34.70965	11.18318	*Islands*	Kerkeris	2019 (1862)	Orthograp-hic/spellin-g variation or alternation	
					Kerkenis	1840	Orthograp-hic/spellin-g variation or alternation	
	Sfax [Szfáksz] صفاقس	34.74056	10.76028	*Settlement, city*	Sfaksz	2019 (1862)	Hungarian orthograph-y and pronunciat-ion patterns	– "sz" represents the /s/ sound, – The letter "x" is typically pronounced as /ks/

– Improved communication: It fosters accuracy and correctness in reference and communication by providing a standardized and methodical collection of toponyms. This is especially significant when dealing with different linguistic variations and historical changes.

– Concordance of variants: It facilitates cross-referencing and comparison, which allows for easy identification of different spellings, linguistic variations, and historical representations of place names.

– Comprehensive reference: It enriches the dataset's comprehensiveness, ensuring access to a wide range of toponymic representations. This comprehensive reference is invaluable for in-depth analyses and historical research.

5. Conclusion

This interdisciplinary study meticulously studied the record of Maghrebian toponyms on Hungarian globes spanning two centuries. The evolution of these representations over time was evident, from early generic terms to accurate nomenclature. The structured Toponymic Dataset of 297 toponyms, categorized by orthographic variations and historical contexts, provides an invaluable resource for researchers. It enhances the accessibility and utility of toponymic data, promoting effective research, reference, and communication in the field of geography and cartography.

References

Alasli, M. (2021). Maghrebian toponym variants in Hungarian school atlases. Geodézia és Kartográfia, 3 (June 2021), 29–36. https://doi.org/10.30921/GK.73.2021.3.6

Cantile, A. (2016). Place names as intangible cultural heritage: potential and limits. International Scientific Symbosium, March 2015, 11–16. https://www.igmi.org/++theme++igm/toponomastica/Place names Symposium 2015.pdf

Coates, R. A. (2006). Properhood. Languages, 82(2), 356–382. https://doi.org/https://doi.org/10.1353/lan.2006.0084

Gede, M. – Márton, M. – Ungvári, Z. (2011). Digital reconstruction of Perczel's globe. E-Perimetron, 6 (2), 68–76.

Földrajzi világatlasz. Cartographia Kft., Budapest, 2022.

International Cartographic Association. (2023). ICC 2021. Retrieved from https://icaci.org/icc2021/.

Lente, Zs. – Kecskés, B. – Márton, M. – Zentai, L. (2020). Digital reconstruction of a unique, giant globe. 8th International Conference on Cartography and GIS, 1, 1314-0604.

Márton, M. (1988). A Kartográfiai Vállalat földgömbjei. Geodézia és Kartográfia, 40(1), 42–48.

Márton, M. (2019). A perczel-glóbusz újraalkotásának legújabb fázisa. Geodezia Es Kartografia, 71(5), 18–27. https://doi.org/10.30921/GK.71.2019.5.3

Márton, M., Gercsák, G., & Zentai, L. (2021). The Perczel Project (2007–2019). Proceedings of the ICA, 4, 1–8. https://doi.org/10.5194/ica-proc-4-72-2021

Nemzeti Atlasz. (n.d.). Award. Retrieved from https://www.nemzetiatlasz.hu/en/award.html

Papp-Váry, Á. (1990). Az ICA 14. konferenciája. Geodézia És Kartográfia, 42(1), 7–24.

Mitxelena-Hoyos, O. – Amaro-Mellado, J. L. (2023). A Comparison of Cartographic and Toponymic Databases in a Multilingual Environment: A Methodology for Detecting Redundancies Using ETL and GIS Tools. ISPRS International Journal of Geo-Information, 12 (2). https://doi.org/10.3390/ijgi12020070

Oberhummer, E. (1924). The History of Globes: A Review. 101–112. https://doi.org/https://doi.org/10.2307/208358

Plihál, K. (2016). Nyomtatott magyar föld- és éggömbök 1840–1990. HM Zrínyi Nonprofit Kft. – Zrínyi Kiadó, Budapest.

Radding, L. – Western, J. (2010). What's in a name? Linguistics, geography, and toponyms. 100 (3), 394–412. https://doi.org/10.1111/j.1931-0846.2010.00043.x

Rofe, M. W. – Szili, G. (2009). Name games 1: Place names as rhetorical devices. Landscape Research, 34 (3), 361–370. https://doi.org/10.1080/01426390802242312

Sandin, A. (2016). Good Place-Name Practice: The Swedish Place-Names Advisory Board's Guide to the Standardisation and Preservation of Place-Names. Ortnamn og namnvård 6.

Uluocha, N. O. (2015). Decolonizing place-names: Strategic imperative for preserving indigenous cartography in post-colonial Africa. African Journal of History and Culture, 7 (9), 180–192. https://doi.org/10.5897/ajhc2015.0279

Ungvári, Zs. – Gercsák, G. – Márton, M. – Zentai, L. (2021). A new interactive gazetteer of Perczel's globe. Proceedings of the ICA, 4, 1–5. https://doi.org/10.5194/ica-proc-4-108-2021

Villette, J. – Purves, R. S. (2018). Exploring microtoponyms through linguistic and geographic perspectives. 21st International Conference on Geographic Information Science (AGILE 2018), 10–13.

Zelinsky, W. (1955). Some Problems in the distribution of generic terms in the Place- names of the northeastern United States. Annals of the Association of American Geographers, XLIII (December 2011), 319–349. https://doi.org/10.1111/j.1467-8306.1955.tb01491.x