ON THE DIGITAL REVIVAL OF HISTORIC CARTOGRAPHY: TREATING TWO 18TH CENTURY MAPS OF THE DANUBE IN ASSOCIATION WITH GOOGLE-PROVIDED IMAGERY

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Abstract

The great navigable Danube River (known as the *Istros* River to the Ancient Greeks and as one of the crucial ends of the Roman Empire northern territories) is an emblematic fluvial feature of the overall European historic and cultural heritage in the large. Originating in the German Black Forest as two small rivers (Brigach and Breg) converging at the town of Donaueschingen, Danube is flowing for almost 2850 km mainly eastwards, passing through ten states (Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria, Moldova and Ukraine) and four European capitals (Vienna, Bratislava, Budapest and Belgrade) with embouchure in the west coasts of the Black Sea via the Danube Delta, mainly in Romania. Danube played a profound role in the European political, social, economic and cultural history influencing in a multifold manner the heritage of many European nations, some of those without even a physical connection with the River, as it is the case of the Greeks, to whom the Danube is a reference to their own 18th century Enlightenment movement. Due to Danube's important role in History, the extensive emphasis to its cartographic depiction was obviously a *conditio sine qua non* especially in the 17th and 18th century European cartography. In this paper, taking advantage of the modern digital technologies as applied in the recently established domain of cartographic heritage, two important and historically significant 18th century maps of the Danube are comparatively discussed in view also to the reference possibilities available today in relevant studies by the digital maps offered by powerful providers as e.g. Google maps, Google Earth and others. The research is relevant to the studies carried out in the recent years concerning the presence of communities of the Greek Diaspora in the area, which were active in cities and towns

along the course of Danube especially during the 18th century, influencing the commercial navigation of this "multi-ethnical" river.

Introduction

The Danube River was considered in History as a *border* separating the level of geographic knowledge and territorial authority in the remote past. Later, until recently, this second longer river in the European continent, passing a variety of multi-ethnical geographies, was always the potential fluvial *carrier* of political and military power and antagonisms, of material goods and economic exchanges but also of various ideas and cultures in diversity. Today the Danube is passing from the lands of ten European countries, four capital cities (Figure 1) and from numerous major and minor well-known towns and cities e.g. Ulm, Ingolstadt, Regensburg, Passau, Linz, Vienna, Bratislava, Budapest, Novi Sad, Zemun, Belgrade, Kozloduy, Vit, Nikopol, Braila, Galati. The domination of this "mythical" River source of life, power and inspiration, happily inspiring until modern times prominent intellectuals (Magris, 1986), was obviously reflected in Geography and Cartography as an always major natural map-element in all cartographic representations of territories of Central and South-East Europe. This was not only due to its length (c. 2850 km, almost 22 degrees in longitude) and to its wide amplitude in latitude (c. 5,2 degrees), but also to its extraordinary overall broader importance which impelled cartographers to represent symbolically the Danube with the Figure of Neptune-Poseidon in a famous 18th century map cartouches.

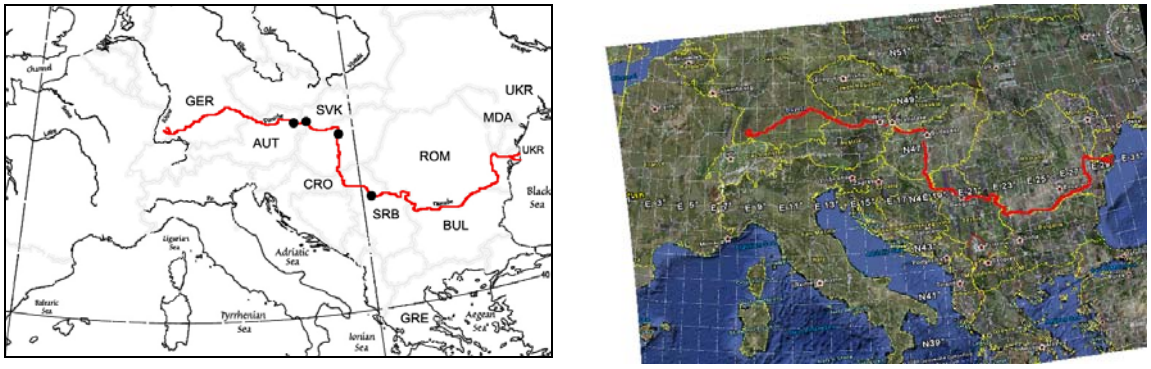

Figure 1. Left: The 2850 km long Danube River starts from the German town of Donaueschingen where converge two small Black Forest-rivers (Brigach and Breg) and ends at the Black Sea. The river is passing from the today's territories of ten European countries: Germany (GER), Austria (AUT), Slovakia (SVK), Hungary (HUN), Croatia (CRO), Serbia (SRB), Bulgaria (BUL), Romania (ROM), Moldova (MDA) and Ukraine (UKR). The black dots place the capital cities of Vienna (AUT), Bratislava (SVK), Budapest (HUN) and Belgrade (SRB). Right: In the Google Earth best fitted image.

The 18th century navigation in the Danube recalls the heavy Greek mercantile maritime tradition in the Black Sea and the surrounding sea-ways carried out especially by

islanders from the Ionian Sea, e.g. among other ship-owners the powerful and innovative Theofilatos family from Ithaca who ordered in English shipyards the first mercantile steamship in 1871. These active sea-merchants dominated the sea transport also in the Danube, especially after the Treaty of Kutchuk-Kaïnardji (today Kaynardzha in the Silistra Province of Bulgaria) between Russia and the Sublime Porte signed in 1774. Old maps depicting the Danube belong today to the Cartographic Heritage of many countries of the region around its fluvial course, but also to the Cartographic Heritage of countries in some distance from that river due to very specific and particular historical regions, as it is the case of Greece. A number of prosperous communities of the Greek Diaspora flourished especially in the 18th century along the Danube contributing in the social and cultural life of the local populations, e.g. in Vienna, Budapest, Belgrade and in many towns of the east provinces of Romania. Members of these Greek communities were among the pioneers of the Greek Enlightenment in 18th century and the Struggle of Greek Independence in the early 19th century, donators of cultural and educational goods (e.g. book and map collections) leading to the revival of many towns and villages in the northern Greek mainland, under ottoman rule at that time, as it is the case of towns especially in the northern part of the actual territories of Greece, especially in West Macedonia, Epirus and Thessaly (Url 1, 2009; Katsiardi-Hering, 2009). One of these towns is Kozani (Url 2, 2009), known from the texts of famous travellers like e.g. William Martin Leake (Leake, 1835) or Ami Bouè (Bouè, 1854), for the benefit of which prominent personalities of the Kozani Diaspora in Central and East Europe contributed for the establishment of an important and rich Library which is live since the 17th century. In this Library, the local municipality established in 2008 a Map Library section in order to document and promote the important backlog of old maps, atlases and geography-related books existing in this Library, sponsoring the relevant "Kozani Cartographic Heritage Experiment" (Livieratos et al., 2009). The book and map collections kept in the Library with direct reference to the Greek Enlightenment (Url 3, 2009), reflect the history and contribution of the Greek Diaspora in Central and East Europe and especially in the lands broadly influenced by the Danube River. Of particular importance of this Kozani cartographic collection are some rare maps and atlases published in Vienna in 18th century, sent to their home-town by Greek scholars and prosperous merchants leaving in Central Europe at that time. Among these maps and atlases we refer here e.g. the monumental twelve-sheet map of South-East Europe and Greece, the *Charta* by Rigas Velestinlis from 1796-1797 (Livieratos, 2008b, 2008c; Boutoura, 2008), the four-sheet world map by Anthimos Gazis from 1800 (Livieratos, 2008a), the first ever Austrian world Atlas by Franz-Anton Schrämbl prepared from 1787 to 1790 and published in 1800 (Dörflinger, 1981) and the seven-sheet Austrian map of the Danube, *Navigationskarte der Donau* by the military officers Ignaz Lauterer and Siegfried Tauferer from 1789 (Besevliev, 1975).

Following the philosophy developed in the last years in the frame of the ICA Commission on Digital Technologies in Cartographic Heritage (Livieratos, 2006a; 2009) a project relevant to the Danube was started in the Kozani Municipal Map Library (Url 4, 2009) in association with the "Kozani Cartographic Heritage Experiment".

Among the aims of this project is the high quality digitization of old maps depicting the Danube River and the development of actions related to the:

a. Research on the history of Greek Migration in the area,
b. Research on pure map history and on the map content relevant to the specific maps involved in the project,
c. Cartographic Heritage communication issues addressed to the general public and to the world of education in terms of map exhibition, publications and socializing.

For this purpose two available maps are used namely the three upper sheets of Rigas *Charta* depicting mainly the Danube areas and the almost ten years earlier *Navigationskarte der Donau.*

The digital concept in Cartographic Heritage

Digital cartographic technologies offered the grounds for a real and proper revival of historic cartography. This new reality is not only a challenge for modern cartographers who are familiar with the proper analytical tools which are potentially capable for the treatment of old maps and other issues relevant to the cartographic heritage in the large, but also a live opportunity for historians traditionally dealing with the history of cartography and maps to broaden their studies and in some cases to see things from a "different point of view". In addition, it is a challenge to socialize Cartographic Heritage by disseminating to the general public the value and the beauty of old maps and cartography objects in general, as objects of the overall world's cultural heritage (Figure 2). Based on the concepts and lines of work introduced in the frame of the ICA initiative for the implementation of digital technologies in cartographic heritage issues (Url 5, 2009), historic cartography finds new domains of investigation, revisiting from a new stand-point old, unknown and/or sometimes forgotten maps, masterpieces of cartography which are strongly related to the historical, cultural, social and economic history of people and communities of the past who somehow came in touch with these maps. In this way not only the beauty but also the technical and social importance of old maps may come to the centre of interest of the community and not only of history experts and skilled researchers or map enthusiasts.

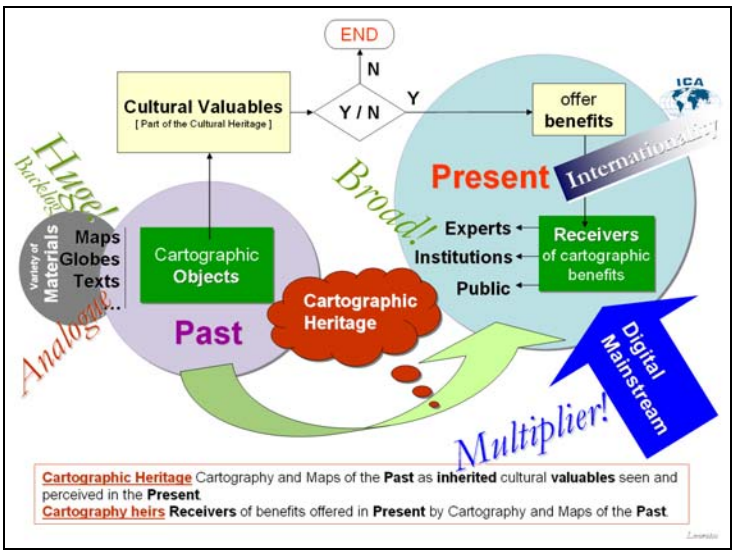

Figure 2. A pictorial summary of the Cartographic Heritage concept and the Digital impact, after Livieratos, 2009.

The Danube cartographic heritage project - Reasoning

Digital technologies offer thus the tools to revitalize the impact of cartography in the modern world (Figure 3). This is the case treated in the paper, for the "sake of the paradigm" but also for specific research interests related to the preparation of a forthcoming map exhibition in the frame of the "Kozani Cartographic Heritage Experiment": Two 18th century historic maps representing a top physical "monument" of the overall history of Central and Southeast Europe: The Danube River. The river which divided and brought close people of a great variety of social, economic, cultural, ethnic, religious or place of birth origins, in a very long course of history. The one map, *Navigationskarte der Donau,* is a product of the Central-Europe cartographic know-how, where Danube is the mapped fluvial carrier for geostrategy, applied geopolitics and trade, the other map, the Rigas *Charta,* is the outcome of the Southeast-Europe cartographic enthusiasm, and national patriotism where Danube represents an ideological border and the symbolic reference of the Southeast-Europe insurrection to the wealthy Greek Diaspora active in the areas in the vicinities of the ancient River. The two maps of almost the same period, stressing the representation of the Danube belong to completely different worlds of technological preparation and ideological ground. Digital cartographic technologies bring the two maps closer allowing quantitative and qualitative comparisons and insights which were almost impossible to gain in the pre-digital era. But further, they allow the direct and indirect communication of these worlds with the general public, thanks to cartography and maps, combining the knowledge with the message, the map aesthetics to technology.

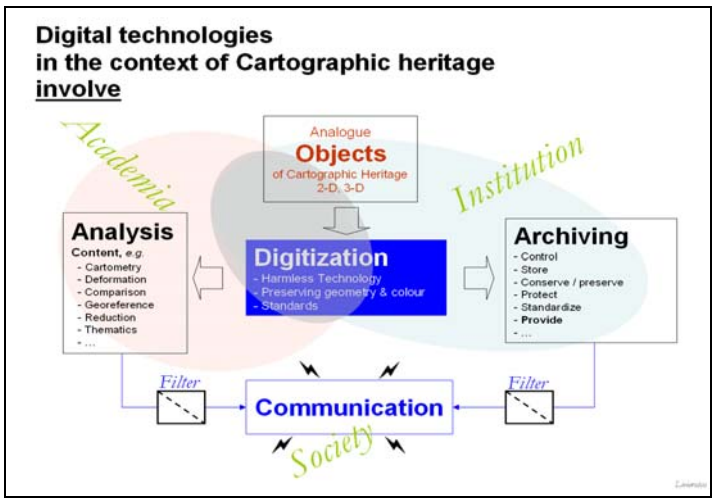

Figure 3. The decomposition of the Digital Technologies impact to Cartographic Heritage, in the components of Digitization (core element), Archiving, Analysis of content and Communication to the Society, after Livieratos, 2009.

Finally the connection with the today's world can be done for a manifold of applications (e.g. education, exhibitions, support of museums etc.) thanks to the Google-type of free provided imagery with which the general public is massively familiar or tend to familiarize soon. In this case, e.g., a visitor of the Danube space images needs twenty to twenty two consecutive image-frames, in about 30 km graphic-scale framing, to fly over the entire course of the River from its start at Donaueschingen to the embouchures at the Black Sea. In this way, the geography of the past and the present becomes a unity, thanks to the digital images of old maps and their modern counterparts obtained from space allowing rich relevant discussions in any level, from a technology-skilled panel to the classroom and from the relaxed exhibition space to the concentration screen of the expert.

The working plan

The historic maps (HM) used, are:

a. The *Navigationskarte der Donau*, Vienna 1789 in scale c. 1:200.000 (Figure 4), is depicting the Danube course from Semlin-Zemun (latitude 44° 48,5', longitude 20° 24,6') to the Black Sea,
b. The upper row three sheets of Rigas *Charta*, Vienna 1796-1797 in scale c. 1:600.000 (Figure 5, Figure 6) as an "independent" depiction of the Danube course from the Serbian village Kolut (latitude 45° 54,5', longitude 18° 55,8') to the Black Sea.

The modern internet provided space imagery (SI) used to assist the overall process is derived by the Google Earth free provider constructed in strip-form at the same scale.

The represented part of the actual Danube course in the *Navigationskarte* is shown in Figure 7 (Left), whilst that in the case of *Charta* is shown in Figure 7 (Right).

Figure 4. The map mosaic of the *Navigationskarte der Donau* seven-sheets. (Courtesy: Kozani Municipal Map Library).

Figure 5. The upper row three sheets of Rigas *Charta*, depicting the Danube. (Courtesy: Aristotle University of Thessaloniki Library)

Figure 6. Left: The twelve-sheet Rigas *Charta.* The upper three sheet strip depicts the Danube. Centre: The cartouche of Rigas *Charta.* Right: The cartouche of the *Navigationskarte der Donau*.

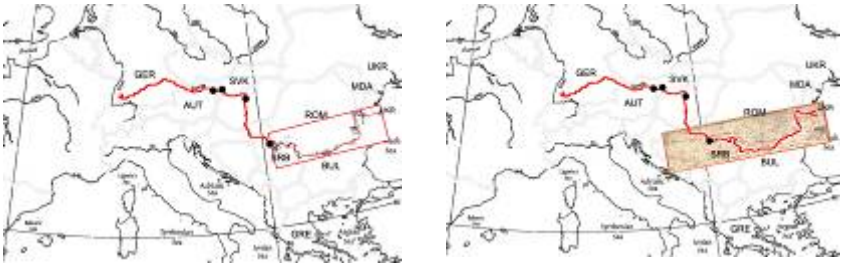

Figure 7. Left: The area of the actual Danube course covered by the *Navigationskarte der Donau* representation. Right: The area of the actual Danube course covered by the upper three-sheet strip in Rigas *Charta.*

The working plan of the Danube project based on historic cartography and assisted by SI is shown in Figure 8: The two HM are digitised following the basic requirements of the special digitisation processing concerning HM, i.e. the highest proper resolution, the lowest possible geometric content deformation and lower possible colour alteration and put in association with the relevant SI. The places of particular historic interest, along the course of Danube River, have identified in the HM with reference to available historic evidence (e.g. Semlin, Severin, Nikopoli, Ruszug, Silistria, Sulina etc) and properly georeferenced to the actual sites labelled also according to today toponymy (e.g. Zemun for Semlin, Ruse for Ruszug, Silistra for Silistria etc). Then, in cooperation with the expert historian the geo-placement of the sites of interest, properly backed with the relevant HM is linked with all available bibliography, textual and non-textual archives (transformed obviously in digital form), whilst the HM and the SI are put in one-to-one correspondence due to a proper best fitting transformation process (Boutoura & Livieratos, 2006), for independent map-content analyses (Figure 3), both of geometric (cartometric) and of thematic type. The two streams in the process namely the History-stream and the Cartography-stream are merged into a Geo-virtual documentation adequate for a manifold of applications and actions related to the communication component in the context of Cartographic Heritage (Figure 3).

A selective example

The working plan of the Danube project concerns a number of significant places along its fluvial course and the role they played in selected spans of history, e.g. the 18th century (figure 8). It concerns also their cartographic representation in HM, milestones of Cartographic Heritage. The shortage of space in this paper restricts the reference to one choice which is in any case mostly important: The Danube ancient town of Zemun (Url 6, 2009), today part of the Serbian capital greater-city of Belgrade, in its NW direction (Figure 9). Zemun was an important historical centre especially in the 18th century known as Semlin, a sort of a buffer place between the Austrian and Ottoman Empires. The *Navigationskarte der Donau* used in this study starts from Semlin. Semlin is reported also in the second map used, the Rigas *Charta* (in Greek lettering) as Rýtion (the ancient name) or Semlin or Zémona (Figure 10).

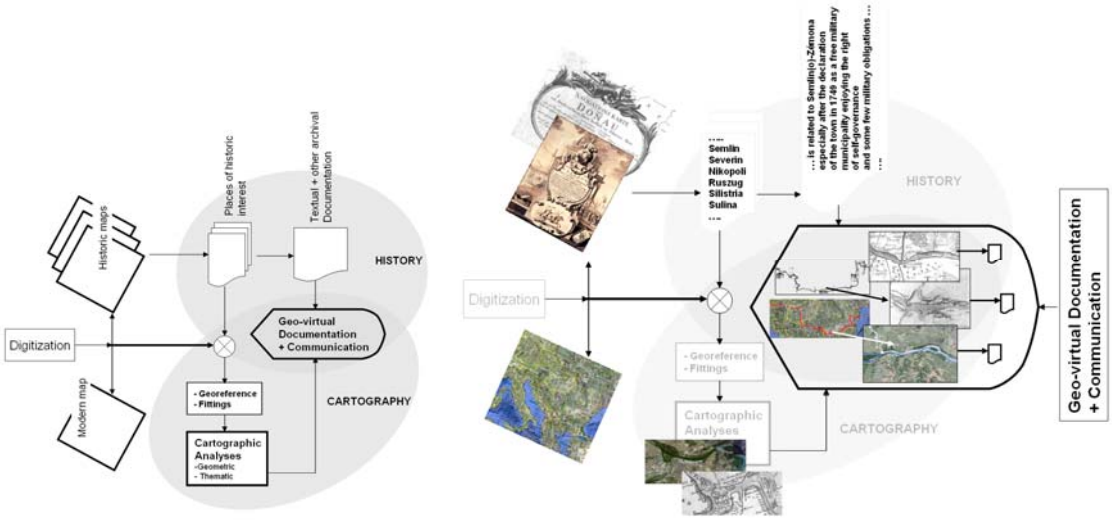

Figure 8. The working plan of the Danube project (left) and the example of Semlin (Zemum) (right).

Semlin is an important place not only for the Serbian heritage but also for the heritage of the Greek migration to Central and East Europe, especially in 17th and 18th centuries, and of their intense trade mobility. The Greek Diaspora is related to Semlin(o)-Zémona especially after the declaration of the town in 1749 as a free Austrian Imperial military municipality enjoying the right of self-governance and some few military obligations. Among the Semlin citizens who climbed high in the local administration (Katsiardi-Hering, 2009) was a number of persons of Greek origin, e.g. I. Kyritsas, K. Petrovich, P. Morfis who served as burgomasters. As far it concerns the judicature, the Greeks as Ottoman subjects obeyed the local courts, whilst the Greeks as Austrian subjects referred to Semlin's Austrian military administration for any dispute with the Ottoman authorities. Greeks financed the first Orthodox Church founded in the city (1752-1780), dedicated to Hagios Nikolaos (St Nicolas) and a second one in 1780 dedicated to Virgin Mary's Birth. Finally, the Greek emigrant Theodoros Apostolou funded by all means the construction of Archangels' chapel inside the pest-house of the city.

Figure 9. Zemun on the Danube, at the NW of the Google Earth SI depicting Belgrade.

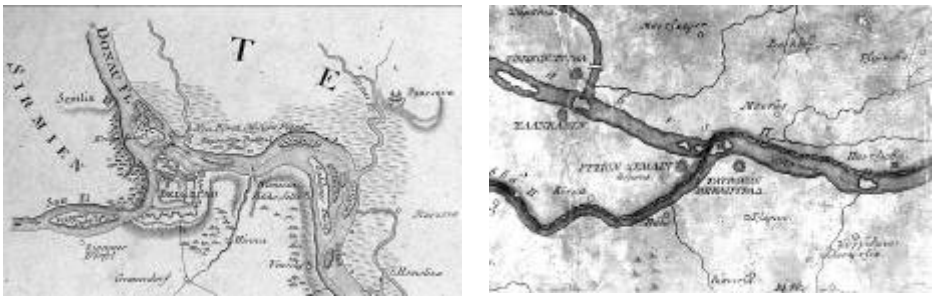

Figure 10. Left: Semlin in *Navigationskarte der Donau.* Right: Rýtion (the ancient name) or Semlin or Zémona in Rigas *Charta.*

Semlin had an important Greek community of 200-250 people in 1764, continuously growing (800 in 1816, 1000 in 1823) till the mid-19th century, when the Greek population in Serbia was little by little diminished. The town's Greek school, called "Hellenomouseion" founded in 1794, was organised in three levels: the elementary, the secondary and the tertiary school, appealing pupils from the Serbian and Hungarian communities of Semlin, the neighbouring Belgrade and other cities, thanks to its library and high level of studies. The members of Greek communities within Austrian Empire were mostly merchants. Especially in the broader area of today's former Yugoslavia, Greek merchants were holding the trade with Ottoman Empire. Among them, the retailers (wandering vendors or owners of small shops), the wholesale merchants (mostly cattle dealers) and finally the commissioners, most of them seated in Semlin, dealing with transportations from Balkans and Near East to Central and West European countries. Through the fluvial transporting networks of Danube and its feeders, as well as the road networks, through Belgrade and Semlin (where the merchandise were recorded and decontaminated), Greek merchants were transporting goods to Adriatic coasts and Black Sea and domestic animals from Serbia to Central Europe and Italy. It is confirmed that many members of Semlin's Greek community, derived from several ranks, knew about Rigas' patriotic activism (the author of his *Charta* used here) for the independence of Greece and the Balkan Peninsula.

Given all these, the geo-virtual documentation and communication interface of the Danube project is related to the georeference processes of the HM to the SI counterpart (Figure 10) on which a number of implementations can built up, in the intersection domain between the History component (as shown above in the Semlin-example) and the Cartography component of the project (Figure 8).

Figure 10. The *Navigationskarte der Donau* area of Semlin best fitted under conformality / similarity (Left) to the relevant Google Earth SI (Right).

Conclusions

In this paper an example of good practice is given, in a synthetic form, on how digital technologies can or could contribute in a revival of historic cartography, in the context of the principles of Cartographic Heritage and according the scheme given in Figure 8. The key-study used here is based on the use of two 18th century historic maps (HM) of the Danube (of different typology and intellectual origin) in association with Google-provided imagery (SI). It is shown how the elaboration of the HM with respect to available historic evidence concerning the political, military, commercial, social and cultural life along the Danube combines History with Cartography and vice-versa offering more as an adding value the international dimension in the historic and geographic heritage of people who interacted in this important area of the overall European natural and cultural legacy.

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Url 6 (2006), see for a brief reference in Wikipedia, especially the enriched French http://fr.wikipedia.org/wiki/Zemun and the Italian versions (interchange in the wiki address "fr" with "it").