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The Paraguayan War: Geotourism and War Tourism Proposal

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ABSTRACT

The Paraguayan War (1864 – 1870) was the biggest war in South America and directly involved four countries: Paraguay, Brazil, Argentina and Uruguay. Currently, this war is a subject of debate and of great interest to researchers, historians and aficionados not only in the four countries involved, but in many others around the world. Based on the enormous interest that this war arouses and the emergence of new areas of tourism that have been gaining adherents around the world and boosting the economy of several places that were previously little visited, it was proposed the integration of war sites that include monuments, museums, archaeological finds and natural parks in the tourist portfolio of Paraguay. To support this research, an extensive historical bibliography was consulted and cited to outline the main events within the Paraguayan territory following the chronology of the conflict. After this historical verification, the main monuments found were located and georeferenced, which were transported to a GIS environment (QGIS software) where unpublished maps were generated with the help of satellite images and SRTM images (NASA). The results obtained show that it is totally feasible to implement these types of tourism in Paraguay, which could generate more development and income, especially in areas where the war was fought.

Keywords: Cerro Corá National Park; Vapor Cué National Park, Ybycuí National Park.

A Guerra do Paraguai: Proposta de Geoturismo e Turismo de Guerra

RESUMO

A Guerra do Paraguai (1864 – 1870) foi o maior conflito bélico da América do Sul e envolveu diretamente quatro países: Paraguai, Brasil, Argentina e Uruguai. Atualmente, esta guerra é um assunto de debate e de grande interesse para pesquisadores, historiadores e aficionados não apenas nos quatro países envolvidos, mas em muitos outros ao redor do mundo. Partindo do enorme interesse que esta guerra desperta e do surgimento de novas áreas do turismo que vêm ganhando adeptos em todo o mundo e impulsionando a economia de vários locais antigamente pouco visitados, foi proposto a integração dos sítios de guerra que abrange monumentos, museus, achados arqueológicos e parques naturais no portfólio turístico do Paraguai. Para fundamentar esta pesquisa, uma extensa bibliografia histórica foi consultada e citada para traçar os principais acontecimentos dentro do território paraguaio seguindo a cronologia do conflito. Após essa verificação histórica, procedeu-se a localização e georreferenciamento dos principais monumentos encontrados que foram transportados para um ambiente em SIG (software QGIS) onde foram gerados mapas inéditos com o auxílio de imagens de satélite e imagens SRTM (NASA). Os resultados obtidos mostram que é totalmente viável a implantação desses tipos de turismo no Paraguai, o que poderia gerar mais desenvolvimento e renda, principalmente em áreas onde a guerra foi travada.

Palavras-chave: Parque Nacional Cerro Corá; Parque Nacional Vapor Cué, Parque Nacional Ybycuí.

Introduction

Tourism is considered an industry where wealth is generated through the entry and circulation of capital and people. In this sense, proposing public policies in partnership with organized civil society is fundamental for the

development of tourism in its most varied areas. The economy feels the effects of tourism through the income generated, the creation of jobs, the increase in public revenues and the promotion of business activity (Sancho, 2008).

The last statistical data provided by the *Secretaría Nacional de Turismo* of Paraguay dates

from 2017, when 1,583,937 tourists entered the country, representing an increase of 21.08% compared to 2016 (SENATUR, 2018). For comparison purposes, in 2017 Brazil received a total of 6,588,770 (Brasil, 2018). It should be noted that in 2017, Paraguay received 4,744,203-day trippers who go to the country just to shop and then return to their countries. These excursionists are mainly Brazilians and Argentines (SENATUR, 2018).

However, according to Schmid and Cabral López (2018), this situation is beginning to change due to the fact that the Paraguayan tourism offer is expanding, especially with regard to the natural environment and the appreciation of historical sites. As evidence of this change, we highlight the creation of the *Secretaría Nacional de Turismo* in 1998 - SENATUR, which was established by Law No. 1.388/98. This regulation specifies in its article 2 that among the functions of this secretary of state is the promotion of national and international tourism and the dissemination of cultural and ecological tourism, among others (Schmid and Cabral López, 2018).

Based on these premises, the “*Plano Director de Desarrollo Sostenible del Sector Turístico* of Paraguay” (2012 - 2018) was organized. This document expresses the country's touristic vision, which was linked to elements such as: the organization of events and conventions, the promotion of its nature and the dissemination of indigenous culture, emphasizing environmental sustainability and valuing tourism as one of the main productive sectors of the country (SENATUR, 2012).

Based on the growth of tourism in Paraguay relating to the greater appreciation of natural environments and historic sites and on the elaboration of the master plan for the sustainable development of the tourism sector, this research proposes the insertion of geotourism and war tourism in the country's tourism portfolio.

Geotourism is a new form of tourism that has gained many followers around the world. Nascimento et al. (2008) define geotourism as a segment of tourist activity that has geological and geomorphological heritage as its main attraction, promoting its dissemination and the development of Earth Sciences. This type of tourism is still very restricted in Paraguay, however there is already the work of Gadea and Benitez (2018) that proposes points of geotouristic interest throughout the country. Brazil is a great reference in scientific works on geotourism (Silva, et al. 2021; Meira et

al. 2021), as well as Portugal (Catana and Brilha, 2020), Italy (Liso et al. 2020) and China (Han et al. 2018).

Bento et al. (2020) made a comparison between geotourism and ecotourism addressing similarities and differences. These authors state that it is prudent to offer both in the same portfolio, providing the interested party with a more holistic view. Conti et al. (2021) framed geotourism in the scientific tourism class and showed that this type of tourism and associated research has been growing in Brazil and in the world.

Duarte et al. (2020) spoke about the potential of geotourism in sustainable development and territorial development, opening the possibility of increasing employment and income in areas still little explored by conventional tourism. The authors report the expansion of this type of research, both by geographers and geologists highlighting its transdisciplinary character as it involves not only issues related to Earth Sciences but also questions of regional economic development, social inclusion and territorial management.

War tourism is actually putting the visitor in contact with places where conflicts and battles occurred, and which currently preserve fragments of these episodes as a way to keep alive part of its history, through museums, monuments, cemeteries, sites archaeological, among other elements of the landscape related to the war (Fraga, 2002).

On war tourism, there are no works published in Paraguay. However, war tourism is already widespread in some countries such as France (Iles, 2018), Croatia (Rivera, 2008; Horvat, 2013), Italy (Capuzzo, 2020), Japan (Elliott and Milne, 2019) and Vietnam (Henderson, 2000) and can be very well implemented in Paraguay, which was the main stage of the biggest war that ever to take place in South America.

Wars and conflicts sometimes give rise to a particular form of tourism, leading some people to visit its direct remains, such as battlefields, or indirect ones, such as memorials, museums, cemeteries, etc. (Lauwers, 2011). This pervasive impact of war figures prominently in tourist engagement with memories, monuments, and travel to places of war and conflict fosters popular interest in historic landmarks and is closely related to issues such as people's belonging and identity (Smith, 1996).

The growing war tourism interest in European countries, United States, Japan, Vietnam

and North Korea has also led to numerous works on battle tourism, understood as a form of travel to places of historical importance. When combined, heritage and tourism result in a particular type of trip that aims not only to explore the unknown or the exotic, but to learn, celebrate and show its relationship with the past (Porter, 2008).

To illustrate, Bessiere and Young-joo (2021) focused on one specific location, a cold war relic that attracts thousands of tourists annually: the Korean Demilitarized Zone (DMZ). This site is on the border between North and South Korea and is still a zone of international tension today.

On the same vein, Joyce (2019) addressed tourism in Dubrovnik, Croatia's most touristy city, which although having its coastline as main attraction, is drawing the attention to sites related to the war that fragmented the former Yugoslavia that are of great interest to international tourists. Therefore, Dubrovnik incorporates war tourism, increasing its tourist potential, which is exactly what this work aims at, to add war tourism and geotourism to the Paraguayan tourist portfolio.

The Paraguayan War, also known as the Triple Alliance War, was the largest war in South America, directly involving Brazil, Argentina and Uruguay against Paraguay. The conflict broke out in late 1864 and lasted until March 1870. Although the data is not accurate, it is estimated that 285,000 Paraguayans among military and civilians, 50,000 Brazilians, 18,000 Argentines and 5,000 Uruguayans died (Doratioto, 2002).

Paraguayan historians believe that the number of Paraguayans killed was much higher. Mendoza (2010) describes that the war may have claimed the lives of up to 69% of the Paraguayan population, with the surviving male population being restricted to children, war invalids and the elderly.

Battles took place in Brazil and Argentina, but the biggest and bloodiest battles took place in Paraguayan territory. In this sense, this research proposes the insertion of geotourism and war tourism only in Paraguayan territory, addressing the three main campaigns (phases) of the war, which are the campaigns of Humaitá (1866 – 1868), Pikysyry (December 1868) and Cordillera (1869 – 1870).

The invasion by Brazilian troops to the Laguna farm, through the state of Mato Grosso, although it took place in Paraguayan territory, was not relevant to the war and, therefore, will not be covered in this article.

It should be noted here that this article paper is the result of a partnership between Brazilian and Paraguayan researchers, and that it is geographical rather than historical aiming to seek support for the implementation of geotourism and war tourism exclusively in Paraguayan territory. Therefore, discussions related to the causes and consequences of the war will not be presented, as well as geopolitical issues related to the Plate River basin that preceded the conflict. To support this research, an extensive historical bibliography was consulted and cited to outline the main events within the Paraguayan territory following the chronology of the conflict.

Location of study area

Paraguay is a continental country without direct access to the ocean, bordered on the north by Bolivia, on the east by Brazil, and on the west and south by Argentina. Its main access to the sea is through the Paraguay River, which practically cuts the country from north to south (Figure 1).

The extension of the Paraguay River within the country is 1,017 km and divides Paraguay into two regions: to the west, Chaco and, to the east, Paraneña due to the influence of the Paraná River which is a natural border with Argentina (South and Southeast) and with Brazil in a stretch to the east between the cities of Salto del Guairá and Ciudad del Leste (INE, 2019).

Brief geological and geographical characterization of Paraguay

Paraguay is a country with a predominance of Quaternary sedimentary terrains (1.8 Ma) and older sedimentary terrains belonging to the Paraná Sedimentary Basin dating from the Cretaceous (66 Ma) to the Ordovician (470 Ma) (PNUD, 1986). These characteristics give the country a predominantly flat relief formed by wide floodplains with meandric rivers liable to overflow in the rainy season.

The non-flat areas are formed by modest altitudes derived from the erosion of sedimentary rocks of the Paraná Sedimentary Basin. The highest point is the Tres Kandú hill, located in the Department of Guairá with 842 meters of altitude, which has a tabular top. There are no recent geological folds in Paraguay that could generate *stricto sensu* mountain ranges, such as the Andes Mountains, for example. The highest peaks in Paraguay have

tabular tops formed mostly by sedimentary rocks dissected by long erosive processes. Extensive outcrops of the Serra Geral Formation also occur in Paraguay, located mainly in the southeast and east of the country. This formation consists of magmatic rocks related to fissural volcanism events (spills) and volcanic intrusions that cover a large part of the Paraná Sedimentary

Basin (Bartorelli, 2005). The main rocks formed from these flows are Basalt and Diabase. These rocks, due to their erosive resistance, collaborate in the formation of many elevations in Paraguay, such as the highest reliefs in the east and southeast of the country, such as Tres Kandú hill (Figure 2).

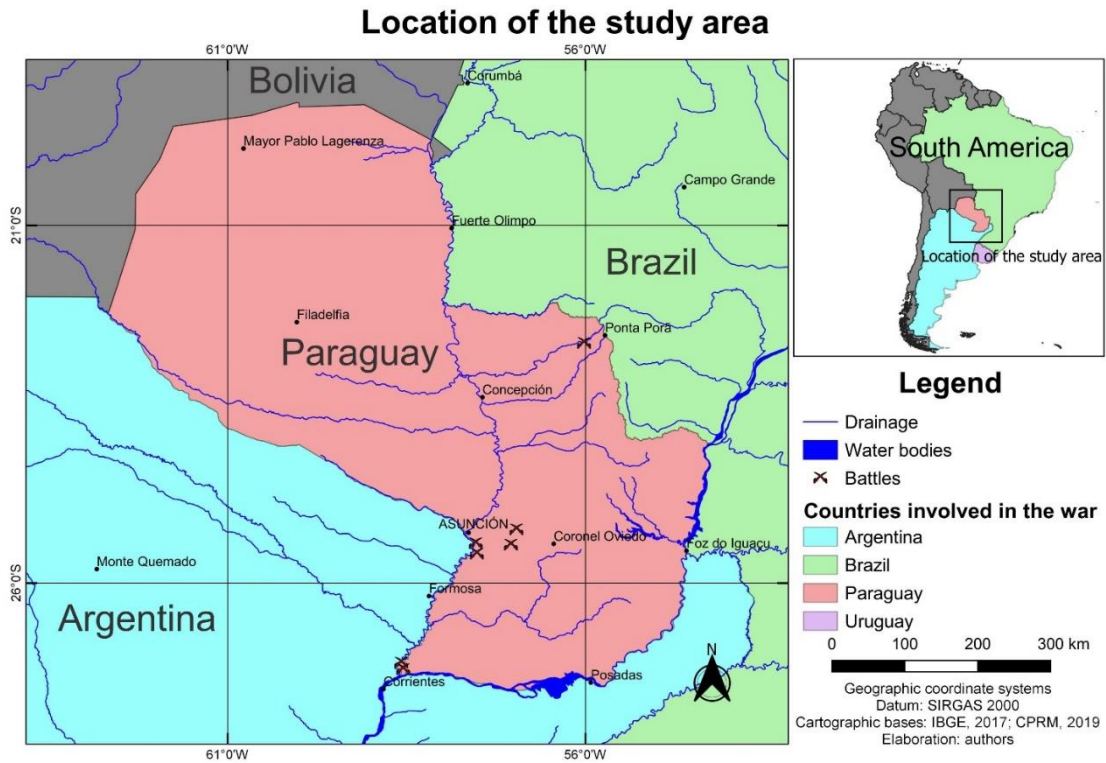


Figure 1. Map of Paraguay showing main battles location. To the south of the country Humaitá Campaign battles. To the south of Asunción, Pikysyry Campaign battles. To the west of Asunción and in the vicinity with the city of Ponta Porã Cordillera Campaign battles.

The tropic of Capricorn practically cuts the Paraguayan territory in half and therefore most of the war was fought south of this tropic in a humid subtropical climate. Climatic data from Asunción indicate an average temperature in the capital of the country of 22.7° C with an average rainfall of 1,420 mm/year, which is considered quite rainy (INE, 2015).

The coldest months coincide with the driest months which are June, July and August. The hottest months are: December, January and February and the wettest months are: January, February and March (INE, 2019). Polar cold waves

are common in Paraguay, not only because of its geographic position, but also because of its flat relief without orographic barriers, where the broad valley the Paraguay river is located, favoring the advance of the polar masses.

On August 21, 2020, 1.2° C was registered in Asunción and -0.8° C in Pilar, capital of the Department of Ñeembucú (La Nación, 2020). It was in the Department of Ñeembucú that the hardest and bloodiest phase of the Paraguayan War took place, the Humaitá Campaign.

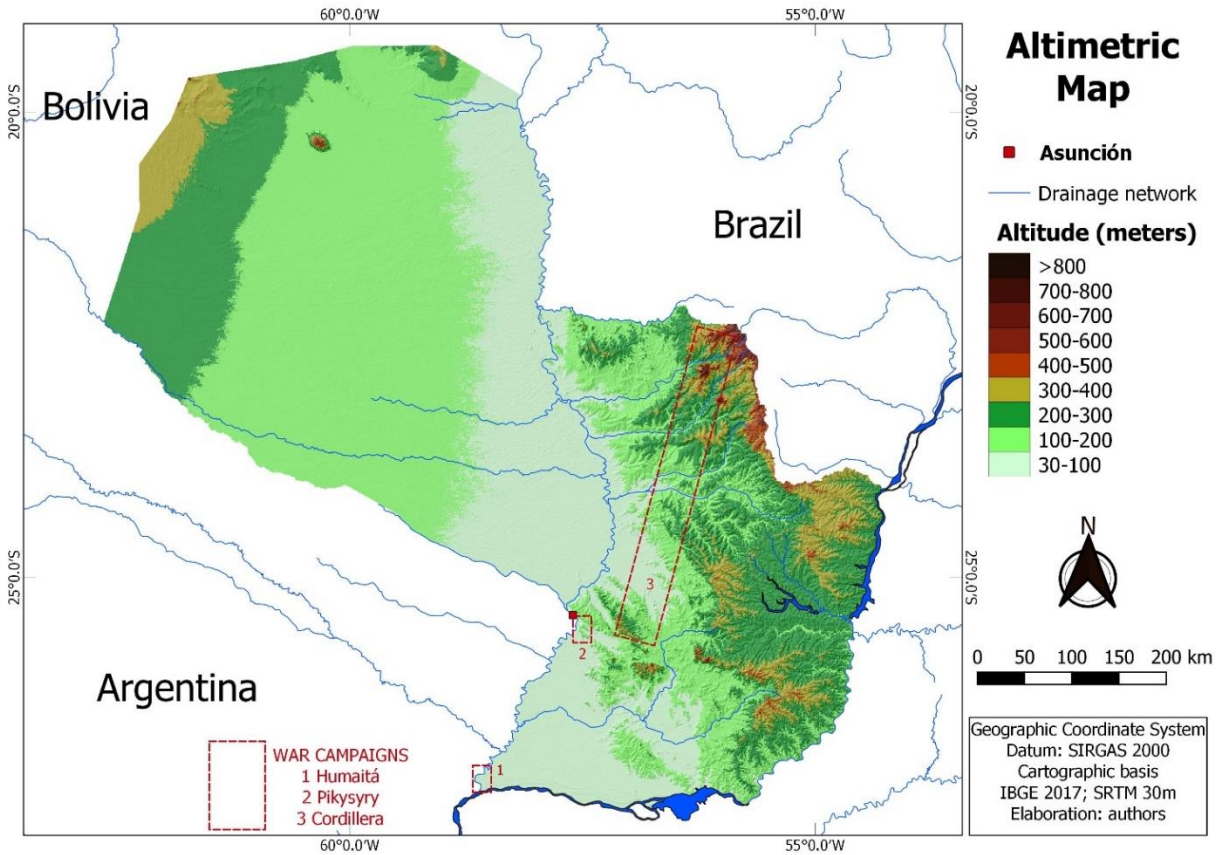


Figure 2. Paraguay's altimetric map with the areas related to the Humaitá (1), Pikysyry (2) and Cordillera (3) campaigns.

Methodology

The search for official information and data about Paraguay is not a simple and easy task. Many public agencies do not have a webpage, and when they do, there is not much information available or contact channels. Contacts with various agencies through e-mail were attempted, but most of the time without success. The bibliography on geographic and environmental aspects of Paraguay is also very scarce. Searches were made in the scientific portals Google Scholar and ResearchGate.

To systematize and organize the survey of geographic, environmental and historical data, the proposal developed by Libault (1971) was adopted, which suggests a rigorous structuring of research in which a beginning, a middle and an end are systematically established.

This author defines four levels in the elaboration of a geographic research: (a) compilation level - collection and organization of available data relevant to the research, (b) correlative level - stage of information comparisons, aiming to establish significant

correlations to the development of the work; (c) semantic level - the interpretation of data selected and correlated in the previous steps is performed, the phase being marked by the transformation of the findings previously elaborated. The last level is normative (d) where the results are translated into usable norms. It refers to the construction of the final research model.

Following these assumptions, extensive bibliographical research was conducted on the history of the Paraguayan War and its development to discover remarkable facts strongly correlated with the physical geography of Paraguay. At this same stage (compilation level), the following items were sought: (i) books and articles on the war, (ii) data from official agencies of the Paraguayan government, (iii) scientific bibliographies on geographic, geological, environmental and tourist issues, (iv) information on public and private websites, documentaries, and videos about the war and places where the main battles took place.

With the general knowledge of the geographic sites of the main battlefields within the Paraguayan territory, the search for monuments, museums and archaeological artifacts strictly related to the battlefields was conducted. Without a

doubt, this was the most laborious phase of the entire research, given that these data were collected one by one through systematic scanning of satellite images from Google Earth Pro, documentaries, newspaper photos and YouTube videos. Afterwards, precise location and georeferencing of each site was performed and, subsequently, such sites were plotted on the maps produced in this research. In total 16 sites related to the war were found and georeferenced. Therefore, the research will only address the battles and events related to the sites found.

The next step was producing thematic maps that show precisely the battlefields, monuments, museums and archaeological artifacts found in this research. A detailed altimetric map of Paraguay was also generated (Figure 2), using orbital images from the Shuttle Radar Topography Mission (SRTM) sensor with a resolution of 30 m available on the United States Geological Survey website. For the elaboration of all maps, the QGIS software version 3.12 was used. Georeferenced images from Google Earth Pro were also used to produce some maps. The distances between battles, monuments, national parks and cities were verified using QGIS software version 3.12, Google Earth Pro and Google Maps.

With all the standardized and mapped data, a tourist route was proposed, passing through the main battlefields, museums, natural parks and archaeological findings. It begins, therefore, with the invasion of Allied troops crossing the Paraná River, near Paso de Patria, Department of Ñeembucú, and ends with the death of Marshal Francisco Solano López, in Cerro Corá in the Department of Amambay, near the city of Pedro Juan Caballero, border with Brazil.

Results and discussions

Humaitá Campaign

With the defeat of Paraguay in the Naval Battle of Riachuelo on June 11, 1865, on the Paraná River, near Corrientes in Argentina, and the surrender of troops in Uruguaiana (Brazil), in the

first days of November 1865, the Paraguayan army left the city of Corrientes and returned to Paraguay. With the withdrawal of the Paraguayan army, plans began for the invasion of Paraguay by troops from the Triple Alliance formed by contingents from Brazil, Argentina and Uruguay. Among the preparations for the invasion was the constant bombardment by the Brazilian navy against Itapirú Fort, already in Paraguayan territory.

On April 16, 1866, the allied armies invaded Paraguay crossing the Paraná River. According to Doratioto (2002), discounting the sick and crew of the ships that assisted the invasion, the allied army had 42,200 soldiers, 29,000 Brazilians, 11,000 Argentines and 2,200 Uruguayans. Marshal Solano López launched counterattacks, but they were repulsed by General Osorio, who defeated the defenses of Itapirú Fort and a week later conquered the village of Paso de Patria where Solano López had set up his headquarters and had ordered the total evacuation of the village days earlier.

Even so, the advance of the Triple Alliance troops was stopped in the first major battle of the war, in Estero Bellaco, on May 2, 1866, considered the first major battle in Paraguayan territory with more than 1,000 deaths on both sides (Hooker, 2008). Estero Bellaco is located just 3.5 km north of Paso de Patria (Figure 3).

After the battle of Estero Bellaco, the allies found it very difficult to advance, due to the precariousness of their mobility equipment, deficiency of provisions, and total lack of knowledge of the terrain. It was only on May 20 that the troops began advancing into the interior of the country and after only 1.2 km they found the existence of drier terrain favorable to the installation of a camp. On the same day, the Brazilian Engineering Battalion began the construction of a base camp, with defensive lines composed of numerous artillery pieces, in order to block the road, therefore initiating the phase known as the war of positions, which would extend during the next two years (Doratioto, 2002).

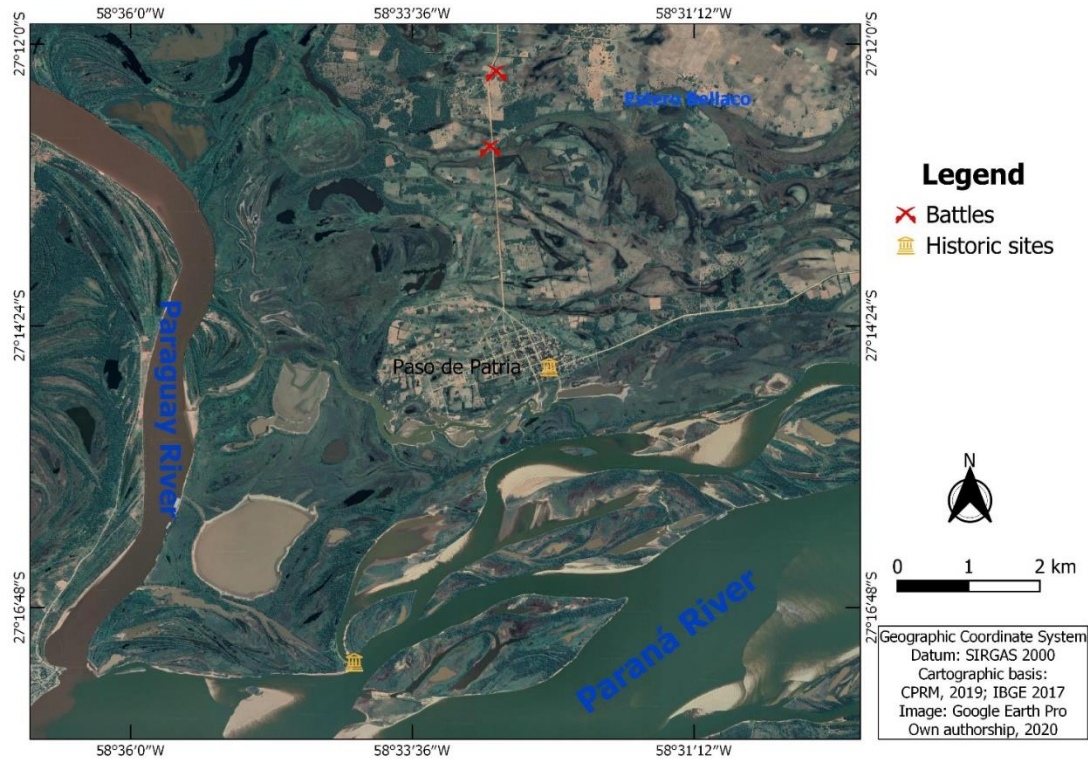


Figure 3. Map of Paso de Patria and surroundings. Historical sites: Itapirú Fort (south) and Paso de Patria Museum in the urban site. Battles: Estero Bellaco (south) and Tuyutí (north).

The Humaitá Campaign is without a doubt the bloodiest phase of the entire war. The camp became known as the Tuyutí camp and is only 16 km away from the Fortress of Humaitá, which at that time was the main objective of the allied troops. On May 24, 1866 Paraguayan troops attacked the Tuyutí camp by surprise, starting the biggest and bloodiest battle ever fought in South America. According to Doratioto (2002) 32,000 allied soldiers, 21,000 of which were Brazilians, 9,700 Argentines and 1,300 Uruguayans faced 24,000 Paraguayan soldiers and officers.

Although all accounts narrate real carnage, the truth is that the exact number of deaths will never be known. An estimated 6,000 Paraguayans lost their lives against 1,000 killed on the side of Allied troops. Many wounded did not resist the injuries due to the poor local conditions and died of infection in the following days as a result of injuries and the cold.

The precariousness of the camp also had repercussions on the destination of the bodies of soldiers killed in battle and who died over time. The Tuyutí camp is completely seated in a quaternary accumulation plain. These lands consist of unconsolidated sands and clays with poor natural drainage. The massive burial of bodies in this terrain type certainly provided a slow decomposition due to excess water in the sediment

pores and low oxygenation which makes decomposition more difficult. This environment may have caused the process of cadaveric saponification, as seen in the Bengui and Tapanã cemeteries in Belém do Pará, Brazil, which resulted in groundwater contamination (Nascimento, 2009).

According to a narrative by Dionísio Cerqueira, who actively participated in the war, the troops continued to drink yellowish water taken from shallow water holes that was polluted by the vicinity of corpses (Cerqueira, 1980). Another factor for the rapid spread of cholera that severely affected Allied and Paraguayan troops may be linked to the pits used by the troops to fulfill their physiological needs. Both the burial of corpses and the pits in swampy and poorly drained land are potential spreaders of pathogens. According to reports by General Pimentel, the Paraguayan corpses in Tuyutí were initially buried and then incinerated due to the high amount (Pimentel, 1978).

After the Battle of Tuyutí, allied troops were stationed in the region for 1 year and 9 months. During that period, there was a phase of demarcation of positions where there was no advance by the Triple Alliance troops, but constant occasional conflicts with the Paraguayan army,

with the battles of Curuzú, Curupayty and the second Battle of Tuyutí being the main ones.

This phase of the Humaitá Campaign is represented in this research by: (i) a naval base of the Paraguayan Navy (Naval Base of Itapirú) which occupies the same location as the former Itapirú Fort, (ii) Museum of Paso de Patria which houses a huge collection of artifacts from the war, as well as other objects that depict daily life in the Tuyutí camp and (iii) two monuments that mark the locations of the battles of Estero Bellaco and Tuyutí (Figure 3 and 4).

Currently, the Itapirú Naval Base (Figure 4a) has become an island due to fluvial dynamics and access is made by boat with authorization from the Paraguayan Navy, which can be obtained from the Naval Prefecture of Paso de Patria. The Itapirú Fort was the first line of defense of the Paraguayan army during the invasion of the Allied troops.

The museum in Paso de Patria is housed in an old house preserved in the city of the same name, which served as the headquarters for Solano López until the invasion of allied troops into Paraguayan territory. Data on the museum's collection are non-existent, but as researched in documentaries, in YouTube videos and on the museum's Facebook page, the number and variety of pieces are impressive. Among the pieces, there are swords, cannon balls, bottles, spurs, metallic pieces of military uniforms, etc.

It is quite interesting the huge amount of perfume bottles found, which suggests the female presence in the Tuyutí camp, which was located just 4.5 km from Paso de Patria. As of the date of this article the museum is maintained by Mr. Vicente Garcia who is an amateur archaeologist and has a deep knowledge of the region where he routinely digs to find new pieces (Figure 4b).

Leaving the city of Paso de Patria towards the north, on a dirt road, after 3.3 km you will find the Monument to the Battle of Estero Bellaco a few meters from the roadside (Figure 4c). It is a simple monument, but with a high historical content, as this was the first major battle in Paraguayan territory. It is interesting to note that the monument is slightly inclined, probably due to the presence of clayey soils, typical of the region. Clay soils are commonly plastic and constructions on this type of soil need special attention in their foundations. The site is on the banks of an *estero*, which is a large swampy area that is usually filled with water by rain or by the overflow of a river or lake during the flood season.

Following the same road towards the north, in 1.2 km you will find the Monument to the Battle of Tuyutí (Figure 4d). It is a more imposing monument than Estero Bellaco's, but even so, very shy for what it represents. Analyzing the map of Paso de Patria and surroundings (Figure 3), it can be seen that this is a dry area, already outside the inundation area of the *esteros*, very common in the area.

After the Battle of Tuyutí, allied troops were stationed at the camp, making incursions into the region. An Allied war council decided to use the Brazilian Navy to bomb Curupayty Fort on the banks of the Paraguay River. Earlier, the Brazilian Navy began bombing Curuzú Fort, which was 3 km away, downstream from Curupayty, on September 1, 1866. On September 3, Curuzú Fort was invaded and the defenders fled through the swamp being pursued by allied troops to the vicinity of Curupayty Fort.

On September 22 at 7 am the Brazilian Navy began with a bombardment of Curupayty Fort that lasted until noon, but with little effect. According to Doratioto (2002), the commander of the Brazilian squadron Admiral Tamandaré, believing that he had sufficiently prepared the ground, gave the signal for the ground forces to attack the Paraguayan positions. Allied troops faced heavy Paraguayan artillery fire that culminated in heavy casualties among Allied troops, who slowly advanced in dense formations across the marshy terrain. Only 60 men from the Allied army managed to get close to the walls of the Paraguayan fort, but they were quickly killed (Hooker, 2008).

After Curupayty's defeat, Argentine president Bartolomeu Miter walked away from the front that was taken over by Marshal Luís Alves de Lima e Silva, (also known as Caxias) on November 19, 1866. Caxias regrouped and organized the allied troops and requested reinforcements from Brazil, keeping the allied army in the Tuyutí region for more than a year, preparing the troops for future attempts to destroy the Curupayty Fort and advance on the Fortress of Humaitá. During this period the camp grew and became a city of more than 60,000 people, with shops, bars, games rooms, a church and even a bank.

After this period of stagnation of allied troops in southern Paraguay, where only punctual confrontations occurred on the front lines, a passage of the Brazilian armada through Curupayty Fort was planned. In the early hours of August 15, 1867, the navy began an intense bombardment,

dropping 665 heavy projectiles on the fortifications of Curupaty. At 6 am, the fleet weighed anchor and sailed against the current, and after two hours the imperial fleet successfully forced its way

through by dropping anchor between Curupaty Fort and the Fortress of Humaitá.



Figure 4. a) Itaipirú Naval Base, b) Museum of Paso Patria, c) monument to the Battle of Estero Bellaco, d) monument to the Battle of Tuyutí.

Sources:

Figure 4a: Facebook of *Esto es Pilar News*

<https://www.facebook.com/diarioestoesPilar/photos/pcb.1643901062548585/1643901009215257>

Figures 4b, 4c and 4d: Facebook of Paso de Patria Museum

<https://www.facebook.com/photo.php?fbid=1022920441152043&set=pb.100003022890876.-2207520000..&type=3>

Under Caxias' command, operations focused on the siege of the Fortress of Humaitá, while the squadron remained divided, part stationed in front of Curuzú Fort and a division anchored beyond Curupaty Fort, a mile and a half downstream from Humaitá.

Francisco Solano López took advantage of the delay. Prevailing the nights during the months that followed, he gradually evacuated to Humaitá some of the troops besieged at Curupaty. Curupaty Fort was taken by Allied troops on March 23, 1868.

The new objective of the allied forces would be to besiege the powerful Fortress of Humaitá and force a passage across the Paraguay River with the support of new Brazilian Navy ships. The Fortress of Humaitá had been under constant attack by Allied artillery since November 1866.

Finally, direct pressure from Emperor Pedro II forced Caxias to order the passage. After incorporating the new monitors built in the shipyards of Rio de Janeiro in the early hours of February 19, 1868, the passage of Humaitá was finally carried out with little damage to the fleet.

On March 3, 1868, unable to resist, Solano Lopes left the fortress, crossing the Paraguay River and following the right bank of the river towards the north. 3,000 Paraguayan soldiers remained in Humaitá and resisted even the Allied attacks until 24 July 1868 when they abandoned the fortress. The following day, allied troops entered Humaitá, which was already completely deserted.

This second phase of the Humaitá Campaign is represented in this research by: (i) monument to General José Eduvigis Díaz, hero of the battle of Curupaty, located in the place where the Curupaty Fort was located, (ii) by a partially buried boiler belonging to the Hospital Ship

Eponina and (iii) by the city of Humaitá, which guards some constructions from the war period,

such as the ruins of the church of San Carlos Borromeo de Humaitá (Figure 5)

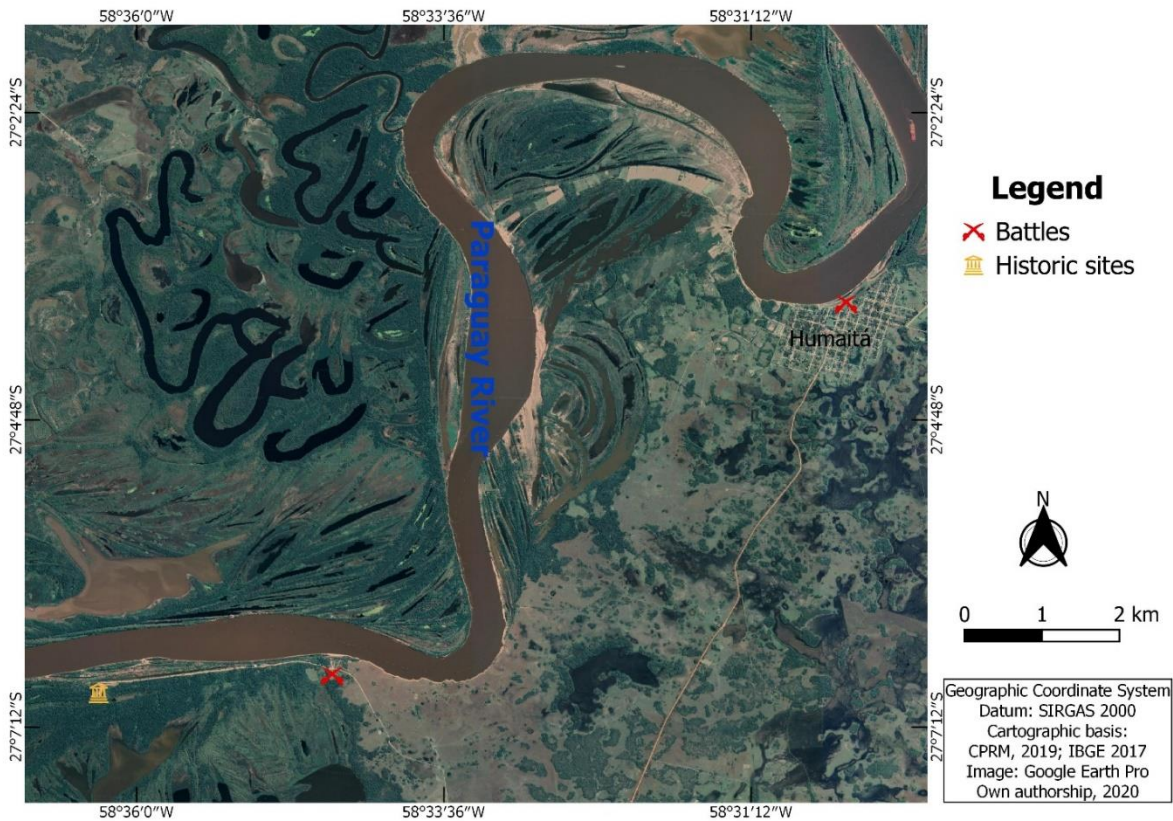


Figure 5. Map of Humaitá and surroundings. To the west is the buried boiler of the Hospital Ship Eponina, to the south-central Monument to the Battle of Curupayty and to the east the city of Humaitá where the Fortress of Humaitá was located.

Departing from the monument to the Battle of Tuyutí, and following 8.5 km towards the north along the same road, you will arrive at an entrance to a secondary road. Turning to the left, as indicated by signs, and traveling another 4.9 km, you will arrive at the monument of the Battle of Curupayty (Figure 5 and 6a). It is a monument, not only in reference to the battle, but also in reference to General José Eduvigis Díaz who commanded the Paraguayan troops in this battle where they obtained an important victory by interrupting the advance of the Allied troops.

In addition to being an extremely important historical site, it is a very beautiful place, on the banks of the Paraguay River in a slightly higher region, out of reach of the constant floods of the river. This feature of slightly higher relief meant that an extensive branch of trenches dug and

used by the Paraguayan army during the battle was preserved to this day.

From the Monument to the Battle of Curupayty, traveling 3 km to the west through a recently opened path, it is possible to reach the partially buried boiler of the Hospital Ship Eponina (Figure 5, 6b). Although no monument to Curuzú Fort was found by the procedures adopted in this research, this fort was probably located near the place where the Hospital Ship Eponina sank. An article published in *Jornal do Pará* on February 19, 1867, claims that that such ship was moored at the Curuzú Fort, where it was attacked by a fire on January 6, 1867, which completely consumed it. As the ship had its planks anchored on the banks of the river, only 8 people died.



Figure 6. a) monument to the Battle of Curupayty, b) boiler of the Hospital Ship Eponina, c) Church San Carlos Borromeo de Humaitá after the arrival of the troops of the Triple Alliance to the fortress, d) preserved ruin of the Church São Carlos Borromeo de Humaitá.

Sources:

Figure 6a: Facebook of Paso de Patria Museum

<https://www.facebook.com/photo.php?fbid=734141603363263&set=pb.100003022890876.-2207520000..&type=3>

Figure 6b: Webpage ABC News

<https://www.abc.com.py/nacionales/2019/09/21/mopc-extrae-buque-eponina-hundido-durante-la-guerra-de-la-triple-alianza/>

Figure 6c: Digital Collection of the Biblioteca Nacional (Brazil)

http://objdigital.bn.br/objdigital2/acervo_digital/div_iconografia/icon393033/icon1406401.jpg

Figure 6d: Website Secretaría Nacional de Turismo (Paraguay)

<https://www.senatur.gov.py/noticias/humaita-propone-un-escenario-historico-para-los-dias-de-descanso>

There are no data on when the Eponina boiler was found. Once again, just as in Itaipirú, the fluvial dynamics in these 154 years has been very active, since the boiler is currently 400 m away from the Paraguay River, partially buried. The boiler of the Hospital Ship Eponina is currently located where the Paraguay river was 154 years ago.

From the monument to the Battle of Curupayty, it is necessary to return to the main road for 4.9 km and follow another 8.8 km towards the north to reach the city of Humaitá, where the mighty Fortress of Humaitá was located (Figure 5).

Strategically located on a sharp bend in the river's course, it consisted of a series of defenses, both on the terrain side and on the river side. In

addition to London's mighty battery, the fortress had troop and officer barracks, ammunition depots, offices, cemeteries and a church (Figure 6c and 6d). The fortress had 12 batteries with a total of 110 artillery pieces and another 40 pieces in the fortified perimeter of 8 km (Doratioto, 2002).

The city of Humaitá is located on a higher fluvial terrace and has a very interesting historical heritage. It features wartime houses, a small museum with relics of the conflict and the majestic ruin of the San Carlos Borromeo de Humaitá church (Figure 6d). This church was heavily bombed during the siege of the fortress, and today it is a symbol of Paraguayan resistance.

Pikysyry Campaign

After Solano López fled and the Paraguayan army abandoned the Fortress of Humaitá, Allied troops advanced towards Asunción across the Chaco, on the right bank of the Paraguay River, now Argentine territory, while a squadron division went upriver to accompany the march. In the first week of December 1868, the campaign called *Dezembrada* by Brazilian historians and the *Pikysyry Campaign* by Paraguayans began.

At this stage, the relief, although still predominantly flat, was not marshy and swampy as in the battlefields of the Humaitá Campaign. Some elevations stood out in the landscape such as Lomas Valentinas, which are hills that reach more than 100 m in altitude (Figure 7). The name Lomas Valentinas in Guaraní is *Itá Ybaté* which means "high stone", due to its condition of topographical elevation relative to the surrounding landscape. Lomas Valentinas are formed by Silurian glacial rocks and were considered a site of geotourism interest by Gadea and Benitez (2018).

There is no doubt that environmental issues had a strong influence on the war and correlating historic sites with geology and geomorphology corroborates the core of this research, which is to propose a geotourism and war tourism itinerary. This statement is widely valid and applicable in the three campaigns of the war. In the *Pikysyry* campaign, although it was fought on the banks of the Paraguay River, the geology and geomorphology have already changed considerably.

On December 6, the bulk of the Allied army, with 18,600 men, marched south to attack the *Pikysyry* enemy line from the rear (Doratioto, 2002). After a six-kilometer march, along a narrow path, the Brazilians arrived near a narrow bridge over the Ytororó stream, a mandatory crossing

point for marching towards Solano López's rear in Lomas Valentinas. On the other side of the bridge was the Paraguayan army, which was defended by five thousand men under the command of General Caballero.

The fighting in Ytororó began at 8 am and ended at 1 pm, with the losses of 1,200 Paraguayans — 600 dead — while the Brazilians, victorious, lost 1,806 combatants, between dead and wounded (Doratioto, 2002). Caballero and his remaining troops retreated to the town of Villeta 8 km away from the conflict, where their troops could gather their forces and prepare for a new battle (Figure 7).

Just five days after the Battle of Ytororó, on December 11, 1868, the second battle of the *Pikysyry Campaign* began, which was the Battle of Avay. The advance of the Allied troop towards Villeta stopped where the road crossed the Avay stream when this battle began at midday lasting five hours. The Paraguayan army commanded by General Caballero suffered a great defeat and its survivors retreated to Lomas Valentinas, taking advantage of the higher relief where Solano López had assembled 3,000 soldiers, another 2,000 in *Pikysyry* and 700 in Angostura (Hooker, 2008). After the defeat at the Battle of Avay, Solano López ordered the evacuation of Asunción to the provisional capital of Piribebuy, in the Cordillera Department (Figure 7).

The Battle of Lomas Valentinas was fought from December 21 to 27, 1868 (Figure 7). The Paraguayan army, personally led by Solano López, was decisively defeated, although he managed to escape (Hooker, 2008). The Allies almost completely destroyed the Paraguayan army and opened the way to occupy Asunción, although Solano López had fled to the countryside, which prolonged the war by more than a year.

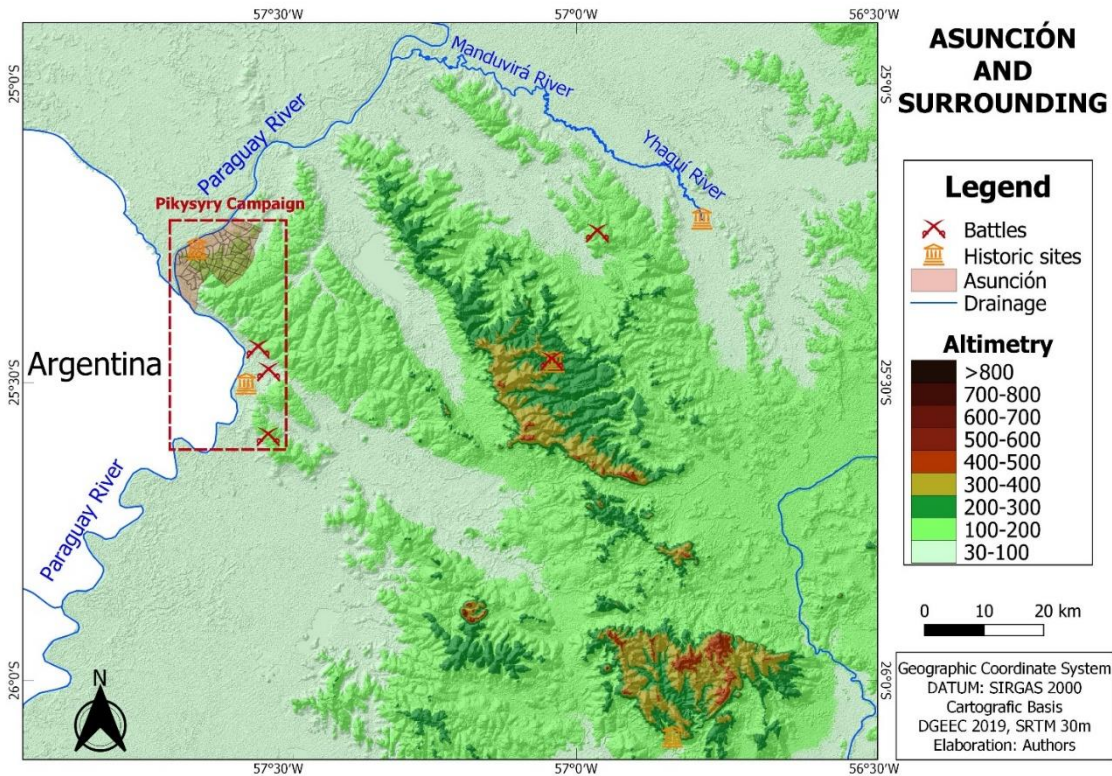


Figure 7. Map of Asunción and surroundings where the entire Pikysyry Campaign was developed. To the east is part of the battle sites of the Cordillera Campaign.

Battles of the Pikysyry Campaign: north Ytororó, center Avay, south Lomas Valentinas. Historical Sites of the Pikysyry Campaign: monument in honor of the heroes of the Battle of Avay, in the city of Villeta (south) and Palacio Mariscal Solano López, bombed during the taking of Asunción.

Battles of the Cordillera Campaign: center of map monument to the Battle of Piribebuy and in the vicinity of the Yhaguy River the monument to the Battle of Acosta Ñu. Historic Sites of the Cordillera Campaign: Vapor Cué National Park on the banks of the Yhaguy River and monument to the Piribebuy Blood Hospital located in the homonymous city.

On January 1, 1869, Brazilian troops invaded Asunción, which was already practically empty. Alleging health issues, the commander of the allied troops, Caxias withdraws from the war on January 19, 1869.

The history of the Pikysyry Campaign is represented by: (i) three monuments that mark the locations of the battles of Ytororó (Figure 8a), Avay (Figure 8b) and Lomas Valentina (Figure 8d), (ii) the monument in honor of the heroes from the Battle of Avay, erected in the city of Villeta (Figure 8c) and (iii) by the majestic los López Palace in Asunción, which is the current seat of the Government of the Republic of Paraguay (Figure 8e and 8f).

Unlike the monuments referring to the Humaitá Campaign, all these monuments related to the Pikysyry Campaign and the los Lopes Palace are easier to find and visit. The most distant monument from the center of Asunción is Lomas Valentinas, which is 40 km away and can be reached via paved road.

Cordillera Campaign

Under the command of the Count d'Eu, the Brazilian army became a pursuit force to capture Solano López. The war left the banks of the Paraguay River and penetrated into the interior of a devastated country. The pursuit of Solano López is known as the Cordillera Campaign, moving away from Asunción towards the east and then towards the northeast of the country.

On May 1, 1869, the Allied army began the march towards the Cordillera Department in search of Solano López. On May 17, an Allied army troop attacked the Ybycuí iron foundry, in the Department of Paraguari, where cannons and other armaments for the Paraguayan forces were manufactured (Figure 9a). Although the taking of the Ybycuí iron foundry is not part of the Cordillera Campaign, this theme will be dealt with here, as it is a later phase than the Pikysyry Campaign.



Figure 8. a) monument to the Battle of Ytororó, b) monument to the Battle of Avay, c) monument in honor of the heroes of the Battle of Avay, in the city of Villeta, d) monument to the Battle of Lomas Valentinas, e) los López Palace during the occupation of Asunción, f) los López Palace today.

Sources:

Figure 8a: Webpage of *Agencia de Información Paraguaya*

<https://www.ip.gov.py/ip/gran-acto-conmemoro-en-ypane-los-150-anos-de-la-batalla-de-ytororo/>

Figure 8b: Marcos Paraguay community channel on YouTube

<https://www.youtube.com/watch?v=Ogjk4oFPxBM>

Figure 8c: Webpage of *Secretaría Nacional de Cultura* (Paraguay)

<https://www.abc.com.py/edicion-impresa/suplementos/comercial/aniversario-n-305-de-villeta/las-batallas-de-avay-y-lomas-valentinas-1792271.html>

Figure 8d and 8f: Webpage of ABC News

<http://www.cultura.gov.py/2018/12/honran-a-los-heroes-de-la-batalla-de-ita-ybate/>

<https://www.abc.com.py/edicion-impresa/suplementos/cultural/el-palacio-de-los-lopez-1756112.html>

Figure 8e: Digital Collection of the *Biblioteca Nacional* (Brazil)

http://objdigital.bn.br/objdigital2/acervo_digital/div_iconografia/icon393035/icon1408772.jpg

There are not many reports about this iron foundry, especially regarding the choice of its location, as it is placed 152 km from Asunción, therefore quite distant, especially at that time when roads were non-existent or pretty precarious in Paraguay. It is known that the intention of the first railway line was to link Asunción to the Ybycuí iron foundry, but this was not due to the war.

According to Mendoza and Mariotti (2013), the foundry was established in the Ybycuí area at the foot of a mountain where the Ybycuí stream ran and which configures an easily defended geomorphological amphitheater. These authors report that the high and large forests in the surroundings provided the wood needed to make charcoal and at the bottom of the valley there were clays of excellent quality for the manufacture of refractory bricks and molds. In addition, its ideal equidistance with the Ybycuí, Quyquyó, Caapucú and San Miguel iron ore deposits, which could be easily transported by the Tebicuary River, passing through the Caapucú, Quyquyó, Mbuyapey and Ybycuí streams.

The city of Piribebuy, located in the Cordillera Department 74 km from Asunción, was declared the capital of Paraguay after the defeats of the Pikysyry Campaign in December 1868. The city is located on the edge of a cliff, at an altitude of approximately 260 m and with a wide panoramic view of the plain of the Paraguay River to the west, where the troops of the Triple Alliance were located (Figure 7).

The Battle of Piribebuy was fought on August 12, 1869. The Paraguayan defenders, who were in the city, were poorly armed and were helped in the fighting by women and children. The battle lasted 5 hours with a landslide victory for the allied army, which had an overwhelming numerical advantage. The city hospital was set on fire with several wounded inside and official documents were lost in the fire (Hooker, 2008).

Just four days after the Battle of Piribebuy, what was left of the Paraguayan troops reorganized 25 km northeast of Piribebuy to fight in the Battle of Acosta Ñu. Due to the scarcity of adult men, out of the about 6,000 Paraguayans who fought at the Battle of Acosta Ñu under the command of General Bernardino Caballero, most of them were children aged 15 or under. They fought 20,000 Triple Alliance men for eight hours. The place where the battle took place was a vast plain on the way to Caragatay, located between the Piribebuy creek

and the Yuquyry creek, now known as the Eusebio Ayala district (Doratioto, 2002).

This was the last great battle of the Paraguayan War. It was followed by irregular movements of Brazilian troops, in a veritable hunt for Solano López who would finally be killed months later in Cerro Corá. In Paraguay, Children's Day was celebrated on August 16, the day of the battle of Acosta Ñu.

An epic episode and still very little discussed is the saga of the remaining ships of the Paraguayan Navy along the Manduvirá and Yhaguy rivers. The historical accounts of Frago (2012) and Centurión (2013) describe this epic moment, but there are still many gaps that prevent reaching a historical and environmental accuracy of this event.

Grau Paolini and Nakayama Rojas (2020) narrate the phases of this persecution, always emphasizing the heavy rains that devastated this region, raising the levels of the rivers and enabling the navigability of both the Paraguayan Navy and the Brazilian Navy that pursued it.

During the occupation of Asunción by the troops of the Triple Alliance, the few ships of the Paraguayan Navy sailed northwards along the Paraguay River. On January 5, 1869, a division of the Brazilian Navy set out to capture them. Above all, they wanted to recover the Anhambay, a Brazilian ship that had been captured by the Paraguayans in Mato Grosso during the initial phase of the war, on January 6, 1865 (Grau Paolini, 2006).

Taking advantage of the knowledge of the local geography, the Paraguayan Navy entered the Manduvirá River, a left bank tributary of the Paraguay River, where it purposely sank some vessels to prevent the entry of the Brazilian Navy. On an escape route, the Paraguayan Navy sailed 25 km upstream to enter the Yhaguy River, where it sailed another 35 km. Faced with the numerical superiority of the Allied force and following the orders of Solano López, the sailors set fire to the ships and fled to join López's forces on August 18, 1869.

Furlan (2020) narrates in detail the last naval operations that took place in the war. Brazilian ships, with a greater draft, had serious difficulties in navigating the Manduvirá and Yhaguy rivers. Three incursions were made by the Brazilian navy without success. Paraguayan sailors set fire to the ships when they realized they were surrounded by the Brazilian navy and the allied army that was approaching from land.

The Manduvirá River is a lowland and extremely meandric river. Current measurements carried out using Google Earth Pro show a downstream width of 80 to 100 m, and at the meeting with the Yhaguy River an average width of 60 m. The Yhaguy River is also a plain and meandric river, but with much smaller dimensions than the Manduvirá River.

In downstream sections, the average width verified through Google Earth Pro was 30 m and where the ships were purposely sunk, the average width is only 12 m. Just for comparison purposes, the ship Anhambay that is exposed in the Vapor Cué National Park (Figure 9e) measures 41 m in length and 8.1 in width. The fact is that there is no way a ship of this size could have reached this location without a sequence of torrential rains that raised the level of these rivers to their overflows, enabling these ships to maneuver through the meanders of these rivers.

On February 8, 1870, Francisco Solano López and his column, made up of about 500 people, including Vice President Domingo Sánchez, Generals Bernardino Caballero, Isidoro Resquín, Francisco Roa and José María Delgado, as well as women and children arrived at Cerro Corá (Maestri, 2014).

The place chosen by López, for camping, was nicknamed “*circo de gigantes cas rocas*” by one of his followers (Maestri, 2020). This code name is due to the relief of the area, which is composed of beautiful outcrops of sandstones from the Misiones Formation, forming residual hills with flat tops (Figure 9h).

On March 1, 1870, Brazilian cavalry and infantry entered Cerro Corá and there was a fierce struggle against two or three hundred Paraguayan soldiers. Solano López tried to flee at a gallop and in the escape was caught and mortally wounded by a spear thrust given by Corporal Francisco Lacerda, known as Chico Diabo (Doratioto, 2002). The dictator ended up being wounded on the banks of the Aquidabán stream. In this position he was found by General Câmara, who summoned him to surrender, but who was refused. At that moment, he was shot by a Brazilian soldier. The biggest war in South America was ended.

The history of the Cordillera Campaign is represented in this article by (i) two monuments referring to the Battles of Piribebuy and Acosta Ñu and (ii) a monument in honor of the Piribebuy Blood Hospital. There are also three national parks that portray part of this campaign: Vapor Cué, La Rosada and Cerro Corá.

In Piribebuy, it is possible to visit the monument in memory of Piribebuy battle located in the central square of the city (Figure 9b) and the monument to remembrance the dead in the Boold Hospital which is located 650 m from the city center (Figure 9c). The monument to the battle of Acosta Ñu (Figure 9d) appears to be controversial as to the exact area where this battle took place. A new monument was recently elected to represent the exact location of the battle. This new monument was not found in the searches carried out during the execution of this research and neither more accurate information was found. According to the historian Fabián Chamorro the real place is the Serranía de Itakyty (ABC, 2019).

National parks referring to the events in the Cordillera Campaign or related to it are scenic and historical treasures that must be widespread in the world. Vapor Cué National Park is located 98 km from Asunción and access to the park is via a paved road. In this small park, two ships that acted directly in the war are preserved in good condition: the Pirabebé steam and the Anhambay steam (Figure 9e). The latter was captured on January 6, 1865 from the Brazilian Navy by Paraguayan ships on the São Lourenço River, a tributary of the Paraguay River in Brazilian territory.

In addition to the two ships, the park has four more recovered boilers and numerous pieces rescued from the Yhaguy River (Figure 9f). Of the six ships sunk on the Yhaguy River, two had iron hulls (Anhambay and Pirabebé) and four had wooden hulls. These ships were partially buried in the Yhaguy riverbed for over a hundred years until a rescue project was carried out in 1978 by diverting the Yhaguy river and recovering these ships, their boilers and many other parts (Grau Paolini, 2006) (Figure 10 e 11).

The Ybycuí National Park hosts La Rosada museum (Figure 12) (former Ybycuí iron foundry) and is located 149 km away from Asunción featuring beautiful outcrops of Silurian sandstones, especially in the waterfalls inside the park. The former Ybycuí iron foundry was destroyed by the Allied troops and remained like that until 1973 when the restoration works began and were carried out until 1975. The external walls were rebuilt with the same rock as the original construction, which are conglomeratic sandstones of the Boquerón Formation of Silurian (Figure 9a).

The Cerro Cora National Park is located 416 km from Asunción and just 44 km from Ponta Porã, in Brazil (Figure 12). In addition to its scenic beauty, the park has a series of monuments

referring to the Battle of Cerro Corá including a bust that marks the probable place of Solano López's death, on the banks of the Aquidabán stream (Figure 9g). The Park has beautiful outcrops of the Jurassic Misiones Formation, such as the mounts Itá Guazú (Figure 9h) and Muralla seen as

high geotouristic potential by Gadea and Benitz (2018).

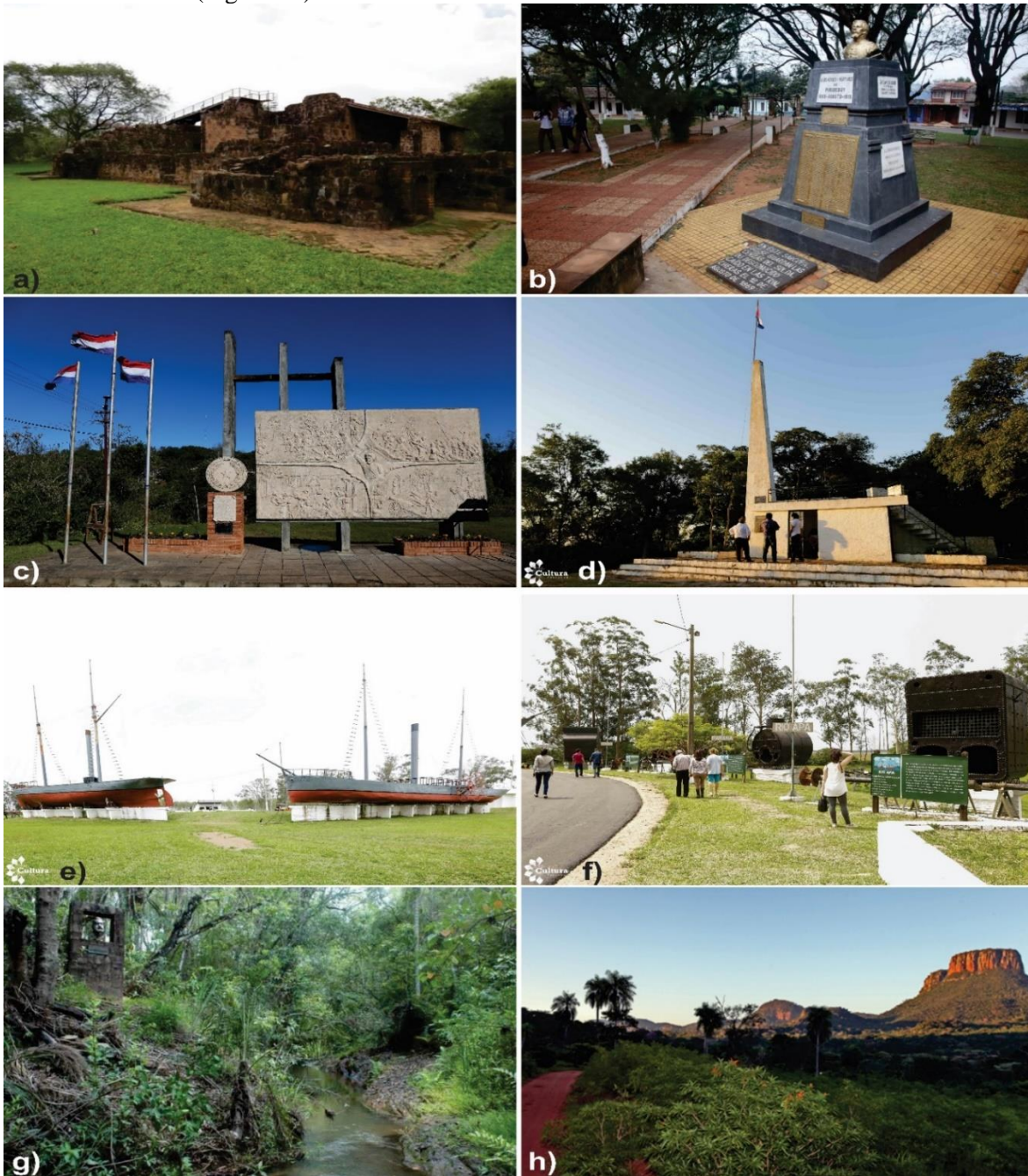


Figure 9. a) la Rosada Museum, b) monument to the Battle of Piribebuy, c) monument to the Piribebuy Blood Hospital, d) monument to the Battle of Acosta Ñu, e) Pirabebé and Anhambay ships in exhibition in the Vapor Cué National Park, f) boilers on display in the Vapor Cué National Park, g) monument that marks the place where Solano López was probably killed, h) view from mount Itá Guazú in Cerro Corá National Park.

Sources:

Figure 9a: Webpage of ABC News

<https://www.abc.com.py/especiales/fin-de-semana/fusion-de-historia-y-naturaleza-1718310.html>

Figure 9b, 9c, 9d, 9e and 9f: Webpage *Secretaría Nacional de Cultura* (Paraguay)

<http://www.cultura.gov.py/2019/07/ultiman-detalles-para-la-conmemoracion-de-la-batalla-de-piribebuy-e-inmolacion-de-la-flotilla-paraguaya-en-el-rio-yhaguy/>

Figure 9g: Webpage 9N Portal de Información

<https://www.campo9noticias.com/2020/02/28/paraguay-aun-atormentado-por-una-guerra-cataclismica-que-casi-lo-borro-del-mapa/>

Figure 9h: Webpage Diário Itaipu Electrónico

https://die.itaipu.gov.py/?secao=noticias_itaipu&conteudo=20440&q=node/3

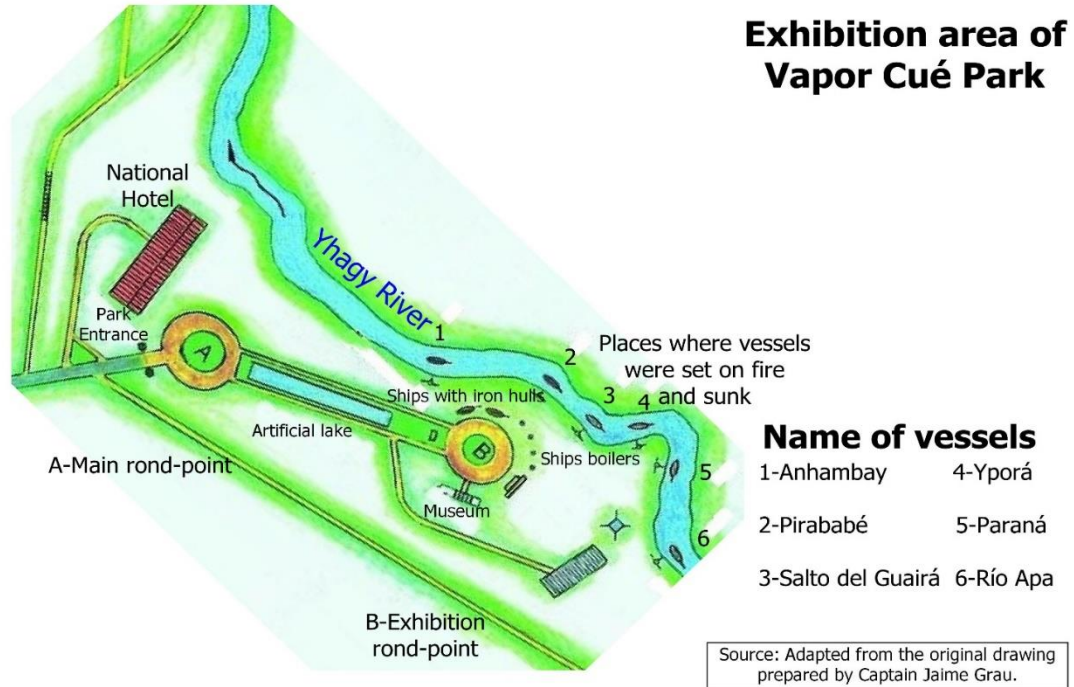


Figure 10. Drawing showing the Vapor Cué National Park and the position of the 6 ships that were deliberately sunk in the Yhaguy River.

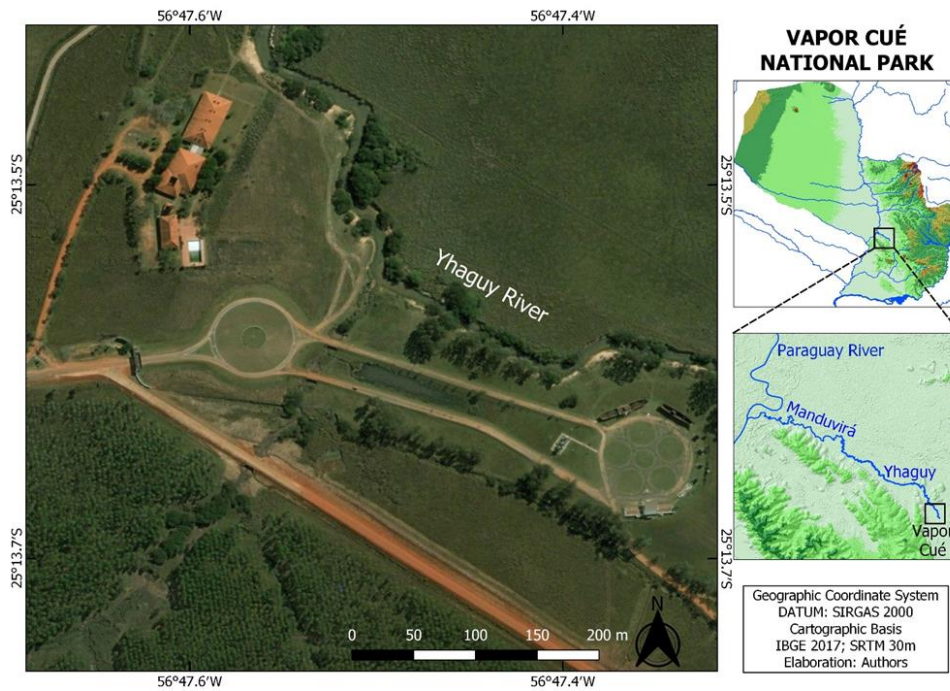


Figure 11. Vapor Cué National Park with the Yhaguy River beside it. The ships with an iron hull and the four boilers can be seen in the lower right corner.

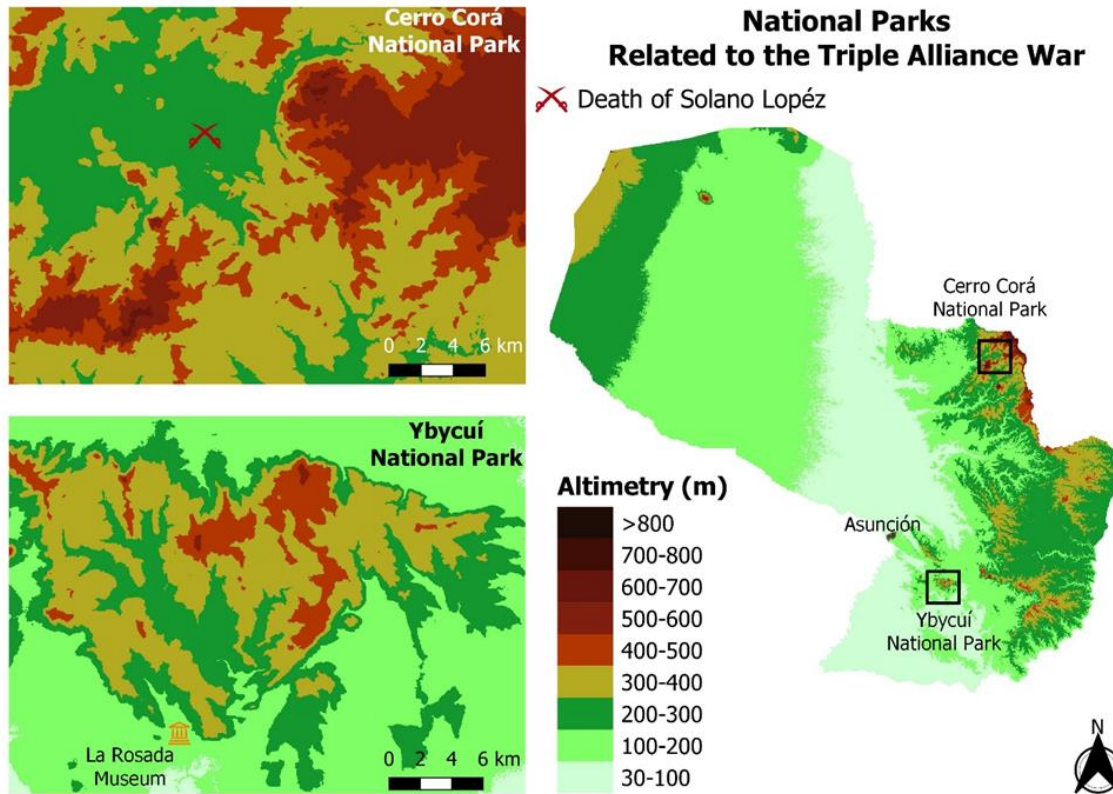


Figure 12. Cerro Corá National Park located northeast of Asunción in Amambay Department and Ybycuí National Park located southeast of Asunción in Paraguari Department.

In the Humaitá Campaign, all battles were fought in Quaternary terrains and within the Paraguay and Paraná rivers themselves when the Brazilian Navy acted bombing the Itapirú, Curuzú and Curupaty forts, in addition to the Fortress of Humaitá (Table 1)

Table 1. Points of geotouristic interest referring to the Humaitá Campaign

| EVENTS | GEOTURISTIC INTEREST |
|--|---|
| Bombing of Fort Itapirú | Fluvial Island on Paraná River |
| Battle of Estero Bellaco | <i>Estero</i> |
| Shipwreck of the Hospital Ship Eponina | Meander abandoned by the Paraguay River |
| Battle of Curupaty | Fluvial terrace on the Paraguay River |
| Conquest of the Fortress of Humaitá | Fluvial terrace on the Paraguay River |

The shortest phase of the war was the Pikysyry Campaign, fought in December 1868. In this campaign, the battles of Itororó and Avay were fought on the fluvial plains of the homonymous

rivers. The battle of Lomas Valentinas was fought on a hilly terrain formed by sandstones from the Cerro Jhú Formation of the Silurian.

The Cordillera Campaign advanced to the interior of Paraguay trying to find Solano Lopes. At this stage, geological and geomorphological diversity is much greater and there are three national parks directly related to the war. Among the three parks, Ybycuí and Cerro Corá have great geotouristic relevance (Table 2).

Table 2. Points of geotouristic interest referring to the Cordillera Campaign

| EVENTS | GEOTURISTIC INTEREST |
|---|---|
| Conquest and destruction of the Ybycuí Iron Foundry | Geomorphological and geological (Sandstones of the Cerro Jhú and Tobatí Formations – Silurian/Ordovician) |
| Death of Francisco Solano Lopes | Geomorphological and geological (Sandstones of the Misiones Formation – Jurassic) |

Final considerations

Paraguay is a country that has been experiencing strong economic growth in recent years improving its roads and touristic infrastructure, especially in the capital Asunción. As discussed, Paraguayan tourism is also experiencing growth as the information about the country becomes more accessible and national policies aimed to strengthening this sector are implemented.

Although there are already some proposals to boost local environmental tourism and even geotourism, war tourism there is still to be explored and demands further studies. This research shows how tourism linked to Paraguayan War can be an excellent option to increase the country's tourism portfolio. There is still a lot to be done in relation to the war sites, however, some sites have recently renovated and others are being restored.

This work will open up new research possibilities not only in the area of geotourism and war tourism but also in more in-depth geographic and environmental studies that relevant to the Paraguayan war. According to Oliveira (2020) so far there are no works on the Paraguayan War that address the geography and environmental characteristics with the necessary precision in the areas where the battles took place.

Obtaining accurate information is still a major challenge, especially when it comes to a subject that is still very little approached in the country, which is geotourism and war tourism. With due effort, a considerable amount of information was obtained and analyzed in this paper and it should be discussed in the future by researchers and public officials responsible for culture and tourism in Paraguay.

In addition to this research proposing tourist itineraries about the war, emphasis was also given to the environmental and geomorphological aspects of the battlefields and their surroundings to add interest and options to the itinerary. Precise and unpublished georeferenced maps were produced, which can serve as subsidies for future studies, including historical research, since in the bibliography consulted for the execution of this research, all maps about the Paraguayan war were inaccurate and lacking in scales and geographic coordinates. It is also common to read that the war was fought, for the most part, in the Paraguayan Chaco, when in fact it was fought in the Paraneña region.

It is hoped with this research that new studies and discussions will emerge and that the results obtained here will leave the academic walls of universities and reach the public bodies responsible for the tourist, cultural, environmental and economic sectors of Paraguay. This war that was long, bloody and cruel still today moves a multitude of researchers and aficionados not only in the four countries involved but in several others around the world. Being able to visit the battlefields and see the archaeological relics of the war, is a unique possibility to be able to revisit the past, enhance awareness of Latin American and, in fact, be moved by history.

Acknowledgement

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