

THE EVOLUTION OF CLUJ FORTRESS FROM EXTRAMUROS AREA AND THE IMPRINT OF THE GEOSITE IN THE GEOGRAPHICAL LANDSCAPE OF CLUJ-NAPOCA CITY

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ABSTRACT. – **The Evolution of Cluj Fortress from Extramuros Area and the Imprint of the Geosite in the Geographical Landscape of Cluj-Napoca City.** Cluj Fortress was built by the military garrison of the Habsburg Empire to have a defensive role in tragic periods. The site of its location was chosen possibly due to morphology, the presence of landforms developed on sandstones and conglomerates which led provided conditions for living and development in that place. The evolution of the area from extramuros to intramuros was shaped by the living necessities that the military garrison had to satisfy. By entering the area beyond the walls, “the world down there”, they had access to the means of satisfying their needs, to the necessary substance and energy exchange. The emergence of miserable households, mere holes in the slope, was possible due to the geological structure. They had a negative impact on the geographical landscape, due to the negative look of the slope, but also because of the precarious living conditions of the inhabitants of that area. The development of communities including disfavoured people determined miserable living conditions, while they tried to survive in different manners. By means of the used methodology, the paper highlights the evolution of Cluj Fortress since ancient times until today, and to emphasize the importance of the Fortress site from a scientific and anthropogenic point of view, by means of the geomorphosite inventory list.

Keywords: *evolution, Fortress, extramuros / intramuros, sandstones and conglomerates, geosite, geographical landscape, Cluj-Napoca, Romania.*

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1. INTRODUCTION

The geographical landscape represents the result of the interaction that exists between the components of the (geographical) natural environment and the anthropogenic (man-made) ones, revealing the fact that geographical reality is a complex space having well-defined territorial functions (Irimuş, I.A., 1997, 2004, 2006). The landscape geodiversity existing within a territorial unit makes reference to all that is supposed and included in nature as a whole, highlighting its variety. This variety may rely on geological aspects (rocks, minerals, etc.), geomorphological aspects (landforms, landform typology, geomorphological processes), soil typology, fauna / flora, the presence of systems and processes (Irimuş, I.A., and Mureşan, Alina, 1994; Quesada-Román *et al*, 2022). Geodiversity outlines a higher importance depending on the quality of existing relations between different processes and the impact they have on morphology (Castre, N., 2019).

The natural component represents a proper space to support the social system (population, settlements, buildings, industry, transport, etc.). Medieval and early modern fortresses may also be added to this, as they served as defensive barriers in times of war. As a consequence, they may be included in the category of geosites, and they are also part of the man-made heritage, representing points of interest both in economic terms, and in educational – historical terms. In our perspective, the use of the term geosite refers both to the morphological forms, as well as to forms created as a result of anthropogenic activities (Carrion Mero, P. *et al*, 2020).

In time, this subject raised the interest of some scientists who made investigations in the field, trying to reconstitute the historical border objectives in a military context, highlighting the interests of colonialism and political nationalism (Di Paola, G.M.F., 2018). In a territory, fortresses represent a stage of urban development that started from the moment they were built and continued with the impact they had on the communities. Apart from their main military function, the fortresses also include buildings meant for the residential function of the human community.

An important element regarding the location of a fortress used for military purposes is based on the premise that any human settlement must be planned taking into account the opportunities for proper living conditions, and should be close to some attraction points, such as a source of water, it should be accessible, while a developed centre should be present nearby (Mac, I. and Hosu, Maria, 2003). All the above-mentioned elements make possible the existence of living and working conditions. Moreover, facilities and conditions related to height are to be monitored and assessed, as well as the existence of favourable angles, providing long-distance visibility. All these are essential

arguments regarding the location chosen for building a fortress. It is obvious that the morphology (the height) is a predominant and first-rank criterion in determining the optimal location for a fortress (Irimuş, I.A., Petrea, D., Rus, I., Corpade, A.M., 2010).

The urban community tends to closely follow the history of events and activities, as well as the land and estate property which existed in the moment when a new human component appeared (Deac, Simona, Irimuş, I.A., Păcurar, B.N., 2013; Guenzel, S., 2013). One should also analyse the development and changes occurred in time, by means of history, and also the impact performed on the environment (Hyun Sil Shin *et al*, 2015).

The purpose of this paper is to highlight the evolution of the Cluj-Napoca City Fortress from the extramuros areas towards an intramuros area. The detailed research aims at establishing the place and development of the fortress, the morphological features of the space where it was located, the suitability of the geological bedrock, the potential natural risks, the typology of the landscape created by the existing human community compared to the neighbouring human community, the role of the fortress for the nearby urban centre, as well as the resilience of the existing formations under anthropogenic influence.

The proposed objective should be reached by means of specific methods. These include the geomorphological methods of research and analysis, and the cartographic method by means of which a comparative analysis may be performed between bibliographic, topographic, informatic and photographic sources. The observations made by using the older or current cartographic materials have been confronted with the reality in the field. Analyses have been performed on the morphology, the geological bedrock, and the existing areas of risk. Also, an inventory sheet for the Fortress site has been accomplished, using the specific methodology related to the inventory of a geomorphosite. This sheet may be then used to reveal the importance of the site, taking into account several criteria of interest.

The creation of links between geographical components, the quality of the established links and the spatial dynamics of the relations between the components may be inferred from the manner in which the geographical landscape is structured and the way it functions.

2. SHORT HISTORY OF THE URBAN DEVELOPMENT IN THE FORTRESS HILL AREA

The Fortress Hill in Cluj-Napoca City is located on the fifth terrace of Someş River, also named the Fortress Terrace, at an absolute height of 390 – 405 m and a relative height of 55 – 75 m (Meszaros, N., Clichici, O., 1976).

The Habsburg fortress was built between 1715 and 1735 according to the plans of the military architect Giovanni M. Visconti, which provided a star-shaped architecture of the defensive walls (Danci, I., Irimuș, I.A., Vieru, Ioana, Toma, Bianca, 2010).

The fortress represented a form of human habitation, from where the military garrison had an excellent perspective and visibility over the entire urban centre. Its primary role was to control the intramuros (the entire settlement), but also to defend the city in case of a siege.

By order of the future emperor Joseph II, the Habsburg army accomplished the first military topographic survey of the Empire in the second half of the 18th century, in Transylvania between 1763 and 1773 (fig. 1). As a consequence, the series of maps created then will remain in the universal heritage under the name of Josephine maps. The hill fortress is represented together with the older “fortress” of Cluj, actually the city walls. On this map, one notices the star-shaped nature of the fortress, the access route, and one may also infer the use of the neighbouring land, as vineyards were present close to the fortress, on the southern and eastern slopes of the Fortress Hill. Also on this map, one may notice the absence of the households built outside the fortress.

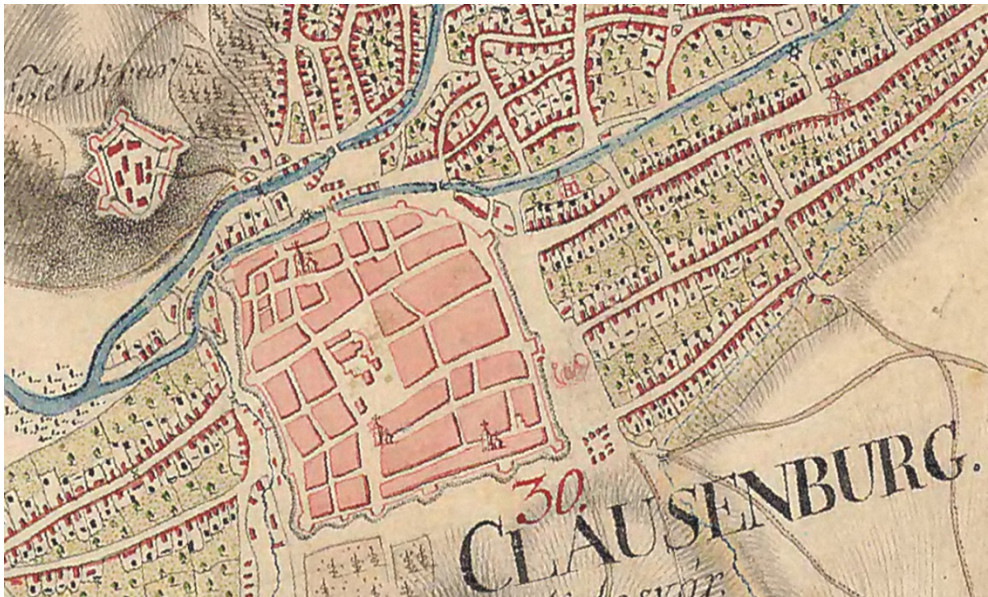


Fig. 1. The Josephine Map – 1763 -1773

Photo source: Arcanum Publishing House

The second Habsburg military topographical survey campaign started in 1853 and led to the appearance of a new set of maps (1853-1873), which are universally known in the cartographical culture as the Franciscan maps (fig. 2). For the needs of research, the Franciscan maps are more detailed and more precise than the Josephine ones. Many patterns appear on the Franciscan map including Cluj, and a change of land use is also noticeable. In this sense, one remarks the first signs of habitation on the southern slope of the Fortress Hill (fig. 2).

The extramuros area (the Fortress Hill) was the poorest area of the town (fig. 3), and disfavoured people lived there. In the first period of their habitation in this place, the residents did not have any alternative, so they created their own households by digging holes in the slope (fig. 4), building inside, carving the slope along the contour line. This was made possible by the landform and topographical features of the terrain, the geological and lithological features, all contributing to the creation of these “households” in the rocks.

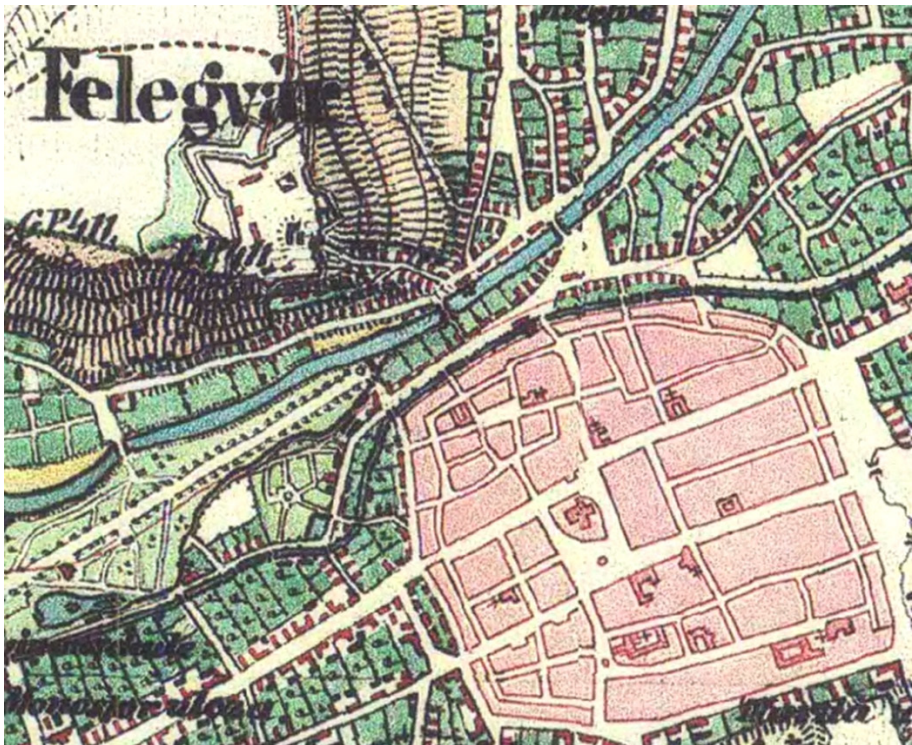


Fig. 2. Franciscan Map – 1853-1873
Photo source: Arcanum Publishing House



Fig. 3. Comparative images between the extramuros area (left) and intramuros area (right)

Photo source: <https://clujwebstory.ro/cetatuia-acoperisul-clujului-in-ochii-clujenilor-de-altadata/>



Fig. 4. Holes in the rock which served as human residence

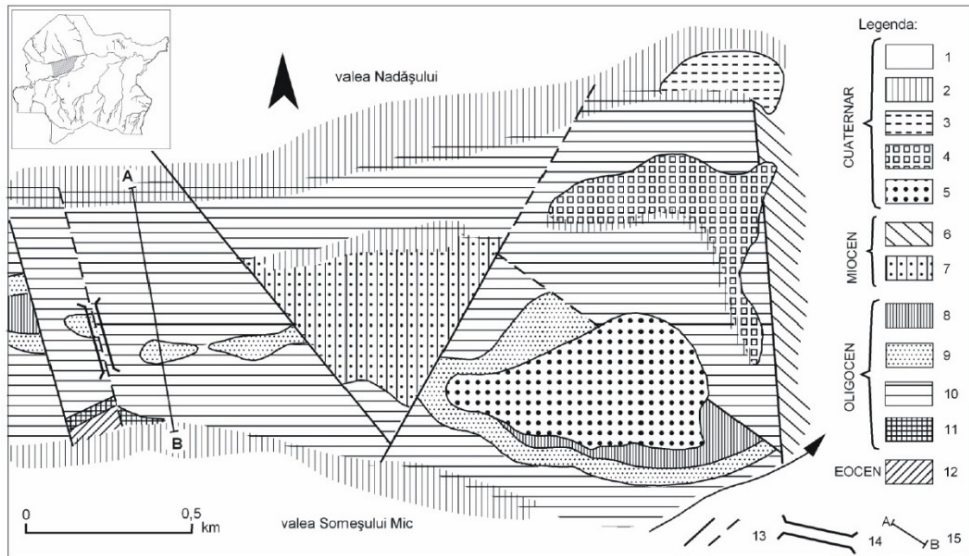
Photo source: <https://actualdecluj.ro/foto-cetatuia-de-acum-100-de-ani-era-locuita-de-banditi-prostituate-si-oameni-ai-pesterilor/>

To better understand the geological bedrock which allowed for the creation of those carved households, it is necessary to analyse its features and manner of formation (fig. 5). The caves created by people looking for a shelter were carved in the sandy intercalations of the Cetățuia (Fortress) strata. Above the striped complex of Ticu strata, the Cetățuia strata appear on the upper part of the Fortress Hill. They have an Upper Oligocene age and are covered by marls and sandy clays. Above these, there is a thick series of sandstones, sands and microconglomerates. The sands present in the terminal part of the Cetățuia strata horizon feature kaolinization phenomena.

The fortress itself is delineated by earth elevations, which have the aspect of mounds. In its surroundings, there is plenty of gravel, which indicates that the waters of Someș River were present during the Upper Quaternary, leaving behind alluvia, which form the terrace level of the fortress (Meszaros, N., Clichici, O., 1976).

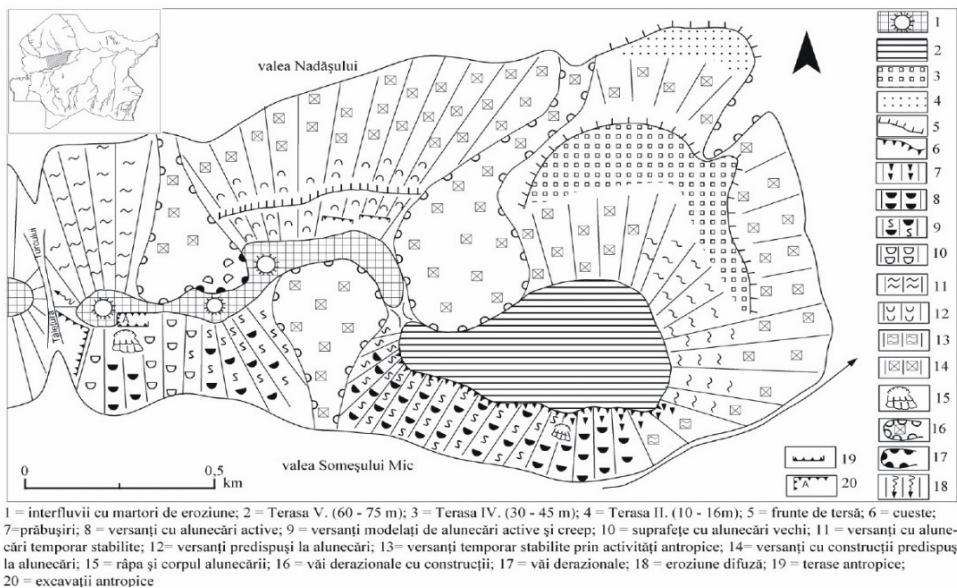


Fig. 5. The location of the fortress in geological context.
 Photo source: *Geological Map 1:200.000 (by IGR)*



= aluviuni; 2 = glaciis; 3 = Terasa II. (10-16 m); 4 = Terasa IV. (30-45 m); 5 = Terasa V. (60-75 m); 6 = Formațiunea de Iris; 7 = Formațiunea ũfului de Dej; 8 = Formațiune de Gruia; 9 = Formațiunea de Dăncu; 10 = Formațiunea de Moigrad, 11 = Formațiunea de Mera; 12 = Formațiunea ȃrnelor de Brebi; 13 = falii; 14 = Tăietura Turcului; 15 = linia profilului

Fig. 6. Geological map between the Fortress Hill and Tăietura Turcului
Source: Szilárd-Lehel, P. (2011)



1 = interfluvii cu martori de eroziune; 2 = Terasa V. (60 - 75 m); 3 = Terasa IV. (30 - 45 m); 4 = Terasa II. (10 - 16m); 5 = frunte de terasă; 6 = cueste; 7=prăbușiri; 8 = versanți cu alunecări active; 9 = versanți modelați de alunecări active și creep; 10 = suprafețe cu alunecări vechi; 11 = versanți cu alunecări temporar stabilite; 12= versanți predispuși la alunecări; 13= versanți temporar stabilite prin activități antropice; 14= versanți cu construcții predispuși la alunecări; 15 = răpa și corpul alunecării; 16 = văi derazionale cu construcții; 17 = văi derazionale; 18 = eroziune difuză; 19 = terase antropice; 20 = excavatii antropice

Fig. 7. Geomorphological map between the Fortress Hill and Tăietura Turcului
Source: Szilárd -Lehel, P. (2011)

The sector between the Fortress Hill and Tăietura Turcului is part of the hills between Someșul Mic River and Nadăș River and has been approached by many researchers whose studies stress the vulnerability of the area to slope processes (landslides and collapses) (Szadeczky-Kardoss, Gy., 1918, Xantus, J., 1942, Meszaros, N. and Clichici, O., 1976, Buzilă, L. et al., 2002, Szilárd-Lehel, P., 2011).

The building of the fortress for the garrison and the subsequent presence of the military led to the emergence of new problems out of human necessities, as the garrison became a centre generating demand. This is the main reason which determined the evolutionary stage of the fortress, from the extramuros area to the intramuros area. According to Mac I. and Hosu Maria (2003), any landform that provides support for an anthropogenic structure needs to exchange mass, energy and information with the surrounding environment. To better communicate with the world behind the walls, but also to satisfy the needs, the Germans' bridge was built at the end of the 18th century, linking the base of the Fortress Hill to the world below. This bridge represented the main access of the garrison to resources and other necessary supplies.

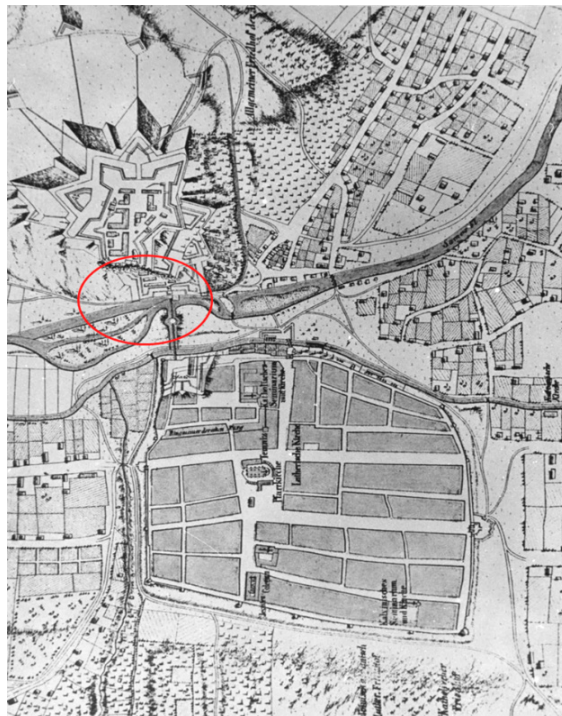


Fig. 8. The Germans' bridge

Source: https://www.omnia.ie/index.php?navigation_function=3&europaena_query=Dealul%20Cet%C4%83%C8%9Bua

In time, those who lived on Fortress Hill developed houses in the form of miserable hovels (fig. 9), creating a sort of shanty town, resembling those which currently exist in Brazil in some of the large urban areas, known as “favelas”. They shelter the poorest community, which attempts to satisfy their needs for a living in different manners, by means of another nearby community, using various methods. Historian Tudor Sălăgean presented the situation that existed during the 19th century, stating that on the lower slopes of the Fortress Hill, on the left bank of Someş River, there was a suburb inhabited by poor people who had links to the Austrian garrison from within the existing fortress. Those links had the purpose of providing all sorts of services (women of loose morals, porters, etc).



Fig. 9. The shanty neighbourhood on Fortress Hill

Source: <https://www.stiridecluj.ro/social/cetatuia-cluj-din-1890-pana-in-1965-de-la-oamenii-grotelor-la-demolari-si-civilizatie-video>

These huts influenced negatively the geographical landscape of Cluj City, and for this reason the local authorities decided to dynamite the neighbourhood built by the people living there. Nevertheless, they rebuilt their households. This aspect highlights the fact that the geology, the landform typology and the location of the settlement create the support for habitation,

which allowed that community to resist to those living conditions, and even to develop further. The idea to blow up the neighbourhood was a real failure, so the local authorities appealed to another method by means of which they considered that the neighbourhood would integrate, applying taxes and fees. This idea also failed.

At the beginning of the 1960s, the communist leader of Romania, Gheorghe Gheorghiu Dej, during a politically-motivated visit to Cluj, toured the city and his route included the existing road at the foot of the hill. He noticed the landscape created by the hovels, and was negatively impressed by them. As a result, he ordered those miserable huts to be erased, because they represented a negative hotspot for the city of Cluj, and had a negative impact on the geographical landscape.

Therefore, the neighbourhood built on the Fortress Hill disappeared between 1960 and 1964 (fig. 10). In 1964, at the foot of the hill, modern blocks of flats were in process of being built, while the slope behind was perfectly cleaned up of huts, as one concretely notices the landform and its structure.



Fig. 10. The slope of the Fortress Hill and the presence of modern blocks of flats at the foot of the hill between 1960 and 1964

Photo source: <https://actualdecluj.ro/foto-cetatuia-de-acum-100-de-ani-era-locuita-de-banditi-prostitute-si-oameni-ai-pestelor/>

3. Methodology

The research was based on the projection of the historical reality of the Fortress geosite in its geographical (geomorphological, geodemographic and geotouristic) syngeneic development. This study allowed us to perform a connection between the landform factor (Irimuş, 1994) with the geodemographic and political-administrative dynamics of Cluj-Napoca City, identifying morphological opportunities as pillars of resilience to geopolitical changes. The cartographic method has been used to compare the sets of maps, with the purpose of highlighting the manner of evolution of Cluj Fortress in different historical periods, and the part played by this geomorphosite in defining and structuring the geographical landscape of Cluj City (Pop, Simona-Octavia, Irimuş, I.A., Păcurar, B.N., Trif, Teodora, 2014).

The analyses performed on the sets of maps belonging to the historical heritage provided information related to the evolution of the Fortress, as a geosite integrated to the left bank and slope of Someşul Mic River, in *extramuros*. The satellite images and photos present the evolution of the Fortress as an internal part of the city, *intramuros*, and its impact on the geographical landscape.

The method used to create the inventory sheet comes from the qualitative and quantitative methods of assessment, developed to highlight the values of geomorphological interest, the degree of use, the aspects related to the managerial assessment, but also the restrictive features of the analysed landform. Cendrero, A. (1996), Pralong, J.P. (2005), Reynard, E. (2008), Pereira, P. (2007, 2010) proposed the methods of inventory to assess the site on the basis of which the inventory sheet was achieved. The method has first in view the geomorphological value, that is related to the scientific, cultural, aesthetic and landscape aspects. Another aspect is the degree of use of the site, including criteria regarding visibility, accessibility, risk typology, infrastructure, tourism flows and visiting hours. In terms of managerial aspects, the analysed criteria are sustainable development and educational activities, while the restrictive features are related to vulnerability to risks, the presence of risks which may affect the tourism activities, as well as inaesthetic elements. All the criteria are proposed, analysed and graded according to the subjective point of view of the researcher.

The mathematical formula to acquire the geomorphological value, the degree of use, the managerial aspects and the restrictive features is performed by means of the arithmetic method.

$$V_{TOTAL} = (V_{GEO} + V_{UTIL} + V_{MNG} + V_{AR}) / 4$$

4. Results and discussions

The morphology and the geological structure of the site made possible the establishment of a fortress and the development of living conditions on the location of the Fortress geosite. The geosite is representative within Cluj-Napoca City because of its history, as it had the main purpose to defend the city in case of attacks, because of its scientific importance, related to the geomorphological criteria of assessment, namely the landform typology and the geological composition, and because of its socio-economic and educational importance.

Table 1. Geomorphological value – the scientific criterion (Sce)

Scientific criterion (Sce)	Subcriteria	Score	Given value
Integrity (Intg)	Site destroyed	0	0.50
	Low integrity	0.25	
	Medium integrity	0.50	
	Integrity up to 70%	0.75	
	Unaffected	1	
Representativity (Reprez)	Presence of vegetation	0	1
	Presence of conglomerates	0.25	
	Presence of sandstones	0.50	
	Presence of geomorphological processes	0.75	
	Composition of the geological bedrock	1	
Genesis (Gnz)	Common genesis	0	1
	Genesis involving a single factor	0.25	
	Genesis involving three factors	0.50	
	Genesis involving five morphogenetic factors	0.75	
	Genesis involving more than five morphogenetic factors	1	
Rarity (Rar)	Common site	0	0.25
	Site of local interest	0.25	
	Site of regional interest	0.50	
	Site of national interest	0.75	
	Site of international interest	1	

The scientific interest (Sce) (table 1), evaluated at 2.75 points, concerns aspects related to integrity, representativity, genesis and rarity. The first criterion, integrity, received a score of 0.50 points, reflecting a medium integrity. This is underlined by the mark left by the action of geomorphological, meteo-climatic and even anthropogenic processes which negatively affected the studied landform. In terms of the representativity of the researched site, the value given is 1 point, because the presence of the natural and anthropogenic processes made possible the degradation of the form due to the geological bedrock. Even the holes in the rock dug by the inhabitants and used as dwellings were possible due to the presence of the sandstones and conglomerates, types of rocks feasible for anthropogenic activities. Regarding the genesis of the Fortress Hill, there are several factors involved, such as geological, climatic, hydrological, geomorphological and biotic (including anthropogenic) ones. The value given to this factor of interest is 1 point. The site is mainly important for Cluj-Napoca City, having an impact on local development, for which it received a score of 0.25.

Table 2. Geomorphological value – the cultural criterion (Cult)

Cultural criterion (Cult)	Subcriteria	Score	Given value
Religious importance (IR)	Lack of religious buildings	0	0
	Presence of churches	0.25	
	Presence of monasteries	0.50	
	Presence of cathedrals	0.75	
	Presence of religious buildings and attractions	1	
Geohistorical importance (IG)	No importance	0	0.75
	Site of minor interest (geologically and historically)	0.25	
	Site of major interest (geologically)	0.50	
	Site of major interest geologically and historically	0.75	
	Prehistoric site	1	
Bibliographical importance (IB)	No importance	0	0.25
	Presence in books, studies	0.25	
	Presence in the university curricula	0.50	
	Presence in the high school curricula	0.75	
	Presence in the school study curricula	1	

Regarding the cultural criterion (Cult) (table 2), the value obtained is 1 point. In the analysis of the Fortress Hill, the historical importance is provided by the presence of the Habsburg fortress, built between 1715 and 1735 by the military garrison on the fifth terrace of Someș River, a human settlement called Cetățuia (Fortress). Therefore, in terms of the geohistorical importance of the studied site, the score given is 0.75 points, which reflects its major importance both from a geological and from a historical perspective. The location of the fortress on the steep hill was also possible due to the geological bedrock, consisting of sandstones and conglomerates. Regarding the importance of the site from a bibliographical point of view, the subject of the Fortress is approached in many books, studies, press articles, and so the value given is 0.25 points.

Table 3. Geomorphological value – The aesthetic and landscape criterion (Est)

Aesthetic and landscape criterion (Est)	Subcriteria	Score	Given value
Panoramic viewpoints (PB)	No panoramic viewpoints	0	1
	One panoramic viewpoint	0.25	
	Two panoramic viewpoints	0.50	
	Three panoramic viewpoints	0.75	
	More than five panoramic viewpoints	1	
Chromatic contrast (C)	No chromaticity	0	0.50
	Unimportant chromatic contrast	0.25	
	Medium chromatic contrast	0.50	
	High chromatic contrast	0.75	
	Intense chromatic contrast	1	
Artistic importance (ART)	No artistic importance	0	0.25
	Present in 5-10 media releases	0.25	
	Present in 10-15 media releases	0.50	
	Present in more than 20 media releases	0.75	
	Presence of the site in an art opera	1	

The aesthetic and landscape criterion (Est) (Table 3) reached the value of 1.75 points. This score has been calculated as a result of the analysis of three factors: panoramic viewpoints, chromatic contrast and artistic importance.

An analysis of these above-mentioned criteria is needed because they have a great relevance regarding the introduction of this geomorphological site in educational activities. This attraction provides numerous panoramic viewpoints for the researcher and for the visitor alike. These granted a special importance in terms of location for the military garrison, because the site provides an excellent visibility of the whole city. Even nowadays, the fortress is famous for the panoramic overview of Cluj-Napoca City, available for the visitor. The value given for this criterion is 1 point. The chromaticity reaches a medium level, as there is a contrast between the geological bedrock (in yellow-brown colours) due to the presence of clayish rocks, and the herbaceous vegetation, which is not of peculiar interest, but contributes to the development of chromatic contrast. The score given for the chromatic contrast is 0.50. The fortress is mainly interesting at local level, and is seldom presented at national or international level. There are some press articles in the local Cluj newspapers, reason for which the given score is 0.25, reflecting its presence in 5-10 media releases.

Table 4. The degree of use (V_{UTIL})

Assessed criterion	Subcriteria	Score	Given value
Visibility (VIZ)	Visible from a distance of less than 1 km	0	1
	Visible from a distance of 1 km	0.25	
	Visible from a distance of 3 km	0.50	
	Visible from a distance of 5 km	0.75	
	Visible from a distance of more than 10 km	1	
Accessibility (ACC)	Lack of any access road to the site	0	1
	Presence of a road to more than 1 km to the site	0.25	
	Presence of a road at 1 km from the site	0.50	
	Presence of a road at less than 500 m from the entrance to the site	0.75	
	Presence of several roads to the top of the site	1	
Risk typology (RSC)	Technological risk	0	1
	Climatic risk	0.25	
	Geological risk	0.50	
	Geomorphological risk	0.75	
	All of the above	1	

Assessed criterion	Subcriteria	Score	Given value
Infrastructure (INF)	Poor facilities	0	0.75
	Facilities at the periphery of the site	0.25	
	Modern facilities within the site	0.50	
	Facilities and services both at the entrance and within the site	0.75	
	Modern infrastructure both along the access routes, and within the site and in its surroundings	1	
Tourist flows (TUR)	Between 0 and 50 tourists/day	0	1
	Between 50 and 100 tourists/day	0.25	
	Between 100 and 150 tourists/day	0.50	
	Between 150 and 200 tourists/day	0.75	
	More than 200 tourists/day	1	
Visiting hours (H)	Between 10.00 and 14.00	0	1
	Between 10.00 and 16.00	0.25	
	Between 10.00 and 18.00	0.50	
	Between 10.00 and 20.00	0.75	
	No visiting hours (visit possible at any time)	1	

The degree of use (V_{UTIL}) (table 4) is characterized by several factors, such as: visibility, accessibility, risk typology, infrastructure, and tourism flows. As a result of the quantitative analysis, the total given score is 5,75 points. The first analysed criterion refers to visibility, an aspect which received the maximum score of 1 point, because the location of the fortress, namely the Fortress Hill, is visible from a distance of more than 10 km. Regarding accessibility, there is a road which leads to the basis of the site. The access on the slope may be performed only on foot, and there are stairs with the help of which one may reach the location of the fortress, at Belvedere Hotel / Restaurant and to the panoramic viewpoints. There are also several routes leading to the peak of the slope. The score given for this analysed criterion is therefore 1 point. Concerning the typology of the risks that exist in the study area, one remarks the presence of geological, geomorphological and climatic risks. The value given for this criterion is 1 point. The infrastructure received a score of 0.75, reflecting the arrangements and facilities that exist both at the foot of the hill, as well as within the site (Belvedere Hotel, the existence of rest areas, etc). The Fortress geomorphosite enjoys tourism flows that includes more than 200 tourists per day, a criterion which received 1 point. In the

category of tourists, one also includes students from other towns who choose the Fortress to hike on short trails to the panoramic viewpoints. It is an attraction which does not have visiting hours, and is therefore open to the public at any time, day or night, and therefore the score given for this is 1 point.

Table 5. Managerial aspects (V_{MNG})

Assessed criterion	Subcriteria	Score	Given value
Sustainable development (DEZ)	Site is missing from managerial projects	0	0.50
	Site is present in one development project	0.25	
	Site is present in two-three development projects	0.50	
	Site is present in protection projects	0.75	
	Site completely protected by law and closed for public	1	
Educational activities (EDU)	No educational activities performed	0	1
	Presence of school field trips	0.25	
	Presence of routes dedicated to pupils	0.50	
	Performance of school-related festivities	0.75	
	Performance of numerous educational activities	1	

The research made regarding managerial aspects (V_{MNG}) (table 5) resulted in assessing a score of 1.50 points. Concerning the sustainable development of the site, there were development projects made even by foreign researchers in 2008, which however did not come to life because of the economic problems during that period (the economic crisis). The score given for this criterion is 0.50 points. Taking into account the presence and integration of the site in educational activities, there are many activities that may be performed including this point of interest, such as: tourist trails, field trips with the specialized professors of the Faculty of Geography, Babeș-Bolyai University of Cluj-Napoca, or from other cities, to confront the reality in the field with the cartographic material, to fly drones to acquire real data from the field, etc. The given value for the educational activities is 1 point.

Table 6. The analysis of restrictive features (V_{AR})

Assessed criterion	Subcriteria	Score	Given value
Vulnerability to risks (VUL)	The site has no vulnerabilities	0	0.50
	The site has vulnerabilities but it is not affected	0.25	
	The vulnerabilities affect the site in a proportion of 50%	0.50	
	The site is partly destroyed	0.75	
	The site is totally destroyed	1	
Presence of risks that may affect tourism activities (RT)	Lack of risks	0	0.25
	Risk of landslides	0.25	
	Risk of degradation for the forms	0.50	
	Risk of collapse for the forms	0.75	
	Risk of total destruction for the site	1	
Inaesthetic elements (EI)	Lack of inaesthetic elements	0	0.75
	Natural inaesthetic elements	0.25	
	Degraded households	0.50	
	Presence of waste	0.75	
	Presence of industrial units and infrastructures	1	

Analysing the restrictive features (V_{AR}) (Table 6), we obtained a total value for this criterion of 1.50 points. The aspects regarding the vulnerability to risks received 0.50 points, because there are vulnerabilities affecting the site in a proportion of 50%. These vulnerabilities are caused by the presence of natural processes that currently affect and will continue to affect the researched site. The risks that have an impact on tourism activities are those related to the presence of landslides. A negative imprint on the geographical landscape resulted from the forced planning of the landform, which included the building of blocks of flats since the 1960s. As a result of concreting, phreatic waters were obstructed, a negative aspect for a landform developed on a geological bedrock made up by sandstones and conglomerates. This determined the hydration of clayish minerals, leading to the emergence of landslides. This criterion has therefore received 0.25 points. The presence of a high number of tourists had the notable effect of increasing the amount of waste, an aspect which is one of the inaesthetic elements, which received 0.75 points as a result of its analysis.

The total value of the Fortress geomorphosite by applying the above-mentioned mathematical formula is 3.56 points, and was acquired as a result of the assessment made according to the inventory sheet taken over from the studied methods, which suffered relevant changes, as we saw fit.

5. PROPOSALS

It is our opinion that this important site should be introduced in educational activities, because it has a high geomorphological and historical significance. In this study we propose two itineraries that may be taken into consideration by the schools or universities.

The first itinerary should be conceived as a local tourist route for the pupils of the schools in Cluj-Napoca City. This route may be achieved in two ways. First, it may be introduced as a part of a larger tour of Cluj-Napoca, which may include many other attractions (Mihai Viteazu Square, the Cathedral), but also the Fortress Hill. This city tour may be addressed to pupils in pre-university schools, within the projects entitled "Different School", but also to university students, at the beginning of the academic year. This might be a short trip guided by the tutor to show the new students, coming from all corners of the country, the importance and beauty of the city where they choose to study.

Also, the same route may be used for field trips by the students of the Faculty of Geography belonging to Babeș-Bolyai University of Cluj-Napoca. They should be guided by their specialized professors, to set up geomorphological and topographical maps, to confront the reality in the field with the cartographic material, and even to fly drones in order to acquire or update databases.

The second itinerary should take into consideration a longer trip (for about 2-3 days) to the sites that have a geological bedrock made up by sandstones and conglomerates. This itinerary may include sites in Cluj County, as well as in the neighbouring counties. A good example in this sense is Sălaj County, where there are many attractions developed on a geological bedrock consisting of sandstones and conglomerates (Stanii Clițului, Grădina Zmeilor, Stâncă Dracului, etc). As a result of this field trip, one may perform a comparative analysis between the visited attractions, concerning the strengths and weaknesses of the attractions (a SWOT analysis). The pupils or the students may propose new methods of protection for the sites, or they may be challenged to provide ideas regarding the future set up plans for the visited attractions.

6. CONCLUSIONS

The Fortress of Cluj-Napoca City represents a historical landmark of great importance because of the part it played in the development of the city, its military background, but also due to its geographical significance as highlighted by the suitability of the landform to the anthropogenic influence.

The methodology used in this research was helpful in underlining the powerful impact that the evolution of the fortress had on the geographical landscape and the social and educational activities, since the times of its building until nowadays. Also, according to the methodology, the inventory sheet of the Fortress geomorphosite has been created, highlighting the important aspects related to the geomorphology, the degree of use, the management, and also the restrictions of the studied landform.

The setting up of the tourist routes or of those made for educational purposes represents an important factor for the economic and educational sector. The historical importance, hand in hand with the geographical one, constitutes the basic foundation for the attraction of tourists.

The presence of the fortress within the geographical landscape of Cluj-Napoca City also had and still has a negative imprint, because of the hovels that were built along the slope, which greatly affected the vegetation and led to soil degradation. In more recent times, the blocks of flats which still exist at the foot of the hill are in constant danger due to the geological bedrock and the processes that led to the emergence of landslides in the past, and may possibly occur once again.

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