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LISTING, EVALUATION AND TOURISTIC UTILISATION OF GEOSITES CONTAINING ARCHAEOLOGICAL ARTEFACTS CASE STUDY: CICEU RIDGE (BISTRITA-NASAUD COUNTY, ROMANIA)

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ABSTRACT
The Ciceu Ridge Geosite is located in Bistriţa-Năsăud County (Romania) and is characterised by important geological and geomorphological features which exert influence at cultural and historical level. Thus, through its geo-morphometric parameters and its situation in the vicinity of the Someşul Mare Valley, the Ciceului Crest gained since ancient times special cultural and historical values, as proven by the multitude of archaeological artefacts it comprise, dating from Dacian, Roman, and medieval periods. The present paper intends to complexly list and evaluate this geosite for its touristic utilisation. As such, basing on an inventory list, we evaluated the scientific, ecological, aesthetical, cultural, and economic value of the Ciceu Ridge, assigning to each criterion appointed to these values a score between 0 and 1. The results revealed that the geosite has a high scientific, aesthetic, and cultural value (scoring between 0,82 and 0,93), which assure a high attractiveness, and low ecological and economic value (0,4 – 0,5 points), which has a negative effect on the utilization, protection, and preservation of its components.

Keywords: geodiversity, geomorphosite, geotourism, geoarchaeology, Ciceu Ridge

1. INTRODUCTION

During the last decade, geomorphologists' interest was oriented towards listing and evaluating geosites for their future touristic utilisation. Geosites and geomorphological sites are relief forms with a scientific, aesthetical, ecological, economical, and cultural value, in respect of human perception, that complete the total heritage of a given territory, beside biodiversity and human creation (Panizza, 2001, Panizza, Piacente, 2003, Panizza, Piacente, 2008, Marthaler, 2003, Reynard, Coratza, Regolini-Bissig, 2009, Reynard, Regolini-Bissig, Kozlik, Benedetti, 2009, Ilieş, Josan, 2009).

In the evolution of human society, the relief was not only a support for economic activities, but also fulfilled a strategic role, of defence against invasion and war. Thus, some relief form gained cultural and historical value, as special constructions for observation and defence occurred: citadels, castles, observation towers, etc.

Some of these artefacts are functional to the present day, while other resist only as archaeological vestiges, revaluing the comprising relief, providing the latter a cultural and educative value that may be utilised through various touristic activities. This also applies to numerous vestiges and artefacts in Bistriţa-Năsăud County, emphasising the strong relation between human communities living here and its relief.

Bistriţa-Năsăud County lies in north Romania, at the contact between the Transylvanian Depression and the Eastern Carpathians (figure 1). The county's relief presents two geomorphological steps in form of a natural amphitheatre which opens widely towards the Transylvanian Depression: the mountain level to north and east, comprising the Ţibleş – Rodna – Bârgău – Călimani mountain area, and the hill region in the south, south-west and west, represented by the Someşului Mare Hills, the Bistriţei Hills, the Lechinţei Hills, the Jimborului Hills, and the Unguraşului Hills.

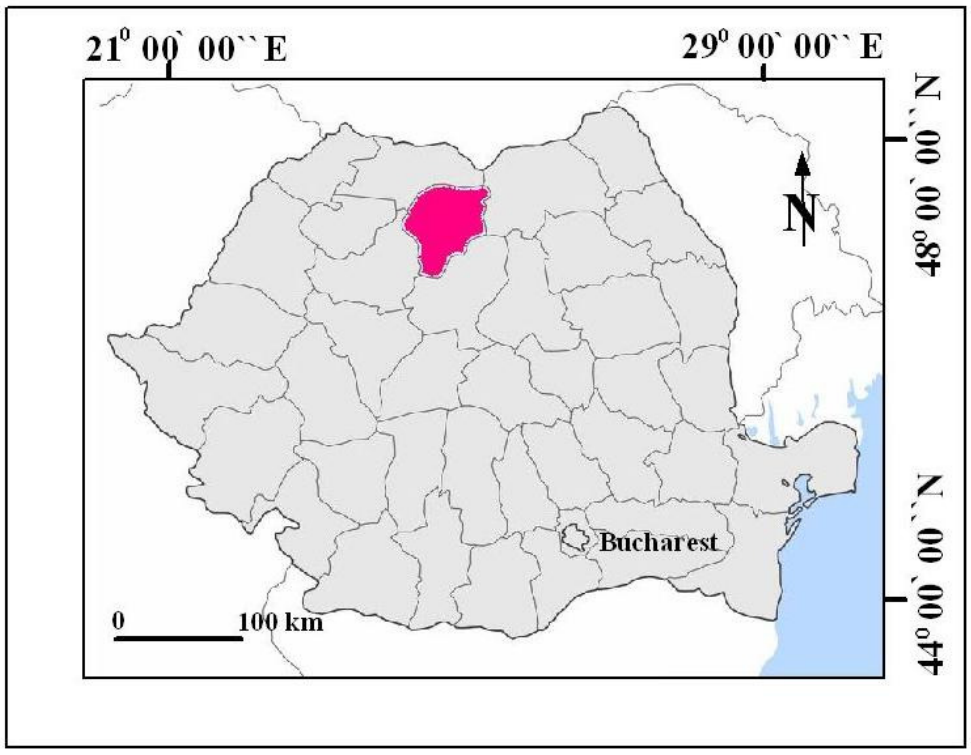

Figure 1-Geographical location of the Bistrita-Nasaud County in Romania

These geomorphological units comprise a relief which stirs, in addition to a strictly scientific interest, also a cultural and historical interest, as they served over time, through their position and geo-morphometric parameters (altitude, energy, slope) as base for the placement of settlements, fortifications, or roads with historical relevance. Such geosites, with strategic functions, are represented by prominent peaks and elongated crests which offer good visibility over the nearby communication corridors. Among these geosites, the most geo-archaeological important ones are: Cetăţii Hill from Bistriţa, Cetăţuii Peak from Pintic, Cetăţii Hill from Viile Tecii, Cetăţii Peak from Anieş, Ciceu Ridge and Păltiniş Ridge from Sita Spermezeului and Băile Figa (figure 2).

The Cetăţii Hill from Bistriţa (680 m) rises above the Bistriţa Ardeleană couloir and the Dumitra Depression as a narrow crest on a synclinal slope carved on Jabeniţa conglomerates, preserving vestiges of a middle-age earth fortress, represented by enclosures, ditches, earth mounds and slopes.

The Cetăţuii Peak from Pintic (549 m) rises above the Pinticului Valley and resembles a cone situated at one end of a crest, surrounded by radial-divergent slopes. O its top, there are vestiges of an early middle-age earth fortress, represented by ditches and earth mounds.

The Cetăţii Hill from Viile Tecii (512 m) guards the Dipşa Valley, shaped as an isolated cone. Here, artefacts from the Dacian period until the late Middle Ages have been discovered.

The Cetăţii Hill from Anieş (759 m) dominates the valley of the Someşul Mare River in the form of a blunt peak over a ridge, offering a wide visibility towards the Rodna basin, holding traces of medieval earth fortress.

The Păltiniş Ridge (700 m) from Sita Spermezeului dominates the valleys of Ilişua and Curtuiuş, preserving vestiges of a roman watchtower and Băile Figa (*Spa*) near Beclean preserve artefacts from the Bronze Age and Iron Age linked to salt mining and utilisation.

It can be noticed that most of these geosites are named "Cetăţii (*Fortress*) Hill" or "Cetăţii (*Fortress*) Peak", revealing their strategic role in the past.

Beside these geosites, several other can be mentioned, preserving World War II fortifications (entrenchments, shooting ranges, communication ditches, shooting positions): Bistricior Crest, dominating the Dorna Valley and the Colibiţa Depression, Tihuţa Hill in the Bârgău Defile, or Dosul Zâmbraiei in the Bârgău Mts.

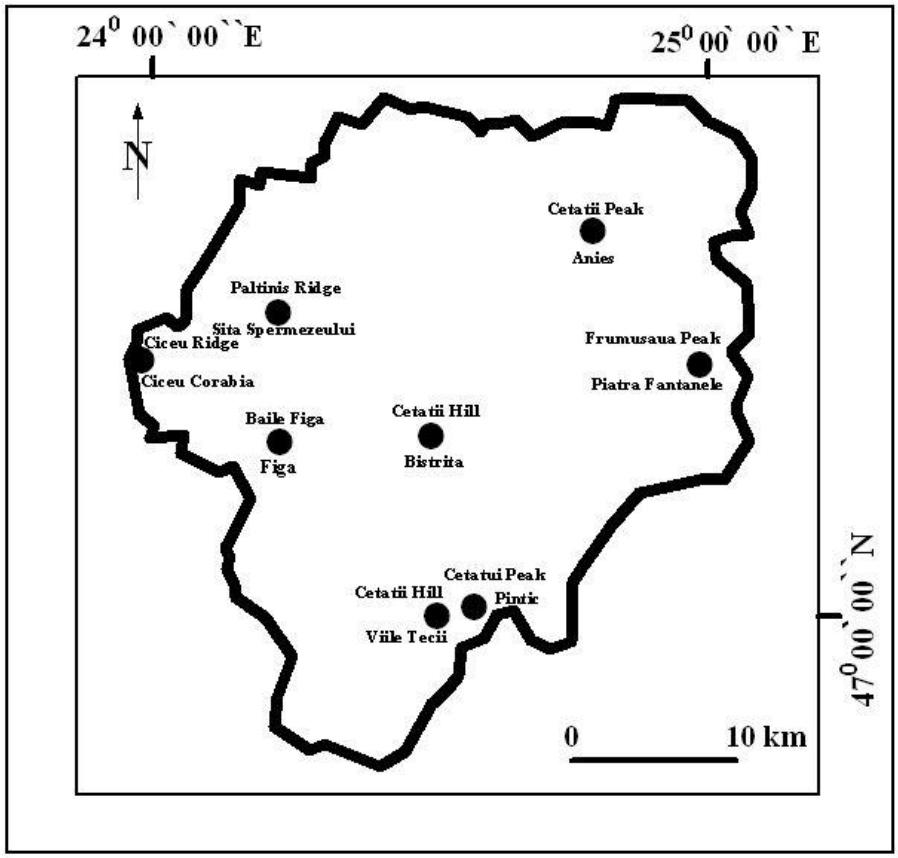

Figure 2-The Map of geosites with archaeological vestiges in Bistrita-Nasaud County

The presence of these archaeological valuable geosites in the county of Bistriţa-Năsăud offers a series of educational and touristic opportunities, thus supporting cultural, historical, and geo-didactic tourism (Panizza, Piacente, 2008, Pralong, 2009).

Our article attempts to catalogue and evaluate the Ciceu Ridge geosite, which has an important historical value, besides the scientific dimension, and is therefore valid to be included in touristic circuits, basing on future utilisation strategies.

2. MATERIALS AND METHODS

2.1. Geographical position and characterisation of Ciceu Ridge geosite

The Ciceu Ridge geosite lies in the west of Bistriţa-Năsăud county, in the central part of the Ciceu Hills, a subunit of the Someşul Mare Hills, 7 km north of Ciceu Mihăieşti and the European route E58 (figure 3).

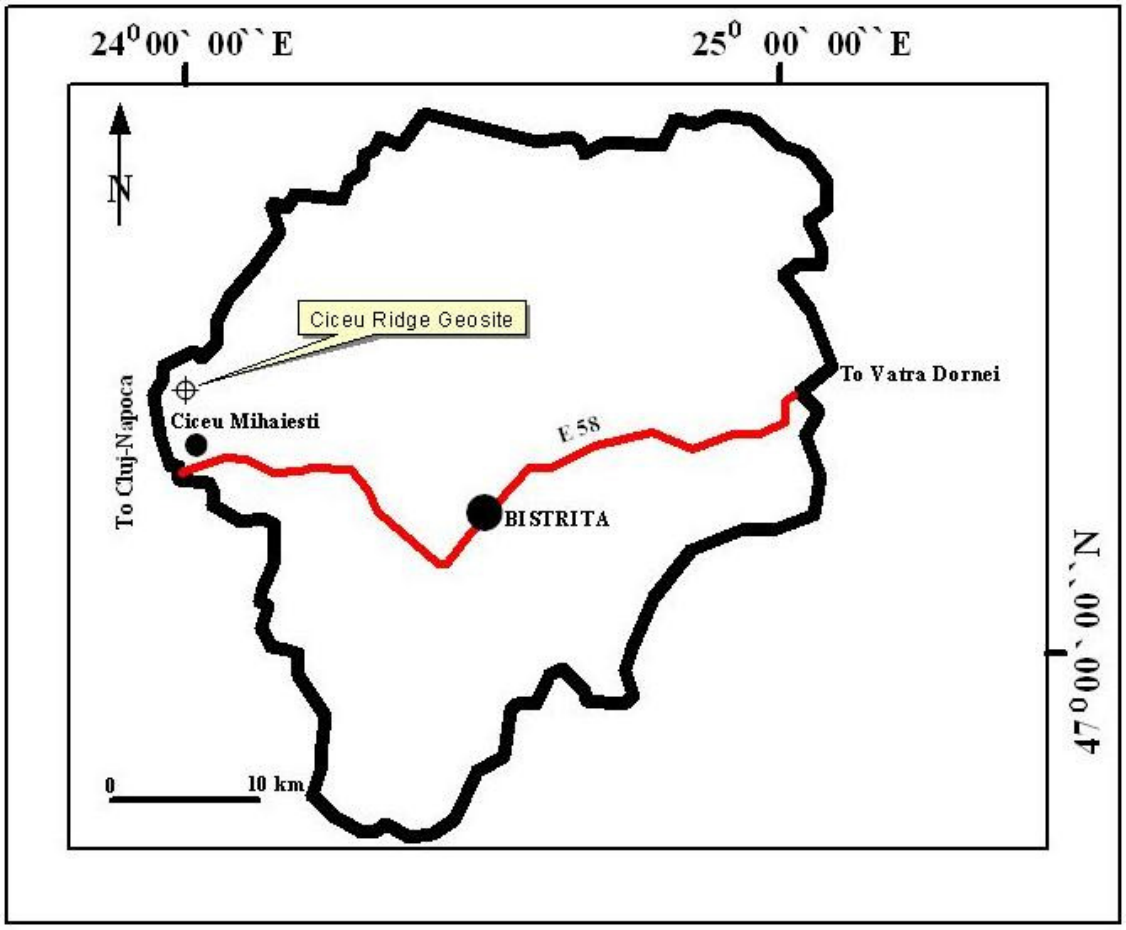

Figure 3-Geographical position of Ciceu Ridge geosite in Bistrita-Nasaud County

The Ciceu Ridge was modelled on a volcanic massif from the Badenian, and is formed of rhyo-dacitic ignimbrites and fallout tuffs. It stretches along a W-E-NW-SE line, neighbouring the Sălătruc Valley to the west, the Bricii Valley to north-west, the Dumbrăveni Valley to north-east, the Girgeşti Valley to east and south-east, the Merilor Valley to south-west and the Ciceu Valley to the south (figure 4).

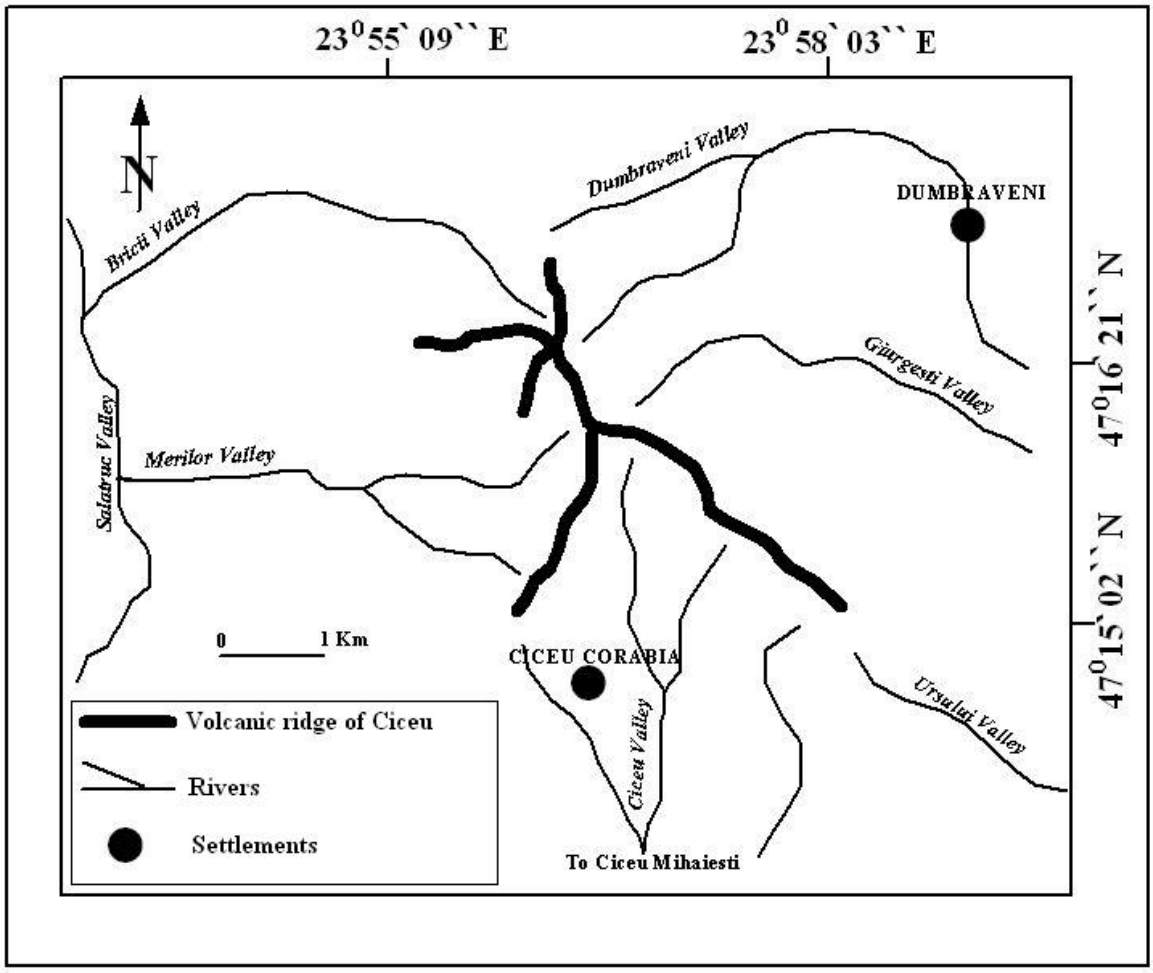

Figure 4-Geographical position of Ciceu Ridge within Ciceul Hills Unit

In its longitudinal profile, the Ciceu Ridge has a sequence of plateaus and rounded, blunt, and sharp peaks, reaching between 680 and 790 m, separated by gaps. The length of the ridge is 5 km, containing following segments:

- Ciceul Mic - Măgura Sector, with the Ciceul Mic Peak (683 m), the Ciceul Spânzului Plateau (730 m) and the Măgura Plateau (750 m);
- Zidia Sector (700 – 735 m);
- Spânzul Sector, with the Spânzul Peak (795 m), Bicii Peak (720 m) and Poniţa Peak (715 m).

The cross section of the ridge is narrow, extending between 100 m (Bricii Peak, Poniţa), 125 m (Ciceul Mic, Măgura), and 250 m (Ciceul Spânzului), while its flanks have steep, fragmented slopes with scarps, dells and erosion basins (figure 5). At the foot of the side that lies under the Măgura plateau to the south-west, there is a 273 m long tectonic cave, carved in to tuffogenous rock and in pre-existent sandstone (Giurgiu et al., 1983, Tămaş et.al., 2000).

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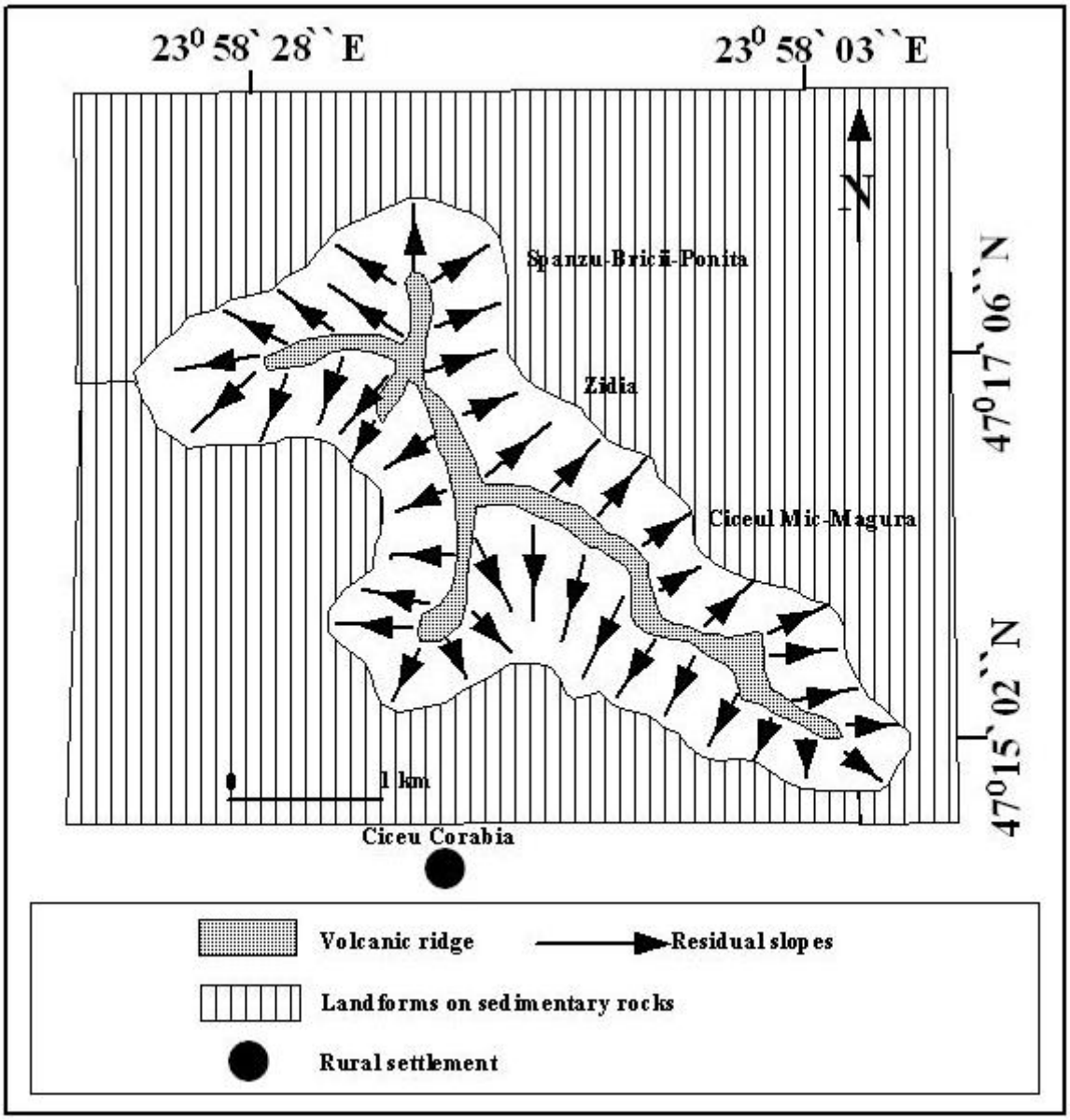

Figure 5-Geomorphologic map of the geosite Ciceu Ridge

The drop between the ridge and the surrounding sedimentary relief (Ottnangian sandstone, sand, diorite, silt) measures between 250 and 350 meters, therefore dominating the landscape (figure 6, figure 7).

Regarding its origin, the Ciceu Ridge is part of the volcanic structures situated at the exterior of the Neogene eruptive chain from the Easter Carpathians and the Apuseni Mts., inside the Transylvanian Plateau (intra-plate volcanism).

The emergence of the volcanic massif from Ciceu took place during the Badenian over the G9 fracture, and the eruptive activity had three stages, as follows (Mârza, I., Mirea, O., 1991):

Figure 6-View over the Ciceu Ridge from south-east

Figure 7-Rhyo-dacitic ignimbrite scarp under the Ciceul Spânzului Plateau (730 m)

- in the first, explosive-submarine stage, the coarse tuff is formed (the lower level of the Dej tuff), widely present in the sector Ciceul Spânzului-Măgura and Poniţa;

- in the second, mixt-over-ground stage, the ignimbrite flows, pyroclastic

flows and fallout tuffs emerge, covering the entire massif;

- in the third, explosive stage, the medium-coarse and fine fallout tuffs (the upper level of the Dej tuff) form a layer over the entire massif.

Through its considerable dimension, the Ciceu Ridge dominates the Someşul Mare Corridor, an important historic communication axis. Therefore, the Ciceu Ridge possessed since oldest times a remarkable strategic function. On it and at its base, fortifications and settlements were erected, which are nowadays preserved as archaeological vestiges, giving this space a distinct cultural value (Pădureanu et.al., 1995, Szasz, 2010).

Thus, the southern part of the Măgura Plateau preserves traces of a fortification from the first period of the Iron Age (9^{th} – 8^{th} cent. BC), while at the foot of this plateau, in a place called Sub Cetate (*Under the Castle*) there is evidence of a Dacian settlement. During the Roman period, the Ciceu Ridge was part of the northern border ("limes" in latin) of the Dacia Porolissensis Province, in the sector between the castras from Căşeiu and Ilişua. Therefore, on the whole crest fragments of roman roads and watchtowers are visible (Poniţa, Muncel). During the medieval period, after the Mongol invasion from 1241, the Ciceu Fortress was erected on the Ciceul Mic Peak and the Ciceul Spânzului Plateau, which represented, from the 13^{th} to the 16^{th} century, an important bastion of the defence of this part of the Principality of Transylvania (figure 8, figure 9).

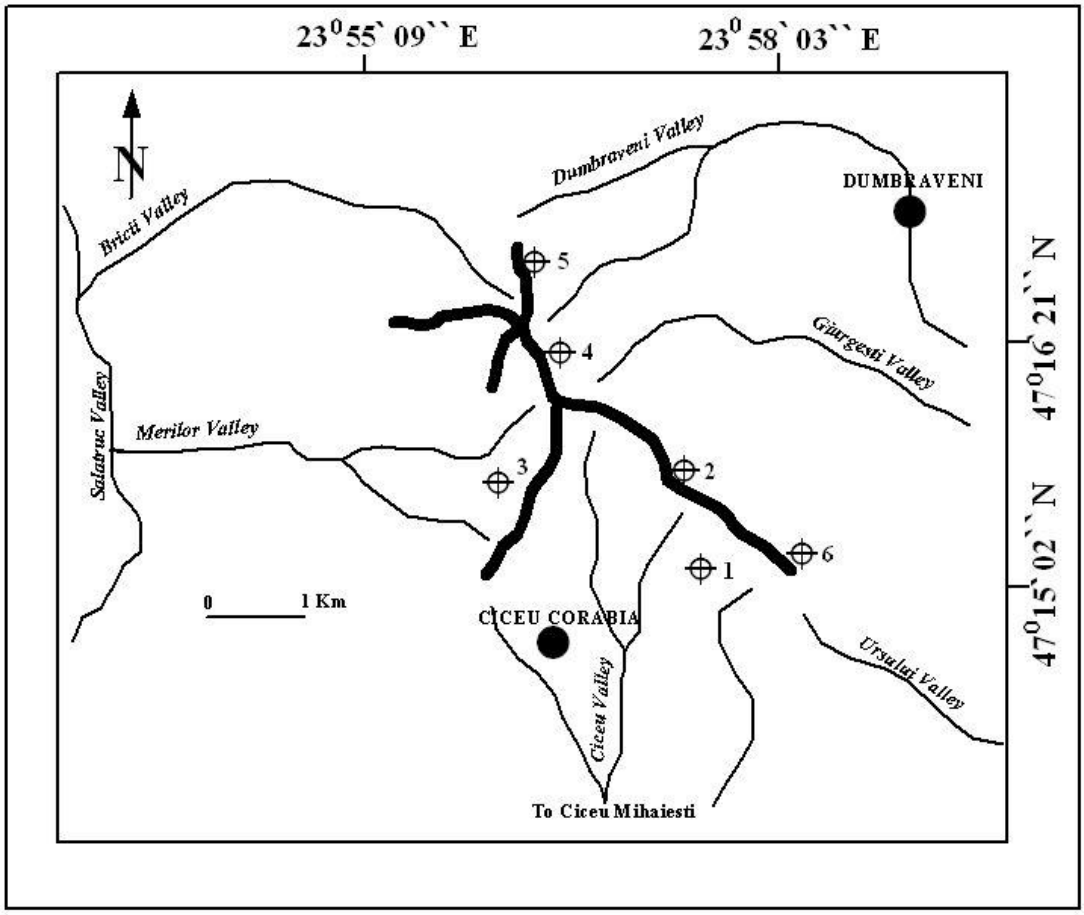

Figure 8-Geoarchaeological map of Ciceu Ridge geosite. 1-Dacian settlement; 2-Dacian fortress; 3-Fragments of Roman roads; 4, 5-Roman watchtowers; 6-Ruins of the Ciceu Fortress

Beside its strategic role, the Ciceu Ridge supported the craft of millstone manufacturing, because its slopes offered the necessary hard rock (rhyo-dacitic ignimbrite). From the medieval period until the 19th century, thousands of millstones were cut at the foot of the Ciceu Ridge, and then distributed in Transylvania. This activity had a negative impact on relief, as proved by the residual image of the slopes around the ridge. On their façade, pits, ditches, overhangs and excavations are still visible, generated in the rock extraction process. At the base of slopes, there are large debris fields, resulted from the millstone chiselling.

An actual stone civilization developed in the settlements around the Ciceu Ridge, with its artefacts still present in form of gate pillars, troughs, and grave crosses (figure 10). Furthermore, peoples from the villages Ciceu Corabia, Leleşti, Ciceu Mihăieşti and Ciceu Giurgeşti uses the blocks from the slope debris as building material.

Figure 9-Ruins of the Ciceu Fortress

Figure 10- Trough carved in volcanic rock in Ciceu Corabia village

2.2. Methodology

For the elaboration of this paper, following working steps were completed. First, the consulting of special sources referring to the historic role of this sector and to its archaeological vestiges. Given its configuration, the Ciceu Ridge fulfilled a strategic role since the dacian-roman period, when fortifications for the surveillance of the surrounding area, widely open towards the Somesul Mare corridor, were erected here. In the Middle Ages, the Ciceu Castel was built on it as an administrative centre of the Ciceu land, comprising 60 villages. Basing on these facts, the archaeological elements to be inventoried and evaluated were specified. Further, the review of international literature regarding geosites and geo-landscapes, basing on which future action measures were drawn, and evaluation criteria and quantification methods for each analyzed element wer set.

After establishing the theoretical and methodological framework, a detailed field research has been undertaken, during which various geo-morpho-dynamic features were charted, such as the configuration of slopes and crest, the position and characteristics of fortifications, present-day geomorphological processes, the impact of human intervention on the relief, etc.

The final step consisted in creating evaluation sheets for the geosite, defining the inventory and evaluation of the scientific, ecological, aesthetical, cultural and economic dimensions of the geosite, basing on relevant criteria. For each criterion, a score between 0 and 1 was appointed, whit steps of one quarter of a point, resp. 0 = nothing, 0,25 = low, 0,50 = high and 1,00 = very high. The scoring had deviations from these standard values, depending on the actual status of the evaluated element (e.g. 0,20 or 0,80). After each criterion was noted, the global value was calculated by summing the points and dividing the result to the total number of criteria.

After quantifying the scientific, ecological, aesthetical, cultural and economic values of the geosite, the global value of the geosite was calculated, the result being in fact its touristic value, by summing all individual global values and dividing them by 5, according to the formula: Vtour = (Vsci + Veco + Vaest + Vcult + Vecon)/5, where Vtour represents the touristic value, Vsci is the scientific value, Veco is the ecological value, Vaest the aesthetical value, Vcult the cultural, and Vecon the economic value.

3. EVALUATION OF THE CICEU RIDGE GEOSITE

Due to the scientific and cultural importance of the Ciceu Ridge, a complex evaluation has been implemented, basing on an inventory file suggested by Reynard (2006), with necessary adaptations. The results of this process are represented in the tables 1 to 6.

Table 1 contains some identification data of the geosite, as follows:

Table 1. General data

Geographic position	Ciceu Hills, Someş Plateau
Coordinates	$47^0$16`15``N-$23^0$56`10``E
Type	Linear
Area	6 km^2

In table 2, the scientific value of the geosite was evaluated, basing on several criteria meant to emphasize its geomorphological and functional character. The score of these criteria was maxim, excepting the one regarding the integrity of the geosite, because the slopes of the Ciceu Ridge suffered severe changes due to anthropic intervention along time through rock exploitation for buildings, household equipment (troughs) and mill stones.

Table 2. Scientific value

Criteria	Evaluation	Marks
Integrity	Building of fortifications and stone winning severely degraded the relief	0,20
Representativity	Ciceu Ridge is a representative morphological structure, both geo-morpho-functional and morphogenetic, in the Ciceu Hill area	1,00
Uniqueness	It is a distinct volcanic structure in the geomorphologic landscape of the Someşul Mare Hills and the Transylvanian Plateau	1,00
Palaeogeographical value	The geomorphosite is representative for the evolution of outer-Carpathian Neogene volcanism and for the relief on linear volcanic structures	1,00
Educational value	The Ciceu Ridge offers information about comprising petrographic formations, the evolution of volcanic relief and the impact of human activities on the environment	1,00
Scientific value	The Ciceu Ridge geomorphosite is highly representative for the evolution of Neogene volcanic relief in the outer-Carpathian area	**0,84**

The ecological value, specified in table 3, got a low score because the geosite is not protected and preserved by a protected area, although the scenery and the ecosystem are important (mesophyll oak forests, hill willows, rock vegetation, etc.).

Table 3.Ecological value

Criteria	Evaluation	Marks
Ecological influence	Through its geomorphological features, Ciceu Ridge supports the development of various ecosystems (forest, meadow, rock, cave, etc.)	1,00
Protected sites	There are no protected sites in this geomorphosite	0,00
Ecological value	The Ciceu Ridge possesses a high ecological relevance, but is not favoured with the benefits of a protected area	**0,5**

The aesthetic value of the geosite got a high score (table 4), as the Ciceu Ridge is characterised by an important attractive potential, given by its extent and altitude. A somewhat lower score (0,80) was given to the chromatic contrast which, although relevant, does not represent the main feature of the magmatic massif.

Table 4. Aesthetic value

Criteria	Evaluation	Marks
Visibility	Through its altitude and shape, the Ciceu Ridge can be observed from a great distance. Moreover, the ridge offers, from certain points, a great visibility over the surroundings	1,00
Contrast, vertical development and space structuring	The Ciceu Ridge rises above the surrounding sedimentary relief with some 250 – 300 m. Its top line is bordered by steep slopes which connect to the lower sedimentary area through glacises.	1,00
Chromatic diversity	The alternation of grey rocks and the green of oak forests and meadows assure the geomorphosite an interesting chromatic image	0,80
Aesthetic value	By its dominant position and its physiognomy, the Ciceu Ridge impresses through a high aesthetic level	**0,93**

The cultural value of the geosite (table 5), determined by means of criteria regarding spiritual and historical components, obtained relatively high marks (0,50 – 1,00), thus certifying the strong bound between human communities and the Ciceu massif.

Table 5. Cultural value

Criteria	Evaluation	Marks
Religious and symbolic importance	It does not support religious activities, but through the ruins of the Ciceu fortress, preserved on the Ciceul Mic Peak (698 m), it represents symbol for the population of the surrounding region	0,50
Historic importance	The Ciceu Ridge preserves numerous archaeological vestiges, represented by traces of Roman watchtowers, traces of a fortress from the 9th century and the ruins of the medieval Ciceu Fortress. On the plateaus at the bottom of the crest, housing ensembles, tools and weapons from the Palaeolithic, Chalcolithic and Bronze Age were discovered.	1,00
Literary and artistic importance	The Ciceu Ridge and the ruins of the medieval fortress are found in many writings about this region. Likewise, in Poiana Doamnei (*Lady's Glade*) beneath the crest, the annual Ciceu Fortress Festival takes place.	0,80
Geo-historic importance	The Ciceu Ridge is geologic, geomorphologic and archaeological relevant	1,00
Cultural value	The Ciceu Ridge geomorphosite features ancient inhabitation traces and many archaeological vestiges, thus possessing a significant cultural dimension	**0,825**

Economically, the Ciceu Ridge geosite recorded a lower score, as the region lacks on special touristic facilities (access roads, marked touristic paths, resting places, lookouts, touristic pensions), and promotion activities are insignificant.

Table 6. Economic value

Criteria	Evaluation	Marks
Accessibility	Relatively facile access on the routes Ciceu Mihăieşti-Leleşti-Ciceu Corabia, Dej-Rugăşeşti-Leurda and Ciceu Giurgeşti-Dumbrăveni	0,50
Present utilisation and geomorphological interest	The Ciceu Ridge geomorphosite attracts moderate number of hiking, climbing, and scenery admiring tourists	0,50
Present utilisation and cultural-historical interest	The archaeological vestiges and the Ciceu Fortress Festival attract a large number of visitors	0,80
Legal protection and utilisation restrictions	There are no regulations regarding the protection and utilisation of the geomorphosite	0,00
Installations and services	There is no adequate touristic equipment, nor agro-touristic facilities. There is a marked touristic path to the ruins of the Ciceu fortress	0,20
Economic value	The economical utilisation of the Ciceu Ridge geomorphosite is poor	**0,4**

The score gathered by the Ciceu Ridge geosite at scientific, ecological, aesthetic, cultural and economic level emphasizes, on one hand, its strong points, and on the other its threats and opportunities (table 7). Therefore, a correlation of all stakeholders is necessary for a touristic utilization of the geosite.

Table 7. Synthesis

Global value	The geomorphosite is scientifically and culturally very important
Potential threats	Construction stone winning on the south-eastern side Degradation of archaeological vestiges (the ruins of the Ciceu fortress) Accumulation of garbage in Poiana Doamnei after the Ciceu Fortress Festival
Management measures	Including the geomorphosite into a protected area is imperative

4. RESULTS

After the inventory and evaluation process, the Ciceu Ridge geosite reached a relatively modest global value (0,698), obtained by summing the global values of all studied components and dividing the result by their total number, according to the formula: Vglob = (Vsci + Veco + Vsce + Vcult + Vecon)/5, where Vglob is the global value, Vsci is the scientific value, Veco is the ecological value, Vsce is the scenic value, Vcult is the cultural, and Vecon the economic value. Given the purpose of this paper, the global value represents actually the touristic value (Vtour) of the geosite.

The conducted complex evaluation shows that the lowest values are recorded by the ecologic (0,5) and economic (0,4) components, since Ciceu Ridge is not yet a protected area, and its touristic value, with minor exceptions, is quite modest (table 8).

Table 8. Global value of the Ciceu Ridge Geosite

Scientific value	Ecologic value	Scenic value	Cultural value	Economic value	Global value
0,84	0,5	0,93	0,82	0,4	0,698

Scientifically, aesthetically and culturally, the Ciceu Ridge geosite comes out with high global values (0,82 – 0,93), supported by its geomorphological and archaeological features. This emphasizes the personality of the Ciceu massif and is

reflected by the options of tourist arriving in the area. Thus, after a monitoring in the timeframe 2008 – 2010, 1500 visitors were counted, from which 70% have been attracted by the ruins of the Ciceu Castle and the Ciceu Castle Festival (figure 11), while 30% of the were attracted by the scenery.

Thus, future strategies for the utilization of the local touristic patrimony, elaborated by the communes of Ciceu Mihaiesti and Ciceu Giurgesti, but also at county level, are oriented mainly towards the integration of the Ciceu Ridge in cultural and educational touristic circuits. Furthermore, the ecologist association Harta Verde (*Green Map*) from Bistrita and the Faculty of Tourism Geography from Bistrita are developing a project to ensure the Ciceu Ridge will be declared a protected area of archaeological and scenic interest.

Figure 11-Ciceu Castle Festival

5. CONCLUSIONS

The Ciceu Ridge Geosite from the county of Bistriţa-Năsăud, consisting of the Ciceu volcanic massif, represents an important geological and geomorphological landmark in the Transylvanian Plateau, with consequences on scientific, aesthetic, ecologic, economic and cultural level.

Through its geo-morphometric parameters and its location near an important transportation corridor, the Ciceu Ridge gained distinct cultural-historical connotations, emphasized by the archaeological vestiges present in this area.

The incorporation of the Ciceu Ridge in different touristic programmes is a long term issue, which has to be perceived in a larger context such as the development of tourism in Bistriţa-Năsăud County and well as in Romania. What is more, due to its singularity the geosite could support cultural-educational, scientific and leisure touristic activities, favoured in addition by its closeness to the European Rout E58 as well as the towns of Dej and Beclean.

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