

**THE GEOTOURIST MAP OF CIUCAȘ MOUNTAINS
(EASTERN CARPATHIANS, ROMANIA) – MODEL
REGARDING CAPITALIZATION OF GEOMORPHOSITES**

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ABSTRACT

The Geotourist map is a synthetic cartographic product that starts from the Tourist Map (on which natural and anthropogenic tourist attractions and infrastructure are represented) to which elements of geology and geomorphology (especially geosites and geomorphosites) are added. The map is based on the documentation of the specialized literature, the use of topographic maps and aerial images as well as detailed mapping in the field. The case study chosen is Ciucaș Mountains located in Eastern Carpathians (Romania). The main objective of our paper is to introduce into the tourist activity a series of geomorphosites of great value, insufficiently known and exploited, and the creation of geotourist routes: the differential erosion route and the subalpine route.

Keywords: geotourist map, geotourist routes, geomorphosites, Ciucaș Mountains, Carpathians, Romania

INTRODUCTION

The geotourist map is a relatively new type of map, which combines information related to geology and relief (primarily geosites and geomorphosites) with those of tourist interest (natural and anthropogenic tourist attractions, access infrastructure - different categories of roads and paths, access by cable, accommodation infrastructure, food and leisure, belvedere points, etc.). Their use has become more and more important, with the increased development (especially in Europe) of geotourism. They also have an educational function, this representing a basic geotourism product through which geoeducation is carried out (the transmission of knowledge from various fields related to geosites and geomorphosites).

The first cartographic representations of this type belong to the Italian school of geomorphology [1] [3] [4] [5] [6] [7], followed by other countries in the Alpine area, such as Switzerland [2] [14]. Later, the use of the geotourist map was extended to several countries, most of them with large mountainous areas (Morocco, Spain, Poland, Czech Republic, France, Serbia, Brazil, etc.).

In Romania, the first contributions of this kind are related to the Oradea school of geomorphology for the Băile Felix resort [12], by the geomorphologists from the University of Bucharest [8] [9] [10] for the Bucegi Mountains and those of the Babeș-Bolyai University Cluj Napoca (Măcin Mountains, Trascău Mountains).

The main objective of this paper is to create and analyse the geotourist map of the Ciucaș massif, a massif that presents a varied range of geomorphosites of great value,

insufficiently known and exploited. This must be achieved through geotourism. In addition, two geotourist routes have been created, which are representative and interesting for tourists, such as: the subalpine route and the differential erosion route.

STUDY CASE

The case study chosen is represented by the Ciucaș Mountains located in the southern part of the Eastern Carpathians (Romania) (Figure 1), having as neighbouring units: Clăbucetele Buzăului (N), Grohotiș Mountains (W), Teleajenului Subcarpathians (S) and the Siriu Mountains (E). They have a relatively central position in the Curvature Carpathians and show intense flows of tourists due to the concentration of a large number of valuable tourist spots (related to geology, relief, hydrography, vegetation and anthropogenic) as well as high accessibility due to the presence of national roads, forest or of tourist trails on all sides of the massif [11]. The most important access point is the Cheia resort.

The Ciucaș Mountains are made up of two subunits: Ciucaș massif (north of the springs of Teleajen, it has a central peak, with the maximum altitude in Ciucaș peak-1,954 m, with numerous ruin-shaped relief forms, with a fairly extensive subalpine floor) and the Grohotiș massif (located between the Telejean and Doftana valleys, it is composed of rounded peaks and large plateaus, with altitudes varying between 1,100-1,500 m, mainly covered with forests) [11].

They are made up of conglomerates with limestone elements which are part of the internal flysch, to which is added the presence of a broadly fold structure that led to the imposition of structural plateaus and steps on the ends of the strata (to the West and East) [13].

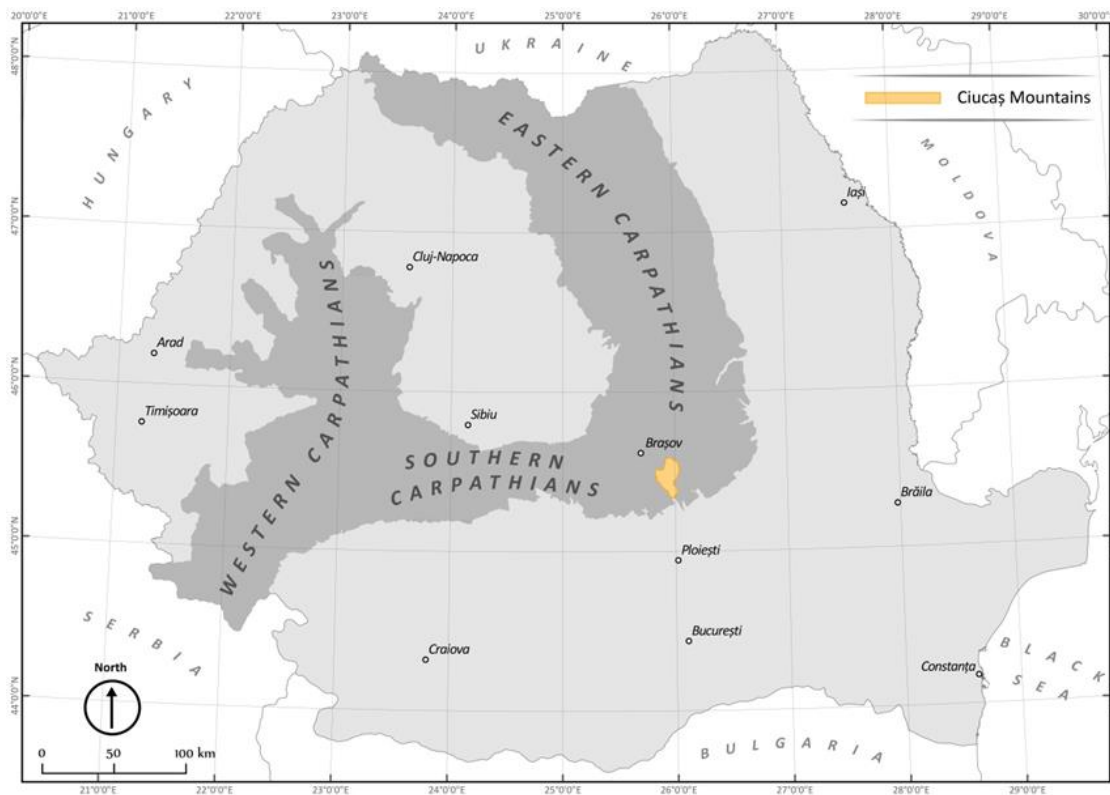


Figure 1. The geographical position of the Ciucaș Mountains in Romania

The relief is the result of the interaction in time and space of internal and external agents, resulting in different genetic types of relief such as: fluvial, periglacial, nival, denudational, structural and petrographic.

The most important and representative types of geomorphosites that can be used in tourist activity are ([11], with additions) (Figure 2):

- the cliffs, the columns, the towers around the peaks of Ciucaș, Colții Nitrii, Tigăile, Zăganu, Grohotiș;
- the ridges in the Gropșoarele - Zăganu area;
- peaks that constitute important belvedere points such as Ciucaș -1,954m, Gropșoarele - 1,883m, Zăganu -1,817m; Tigăile Mari -1,845m, Bratocea -1,827m, Zăganu -1,817m, Muntele Roșu -1,765 m, Tigăile Mici -1,717m;
- pyramidal or dome-shaped peaks on conglomerates (Dungu, Muntele Roșu, Bobu) or limestone (Tesla);
- the structural plateaus in the Chirușca Mountain, Berii Valley or in the East of the Colții Nitrii ridge;
- the narrow gorges with steep slopes along Teleajen, Valea Albă, Stânei Valley, Tesla, Șipote, Cheița, some of which appear waterfalls;
- landforms of differential erosion: Bratocei Sphinx, Tigăile Mari, Tigăile Mici, Babele la Sfat, Mâna Dracului (Five-fingered hand), Goliath Tower, Gemenii Ciucașului, Căprioarei Tower, Podul de Aramă, Porumbelul, Moș Crăciun, Triangular Tower, Red Tower, Muntelui Roșu Needles, Bratocei Needles, Zăganu Needles;
- cuesta fronts developed along the Bratocea-Tigăi interfluves - Nitrii peak - Zăganu mountains alignment;
- hogbacks in the Zăganu Mountains;
- steep structural slopes of over 500 m with scree and rock torrents;
- nival microdepressions, niches and cirques resulting from snow accumulations (Chirușca, Bratocea interfluves and at the origin of the Stânelor valley);
- nival valleys in the shape of the letter U, with a length of about 500 m, located at the origin of the Berii, Stânei and Chirușca valleys;

METHODOLOGY

To create the geotourist map, several steps must be followed, this being the result of combining geology/geomorphology information with tourist geography information (Figure 3). Thus, in the first stage, the documentation related to the analysed area is carried out from the specialized literature (works in geology, geomorphology, hydrology, vegetation and fauna, protected areas, geography of tourism, but also from related fields such as history, ethnography, architecture, religion) and from the cartographic database (tourist maps at different scales, topographic maps from various editions, orthophotos and aerial images).

The next stage consists in field trip, where the information from the first stage is completed and updated, the mapping of the most important landforms, the inventory of geomorphosites and their location on the cartographic support, the identification of natural and man-made tourist attractions, infrastructure elements and their representation on the cartographic support.

In the further of the approach, specialized SIG software (including information from own flights) is used to represent information related to geology, relief and those of tourist interest, as well as other elements that may be useful in carrying out tourist activities (for

example: natural protected areas, slopes where you can practice winter sports, vegetations, springs).

Usually, on the back of the map, various geographical information, spot, routes and tourist facilities, useful addresses and phone numbers, marked routes, proposed routes are presented.

This mapping product has multiple uses (for orientation in the field, for information and preparation of tourist activities or for didactic purposes). Depending on the purpose for which the map was made and used, it can be in the traditional format (on paper) or online (by accessing a specialized site, when the possibility of updating is permanent).

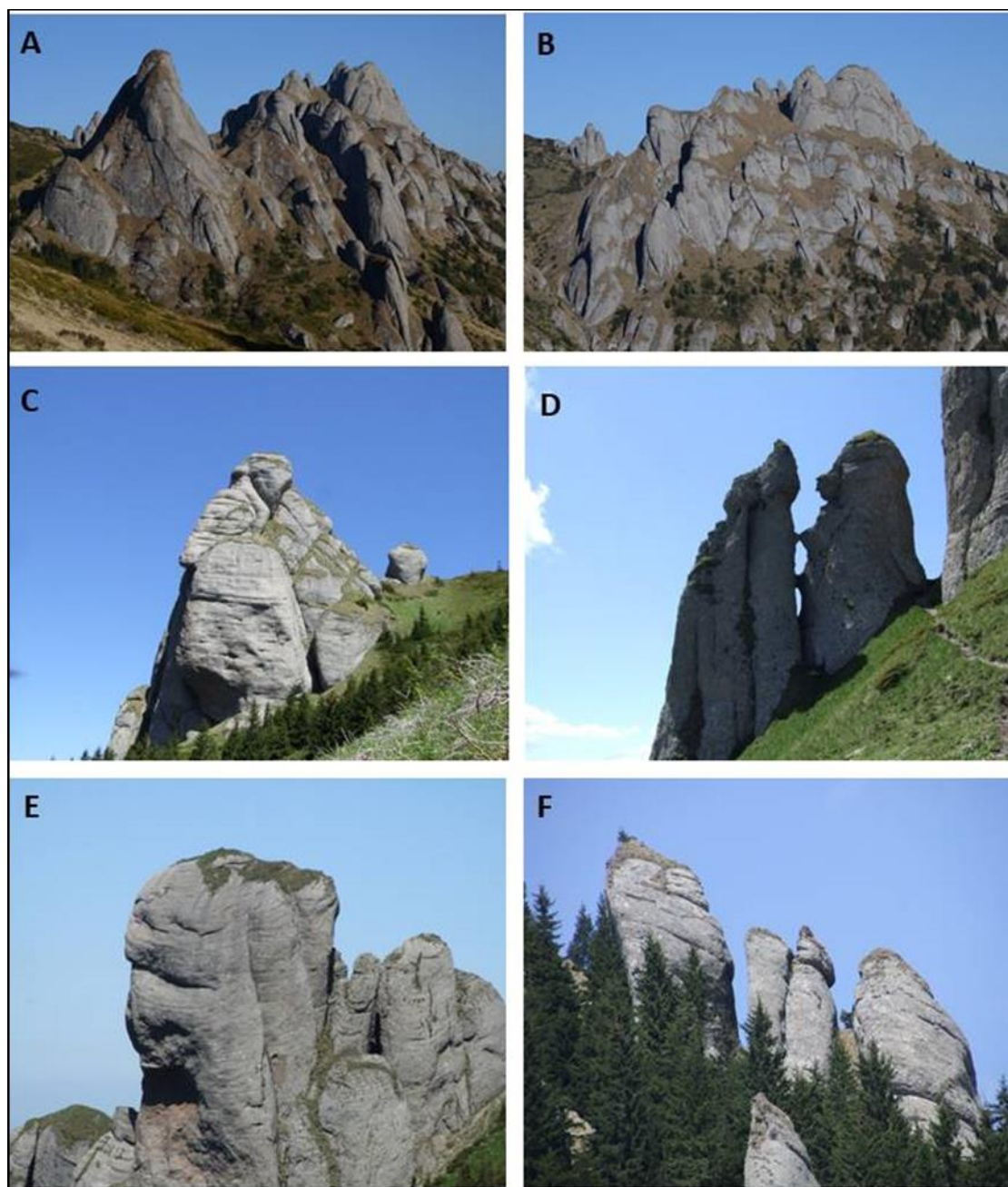


Figure 2. The most important geomorphosites in Ciucaș Mts (original) (A- Tigăile Mari, B-Tigăile Mici, C- Goliat Tower, D- Babele la Sfat, E- Bratocei Sphinx, F- Bratocei Needles)

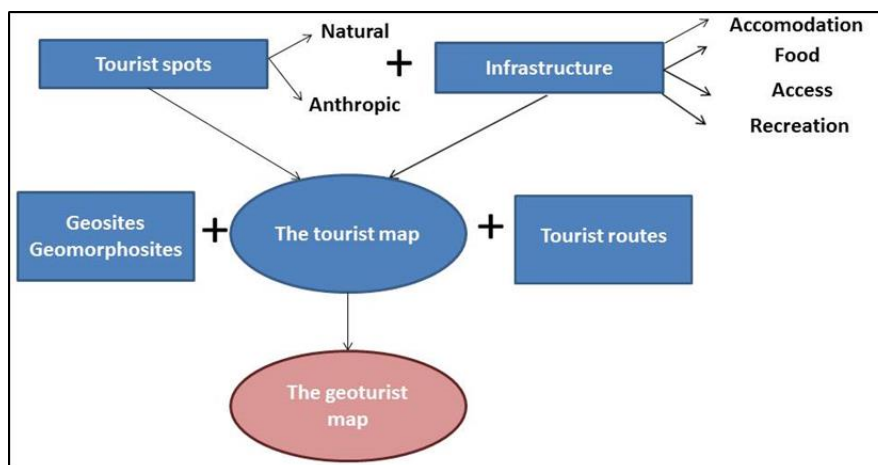


Figure 3. The geotourist map- methodological approach

RESULTS AND DISCUSSION

Following the application of the previously described methodology, the geotourist map was created in the central part of the Ciucaș massif, where most of the objectives and infrastructure of tourist importance are located (Figure 4). The main elements included in it are: the access network (national roads, forest roads, paths with markings and panoramic paths), tourist infrastructure (for accommodation - chalets, campsites, parking, information points, slopes where you can practice skiing, cross-country skiing and rock climbing routes), elements related to the relief (geomorphosites, geomonuments, belvedere points, passes, isolated rocks, gorges, avalanche corridors), hydrographic elements (permanent and temporary hydrographic network, snow accumulations), types of vegetation (forest, junipers), natural protected areas, other types of elements (sheepfolds, isolated buildings).

Access is from all directions, the main route being represented by DN1A- Bucharest-Cheia-Brașov. From the northwest, the access is through the Târlungului valley to the Babarunca chalet in the localities of Întorsura Buzăului, Vama Buzăului, Valea Doftanei [11]. One notices the access by forest paths and marked trails, most of them entering the radiating valleys that fragment the massif.

The most important marked trails of the Ciucaș massif are: Cheia - Cheiței valley - Bratocea Pass - Bratocea Mountain - Tigăile Mici Mountain - Ciucaș Peak; Cheia - Buzoianul peak - Poiana Zăganu - Zăganu Mountain - Groșoarele Mountain - Cheia, Cheia - Muntele Roșu - Valea Berii - Cheia; Cheia- Cheiței valley - Balaban Mountain - Tigăilor Saddle - Ciucas Chalet - Ciucaș peak; Poiana Stânei - Valea Berii - Cheia; Vama Buzăului - Poiana Dălghiului - Mâna Dracului - Ciucaș peak; Babarunca - Poiana Tesla Valea Stânei Gorges- Stânei Saddle; Poiana Stânei - Părăului Alb valley - La Râscruce [15].

The accommodation infrastructure is represented by chalets: Muntele Roșu Chalet (1,260 m altitude, camping, slopes for winter sports, permanent regime, the existence of a meteorological and a seismic station) and Ciucaș Chalet (1,595 m altitude, two buildings, permanent regime), to which are added several sheepfolds and forestry cabins. Geomorphosites and geomonuments (geomorphosites of great value) (Table 1) are the landforms of great value that acquire (scientific, aesthetic, cultural, economic) value through human perception and constitute the basis of geotourism development. For this purpose, two routes were created: the subalpine route and the differential erosion route.

Table 1. The geomorphosites localized in the central area of Ciucaș Mts.

Name	Code	Origin	Type	Values	Route
Ciucaș Peak	BVmor01	Morphological	Punctual	Scientific, Aesthetic	Subalpine
Goliat Tower	BVed01	Differential erosion	Punctual	Scientific, Aesthetic	Subalpine
Bratocea Interfluves	BVmor02	Morphological	Area	Scientific	Subalpine
Babele la Sfat	BVed02	Differential erosion	Punctual	Scientific, Aesthetic	Subalpine
Tigăile Mari	BVed03	Differential erosion	Punctual	Scientific, Aesthetic, Cultural	Subalpine
Chirușca Intefluves	BVmor03	Morphological	Area	Scientific	Subalpine
Tigăilor Saddle	BVfl01	Fluvial	Punctual	Scientific, Aesthetic	Subalpine
Tigăile Mici	BVed04	Differential erosion	Punctual	Scientific, Aesthetic	Subalpine
Roșu Tower	PHed01	Differential erosion	Punctual	Scientific, Aesthetic	Subalpine
Albela Intefluves	PHmor01	Morphological	Area	Scientific	Differential erosion
Muntele Roșu Peak	PHmor02	Morphological	Punctual	Scientific, Economic	Differential erosion
Muntele Roșu Intefluves	PHmor03	Morphological	Linear	Scientific, Economic	Differential erosion
Gropșoarele-Zăganu Intefluves	PHkar01	Karst	Punctual	Scientific, Aesthetic	Differential erosion
Muntelui Roșu Needles	PHed02	Differential erosion	Punctual	Scientific, Aesthetic	Differential erosion
Gropșoarele Peak	Phmor04	Morphological	Punctual	Scientific, Aesthetic	Differential erosion
Triunghiular Tower	Phed03	Differential erosion	Punctual	Scientific, Aesthetic	Differential erosion
Căprioarei Tower	Phed04	Differential erosion	Punctual	Scientific, Aesthetic	Differential erosion

On each of these routes, in addition to the geomorphosites that can be observed (Table 1), a series of other information related to relief, vegetation cover and hydrography can be highlighted. For the most part, these routes correspond to sectors of existing tourist routes in the massif, with a series of deviations to include other objectives within them.

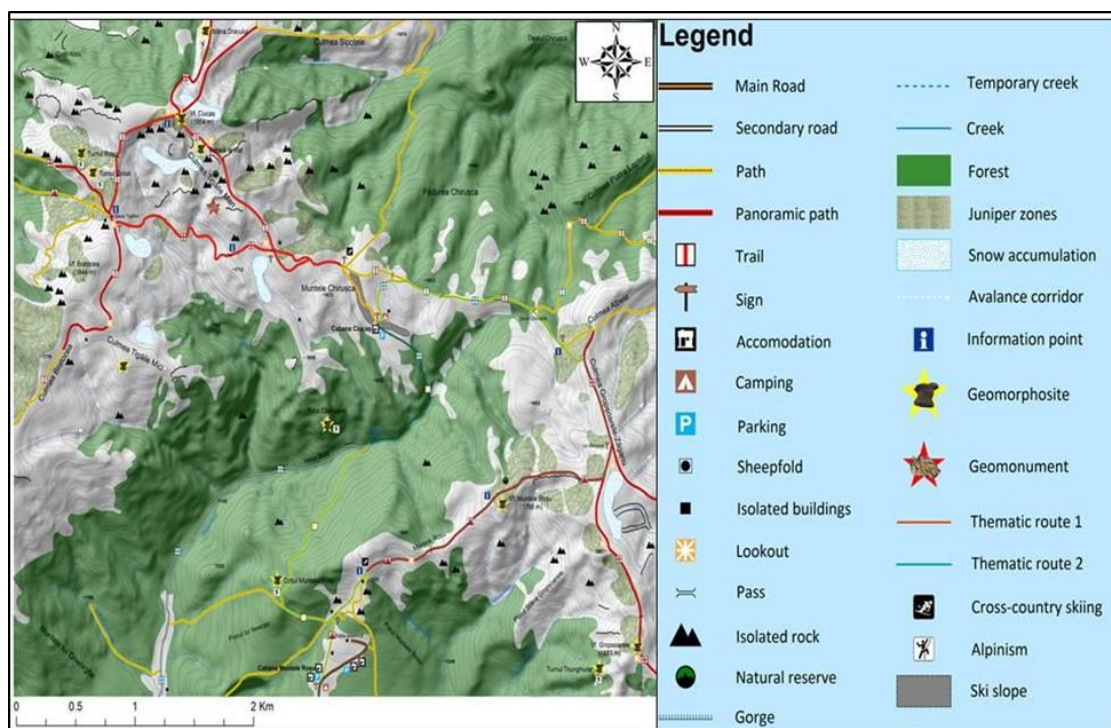


Figure 4. The geotourist map of Ciucaș Mts

CONCLUSION

The Ciucaș massif has numerous geomorphosites that are reduced or not included in the tourist activity, due to the lack of necessary information (lack of updated or complete cartographic materials, non-existence of information panels both in the Cheia resort and along some routes, deficient markings in certain points; flyers with a few and poor geotourism information). It is also necessary to adopt some legislative measures (declaring the natural protected areas) and structural measures (construction of fences, arrangement of paths) for the most important geomorphosites located in this area. The degree of protection is quite low in this area. Thus, the Ciucaș Mountains currently have protection status - SCI within the Natura 2000 network, but this primarily concern the ecosystems (existing species of flora and fauna). Among the geomorphosites, Tigăile is a protected natural area (category IV IUCN), by Law No. 5 of March 6th, 2000 and has an area of 3 ha, a set of forms of differential erosion, areas with alpine hollows, meadows and pastures, being protected.

Given the value of geomorphosites in this area, it is necessary to develop geotourism, which can also provide benefits to local communities. The present map is intended to be multiplied and transmitted to the competent local authorities, in order to carry out projects aimed at the development of this form of tourist at the level of the Ciucaș massif.

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