THE ARIEŞULUI GORGE, A COMPLEX GEOMORPHOSITE IN THE APUSENI MOUNTAINS

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Abstract: – The Arieşului Gorge, a Complex Geomorphosite in the Apuseni Mountains. The linear geomorphosites are representative for the Apuseni Mountains, as for no other mountains in the Romanian Carpathians. Among them, caves of high lengths and gorges carved in limestone have always generated an attractive outshine phenomenon over gorges carved in other types of rocks, defiles. There are some defiles in the Apuseni Mountains, however, that constitute important geomorphosites. Among these, the Arieşului Gorge is one of the most representatives. With an impressive length, of 30 km between Sălcia and Moldoveşti, this gorge has a fairly high structural value due to the succession of narrow sectors and depressions, to the complexity of the landscape caused by the different types of rocks that the valley crosses, and due to the various detail morphology. At a closer look one can note that both the structural and functional values of the gorge have placed it in the top geomorphosites of the Apuseni Mountains.

Key-Words: the Arieşului Gorge, the Apuseni Mountains, geomorphosite, narrow sectors, depressions, structural and functional value

1 Introduction

The linear geomorphosites in the Apuseni Mountains, gorges and caves longer than 500m have a significant share in the inventory of geomorphosites of the region. As far as gorges are concerned, one can easily observe that the ones carved in limestones are well detached in the viewers’ perception as important landmarks. The gorges carved in other types of rocks, crystalline or volcanic are often subject to the attractive outshine phenomenon, being perceived as complementary forms.

This phenomenon is easily identified when such forms are located nearby limestone gorges, or, even more obvious, when a gorge sector carved in crystalline or volcanic rocks is associated to a limestone one, on the same river. Such examples are very frequent in the Trascau Mountains, on many of the main valleys: Râmeţ, Ampoiţa, Tur, Hâşdate, Galda etc.

However two situations arise when such forms are not subject to the attractive outshine phenomenon:

- isolated defiles, that are well imposed in the area’s landscape, due to the absence of another landform to be reported to, such as Iara Gorge
- well extended defiles, such as the ones on the Crişul Repede and Arieş rivers.

2 Study area

We will now focus on the Arieşului Gorge, a very important geomorphosite in the Apuseni Mountains, due to both its geomorphological importance to the region, especially to the Trascau Mountains, and its cultural importance.

The Arieşului Gorge is located in the northern part of the Apuseni Mountains, on the Arieş valley, between Sălcia and Moldoveşti. The gorge is overlapping the border between the Trascau Mountains and the Muntele Mare Massif between Sălcia and Poşaga; while downstream of Poşaga the waters of the Arieş carve their way exclusively in the structures of the Trascau Mountains.

Along the 30 km of the gorge sector, the Arieş Valley mainly carves hard crystalline or volcanic rocks (Popescu-Argesel, 1977). At a closer look, one can note that almost all types of rocks in the northern Apuseni Mountains are present here. The gorge is indeed carved mainly...
in crystalline rocks but in some sectors, the water exploited the contact between these rocks and the Cretaceous flysch, recognized by its tectonic instability, ophiolites downstream of Buru or even a strip of limestones.

Depending of the type of the rocks crossed, the profile of the valley has different features [Fig. 1]. In the crystalline rocks, one can note the symmetric profile, with steep, convex slopes. When the valley is carved both in crystalline and flysch, one can notice a steep, almost vertical slope in the crystalline side, and more attenuated angle of the left slope, carved in sedimentary rocks.

In the ophiolite sector, the major river bed is barely sketched, but the meandering index is very high. The steep and fragmented slopes have a ruiniform aspect, and they are covered with various forms of disaggregation (poles, towers, ridges) and debris.

![Fig 1. The Arieșului Gorge in crystalline rocks (A) and ophiolites (B)](image)

3 The geomorphosite value of the Arieșului Gorge

The main features that indicated the Arieșului Gorge as a possible geomorphosite of the Apuseni Mountains, are based on the following morphogenetic, morphometric and morphological properties:

– the multifactorial genesis, with the completion of the current „architecture” as a turnout of both complex epigenetic processes and capture from downstream to upstream;

– the great spatial extent of the Arieșului Gorge of 30 km, thus being one of the longest gorges in the Apuseni Mountains;

– the pronounced meandering index;

– the presence of steep, convex, massive slopes, among which the spectacular Bedeleu scarp stands out;

– the wide variety of detail morphology, with the predominance of alteration-disaggregation and differential erosion forms;

– the succession of narrow and wide sectors, with an important contribution to the diversity of the landscape.

In terms of complexity, the Arieșului Gorge can be registered as a system geomorphosite (a large geosite that includes in its structure smaller ones) due to the location of the Șipote Waterfall upstream from the Lunca Arieșului depressional basin, a punctual geomorphosite [Fig. 2]. It drains the waters of an abundant karst exurgence arising from the flysch deposits.

![Fig. 2. The Șipote Waterfall](image)
at the base of the Bedeleu scarp, and more likely, of a more developed endokarst system in the Bedeleu-Cireșu ridge.

The travertine cone stands as an argument in this sense, showing a long and ample underground karst denudation, with the loading of the water with carbonates deposited in contact with the air. Therefore, one can note the arrangement in successive steps of the waterfall over the travertine cone, in which a series of small concavities are sculpted, a less noticed aspect from the distance, due to the increased afforestation of the adjacent area.

The Arieșului Gorge has already been inventoried as a geomorphosite of major importance in the inventory and ranking of the geomorphosites in the Trascău Mountains. It occupied the fourth position, scoring a total of 22 points, 9.75 for the structural value and 13.75 for the functional ones. 1.5 points have been deducted, representing the restrictive attributes (Cocean and Surdeanu, 2011. Cocean, 2011).

3.1 The structural value of the Arieșului Gorge

Among the structural values, the geomorphological ones stand out. Of a high interest is the multifactorial genesis of the gorge, implying epigenetic processes, and the capture from downstream to upstream. Popescu-Argesel (1984) notes that the Arieșului gorge was formed in a complex manner: the Sălcia-Ocoliș sector by epigenesis, while the downstream part by capture made by a river that regressively advanced from the Turda subsidence bay, intersecting the old north-western Trascău hydrographic system, with the debouching in the Petreștilor Bay.

Inside the Arieșului Gorge one can notice more than five elements of geomorphic interest among which: the marginal steeps, the narrow valley profile that alternates with depressional basins, the high meandering degree and the diversity of forms carved in crystalline, volcanic or sedimentary rocks. In addition, there are many torrents with extended dejection cones (the best known being the Vidolm Valley’s one). There is also the Șipote Waterfall that has both a geomorphological value, due to its travertine cone, as well as a hydrographical one, due to this association and coexistence of the landscape and the predominant agent that has carved it.

The Arieșului Gorge is one of the longest gorges in the Apuseni Mountains, and the longest in the Trascău Mountains, followed at a great distance by the Rachisului Gorge (8 km), constituting the regional high standard in terms of length (for the defiles).

And it is because of this length, that the Arieșului Valley traverses different geological regions, this mosaic of constituent rocks putting its imprint on the gorge’s structure, which has been classified as rare, perhaps unprecedented on a regional scale. (Cocean, 2011).

The Arieșului Gorge is characterized by the succession of narrow sectors, and micro-depressions, with a flat landscape and massive, convex slopes at the margins, formed especially at junctions, where the denudation rate was higher (Lunca Arieșului, Ocolis, Vidolm, Ocolișel, Buru).

Each narrow sector has its own attractive features, depending of the types of rocks in which it is carved. The first one begins downstream of Sălcia, where the valley is carved in the crystalline schists of the Vârful Lung ridge, for about 6 km. The valley is narrow, meandering, while the slopes are steep and fragmented by ravines that descend from the impressive limestone scarp of the Bedeleu. On the right side of the valley, over a long cone of travertine, the Șipote Waterfall debouches.

A sector shaped in sedimentary formations (conglomerates, sandstones, marls) follows, thus the valley widens and the angle of the side slopes softens. Still the slopes display an excessive fragmentation, with ravines, torrents and landslides. Here is the junction with the Poșaga Valley, after which the valley widens into the depression from Lunca Arieșului, a typical fluvial depression dominated by the calcareous peak Piatra cu Urdă [Fig. 3].

Fig. 3 The Arieșului Gorge at Lunca Arieșului
Further, downstream of the confluence with the Ocolişului Valley, there is another area of narrowing, about 2 km long, due to the return of the crystalline substrate, also in the form of limestone apophyses highly metamorphosed. This sector is followed by the Vidolm Depression, developed especially on the right side, on account of the extended cone of dejection where the Vidolm village is also located. The depression is closed downstream by a new narrowing, due to a strip of crystalline limestones.

The narrowing and widening areas alternate downstream until the Buru Depression, the place of confluence with the Trascău Valley. Here, the surrounding landscape consists of crenelated slopes, shaped in all four dominant categories of rocks in the region: limestones, crystalline schists, ophiolites and conglomerates.

The gorge has its most typical sector carved in ophiolites in the downstream part, between Buru and Moldovenişti, for about 7 km. The resistance to erosion has resulted in the narrowing of the valley profile, with a just outlined major river bed, steep convex slopes, and a high sinuosity degree. At the same time, alteration-disaggregation processes found the most favorable conditions in this sector, thus generating a fragmented, residual landscape, with rich detail morphology, formed by needles, poles, towers, pyramid shapes, sharp and narrow ridges, covered in debris. This type of rocks preserves illustrating traces of the periglacial modeling.

The aesthetic value of this geomorphosite is given by the mosaic landscape of the gorge, and the chromatic puzzle resulted from the association of rocks, water and vegetation. As a classical valley landscape, the palette of the major forms defines the morphographical parameters of the fluvial corridor, and the bazaar of small landforms diversifies to the maximum the physiography of the slopes and of depressional basins.

In the present instance, one can note the association of three types of morphogenetic narrowings: gorge sectors carved in crystalline rocks, in ophiolites and limestones, separated throw picturesque intermezzos, by depressional corridors carved by the same river in the sedimentary formations of Cretaceous flysch.

The appreciable length of the canyon, over 30 km, allows a display of all forms, subject to the harmony coefficient that is born through the association and cooperation of these forms (Cocean, 1984), positively perceived by tourists, thus important for the tourist exploitation.

The grand scarp of the Bedeleu is emblematic for the gorge’s landscape, dominating the valley with 600 m. This massif contains in the apophyses of the Bulz Mountain the largest cave in the Trascău Mountains, Huda lui Papară, and one of the most famous sinkholes in the Apuseni Mountains, Vânatura, animated by the Valea Poienii Waterfall.

Another unique element in its perimeter is the cone of travertine, and the waterfall that can be admired from the opposite bank. Its water qualities are revealed through the pipeline suspended over Ariesşului.

The overlay of the Turda–Câmpeni–Luncă Vaşcăului road ensures a high accessibility, and large opportunities to admire the gorge from the inside. In addition, the analyzed geomorphosite can be observed from many lookout points located on the Bedeleului Massif (Cireşului Hill, Bedeleu Peak, Ardoscheia Peak).

The ecological value is marked by the presence of endemic plants associated to the ecological niches of the steep slopes and common faunistic biotopes. The most important site in the gorge from an ecological point of view is the „Laricetul de la Vidolm” reserve, of 91,5 ha surface.

3.2 The functional value of the Arieşului Gorge

The cultural value is given mainly by the presence of ethnographical important settlements in the depressional basins (Vidolm, Luncă Arieşului, Buru), thus, the Arieşului Gorge is a geomorphosite of landscape and religious relevance. In these settlements old churches are well preserved, whose architecture and functions are reflected directly on the landscape and surrounding communities, including in their derived status as tourist sights. The Buru wooden church is worthy to note in this respect, dating from the early eighteenth century, with painting fragments preserved in
the small altar, old books and a few icons. These churches may host various religious and cultural events, among which stand the feasts of the patrons, one example being the one from the church from Poşaga (August 15).

Moldovenesti, situated on the terrace Aries at its exit from the mountains, should also be mentioned, where the remains of the Moldovenesti fortress are partially preserved. Built in the eleventh century, the fortress is now more relevant from an archaeological point of view than a touristic one.

Sâlciua de Jos and Sâlciua de Sus villages, located on the terraces and dejection cones from Lunca Ariesului, before the entrance in the gorge sector, must also be mentioned. They are important not only because of their early documentary attestation (1379), but also because of the preservation of traditional architecture typical to the Tara Moților region and because of the well preserved customs and traditions.

Due to its length, but also to its very favorable positioning as one of the main access roads in the Apuseni Mountains, the Ariesului Gorge is often represented on maps, photos, albums, blockdiagrams.

The scientific value of the gorge is conferred by its controversial genesis (epigenetic, capture), that has lead to at least one scientific theory, its recognized potential for survey, the versatile addressability in Geography, Geology, Biology, Sociology, etc., its national representativeness and the fact that it is a model of an important illustrative value.

The economic value, namely the touristic value can be easily deducted from the many types of tourism for which it has optimal conditions, from the touristic potential derived not just from resources but also from its location, facilities and equipment and of course, the development of the touristic phenomenon.

Four or five types of tourism can be practiced on wide areas: hiking all along the valley and on the surrounding massifs, geotourism, mountain-biking, rural tourism (this geosite being included in the Middle Aries touristic region) and climbing on the four routes on the Bedeleu scarp (Cocan and Anghel, 2011).

The Buru cabin, a modern accommodation base is present in the perimeter of the geomorphosite. It has a capacity of 84 seats required especially for transit tourism, or to absorb the extra tourist flow from the Trascău Depression. There are also many numerous secondary residences, a three daisy boarding house, with a capacity of 20 seats and two boarding houses under construction.

The access to the geomorphosite is ensured by the high traffic road Turda–Câmpeni–Lunca Vâscului that is crossing it from one end to the other. In perspective, with a purely touristic purpose, the „Mocănița”, on the traditional route Turda–Câmpeni–Abrud, can increase the attractive dowry significantly.

At a distance below 25 km there is Turda, an urban center of over 50,000 inhabitants, and a modern service center, which compensates for the poor development of the services inside the geomorphosite.

Although the Ariesului Gorge is a top touristic attraction at a regional level, due to the diversity and wealth of its potential, and enjoyed a complex regional promotion, linked to the exploitation of the entire region of the Apuseni Mountains, however touristic exploitation, although permanent remains nevertheless simple.

3.3 Restrictive factors in the Ariesului Gorge

Among the restrictive attributes that were identified in the Ariesului Gorge, one can note the intense logging without replanting, the abandonment of agricultural areas and degradation of the cultural landscape, associated to these activities, and high risk of flooding. There are also some unsightly details linked to the damaged roads and improvised infrastructure elements, to the abandonment of narrow-gauge railway „Mocănița” followed by the degradation of the embankment, as well as the presence of waste in the riverbed.

4. Conclusion

The Ariesului Gorge is a morphologic element of a striking individualization in the landscape, in relation to other landforms in the area. Its complex structure and appearance, due
to the three types of rocks it carves, allows the comparison between this gorge and any other gorge carved in limestones. In addition, the functional value of this geosite has multiple valences, and recommends it as a top geomorphosite in the Apuseni Mountains.

References