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THE ASSOCIATED RISK TO HUMAN ACTIVITIES AND THE STATE OF GEOGRAPHICAL ENVIRONMENT IN MĂCIN MOUNTAINS NATIONAL PARK

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Summary

The Măcin Mountains are located in South-East Romania, in the North-West of Dobruja, Tulcea, between the Danube Valley, the Luncavita Valley and the Cerna-Horia cinching, being situated between $28^{\circ} 07'$ and $28^{\circ} 27'$ long. E, respectively $45^{\circ} 01'$ and $45^{\circ} 21'$ lat. N. Macin Mountains National Park covered the largest part of the mountain area. The Park's area consists in 11.151,82 ha..

The Macin Mountains National Park is a real "living laboratory" for geological, geomorphological and biological school. For this reason it represents the most important touristic objective, in particular for didactic purpose. It was done up a detailed study, the first of its kind, about the geomorphosites of national and international importance of The Măcin Mountains.

The Măcin Mountains National Park belongs to the category of national parks, which are aimed at the protection and conservation of representative samples for the national geographic space, including natural elements with particular value under the physical-geographical, floral, fauna, hydrological, geological, palaeontological aspect or otherwise, providing the opportunity for scientific purposes visit, educational, recreational and tourism.

The Măcin Mountains National Park lies on the oldest geological area in Romania, the rest of the hercinico-kimmerice orogeny. Dominant rocks: granite and gneisses are in S and E, calcare and crystalline rocks in SE, metamorphic and eruptive rocks in N, leossoide deposits on the plates and low altitudes, etc. There are also found the Carapelit formations that consists of sandstone, shale, conglomerate.

In the Măcin Mountains National Park there are two units of relief: the Macin Mountains and the hills of Niculițel

The Măcin Mountains occupies the north-western side of Northern Dobruja, in the form of tow parallel peaks with NW-SE orientation. The maximum width (24 km) is reached between Turcoaia vilage and the Valley of Lodzovei.

Although there are mountains with low altitude, between 7-467 m (Țuțuiatul peak or Greci), they have a pronounced alpin relief, especially in the area of the Pricopanu peak. Other hilly peaks maintained altitudes under the rate of Țuțuiatu peak: Coștiag (428 m), Priopcea (409 m), Boclucea (393 m), Piatra Mare (380 m), Bujoarele (380 m), Pricopan (370 m), David's Hill (334 m), Victoria (341 m), Crapcea (344 m), Coslucea (336 m), Megina (285 m), Carpelit (250 m) etc. The relief energy holds values of 250-300 m.

The dominant feature is represented by a structural relief and differential erosion. The steep versants, affected by differential erosion, housing at the foot of the hill, fossil and active detritus.

Arid climate has favoured the development of a residual relief (peaks and fragmented's cuarțite in almost vertical position; mass of detritus), a thick crust of alterations and rounded peaks (on granite).

The hills (highland) of Niculițel are in the north-central of Northern Dobruja. Geologically the Highland of Niculițel is composed of the Mesozoic (Triassic) formations, genetically differentiated. They have the same tectono-structural orientation as well as the Măcin Mountains. The main part of the hills (highland) of Niculitel is between the hills of Cornet (294 m) and Trestenic (364 m).

The most important tourist heritage of The Măcin Mountains National Park is represented by single geomorphosites stand on Romanian territory or even in Europe. In fact the parts about geology and relief support the study on the geomorphosites as a basic touristic

resource of the Măcin Mountains National Park. In terms of geographical area, it was made a detailed study, the first of its kind, about geomorphosites of national and international importance of The Măcin Mountains. In this category have been also included geomorphological processes, unique in Romania: chemical weathering of granite under large temperature differences, under a transitional continental temperate climate with slight influences of continentalism.

Geomorphosites represent landforms or geomorphologic processes with specific or unique value in people's perception. A geomorphosite can be a form of relief which is very important in the genetical deciphering of the Earth. It may have a scientific or additional value (aesthetic, ecological, economical, cultural). In The Măcin Mountains National Park have been identified 15 types of landforms and processes that can be fall under the definition of geomorphosite. Geomorphosites were valued on the basis of a model already accepted in the literature. The touristic value of geomorphologic forms and processes fall into four categories, to which were added and other criteria: scenic/ aesthetics; scientific (which include ecological value); cultural, economical.

All 15 geomorphosites were evaluated to determine the potential of tourism. All geomorphosites stand can be found in the territory of Măcin Mountains National Park. It must be specify that the entire mountain range of Măcin is a geomorphosite. Its fragmentation and the high landscaping interest makes possible to demarcated geomorphosites of great importance inside of him

The Măcin Mountains are characterized by a pronounced temperate-continental climate, with sub-Mediterranean influence in areas with higher elevations, and with obvious influences of barrenness in the southern part of the protected area. The climate is characterized by hot and dry summers, long and dry autumns and frosty winters with little snow. Frequent winds prevail from the North and North-East. The high relief, above the altitude at which the regional climate gathers, causes a gradual reduction in temperature and a rise of precipitation, conditioning the formation of climate changes and the corresponding switches of vegetation. According to the thermal gradient of 0.6 °C /100 m average annual temperature decreases up to 9.5 °C and according to the gradient of the pluvial 40 mm/100 m average annual precipitation increase up to 550 mm/year, for maximum altitudes

Permanent hydrographic lath in The Măcin Mountains and Hills (highland) of Niculițel is underdeveloped. The mountainous versants in the protected area of Măcin Mountains demarcates only six hydrological water catchment areas, five of them with permanent water (Jijila, Luncavița, Cerna, Recea and Taița) and the sixth formed of the western peak of Culmea Pricopanului. For the hills (highland) of Niculițel there is a single water catchment area: the upper Telita.

Around The Măcin Mountains National Park there are a number of natural and artificial lakes. The most numerous are the meadow lakes, entirely drained (Salty lake) or partially drained (Slatina) during the summer. The deficiency of water from Salty Lakes and Slatina is due to the reduced quantities of rain that have fallen in recent years, as well as reservoirs of Balta Brăilei and the alarming decreasing levels of water in summer on the Măcin channel. The Jijila and Garvăn, lakes in the West and North of Măcin mountains, have been entirely drained and converted to farmland. This three lakes from the Northern of Măcin Mountains National Park were an area of 4724 ha: Crapina 2940 ha; Jijila 1384 ha; Pietrei 400 ha. In the northern sector of Turcoaia there is a quarry lake.

From the anthropic lakes are noted: Greci, on the brook with the same name; Horia on the Taița River. Their waters are used for irrigation and for animals.

Due to the composition of rocks (granite, limestone, crystalline schist, diabase, etc.) most of the Măcin Mountains National Park cannot form aquiferous levels. Some of the important water table with experimental levels situated between 5-20 m deep, are found in

internal and marginal depressions: Măcin, Greci, Cerna, Horia. Groundwater aquifer layer develops at the base by loess deposits. In small rivers (Taita , Telița) are found alluvial deposits that can be stored underground aquifers ledges. In this case it starts with flow rates from 1-3 l/s. At the base of versants, in deluvio-proluviale deposits there are formed aquiferous strats which give springs with flow rates of 5-6 m/s. Springs are baking soda and represent an important resource for drinking water.

The Măcin Mountains represents the northern boundary of the Sub-Mediterranean area of the Balkan Peninsula and is a distinct unit of the floristic province of Macedo-Thracian. The vegetation unique feature of Dobruja, in comparison with the rest of the territory of Romania, it is its composition which is determined by a combination of species: Pontic-Balkan (26.4%) and Pontus (16.7%), to which may be added species of Euro-Asian origin (12.5%), Balkan (11.1%), Mediterranean (8.3%) 29, Mediteraneano-Pontic (6.9%), and other species of African, Asian, Caucasian and Cosmopolite (18.1%).

Richness of flora and vegetation of the Măcin Mountains is represented by over 1770 species of plants, representing approximately 50% of the Romanian flora which vegetates on 0,05% of the country's surface : 72 plant species are protected as endangered or vulnerable, and 27 species are endemic to the region. From those 72 threatened species , 18 are rare for Dobruja and 5 are rare in Northern Dobruja.

A great diversity of woody plants is present: the 67 species include: *Quercus* (7 species), *Tilia* (3 species), *Acer* (3 species), *Ulmus* (3 species), *Carpinus* (2 species), *Fraxinus* (3 species), *Fagus* (2 species), *Malus*, *Celtis*, *Juglans*, *Prunus*, *Sorbus*, etc., as well as numerous species of pines (*Corylus*, *Lygustrum*, *Rosa*, *Cornus*, *Sambucus*, *Lonicera*, *Cotinus*, *Paliurus*, *Crataegus*, *Viburnum*, *Growing*, etc.). The most common forestry association- *Tilia tomentosa*-*Carpinetum betuli* , prevalent in Romania on 65,000 hectares (about 1% of the area of the forest fund) is representative of the Park, and the most rare and unique in Romania is represented by the Dobruja făgeto-cabbie association with *Carex pilosa* (Beeches Valley- Luncavita).

The Măcin Mountains National Park and the adjacent area is the home of a number of protected areas and natural sites. Among these may be noticed: The Nature Reserve Chervant-Priopcea (567,78 hectares in the village of Cerna), The Nature Reserve of Edges of Cerna-Iaila (1891, Cerna and Dorobanțu), The Nature Reserve Troesmis (93,26 ha Turcoaia). The Măcin Mountain's fauna is of great diversity and some rare species are protected by international law.

Species of special interest for conservation of the park are: *Testudo graeca iberica* (the turtle of Dobruja), a nature monument, *Elaphe sauromates quatorlineata* (Dobrujan basilisk), the largest snake in the country, threatened by extinction, *Elaphe longissima* (the serpent of Asclepius), *Vipera ammodytes montadoni* (The viper with horn).

Inside the park there were identified five important species of habitats (according to the classification of the Corine's biotope). Cliffs, prairie, forest, veltforest and wetland habitats

On the park's area there are two important Nature reserve: The Moroianu Nature Reserve and The Beeches Valley Nature Reseve, approved as Stricted Protected Areas (equivalent IUCN, first category) Forestry includes 99% of the total area of 11151,82 ha to PNMM. Around the Park live 15 human communities, amounting to a total of about 38,000 inhabitants. Are in 6 villages (Greci, Cerna, Turcoaia ,Jijila Luncavița, Izvoarele) and a city (Măcin).

The Măcinu Mountains National Park is a popular tourist destination, but its natural and human potential is extremely high. Măcin Mountains National Park has the advantage that it is only 80-100 km from the tourist area of the Danube Delta. The most intense tourist activity is summer. Tourist visit the main peak of the Măcin Mountain, Culmea Pricopanului and the Wine valley of Cerna.

For specialized tourism are worthy of pointing out the protected areas, which conserves a vegetation and fauna specific to mountain regions with dash of steppic mammals. At the same time there are a few cultural and historical attractions in the neighbourhood of:

- Basilica with the crypt-(martirium), Church of Saint Athanasius, Paleo-Christian Basilica with the crypt, located in Niculițel village, Tulcea County;
- The monasteries: Saon, Cocos and Celic Dere;
- Pilgrimage-The fountain of healing in Culmea Pricopanului;
- The Roman-Byzantine Dinogeția the civil settlement from the island, the medieval fortress (in section Basilica);
- The roman castle Noviodunum - Isaccea town
- The Roman fortress-town of Măcin Arrubium;
- Roman Fortress-city of Aegyssus Tulcea;
- Thraco-getic fortress, the roman fortress city of romano-Byzantine Iglița-Troesmis-Turcoaia village.

The Măcin Mountains National Park is an area with natural and quasi-natural ecosystems located in the middle of some agricultural fields. From the forest ecosystems, 31% can be considered natural, semi-natural 32% and 26% extensively modified, but they still have native species. Only 9% are local species or plantations.

The Măcin Mountains represent an important link on the migration routes of birds that follow the courses of the rivers Prut and Siret. Forested massif of Măcin Mountains recorded 26 points out of a maximum of 28 on the Helliwell scale. This value is based on the large area of the forest, her high position in the landscape, the possibility of being seen by a large number of people, a forest with large trees and compatibility in the arrangement of the landscape. These values may add three specific factors: public access, the value and the presence of important landscape areas with wild flowers.

The most direct and obvious threat to landscape structure and certain important ecosystems and species are systematic work in the quarries of the boundaries of the Park.

They were marked out seven quarries of prime importance: Iacobdeal- Turcoaia, Izvoarele Macin VII, The Beech es Valley-Luncavița, The Hill of Manole,Maseaua Rosie (sorting Station SC DUNAPREF QUARRIES SRL Niculițel), Revarsarea, Aric Valley – Drumul Iazului . Old exploatations were extremely well managed and monitored. The miners had the optimum conditions of living and with the money they earned they made to flower the surrounding villages, especially the Greci and Turcoaia.

The environment is preserved in national parks through specific laws. Unfortunately the economic activities that take place inside the Măcin Mountains National Park, or in close proximity , adversely affecting some components of the environment . Most of the economic activities relating to their subsistence for local populations: plant raising, animal raising beekeeping, etc.

The most important economic activity which adversely affect the environment in the Măcin Mountains National Park aimed at the exploitation of underground resources, especially of borders and basalts. Romania's economic development, especially the one manifested in recent years has spurred the opening of new quarries. The explosive growth of the quantity of borders and basalts from Northern Dobruja was linked to building new houses or the opening of new roads. The number of new houses is spurred by the population who works abroad. A great deal of europeans money are obtained from the local authorities for infrastructure improvements.

The noise from machinery and explosions or the dust removed in the atmosphere do not have borders and spreads unhindered within the National Park. For this reason a part of the terrestrial animals are affected and also their behavior can. At the same time scraping material from the quarry and the creation of transport infrastructure affects the soil coating irreparably.

Surface waters and even ground waters, are affected by alluvial materials from dumps carried by torrents.

Quarries who affects the most the National Park are Izvoarele Măcin VII and Meseaua Rosie. The two careers can be found on the border of the Măcin Mountains National Park and the immediately area. Operating step of elevation + 190 m (200 m) has been exceeded in the Izvoarele – Macin VII.

Most companies have concessions for the exploitation of stone (granite and basalts) until 2030. From the past experience we can say that the ecological reconstruction to be complied and the natural environment to be affected in a low proportion. Development of road infrastructure inevitably leads to increase production and also opening new quarries.

It is shown that in the future an exploitation to be approved at only the appreciable distances that does not affect the area National Park.

A highlighted item is the fact that the local population is qualified in the field of exploitation of stone in the quarry system. The lack of mining can lead inevitably to an economic setback. The first specialists in the processing of stone were the Italians, who are established in Greci and Turcoaia villages.

The importance of stone exploitation in the area of the Macin Mountains National Park is demonstrated by the fact that people often use granite and diabase for the building of their houses, the annexes, the tombstones and memorials, hedges, roads or local interest, etc. The revenue of companies specialized in the exploitation of non-metallic materials are often invested in adjacent municipalities. For this reason, all localities have asphalt roads or paved, sewage and drinking water adduction etc. . This is precisely the reason why there are a lot of new applications for the opening of quarries in Măcin Mountains National Park area

Has been compiled the first interdisciplinary study of romanian geographical literature about the historical of granite and diabase exploitation.

Keywords: sustainable use of resources, the conservation of biodiversity; increase in the number of tourists in the area, geomorphosites, quarry, National Park, pollution.

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