

# DRĂGOIASA-TULGHEȘ DEPRESSION ALIGNMENT. APPROACH MODEL FOR THE SMALL DEPRESSIONS OF THE ROMANIANS CARPATHIANS

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**ABSTRACT.-** *Drăgoiasa-Tulgheș Depression Alignment. Approach Model for the Small Depressions of the Romanians Carpathians.* The depressions of Romania have been studied lately from a physical-geographic perspective, as well as from a human perspective, leading to a series of aspects of theoretical and practical nature, such as: the diversity of the depression relief or its genetic and evolutionary complexity, the identification, inventory and classification of all depressions, the localisation of surface and underground water sources, the distribution and composition of plant associations and soil types, the evolution of demographic structures, the social-economic development or the geographic space's organisation and management. All these studies combined allow for a series of general conclusions regarding their positional or morphological type or other morphographic, morphometric and even statistical aspects.

**Key words:** small depressions, Eastern Carpathians, volcanic barrage depressions.

## 1. Introduction

Depressions hold a special place in the geographic landscape of our country - territorial geographic units, that are well established, that occupy roughly 30% of the country and stand apart from the higher mountain areas, through their own physical and economic elements.

The depression, a term of Latin origin *depressio, -onis*, according to DEX, is a negative, concave relief form, situated at a lower level than the surrounding regions, of varied shapes and sizes.

The popular term is „*lăsătură*”. One must mention the fact that, in many cases, the terms „*depressionary alignment*” or „*depressionary passageway*” are associated with the term mentioned above, when it comes to a succession of elongated and narrow depressions, semiclosed, that go over several river basins divided by saddles, separating mountainous massifs or hill and mountain ridges.

In a geographic sense, depressions, alongside valley passageways, are first and foremost areas of geographic discontinuity in the Carpathian mass (V. Mihăilescu, 1969), detaching themselves from the high mountain areas through the landscape's specificity in which man's activity is extremely intense and

also permanent.

Their morphogenetic, human and economic characteristics place them in mountain areas (Geografia României, vol. III, 1987, p. 16). Being less rugged than the adjacent units and also more protected, they offered splendid conditions for population concentration.

Human pressure on the landscape is obvious, so that spectacular mutations within the area's fauna creates a more pronounced discontinuity.

Instead of forests, secondary grassy areas developed, being used as pastures and hay fields or as arable land. Consequently, the ensemble of geographic-physical components was the natural premise for the favourability of human colonisation of depressions, to which one can add the historical factor, so as to have the exact measure of understanding of the complex humanisation process in the Eastern Carpathians.

Including both natural as well as social-economic elements, V. Mihăilescu defines the region as „*a territory demarcated by exterior features (landscape features) and interior (structure and functions), and by creating a unit derived from the connections between its components and between them and the whole*” (V.

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Mihăilescu, 1969), resulting in the fact that „*this is different from the natural region, which is demarcated and defined solely through natural facts, and from the anthropic region, defined by social-economic facts*” (I. Donisă, 1977), which means that innermountain depressions can also be seen as distinctive „geographic regions”, characterised by complex landscape transformation processes. The number and surface areas of Romanian depression units are impressive.

According to the calculations of N. Popescu (1973), Romania has over 950 depressions, basins and depression passageways, claiming roughly 1/3 of the entire territory.

336 can be found in the Carpathian Mountains, 118 in the Subcarpathians, 199 in the Transylvanian Plateau, 53 in Dobrogei Plateau, 52 in the Moldavian Plateau, 74 in the Getic Piedmont, 5 in the Curvature

Subcarpathians, 46 in the Western Hills, 15 in Mehedinți Plateau, 41 in the Romanian Plain and 15 in the Western Plain. In the Carpathian Mountains, depressions occupy 23% of their surface, in the Subcarpathians 48%, in plateaus 41%, 21% in piedmonts and 30% within plain areas.

Within the Eastern Carpathians, unlike the other two Carpathian ranges, the depressions are more numerous, representing more than 48% of the total number of intramountainous depressions in the country.

The high number of depressions, in conjunction with the fragmentation found in the Eastern Carpathians led to the existence of numerous mountain passes, positioned on a mountain, between two lower areas, enabling easier connections between Transylvania and Maramureș, and also with Moldova.

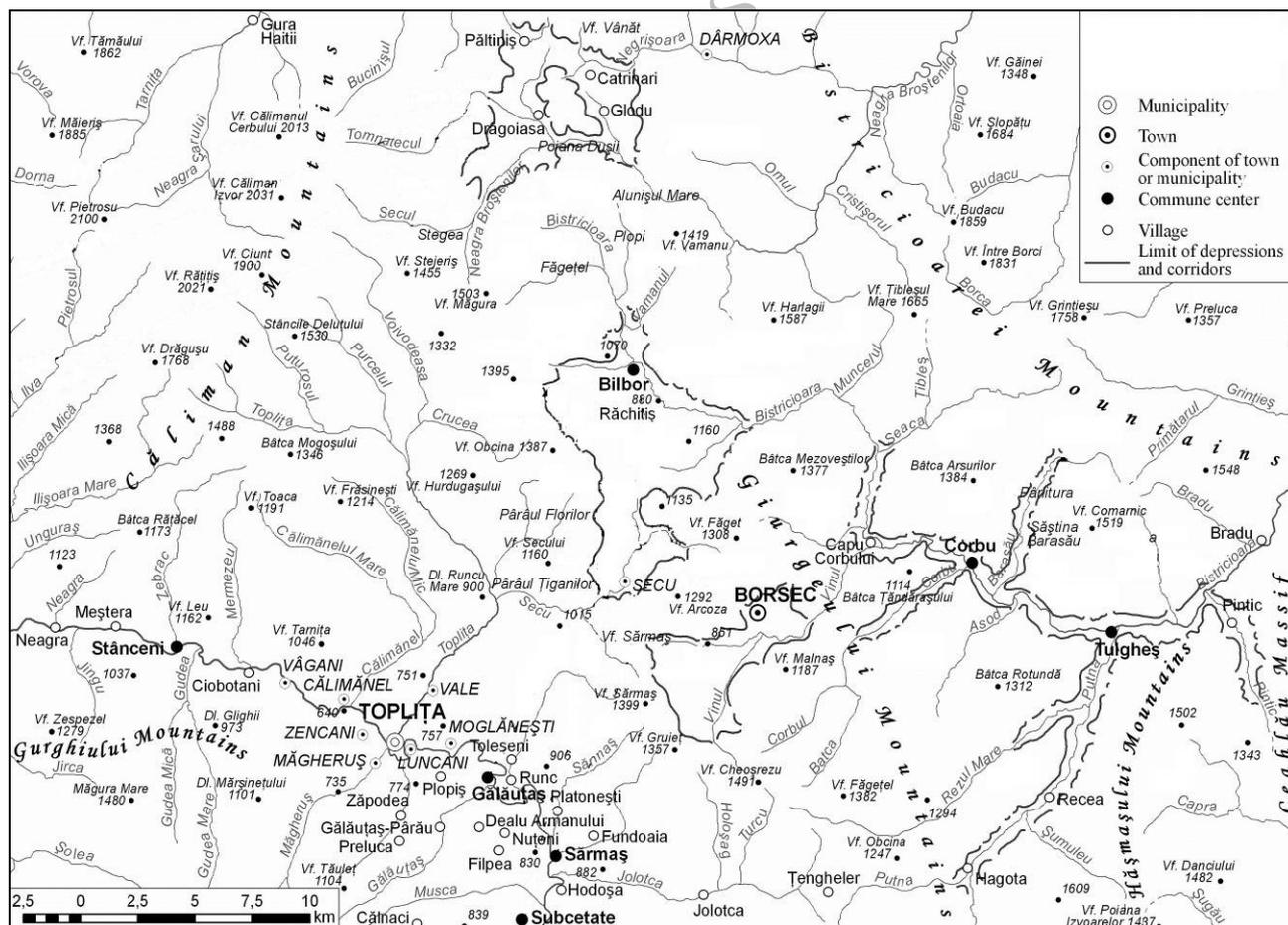


Fig. 1. Drăgoiasa-Tulgeș depression alignment. General map.

## 2. The studied area

Drăgoiasa-Tulgheș depression alignment is a well individualised unit, made of a string of *small depressions* (*Drăgoiasa, Glodu, Bilbor, Secu, Borsec, Corbu and Tulgheș*), situated in the Central Group of the Eastern Carpathians, where the crystalline-Mesozoic area of Bistricioarei Mountains (to the east) and the Neogene eruptive of the Căliman Mountains (to the west) meet.

This suspended innermountain compartment represents the middle area connecting Dornelor Depression with Giurgeu Depression, whose margins are flanked by Căliman Mountains to the west and north-west, by the Giurgeului Mountains to the south-west, Hăghimaș and partially Ceahlău Massif to the south-east, and Bistricioarei Mountains to the east.

From an administrative perspective, the area overlaps the territory of Păltiniș, Drăgoiasa, Catrinari and Glodu villages, part of Panaci Commune, Suceava County, followed by Bilbor Commune, Secu (part of the town of Toplița), the town of Borsec, and Corbu and Tulgheș communes, Harghita County.

## 3. Method

This scientific endeavour materialised by resorting solely to the regional method, alongside the usual approaches (inductive, deductive, cartographic, mathematical, hypothetical, modelling, comparative, observational, analytical, synthetic, GIS).

In the study at hand, the surfaces of the analysed depressions resulted from the usage of automatic GIS calculations, taking into account only the depression space proper.

## 4. Results and Discussion

A first classification of the depressions from our country has to do with their position in regards to the major relief forms, thus resulting a first classification criterium, *positional*.

In the study at hand, we classify depressions as situated in mountain areas, also called *innermountain or innercarpathian depression areas*, reflecting the fragmentation of the Carpathian relief on one hand, and its

major role in the people's economic and social lives on the other.

Another criterium refers to the *genetic variety* of depressions and their grouping in certain relief forms. In the Eastern Carpathians, differential erosion depression (73% of the total number and 15% of their surface area) and erosional depressions (17% of the total number, and 4% of their total surface) are the ones that predominate, tectonic and tectonic-volcanic depression having only 10% of their total number, but 81% of the surface area.

Tectonic-volcanic or volcanic barrage depressions represent only 5% of the total number of depression in the Eastern Carpathians, but have 32% of their surface area. They were formed where fractures and peripheral subsidences appeared within the Eastern Carpathians and through volcanic barrage.

Their maturity phase was during the Pontian-Lower Cuaternary period (N. Popescu, *Depresiunile din România*, 1973, vol. *Realizări în Geografia României*, p.139-142). *Drăgoiasa, Bilbor, Secu and Borsec depressions* are such areas, that is tectonic-volcanic and volcanic barrage.

In the territory under scrutiny, there is another genetic type of depression, called *proper sculptural depressions*, formed by differential or accelerated erosion in soft materials.

The aforementioned depressions have two types: *depressions of differential erosion (accelerated erosion in nonhomogenous rocks), with the facies subtype (contact)*, such as *Pintic and Glodu*, and *accelerated erosion depressions in homogenous types, with the confluence type*, like *Corbu and Tulgheș*.

Through their characteristics, they are highly individualised within the Carpathian Range, without fully detaching themselves from the adjacent units, but having many common features with other innermountain depression areas from the Carpathians, but especially with those from the Eastern Carpathians.

According to size, there are *depression basins*, generally small, under 10 km<sup>2</sup>, and *proper depressions*, exceeding 10 km<sup>2</sup>.

This dimensional criterium implies an

extremely complex operation, therefore many authors who have classified depression according to size, only took into account the hearth. In my case, the surface areas of the analysed depression were calculated using GIS methods, taking into account only the depression space proper.

**Tab. 1.** Surface areas of the analysed depressions, according to different authors

No.	Depression	Surface area (km <sup>2</sup> )			
		B. Szöny, 1958	N. Popescu, 1972	I. Săndulache, 2007	G. B. Tofan, 2012
1	Pălteniș	-	-	-	4.6
2	Drăgoiasa	11.5	16.0 <sup>1</sup>	-	14.3
3	Catrinari	-	-	-	4.7
4	Glodu	12.5	-	-	6.2
5	Bilbor	15.9	41.0	29.2 <sup>3</sup>	38.0
6	Secu	-	-	-	11.6
7	Borsec	48.5	29.0	16.4	20.4
8	Capu Corbului	-	-	-	6.0
9	Corbu	-	-	-	13.1
10	Tulgheș	-	30.0 <sup>2</sup>	-	23.3
11	Pintic	-	-	-	4.8

<sup>1</sup> Including Glodu Depression; <sup>2</sup> Appears as Bistricioara Depression, including Corbu, Tulgheș, and Grințieș;

<sup>3</sup> Including Secu Depression.

According to *form*, depressions can be: *ellipsoidal*, when the length-width ratio does not exceed 2/1 (for example Bilbor Depression has roughly 17 km in length, and 7 km in width); and *depression passageways*, when this ratio exceeds 5/1 (Capu Corbului-Corbu, Tulgheș-Pintic).

Due to the complexity and diversity of the humanisation process, there are a series of differences of typological nature. Consequently, we have „*hearth*” depressions, having specific settlement localisation processes, through their special role in their evolution, population flows, generated by the capitalisation of natural resources. The depression alignment studied in this article fits perfectly in this category.

The mountain ridge and the depression reveal contradicting physical-geographic processes.

High, on the ridge, erosion processes predominate, while down in the depression, we mainly find accumulation processes. Man settled primarily where these two environments met, with the contact area.

Therefore, depressions are well defined areas from a physical-geographic perspective, true „*nests*” within the mountains, with a special genetic affinity for the surrounding mountainous areas, asserting themselves through their amazing historical and social personalities.

One of the main coordinates of these depressions’ history is man’s permanent connection with the land, of human communities with the historical hearths that they created and worked, and extremely tight and obvious connection as we go back in time, to the beginning of population.

Regarding the human pressure felt by the landscape, it seems that it began more recently than in Dornelor, Giurgeului and Ciucului depressions, the presence of mountain grasslands, wood and mineral waters determining their economic profile.

The organisation of human communities that populated and today occupy the space of depression areas and their surroundings, took place in a tight and intimate connection with nature and its habitation potential.

The geographic position of these areas influences local life, firstly through a sheltered mountain climate, but also through more permanent effects such as temperature inversions, with negative consequences on crops.

The mountain slopes that close the hearths, covered by forests, were the basis for the very first wood civilisation, while natural pastures and hayfields, rich and expansive, associated with secondary man-made grasslands, enabled the assertion of a significant number of villages as transhumance and local herding settlements, functioning as „true places of refuge”, with considerable differences in terms of localisation specificity, altitude variations, evolution stage and current land modelling dynamic, with the addition of the specific styles of the humanisation process, (Melinda Căndea, 1996).

The land is the main, coordinating factor for the spatial elements’ interaction, with deep

implications on the economic potential, economic production, territorial distribution, and on humanisation.

The high piedmont levels, either wide or narrow, situated where depressions and mountain ranges meet have a rugged landscape, with deep valleys, with moderately to highly inclined slopes, and with extensive forests, which increase the degree of isolation, exacerbating communication problems, limiting settlement development and household positioning, the development of traditional land usage, and the introduction of new forms of utilisation.

Terrace levels are the ones that follow, used as arable land as well as for settlements.

Next come lower levels corresponding with the hearth proper of the depression areas, and swampy flatlands, with poor drainage, used primarily as hayfields, and less as arable land.

The land, with its different morphological, morphometric and exposure characteristics, is a fundamental differentiation factor for the natural and humanised landscapes, with implications regarding the economic potential, agricultural production structure, the degree and manner of anthropisation.

Vegetation offers important potential resources for the existing human communities, the vegetal unit that standing out being the forest.

It is a well knit ensemble, backed in its existence and vigour by extremely favourable morphological and pedo-climatic conditions, having an important role in the lives of human communities, availing food, shelter and wood, stimulating the emergence and development of several activities: logging, skidding, on-site and off-site processing, forest carriers, etc.

If in the past the depressions were mostly covered by forests, a fact quite apparent as massive tracts of land have forest soils and there are numerous toponyms depicting the existence of deforested places (clearings, burns), starting with the feudal period, the spatial retreat of forests, due to deforestations, burnings, clearing, effects of human pressure, the emergence of the new settlements, the development of the agro-pastoral economic system, have been the main features of the man-forest relationship.

In conjunction with the gradual decrease in forested surfaces, in depression areas, as well as in their economic hinterland, a process involving the replacement of primary vegetation with secondary one (grass lands used as pastures or hayfields or even arable land) took place.

The activities involving forest exploitation, upkeep, protection and management, or those involving wood processing, generated the most diversified humanisation forms within the hearth of the depression and in the surrounding mountain areas: forestry roads, barracks and forestry lodges, loading, unloading and storage installations, sawmills, etc., some acting as nuclei for future polarisation of people and settlements.

The diversity of activities based on wood processing led to a genuine wood civilisation, in a strongly related to mountain agriculture and animal husbandry, especially sheepherding, for the benefit of the population who conquered extensive areas covered by forests, and transforming them in arable or grass lands.

Pastures and hayfields, alongside forests, are valuable natural resources, the backbone of animal husbandry, an ancient occupation for the population living in innermountain depressions.

Acting as activity generators and agro-pastoral humanisation forms, pastures and hayfields are the main factors for insuring the continuity and the evolution of agriculture and subsidiary activities in innermountain areas, and also for animal fodder, with low energetic consumption.

The presence of pastures enabled the development of sheepherding, in its most simple, intuitive form. In almost all the depressions taken into account there are mineral water springs, considered as the most important natural riches, well known for their curative properties ever since the 16th century (the springs of Borsec), to which the adjacent areas owe their great fame within the country and also abroad, being premises for the emergence and development of spa resorts, as well as for the building of a mineral water bottling plant.

Extremely significant for human habitation are piedmont forms, hydrographic convergences, refuge topoclimates and thermal inversions, the pedo-geographic diversity or certain soil and

underground riches etc. Due to such favourable elements, mountain depression areas polarised formation and evolution factors for the humanisation processes, being „nuclei” for human habitation, for a permanent human concentration (G. Erdeli, V. Cucu, 2005).

## 5. Conclusions

These spaces stand out through a compact „oicuménisation”, without excluding the diversity of habitat types, which are influenced by their well determined social-economic potential.

The variety of such types was also influenced by an intense capitalisation, of the mountain space proper, as well as of the mountain interference perimeters, thus giving the answer for the humanisation process's push beyond the limits of the depressions.

Depressions are the ones that polarise economic activities linked to resource capitalisation, whether it is wood or underground resources, or crops, where biopedoclimatic conditions allow it, or the grass lands that go up the mountains and implicitly the storage and processing areas.

These have been studied, and the studies enabled a correlated interpretation of the natural framework conditions with the social-economic ones, that changed the landscape in innermountain depressions.

Thus, there is a series of papers confirming the mutations that took place in land usage, land improvement possibilities, the concentration of settlements, their new economic functions, tourism development and so on.

As these areas become, especially in winter, „lakes of cold”, air accumulation, temperature inversions and their influence on vegetation and pedogenetic processes are factors that have been studied extensively.

As these are volcanic barrage depressions, at the end of the Neogene, they held temporary lakes, by blocking waterways, becoming regions of hydrographic convergence due to the local base level. Situated within the Căliman-Harghita moffette, present due to postvolcanic activity, the

area stands out through the emergence of mineral springs, while the smooth sediments contain important coal reserves.

Therefore, depression spaces are well outlined areas, with sunny slopes, with numerous elements of favourability: defense, large forests, water, pastures and hayfields for animal husbandry, with possibilities for underground reserves extraction and processing.

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