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THE GEOMORPHOLOGICAL LANDSCAPE OF DERASION. A MODEL FROM RUMANIA

ABSTRACT: MAC I., *The geomorphological landscape of derasion. A model from Rumania.* (IT ISSN 0391-9838, 1996).

This paper peresent a specific geomorphological landscape, created by the process of derasion, which is characterized by specific features. Belongig to the group of discrete landscapes, but different in content and extension, it is modelled by the combined effect of gelifluction, cryoturbation, cryofraction, pluvionivation and the gravitational movement of materials on the slopes in periglacial condition. The processes of derasion create two categories of products: deluvial and taluvial deposits and residual relief. The main characteristic of the derasional landscape is the continuous multiplication of relief forms until the complete destruction of the initial landscape is reached, and there is emergence of a secondary landscape. The most illustrative morphological element of the derasion landscape is represented by the derasion valley.

KEY WORDS: Derasion valleys, Landscape of derasion, Rumania.

RIASSUNTO: MAC I., *Il paesaggio geomorfologico di derasione. Un modello dalla Romania.* (IT ISSN 0391-9838, 1996).

Questo lavoro vuole rappresentare un particolare paesaggio geomorfologico creato dal processo di derasione, che è caratterizzato da forme tipiche. Appartenente alla categoria dei paesaggi «discreti», ma con differenti elementi ed estensione, esso è modellato dagli effetti combinati di geliflusso, crioturbazione, crioclastismo, pluvionivazione e movimenti gravitativi nei versanti in condizioni periglaciali. L'azione dei processi di derasione crea due categorie di prodotti: *talus* detritici e rilievi residuali. La principale caratteristica di questo paesaggio è data dalla continua moltiplicazione delle forme del rilievo fino alla completa distruzione del paesaggio iniziale e allo sviluppo di un paesaggio secondario. Il più tipico elemento morfologico di questo paesaggio è rappresentato dalle valli di derasione.

TERMINI CHIAVE: Valli di derasione, Paesaggio di derasione, Romania.

The geographic landscape, in its most obvious manifestation, that is its physical appearence represents the result of the combination of geographic components (substratum, community, hydro-atmospheric mass) on the territory. As a temporo-spatial product the landscape has a gradual edification and a territorial multiplication as its cooperation between the above mentioned components remains in the limits of some reciprocal sustainment and adjustment relationships. This means that a landscape may suffer changes and may even be replaced by another landscape, in the case in which the geographical state modifies.

Unlike the geographic landscape, the product of a complex integration (global), the geomorphologic landscape is defined by the prevailing of certain forms of relief, such as glacial, eolian, volcanic or littoral forms. It is an expression of the intimate relationship between form and process.

The variability of the above mentioned relationship and its quantitative and spatial dimension, explain the dominance of some geomorphologic landscapes on the surface of the Earth (glacial landscape, desert landscape, littoral landscape, etc.) and the presence in small areas, of the others.

Usually, the landscapes generated by more *discrete processes*, such as supergene processes, karstic, cryogene, anthropic processes, have an intimate ambiental relief which makes them more attractive for science and knowledge.

Belonging to this group of discrete landscapes, very different in content and extension, is the derasion geomorphologic landscape (PÉCSI, 1995).

Derasion is understood as the combined effect of gelifluxion, cryoturbation, cryofraction, pluvionivation and the gravitational movement of masses of materials, on slopes, in periglacial conditions. The above mentioned processes are worthy to be associated with show melting and sheetflooding, developed in the same periglacial morphoclimatic conditions. These processes work especially on the slope surfaces and their effect is greater the more some conditions are fullfilled. Among these, it is remarkable the presence of the slightly coherent deposits sensitive to freezing - defreezing, superumectation, pluviodenudation, cryoturbation (sands, loess, sandy clays, sandstones, microconglomerates, deluvial covers, weathering crust).

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Another condition is represented by the inclination of the slope, which provides the gravitational movement. The most favourable surfaces are the slopes with inclinations between 5 and 15 degrees.

An important role is played by denudation of the vegetation and, also, the reduction of this to a thin grassy stratum.

The processes of relief modeling work in sequence. At the beginning areal erosion (solifluxion, creep, raindrop impact, etc.) dominates; then, the areal processes combine with linear processes (sheetwash, rill erosion, etc.).

The action of the derasion processes creates two categories of products: deluvial, taluvial deposits and residual rilief. The derasional forms of relief are positive and negative, especially in destruction (PINCZES, 1995).

The wide development of the processes and their extension, up to the point of dominating the territory, generate the derasional landscape. Its main characteristic is given by the continuous multiplication of the forms of relief, reaching the complete destruction of the initial landscape, with the emergence of a secondary landscape. The most illustrative morphologic element of the derasion landscape is represented by the derasion valley (fig. 1).

Geomorphologic literature from various countries offers some similar terms: dry valley (English), *dellen* (German), dales of congelifluxtion (Russian). The derasion valley has the form of a longitudinal basin (semicylindrical), with an uniform inclination, limited by concex and concave slopes, with a flat bottom, without water flow, but filled with heterogenous deluvia. They can be wide and short, long and dish shaped, or narrow and long, with a semicylindrical appearance, and always dry.

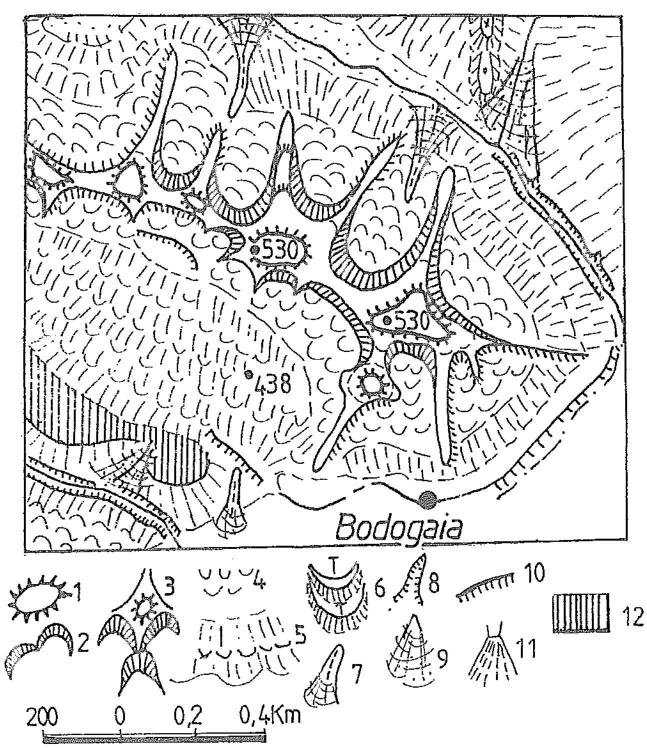

FIG. 1 - Derasion forms of relief near Bodogaia: 1) evidence of erosion; 2) scarp of derasion valleys; 3) shape of the main and secondary interfluves as a results of derasion valley development; 4) superficial landslides in furrows; 5) glacises at the foot of the slope; 6) cryoplanation terraces; 7) incipient gully; 8) developed gully; 9) alluvial cone; 10) fissures in the present soils; 11) triangular facets on the extremities of interfluves; 12) structural surface.

During their evolution, it can be noticed either the deepening tendency, or the increasing tendency (spatial extension). They are to be found in simple configurations or in compound configurations, that is two or three sculptured generations, within the morphological frame of a bigger valley. Through the contribution of these secondary valleys, the main valley is widened. The main interfluves (from the watershed) are gradually destroyed.

The emergence and development of derasional valleys can occur in two ways: independently, when the periglacial processes provide the gravitational movement of some fine soil particles, which leads to the sketching of a negative microform, in the surface of the slope. The emergence of this microforms determines the concentration of the forces and the cooperation of the processes (creep, solifluction, pluvionivation), carrying away large quantities of materials, toward the bottom of the slope. Thus, the valley is continuously deepening and widening, on account of the main and secondary interfluvial surfaces. Later, in these valleys superficial landslides develop, which increase the dimension of the form, and change it into a landslide valley. In other cases, in the derasion valleys linear erosion develops (rills, gullies, torrents), changing them into mixed derasion-erosion valleys (MAC, 1972).

Derasional valleys can emerge also independently, when there is a transition from the processes of formation of the erosion valleys, to periglacial processes (pluvionivation, solifluxion), with the plane-spatial denudation of the initial slope. In this case, the derasion valleys develop upstream the initial point of the linear erosion forms, and, also, laterally, in the space of the secondary interfluves of erosional origin.

In the periglacial conditions of Transylvania, the process has developed through its own forces, without a previous geomorphologic premise. An argument which supports the thesis, which asserts that they were not formed in the older torrential structures, is the frequency of these relief forms.

In the region chosen as a model, detailed examination of the relief identified two generations of derasion valleys. These ones were formed in two phases, different in time, with similar conditions, but with a different intensity of process.

The first generation is composed of the extensive derasion valleys, whose sculpturing is connected with the period when the periglacial climate was at its peak in Romania (Riss, Würm......). Only in such conditions were huge masses of materials (deluvia) able to move down the slopes as solifluxion currents, covering distances of around 0,5-2 km. The essential feature of derasion valley genesis in the Odorheiului SubCarpathians, is that the detachment of the material, from their basins, occurred through landslides whose depth was not greater than 3 meters, assuming the character of a solifluxional flow, with numerous furrows. The traces of the solifluxional waves can hardly be recognized today, in the slope *glacis*.

After the period of massive solifluxional flows, in the big valleys of derasion, there was a process of sheet-flood (in the humid period of the interglacial) of fine particles. This was transported toward the bottom of the slope, where it levelled the asperities, which exist between the waves of the solifluxional flow (MAC, 1986).

The phase of development of the big derasion valleys should have been bigger, if we consider the great intensity of the periglacial processes which took place then, and the duration of the glacial period which enabled the morphogenetic processes in Transylvania. Even in this phase, the derasion valleys come to intersect completely the line of the interfluves, fragmenting the old levelling surface.

In a new cycle (glacial-interglacial), in the old types of the first generation of derasion valleys, smaller basins (small cirques) were sculptured. The detached materials were not carried any farther down on the slope, but they boardered the flat bottom of the first generation of derasion valleys, especially in the upper parts.

In the frame of the secondary derasion basins, and also in the upper portions of the first generation valleys, the solifluxional waves can be clearly recognized. Their height varies between 0,30 and 2 m. It is surprising that the number of the landslides waves is strictly limited between 8 and 11.

At present there is a contrast between the action of linear erosion and areal erosion, materialized in forms of transitions from derasion to erosion valleys. The derasion valleys changed quickly into erosion valleys, in the portions where the water bearing layers have been intersected and were the destruction of the natural vegetation has reached huge proportions (fig. 2).

The process of modelling, in the old types of derasion valleys, continues with new forms, even today. The Pleistocene valleys have been transferred to the present modelling. Apart from this reason, in the slope profile two more active zones are present: one is localized at the origin of the derasion valleys, where, yet, the process of modelling through areal erosion prevail; and the second one is situated in the lower portion of the profile, where they appear on the surface of the glacises: furrows, gullies and active torrents. This process is largely stimulated by anthropic factors.

Apart from the derasion valleys, an important role in relief modelling has been played by the material transport channels. Their formation may be explained by the more rapid movement, in the valley axis, of the material on the slope, than on the sides. These transport channels represent the present equivalent of the active mud torrents.

The territory extended between the Valleys Târnava Mare and Târnava Mică, up to the Volcanic Plateau of the Gurghiu Mountains, offers the most typical derasion valley in Transylvania. At first sight an image composed of 3 morphologic sections can be distinguished:

– the lowest plane, which is the section of valley corridors, with well identified riverbeds, with large meanders, in which the large river meadows offer good places for settlement, for communication routes and for agriculture; of slopes, partially deprived of their vegetal and natural cover, in which the spatial sequence follow along the whole profile;

– at the bottom, the *glacis* surfaces with thick deluvial and proluvial deposits, which create a smooth and flat profile, which emphasizes their slopes in the middle portion of the slope (the convex portion);

– a little above the middle of the slope the glacises are, gradually, replaced by secondary interfluves, large amphitheatres, branched narrow-valleys and areas of landslides;

– in the upper section, toward the edge of the interfluves, the physionomic unit of the slope is decomposed into abrupts, taluses, secondary interfluves, scarps, gullies and

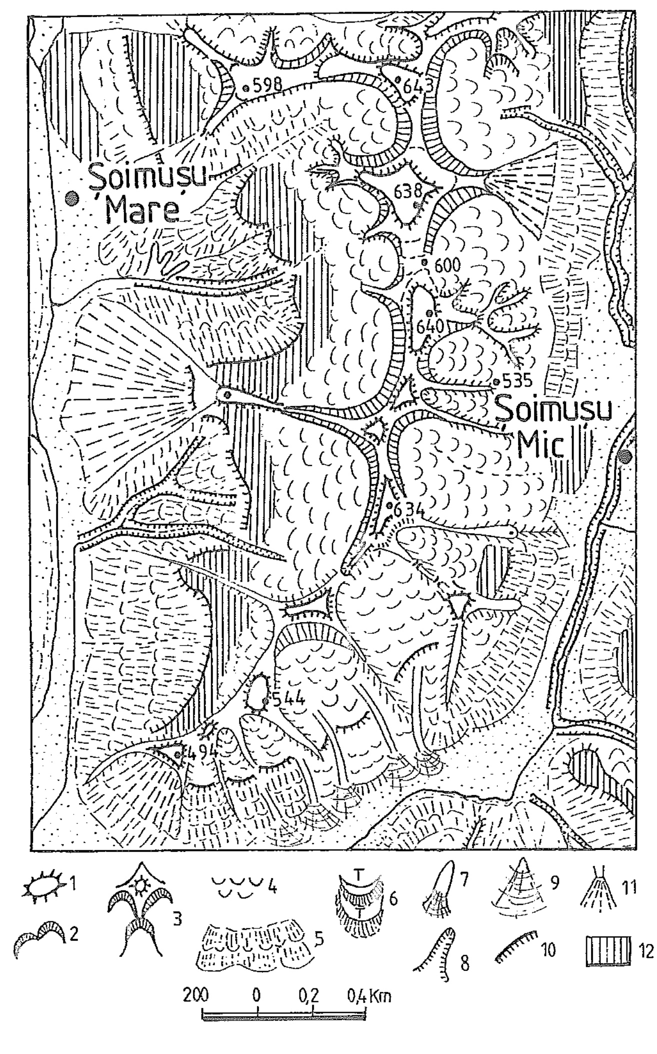

FIG. 2 - Derasion form of relief between Soimusu Mare and Soimușu Mic (for the legend see fig. 1).

torrents. This is the most active section with still visible changes;

– the upper section of the interfluves, with the most contrasting physiognomy. The altitudes are between 400 and 700 meters, which gives the territory the quality of a hilly step, in the morphometric assemble of Romania.

The interfluves are sinuous, modelled like ridges on cone-shaped and pyramid-shaped residual peaks, above which there are isolated peaks, relicts of some older morphologic surface or of the Pleistocene sedimentation.

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